Annual Report 2022
Statewide Habitat Plan

Wyoming Game and Fish Department
May 2023

Conserving Wildlife
Serving People

Aquatic Habitat
Terrestrial Habitat
Habitat and Access Branch
Lands Administration
Communications Divison
Habitat Protection Program

MESSAGE FROM THE DIRECTOR

Quality habitat is a cornerstone of wildlife management. That's why the Wyoming Game and Fish Department invests heartily to sustain wild and healthy populations of aquatic and terrestrial wildlife. Investing in sound habitat helps us build a resilient landscape that allows wildlife to withstand the highs and lows of water availability and harsh winters. Our habitat work at Game and Fish is long-term and thoughtful, not reactionary.

Game and Fish allocated over $4.6 million in funds for habitat projects and leveraged that for over $10 million more from the Wyoming Wildlife Natural Resources Trust fund, federal government funds, state funds, private landowners and our local conservation partners. Together with partners, we allocated nearly $15 million towards habitat projects — a 51% increase compared to 2021. That's about $2.18 from external partners for every Game and Fish dollar allocated. With 800 species in the department's charge, we use each dollar in the most impactful and effective way. That's how we executed over 240 projects in 2022.

The way these funds are spent is determined by the Statewide Habitat Plan, a five-year plan guiding our work until 2025, at which time the plan will be updated. Since 2001, the SHP has remained the cornerstone of habitat management in the state. As a result, projects in this report were subject to intense scrutiny and planning. The plan directs our efforts to focus on projects that invest in the future of Wyoming's wildlife.

Game and Fish and our partners united to work for a sustained future for aquatic and terrestrial wildlife. Last year, nearly 257 stream miles required habitat improvement. The stream miles logged by Game and Fish personnel and partners exceeded the 5-year average of 175 miles. And to ensure past work was successful, Game and Fish tagged 500 fish in the Wood River to monitor their use of a newly installed fish ladder.

Battling invasives is a priority of Game and Fish. I'm incredibly proud of the work to control and prevent the spread of invasive plants, like cheatgrass, treating a notable 101,846 acres. We will keep this work going; bettering wildlife habitat is part of our long game, and these efforts take years to produce measurable results.

In this year's annual report, we profiled a crucial partner — the National Resource Conservation Service (NRCS). They play a critical role in many restoration and conservation projects throughout the state. NRCS often contributes to on-the-ground project implementation and has partnered on various aquatic and terrestrial projects. They are also a critical partner in many local collaborative efforts and have invested $16 million in the USDA-Wyoming Big Game Partnership Pilot program. This partnership has been instrumental in increasing conservation on private working lands.

Enjoy reading about the projects making a difference for Wyoming's future. Together we are making a difference for our state.

Brian Nesvik, Director, Wyoming Game and Fish Department

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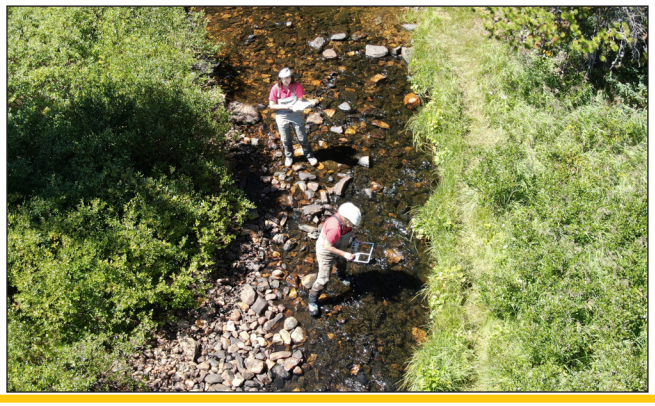
STATEWIDE HABITAT PLAN ANNUAL REPORT MISSION

The Statewide Habitat Plan (SHP) defines how the Wyoming Game and Fish Department (WGFD) will meet its mission of Conserving Wildlife, Serving People by working with external partners to conserve and improve habitat statewide and manage Wyoming Game and Fish Commission (WGFC)-owned lands. Within the WGFD, the SHP provides a road map defining how the Director's Office and all divisions will work together to accomplish habitat protection and enhancement goals. Progress to achieve these goals is tracked by the WGFD Habitat Technical Advisory Group (HTAG). A synopsis of goal progress can be found in Appendix A, SHP Implementation.

Strategy II of the SHP directs the WGFD to communicate habitat efforts and project results by developing an annual report highlighting habitat projects. This strategy will be implemented by sharing this habitat plan with the Governor's Office, state and federal agencies, private landowners, conservation districts, conservation groups and the public. The SHP Annual Report documents habitat projects executed by WGFD programs to meet SHP goals:

1) Conserve and protect crucial aquatic and terrestrial wildlife habitats.
2) Restore aquatic and terrestrial wildlife habitats.
3) Conserve, enhance and protect fish and wildlife migrations.

For additional information, please contact any of the personnel listed at the end of this document. This report can be viewed on the WGFD website.



HABITAT PROGRAM EXPENDITURES

The WGFD and partners have funded projects focused on SHP goals. The figures below (rounded to the nearest $1,000) represent the estimated totals expended on these goals during 2022. Additional information can be found in Appendix B, Habitat Program Expenditures.

WGFD funds expended on SHP goals: **$ 4,666,000**

Non-WGFD funds expended on SHP goals: **$ 10,187,000**

Total for SHP goals: **$ 14,853,000**

THANK YOU, PARTNERS!

The following lists major funding partners and approximate amounts (rounded to the nearest dollar) the WGFD spent in 2022. 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 2022 Amount	Approximate 2022 In-Kind Donation
Albany County Weed and Pest	$1,400	
Bowhunters of Wyoming	$5,675	$500
Bureau of Land Management	$1,051,490	$66,650
Bureau of Reclamation	$1,500	
Clear Creek Conservation District	$9,077	
Cody Conservation District		$4,680
Cross Charitable Foundation	$20,000	
Ducks Unlimited	$269,991	
Environmental Protection Agency	$63,681	
Fremont County Fire Protection	$29,190	
Fremont County Weed and Pest	$575	
Friends of Jackson Hole Ducks Unlimited	$45,000	
Goshen County Weed and Pest	$2,300	
Jackson Hole One Fly	$11,429	
Jackson Hole Trout Unlimited	$16,764	
Jonah Interagency Office	$5,300	
Knobloch Family Foundation	$317,586	
Laramie County Conservation District		$3,000

Funding Partner	Approximate 2022 Amount	Approximate 2022 In-Kind Donation
Mule Deer Foundation	$44,625	
Muley Fanatic Foundation	$5,000	
National Fish and Wildlife Foundation	$371,243	
National Resources Conservation Service	$1,075,833	$20,007
North American Waterfowl Conservation Act	$310,000	
Northern Great Plains Joint Venture	$5,000	
Park County Public Works Department	$5,000	$11,691
Pheasants Forever	$45,495	
Pinedale Anticline Project Office	$97,609	
Powder River Conservation District		$3,432
Private Donor	$164,047	$22,070
Private Landowner	$377,890	$21,960
Rocky Mountain Elk Foundation	$154,339	$1,000
Saratoga-Encampment-Rawlins Conservation District	$30,000	$6,926
Sheridan County Weed and Pest	$514,761	
Sublette County Conservation District	$4,547	
Teton County	$100,000	
Teton County Conservation District	$17,042	
The Nature Conservancy	$76,717	
The Trumpeter Swan Society	$1,000	
The Wyldlife Fund	$25,000	
Town of Jackson	$200,000	
Trout Unlimited	$4,900	$1,498
Ultra Resources		$36,260
US Department of Agriculture	$159,350	
US Department of Interior SO3362	$125,000	
US Fish and Wildlife Service - Boating Access	$4,057	
US Fish and Wildlife Service - Fish Passage	$553,169	
US Fish and Wildlife Service - Great Plains FHP	$15,808	
US Fish and Wildlife Service - Private Lands Program	$170,614	
US Fish and Wildlife Service - WNTI	$50,000	
US Forest Service	$197,719	$12,000
US Geological Survey	$150,000	
Volunteer In-Kind		$6,884
Water for Wildlife Foundation	$30,541	
Wyoming Department of Transportation	$11,532	
Wyoming DEQ 319	$19,055	
Wyoming Governor's Big Game License Coalition	$454,820	

Funding Partner	Approximate 2022 Amount	Approximate 2022 In-Kind Donation
Wyoming Landscape Conservation Initiative	$420,727	
Wyoming Office of State Lands and Investments	$297	
Wyoming Sportsmans Group	$7,200	
Wyoming Water Development Commission	$249,669	
Wyoming Wild Sheep Foundation	$72,417	
Wyoming Wildlife and Natural Resources Trust Board	$1,986,100	
Wyoming Wildlife Federation	$28,350	$2,000
Total	**$10,187,391**	**$220,558**
Grand Total	**$10,407,949**	

2022 PARTNER PROFILE

NATIONAL RESOURCE CONSERVATION SERVICE

WGFD hereby recognizes the National Resource Conservation Service (NRCS) for its diligent efforts to improve habitats and partner with private landowners throughout Wyoming. NRCS has been a meaningful partner on many restoration and conservation projects throughout the state and has helped accelerate the pace at which many projects are put on the ground through various farm bill funding opportunities. NRCS has partnered with WGFD on a wide range of projects including stream restoration, fish passage, invasive annual grass treatments, wildlife friendly fencing projects, rangeland treatments and grazing management.

NRCS also is a critical partner on many local collaborative efforts along with WGFD and other federal, state and county partners in communities throughout the state. NRCS shares technical expertise and serves as a connection to landowners who may otherwise not participate in conservation programs.

This year NRCS has invested $6 million in additional EQIP assistance and $10 million through ACEP in Wyoming for big game conservation through the USDA-Wyoming Big Game Partnership Pilot Program. This partnership has been instrumental in increasing our footprint of conservation work on private land.

THE DIRECTOR'S OFFICE

HABITAT PROTECTION PROGRAM

The Habitat Protection Program (HPP) coordinates project proposal and land/resource management plan reviews and recommends appropriate wildlife stipulations and mitigation strategies to protect important fish and wildlife habitats. It also is used to facilitate the implementation of Wyoming's Greater Sage-Grouse Executive Order 2019-3 (SGEO) and Wyoming's Mule Deer and Antelope Migration Corridor Executive Order 2020-1 (MCEO). HPP has six permanent, full-time employees consisting of the HPP Supervisor, four staff biologists and an office support specialist. These employees are located in Cheyenne, Lander, and Pinedale. In 2022, HPP completed 539 Wildlife Environmental Reviews (WERs) for federal, state, local

government and private sector proponents. The majority of these reviews were completed for private sector and state proponents (43% and 33%, respectively). HPP completed 172 WERs for SGEO compliance and 10 WERs for MCEO compliance. The project types most frequently reviewed by HPP were related to roadwork/fences, mining, oil and gas and linear/utilities.

TOTAL WERS		
	NUMBER OF WERS	PERCENTAGE OF TOTAL
Federal WERs	88	16%
State WERs	178	33%
Local Government WERs	39	7%
Private Sector WERs	234	43%

FISH DIVISION

AQUATIC HABITAT PROGRAM

The aquatic habitat program works to protect, restore and enhance Wyoming's water, watersheds and waterways. The program consists of 12 permanent, full-time employees: Six regional aquatic habitat biologists, a statewide fish passage coordinator, a statewide fish passage biologist, a Wyoming Landscape Conservation Initiative coordinator, an aquatic habitat program manager and assistant manager and a water management instream flow biologist. An aquatic habitat project biologist under an annual contract worked for the section in Lander. Seasonal biologist technicians assisted the section out of the Lander, Cheyenne and Casper offices.

In 2022 there were 42 on-going aquatic habitat projects involving significant funding. Tracked annually, this metric has ranged from 34 to 42 the last five years. It was a productive year with 257 stream miles seeing some sort of attention. Those miles of habitat work logged on Wyoming's rivers and creeks in 2022 outpace the five-year average of 175 miles (see Appendix F for information about how miles are summarized). As usual, stream work includes a strong mix of assessments, project implementation and monitoring. All three of these activities are vital for identifying and understanding aquatic habitat issues, implementing lasting solutions and learning whether work achieved objectives. Noteworthy, 2022 was marked by a high number of assessments (33) and designs (23) as newer biologists in Casper and Jackson collected information to understand and address impairments in regional streams. Water temperature monitoring has increased to the point where biologists are keeping a close eye on stream temperatures at 44 sites across the state. Beaver dam analog work has increased with WGFD workers joining partners to install 77 BDAs and maintain another 70. Finally, 2022 was especially successful in making it easier for fish to move around with Fish Passage and Aquatic Habitat biologists working with others to open more than 127 miles of streams, double the normal annual rate.

WYOMING LANDSCAPE CONSERVATION INITIATIVE

The Wyoming Landscape Conservation Initiative (WLCI) is a longstanding research-based effort to improve habitats at a landscape scale in southwest Wyoming. The WLCI has received more than $2 million from the BLM, USFWS, and the state to promote healthy habitats. Work in 2022 with partners produced 13 miles of wildlife friendly fence conversion, more than 3,800 acres treated for Invasive Annual Grasses (IAG), Russian olive, tamarisk and noxious weed controls, an additional 743 acres of sagebrush treatment

to thin canopy cover, installation of a bottomless, arched culvert to allow fish passage and improvements to the Muddy Creek wetlands near Baggs that added an additional 32 acres of habitat.

The WLCI granted nearly $800,000 to its partners in 2022 to conduct conservation projects. The projects include stream restoration, wildlife friendly fence conversions, IAG control and habitat improvements such as off-site watering facilities, along with aspen, juniper, and mixed mountain shrub thinning. WGFD's coordinator to WLCI administered 22 grant agreements to 10 different agencies and entities. The WLCI has approximately $300,000 for projects in 2023.

FISH PASSAGE

The WGFD fish passage program consists of two full-time personnel and one seasonal technician. It works with several internal and external teams to address fish passage needs across the state. A diverse workload includes passage inventories, entrainment sampling, fish movement evaluations, design review, grant writing, permitting, construction oversight and coordination with various engineering consultants. On average, four to six projects are started each year to remove barriers and reconnect streams.

Highlights for 2022 included installation of a corrugated fish screen at the Spread Creek diversion near Jackson. Roughly 500 fish were tagged in the Wood River to monitor their use of the new fish ladder, and many were found using it. Improvements were made at two diversions on the North Laramie River to provide better passage while a barrier was enhanced downstream to prevent invasion from nonnative species such as smallmouth bass. For a second irrigation season, several ditches were sampled in the Bear River drainage for entrainment and these fish will find more room to roam after the river was rerouted around the old City of Evanston dam, effectively removing that barrier. Rubber culvert baffles were installed in two large culverts underneath I-80 near Evanston, and more than 500 inventories of road crossings and irrigation diversions were conducted further developing the state's fish passage prioritization tool.

Fish Passage Prioritization Tool (Goals 1 and 3) - Nick Scribner, Jim Wasseen, and Erin Sobel

Since 2020 WGFD fish passage personnel have worked with the Southeast Aquatic Resources Partnership to develop a fish passage prioritization tool that came to fruition through funding from the USFWS national fish passage program. Primary goals of the tool include storing and maintaining passage inventory data, prioritizing passage projects, and communicating with our partners and public. In 2022, 514 passage inventories were completed across the state. These inventories were largely focused on road crossings, but several irrigation diversions were also surveyed. Biologists used protocols developed by the partnership through a Survey 123 application to collect various measurements in the field. The application calculates a "passability score." Data was collected on public land, within the public road ROW and where permission was granted by private landowners. Stream crossings ranged from single or multiple culverts to bridges to multiple cell bridges. Irrigation diversions were primarily rock, push-up dams. A subset of measurements collected at each crossing or diversion structure included height and width of structure, slope of the structure, length and depth of pools, stream width, outlet drop to water surface, physical barriers, substrate, water velocity and photos. Information collected from the application is uploaded to a database where the information is reviewed by partnership personnel. Reviewed data is loaded into the fish passage prioritization tool where a user can perform analysis to identify problem structures and assist with prioritization of projects. To date, 1,325 road crossings have been inventoried and 570 are likely to impact fish passage. There are 9,212 dams in the passage prioritization tool, but only a portion of those have been inventoried. Work will continue in future years to ground truth, inventory and further populate data to improve the prioritization tool.

SERVICES DIVISION

HABITAT AND ACCESS

The Habitat and Access Branch is responsible for managing WGFC-owned lands. The mission is to manage Commission lands to be the benchmark for wildlife habitat while providing public access. The Habitat and Access branch in 2022 consisted of a branch chief in Cheyenne, four regional supervisors in Lander, Cody, Pinedale and Laramie, one statewide crew supervisor in Cheyenne, four coordinators in Sheridan, Casper, Jackson, 12 biologists in Pinedale, Dubois, Lander, Yoder, Cody, Lovell, Laramie and Saratoga, and numerous seasonal employees stationed across the state.

The Habitat and Access branch manages 45 WHMAs, 200 PAAs and 22 feedgrounds consisting of approximately 500,000 acres. In addition, a statewide crew completes habitat development projects throughout Wyoming. 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.

Along with land associated with WHMAs, PAAs and feedgrounds, the branch manages and maintains 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 anglers, another 1,100 miles of road, 395 parking areas, 67 boat ramps, 28 docks, 200 outhouses and more than 10,000 signs are maintained.

Ogallala Ranch was a new PAA developed in 2022, along with the acquisition of the Ellis WHMA that will be developed in 2023. The branch also worked on other habitat development projects, including MDI, aeration, harrowing, mowing, meadow improvements, wetland developments, stream restoration, food plots, wildlife friendly fence conversions, noxious weed spraying and riparian projects. Grants provided an additional $633,021 in on-the-ground expenditures.

LANDS ADMINISTRATION BRANCH

The mission of the Lands Administration branch is to administer WGFC property rights and work with federal and state agencies, NGOs and the public to acquire and manage property rights for the benefit of wildlife conservation and public access. The Lands Administration branch administers approximately 500,000 acres of property rights including WHMAs, PAAs, conservation easements and administrative facilities. It consists of a Lands Branch Chief in Cheyenne and two Lands Coordinators located in Cheyenne and Lander. The state is divided into two Lands Administration regions with each Lands Coordinator handling four regions.

Personnel worked on numerous projects involving habitat conservation and conservation easements. A significant portion of the Lands Coordinators' time is spent monitoring conservation easements held by the WGFD to ensure the terms of the easements are not violated, and processing lease payments for the use of both public and private properties. Branch personnel also spent a significant amount of time communicating with WGFD personnel, state and federal agencies and various NGOs, including Rocky Mountain Elk Foundation and The Nature Conservancy, among others.

The 2021 Wyoming Legislature increased the Conservation Stamp fee, and required at least 85 percent of the increased revenues be used to purchase access easements or other agreements to provide public access to private property and federal and state land parcels that are inaccessible or difficult to access for hunting and fishing purposes. Since that law was implemented in July 2021, the Lands Branch has identified and

prioritized locations statewide to pursue easements or access agreements and continues to negotiate access agreements with landowners.

Buffalo and Saratoga Game Warden Station Acquisions (Goal 1) - Lands Administration Branch

The Wildlife Division established the need to replace the Game Warden stations in Buffalo and Saratoga due to their age and functionality. The Lands Branch conducted an extensive search in late 2021 and through 2022 to find properties would be suitable to replace the aging houses. This search took a considerable amount of time due to the nature of the real estate markets in Buffalo and Saratoga and the lack of inventory available for purchase. The WGFC purchased a house in Buffalo in July 2022 and a house in Saratoga in September 2022. The Lands Administration Branch will work to sell the former Game Warden stations once both houses are ready.

WILDLIFE DIVISION

STATEWIDE TERRESTRIAL HABITAT PROGRAM

The Statewide Terrestrial Habitat Program works to actively enhance Wyoming's vast array of terrestrial habitats. This Wildlife Division work unit consists of a Terrestrial Habitat Program Manager and Office Manager in Cheyenne, a Big Game Migration Coordinator in Pinedale and a Migratory Game Bird and Wetland Biologist in Lander. In addition, the Terrestrial Habitat Program works closely with regional personnel to administer grants, contracts, agreements and expenditures for all terrestrial habitat projects statewide.

During calendar year 2022, Terrestrial Habitat Program personnel were heavily involved with on-the-ground implementation, oversight or verification of expenditures on 94 projects concerning WGFD trust funds and funds granted to or from 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 $7 million towards on-the-ground expenditures for terrestrial projects.

In 2022, increased emphasis was placed on beaver restoration and wetland development with 18 beavers translocated and 244 wetland acres developed or restored. Invasive annual grasses continued to represent a significant portion of regional workloads with more than 101,846 acres treated statewide for the first time in the program's history. WGFD personnel and partners converted more than 57 miles of fence to wildlife friendly specifications in 2022. Lastly, increased emphasis and work resulted in improved wildlife passage in 2022 and future plans to add to Wyoming's growing list of migration structures intended to reduce wildlife vehicle collisions in the future.

WILDLIFE MIGRATION

The Big Game Wildlife Migration Program was created in 2019 with the establishment of a Statewide Big Game Migration Coordinator position. This created an opportunity to increase the effectiveness of the WGFD's ongoing migration work including wildlife crossings, fence modifications, vegetation improvements and other conservation practices in migratory habitat, as well as assist with the implementation of the governor's Mule Deer and Antelope Migration Corridor Protection Executive Order. Additionally, a significant number of GPS-collar research projects have been underway across the state to better understand migratory habitat selection and help prioritize conservation work. In 2022, the Wildlife Crossings and Migration Team was created by the Director's Office to bring together representatives from all the divisions and work towards a common goal of improving WGFD's effectiveness in managing fish and wildlife migrations,

utilizing federal funding opportunities and continuing to keep Wyoming at the forefront of developing the science of migration. While the majority of work in this program is focused on Goal 3 activities, many of the projects have multiple objectives and benefits to a wide variety of terrestrial and aquatic wildlife.

HABITAT PROGRAM ACCOMPLISHMENTS

Miles of stream and riparian habitat and acres of riparian and upland habitat directly impacted by habitat work in 2022 are tallied below. Additional information can be found in Appendices D and E.

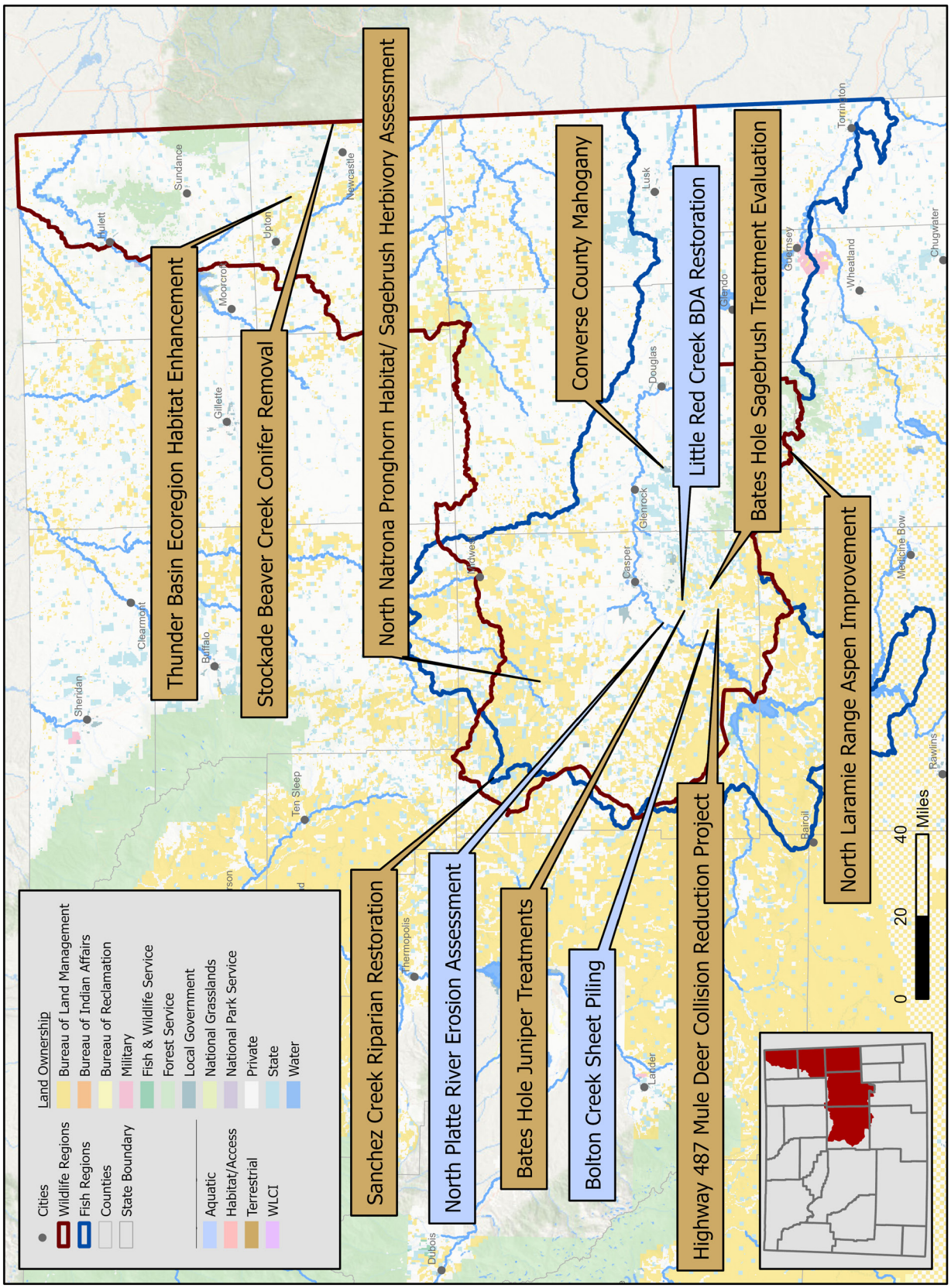
STREAM AND RIPARIAN ACTIVITY	STREAM MILES	5 YEAR AVERAGE
BDAs installed	2.4	2.2
Beaver restoration	7.6	4.1
Detailed stream assessments	11.3	5.1
Fish passage stream miles connected	127.6	68.5
Instream flow filing segments	0	5.4
Post-stream project channel/riparian monitoring	24.4	14.7
Riparian protection and management	3.0	1.7
Stream restorations or bank enhancements	1.4	3.5
Survey or design for passage or stream restoration	4.3	4.8
Watershed stream assessments	72.4	63.8
TOTAL	**254.4**	**173.8**

RIPARIAN AND UPLAND ACTIVITY	ACRES	5 YEAR AVERAGE
Aspen Rapid Habitat Assessment	2,143	4,059
Aspen, cottonwood, willow browse monitoring	5,056	2,291
Conservation easements in process and acquired	0	109
Fee title acquisition	2	1
Herbicide vegetation to thin sagebrush	743	469
Herbicide weed treatments	101,846	75,387
Livestock grazing management plans or wildlife habitat stewardship plans	236,155	137,855
Mechanical shrub treatment	2,422	1,525
Mechanical tree removal	5,653	5,143
Mowing, chopping, and Lawson aerator treatments	3,488	2,609
Noxious weed control	89,141	65,729
Post management prescription monitoring	30	31,645
Post-vegetation treatment monitoring	183,061	121,961

RIPARIAN AND UPLAND ACTIVITY	ACRES	5 YEAR AVERAGE
Pre-vegetation treatment monitoring	12,453	28,339
Prescribed burns	460	953
Rangeland Rapid Habitat Assessments	48,977	31,471
Riparian habitat protection, enhancement, and management	1	1
Riparian Rapid Habitat Assessments	1,049	735
Special Rapid Habitat Assessments	3,810	3,737
Trees or shrubs planted	113	3,644
Upland exclosure developed	2	2
Upland grass, forb, and food plot seeding	196	426
Upland habitat assessment (e.g. GIS)	16,928	30,800
Wetland development or major renovation	244	237
WGFC-managed lands farming contract	835	1,177
WGFC-managed lands food plot	200	246
WGFC-managed lands forage reserve	0	9,538
WGFC-managed lands grazed	20,126	61,016
WGFC-managed lands irrigated	1,020	2,577
WGFC-managed lands meadow mowed/ farmed	1,034	955
WGFC-managed lands noxious weed control	6,461	4,347
WGFC-managed lands prescribed burns	85	83
TOTAL	**743,732**	**629,066**

MIGRATION ACTIVITY	NUMBER	5 YEAR AVERAGE
Fish entrainment assessments	8	5
Fish movement monitoring	4	5
Fish barriers inventoried	514	167
Fish passage structures monitored	3	16
Fish passage structures installed	9	10
Fish passage structures maintained	6	11
Fish passage upstream miles connected	128	68
Wildlife crossing assessment	8	3
Wildlife crossing monitoring	3	6
Wildlife crossing structures installed and enhanced	5	9

CASPER REGION



The Casper Region spans from the plains of the North Platte River along the Laramie Range to the Black Hills across many different habitat types. Across the region, terrestrial and aquatic habitat work focused on:

- Understanding seasonal use/migrations to assist with the management and targeting future habitat treatments
- Addressing landscape permeability issues for wildlife and reducing road collisions by modifying fences to wildlife-friendly specifications and increasing the visibility of wildlife to motorists
- Removing invasive and encroaching species
- Regeneration of habitat
- Reduction of erosion
- Previous project maintenance
- Maintaining and building partner relationships

One project targeted these goals along Wyoming Highway 487, where 20 miles of chemical and mechanical shrub treatments were conducted along the highway right-of-way to increase the visibility of crossing wildlife to motorists. Maintenance for this project will be ongoing, and the number of documented wildlife-vehicle collisions will be compared before and after treatment to evaluate success.

Ongoing collaring of pronghorn (58 does total) and mule deer (68 adults) continues to inform managers of wildlife movements, seasonal habitat selection, and other invaluable data. In addition, this data will inform future habitat modification treatment priorities, fence modification, and migration corridor risk assessment across Shirley Basin and Bates Hole for both pronghorn and mule deer.

Due to the lack of historic fire regimes, conifers are encroaching in areas where more plant species beneficial to wildlife once occurred. While junipers can provide good cover, they offer poor forage for wildlife. Mechanical removal of conifers allows for increased water availability and vegetation regrowth with higher nutritional value for wildlife, especially mule deer. Across the Casper Region, conifer removal occurred on 788 acres in Bates Hole, 838 acres in the southern Bighorns, 560 acres within the Thunder Basin Grasslands, 243 acres in the Laramie Range, and 834 acres in the Black Hills. In addition, 1,110 native trees and shrubs were planted in the southern Bighorns after a steel jack fence was placed to protect over one mile of riparian habitat.

Sagebrush and true mountain mahogany work was also completed. In 2022, 120 acres of true mountain mahogany were mechanically mowed to rejuvenate both leader growth and new plant growth in Converse County Park, with 1,100 total acres treated on the project to date. This shrub is significant to mule deer during the winter as forage, so regenerating these shrubs is critical.

Several projects focused on improving riparian vegetation and reducing sediment inputs to the North Platte River. Along Bolton Creek, a tributary to the North Platte, six sheet piling structures were constructed to reduce fine sediment inputs, raise the water table, expand riparian vegetation, and encourage beaver re-colonization. In addition, beaver dam analogs were installed on Little Red Creek, contributing to the efforts to reduce sediment input to the North Platte.

This summary is just a snapshot of the many ongoing projects across the region. In addition to these projects, the Casper Region continues to excel at relationships with multiple partners and funding sources for all of its projects. From private landowners to state and federal agencies, employees work hard to have support from many different levels to ensure project completion and longevity of outcomes.

Highway 487 Mule Deer Collision Reduction (Goal 3) - Willow Bish

Landowners, WYDOT and WGFD met and identified highway crossing points used by mule deer along Wyoming Highway 487. These areas were targeted for shrub treatment within the highway ROW with the goal of reducing concealment cover for mule deer, thereby increasing driver visibility and reducing vehicle collisions on the highway. In summer 2021, approximately 180 acres of shrubs (primarily sagebrush and greasewood) along 10 miles of Highway 487 were chemically sprayed. In fall 2021, sprayed areas were mowed. These areas were re-treated in 2022 to address re-sprouts and seedlings, along with an additional ten miles of highway ROW treatment. The newly sprayed areas were mowed in fall 2022. This will require on-going maintenance for several years to ensure successful treatment. The number of documented wildlife vehicle collisions will be compared before and after treatment to evaluate success. Funding was provided by the WGFD and WWNRT.

Figure 1. Mule deer more visible when crossing treated areas of Highway 487.

Bates Hole Juniper Treatments (Goal 2) - Willow Bish

Juiper trees are encroaching into productive big sagebrush and riparian communities in Bates Hole due to the disruption of historic fire return intervals. Juniper is a native tree species to Wyoming and has value as cover for wildlife, however, disturbances such as fire restrict juniper to rocky, minimally vegetated areas where they do not place a competitive burden on more diverse communities. Outside of these sites, junipers tend to dry out soils, decrease plant diversity by competition, release compounds that inhibit other plants, change wildlife use patterns due to increased obstruction for predator viewing and provide avian predator perches. WGFD mechanically removed juniper trees from productive habitats to increase habitat quality for wildlife. About 788 acres of encroaching juniper in lower Bates Hole were lopped and scattered in 2022. Funding was provided by the WGFD and WWNRT.

Figure 2. Pre-treatment.

Figure 3. Post-treatment.

Bates Hole Sagebrush Treatment Evaluation (Goal 2) - Willow Bish

Upper Bates Hole has a long history of mountain big sagebrush treatments, including prescribed fire as well as mechanical mowing. Many of these treatments have occurred in sage-grouse core habitat and are counted as disturbance within the DDCT. Stakeholders are interested in continuing treatments. An effort was made in 2022 to evaluate the majority of past treatments, assess them for recovery and removal from the DDCT and to assist in determining future treatments. Mosaic treatments, treated with either prescribed fire or mowing, responded generally well. Sagebrush is recovering in these sites and had good leader growth and form. Additionally, sites had excellent cover and diversity of forbs and grasses. Larger, flat burned areas which congregated elk and cattle after the burn, are recovering slowly and have less herbaceous understory. Given this information, an additional 500 acres of mountain big sagebrush mosaic mowing was planned for future treatment across about 1,000 acres.

Figure 4. Mountain big sagebrush approximately 30 years post-prescribed fire.

Bolton Creek Sheet Piling (Goal 2) - John McCoy

Bolton Creek is an incised and highly erosive, seasonally intermittent and heavily degraded stream channel. The Bolton Creek Watershed Restoration project began in 2009 to improve riparian vegetation and reduce sediment transport to the North Platte River. Over the last 13 years, restoration efforts have involved beaver transplants, channel plugs, BDAs, riparian plantings and invasive species removal. In 2015, the BLM began planning a sheet piling grade control project within the watershed addressing ten sites between the Bates Hole Stock Trail Road and Bolton Creek Road. Unfortunately, due to high implementation costs, the project stalled and remained a low priority until recent years. Following negotiations with the BLM hydrologist, a cooperative agreement was created turning the project over to the WGFD to be completed. In 2022, the Casper AHAB and the Statewide Habitat and Access crew installed six structures by inserting two spans of sheet piling perpendicular to the channel encompassing the floodplain. Graded rock material and a geotextile filter fabric were placed between and downstream of the piling to protect

Figure 5. Bolton Creek Sheet Piling structure.

structures from scour. The structures will collect sediment, thereby reconnecting the channel with the floodplain. They also are expected to increase perennial flow, reduce fine sediment inputs to the

North Platte River, raise the water table, expand riparian vegetation and encourage beaver re-colonization. Prior to implementation, MIM assessment was conducted to document riparian and channel health. Funding was provided by WGFD and the BLM.

Converse County True Mountain Mahogany Rejuvenation (Goal 2) - Willow Bish

This project mechanically treats true mountain mahogany stands by mosaic mowing approximately 50% of the area within the treatment sites. True mountain mahogany is a re-sprouter, but requires a disturbance to activate this mechanism. Due to the loss of historic disturbance regimes, such as fire, many of these stands are very decadent and lack the productivity needed to sustain big game populations. With the inherent costs, risks and liabilities of conducting a prescribed fire, alternative treatment methodologies are warranted. The use of chemical treatment options, which are much less expensive, were previously trialed but did not meet the objectives of the project. Mechanical mowing was used to rejuvenate mahogany stands by stimulating new, palatable and nutritious leader growth. Using mechanical methods creates a predictable response. Because topography limits the use of heavy equipment, hand crews with brush saws conducted the mowing. Approximately 120 acres were treated in 2022 at Converse County Park south of Glenrock, with a total of 1,100 acres treated to date. WWNRT provided funding for this project.

Figure 6. Contractor hand cutting mahogany.

Little Red Creek BDA Restoration (Goal 2) - Willow Bish and John McCoy

Little Red Creek is a seasonally intermittent and incised tributary of Bates Creek that has been identified as a contributor of sediment to the North Platte River. Since the late 1990s, Little Red Creek restoration efforts have included beaver transplants, a grazing exclosure, woody debris structures, rock grade control structures, willow plantings and juniper removal. In June, WGFD installed six BDA structures along a straightened and incised reach on OSLI lands. Untreated fenceposts were driven perpendicular to the channel and juniper cuttings were woven throughout. The BDAs will improve floodplain connectivity, decrease fine sediment inputs into the North Platte River, promote riparian vegetation, increase perennial flow, raise the water table and encourage beaver re-colonization from a downstream dam complex. Longitudinal profile, cross-section and greenline surveys were conducted pre-construction and will be repeated in two and five years.

Figure 7. Weaving juniper cuttings throughout a Little Red Creek BDA.

Mountain Lion Predation and CWD in Mule Deer (Goal 3) - Justin Binfet

The overarching objective is to examine mountain lion predation and CWD dynamics within the Bates Hole / Hat Six Mule Deer Herd Unit. CWD prevalence has been steadily increasing in this mule deer herd, hovering around 29% in adult bucks over the past five years. Some potential management strategies to combat CWD such as deer density reductions and increased male harvest can be extremely controversial, so managers wanted to better understand the influence of natural predation on CWD. Selective removal of CWD-positive animals may be one of the most promising strategies to reduce density-dependent CWD transmission and environmental contamination. While past research projects suggest mountain lions may selectively prey on CWD-positive animals due to increased vulnerability, this has never been empirically measured in a formal research project. In addition, managers need to better understand the dynamics of mountain lion predation in a mule deer population with high CWD prevalence. In such a system, is lion predation an additive or compensatory source of mortality for mule deer, or is it potentially mitigating in terms of CWD transmission via the removal of CWD-positive animals? This research aims to answer this question while collecting additional information on mountain lion diet selection, mountain lion and mule deer movements, mule deer survival and cause-specific mortality and CWD dynamics. To date, we collared 68 adult mule deer, located 110 newborn fawns from collared mothers (and collared the vast majority of those) and collared 26 individual lions. Understanding mule deer movements and seasonal habitat selection also will inform future habitat treatment priorities for this MDI herd. Funding was provided by the BLM, WGFD, US Geological Survey and Knobloch Family Foundation.

Figure 8. Female mountain lion.

Figure 9. Net gunning mule deer.

North Laramie Range Aspen Improvement (Goal 2) - Willow Bish

Fire suppression and excessive herbivory have resulted in declining aspen conditions in the North Laramie Range. Conifers have encroached into many of the aspen stands, resulting in a lack of regeneration. Removal of conifers by hand with chainsaws, select coppicing of aspen and using cut conifer resources to provide protection from excessive herbivory improves aspen stands by supporting the growth of young aspens. Functional aspen stands with a diversity of age classes provide an important habitat component for many wildlife species including mule deer, elk, migratory song birds and many other game and nongame wildlife species. Aspen improvement projects occured in

the spring/summer/fall elk and mule deer seasonal ranges and will improve habitat quality in areas targeted for use during this time frame. In 2022, we removed 243 acres of encroaching conifers in and around aspen stands. Treatment methods including jackstraw (cut and leave), which helps to limit excessive herbivory by discouraging large herbivores from passing through stands, lop and scatter and cut and pile. Funding was provided by the WGFD and WWNRT.

Figure 10. Jackstrawed conifer in aspen stand.

North Natrona Pronghorn Habitat / Sagebrush Herbivory Assessment (Goal 2) - Willow Bish

Casper Region personnel are interested in evaluating the current habitat conditions of the North Natrona Pronghorn herd to determine if the population objective could be adjusted. Sagebrush leader browse levels, plant condition, and hedging class was assessed across 30 sites representing all seasonal ranges within the herd unit. Hedging class analysis revealed that 24% of the sagebrush plants were classified as low hedging class, with 40% of plants having medium hedging, and 36% of sagebrush had severe hedging. Overall, 23% of available sagebrush leaders were browsed, 30% of the plants were in poor condition which means that 30% or more of the plant appeared dead. The conclusion was that current annual herbivory was within acceptable ranges, but previous years of drought and high population levels have negatively impacted overall plant condition. Therefore, current conditions indicate it would be difficult for the herd unit to support more pronghorn.

Figure 11. Severely hedged sagebrush in the North Natrona pronghorn herd area.

North Platte River Erosion Assessment Phase 3 (Goal 2) - John McCoy

Historically, the North Platte River was wide and shallow. Throughout the 20th century a series of dams were constructed along its reaches storing irrigation water, and providing hydroelectric power and flood control. As a result, the river has narrowed and deepened, incising into the historic floodplain and now providing cold water habitat for a blue-ribbon trout fishery. The North Platte's tributaries also have adjusted to the new base elevation, incising within their degraded landscapes and coincidently increasing sediment inputs into North Platte River. These sediments accumulate in the channel, especially around islands, causing lateral scour and bank erosion. Sediment from these shifts are detrimental to salmonid spawning success.

A 15-mile reach from Sechrist boat ramp to Robinson Road Bridge was floated in late spring to conduct a semi-qualitative visual assessment iden-

tifying sediment source banks. A BANCS survey was used to identify 17 eroding banks contributing an estimated 8,000 tons (550 dump truck loads) of sediment to the river annually. Combined with erosion assessments in 2020 and 2021, a total of 121,700 tons (8,700 dump truck loads) of annual sediment source have been identified between Grey Reef Dam and Robinson Road Bridge. A restoration priority list will be established considering sediment inputs, landownership, danger to infrastructure and impact to spawning habitat.

Figure 12. Surveying a North Platte River eroding bank.

Northern Shirley Basin / Bates Hole Pronghorn Migration (Goal 3) - Justin Binfet

Within the northern Shirley Basin/Bates Hole portion of the Medicine Bow Pronghorn herd unit, the WGFD partnered with UW and Dr. Matt Kauffman to conduct a study of pronghorn movements in central Wyoming. As part of a larger six-year study to evaluate potential effects of wind energy on pronghorn, 40 does were collared in northern Shirley Basin/Bates Hole in March 2020, with additional collars being deployed in 2021 and 2022 to augment mortalities, bringing the total to 58 adult females collared. Collaring these individuals specifically works toward the objective of understanding seasonal movements between summer range in Shirley Basin and winter range in Bates Hole, and will help inform future land-use planning and conservation efforts (i.e., fence modification, migration corridor risk assessment and habitat management opportunities). Bates Hole has long been known to receive a large influx of wintering pronghorn that migrate out of Shirley Basin, with some of the highest winter densities of pronghorn known in this part of the state. WGFD wanted to better understand migratory habitat, especially given the potential for wind and solar energy expansion in this area. As an example, the WGFD recently partnered with WYDOT and local landowners to convert most of the fence along Wyoming Highway 487 from woven wire to barbed wire to facilitate these movements.

Figure 13. Pronghorn buck.

Sanchez Creek Riparian Restoration (Goal 2) - Willow Bish

WGFD constructed 14,225 feet of steel jack fence on Sanchez Creek from 2020-22. The fencing consists of three exclosures, with water gaps between each exclosure. Approximately 1,110 native trees and shrubs were planted in fall 2022 to facilitate riparian recovery.

Additionally, 838 acres of conifer removal was completed. The majority of the area had lower density, smaller trees which were lopped and scattered, but about 14 acres were cut and piled due to higher tree density, tree size and proximity to an access road. The landowner will burn these piles when conditions are appropriate. About half of the conifer treatment occurred on BLM land, and half on private land. This effort was funded by the WGFD, WWNRT and US Department of Agriculture.

Figure 14. Pre-treatment conifer removal.

Figure 15. Post-treatment conifer removal.

Stockade Beaver Conifer Removal (Goal 2) - Todd Caltrider

Stockade Beaver Creek is a large drainage in Weston County that runs north-to-south from the Black Hills to the prairie near the Wyoming/South Dakota border. This area serves as a major migration route for mule deer traveling between winter range and 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, 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 WSF to set back succession and create early seral habitats. To accomplish this, WGFD worked with landowners and WSF to thin areas dominated by juniper and ponderosa pine to promote more herbaceous and browse habitat for mule deer. In addition to conifer removal, WGFD also is mowing stands of decadent and mature true mountain mahogany to increase leader growth and production. Phase I of this project was completed in 2018, where 492 acres of conifer removal/thinning and mahogany mastication occurred on a mixture of private and State of Wyoming trust

Figure 16. Masticator removing conifers in Stockade Beaver Creek.

land. Phase II started spring 2019, and was completed winter 2022. A total of 834 acres of conifer removal/thinning has been completed. Funding was provided by WWNRT.

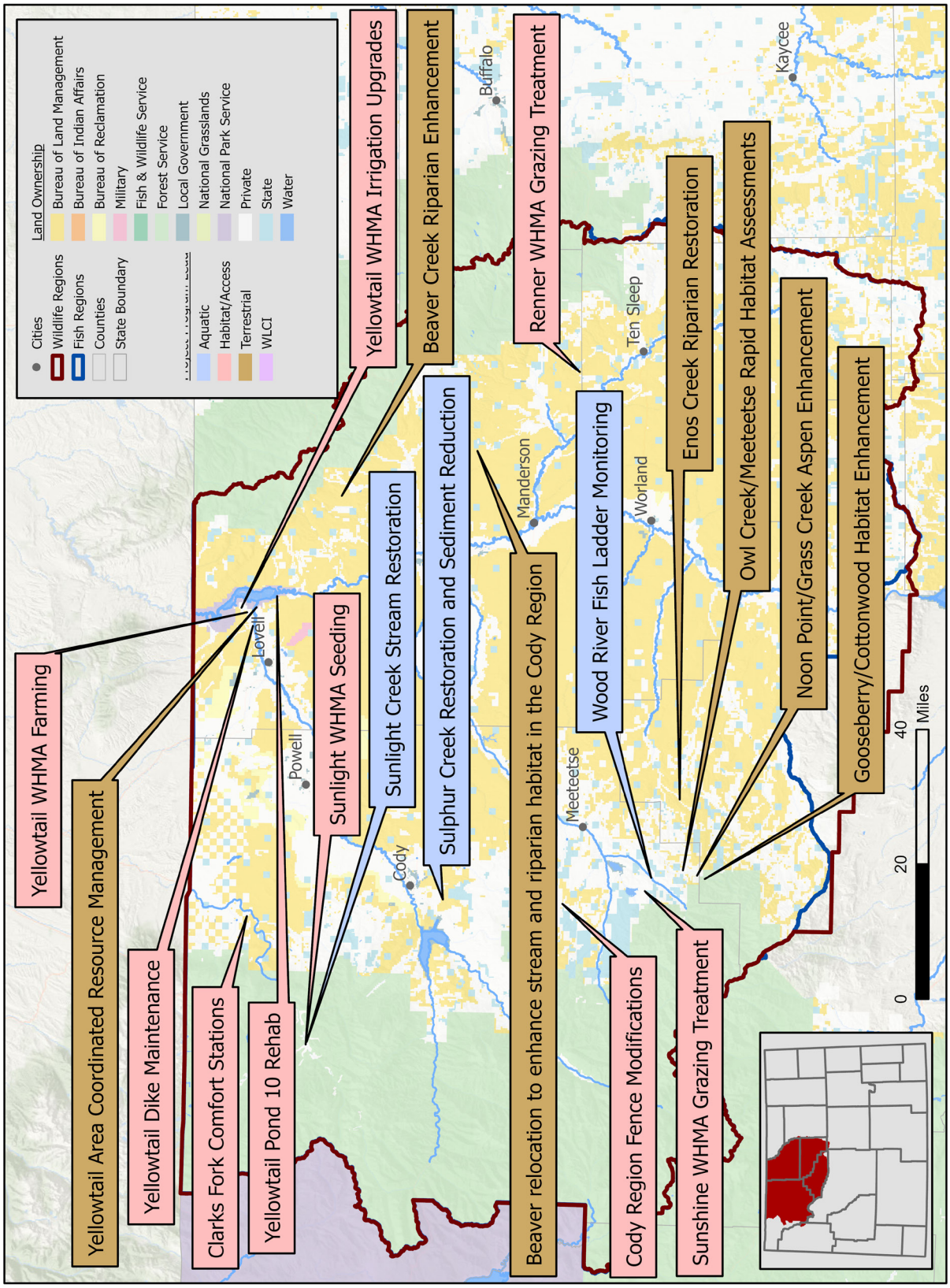
Thunder Basin Habitat Improvement (Goal 2) - Willow Bish

Habitat needs for greater sage-grouse, mule deer, pronghorn and other associated species are being addressed within the Thunder Basin area by removing encroaching juniper, modifying fences to wildlife friendly specifications, enhancing green areas in ephemeral and upland habitats and developing and implementing livestock grazing management plans. In 2022, 560 acres of juniper were removed from ponderosa pine and sagebrush/grasslands in the Clay Spur area within the Thunder Basin National Grasslands. This builds upon previous efforts within this area.The remaining components of this project will be completed in 2023, however, partners will continue to work in this area.

This is a collaborative project involving the Thunder Basin Grasslands Prairie Ecosystem Association, WGFD and the Thunder Basin Grazing Association among others. These projects have been developed in collaboration with other management entities in the ecoregion and they contribute to several high-priority conservation needs. Funding for this effort was provided by MDF, WGBGLC, WWNRT and the WGFD.

Figure 17. Cut and pile juniper removal.

CODY REGION


Yellowtail WHMA Farming
Yellowtail Area Coordinated Resource Management
Yellowtail Dike Maintenance
Clarks Fork Comfort Stations
Yellowtail Pond 10 Rehab
Sunlight WHMA Seeding
Sunlight Creek Stream Restoration
Sulphur Creek Restoration and Sediment Reduction
Yellowtail WHMA Irrigation Upgrades
Beaver Creek Riparian Enhancement
Beaver relocation to enhance stream and riparian habitat in the Cody Region
Renner WHMA Grazing Treatment
Wood River Fish Ladder Monitoring
Cody Region Fence Modifications
Sunshine WHMA Grazing Treatment
Enos Creek Riparian Restoration
Owl Creek/Meeteetse Rapid Habitat Assessments
Noon Point/Grass Creek Aspen Enhancement
Gooseberry/Cottonwood Habitat Enhancement
Land Ownership
Bureau of Land Management
Bureau of Indian Affairs
Bureau of Reclamation
Military
Fish & Wildlife Service
Forest Service
Local Government
National Grasslands
National Park Service
Private
State
Water
Cities
Wildlife Regions
Fish Regions
Counties
State Boundary
Aquatic
Habitat/Access
Terrestrial
WLCI
Lovell
Powell
Cody
Meeteetse
Manderson
Worland
Ten Sleep
Buffalo
Kaycee
0
20
40
Miles

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.

In 2022, habitat enhancement efforts within the region focused on enhancing riparian areas and improving wildlife habitats throughout the Big Horn Basin that have been degraded by fire, invasive weed species or encroachment of conifers. A key component to habitat enhancement efforts within the region is the use of beaver translocation. This year, a total of 24 beavers were trapped and relocated to various locations including the Shoshone River, Enos Creek, Buckskin Ed Creek, Middle Paintrock Creek and Porcupine Creek.

Habitat enhancement efforts include:

- Grass Creek Aspen Enhancement, removal of encroaching conifer
- Gooseberry/Cottonwood Habitat Enhancement, removal of encroaching conifer
- Enos Creek Riparian Restoration, install beaver dam analogs
- Beaver Creek Riparian Enhancement, removal of encroaching juniper
- Sulphur Creek floodplain and riparian restoration, install beaver dam analogs and protective exclosure in riparian area
- Wood River fish ladder, monitoring upstream passage of fish
- Meeteetse moose project, research project to explore how habitat condition, thermal landscape, predator and human activities influence moose

WGFD manages five WHMAs within the Big Horn Basin that provide crucial habitat for wildlife and 49 public access areas. Improvements and maintenance to infrastructure and habitats on these areas continues to be a strong focus. Overall, seven miles of road maintenance and improvements occurred on WMHAs in the Bighorn Basin, 2000 acres of noxious weeds were treated, four miles of fence were modified to be wildlife friendly and 115 miles of fence were maintained to reduce trespass livestock.

Habitat enhancement efforts associated with WHMAs include:

- Sunlight WHMA: Sunlight Creek riparian restoration and willow planting, 60 irrigated acres were reseeded.
- Renner and Sunshine WHMA grazing treatments were conducted to stimulate plant growth for wintering wildlife and a seeding trail on Sunshine WHMA.
- Yellowtail WHMA: Pond 10 rehabilitation, dike maintenance, Big Fork wildfire restoration, farming to maintain permanent cover or food plots, grazing treatments and irrigation canal maintenance and upgrades.

Beaver Creek Riparian Enhancement Phase II (Goal 2) - Sam Stephens

In June 2022, 87 acres of riparian habitat that was moderate-heavily encroached with juniper was treated. This project enhanced this important riparian corridor which will allow for increased plant and assocated wildlife species diversity. This included 34 acres that were lop and scattered and 53 acres of slash piling which will be burned in winter 2022-23. Funding was provided by RMEF and WGFD.

Figure 18. Beaver dam on Beaver Creek discovered after riparian enhancements occurred.

Beaver Translocations for Stream and Riparian Restoration (Goal 2) - Jerry Altermatt

Between June 9 and October 13, 2022, 24 beavers were trapped and relocated within the Cody Region. Beavers were trapped using Hancock and Comstock traps and snares by WGFD personnel from seven different locations where they were causing problems on private or WGFD-managed lands. Beavers were relocated to Shoshone River, Buckskin Ed Creek, Middle Paintrock Creek, Porcupine Creek and Enos Creek for stream and riparian restoration. Beavers were held in trailer-mounted holding facilities until the time of release, with holding time ranging from 1 to 13 days. All beavers were weighed to determine an approximate age.

Figure 19. Family of beavers in a trailer-mounted holding facility.

Shoshone River: Two adults were trapped from the Big Fork Ditch on the Yellowtail WHMA and released on the Shoshone River. This translocation was conducted solely for the purpose of removing a potential hazard to the canal rather than for habitat restoration.

Buckskin Ed Creek: On August 22 a family of two adults, two yearlings and two kits were released on Buckskin Ed Creek in the Bighorn National Forest. A new complex of dams was discovered in October within 0.5 miles downstream of the release site (Figure 2).

Middle Paintrock Creek: On September 6 a family of two adults and one sub-adult were released on Middle Paintrock Creek in the Bighorn National Forest. No dam building activity was observed before snows prohibited visiting the site.

Porcupine Creek: On September 22 and September 30 one family of two adults and one yearling and another family of two adults, one yearling and four kits were released at two locations of Porcupine Creek in the Bighorn National Forest. No

dam building activity was observed before snows prohibited visiting the site.

Enos Creek: On October 10 and October 13 a family of one adult and two kits and another unrelated adult were released in Enos Creek on private lands. This release site was within an area where 48 BDAs were constructed one week earlier. The area was not searched for new dam construction in 2022.

A second mobile beaver holding facility was added to the program in 2022. The fabrication of the aluminum structure and the trailer upon which it is mounted was made possible by a private donation. The addition of the trailer enabled nearly twice as many beavers to be translocated as in previous years. Additionally, funding for the design and construction of a permanent facility capable of holding up to four beaver families was secured. The facility will be constructed at the newly-acquired Cody Regional Office property in 2023. These efforts have been made possible by a generous, private donation.

Figure 20. Newly constructed dam on Buckskin Ed Creek.

Clarks Fork PAA Comfort Stations (Goal 1) - Brad Sorensen, Craig Swanson and Kade Clark

Two new CXT-type single vault comfort stations and ADA pads were installed on two separate PAAs on the Clarks Fork River. The new comfort stations replaced obsolete wooden structures became become dilapidated over the years.

Figure 21. Comfort station.

Cody Region Fence Modifications (Goal 1) - Brad Sorensen and Craig Swanson

In 2022, approximately four miles of fence was modified to wildlife friendly at four separate areas. Wildlife friendly fence modifications are necessary to eliminate entanglement and allow movement into and out of WHMAs and PAAs. Some fences were completely removed to allow wildlife to migrate without hazards.

Cody Region Noxious Weed Control (Goal 1) - Brad Sorensen, Craig Swanson and Eric Shorma

Approximately 2,000 acres of invasive plants were treated by Cody Region Habitat and Access personnel and local Weed and Pest Districts on WGFC-managed properties. These invasives are treated using chemical, mechanical and biological methods. Controlling noxious plants will enhance habitat while allowing native plants to thrive.

Figure 22. Invasive plant treatment.

Cody Region PAA Road / Parking Area Upgrades (Goal 1) - Brad Sorensen, Craig Swanson, Eric Shorma, Kade Clark, Mac Foos and Rick Harmelink

Various PAAs within the Cody Region received road upgrades in 2022. Approximately 2,000 cubic yards of gravel was hauled, spread and bladed at two different access areas. Funding for this effort was provided by the BLM and WGFD.

PAA Maintenance and Upgrades (Goal 1) - Brad Sorensen, Craig Swanson and Eric Shorma

PAAs serve as critical recreational areas for the general public and sportsmen alike. Yearly maintenance and upgrades are necessary to preserve these habitats. Yearly upgrades include: treating noxious weeds, adding gravel and blading roads, installing new cattle guards, replacing dilapidated fences and replacing signs.

Figure 23. Skeleton boat ramp.

Cody Region Annual WHMA Maintenance (Goal 1) - Brad Sorensen, Craig Swanson and Eric Shorma

Approximately seven miles of road maintenance and improvements continued on the five WHMAs in the Cody Region in 2022. The Sunlight, Yellowtail and Medicine Lodge WHMAs received annual fence maintenance on a total of 70 miles to reduce trespass livestock. The Sunshine and Renner WHMAs received annual fence maintenance on a total of 45 miles of stock fence by lessee. About 1,486 acres of irrigation water rights were spread on the Yellowtail, Renner, Medicine Lodge and Sunlight WHMAs. Annual parking lot and road maintenance was performed. More than 57,000 acres of WGFC-managed property rights were monitored. Approximately 2,000 acres of noxious weeds were treated by WGFD personnel and contract applicators.

CWD and Declining Mule Deer: 2022 Update (Goal 3) - Sam Stephens and Bart Kroger

CWD has reached high levels (16-18%) in mule deer in the southeast Bighorn Basin. Effective management of this disease requires adequate baseline data to design prescriptive management strategies and monitor the impacts of management. Our on-going research aims to collect this baseline data for two mule deer herd units (Paintrock and Southwest Bighorns) in the Bighorn Basin by GPS collaring (n=100) adult female mule deer for a three-year period. This will enable managers to monitor population-level vital rates and seasonal range use. Additionally this data will help managers better define herd-unit boundaries and determine what level of interchange between neighboring herd units could be contributing to CWD transmission. Lastly, maintaining a robust sample of marked individuals will help managers understand harvest rates of adult females for each herd unit.

In December 2022 an additional 100 GPS collars were deployed in Mule Deer Hunt Areas 41, 47, 37 and 164. At the end of 2022 the sample size stands at 67 and 59 GPS-collared adult females in the Paintrock and Southwest Bighorns Mule Deer Herds, respectively. Funding was provided by the BLM, MDF, WGBGLC, and Wyoming Wildlife Federation.

Enos Creek Riparian Restoration (Goal 2) - Jerry Altermatt

Riparian habitats are disproportionately important relative to their availability on the landscape. These diverse habitats provide valuable forage and cover for a multitude of wildlife species. Beaver play an important role in enhancing and maintaining these important habitats by capturing sediment, aggrading channel beds, raising water tables, reconnecting streams with their floodplains and ultimately expanding riparian areas.

Enos Creek is a second order tributary of Gooseberry Creek. Much of the stream has down-cut, and there is evidence of a lowered water table resulting in conversion of riparian vegetation to upland vegetation within the historic floodplain. Riparian shrub species, primarily willow, are present but the extent and distribution appear to be below potential. Several translocations of beaver into Enos Creek were made in 2020 and 2021 but no dams have been documented. The reason for the failure to establish was assumed to be due to the lack of deep pool habitat to retain beavers immediately after translocation.

Figure 24. Installation of a BDA on Enos Creek.

In October 2022, Anabranch Solutions, a private contractor from Utah, installed 48 BDAs in three locations on Enos Creek. BDA installation utilized sagebrush and juniper branches re-enforced with sharpened wood posts driven into the stream bed. On average, each BDA raised the water level 1-1.5 feet and backed up water for 100 feet. Three beavers were translocated to the site shortly after completion. More translocations will occur in fall 2023. This is part of a multiple phase project that will include steel jack fencing and cottonwood/willow planting in 2023 and 2024. Funding was provided by WGFD, WWNRT and WGBGLC.

Gooseberry/Cottonwood Habitat Enhancement III (Goal 2) - Jerry Altermatt

In October 2022 a private contractor removed conifers from 150 acres of aspen in the upper reaches of Gooseberry Creek on the Shoshone National Forest. Conifers were lopped and scattered in preparation for broadcast burning in 2023 or 2024. The project is part of a multi-year effort that will eventually mechanically treat and burn over 300 acres of aspen communities and 2,400 acres of conifer-encroached sagebrush steppe. The project is located within the Owl Creek/Meeteetse mule deer herd unit, a priority herd under the MDI, and addresses the issue of aspen decline as identified during collaborative public input. This effort was funded by the USFS and WGFD.

Figure 25. A sawyer lops and scatters conifers in an aspen stand.

Meeteetse Moose Project (Goal 3) - Corey Class and Bart Kroger

Though moose at the southern end of their range have only come onto the scene in the past 150 years, they have become an iconic and revered species in this short time. Yet, over the last two decades nearly half of the moose populations in their southern extent have declined. These declines are sobering because conditions, in Wyoming, may be a warning of what moose throughout their range will face as the climate warms. Many factors can influence moose populations, including predation, disease, climate and foraging opportunities. Despite widespread interest in moose conservation, the complexities of how moose are influenced by their environment makes for a challenging assessment of efforts needed to bolster moose populations.

The Wood River and surrounding region is home to diverse wildlife and relatively intact habitats. WGFD is exploring how habitat conditions, the thermal landscape, predators and human activity influence behavior, reproduction and survival. From winter 2020 to spring 2023 WGFD will track 30 moose to monitor their behavior, reproduction and survival. Each GPS collar fit on a female moose is equipped with a camera. Using the newest innovations in camera-collar technology, we are not only observing moose behavior from a whole new perspective but gaining insight into foraging ecology and maternal behavior. Perhaps equally as important, the footage is yielding incredible opportunities for outreach and engagement to connect a diverse public with moose and communicate their current state. Part of our work aims to untangle how mom's traits impact her ability to keep a calf alive. Starting in mid-May, when moose begin giving birth, we track females to see if they have a live calf and continue to monitor survival throughout the rest of the summer. With this detailed information about calf survival, we can better understand what makes a moose successful in raising young.

We are focusing a portion of our efforts on the

ecology of male moose. Females are often the target of research because of their strong influence on population growth, leaving the ecology of males overlooked. Understanding male moose interactions with their environment is critical to advancing management of the species. Finally, many of the habitats of the Wood River and surrounding areas are not necessarily considered ideal for moose, yet animals scrape out a living in these unexpected areas. We are exploring how moose seek available food and thermal refuge in such diverse habitats, including riparian, agricultural, and montane areas. Funding was provided by private landowners and WGBGLC.

Noon Point / Grass Creek Aspen Enhancement (Goal 2) - Jerry Altermatt

Fire suppression has allowed conifers to establish themselves in aspen, sagebrush steppe and riparian habitat in many areas of Wyoming. These communities have historically supported diverse communities of forbs, grasses and shrubs that provide high-quality habitat for wildlife, promote rangeland health and soil productivity, improve water quality and reduce erosion. They also are are an important source of forage for elk, deer and moose. The values of these communities are reduced when conifers establish and shade-out desirable species, reduce soil moisture through transpiration and adversely lower soil pH values. Floral and faunal diversity in aspen stands are the second-highest habitat types (after riparian habitat) in Wyoming.

Aspen are a sub-climax species that require natural or man-made disturbance to persist. Along the Absaroka Front, Wyoming, a lack of natural disturbance such as caused by fire has led to conifer encroachment. As a result, aspen have declined in spatial extent or have been totally lost.

In October 2022, Summitt Forests, a private contractor from Oregon, treated 236 acres of aspen on private, state and BLM lands in the Noon Point and Grass Creek areas south of Meeteetse. Conifers up to 13 inch DBH within aspen stands were felled with chainsaws, lopped and scattered. An additional 240 acres will be treated in the Noon Point area in 2023. Removing conifers will maintain aspen communities, and the slash from the lop and scatter prescription will protect new aspen suckers from browsing. This effort was funded by the BLM, RMEF, WGBGLC, WWNRT and WGFD.

Figure 26. Sawyers lopping and scattering conifers.

Owl Creek / Meeteetse RHAs (Goal 2) - Jerry Altermatt

RHAs are conducted annually across the state to assess condition of seasonal mule deer habitats. These data are used to inform decisions on population objectives at each five-year review. In 2022, 15 aspen, 5 riparian and 5 rangeland assessments were conducted.

Renner WHMA Grazing Treatment (Goal 1) - Brad Sorensen

A spring/summer/fall grazing treatment was conducted on the Renner WHMA in 2022. 383 AUMs were utilized for approximately five months in a high intensity short duration approach on a rotational schedule through the eight pastures. This treatment will reduce litter and stimulate new plant growth on the WHMA.

Sulphur Creek Floodplain and Riparian Area Restoration (Goal 2) - Jerry Altermatt and Laura Burckhardt

Sulphur Creek is a tributary to the Lower Shoshone River, which flows through Cody. The Shoshone River Partners (formerly Willwood Working Group #3), identified the Sulphur Creek watershed as a high priority for restoration due to the high sediment load that is produced as a result of highly erodible soils in portions of the watershed, land disturbances and variable flow regimes influenced by irrigation. During irrigation season (April-October), 1,720 tons (147 dump truck loads) of sediment leaves Sulphur Creek, impacting recreation and aquatic habitat in the Shoshone River.

In an effort to restore Sulphur Creek back to its original floodplain and enhance the riparian vegetation, a phased approach was adopted consisting of 1) BDAs in conjunction with riparian exclosure fencings, 2) Russian olive removal and woody riparian plantings, and 3) road-crossing hardening and repair. In 2022 the first phase was completed with the construction of 12 BDAs over 1,582 linear feet of stream channel. In conjunction with the BDA construction, a riparian protective exclosure was installed around 0.5 miles of Sulphur Creek to exclude cattle from grazing within the riparian area. Upon completion of riparian area restoration, the goal is to reintroduce beavers to Sulphur Creek. This restoration is key for providing important habitat for mule deer, antelope, sage grouse and various avian species. The restoration also will help eliminate bank erosion and result in a sediment load reduction to the Lower Shoshone River, which is an important blue-ribbon trout fishery that is currently limited by sedimentation of spawning gravels. This effort was funded by the BLM, TU, WGFD, Cody Conservation District, Cross Charitable Foundation and made possible by volunteers.

Figure 27. Sulphur Creek BDAs and riparian fence.

Sunlight Creek Riparian Restoration (Goal 2) - Laura Burckhardt, Kade Clark, Mac Foos, Rick Harmelink and Todd Grosskopf

In 2022 the WGFD planted woody vegetation within a 25-acre riparian area meeting the goal of establishing resilient, woody vegetation along stream channels and floodplain areas within the Sunlight Creek stream restoration area. In 2022, 7,850 willows were planted bringing the total planted to more than 30,000 willows. Planted willows are averaging a 70% survival rate. Due to the elevation of the site (7,000 feet), willows are expected to grow to maturity within 10 years. The willows will foster channel stability, wildlife forage and cover and improve aesthetics. Funding was provided by WGBGLC and WGFD.

Sunlight WHMA Seeding (Goals 1 and 2) - Brad Sorensen and Craig Swanson

Approximately 60 acres of irrigated land was treated and re-seeded with Timothy, Biscuitroot, Winterfat, Bluegrass, Fescue, Junegrass, Wheatgrass and Sticky Geranium in spring 2022.

Sunshine Seeding Trial (Goal 1) - Jerry Altermatt, Craig Swanson and Eric Maichak

Within the Greater Yellowstone Ecoregion of the Cody Region, brucellosis and CWD continue to challenge wildlife, livestock and managers. Our goal is to determine if a dryland mix of forbs and

grasses will establish on a variety of sites as a potential tool to distribute elk and deer and help mitigate disease transmission and prevalence.

In July wildlife disease, terrestrial habitat and habitat and access personnel collected pre-treatment species composition and set wooden posts for electric perimeters to exclude livestock from test plots at Sunshine WHMA. Plots were distributed among aspects of all cardinal directions and one previously irrigated site, and included transects for non-treated and future-treated areas within plots. Shannon-Weiner diversity indices ranged from a low of 0.56 on an east-facing crested wheat monoculture, to a high of 2.37 on a north-facing ridge with copious forb species. This pre-treatment data will allow managers to understand site diversity pre- and post-treatment. Treatment of the past-irrigated plot with glyphosate and seeding of all plots is scheduled for summer 2023.

Sunshine WHMA Grazing Treatment (Goal 1) - Brad Sorensen

A spring/summer/fall grazing treatment was conducted on the Sunshine WHMA in 2022. A total of 1,153 AUMs were utilized for approximately five months in a high intensity short duration approach on a rotational schedule through the four pastures. This treatment will reduce litter and stimulate growth on the WHMA for wintering wildlife.

Wood River Fish Ladder (Goal 3) - Nick Scribner and Erin Leonetti

The Wood River Supply Diversion to Lower Sunshine Reservoir is located on the Wood River west of Meeteetse in Park County. The diversion is approximately 14 miles upstream of the Greybull River confluence and diverts irrigation water for storage in Lower Sunshine Reservoir. A fish ladder constructed on the dam was completed in December 2021. Fish Passage personnel monitored upstream passage for the first year in 2022 to evaluate fish movement through the Wood River fish ladder. Biologists captured fish from May through July using backpack electrofishing. Fish were measured, weighed and had a PIT tag inserted into their abdomen with a unique identification number. A total of 476 fish were tagged; 431 Yellowstone cutthroat trout, 39 Mountain whitefish and six Mountain sucker. Two antenna stations were established at the entrance (Antenna 1) and exit (Antenna 2) to record fish movement and direction through the ladder.

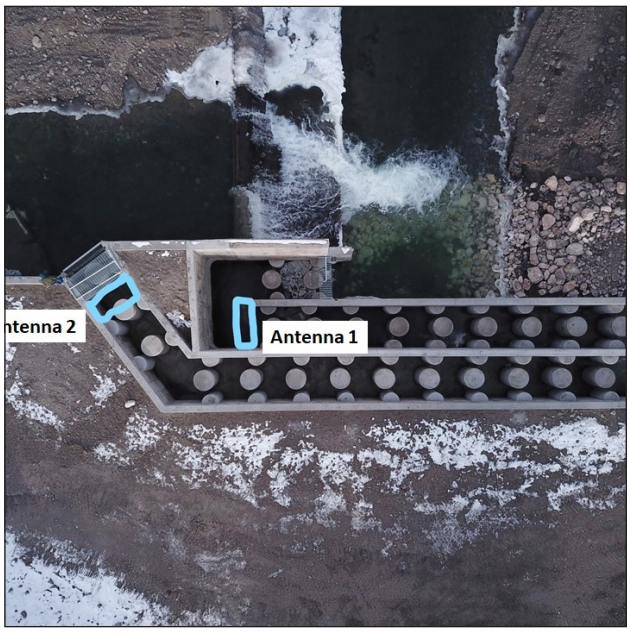


Figure 28. The Wood River fish ladder showing antenna locations at the entrance and exit to monitor fish movements.

Fish ranging from 6 to 21 inches long moved through the ladder. Antenna 1 had 140 detections and Antenna 2 had 118 detections. Most fish movement occurred during June, likely spawning movements. Overall, there was a 74% success rate of upstream passage. Not only were Yellowstone cutthroat trout moving through the fish ladder, but one Mountain suckers also successfully moved upstream. Providing upstream passage past the Wood River Supply Diversion gives fish more than 50 miles of habitat to occupy. Fish ladder monitoring will continue in 2023.

Big Fork Wildfire Restoration (Goals 1 and 2) - Jerry Altermatt

On April 27, 2013, the Big Fork Fire burned more than 1,500 acres on the Yellowtail Area Coordinated Resource Management Area, 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, burned with high intensity and prolonged heat, causing severe fire effects. This has 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 2022, more than 400 acres of the Shoshone River riparian area were treated with herbicide via backpack sprayers to reduce or eliminate Russian olive and tamarisk re-sprouts and seedlings. Funding was provided by WGBGLC and WGFD.

Figure 29. Backpack spraying to control Russian olive.

Yellowtail WHMA Dike Maintenance (Goal 1) - Brad Sorensen and Eric Shorma

The Yellowtail WHMA contains approximately 12 dikes within its wetland complexes that require yearly maintenance. Woody vegetation removal is required to maintain these dikes. Annual mowing, blading and some chainsaw work is required to stay within the Safety of Dams Act.

Yellowtail Pond 10 Rehab (Goal 2) - Brad Sorensen, Eric Shorma and Daniel McGillivray

A dilapidated pond was rehabilitated to allow water to pass through and fill up two separate ponds. This pond had silted in from the lake rising in past years. Agri-drains were installed and approximately 1,000 cubic yards of sediment was removed. A concrete diversion box was installed and level ditching occurred to allow water to fill Pond 10 and Pond 7. Funding was provided by WGFD and a private donor.

Figure 30. Installing a concrete diversion box.

Yellowtail WHMA Farming (Goal 1) - Brad Sorensen and Eric Shorma

The Yellowtail WHMA has approximately 137 acres that are farmed and irrigated for permanent cover or food plots. A variety of milo, millet and oats were planted for food plots on three fields. These food plots benefit waterfowl, pheasants, wild turkeys and deer by providing cover and a

food source. These fields also provide hunting and wildlife viewing opportunities for the large number of recreationalists that utilize the WHMA.

Figure 31. Yellowtail WHMA.

Yellowtail WHMA Farming Leases (Goal 1) - Brad Sorensen and Eric Shorma

Two separate farming leases were utilized to provide food plots and permanent cover for wildlife on 1,200 acres. These lessees are responsible for irrigation, farming, seeding and harvesting of the crops of these fields. Ten percent of each field is left standing for wildlife to utilize into the fall and winter months.

Figure 32. Food plots on the Yellowtail WHMA.

Yellowtail WHMA Grazing Treatment (Goal 1) - Brad Sorensen and Eric Shorma

A fall grazing treatment was conducted on the Yellowtail WHMA in 2022. Cattle were utilized for approximately two months in a high-intensity, short-duration approach on a rotational schedule through the WHMA. This treatment will reduce litter and stimulate growth on the WHMA while cleaning up ditch banks in areas where burning is not possible.

Yellowtail WHMA Irrigation Canal Maintenance (Goal 1) - Brad Sorensen, Eric Shorma and Mac Foos

More than 14 miles of irrigation canals were cleaned of sediment deposits and debris. The Big Fork Canal supplies water to more than 600 irrigated acres on the Yellowtail WHMA. Irrigated food plots provide forage and dense nesting cover for migrating waterfowl, upland game birds and big game.

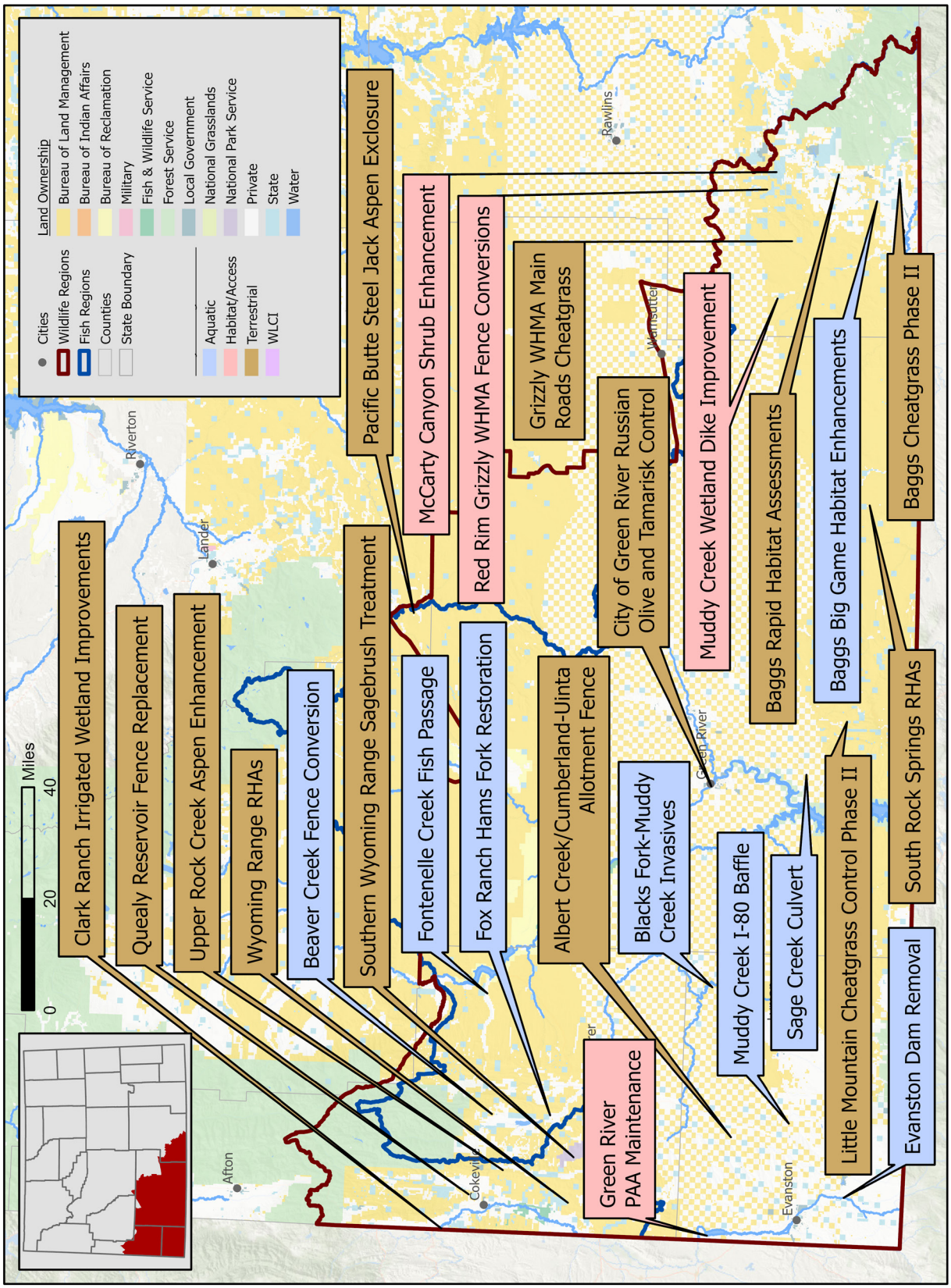
Figure 33. Yellowtail food plot.

Yellowtail WHMA Irrigation Upgrades (Goal 1) - Brad Sorensen, Craig Swanson and Eric Shorma

Irrigation is a critical part of maintaining and improving wildlife habitat on the Yellowtail WHMA. Yearly maintenance and upgrades are necessary to facilitate the most efficient use of irrigation water. In 2022, Habitat and Access personnel installed one new canal check in the Big Fork Canal and installed approximately 400 feet of gated pipe on the Poison Springs field.

Figure 34. Irrigated field on Yellowtail WHMA.

GREEN RIVER REGION



The strategic habitat efforts and accomplishments achieved during the 2022 field season in the Green River Region were guided by a commitment to projects on a landscape-level, in multi-year phases, and projects completed via collaboration with state, county and federal partners, as well as private landowners and non-governmental agencies. Habitat improvement projects focused on enhancing habitat for big game, beaver and sage grouse and improving fish passage throughout the region.

Projects included:

- Maintaining an improving fish passage and spawning
- Maintaining and improving Public Access Areas
- Control of invasive species (cheatgrass, tamarisk, Russian olive, knapweed, pepperweed, thistle)
- Improving fish passage by eliminating barriers to movement
- Replacing woven-wire fencing with wildlife friendly fencing
- Stream stabilization and wetland improvement

Focal areas continue to be delineated through priorities defined within the SHP, priority areas established by the WLCI Local Project Development Teams, the Wyoming Range and Baggs MDIs, and plans developed by the Southwest and South-Central Sage-Grouse Local Working Groups.

Monitoring activities focused on habitats within MDI herd units (Wyoming Range and Baggs Deer within the Green River Region), with a significant number of RHAs completed. Biologists also continued to monitor aspen, mountain shrub and cottonwood communities using the Live-Dead Index. Sagebrush, aquatic and terrestrial habitat health assessments were also conducted. Habitat and Access employees continued to maintain and treat noxious weeds, enhance public facilities and access points in the region.

Personnel in the Green River Region continue to focus a significant amount of time on public outreach about the importance of habitat to our vast wildlife resources via one-on-one contacts, various formal meetings and open houses, and with regional newsletters and web postings and WGFD social media events.

A 2022 highlight for the Green River region and the lands administration branch was securing a 30 year access agreement for the Bear River Divide Hunter Management Area in Uinta and Lincoln counties. This agreement ensures public access to over 91,000 acres of land for the next 30 years.

Albert Creek / Cumberland-Uinta Wildlife Friendly Fence (Goal 2) - Kevin Spence

The BLM led a two-phased effort to convert a 12.7-mile woven-wire sheep fence that divided the Albert Creek and Uinta/Cumberland Grazing Allotments east of the Bear River Divide. Every spring significant numbers of mule deer and pronghorn were found tangled and dead within this fence. This area is crucial winter range for both species, and the fence was impeding their migration between seasonal ranges. Net-wire fence was replaced with a 4-wire, (three barbed; bottom smooth) fence with spacing to wildlife friendly specifications. Fence modification also reduces potential for sage grouse collisions in core habitat. The fence is located near the southern boundary of the Wyoming Range Mule Deer Herd Unit, and deer movement to this area is variable depending on winter severity. Deer migrating from the north are often forced to rely on this area as snow depths in other winter range complexes become too deep for survival. WGFD and NFWF funding was used in conjunction with the BLM in 2022 in completing the second phase of fence totaling 3.5 miles.

Figure 35. Three-and-a-half miles of woven-wire fence converted to improve passage of mule deer and pronghorn.

Baggs Big Game Habitat Enhancements (Goals 2 and 3) - Jim Wasseen

This is a long-term effort (since 2018) to improve habitat for mule deer, pronghorn and sage grouse through a variety of habitat manipulations. Activities include juniper and mixed mountain shrub mastication and applying tebuthiuron to mountain big sagebrush. The project area includes multiple locations around Baggs.

The juniper mastication treatments targeted 289 acres of juniper encroachment into high-value sagebrush habitat on crucial winter ranges for mule deer, pronghorn and occupied sage grouse and core habitats. The treatments are expected to increase forage production of herbaceous species and reduce threats to sage grouse. Sage grouse avoid areas with tall objects (trees, cliffs, rock outcrops, etc.) where avian predators have a better vantage point.

Mixed mountain shrub communities are used by mule deer for food and cover. The WGFD rapid habitat assessments in the project area indicated most mixed mountain shrub stands had a high percentage of old and decadent shrubs. To remedy this, 563 acres of mixed mountain shrub communities were masticated. The mastications were primarily on serviceberry with interspersed chokecherry, snowberry, mountain big sagebrush and aspen. Previous treatments conducted in the area have shown excellent response with rapid shrub regrowth of treated areas and high utilization by mule deer.

Figure 36. Mastication of juniper and mixed mountain shrubs.

Another portion of the project targeted mountain big sage to reduce the canopy cover of the sagebrush, thereby reducing competition between sagebrush and herbaceous species; and improving forage for pronghorn, mule deer and sage grouse. The project consisted of aerial application of tebuthiuron on 742.5 acres in dense stands of mountain big sagebrush (exceeding 30% canopy cover). A goal was to have a 50% thinning rate. The work occurred in mid-elevation (7,500-7,700 feet) summer and transitional ranges for pronghorn, mule deer and sage grouse. Some of the areas chemically treated were in sage grouse core habitat. Treatments were conducted on three different parcels of private lands in the High Savery and Big Gulch areas. Funding was provided by BLM, WLCI, WWNRT and NRCS.

Baggs Cheatgrass Control Phase II (Goal 2) - Kevin Spence

Baggs cheatgrass control efforts continued in the Reader Basin area located in the foothills along the west slope of the Sierra Madre Mountain Range. This area supports a diverse blend of productive vegetative communities including mixed mountain shrub, mountain big sagebrush-grasslands, aspen pockets and wet-meadow riparian areas. The 2022 treatment is part of a multiple phased effort to control the spread of cheatgrass along the leading edge of the invasion, thereby protecting the most diverse and productive native wildlife habitats in the foothills zone.

Carbon County Weed and Pest led efforts to complete aerial application of Rejuvra to treat approximately 4,302 acres of mostly private and state lands located east of Savery Creek and south of Big Gulch Road. The entire project was located on crucial winter/yearlong elk range, and approximately 88% of the project is located on crucial winter/yearlong mule deer range. The project also is located within the South Rawlins Sage Grouse Core Area. This is the second phase of a multiple phased collaborative effort to control the leading edge of cheatgrass along the west slope of the Sierra Madre Mountain Range. Partners included: Carbon County Weed and Pest, private landowners, RMEF, WGBGLC, USFWS, BLM, WGFD and the Little Snake River Conservation District.

Figure 37. Cheatgrass control on the west slope of the Sierra Madre Mountains.

Baggs RHAs (Goal 2) - Mark Cufaude, Phil Damm and Britt Burdett

RHAs are conducted in MDI herd unit areas across the state to assess habitat conditions across mule deer seasonal ranges. Four aspen (143 acres), six riparian (87 acres) and four rangeland assessments (2,445 acres) were conducted in the Baggs mule deer herd unit in 2022. The information from these assessments will be used for Herd Objective Reviews (conducted every five years) and annual data will be summarized in Job Completion Reports. These data provide population managers and the public with documentation of the current state of habitat conditions for the Baggs mule deer herd.

Beaver Creek and Lake Creek Allotment Fence Conversion (Goal 3) - Jim Wasseen

This project replaced nearly one mile of woven-wire fence with four-strand barbed wire, built to wildlife friendly standards. The old woven-wire fence was in poor condition and was impeding pronghorn, mule deer and elk movements. The new fence will improve big game animal crossing and aid in livestock management within a deferred pasture rotation system, thus enhancing riparian and upland

vegetation to benefit livestock and wildlife habitat. The Lincoln Conservation District in conjunction with the Bureau of Land Management, Kemmerer Field Office, managed and provided oversight of the project. Funding was provided by WLCI and WWNRT.

Figure 38. Fences converted to wildlife friendly fencing standards.

Blacks Fork Cottonwood Creek Treatments (Goal 2) - Jim Wasseen

Since 2012 the Uinta County Weed and Pest District has been controlling tamarisk and other invasive species within the Black's Fork and Muddy Creek watersheds. The project is in conjunction with the Green River Russian olive and tamarisk control project. Both projects are aimed at removing Russian olive and tamarisk to improve riparian habitat for fish and wildlife. When these nonnative vegetative species are removed, native vegetation flourishes because competition for resources is reduced. Many species benefit from a functioning riparian area: mule deer, sage grouse, pronghorn, flannelmouth sucker, roundtail chub and passerine migratory birds to name a few.

The District's contractor focused treatments on tamarisk, perennial pepperweed, knapweed, thistle complexes and other invasive species occurring on the Blacks Fork River. The contractor worked on Cottonwood Creek (a tributary to the Blacks Fork) and the Black's Fork River. New tamarisk seedlings and mature parent trees were located within dry drainages. Many mature trees were as far as one or two miles from the drainage and providing a seed source for the reestablishment of tamarisk in the drainage. Several tamarisk trees were treated in the Granger area as it had not been treated for several years. Many new tamarisk seedlings were discovered in gravel pits along with a few mature trees. The contractor also marked the presence of cheatgrass in areas he was scouting for tamarisk. Treatment on noxious weeds was targeted to maintain more desirable vegetation along the riverbank and limit seed propagation lower in the drainage. This project was funded by private landowners, OSLI and WWNRT.

Figure 39. Tamarisk re-sprouted after previous treatment.

City of Green River Russian Olive and Tamarisk Control (Goal 2) - Kevin Spence and Jim Wasseen

2022 marked the final WLCI funding phase for the Green River Russian olive and tamarisk control effort. The City of Green River hired a contractor to perform a foliar herbicide treatment to control 41 acres of young tamarisk and Russian olive that established within the footprint of the Killdeer Wetlands during a recent draw down. Approximately five acres of privately owned riparian area adjacent to the city's downstream portion of the urban greenbelt zone also were re-treated to control re-sprouts and seedlings that had established since the last treatment. Eight native replacement trees were planted on the private property. The city also purchased 40 trees and 136 native shrubs that were planted along the urban greenbelt zone to replace and enhance vertical and horizontal riparian structural habitat.

Figure 40. Russian olive re-sprouts along urban greenbelt area.

Clark Ranch Irrigated Wetlands Improvements (Goals 2 and 3) - Kevin Spence

The Bear River Valley provides habitat for at least 65 wetland bird species during migration, and at least 32 wetland bird species during breeding season. Irrigation practices on the Bear River floodplain create temporary wetlands with water depths ranging from a few inches to two feet depending on site specific topography, which are critical habitat for a host of waterfowl shorebirds, and other waterbirds during the spring migration. The water is drained during July and early August, and the hay from the fields is harvested. Some wetland birds nest and successfully rear broods in the fields near relict oxbows. After haying, the fields are again inundated, and provide migration stopover habitat for numerous birds in the early fall period.

Figure 41. Clark Ranch irrigated wetland improvements along the lower Bear River.

The USFWS Partners Program led an effort near Border Junction on 213 acres of state and private lands leased and owned by the Clark Cattle Company to improve the quality and function of irrigated wetlands. Improvements involved repairing and constructing a series of strategically-placed dikes with water-control structures to impound irrigation water helping to spread water across a larger percentage of hay fields, while creating 51 acres of shallow-water, seasonal wetlands in nine separate cells during the migration and nesting season for wetland dependent wildlife. Cost share funding was provided by WGFD, DU and USFWS-Partners for Fish and Wildlife.

Evanston Dam Removal (Goals 2 and 3) - Nick Scribner

TU, USFWS Partners for Fish & Wildlife, Western Native Trout Initiative, Open Rivers Fund, WGFD and other conservation partners eliminated two passage barriers and restored approximately 2,150 feet of the Bear River in 2022 to benefit Bonneville cutthroat trout and other resident species. The Myers Ditch, at the upstream end of the project, was an irrigation push-up dam that was a seasonal fish passage barrier. It was replaced with a natural-channel-design rock structure that allows year-round passage and delivers permitted water rights, but eliminates the need for annual channel disturbance by the water user. This reduces annual maintenance costs and sediment mobilization.

Figure 42. Aerial view of Evanston Dam rehabilitation reach.

At the center of the project reach was the Old City of Evanston Dam; a concrete diversion dam that was formerly used for Evanston's water supply. Until 2020, four private landowners relied on water delivered from the dam under previous commitments from the City of Evanston. Recent funding from the Open Rivers Fund, the City of Evanston and TU was used to develop wells for the water users that made the dam obsolete. The most stable and cost-effective method for eliminating the Evanston Dam was to realign the river around the dam using boulder-constructed riffles and approximately 500 feet of toe-wood. The concrete dam was partially removed, but the sill and apron remain and serve as a "plug" to protect against the risk of channel migration back to the old channel. More than four miles of upstream habitat were reconnected with this work.

Fontenelle Creek Fish Passage (Goal 3) - Nick Scribner

One of the last remaining fish barriers on Fontenelle Creek was improved in 2022 to reconnect habitat from Fontenelle Reservoir all the way upstream onto USFS lands. More than 96 miles of connected habitat will allow fish the freedom to move and meet all their life cycle needs for decades to come. Since 2014, TU has led a partnership with private landowners to improve a total of 12 irriga-

Figure 43. Diversion before improvements.

Figure 44. Diversion after improvements.

tion diversions to benefit fluvial fish, reduce sedimentation and reduce annual maintenance for water users. Many of the diversions were gravel push-up dams supplemented with large logs and tires to pool water into the irrigation canals. These types of diversions disrupt sediment and debris transport that can reduce bank stability and increase erosion. They also require a substantial amount of time to build and upkeep during the irrigation season. A series of rock weirs were constructed at each diversion that will eliminate the need for annual channel disturbance. These structures also increase bank stability and improve the transport of sediment and debris past the diversion. This effort was funded by the USFWS.

Fox Ranch Hams Fork River Design (Goal 2) - Jim Wasseen

A landowner on the Hams Fork River contacted WGFD personnel with concern that an eroding bank is forming a new channel and could jeopardize his ranch's infrastructure. The Hams Fork River has a public fishing easement and provides quality angling opportunity for rainbow and brown trout. WGFD personnel along with personnel from TU and USFWS completed a survey to determine the extent of repairs needed to fix the problem. The survey revealed the river is aggrading with excess sediment and low stream power. The river is overly wide with eroding banks and mid-channel islands. Plans were developed to address one of the eroding banks with toe wood and narrow the channel.This will improve trout habitat while reducing sediment. Construction is expected to occur in late 2023.

Figure 45. Hams Fork River eroding bank.

Green River PAA Annual Maintenance (Goal 1) - Miles Anderson, Kyle Berg, and Kevin Pousson

Habitat and Access personnel preformed annual maintenance on Green River Region's many PAAs: Lake Viva Naughton, Woodruff Narrows, Hams Fork, Green River Blue Rim, Blacks Fork, V-Cross, Raymond Mountain and newly added Bear River Divide. Maintenance included signs, parking areas, access roads, boat ramps, campgrounds and comfort stations. A comfort station was replaced at Anvil Draw at Flaming Gorge reservoir.

Figure 46. Comfort station replacement Anvil Draw.

Grizzly WHMA Main Roads Cheatgrass (Goal 2) - Kevin Spence

The Grizzly WHMA supports healthy, native vegetative communities that are relatively free from the impacts of cheatgrass invasion. However, improved County and BLM roadside areas have cheatgrass

establishment, likely imported and spread from heavy equipment used to perform road maintenance activities. To prevent these roadways from serving as vectors to introduce cheatgrass to the broader landscape, 152 acres of roadsides were treated aerially on the Grizzly WHMA access roads in 2022. Treatment consisted of six ounces of Imazapic applied by a fixed-wing aircraft to a 45-foot buffer along the Cow Butte Road (BLM RD #3308). Funding was provided by WGFD.

Little Mountain Cheatgrass Control Phase II (Goal 2) - Kevin Spence

Cheatgrass threatens key aspen, sagebrush-grassland, juniper and mountain shrub habitats in the Little Mountain Ecosystem for mule deer, sage grouse, pronghorn, elk and several other species of terrestrial wildlife. Increasing cheatgrass dominance also has a negative effective on watershed function and streamflow for Colorado River cutthroat trout inhabiting these headwater drainages.

Sweetwater County Weed and Pest District used RMEF, WGBGLC, BLM and WGFD contributions as cost share to contract aerial herbicide treatment of 600 acres of private and state lands in the Trout and Red Creek drainages to control cheatgrass. Rejuvra was used at five ounces per acre, and was applied aerially August 22-24, 2022. This project was part of a larger collaborative effort involving BLM, Sweetwater County Weed and Pest District, OSLI, private land owners and WGFD to complete treatments on 7,494 acres during 2022 to control cheatgrass along the leading edge of invasion to protect key terrestrial and aquatic wildlife habitats in the Little Mountain Ecosystem.

Figure 47. Aerial cheatgrass control treatments in the Little Mountain landscape.

McCarty Canyon Shrub Enhancement (Goals 1 and 2) - Mark Cufaude and Mac Foos

About 452 acres of brush adjacent to the Red Rim Grizzly WHMA were mowed in 2022 to enhance habitat. Statewide Habitat and Access personnel used 20-foot batwing mowers to enhance mountain shrub communities through mastication. Shrubs were mowed in a mosaic pattern attempting to reduce brush densities, diversify age classes and increase access to forage. A reduction of approximately 30% was the overall goal and achieved.

Figure 48. Shrubs mowed in a mosaic pattern.

Muddy Creek I-80 Fish Passage (Goal 3) - Nick Scribner

Muddy Creek is an important stream in Wyoming for "three species" conservation efforts. Flannelmouth sucker, Roundtail chub, and Bluehead sucker occupied habitat has decreased substantially across

the Colorado River basin and within Wyoming. Muddy Creek flows north from the Uinta Range in Utah before it joins with the Blacks Fork River near Lyman. Monitoring information for these species in Muddy Creek has indicated that I-80 may be inhibiting upstream passage. The Muddy Creek crossing of I-80 consists of two 12-foot diameter, round, metal pipes that are each 360 feet long. The culvert bottoms are encased with concrete creating a trapezoidal channel roughly two feet deep three feet wide at the bottom and eight feet wide at top of the concrete.

Aquatic habitat personnel installed 68 rubber baffles in these culverts to improve hydraulic conditions to increase passability for fish. The hard, rubber baffles are three feet long by six inches tall and are attached to the culvert bottom with concrete anchors. They were placed every 8-10 feet inside the culvert to serve three primary functions: increase water depths, reduce water velocities and provide resting pools. The hydraulic modifications caused by these baffles will improve conditions for fish passage and not interfere with culvert capacity. This project was funded by WGFD.

Figure 49. Installing rubber baffles.

Pacific Butte Steel Jack Aspen Exclosure (Goal 2) - Kevin Spence

The Red Desert Springs Project has been an ongoing effort since 2019 to maintain the integrity and function of springs, seeps and pocket aspen stands which are vitally important for many wildlife species in this xeric landscape.

The BLM Rock Springs Field Office and WGFD collaborated to construct an additional steel jack fence exclosure around a pocket aspen stand near Pacific Butte to reduce ungulate impacts, encourage vertical growth of aspen suckers and enhance vigor and productivity of associated understory plants. This aspen site was heavily used and degraded by wildlife and livestock to the point where stand sustainability was threatened. The 6.5-foot-tall steel jack fence will discourage excessive use by large ungulates, allowing young aspen trees to mature and perpetuate the stand. Previous funding for fabrication of the steel jack fence was provided by BOW, MFF, WGFD, RMEF, WFW, JIO-PAPO.

Figure 50. Pacific Butte steel jack exclosure to encourage recruitment of young aspen trees.

Quealy Reservoir Fence Replacement (Goal 3) - Kevin Spence

During 2022 approximately 1.5 miles of existing woven-wire fence was replaced with a new four-wire stock fence constructed to wildlife friendly specifications located on a mixture of private and public land on the southeast side of Raymond Mountain near Quealy Reservoir. The netwire fence configuration had segments of two barbed wires above and other segments of three barbed wire above, with top wire heights ranging from 43-49 inches in height, and was a perpendicular impediment to sig-

nificant numbers of mule deer migrating between summer and crucial winter range. This fence also impeded pronghorn movement between seasonal habitats, and was an obstacle for moose and elk movement to winter ranges. The newly constructed fence is more permeable for mule deer and other big game, while functioning as a boundary fence between two grazing allotments. The fence replacement was a collaborative effort between private landowners, the Smith's Fork Grazing Association, Lincoln Conservation District, USFWS Partners for Wildlife and WGFD. Funding was provided by WGFD, WGBGLC, and TNC.

Figure 51. Quealy fence looking west.

Red Rim Grizzly WHMA Fence Conversions (Goals 1 and 3) - Mark Cufaude

Fence conversions have been an ongoing, long-term project on the Red Rim Grizzly WHMA. Sixteen miles of fence were identified within the Baggs Migration Corridor. An additional sixteen miles of non-wildlife friendly has been identified on the WHMA. Seven-and-a-half miles were converted by a contractor in 2022 and an additional 1.5 miles were converted by WGFD personnel and volunteers. This fencing now provides better permeability for wildlife. Funding was provided by BOW, NFWF, RMEF, WGBGLC, WLCI, WWNRT, and WGFD.

Figure 52. Red Rim Grizzly WHMA.

Sage Creek Culvert Installation (Goals 2 and 3) - Jim Wasseen

TU, with assistance from the Sweetwater County Road and Bridge Department, replaced a multiple-culvert crossing on Sage Creek with a bottomless, arched culvert along Sweetwater County Road 33. The Bridge Department contacted TU after it saw beavers had built a dam on the upstream side of the road, blocking the culverts. The dam was causing flooding and the Sweetwater County Road and Bridge Department was concerned the flooding could potentially wash out the road. A bottomless, arched culvert was chosen to prevent beavers from building another dam, allow fish passage (small, nongame fish species), and natural stream function. The new stream crossing opens approximately 2.5 additional miles of stream to fish. Funding was provided by USFWS, WLCI, and WWNRT.

South Rock Springs RHAs (Goal 2) - Kevin Spence

The South Rock Springs Mule Deer Herd is not currently one of the state's MDI herds, however, it is popular with the public and has been experiencing issues with population recruitment and retention for several years. Habitat conditions are a key component for the health of the herd, and RHA data collection has become a priority for this landscape.

Eleven RHAs were completed for the Rock Springs Mule Deer Herd in 2022. Six rangeland assessments, one aspen assessment, four riparian assessments and one special feature assessment were completed totaling 3,727 acres. These data will be summarized in the annual Job Completion Report, and provide current habitat condition information for assisting with population management decisions.

Figure 53. South Rock Springs Rangeland RHA site near Sand Butte.

Southern Wyoming Range Sagebrush Treatment (Goal 2) - Kevin Spence, Kade Clark, Rick Harmelink and Todd Grosskopf

In cooperation with BLM, the Statewide Habitat Access crew completed sagebrush mowing treatment of 3,488 acres of mule deer winter and transitional ranges in the southern Wyoming Range. Dense big sagebrush stands in the treatment area exhibited monotypic older shrubs lacking vigor and recruitment of younger age classes. Productivity of associated grass and forb understories also declined. A fine-scale mosaic of mowed and un-mowed sagebrush was created where an average 31% or 1,082 acres were actually manipulated within the total 3,488-acre project perimeters. Treatments occurred at four locations near Sillem Ridge, Boulder Ridge-Gooseberry Spring, Round Mountain and the northern portion of Slate Creek Ridge. Aerial application of Imazapic herbicide was also applied simultaneously to the entire project area and adjacent locations to reduce cheatgrass establishment and maintain native herbaceous vegetation.

Benefits of creating sagebrush age class diversity across this segment of mule deer crucial winter range will not fully be realized for the next 20-40 years when sagebrush plants have re-established with enhanced vigor and nutritional browse. More immediate benefits are expected with increased grass and forb productivity in mowed areas for meeting needed nutritional demands for mule deer when leaving winter ranges during the early spring migration. Improving the ecological condition of these sagebrush sites using fine-scale mosaic treatments also will enhance habitat for sage grouse and other sagebrush dependent wildlife species.

Figure 54. Sagebrush mowing treatment to enhance mule deer habitat in the southern Wyoming Range.

Uinta Mule Deer Migration and Roadway Interaction Study (Goal 3) - Kevin Spence and Jeff Short

Reducing WVCs has been a priority for the WGFD and we have worked with WYDOT and other partners for many years to develop workable solutions. One of the roadways contributing to mule deer WVCs is I-80, particularly on the west side of the state. I-80 crosses the range of the Uinta mule deer herd which comprises approximately 12,000 to 14,000 animals. These deer are known to cross I-80, which dissects the winter range for this herd. As deer navigate between seasonal ranges they are exposed to being hit by vehicles along the I-80 corridor and in other locations of the herd unit. The purpose of this study is to collect movement and habitat use data for mule deer to aid WYDOT and agency partners in reducing WVCs and conserving ungulate migrations along the I-80 corridor in western Wyoming.

Figure 55. A collared mule deer from the Uinta Herd research using a highway underpass.

Fifty GPS collars were placed on doe mule deer in March 2021 via helicopter net-gunning. In March 2022, an additional 50 collars were deployed to increase sample size to 100 mule deer does, with planned captures in March 2023 to redeploy collars from mortalities to maintain sample sizes. The collars were programmed to collect a GPS location every two hours and transmit up to two locations via satellite daily. The battery capacity of these collars is approximately 3.5 years, therefore, some collars are scheduled to drop off individuals in March 2023.

Upper Rock Creek Aspen Enhancement (Goal 2) - Kevin Spence

BLM and WGFD completed the first phase of a two-phased effort to restore aspen habitat in the upper Rock Creek drainage during 2022. A contracted crew hand cut 192 acres of encroaching subalpine fir from mixed conifer aspen stands, and either lop and scattered or piled the slash to prepare a fuel bed for a follow-up prescribed burn during a later second phase treatment. The prescribed burn is expected to stimulate vigorous aspen suckering that will eventually grow into mature trees to sustain healthy aspen habitat. BLM funds granted to WGFD for the Southern Wyoming Range Mule Deer Habitat Project were used to complete the initial treatment.

Figure 56. Conifer lop and scatter to restore aspen.

Wyoming Range RHAs (Goal 2) - Kevin Spence

RHAs are conducted annually in MDI herds across Wyoming to better evaluate conditions of mule deer seasonal habitats. Seven additional RHA assessments totaling 6,555 acres were completed for the Southern Wyoming Range within Transitional, Summer and Crucial Winter Ranges, including six rangeland habitat assessments and one riparian habitat assessment. RHA survey information will be used for Wyoming Range Mule Deer Herd Objective reviews, annual Job Completion Reports, and assist in determining locations of future habitat improvements.

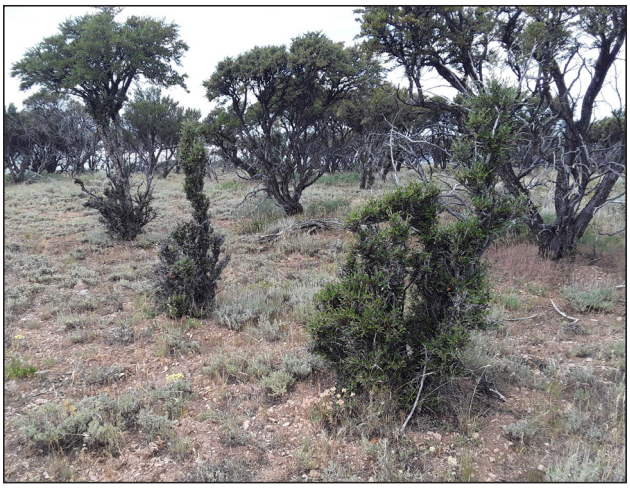


Figure 57. Southern Wyoming Range RHA site with curl-leaf mahogany exhibiting heavy browsing and lacking recruitment of young shrubs.

Muddy Creek Wetland Improvements Phase 10 (Goal 2) - Jim Wasseen, Kade Clark, Mac Foos, Rick Harmelink and Todd Grosskopf

Muddy Creek Wetlands has been an ongoing project to restore Muddy Creek. Project activities include the rehabilitation and enlargement of the George Dew Dike including: the rehabilitation of the east gabion drop structure, the abandonment of the west drop structure and replaced with a new sheet piling rock riprap spillway that facilitates fish passage through the existing dike and drop structures. The new sheet piling spillway has a 12-inch vertical height which will allow fish passage rather than the previous 8-foot drop in the abandoned drop structure, which was a complete barrier to fish movement in Muddy Creek. The new location of the sheet pile spillway restores stream flow back to the historic stream channel of Muddy Creek which will result in enhanced willow riparian habitat. In addition to the work on the George Dew Dike, approximately one mile of five-wire and woven-wire fence was removed and replaced with a BLM-standard wildlife friendly fence (four-wire fence with 42 inch top wire and 18-inch bottom smooth wire). The area is heavily utilized by elk, deer and antelope found in the area.

Duck Pond No. 5 also was rehabilitated with reshaping of the dike face, placement of more than 1,160 cubic yards of riprap placed on the face of the dike, and the installation of an additional headgate to deliver water to downstream wetlands. The riprap will facilitate the ability to increase the storage capacity and expand the number of low-water wetland acres associated with the pond by 32 acres. Funding partners include private landowners, USFWS Private Lands Program, WLCI, Wyoming Water Development Commission, WWNRT and WGFD.

Figure 58. Duck Pond No. 5 rehabilitation.

Bear River Divide HMA (Goal 1) - Lands Administration Branch

The Bear River Divide HMA is located in Uinta and Lincoln counties, and includes more than 91,000 acres in the "checkerboard" of alternating public and private land. The majority of the private property in the HMA is held by three landowners in a grazing association and was previously enrolled in the Access Yes program. Realizing the value to the public, the Lands Branch worked with regional staff and representatives from the grazing association to execute a 30-year access easement to ensure the property will be available to the public for years to come. In addition to the 91,000-plus acres included in this agreement, an estimated additional 200,000 acres of public property also will remain accessible to the public for the 30-year term. This HMA issues the most permission slips to hunters of any area in the state, establishing the high value of this area to the public.

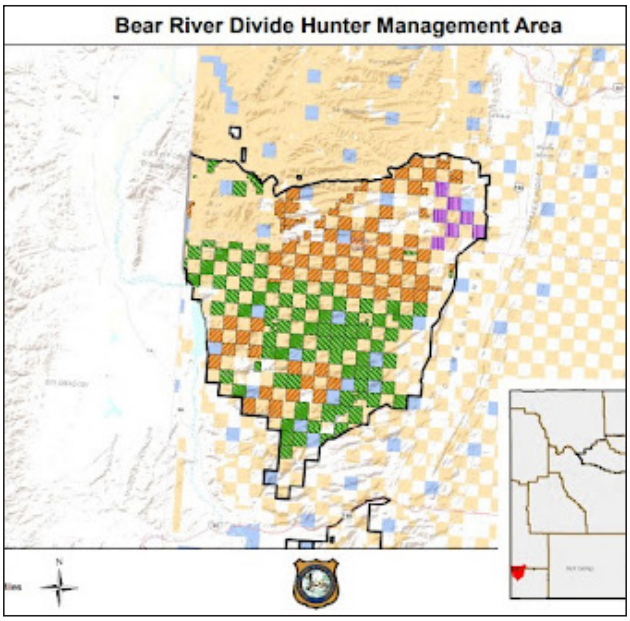


Figure 59. Bear River Divide HMA.

Ten Acres for Future Rock Springs AIS Station (Goal 1) - Lands Administration Branch

In order to help control AIS in the state's water resources, the WGFD established the need for a new AIS watercraft check station on the eastern side of Flaming Gorge Reservoir in Sweetwater County. The Lands Branch, in consultation with the Fish Division, located a suitable location at the intersection of County Road 33 and US Highway 191 south of Rock Springs. Lands Branch personnel negotiated with Aggie Grazing LLC to acquire the property, and received approval from the WGFC to follow through with the purchase at the July 2022 meeting. The property was purchased in September 2022. The lot will be developed into an AIS check station to inspect boaters traveling to Flaming Gorge and other waterways north and south on US Highway 191.

Figure 60. Property acquired for AIS station.

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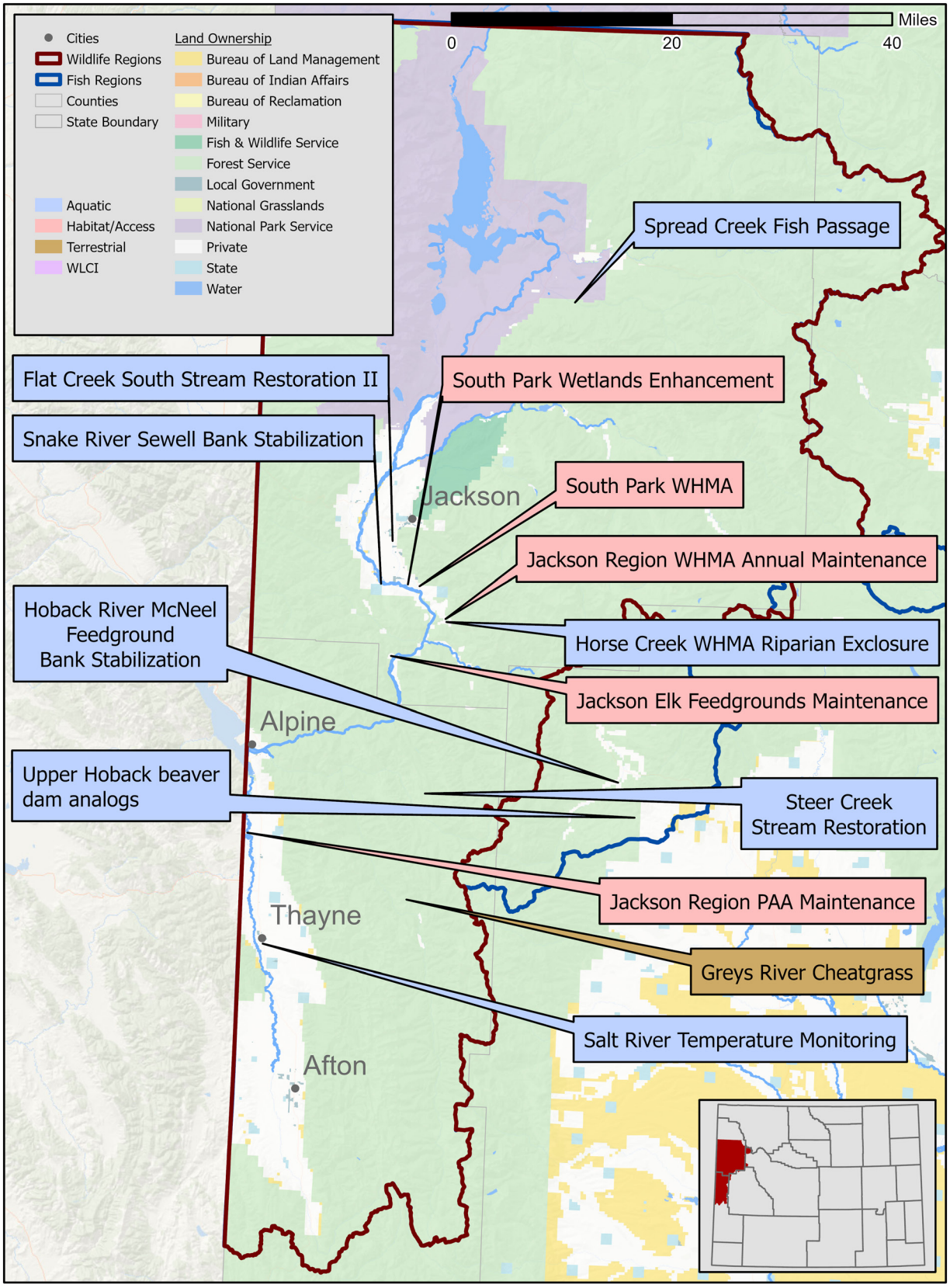

Welcome to the 2023 summary of habitat work done in the Jackson Region! Fish and wildlife habitat improvement projects in the Jackson Region have been highly collaborative efforts primarily focused on wetland and riparian habitats to provide maximum benefit for the most species. It has been estimated that wetland and riparian habitats make up only 3 percent of the Wyoming landscape, yet over 80 percent of the State's fish and wildlife species depend upon them.

Several habitat projects in the Jackson Region have focused on stabilizing stream banks; creating a mixture of meanders, riffles and deep pools; and enhancing connectivity to allow fish passage to access seasonal habitats such as for spawning. These projects have been done on both public and private lands and have involved a number of partner organizations and private landowners.

One high-profile project completed in 2022 was a 600-acre wetland restoration project at the South Park WHMA along Highway 89 five miles south of Jackson. The project returns water to low-lying wet areas between the Snake River and Flat Creek, providing crucial breeding and brood-rearing habitat for trumpeter swans and many other species of waterfowl and shorebirds. The project also reconnects the floodplain of the Snake River, which was disconnected when levees were built to control flood waters. This reconnecting of the floodplain will restore the cottonwood community, providing important habitat for songbirds and improving forage for elk. Another benefit of the project will be increased filtration of the wastewater from the Jackson water treatment facility before it reaches the Snake River. The enhanced wetland will provide additional recreational opportunities for the public through waterfowl hunting, bird watching and hiking.

One additional project not involving wetland or riparian habitat is focused on curbing the spread of cheatgrass in the Greys River drainage south and east of Alpine. Once established, the non-native, invasive cheatgrass will outcompete native vegetation relied on by mule deer and many other wildlife species. Initial aerial treatments have reduced cheatgrass to trace amounts, but it will be monitored annually for additional needed management.

The Jackson Region continues to rely on their relationships with multiple partners and funding sources for the completion of all of their projects. Without the key partnerships with landowners, land management agencies, funding partners, local governments, sportsmen's groups, and NGO's, these projects would not be possible. WGFD also extends their gratitude to the many volunteers who were on the ground helping wildlife across the Jackson Region.

Flat Creek South Stream Restoration Phase II (Goal 2) - Holden Reinert

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 six road miles south of town. Flat Creek is integral to the town of Jackson, the Snake River cutthroat trout fishery and the aquatic ecosystem. The creek provides multiple beneficial uses including fish habitat, water for irrigation, aquifer recharge and municipal drinking supply. The creek is 305(d) listed as threatened by the Wyoming DEQ for water quality and habitat degradation. Development and grazing have reduced or entirely removed willows from the riparian corridor, straightened the creek and produced an over-wide and shallow channel lacking in spawning riffles and deep pools. These channel conditions reduce spawning activity and may restrict seasonal movement through shallow depths, high summer temperatures and the formation of unstable winter ice.

Stream restoration on private land south of Jackson was initiated in 2016 to restore form and function to 1.2 miles of valuable Snake River cutthroat trout habitat on Flat Creek. Project objectives include increasing floodplain connectivity, reducing bank erosion, improving sediment transport and restoring the woody, riparian shrub community. The first of two construction phases began October 2021 and was successfully completed in spring 2022. Phase I consisted of approximately 0.6 miles of new channel and floodplain grading. The design included five outside meander bends finished with soil lifts and plantings, three toewood bends, two engineered riffles for grade control and two reinforced riffles to allow for livestock crossing. A combination of barbed-wire and steel jack fence were installed to protect stream bank work and riparian plantings. Approximately 1,800 willows and 550 cottonwoods were planted with the help of community members and volunteers.

Figure 61. Flat Creek Phase II.

Phase II began in summer 2022 with the acquisition and stock piling of materials, and in-stream construction started in October. Approximately 2,000 feet of stream was restored, including one outside bend with a toewood bank, three outside bends finished with soil lifts and plantings and two outside bends fortified with large rock. Armored riffles with cobble material were installed in between the meanders, and seven rock vanes were installed in two locations to provide grade control near infrastructure. Construction was paused in mid-December due to an increase in shelf ice that would compromise infrastructure and previous work completed downstream. Construction will resume mid-February and finish March 14, 2023. A fence spanning the length of stream on the left bank will be installed to protect bank work and riparian plantings, and allow ranch operations to resume on adjacent pastures.

Project partners include: WWNRT, Western Native Trout Initiative, Teton Conservation District, the landowner, Wyoming Water Development Commission, Jackson Hole One Fly, TU, Wyoming DEQ, WFW, WGBGLC, NRCS and the Community Foundation of Jackson Hole.

Greys River Cheatgrass (Goal 2) - Troy Fieseler

The second phase of this project was completed during 2022, with an additional 457 acres treated with aerial application and approximately 5,000 acres surveyed for invasive annual grasses within the Greys River corridor. Currently, the majority of infestations can be found along Middle Ridge

on south-facing slopes which provides transitional and stopover habitats for the Wyoming Range and Sublette mule deer herds, parturition and crucial winter-yearlong habitat for elk and crucial winter-yearlong habitat for moose. Overall project goals and objectives are to manage invasive annual grasses to ensure a dominance of native vegetation to provide for wildlife forage needs and allow natural fire regimes to remain intact. Annual monitoring indicated that initial treatments during 2021 reduced cheatgrass cover to trace amounts from an average of 15% canopy cover. Monitoring will continue on an annual basis to inform future follow-up management and expansions are anticipated throughout areas of the Greys River and Kemmerer Ranger Districts. Funding for 2022 was provided by WWNRT, WGBGLC, and WGFD.

Figure 62. One year post-treatment photo.

McNeel Feedground Bank Stabilization (Goal 2) - Holden Reinert

The Hoback River flows 49 miles from its headwaters to the Snake River confluence. A degraded reach occurs on and upstream of the River Bend Ranch outside of Bondurant, on an active cattle ranch that doubles as a WGFD-leased elk feedground (McNeel feedground). The property's riparian vegetation experiences stunted growth and has an ongoing history of active channel manipulation. In combination with naturally erosive headwater geology, this reach experiences excessive erosion, deposition and braiding throughout the ranch property. The river's instability has caused continual problems for stream habitat and land managers. Numerous outside bends are actively eroding, including high-eroding banks adjacent to the stack yard used by WGFD to store 500 tons of hay for winter elk feeding.

In 2020 consultants created a 60% design to stabilize banks utilizing bioengineering techniques. In total, eight stream banks have been identified to install brush and log structures with bankfull benches to reduce sediment inputs and loss of land from lateral erosion over the course of 2.5 river miles. In addition to constructing stable stream banks, fencing pods were installed to protect woody, riparian vegetation from ungulate browsing pressure. In 2020 and 2021, 21 riparian exclosures were installed. Throughout summer 2022, WGFD staff

Figure 63. Fencing units on McNeel Feedground.

and project partners set up an additional 20, 8-foot tall riparian exclosures around willows and cottonwoods to allow plant growth above browsing height. Each pod protects approximately 0.2 acres of riparian habitat. Additional exclosures will be set up in 2023 and 2024 for a total of 86 exclosures. Permitting is underway, and construction is expected to begin fall 2023.

Project partners include Jackson Hole TU, Bridger-Teton National Forest, Rickett's Foundation, RMEF, WFW, Jackson Hole One Fly and Riverbend Ranch.

Horse Creek WHMA Riparian Exclosure (Goal 2) - Holden Reinert

Steel jack fencing was constructed in 2019 around Horse Creek on the WHMA adjacent to the property boundary fence line. Fencing was constructed to encourage willow and cottonwood establishment, promote stream stability and reduce property boundary fence maintenance. Baseline vegetation monitoring showed decrease vegetation cover and a lack of older age classes of woody, riparian vegetation. In the three years the riparian fence has been installed, the overall bank stability index increased and riparian vegetation populated the majority of the streambank. Age class distribution of woody vegetation saw large increases in sprouts and young cottonwoods, and in sprouts, young and mature willows compared to 2019 data.

Figure 64. Riparian vegetation flourishing within the fencing exclosure.

Annual Jackson Region Feedground Maintenance (Goal 1) - Miles Anderson, Kyle Berg and Kevin Pousson

Annual repairs and maintenance included work on feedground structures, corrals, stackyards, elk migration fences and feedgrounds. Dog Creek, South Park and Horse Creek elk feeding areas were harrowed in spring 2022 to break up elk scat and promote new grass growth. Access roads to feedgrounds were maintained and roads resurfaced or otherwise improved at Horse Creek, South Park and Camp Creek feedgrounds. Eight upright poles and seven rafters where replaced on various haysheds. A new culvert was installed to help facilitate feeding at Patrol Cabin.

Figure 65. Patrol Cabin feedground.

Annual Maintenance on Jackson Region PAAs (Goal 1) - Derek Lemon, Miles Anderson and Kyle Berg

Regional personnel performed annual maintenance on PAAs in the Jackson Region including all 16 PAAs on the Salt River Von Gontard's Landing and Coco Belle. PAA maintenance activities included replacing signs, repairing fences, spraying noxious weeds and painting comfort stations. A total of 415 tons of gravel was used to fill holes and improve the roads on the south half of the Salt River PAAs. New parking lot information signs were installed on eight PAAs. Two new ADA parking pads were added to Narrows Bridge PAA and Diversion PAA along the Salt River. About 200 feet of pole top fence was built at Coco Belle PAA to keep people from driving off-road.

Jackson Region WHMA Annual Maintenance (Goals 1 and 2) - Derek Lemon, Miles Anderson, Kyle Berg and Kevin Pousson

Annual maintenance and improvements continued on the seven WHMAs in the Jackson Region in 2022. The Horse Creek, South Park and Grey's River WHMAs received annual fence maintenance to reduce trespass livestock and comingling of elk and livestock in the winter. One hundred acres of irrigation water rights were spread on Horse Creek WHMA. Horse Creek and South Park were hayed to feed elk in the winter and promote new growth for fall and spring forage; 213 tons were produced between the two WHMAs. Annual parking lot and road maintenance was performed on South Park and Horse Creek WHMAs. Noxious weeds were treated by WGFD personnel and contract applicators on all Jackson WHMAs.

Figure 66. Haying operations.

Salt River Temperature Monitoring (Goal 1) - Holden Reinert

The Salt River is a blue-ribbon fishery hosting excellent habitats for all life stages of native cutthroat trout. The watershed is increasingly impacted by development as agricultural parcels are converted into residential units. Channel manipulation and riparian vegetation conversions affect the thermal regime and water quality, in addition to ongoing temperature shifts associated with the changing climate. Long-term temperature monitoring on the Salt River will help identify and prioritize management actions in this basin. Two temperature loggers were deployed in the lower Salt River drainage in August 2020 and are downloaded annually to establish long-term water temperature monitoring sites. One logger is deployed at the Clark's Barn public access area near Afton and the other is deployed at the Miller public access area near Etna.

Snake River Sewell Bank Stabilization (Goal 2) - Holden Reinert

The Sewell Ranch is a subsidiary of the Snake River Ranch, and is situated on the west side of the Snake River at the foot of Munger Mountain, south of Jackson and near the South Park WHMA. The Ranch has experienced significant bank erosion and land loss at this location, downstream of the river-right terminus of the Snake River levee. This excessive erosion demonstrates the river's highly variable range of flows and geomorphic dynamism. From 2009-17, approximately 180 feet of bank and irrigated pastureland were lost, or about 23 feet per year. Currently, this eroded bank is not along the main channel of the Snake River however, as recently as the summer of 2017 the main channel was along this bank and accelerated rates of bank erosion were observed. There is 1,000 feet of exposed, vertical, actively eroding banks along the Snake River, and an additional 800 feet of erod-

Figure 67. Sewell Bank on the Snake River.

ing bank in a smaller side channel of the Snake River.

TU, WGFD and the Snake River Ranch are collaborating to address bank erosion, land loss and lack of quality fish habitat within the project area. Partners selected a design consultant with extensive experience in designing bank stabilization treatments in large rivers such as the Snake River to ensure that bank treatments will withstand a wide flow range. Treatments for the main channel include brush bank structures and bankfull benches. Side channel treatments are the same, and include log structures strategically placed throughout the reach. The project will create holding, cover and juvenile rearing habitat for Snake River cutthroat trout as well as other native fish species, including Bluehead suckers. Funding partners included the Teton County Conservation District and TNC.

South Park WHMA Wetlands Enhancement (Goals 1 and 2) - Derek Lemon, Miles Anderson and Noelle Smith

The objective of this project is to restore 619 acres of wetland, wet meadow, cottonwood riparian and upland habitats on the South Park WHMA. The project will restore permanent wetlands that are crucial breeding and brood rearing habitat for trumpeter swans. By installing modern infrastructure, including new diversions and water control structures, managers will have the ability to move water into new and existing shallow water emergent wetlands that will produce high-quality foraging habitat for migratory birds. The cottonwood riparian restoration portion will include reconnecting the floodplain of the Snake River which was disconnected when the Army Corps of Engineers built a levee to control flood waters. The installation of new infrastructure, such as rock checks in existing sloughs, water control structures, embankments, as well as reestablishing the flow of water into the system, will allow the water table to rise throughout the floodplain and restore valuable wetland habitat important to migratory birds in the existing cottonwood gallery. This project will result in improved forage production for migratory birds, elk and other wildlife, as well as enhanced recreational opportunities for the public (i.e., bird watching, waterfowl hunting, hiking). This project also will improve water quality by increasing the retention time of the wastewater to improve water quality before it reaches the Snake River. Funding was provided by DU, North American Waterfowl Conservation Act, Teton County Conservation District, TNC, WFW, Wyoming Water Development Commission, WGFD, the Town of Jackson, Teton County, EPA, Friends of Jackson Hole Ducks Unlimited, the Wyldlife Fund and the Trumpeter Swan Society.

Figure 68. South Park WHMA wetlands.

South Park WHMA Fence Conversion (Goals 1 and 3) - Derek Lemon, Miles Anderson and Kyle Berg

One mile of boundary fence was replaced with wildlife friendly pipe fence at South Park WHMA. The fence conversion helps keep neighboring livestock off of the WHMA while allowing for easier movement of wild ungulates. Funding was provided by WWNRT, RMEF and WGFD.

Spread Creek Fish Screen (Goal 3) - Nick Scribner

Phase II of the Spread Creek fish passage project was completed in summer 2022 by TU and key technical partners including Grand Teton National Park, Bridger-Teton National Forest and WGFD.

Spread Creek supports important habitat for Snake River cutthroat trout and other native species such as Mountain whitefish and Bluehead sucker. A corrugated fish screen was installed to eliminate fish entrainment into the irrigation canals. Fish salvage efforts previously were an annual fall event on the Spread Creek ditches to return stranded fish back to the creek. The screen will now prevent fish from reaching the ditches and return them to the creek via a short buried pipeline.

Another key component to phase II included stabilization of the irrigation diversion, banks and channel located on roughly 1,250 feet of stream. When the dam was torn out in 2010, the channel was stabilized with three large rock weirs. However, high runoff in subsequent years dislodged boulders in the weirs decreasing their stability and impacting upstream passability for fish. A 300-foot rock ramp was designed and installed in fall 2021 to repair the channel to improve long-term stability, passage conditions and increase in-stream habitat. Nearly 1,000 willow stakes were planted in the toe-wood and bank stabilization structures. These improvements also will maintain and protect existing infrastructure and minimize future land loss, including the protection of an established Forest Service campsite. Financial partners include the USFWS and WGFD.

Figure 69. Looking upstream at fish screen and sediment settling basin.

Steer Creek Stream Restoration (Goal 2) - Holden Reinert

Steer Creek is a tributary to the Little Greys River that is important for Snake River cutthroat trout spawning and has shown declines in redd counts in recent years. The Jackson AHAB, along with Fish Management Jackson, Trout Unlimited, Bridger-Teton National Forest and the Little Greys Grazing Association are exploring options to address resource needs. The meadows adjacent to the USFS cabin have shallow, homogenous habitat with excessive sedimentation and limited woody vegetation recruitment. Spawning habitat in lower reaches is still available for Snake River cutthroat trout, but may be limited by increased sediment loads from Meadow Creek and cattle crossings. Partners discussed targeted riparian exclosures at observed redds to protect riffle habitat on the downstream reach of Steer Creek near the confluence with the Little Greys River. BDA construction was agreed upon for the upper reaches to promote sediment capture and encourage willow recruitment. Longitudinal profiles and cross sections were surveyed to estimate locations and numbers of BDA installations.

Upper Hoback BDAs (Goal 2) - Holden Reinert

The Roosevelt Fire burned over 50,000 acres across the headwaters of the Hoback River drainage in 2018, and contained many locations of high-intensity burns. In this steep and highly erosive landscape, denuded slopes were expected to create localized landslides and other mass wasting events and generally increase sediment transport across the watershed. In addition, historical overuse by livestock and, in some cases, artificially-elevated wildlife populations led to deteriorated upslope and riparian conditions, and localized channel incision. Muddy Creek and its tributary, Coyote Gulch, near the Hoback Rim are streams that display these impairments.

Historically, beaver would have had a strong mediating effect on these riparian systems by constructing dams that slowed flood flows, vertically stabilized stream beds and inundated floodplains to support vigorous vegetation that resisted erosion. However, with the loss of many beaver populations over the

last two centuries, stream systems have suffered. The goal of this project was to emulate the positive aspects of beaver ecology by constructing BDAs on Muddy Creek, and to compare conditions in Muddy Creek to those in Coyote Gulch that were not treated with BDAs. Conditions monitored included fish assemblages, riparian vegetation, channel morphology and stream temperature.

Crews constructed 20 BDAs in Muddy Creek along approximately 0.5 miles of the Muddy Creek floodplain (approximately 1 mile of stream channel) in June 2020 and 2021 and collected pre-construction data on both the control (Coyote Gulch) and treatment reaches (Muddy Creek). The study reach was revisited in June 2021 and 2022. Longitudinal profiles and cross sections were resurveyed, and 2020 BDAs were maintained. Some beaver colonization of BDAs was noted. On Coyote Gulch, beavers moved into the control reach and provided the opportunity to compare BDAs to naturally occurring beaver dams. While surveyed channel changes are minimal after two years, partners will continue to track ongoing changes in channel slope and cross section, riparian community adjustments and stream temperatures associated with BDA construction.

Figure 70. BDA on Muddy Creek.

Partners include USFWS Partners Program, Bridger-Teton National Forest and the Rolling Thunder Ranch.

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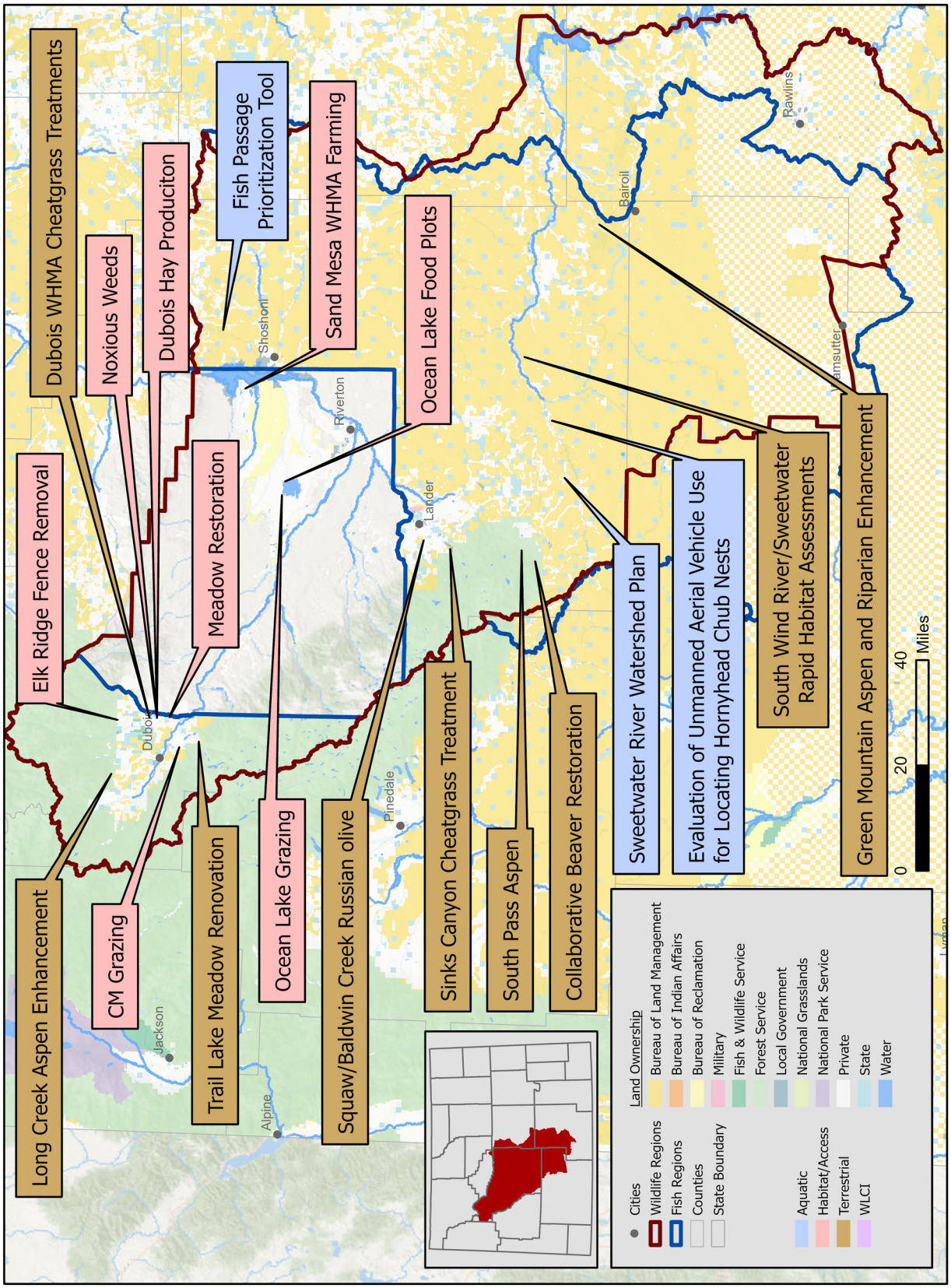
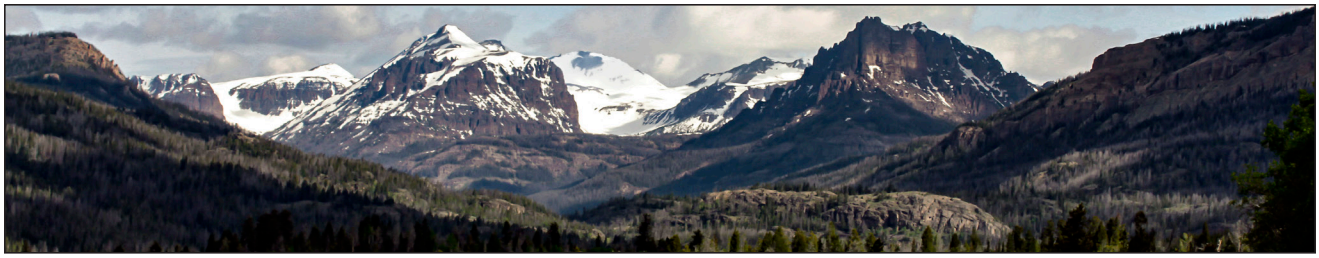




The Lander Region covers a stretch of central Wyoming from the peaks of the Wind River Mountains east to Boysen Reservoir and from Dubois to Rawlins with points between.

The Lander Region projects are aimed at preserving and restoring the state's wildlife and habitats. In one project regional personnel partnered with local organizations to construct a beaver holding cage, which was used to teach community members about the benefits of beaver dams and relocate two beavers to a new location. With a lot of work for our Habitat and Access crew, Commission owned lands near Dubois successfully generated over 800 tons of hay for elk feedgrounds while still providing exceptional forage for elk wintering in the Dubois area. Several high priority vegetation communities across the region were also treated for invasive species like cheatgrass.

Additionally, aspen restoration treatments occurred across the region removing conifers from hundreds of acres. In doing this, land managers are improving wildlife habitat, and also reducing the risk of catastrophic wildfire. Finally, department personnel with the help of the Rocky Mountain Elk Foundation, Wildlife Federation and several volunteers, removed a half-mile section of elk-proof fence in the Inberg-Roy WHMA, which will help with elk movement between the Shoshone National Forest and the winter range on the WHMA.

One of the most interesting initiatives in the report was the use of an unmanned aerial vehicle to locate hornyhead chub nests in the Sweetwater River. WGFD hopes to restore a historical population of the species, which is one of the rarest fishes in the state and an SGCN.

Overall, in 2022 Lander Region habitat projects highlight commitment to preserving and restoring Wyoming's wildlife and habitats through collaborative efforts with local organizations and innovative techniques.

Horse Grazing on Whiskey Basin WHMA Meadow (Goal 1) - Brian Parker, Miles Proctor and Kevin Howard

The WGFD entered into a long-term agreement with CM Ranch to allow 37.5 horse AUMs to be grazed annually from November through December on the Whiskey Basin meadow. In exchange for the grazing, the WGFD received a permanent administrative access easement to Sheep Ridge.

Chain Lakes WHMA Winter Sheep Grazing (Goal 1) - Brian Parker and Matthew Pollock

Chain Lakes is grazed in the winter with sheep to remove decadent, herbaceous material without adversely impacting overall wildlife habitat conditions. Grazing also improves plant vigor and vegetative growth by removing decadent herbaceous material and reducing plant competition and improve plant regrowth and reseeding through hoof action and fertilization through the animal's elimination processes.

Figure 71. Winter sheep grazing on Chain Lakes WHMA..

Collaborative Beaver Restoration (Goal 2) - Amy Anderson and Joanna Harter

Shoshone Metal Works in Powell completed the construction of a beaver holding cage in May 2022. The completed trailer was used in several education events in summer 2022, including WGFD beaver trapping training in Dubois where we were able to hold a beaver in the trailer to help train personnel in determining beaver gender. We brought the trailer to the Wyoming Outdoor Weekend and used it to teach the Lander community about Living with Beaver in our streams due to the benefits they provide in water retention, improved wildlife habitat and protection from fire. In the fall of 2022, USFS and WGFD put the trailer to use in holding beaver trapped from an irrigation ditch near Worthen Reservoir in the Shoshone National Forest. Two beaver were trapped, an adult and a kit (or potentially a small yearling). The trapping effort continued for two weeks to attempt to capture additional adults from the beaver dam complex. These efforts were not successful. The Shoshone National Forest pack string was hoping to transport a family of beaver into a backcountry location in Dubois, but required at least two adults to improve probability of successful beaver restoration to the drainage. Since two adults were not caught, the single adult and kit were relocated to a location on South Pass where existing beaver dams and ponds are located, but currently uninhabited. A trail cam was left at the relocation site, and evidence of beaver activity continued for two weeks post-release, but no activity

Figure 72. Beaver holding cage.

was noted after two weeks. Funding for this project was provided by the USFS, WFW and WGFD.

Dubois Hay Production (Goal 1) - Brian Parker, Miles Proctor and Kevin Howard

The Dubois hay operation allows WGFD to generate hay for use at WGFD's 22 elk feedgrounds, while simultaneously providing supplemental winter forage for elk in the Dubois area. In 2022, the Dubois Habitat and Access crew put up 811 tons of hay on Spence and Moriarity WMA and Whiskey Basin WHMA for use on the feedgrounds.

Figure 73. Hay meadow on Spence and Moriarity WMA.

Dubois WHMA Cheatgrass Treatments (Goals 2 and 3) - Amy Anderson

The Fremont County Cheatgrass Strategy identified the Dubois area as a very high priority treatment area due to the overall intact vegetation communities. The WGFD, in partnership with Fremont County Weed and Pest District, is aggressively working to control cheatgrass.

In 2022, 160 acres of cheatgrass was aerially treated using Rejuvra (Indaziflam) herbicide. This is part of a larger project to control cheatgrass across all of the Dubois WHMA's/WMA's including Whiskey Basin, Inberg-Roy, and Spence-Moriarity.

The Fremont County Weed and Pest District roads crew has worked to annually treat cheatgrass along all of the road corridors since 2018. Monitoring of the roads has shown good cheatgrass control through this repeated treatment regime. Funding was provided by the Fremont County Weed and Pest Control District, NFWF and WWNRT.

Figure 74. Spraying herbicide along the East Fork Road.

Dubois WHMA Production and Utilization (Goals 1 and 2) - Amy Anderson

Annual production and utilization transects on Dubois bighorn sheep and elk winter range sites have been measured since the WGFD began managing the Whiskey Basin WHMA, Inberg-Roy WHMA and Spence-Moriarity WMA. Some of the data goes back to the mid-1940s (Whiskey Basin WHMA). In 2022, the Dubois area recorded normal precipitation amounts, most of which fell in April, May and June, which contributed to an increase in forage production compared to the last several years. Utilization of forage on Whiskey Basin remains within allowable levels at less than 60% use across

all sites, likely due to the declining numbers within the Whiskey Mountain bighorn sheep herd. Utilization of forage within the Inberg-Roy WHMA and Spence Moriarity WMA over the 2021-22 winter was above 70% across many of the clipping sites. This is attributed to higher numbers of elk wintering on the WHMA/WMA.

Elk Ridge Fence Removal (Goal 3) - Amy Anderson, Brian Parker, Miles Proctor and Kevin Howard

The WGFD, with help from WFW interns, removed over a half-mile of eight-foot tall, elk-proof fence near the northern boundary of the Inberg-Roy WHMA near Bear Creek in Dubois. This fence was a relict section of fence nestled into a forested area on Elk Ridge above 9,000 feet in elevation in an area with difficult access, all obstacles which prevented the fence's removal in the past. The Shoshone National Forest approached WGFD about holding a volunteer day to remove the fence, and helped coordinate the fence removal with a sturdy, energetic group of more than 20 volunteers from Wyoming Wildlife Federation, RMEF and BOW. It was a full day of pulling staples and dragging wire in steep, rocky terrain. The project should help with elk movement between the Shoshone National Forest and the crucial winter range found on the Inberg-Roy WHMA.

Figure 75. Volunteer crew working to remove fencing from Elk Ridge.

Use of an Unmanned Aerial Vehicle to Locate Horneyhead Chub Nests in the Sweetwater River (Goal 1) - Del Lobb

Hornyhead chub is one of the rarest fish species in Wyoming and a Species of Greatest Conservation Need. The species was documented historically in Box and Rawhide creeks and the Sweetwater, Laramie and North Laramie rivers, but by the beginning of 2020 was limited to two isolated populations within the Laramie and North Laramie rivers. To restore a historical population, several hundred hornyhead chub were transplanted in 2020 and 2021 from the Laramie River into two sites on the Sweetwater River. One at the Strawberry Creek confluence and another at the Alkali Creek confluence. Both sites were visited in July to document hornyhead chub spawning efforts by locating their nests, which are small, distinctive mounds of gravel piled up by the species. To complement instream searches by regional fisheries management staff, the instream flow biologist used an Unmanned Aerial Vehicle to locate hornyhead chub nests in both sites. The camera was used unsuccessfully in real-time searching for nests. However, videos and photographs allowed identification of several nests.

Green Mountain Aspen and Riparian Enhancement (Goal 2) - Amy Anderson

Green Mountain is an important area for wildlife in central Wyoming. Work on Green Mountain in 2022 focused on private and BLM lands within the Willow Creek drainage on the eastern side of the mountain. Conifer was cut from riparian areas, important mixed mountain shrub habitats and aspen stands using chainsaw crews from Summitt Forests Inc. A total of 581 acres of treatment was conducted within six private landowner's properties and BLM managed lands on Willow Creek.

Partnerships with WSF, BLM and Fremont County Fire Protection District have proven very helpful in completing treatments on Green Mountain. Financial partners for this effort include the BLM, RMEF, WGBGLC, WWNRT, WGFD and Fre-

mont County Fire Protection.

Beaver expansion on Green Mountain is evident in the Willow Creek watershed. By removing conifer in this vicinity, and promoting beaver expansion, willow and aspen should thrive.

There are significant concerns about livestock and feral horse browse on aspen and shrubs. We will continue to work with ranchers who use the Green Mountain BLM allotments to manage livestock grazing for the benefit of treated habitat areas.

Figure 76. Before conifer removal.

Figure 77. After conifer removal.

Long Creek / Dunoir Valley Aspen Enhancement (Goal 2) - Amy Anderson

The Long Creek Aspen Project began in 2015 and has resulted in more than 800 acrs of aspen treated, with an additional 500 acres planned for 2021-2025 on State of Wyoming, private land and Shoshone National Forest land. This project expanded across the Dunoir Valley into the Bench Creek and Wiggins Fork drainages to include other landownerships and partners in 2022. Using a variety of treatments to remove encroaching conifer from aspen and riparian communities, land managers are improving wildlife habitat, and also reducing the risk of catastrophic wildfire in WUI areas.

In 2022, a total of 286 acres of private land Shoshone National Forest were treated using a contracted mechanical saw crew through Summitt Forests Inc. All of these acres were lop and scatter prescription due to lower density of conifer, and healthy, vigorous aspen overstory. Expected aspen response is very good. Funding was provided by NFWF, RMEF, USFS, WGBGLC and WWNRT.

Bain Meadow Restoration and New Pivot (Goal 1) - Brian Parker, 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 western Wyoming elk feedgrounds. Hay meadow farming is typically accomplished over a two-year period. In 2022, we farmed approximately 180 acres on the Bain Meadow. The Bain Meadow also received a new Reinke Pivot.

Spence & Moriarity WMA Noxious Weed Management (Goals 1 and 2) - Brian Parker, Miles Proctor and Kevin Howard

Rocky Mountain Agronomy Center applied herbicide across irrigated meadows on Spence & 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 2022. Habitat and Access personnel also dedicated substantial contract personnel time to noxious weed control.

Figure 78. Weed spraying on Spence & Moriarity WMA.

Ocean Lake Food Plot Planting (Goal 1) - Brian Parker and Justin Rhine

Fifteen acres of Ocean Lake irrigated fields were planted in sorghum food plots. These food plots were planted with the intent to increase forage and cover for pheasants, but for other wildlife as well. Food plots are left through the winter months to provide food and cover and will be mowed and re planted in the spring.

Food plots are planted at Ocean Lake to increase diversity in the habitat surrounding the lake. Smooth brome dominates almost all of the irrigated fields, and food plots allow for wildlife to utilize different cover and food sources.

Figure 79. Parkhill southeast watering.

Ocean Lake WHMA Grazing (Goal 1) - Brian Parker and Justin Rhine

Ocean Lake WHMA is grazed rotationally on a five-year cycle. Each field is grazed with a short -duration, high-intensity intent and is done during January to reduce litter and avoid grazing during the growing and brooding season.

Red Rim - Daley WHMA Grazing (Goal 1) - Brian Parker and Matthew Pollock

Red Rim-Daley WHMA is comprised of OSLI, BLM and WGFC-owned property, and managed as a wildlife habitat/livestock grazing demonstration area. 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 also are important wildlife habitats. The grazing lessees also perform fence maintenance, water well maintenance, and other infrastructure improvements and maintenance, as well as deferred grazing on their private ground in exchange for grazing on the WHMA.

Sand Mesa WHMA Farming (Goal 1) - Brian Parker and Justin Rhine

Approximately 500 acres of Sand Mesa WHMA are under contract to be farmed annually. There are presently three pivots and two flood irrigated fields being farmed by the lessee. Each field is planted with a mixture of grains and grasses and is left with suitable wildlife habitat at the end of each farming season.

Figure 80. Fertilizing.

Sinks Canyon Cheatgrass Treatment (Goal 2) - Amy Anderson

In 2022 WGFD, BLM and Fremont County Weed and Pest partnered to aerially apply herbicide to control cheatgrass in Sinks Canyon. A total of 406 acres were treated using Rejuvra on WGFC-owned lands, and Plateau on BLM owned lands. Hammond Helicopter did the application. The area provides crucial winter range for mule deer. Funding was provided by the BLM and WGFD.

South Pass Aspen Enhancement (Goals 2 and 3) - Amy Anderson

In 2022 Joe Flower, Wildlife Biologist with Shoshone National Forest, coordinated with the Rock Springs BLM to repair four miles of boundary fence that was in poor condition allowing trespass cattle access to the Pine Creek/Mill Creek aspen enhancement project area. These cattle were causing extensive damage to the aspen regeneration and to the 20 BDAs constructed in the area. Some funding was used to clear downed trees off of the fence, and to cut standing trees within a 15-foot buffer on either side of the fence-line to allow access for conducting repair work on the fence. A large crew from Shoshone National Forest, WGFD, Rock Springs BLM and a youth crew called MobilizeGreen reconstructed four miles of boundary fence to protect our investment in the aspen and riparian habitat in the Pine/Mill Creek area. Also in 2022, Summitt Forests cut conifer from 243 acres of aspen and riparian areas in Mill Creek, the Loop Road and on Broken Anvil Ranch. This year's work brings the total treatment acreage for the South Pass Aspen project to 3,101 from 2015-2022. Funding for this effort was provided by the BLM, RMEF, USFS, WFW, WGBGLC, WWNRT, WGFD and was made possible by volunteers.

Figure 81. Loop Road Aspen Unit 29B after conifer removal.

South Wind River / Sweetwater RHAs (Goal 2) - Amy Anderson and Stan Harter

In 2022 a total of 24 RHAs were conducted across both of the Lander Region MDI priority herd units.

In the South Wind River Herd Unit, three Rangeland, six Riparian and three Aspen assessments resulted in 270 acres of habitat assessed.

In the Sweetwater Herd Unit, seven Rangeland, three Riparian, and two Aspen assessments were conducted, resulting in 1,050 acres of habitat assessed.

The information from these assessments will be used for Herd Objective Reviews (conducted every five years) and annual data will be summarized in Job Completion Reports. These data provide population managers and the public with documentation of the current state of habitat conditions for the South Wind River and Sweetwater mule deer herds.

Figure 82. RHA near Strawberry Creek in the Willow Creek drainage.

Squaw Creek Russian Olive Removal (Goal 2) - Amy Anderson

In 2022 the Popo Agie Weed Management Association hired a mechanical tree removal contractor to cut Russian olives from five properties. The contractor used a variety of methods including chain saws and large machinery, and treated the cut stumps to reduce re-sprouting. The infestations ranged from extremely dense to very sparse, so the contractor gave individual estimates for each property rather than bidding the entire project as a whole, and this seemed to work very well. This method of getting cost estimates will likely be used in future years. The NWTF-Wetlands for Wildlife Program continues to invest in this project along with WGFD, Fremont County Fire Protection and Fremont County Weed and Pest.

Figure 83. Before Russian olive removal.

Figure 84. After Russian olive removal.

2022 Rock Creek Watershed Assessment (Goals 2 and 3) - Joanna Harter and Colter Brown

An assessment of the Rock Creek watershed, a sub-watershed of the Sweetwater River watershed, was conducted from 2020 to 2022 to describe stream and riparian habitat, identify major watershed issues, describe possible restoration approaches and outline future enhancements. The Sweetwater River has been prioritized to preserve Species of Greatest Conservation Need fish habitat and riparian reliant wildlife. The Wyoming Habitat Assessment Methodology documented current conditions along approximately 62 miles of the Sweetwater River from the US Highway 287 Bridge upstream to the State Highway 28 Bridge and 41 stream miles of tributaries. An additional 29 miles of tributaries, primarily on the north side of the Sweetwater River, were also inventoried. Sweetwater Canyon WSA was evaluated in early July 2022 to appraise the segment in multiple seasons. Of the total 132 miles assessed, 34 miles were completed in 2022.

Figure 85. Rock Creek watershed.

Throughout the Sweetwater River, excessive lateral streambank erosion and low density and recruitment of willow communities is common. These issues are likely due to both historic and ongoing land use. The Sweetwater River valley has experienced extensive human use and modification including: pioneer travel along the Oregon Trail and associated livestock grazing, cultivation in the floodplain, construction of irrigation diversions and dams and stream channel modification and sedimentation due to gold and iron mining. During assessments, riparian herbaceous vegetation stubble height was often near or less than 2-3 inches in the fall, sometimes up to the water's edge. Wild ungulates browse riparian vegetation and portions of the watershed are crucial winter range. Additionally, livestock and feral horses contribute grazing pressure to these degraded riparian communities along almost the entire length of the river. High flows in the spring combined with reduced stream bank stability caused by degraded riparian vegetation, have led to excessive bank erosion, over-widening of the channel and channel incision.

Trail Lake Seeding (Goals 1 and 2) - Amy Anderson, Brian Parker, Miles Proctor and Kevin Howard

Trail Lake Meadow has decadent forage and was identified to be replanted. Trail Lake Meadow provides cucial forage for bighorn sheep. Trail Lake Meadow was aerated and seeded in spring 2022, however due to equipment break downs and short supply of parts the final seeding was late and therefore only partially successful. Re-seeding will occur in spring 2023.

Figure 86. Lawson aerator used on Trail Lake Meadow.

Sussman Property Acquisition (Goal 1) - Lands Administration Branch

The Sussman family owned a 120-acre parcel located within the boundaries of the Spence & Moriarity WMA in Fremont County. Since the property was land-locked and didn't have legal access, the family offered the property for sale to the WGFC. The property acquisition was approved by the WGFC at the September meeting, and the property was purchased in October 2022. The property will be added to the acreage of the Spence & Moriarity WMA and will provide habitat for wildlife in the area.

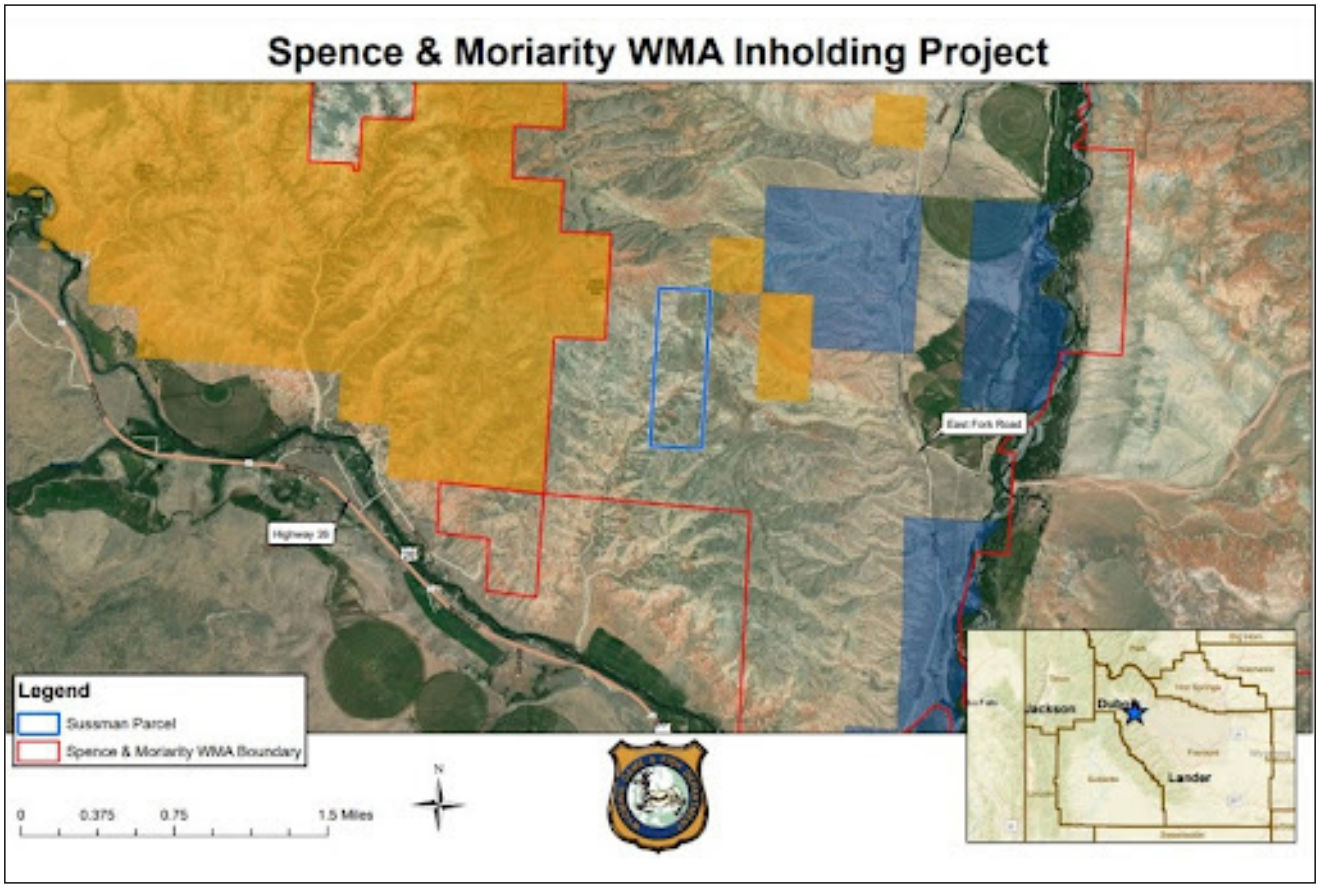
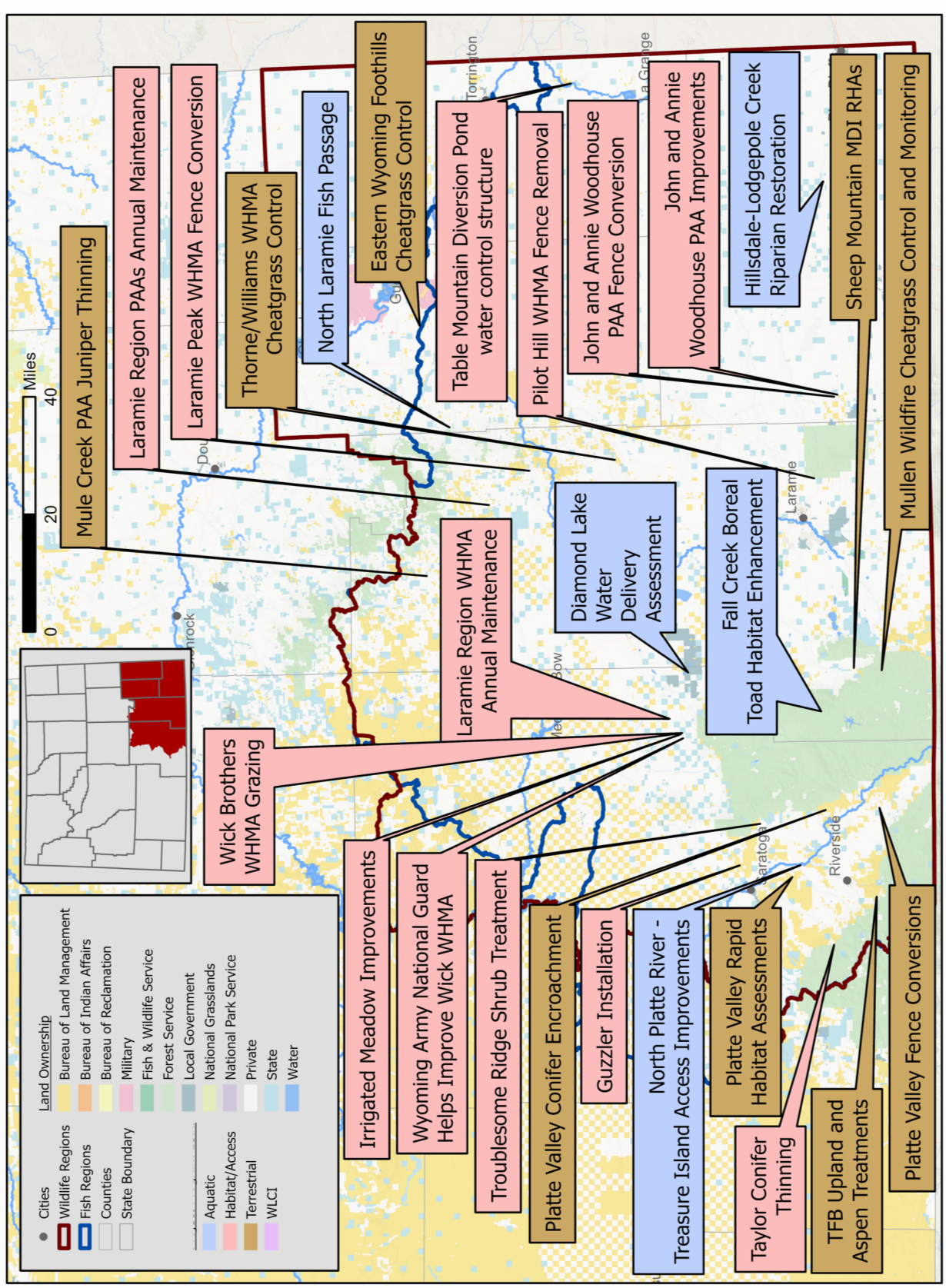


Figure 87. Sussman property.

LARAMIE REGION



The Laramie Region spans the southeast corner of Wyoming, encompassing a range of habitats from alpine meadows to prairie streams. Correspondingly, the habitat work in the region is diverse in both its scope and partnerships. In 2022 the Laramie Region Game and Fish continued and grew partnerships with private landowners, federal agencies, non-profit organizations, local conservation and public utility districts, and others to carry out important conservation, restoration, and research projects. The region is grateful for the funders, partners, and volunteers who made their 2022 habitat work possible.

One focus of the Laramie Region over the past several years has been using GPS collars to collect movement data for bighorn sheep, mule deer, moose, and elk. In 2022, 201 mule deer, 39 bighorn sheep, 40 pronghorn and 9 moose were collared, while previously deployed collars on mule deer and elk were monitored and retrieved. Additional collaring activities are planned for 2023. These movement data reveal which habitats animals are using, allowing habitat restoration work to be guided by the needs of wildlife.

Partially informed by GPS collar data, the Laramie Region worked on numerous fencing projects in 2022. Fencing projects included converting 12 miles of fencing to wildlife-friendly fences and removing over three miles of old, unused fencing. These projects will help increase habitat connectivity for migrating animals.

Aquatic habitat connectivity was also a focus of the past year. Three irrigation diversions on the North Laramie River were improved; two helped connect 13 miles of stream, while the third prevented expansion of smallmouth bass into critical hornyhead chub habitat. The North Laramie River is one of only three locations where hornyhead chub exist in Wyoming, and this project improved their habitat access and quality.

Other habitat restoration projects in the region were diverse, ranging from installing nine beaver dam analogs in Fall Creek to improve boreal toad breeding habitat, to thinning juniper in several key mule deer and elk habitats to encourage the growth of other native plants that provide better forage. Alongside partners, extensive efforts were also undertaken to combat invasive cheatgrass; in 2022, over 7,000 acres of land in the Laramie Region were treated with herbicides. These herbicides have proven effective at reducing cheatgrass while still allowing the recovery of native species.

In addition to a range of targeted projects, the Laramie Region continued maintenance and oversight of its ten wildlife habitat management areas and more than 40 public access areas. These areas are valued for both wildlife and people, and the Laramie Region has remained dedicated to the upkeep and management of these lands.

Diamond Lake Water Volume Delivered (Goal 2) - Jerry Cowles and Del Lobb

In 2017 the WGFD entered into a 10-year agreement with Wheatland Irrigation District to purchase up to 1,000 acre-feet of water annually to be delivered and stored in Diamond Lake. Water is delivered through a pipeline constructed by WGFD in 2018. Water exits the pipe and flows through a rocked channel and then into the lake. The agreement calls for Wheatland Irrigation District and WGFD to calculate and agree on the total acre-feet of water delivered to the lake.

Figure 88. Diamond Lake.

Water delivery to Diamond Lake began on July 12 and ended July 19. Prior to initiation of water delivery, WGFD staff installed a trail camera to monitor water level in the flume's staff gauge every 15 minutes. As a backup, a water level datalogger was installed in a stilling well adjacent to the flume. For each day of water delivery, stage was determined from two video clips: one for 7 a.m. (11 a.m. on July 12) and 7 p.m. (except for July 19 because water was shut off). Those two stages were averaged to estimate each day's average daily stage, which were then converted to average daily flow based on the rating equation for the flume. Using the hours of flow each day, average daily flows were used to calculate that 205 acre-feet of water was delivered to the lake in 2022. Wheatland Irrigation District and WGFD agreed that the Irrigation District delivered 200 acre-feet of water, which Game and Fish purchased at $1,000 per acre-feet for a total of $20,000. The water delivery raised the lake level 0.85 feet to 7,349.45 feet on July 19.

Douglas Creek Bighorn Sheep Collar Study (Goal 3) - Ryan Amundson and Lee Knox

Nineteen adult ewes were captured and fitted with GPS collars to document habitat use and assess the disease status of this herd. To date, we have had two mortalities, with the first mortality documented on July 5. We were unable to get to the site in time to determine the cause of death. The second mortality was September 7. This ewe was found next to the Platte River near another older mortality of an unmarked yearling ewe. At first it appeared a lion had killed her, with puncture marks in her temple. During the field necropsy it was discovered that she had a severe case of pneumonia.

Figure 89. Ewe mortality from pneumonia in Summer 2022.

Additionally we are seeing an increased movement into areas of the Mullen Wildfire scar that were not previously utilized, which is encouraging, but they still have strong fidelity to an old burn scar between the Platte River and Savage Wilderness areas. Funding was provided by WGBGLC and Wy-WSF.

Eastern Wyoming Foothills Cheatgrass Control (Goal 2) - Ryan Amundson

In 2022, 1,940 acres of mountain foothills burned by recent wildfires were treated with herbicides to control cheatgrass infestations to promote native, perennial plant recovery. Habitats for mule deer, elk, pronghorn, bighorn sheep and wild turkey were treated. Four permanent vegetation transects were

established within the treatment areas where cheatgrass control and native, perennial plant composition will be monitored over the next several years. Funding for this effort was provided by the BLM, private landowners, RMEF Wy-WSF and WGFD.

Figure 90. Private and BLM acres sprayed in fall 2022 north of Gurnsey.

Encampment River Bighorn Sheep Research (Goal 3) - Teal Cufaude, Martin Hicks, and Britt Burdett

Over four winters (2017-18, 2018-19, 2019-20, 2020-21) four helicopter/net-gun capture and collar efforts have occurred in the Encampment River bighorn sheep herd unit. The original purpose of this work was to provide a credible estimate of the number of bighorn sheep that utilize winter range in this herd unit. Additionally, a full array of disease samples were collected from captured bighorn sheep as part of a statewide disease surveillance effort. Since the original capture effort, the objectives for this work have evolved. Fine-scale movement data collected from the GPS collars will help managers to more fully understand the movements of this herd and to delineate the habitats these bighorn sheep select. Managers will use these data to determine high-use ranges and movement routes and to better quantify the habitat attributes that are important to the resilience of this herd and other small, isolated bighorn sheep herds across the state. From location data collected thus far, it appears the bighorn sheep are using approximately 12.75-square mile area in shrub-dominated slopes within the Encampment River drainage and avoiding dense conifer stands. Coarse, qualitative habitat analyses show bighorn sheep movement seems to be constrained by habitat type and Wyoming Highway 70, despite the availability of suitable habitat to the northwest and southeast of their current area of use.

Figure 91. Encampment school kids helping to retrieve Encampment River Bighorn sheep collars.

Fall Creek Boreal Toad Habitat Enhancement (Goal 2) - Christina Barrineau

Fall Creek, a tributary to the Middle Fork Little Laramie River, harbors one of three Boreal toad breeding sites on the Medicine Bow National Forest. The site consists of relict beaver ponds in a wide, open, grassy meadow. There are no active beaver in Fall Creek. The only willow species observed in the drainage is plainleaf willow, which are heavily browsed by wildlife. The cattle grazing allotment is currently vacant, so no domestic livestock graze the watershed. The WGFD Herpetological Coordinator is concerned the remnant beaver ponds will continue to fill with sediment and

vegetation and render the area unsuitable for Boreal toad breeding. Current habitat conditions are unsuitable for beaver food or building material.

The Laramie AHAB, Herpetological Coordinator and the Medicine Bow National Forest fisheries biologist developed an adaptive management plan to enhance beaver activity and Boreal toad breeding habitat in Fall Creek. To help bridge the gap between existing Fall Creek beaver habitat conditions and optimal Fall Creek beaver habitat conditions, nine BDA structures were installed within a 420-foot reach of Fall Creek in late summer 2022. The BDAs were constructed out of sod, mud, rocks, pine tree poles and branches. All materials were gathered on-site, since the location is within a designated roadless area. The goal is for the BDAs to maintain adequate Boreal toad breeding water depths.

To aid willow diversity along Fall Creek, the Laramie AHAB identified less palatable willow species on the Medicine Bow National Forest at a similar elevation to Fall Creek (9,800 feet). Wolf willow was found in large patches across the upper Douglas Creek watershed (elevation 9,500-plus feet). Minimal wildlife browse was observed for this species. Geyer's willow was sporadically found in the upper Douglas Creek watershed with limited browse. In October 2022, wolf and Geyer's willow cuttings were obtained from plants immediately upstream of Rob Roy Reservoir along Douglas Creek. The willow cuttings were transported to Fall Creek where they soaked for five days. After soaking, approximately 300 cuttings were planted along the BDA enhancement perimeter.

Figure 92. Building a BDA on Fall Creek.

An additional step in the adaptive management process will be pursued in 2023. The Laramie Region AHAB worked with the Laramie Region THAB to come up with a fencing strategy to exclude wildlife from the BDA area. An electric fence with an interior four-wire fence (6-feet-tall) and exterior single-strand fence will be installed in 2023. The optimal time of year to operate the fence will be from May-November, but snow may preclude accessing the site during May and November some years.

Ferris-Seminoe Bighorn Sheep Research (Goal 3) - Amy Anderson, Teal Cufaude, Britt Burdett and Greg Hiatt

Pedro Mountain has provided a buffer between bighorn sheep occupying the Seminoe and Bennett mountains in the Ferris-Seminoe bighorn sheep herd unit from domestic sheep that graze on Canyon Creek just to the north of Pedro Mountain. This may have changed as a result of the Pedro Mountain wildfire that was started by a lightning strike in August 2019. The fire consumed an estimated 23,408 acres and essentially all of the mountain and much of the sagebrush/grasslands surrounding the foothills of the mountain were burned either by the wildfire or by back-burns lit to contain the fire. It is believed the vegetative change due to the fire will result in suitable bighorn sheep habitat and may become enticing to Ferris-Seminoe bighorn sheep - particularly those sheep in the Miracle Mile area. Immediately post-wildfire, WGFD wildlife managers discussed methods to monitor bighorn sheep movements out of the Ferris-Seminoe herd unit to the newly burned areas. It was determined the most effective method to monitor bighorn sheep movements was to capture and collar several ewes and rams in the Miracle Mile area. In February 2020, ten bighorn sheep (four rams and six ewes) in the Miracle Mile area were collared to monitor movements. Each day, wildlife managers receive four locations for each collared animal. An R code was developed to automatically notify managers if a collared bighorn sheep has left the herd unit boundaries. To date, no collared animals have

Figure 93. WGFD personnel working up a bighorn sheep ewe in the Ferris-Seminoe herd.

crossed the herd unit boundary. These original ten collars began releasing from sheep in December 2022. In order to continue monitoring movements of these sheep, the WGFD collared ten additional sheep (five rams and five ewes) in February 2022. These ten collars will release in December 2024.

The Pedro Mountain area is just now becoming re-vegetated, so wildlife managers are interested in continuing to monitor bighorn sheep in the Miracle Mile area and Bennett Mountains. The goal of Phase 2 of the project is to continue to monitor movements of bighorn sheep in the Ferris-Seminoe herd unit through 2024 and allow for immediate management response if any of the collared bighorn sheep wander outside of the herd unit to Pedro Mountain and come within close proximity to domestic sheep. The data gathered from these collar efforts will be primarily used to monitor movements outside the herd unit boundaries, but could also be used to evaluate bighorn sheep habitat use in the Ferris-Seminoe herd unit. Additionally, managers will use collared animal data to help evaluate annual trend flight results and better estimate the population of this herd. Ferris-Seminoe bighorn sheep research is funded by Wy-WSF and WGBGLC.

Solar Well Guzzler Improvement (Goal 1) - Mark Cufaude

When the original solar well development was completed on Pennock WHMA a guzzler was supposed to be installed in accordance to BLM. An open top tank was instead installed and in 2020, BLM biologists were able to obtain a guzzler through Local Sage-Grouse Working Group funds to be installed in place of the open top tank. This was a continuation of a project completed in 2021 where another dilapidated guzzler was replaced.

Hillsdale - Lodgepole Creek Riparian Restoration (Goal 2) - Christina Barrineau

The Hillsdale-Lodgepole Creek Riparian Restoration continued in 2022 in cooperation with Laramie County Conservation District, the USFWS - Partners for Fish and Wildlife Program and the landowner. The restoration seeks to create a 119-acre riparian grazing pasture to enable better cattle management on the ranch, which has previously grazed leased cattle year-round. Managed riparian grazing will allow for vegetation recovery providing necessary cover and stream shading for native, nongame fish species. It also will help narrow and deepen the channel over time to provide deeper pools and refuge habitat for fish.

Riparian fencing was completed in 2021. The riparian pasture was grazed until mid-July 2022 because water was not yet available on the upland pastures. A 200-foot well was drilled in fall 2022. The new solar well and stock tank serve the pasture north of Lodgepole Creek. The pasture south of Lodgepole Creek will have a pipeline run from an existing

well to a tire tank in spring 2023.

Additionally, a new riparian grazing plan was developed between the landowner, USFWS and Laramie County Conservation District. A new grazing lessee will graze the south and north pasture starting in 2023. Managed riparian grazing is expected to begin in the riparian pasture in 2024.

Partners for the Hillsdale-Lodgpeole Creek Riparian Restoration include the landowner, WWNRT, Laramie County Conservation District, WGFD, Great Plains National Fish Habitat Partnership Program, USFWS - Partners for Fish and Wildlife Program, Wyoming Water Development's Small Water Program and NFWF.

Figure 94. New willows sprouting at Hillsdale-Lodgepole Creek riparian restoration.

Forb/Legume Seeding (Goals 1 and 2) - Jerry Cowles and Micah Morris

A dormant forb and legume seeding of 100 acres was completed on the northern portion of the Johnson-Oleson meadow within the Wick Brothers WHMA. The goal is to provide diverse and nutritious, native forage throughout all seasons for the suite of wildlife species present on the WHMA. Re-seeding riparian areas along Wagonhound Creek reduces erosion and sedimentation, stabilizes stream banks, improves plant diversity and soil health on the WHMA and improves wildlife values of sensitive areas.

Figure 95. Wick WHMA.

John and Annie Woodhouse PAA Fence Conversion (Goal 3) - Jerry Cowles and Micah Morris

During 2022 the Laramie Habitat and Access crew converted 1.2 miles of four and five-wire barbed wire stock fence to four-strand, wildlife friendly fence. This fence line is internal running along the eastern side of the main access road. This fence line is required to exclude neighboring livestock grazing on the managed area, and prevent visitors from traversing off road. The conversion is in mule deer high-use areas, and reduces wildlife mortalities, entanglement while still maintaining proper grazing allotments

John and Annie Woodhouse PAA Improvements (Goal 1) - Jerry Cowles and Micah Morris

In 2018 the Cheyenne Board of Public Utilities completed a large-scale silt removal project at Lower North Crow Reservoir at the John and Annie Woodhouse PAA to allow the reservoir to hold more water. The WGFD took advantage of this opportunity and utilized the low water level to reduce the population of problem suckers in the reservoir. In addition, Habitat and Access installed a

fishing pier for people with disabilities.

Following the completion of the public fishing pier, an ADA-compliant parking pad was installed to further aid public users with disabilities. This project was made possible by collaboration between the WGFD, Cheyenne Board of Public Utilities, TU, Black Hills Energy, Lions Club, Capital Lumber Company and Platte Rivers Veterans Fishing.

Figure 96. PAA pad.

Laramie Peak Bighorn Sheep Disease Surveillance (Goal 3) - Ryan Amundson and Keaton Weber

This collaring project is part of the statewide bighorn sheep disease surveillance effort to garner baseline information on the various respiratory pathogens within Wyoming's wild sheep populations. For the Laramie Peak herd unit (Hunt Area 19), the primary goal is to better monitor respiratory disease outbreaks that could potentially cause large or small scale die-offs. Additionally, this collar data will assist in identifying seasonal movement patterns, crucial winter ranges, habitat selection, lambing areas and cause-specific mortality and survival estimates.

In 2022 10 ewes, three from Sybille Canyon sub-herd and seven from the Duck Creek sub-herd, were captured and collared. Collars are set to release in February 2025. There were two mortalities throughout 2022. One mortality was in March 2022 and it was determined that this ewe had succumbed to starvation due to a large sarcoma abscess (cancer) in her jaw. The second mortality occurred in October 2022. This ewe was predated by a mountain lion.

Within the herd unit, there have been wild and prescribed fires in which location data will be used to determine if sheep are utilizing habitat within these burn scars more or less frequently. Additionally, burned areas and unburned areas with high sheep use have been treated for cheatgrass. Collar location data will help managers determine if sheep are selecting for these treated habitats.

Figure 97. Carrying a bighorn sheep to the processing site.

The primary concern with this herd unit is outbreaks of respiratory pathogens. In 2019, there was a small scale die-off due to a pneumonia outbreak within the Sybille Canyon sub-herd and these collars will aid in monitoring future disease outbreaks and mortalities. Mortality notifications from collars will inform managers of major die-offs. This effort was funded by WGBGLC.

Laramie Peak WHMA Fence Conversion (Goals 1 and 3) - Jerry Cowles, Micah Morris and John Henningsen

In 2022 a contractor, volunteers and WGFD staff converted 2.5 miles of woven-wire fence to wildlife-friendly standards. This is a continuation of the Laramie Peak WHMA Fence Conversion, where the goal is to convert 10 miles of fence from 2021-23. The new fence is constructed with drill stem H-braces, all T-post and three barbed and one smooth wire.

Since starting the project, 5.5 miles have been converted in high priority areas. Volunteer days have built meaningful relationships. We appreciate our funding partners: WWNRT, WGBGLC, RMEF and MFF on a project that showcases proper land stewardship, and brings awareness to neighboring landowners and the public.

Figure 98. Fence conversion on Laramie Peak WHMA.

Laramie Region PAA Annual Maintenance (Goal 1) - Jerry Cowles, Micah Morris, Jacob Sorensen, Mark Cufaude and John Henningsen

PAAs serve as critical recreational areas for hunting, fishing, birding, biking, boating, camping, and many other activities. Managers recognize and create opportunities for public collaborative conservation efforts that influence and maintain the ecological functions that sustain terrestrial and aquatic species.

Crews conduct annual biological monitoring, including: terrestrial and aquatic observations, vegetative and habitat data collection and assessing the effectiveness of management and restoration activities. Collected data provides diversity, composition, density and trend history which informs the management of each area. A variety of hunting, angling and trapping opportunities are available to the public. Annual maintenance preserves habitat, mitigates/reduces area impacts and promotes safe and responsible public recreation.

Habitat and Access personnel performed annual monitoring and maintenance at each PAA. This encompasses:

Thirty-three miles of boundary or interior fences are maintained annually across the region's PAAs. These fences serve many functions: containing neighboring livestock, reducing ORV use in sensitive areas, delineating boundaries for sportspersons and showcasing wildlife-friendly fencing designs as much as possible. The Laramie crew continued installing and updating signs to provide directional, regulatory, interpretive and informational awareness. In addition, crews maintained or provided contract oversight for 60 miles of currently designated open roadways with 66 associated parking areas. The crews inspected 31 cattleguards and installed 4 new cattleguards to limit public/landowner conflicts with neighboring livestock operations. Two of the four new cattleguards are a

Figure 99. Diamond Lake PAA dock.

horse-friendly style donated by the BLM for Twin Buttes PAA.

Laramie personnel conducted oversight on 11 contracts to service comfort stations, remove litter and collect public use data. Noxious weed control consisted of herbicide applications, hand removal, mechanical removal, grazing revegetation and biological control methods in various extents to achieve the most biologically sound technique on each area. Noxious weed locations were documented by contractors, Weed and Pest districts and Habitat and Access personnel in order to track effectiveness of control efforts. We regularly remove silt and debris from boat ramps, move boat docks to match seasonal water levels and make repairs to boat docks. We strive to provide safe and ample recreational opportunities and well-maintained facilities for the public. Albany County Weed and Pest assisted with the funding of these projects.

Laramie Region WHMA Annual Maintenance (Goal 1) - Jerry Cowles, Micah Morris, Jacob Sorensen, Mark Cufaude and John Henningsen

Many WHMAs were acquired to protect and enhance winter range for big game species but the areas are important in all seasons for all species. WGFD is responsible for the conservation, protection and perpetuation of these managed lands. WHMAs are managed to provide and showcase important habitat for all wildlife, offer high-quality wildlife-based public recreation and provide historic and current land use practices designed to benefit wildlife species of interest.

In order to provide high-quality habitat for wildlife and manage livestock grazing, fences on many WHMAS are constructed and maintained annually. Fences delineate property boundaries, control public access and manage livestock. In 2022, the crew maintained 210 miles of boundary and interior allotment fences while converting 12 additional miles to meet wildlife friendly specifications.

Agricultural irrigation is used on portions of the WHMAs to increase big game winter forage, improve production in hay meadows and grow small grain food plots and nesting cover for upland birds and waterfowl. Several times throughout the season irrigation water was spread across 974 adjudicated acres. Roughly 1/8 of the irrigated acres were harvested for hay or grain crops beneficial as wildlife nesting cover, food plots and improving palatability for wintering wildlife. Barter contracts were arranged to exchange agriculture work for harvested hay or grain crops.

Crews annually conduct biological monitoring including: terrestrial and aquatic wildlife observations, vegetative and habitat data collection and assessments on the effectiveness of management and restoration activities. Data on species composition diversity density and trends informs management decisions.

Figure 100. Noxious weed control.

Management crews expanded efforts on noxious weed control. We worked with several private contractors and county Weed and Pest districts to eradicate or control state-designated noxious weeds on 1,183 acres within regional WHMAs.

Infrastructure maintenance was conducted on more than 297 miles of roads and 64 parking areas for public use; work is accomplished annually by various contractors and staff. The Laramie crew continued installing new or updated signs to provide directional regulatory interpretive and informational awareness on managed lands. Crews provided contract oversight and hands-on repairs for comfort stations and parking areas at all the region's WHMAs.

The Laramie Region's WHMAs have several building facilities that require annual maintenance and updates. These WGFD facilities are located at: Springer, Red Rim Grizzly, Saratoga Wick Brothers, Laramie Peak and the Laramie Regional Office. Facility improvements included: Structural improvements, roof replacements, water drainage, repair/replace siding, kitchen remodel, electrical, plumbing, HVAC, water quality testing and annual inspections.

Laramie River Instream Flow Study (Goals 1 and 3) - Del Lobb and Paul Dey

A study was initiated in 2018 to model fish habitat availability at various flows in a Laramie River study site on public land. Hydraulic, hydrologic, habitat and water quality data were collected to calibrate habitat models. Hornyhead chub nest locations were identified and measured in 2018 and 2019 to develop spawning habitat suitability criteria needed for the modeling. An Unmanned Aerial Vehicle was used to collect videos and oblique and vertical angle photographs of the Laramie River Instream Flow study site. The imagery was collected to help find Hornyhead chub nests and to develop maps of wetted habitat at 2.8 cfs, 4.3 cfs, and 7 cfs.

Figure 101. Upstream end of Laramie River instream flow study reach.

Mule Creek PAA Juniper Thinning (Goal 2) - Ryan Amundson

In 2022, 305 acres of junipers were thinned by hand from riparian, aspen and sagebrush habitats on the PAA. Juniper encroachment into these habitats created more xeric conditions, negatively impacting vegetation production, ground cover and vegetative species diversity. The property provides important parturition habitat and Spring, Summer, Fall range for elk and mule deer.

Mullen Wildfire Cheatgrass Control and Monitoring (Goal 2) - Ryan Amundson and Britt Burdett

To control cheatgrass in areas burned by the Mullen Wildfire in 2020, WGFD aided USFS in treating 6,288 acres in July 2022. Areas treated were predominantly south facing aspects, areas of high fire severity or were known to have cheatgrass infestations prior to the wildfire. Herbicide was utilized at a rate of five ounces per acre. Due to the steepness of slopes, a helicopter was used for application.

Fifteen permanent vegetation plots were again monitored by WGFD personnel in the wildfire scar. To date, project partners have been very pleased with herbicide efficacy. Species diversity in areas treated with herbicides continues to increase, demonstrating the selected herbicide is having minimal impacts on native, perennial vegetation recovery. Due to fire severity and lack of growing season moisture in 2021, recovery of vegetation

Figure 102. Permanent vegetation plot monitoring one year post-treatment.

was delayed. In summer 2022, we were encouraged to see re-sprouting of aspen and important mixed mountain shrub stands, after poor recovery the year immediately post-fire. Intensive vegetation monitoring will continue on treated and untreated acres within the Mullen scar for the foreseeable future. Funding partners include WGBGLC, WyWSF and WGFD.

North Laramie Fish Passage (Goals 1 and 3) - Nick Scribner

Improvements were made in fall 2022 to three irrigation diversions on the North Laramie River near Wheatland to improve connectivity to over 13 miles of stream and enhance protection of native fish species from predation and competition. Hornyhead chub exist in only three streams within Wyoming: the North Laramie River, Laramie River and Sweetwater River. Populations within the North Laramie River are still recovering following a large fire in the Laramie Range that occurred in 2012 and essentially wiped out much of the fishery. Translocations of Horneyhead chub from the Laramie River in 2014 and 2017 reestablished Horneyhead chub populations in the North Laramie River upstream of two of the diversions that were improved in 2022. These diversions previously were barriers to fish movement. They both were replaced with roughened rock channels to simulate natural riffles. This creates variable flow conditions that fish of all sizes and species can navigate to make their way upstream. The rehabilitated diversions will also improve debris and sediment transport that will reduce maintenance for water users.

About 12 miles downstream near I-25 lies the Burger Diversion that was enhanced to remain a barrier to upstream movements of smallmouth bass. Concrete wing walls were added to concentrate flows to the channel center during high flood flows. Downstream of the dam there was substantial grading of the channel to create uniform flow conditions and reduce pool depths to discourage bass and other potential unwanted species from moving upstream. Lastly, a pipe reducer was attached to the sluice pipe culvert to increase water velocity to prohibit movement through the culvert at higher flows. Collectively, this work secures and opens stream habitat for Horneyhead chub and many other native species for decades to come. Funding for this project was provided by USFWS – Fish Passage, WGBGLC, WWNRT and WGFD.

Figure 103. Completed Burger Diversion.

Treasure Island Wetland Mitigation (Goal 2) - Christina Barrineau

The Treasure Island Restoration, Boating Access and Parking Improvement was completed in fall 2021. Overall, maintenance requiring heavy equipment was not needed for any portion of the Treasure Island improvement. Stream, wetland, boat ramp and parking lot improvements were stable during spring high flows.

Several monitoring and maintenance activities were conducted in 2022, including photo monitoring, vegetation watering and wetland mitigation monitoring. Supplemental water was provided to the mitigated wetlands in July and August 2022. A temporary water haul permit obtained from the Wyoming State Engineer's Office was used to water vegetation.

The Army Corps of Engineers requested wetland mitigation and monitoring for the improvements as part of the permitting process. A portion (0.18 acre) of an existing wetland adjacent to the parking lot was impacted by the expansion of the parking lot and relocation of the boat ramp. The mitigation wetland is 0.4 acre of constructed floodplain bench

and wetland located adjacent to the North Platte River.

Wetland mitigation monitoring included two routine wetland delineation sampling points, determining seasonal wetland hydrology and wetland vegetation transects. Summer 2022 was the first growing season for the mitigated wetlands and none of the performance standards were met in 2022. The mitigated wetland will be monitored annually until performance standards are met and the area is considered a wetland. Funding was provided by USFWS – Boating Access.

Figure 104. North Platte River - Treasure Island mitigated wetland.

Pilot Hill WHMA Fence Removal (Goal 3) - Jerry Cowles and Micah Morris

Fences are essential for controlling livestock and unwanted trespass. Some fencing is essential for wildlife, such as to funnel wildlife away from dangerous highway crossings. Converting or removing miles of fence that incidentally may impede wildlife access to critical resources will provide landscape scale connectivity for migratory routes essential for sustaining populations and access to critical water, forage, cover and fawning or calving grounds. On Pilot Hill WHMA, 2.6 miles of old, barbed-wire stock fence was removed with a community day of 38 volunteers including the Forest Service, Pilot Hill Inc., Lions Club, Laramie Rivers Conservation District, TNC, RMEF, County Commissioners and WGFD.

Platte Valley Conifer Encroachment (Goal 2) - Britt Burdett

As part of the PVHP effort, the BLM is continuing its large-scale conifer encroachment removal efforts in the Platte Valley. The Barrett Ridge/Corral Creek project focuses mostly on the removal of encroaching juniper in mixed mountain shrub communities. The BLM completed approximately 681 acres of juniper mastication in the Barrett Ridge project area in 2022. An additional 76 acres of lop and scatter treatments were completed as maintenance actions in the Barrett Ridge project area. The BLM also completed six acres of thin and pile treatments in the Corral Creek project area. This work was completed in sage grouse core area and partially within the Platte Valley mule deer migration corridor. Funding was provided by the BLM, Saratoga-Encampment-Rawlins Conservation District, South Central Sage Grouse Local Working Group and WGFD.

Figure 105. Juniper masticated near Barrett Ridge, east of Saratoga.

Platte Valley Fence Conversions (Goal 3) - Britt Burdett

Through the PVHP, the Saratoga-Encampment-Rawlins Conservation District, BLM, WGFD, USFS and private landowners have worked collaboratively to identify fences within the Platte Valley mule deer herd unit that are in need of wildlife-friendly fence conversion. These fence conversions are intended to increase overall habitat connectivity, decrease big-game mortalities, and maintain proper grazing systems. In 2022, 9.2 miles of hazardous fence was converted to wildlife-friendly specifications. Additionally, 3,400 feet of unnecessary fence was permanently removed. Since 2014, the PVHP working group has converted over 70 miles of hazardous fences. The PVHP working group will continue to prioritize large-scale fence conversions within the migration corridor and mule deer crucial range using the Platte Valley mule deer GPS collar data to guide our efforts. Funding was provided by WGFD, BLM, USFWS Partners for Fish and Wildlife, WWNRT and Saratoga-Encampment-Rawlins Conservation District.

Figure 106. A newly converted, wildlife friendly fence within the Platte Valley mule deer migration corridor.

Platte Valley Mule Deer Research (Goal 3) - Britt Burdett, Teal Cufaude and Martin Hicks

In February 2020, 47 Platte Valley mule deer does were fitted with GPS collars. The project area encompasses Deer Hunt Areas 78, 79, 80 and 81. The primary objective of this project is to collect detailed movement data. The movement data will be analyzed to quantify and delineate important areas used for Platte Valley mule deer migration. The data will be refined in accordance with the WGFD's Ungulate Migration Corridor Strategy to update the designated migration corridor, stopover areas and bottlenecks. Managers also will collect information on timing of migration and doe survival. In 2022, more than 10,000 locations were collected on the collared Platte Valley mule deer. Ten of the collared deer died (one vehicle collision and nine unknown causes of death) in 2022. Two mortalities occurred in January 2022; one in February, two in March, one in April, three in May and one in September. Eight of the 2021/early 2022 mortality collars were re-deployed on new mule deer does in February 2022.

Figure 107. Mule deer collar.

In December 2022, the 34 deer collars that were still online began releasing per the initial collar programming. WGFD personnel have picked up the majority of deer collars and will continue to pick up collars in the next several months. Collars stored hourly location information through the study period, so it is essential we retrieve each of these collars.

Data will be used to inform priority opportunities for habitat improvement projects including fence conversions, shrub enhancements, roadway crossings, and invasive species mitigation. Platte Valley mule deer research is funded by the Department of Interior and the Knobloch Family Foundation.

Platte Valley RHAs (Goal 2) - Britt Burdett

RHAs are conducted in MDI herds across the state to better assess habitat conditions across mule deer seasonal ranges. The summer of 2022 was the eighth year of RHA data collection in the Platte Valley. In 2022, five aspen (128 acres), five rangeland (354 acres), and two riparian assessments (68 acres) were completed in the Platte Valley mule deer herd unit. 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. These data will provide population managers and the public with documentation of the current state of mule deer habitat conditions in the Platte Valley.

Figure 108. Rangeland RHA assessing mixed mountain shrub communities.

Rawhide Elk Collar Project (Goal 3) - Ryan Amundson and Keaton Weber

The WGFD partnered with the Wyoming Military Department (Camp Guernsey) and captured 42 cow elk from 2018-22. All 42 cow elk from the Rawhide Herd were fitted with GPS collars. Animals were captured on Camp Guernsey and lands adjacent to Camp Guernsey. Collars were programmed to collect a GPS location every two hours and to drop off after three years. As elk died, collars were collected and redeployed the following January. Western EcoSystems Technology, Inc was contracted to evaluate and summarize all of the collar data and results. This project was finalized in 2022 and the final report was completed in June 2022.

The goal of this project was to identify 1) key winter, summer and parturition ranges, 2) potential movement barriers, 3) important habitat components that elk select or avoid and 4) assess whether elk are effected by military training activities or hunter activity.

Spatial location data indicated this herd of elk are very nomadic and do not select for seasonal winter range or summer range habitats. However, data suggests most elk within this herd do have distinct parturition areas. This herd was thought to have potential movement barriers from I-25 and the North Platte River. Collar data confirmed that I-25 does limit natural elk movements westward across the interstate, however, it was not uncommon for elk to cross the interstate occasionally. It also was found that the North Platte River did not inhibit elk movements whatsoever. Results clearly indicated that elk were being displaced from various military training disturbance events (aerial activities, range fire, personnel on site, etc.) and the elk selected for more rugged terrain during these disturbance events. There was no detection of elk being displaced due to hunter activity, however, this was likely due to the lack of fine scale hunter activity data. Managers will ultimately use these results to help minimize disturbances to the elk, locate high use habitats, and assist in making informative recommendations for potential energy and mining developments in the area.

RHAs in the Sheep Mountain Mule Deer Herd Unit (Goal 2) - Ryan Amundson

Sixteen RHAs were completed in 2022 in the Sheep Mountain mule deer herd unit. Assessment efforts this year were spent largely in aspen habitats in transition ranges, where 351 acres were assessed

across 9 sites. Six riparian sites totaling 191 acres, known as important areas for mule deer fawn rearing, were also assessed. About 1,187 acres of mixed shrub and rangeland habitats on the foothills of the Snowy Range that serve as important habitats for mule deer in winter months were assessed.

Aspen habitats continue to rebound post-wildfire in the Snowy Range. Due to the large acreages burned, herbivory has been spread out and has allowed for excellent regeneration of aspen to date. In areas where wildfires have not occurred, aspen communities are largely dominated by mature aspen and conifer encroachment limits aspen recruitment. In riparian areas, browse use by wild and domestic ungulates have had some negative impacts on important woody species in some drainages. Cheatgrass invasion into disturbed and undisturbed rangeland habitats continues to be cause for concern, impacting vegetative species diversity as well as annual production.

Figure 109. Aspen regeneration two years post-Mullen wildfire.

Sheep Mountain Mule Deer Collar Study (Goal 3) - Ryan Amundson and Lee Knox

In November 2020, 15 collars were put on adult doe mule deer in Hunt Areas 74 and 75 in order to address conservation challenges in the Sheep Mountain mule deer herd. Deer were captured using Native Range services with a net gun and a R44 helicopter. Fifteen additional collars were deployed in February 2021 on mule deer in the Hunt Area 76. There were nine mortalities in 2021, eight of which were in Hunt Areas 74 and 75, one being poached. In 2022 we had an additional nine mortalities and those collars will be redeployed in 2023. Data is stored on the collars and no analysis has been conducted at this point.

Figure 110. Processing a mule deer doe and fitting with a GPS collar.

Snowy Range Moose Research (Goal 3) - Lee Knox, Teal Cufaude, Martin Hicks and Britt Burdett

In recent decades moose have declined across much of their range in Wyoming. Research has pointed towards a likely role of climatic conditions, habitat quality issues and density dependence in causing population declines across much of their southern range. The Snowy Range moose herd in south-central Wyoming, has remained productive, despite notable changes in these factors. Despite this herd's stable population performance, the landscape of the Snowy Range has been altered dramatically by the mountain pine beetle and most recently large-scale wildfires. In September 2020, the Mullen Creek Fire started in the Savage Run Wilderness Area, and burned more than 176,800 acres in the

southern extent of the Snowy Range on the Medicine Bow National Forest. The burned acreage included a substantial portion of the Snowy Range moose herd unit. The public and wildlife managers are interested in how these changes could impact the performance of this herd. Snowy Range moose have been monitored through several studies over the past 15 years, allowing us the unique opportunity to compare moose habitat selection, movement, and behavior pre- and post- wildfire. The information collected from these collared moose will allow us to better assess moose population performance and prioritize future habitat projects.

The field component of this project began in February 2022. Nine female adult moose were captured via helicopter darting on winter habitats within and surrounding the Mullen Creek Fire scar. Moose were fitted with GPS store-on-board collars set to collect hourly locations, which will allow us to compare movement and habitat use of moose prior to and following this large-scale fire. These nine collars will remain deployed for a period of four years (through 2025). No collared moose have died since the initial collaring. A second capture will occur in 2023 to collar 21 female moose in the study area. We plan to helicopter dart the majority of these moose, although we may attempt ground darting some moose. These 21 moose will be collared through 2026 in order to improve study sample size and garner an understanding of longer-term impacts of wildfire on moose and moose habitats. Snowy Range moose research is funded by Wyoming Sportsmans Group, BOW and WG-BGLC.

Figure 111. A cow moose is fitted with a GPS collar to monitor movement and habitat use within the Mullen Fire burn scar.

In addition to collaring efforts, biologists are monitoring willow communities throughout the Snowy Range moose herd unit. Willow communities are important food sources for moose. This past summer, fifteen willow transects were surveyed using Kiegley Live-Dead Index with the intention of quantifying habitat quality trends. Habitat monitoring efforts will continue next summer.

Table Mountain Diversion Pond Water Control Structure (Goals 1 and 2) - Jerry Cowles, Jacob Sorensen, Kade Clark, Mac Foos, Rick Harmelink Todd Grosskopf, and Darby Schock

Table Mountain WHMA provides important staging and year-round habitat for numerous species of waterfowl, shorebirds and other birds migrating along the central flyway. These species are associated with shallow flooded fields, ponds, and wetlands. Maintaining a drought cycle in wetlands is natural and fundamentally imperative to the overall health and productiveness of any wetlands. After decades of flooding, sediment, excavating and management operations, water-control structures can and will fail, requiring replacements and upgrades. During the drought in 2022, and once permitting was complete the Statewide and Laramie

Figure 112. Table Mountain.

Habitat and Access crews removed and replaced the water control structure on the diversion pond. This consisted of a new 24-inch canal gate debris screen and water control stem to operate the canal gate. The crew reinforced the canal gate with new bolts, welding a trash rack screen on, and ensure proper operation to control water.

Taylor Conifer Thinning (Goal 1) - Mark Cufaude and Britt Burdett

The Taylor property has been a long standing partner with PVHP with multiple projects occurring on their land. Three years ago a project was implemented to thin the understory of an aspen stand removing all conifers. The conifers were subsequently piled and left to be burned at a later date when conditions allowed. In December 2022 about 50% of these piles were successfully burned.

TFB Aspen Treatment (Goal 2) - Britt Burdett

The TFB aspen treatments were designed to improve big game habitat in important seasonal ranges across the eastern slope of the Sierra Madres. The project area is located approximately six miles southwest of Encampment in the Miner Creek drainage just above the Encampment River. This project expanded on previous projects that aerially treated cheatgrass in 2015, shrub plantings in 2015, mixed mountain shrub enhancements in 2017 and conifer removal in 2017-19.

Aspen are a critical component of mule deer fawning areas as well as summer and transition ranges. As such, maintaining and enhancing the health of aspen stands has been recognized as a priority within the Platte Valley through the PVHP. Due to the lack of natural disturbance, aspen stands in this area are primarily late-seral stage, with heavy conifer encroachment, and little regeneration. Aspen enhancement projects were proposed to diversify age class, increase regeneration, and increase understory production. In 2021-22 aspen enhancement work was completed in the Miner Creek drainage. Aspen treatments included mastication of juniper and hand treatments to remove smaller diameter spruce and fir trees. Approximately 26 acres were treated by the private landowner. Partners include WWNRT and Sierra Madre Land Investments LLC.

Figure 113. Aspen one year post-treatment.

Thorne / Williams WHMA Cheatgrass Control (Goal 2) - Ryan Amundson and Jerry Cowles

To combat cheatgrass invasion into mixed mountain shrub habitats on the Thorne/Williams WHMA, 5,688 acres were sprayed with Plateau and Rejuvra herbicides in fall 2022. Four permanent vegetation transects were established within the planned treatment area prior to herbicide application and will be revisited over the next several years to document cheatgrass control and native, perennial plant recovery.

Risk of wildfire is extremely high in this area due to the establishment and dominance of cheatgrass in the understory of important shrub habitats uti-

Figure 114. Helicopter application of herbicide to control cheatgrass.

lized by big game in winter months. Previous summer wildfires in this area have shown high shrub mortality. In an effort to reduce the risk of a fire that could result in complete loss of winter range shrubs, we opted to proactively treat these habitats. Funding was provided by the BLM, MFF, RMEF, WGBGLC, Wy-WSF, WWNRT and WGFD.

Troublesome Ridge Shrub Enhancement (Goals 1 and 2) - Mark Cufaude, Mac Foos and Britt Burdett

The Troublesome Ridge shrub mowing project was implemented in July 2022. This was the first project completed through the LaVA, specifically focused on improving habitat for wildlife, primarily mule deer. Other wildlife such as sage grouse will benefit from this habitat enhancement project.

The Troublesome Ridge project was designed and implemented cooperatively between the USFS, BLM, MDF, Saratoga-Encampment-Rawlins Conservation District, WGFD, and the Upper Cedar Creek Ranch.

The mechanical treatment was conducted by WGFD Habitat and Access personnel using 100 -horse-power tractors, 20-foot-wide batwing mowers and chainsaws. Shrubs were mowed 6-10 inches above ground height which reduced canopy cover and removed approximately 50% of shrubs from the mowed area.

The remaining shrub community will supply newer regrowth for wildlife, along with grasses and forbs. WGFD Habitat and Access personnel mowed the shrubs in a mosaic pattern. This helps ensure there is still cover for small birds and mammals and reduces the hard edge or corridor effect that predators often exploit when hunting. The partners plan to repeat this treatment in five to seven years, further diversifying the age class structure of the shrub community.

Figure 115. Mowing sagebrush.

Wick Brothers WHMA Grazing (Goal 1) - Jerry Cowles and Micah Morris

The Wick Brothers WHMA grazing treatment began in 2019 and utilized 482 AUMs. During the 2020 field season, 994 AUMs were utilized. During the 2021 field season, 1,246 AUMs utilized and 949 in 2022

The barter contract with grazing leases exchanged fence maintenance, water development and other infrastructure upgrades on the Wick Brothers WHMA, while resting private lands from grazing that provide parturition and summer range habitat for wildlife.

Figure 116. Livestock grazing on the Wick Brothers WHMA.

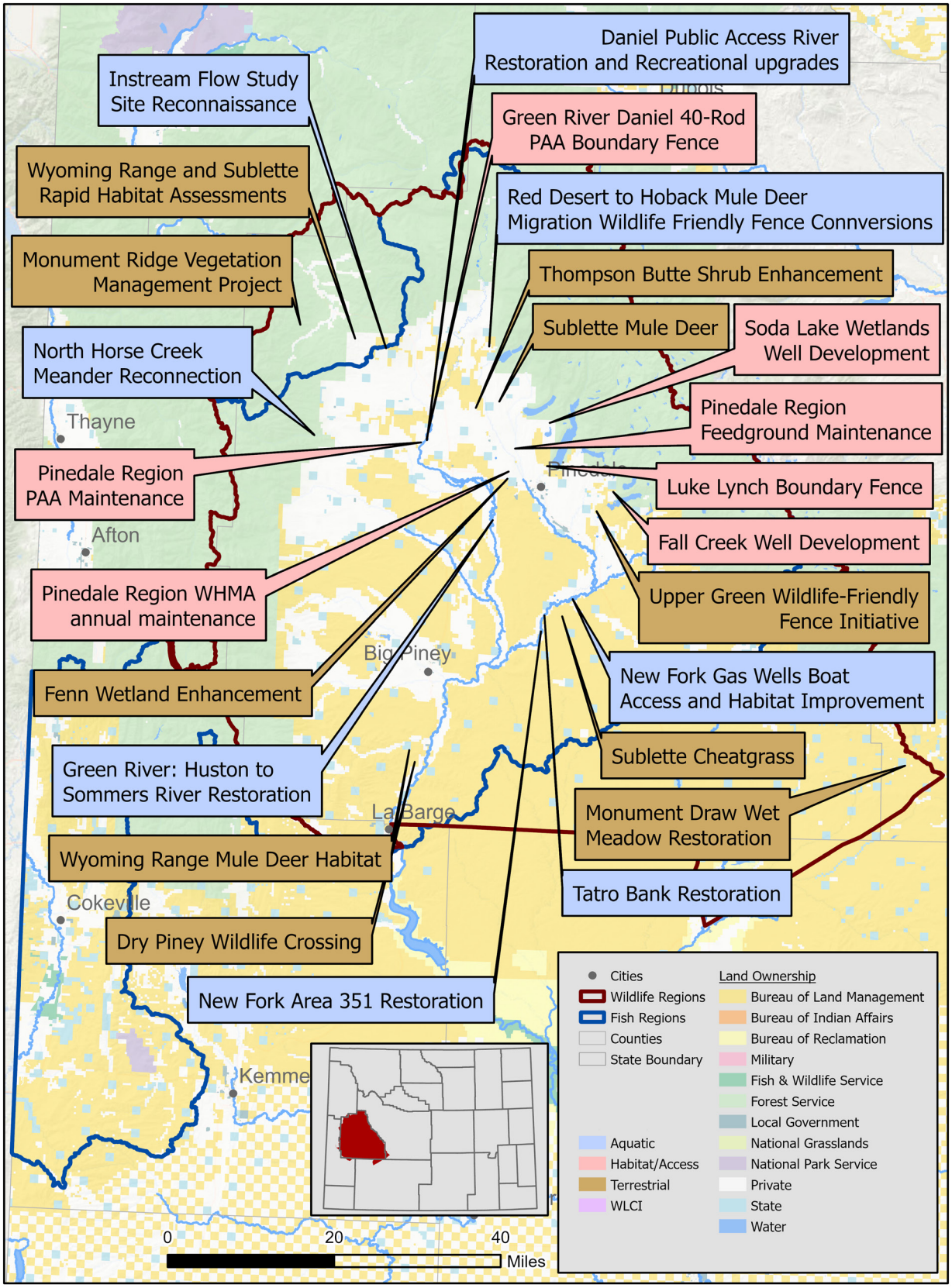
Wyoming Army National Guard IRT Wick Brothers WHMA (Goal 1) - Jerry Cowles, Micah Morris and Ray Bredehoft

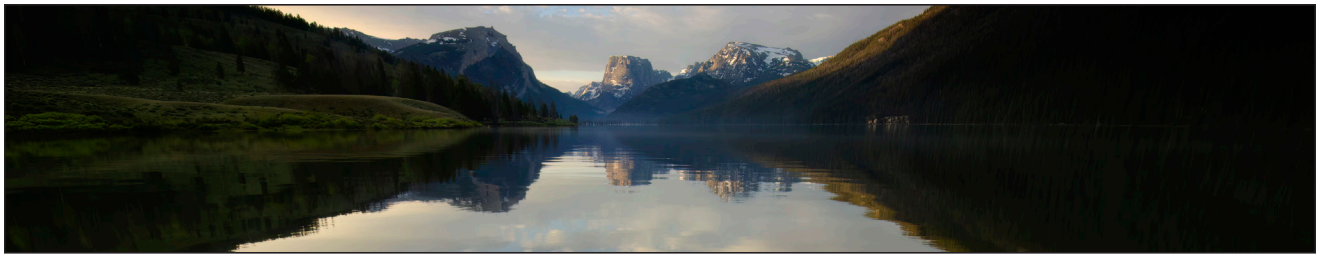
The Innovative Readiness Training project is a Department of Defense military training opportunity, exclusive to the United States and its territories, that delivers joint training opportunities to increase deployment readiness. Simultaneously, Innovative Readiness Training project provides key services with lasting benefits for American communities. The Wick Brothers WHMA project ultimately benefits wildlife and provides enjoyment for citizens.

The 133rd Engineer Company of the Wyoming National Guard is based in Laramie and Rock Springs. As an Engineer Support Company, the group can accomplish a wide array of earthmoving and vertical construction projects, making them perfect partners for WGFD's Laramie Region. The 133rd Engineer Company improved roads at several WGFC-owned properties, as well as remodeled WGFD patrol cabins to meet current building codes. These projects will provide valuable work training for the soldiers and assist the WGFD with projects that would otherwise be sidelined as a result of heavy workload and competing project demands.

Figure 117. Wyoming Air National Guard framing a bunkhouse.

PINEDALE REGION





The fish and wildlife habitat improvement efforts in the Pinedale Region are a diverse array of projects reflecting the diverse habitat types and wildlife found across the region.

One of the more high-profile habitat projects in the Pinedale Region is the Dry Piney Wildlife Crossing project, which is a collaboration between WYDOT and WGFD to improve motorist safety and reduce wildlife-vehicle collisions along US 189 from Big Piney to LaBarge. This 17-mile stretch of highway has one of the highest rates of mule deer vehicle collisions in Wyoming (average 117/year minimum). Mule deer of the Wyoming Range herd migrate across and winter in the vicinity, sometimes crossing the highway multiple times each day. Project construction was initiated May 2022 with five box culverts and one concrete arch have been installed. The arch culvert has a larger opening to hopefully appeal to antelope in the area. The project will be completed in 2023.

Most of the region's habitat projects, which are in various stages of completion, can be grouped into the categories listed below, yet there still a few not listed here.

River restoration projects have focused on stabilizing stream banks; creating a mixture of meanders, riffles and deep pools; and enhancing connectivity to allow fish passage to access seasonal habitats such as for spawning.

Green River:

- Daniel PAA River Restoration and Recreational Upgrades
- Huston-Sommers River Restoration

New Fork River:

- New Fork Area 351 Restoration
- New Fork Gas Wells Boat Access and Habitat Improvement
- Tatro Meander Bend Restoration

Horse Creek:

- North Horse Creek Meander Reconnection

Wetland restoration projects have involved creating both open water and wet meadow habitat for a wide variety of species.

- Soda Lake
- Fenn Wetland
- Monument Draw

Wildlife-friendly fence projects, totaling nearly 700 miles to date, have involved fence removal, fence conversion and new wildlife-friendly fence construction.

- Upper Green Wildlife-friendly Fence Initiative
- Red Desert to Hoback Mule Deer Migration Fence Conversions
- Luke Lynch WHMA Boundary Fence
- Black Butte

Upland habitat projects have involved a variety of habitat treatments including sagebrush mowing, aspen enhancement, prescribed fire, native seedling plantings, and cheatgrass treatments.

- Monument Ridge Vegetation Management Project
- Wyoming Range Mule Deer Habitat
- Thompson Butte Shrub Enhancement
- Fall Creek Well Development

The Pinedale Region continues to rely on their relationships with multiple partners and funding sources for the completion of all of their projects. Without the key partnerships with landowners, land management agencies, funding partners, local governments, sportsmen's groups, and NGO's, these projects would not be possible. WGFD extends gratitude to the many volunteers who were on the ground helping wildlife across the Pinedale Region.

Daniel Access River Restoration Maintenance (Goal 2) - Luke Schultz

In August 2021 river restoration work and modifications to the boat ramp at the Daniel PAA were completed. Modifications included the installation of an approximately 400-foot-long constructed riffle that included three boulder steps and a 20-foot -wide bankfull bench with a brush bank, an approximately 250-foot-long deepened pool with toewood along an approximately 15-foot-wide bankfull bench, a 200-foot-long bankfull bench with brush banks and an approximately 150-foot-long enhanced pool with toe wood. Along all bankfull benches, trenched willow pickets were installed perpendicular to stream flow using dormant willow cuttings in October 2021. The work also moved the existing boat ramp upstream about 50 feet to a small backwater behind an island on the upstream end of the property and reclaimed the previous boat ramp area. All told, the channel and banks were manipulated through about 1,500 feet of the river at the property.

Figure 118. Installing toe wood.

In spring 2022 the work experienced its first runoff following construction, peaking at 3450 cfs in mid-June. While much of the project fared well, high waters displaced much of the toe wood along the enhanced pool. Following runoff, several additional site visits were conducted to develop a maintenance plan to address these issues.

In August 2022 the Pinedale and Statewide Habitat and Access crews assisted with construction for four days to address the eroded bank. They reconstructed approximately 300 feet of bankfull bench with toe wood using approximately 50 cottonwood and pine trees with rootwads. The toe wood was made more robust by installing more trees with tighter spacing and utilizing whole-grubbed, 8-15 -foot-tall willow clumps and woody slash between root wads to increase boundary roughness and along the bankline. Several adjustments also were made to boulder structures to reduce hydraulic energy directed at the outside bend and to tie in with the new bank lines. In October willow pickets were again installed along the newly constructed bankfull bench, with an approximate spacing of one picket every 25 feet along the river left bank. Site visits in 2023 will evaluate effectiveness of these modifications. Assistance was provided by the Pinedale and Statewide Habitat and Access crew and JIO.

Dry Piney Wildlife Crossing (Goal 3) - Jill Randall, Brandon Scurlock and Gary Fralick

The Dry Piney Wildlife Crossing project is a collaboration between WYDOT and WGFD to improve motorist safety and reduce wildlife-vehicle collisions along US 189 from Big Piney to LaBarge (mile markers 86-103). This stretch of highway endures one of the highest rates of mule deer-vehicle collisions in Wyoming (average 117/year) based on reported collisions and carcass recovery data. Mule deer of the Wyoming Range herd migrate across and winter in the vicinity, sometimes crossing the highway multiple times each day. WYDOT and WGFD have discussed and conducted preliminary planning for structures and fencing in this area since 2010.

The Dry Piney Wildlife Crossing project construction was initiated May 2022 with an anticipated completion date of October 2023. The project scope includes 33.4 miles of 8-foot-tall deer fence, nine underpass structures, 1.85 miles of roadway reconstruction and other miscellaneous work. Big game winter range restrictions only allow for construction between May 1-November 15 annually. Eight of the underpass structures are box culverts and one is an arch culvert which has a larger open-

ing to potentially appeal to antelope in the area. Structure locations were selected with engineering and wildlife resources in mind, and agreed upon by both agencies.

At the end of the first construction season five box culverts and one concrete arch have been installed. The remaining three box culverts will be installed in 2023. Just under 35,000 feet of the 175,000 total feet of wildlife-exclusion fence was completed in 2022 and the remainder will be completed in 2023. WYDOT installed cameras in December at two underpasses that have deer fence to begin monitoring use.

Figure 119. Box culvert underpass constructed on the Dry Piney Wildlife Crossing project.

Fall Creek Well Development (Goal 1) - Miles Anderson, Kyle Berg, and Kade Clark

A new solar system and water lines feeding three tire tanks was completed for the new well drilled last year on Fall Creek WHMA. The tanks provide water for wildlife in summer and fall as drought conditions have affected Fall Creek causing it to dry up in late summer. This WHMA habitat improvement also makes it possible for possible grazing treatment inside the fenced WHMA boundaries that had no previous water source.

Figure 120. Overview of solar well and water tanks at Fall Creek WHMA.

Fenn Wetland Enhancement (Goal 2) - Noelle Smith

WGFD and the USFWS Partners Program, in partnership with the Sublette County Conservation District and a private landowner, created and enhanced approximately 11 acres of wetland at the bottom of a private irrigated pasture off Duck Creek near Pinedale.

The effort installed a low embankment and water control structure in the southeast corner of the Fenn property west of Pinedale off U.S. Highway 191. The embankment catches irrigation return flows and natural runoff to the site to extend the wetland's hydroperiod, increasing the retention period and depth of standing water. The objective was to create a shallow wetland (maximum of

Figure 121. Fenn wetland.

three feet by dike, majority much shallower) with a seasonally fluctuating water level that can be manipulated via a water control structure to encourage desired plant communities for waterfowl and shorebird foraging. The wetland adds diversity to the complex of shrubby riparian areas and floodplain meadows that are abundant in the area.

Our target species include rumpeter swans, which nest nearby and can use the wetland for foraging and loafing, as well as various species of dabbling ducks and wetland associated birds.

About 1,900 feet of wildlife-friendly fence was built to exclude the wetland area from the grazing pasture. Some livestock grazing may be utilized in a controlled manner in the wetland area in the future to manage vegetation. Funding was provided by the Wyoming Water Development Commission, WWNRT, and WGFD.

Wildlife Friendly Fence Conversion at Green River Daniel 40-Rod PAA (Goals 1 and 2) - Miles Anderson, Kyle Berg, Darby Shock and Kevin Pousson

About 1.5 miles of boundary fence was replaced with wildlife friendly pipe fence at the Green River Daniel 40-Rod Public Access Area. The fence conversion helps protect riparian habitat from trespass cattle and the river restoration project that was completed last year.

Figure 122. 40-Rod pipe boundary fence.

Green River: Huston to Sommers River Restoration (Goal 2) - Luke Schultz

In 2021 the Pinedale AHAB was contacted by the owner and ranch manager of the Grindstone Cattle Company about bank instability and loss of valuable hay meadows at several outside bends on the Green River. This parcel is between the Huston and Sommers boat ramps, and protected under the Sommers-Grindstone conservation easement and permanent fishing access. In working with the ranch manager, six work areas were identified of concern on the Grindstone Ranch. Adjacent landowners were interested in solutions to very similar issues, so an additional two work areas have been included within the project's reach. All told, this work will cover nearly four miles of the Green River Corridor, which encompasses multiple terrestrial and aquatic habitat priority areas.

Figure 123. Surveys conducted on the Green River to inform river designs.

In September 2022 river surveys of the Green River valley were conducted to inform restoration designs. Following a detailed reach walk with aerial images to note specific landscape features, surveys of the individual work segments included approximately 13,600 feet of main river channel and approximately 700 feet of one of the side channels in the reach. Summarized field data were then used to

develop restoration designs.

Work in 2023 will help advance permitting and funding and will include wetland delineations and final revisions to the restoration designs, as well as mobilizing materials to the site. We anticipate construction will occur beginning in 2024 and likely include multiple bouts of construction to fully complete.

Instream Flow Study Site Reconnaissance (Goals 1 and 3) - Del Lob

Instream flow water rights are used to help maintain fishery hatitat for SGCN fish in Wyoming, like Colorado River cutthroat trout. The WGFD conducts studies and files for water rights for flows needed to maintain or improve existing fisheries. Rock Creek and South Beaver Creek in the Upper Green River Basin contain core conservation populations of Colorado River cutthroat and are candidate streams for instream flow studies in 2023. A reconnaissance review of both streams was conducted in August to search for study sites. A potential study site was delineated in Rock Creek. Two potential study sites were identified in South Beaver Creek. Site morphologic and hydraulic features were noted. Photographs were taken from ground-level and an Unmanned Aerial Vehicle.

Figure 124. South Beaver Creek potential instream flow study site.

Luke Lynch Wildlife Friendly Boundary Fence Addition (Goals 1 and 3) - Miles Anderson, Kyle Berg, Kerry Gold and Brandon Scurlock

Three-quarters of a mile of wildlife friendly, drill-stem pipe was constructed on the north boundary of Luke Lynch WHMA to protect forage for wildlife. Five migration gates were installed to reduce stress on migrating wildlife along with a self-closing, bump-style gate for pedestrian access along Fremont Ridge. This area lies within a bottleneck of one of the most important migration routes in North America.

Figure 125. Completed wildlife friendly pipe fence on Luke Lynch WHMA boundary.

Wet Meadow Restoration - Monument Draw (Goal 2) - Troy Fieseler and Kyle Berg

This is a cooperative project between the Southwest Sage Grouse Local Working Group, Wyoming Wildlife Federation, State Lands, WGFD and the USFWS that identified opportunities to improve degraded wet meadows within Monument Draw near the intersection of the Lander cut-off road and Wyoming Highway 28. The loss of natural water storage capacity in these systems is of concern, especially in low-precipitation areas where wet-mesic areas represent a small fraction of the landscape, but are disproportionately important to wildlife.

A total of 17 rock structures (Zeedyk structures) were hand-built during the first phase of this proj-

ect. These structures are intended to kick-start regeneration of ecological processes to assist in reversing the trend of degradation over time. Structures also were placed in locations to reduce or stop active erosion, such as in and near head-cuts. The overall objective will be to slow and disperse water, dissipate energy, capture sediment and increase soil moisture to promote mesic and wetland plant species expansion and channel recovery. Achieving this will help to improve wildlife habitat, water quality and quantity, soil health, drought resilience and overall watershed health. This project would not have been possible without the help of public volunteers and funding provided by the Sage Grouse Local Working Group.

Figure 126. Completed Zuni Bowl structure within Monument Draw.

Monument Ridge Vegetation Enhancement (Goal 2) - Troy Fieseler

The Monument Ridge project is primarily aspen enhancement on Bridger-Teton National Forest near Bondurant. This area has been prioritized for disturbance due to the significant conifer encroachment of older-age aspen stands that are critically important to mule deer and other wildlife. This area is used heavily by the Sublette Mule Deer Herd, including a considerable number migrating from the Pinedale Anticline winter range in addition to those migrating along the Red Desert to Hoback migration corridor. In addition to occurring within the designated Sublette Mule Deer Migration Corridor, the area supports stopover habitats as well as parturition habitat for deer. Through the completion of this project, the quality and quantity of forage will be enhanced for mule deer and a suite of other wildlife species. Furthermore, private property will be protected from the threat of additional wildfires through the reduction of fuels

Prescribed fire will be used after mechanical slashing of conifers to meet vegetation restoration goals, similar to other successful treatments completed in the Wyoming Range in recent years. Treatment prescriptions include mechanical slashing of conifer encroached aspen followed by broadcast prescribed burn and pile burning treatments. Mechanical preparation of treatment units continued during 2022, however, burning operations were postponed due to a nationwide moratorium on

Figure 127. Example of area targeted for treatment on Monument Ridge.

prescribed burns on federal lands. Project implementation will continue in 2023 with final mechanical prep and the beginning of broadcast burning. Funding contributions have been provided by USFS, NFWF, PAPO, WGFD and WWNRT.

New Fork Area 351 River Restoration (Goal 2) - Luke Schultz

WGFD has been working closely with TU and USFWS Partners program to complete a large restoration on approximately 2.5 miles of the lower New Fork corridor. The work involves bank stabilization, fish habitat enhancement, reconnection of old side channels that were lost due to channelization of the river and an upgraded irrigation diversion that improves fish passage and boatability. Work will be completed on the Johnson Ranch, Olson 3-H Ranch, BMG Ranch and Sublette County Historical Society property. Together the three landowners hold nearly seven miles of the river corridor. If the project area were to expand to include state and BLM lands, it could encompass nearly 10 miles of the river corridor.

Figure 128. TU digs a soil pit for a wetland delineation near an eroding bank.

In 2022 four primary work areas were identified, and preparations were made on each site to complete construction beginning in spring 2023. This included wetland delineations and final design revisions prior to permitting. Work in 2023 intends to address a 900-foot-long, 5-foot eroding bank downstream of Wyoming Highway 351 on the Johnson Ranch, 1,500-foot-long, 6-foot-high vertical eroding bank on the Olson 3-H Ranch. We also surveyed an additional reach, the Looney Bend, in late 2022 for design development and future restoration.

Project partners have begun fundraising and have support from the JIO, The Wyldlife Fund, WWNRT, and the Wyoming DEQ 319 Non-Point Source Pollution Task Force program. TU's Nick Walrath is the project lead, with assistance from WGFD's Luke Schultz and USFWS's Dave Kimble.

New Fork Gas Wells Habitat Restoration and Boat Access (Goal 2) - Luke Schultz

The New Fork Gas Wells Boat Access and Habitat Enhancement was conceived in the mid-2000s to address channel instability, poor quality habitat and the loss of a boat ramp on the New Fork River at an approximately two-mile-long segment managed by the Pinedale Field office of BLM. This reach represents nearly half of all the publicly held river corridor on the New Fork between Boulder and its confluence with the Green River. Phase I of this work was completed in May 2021 and involved installing approximately 500 feet of toe wood with double soil lifts, two boulder j-hooks and a roughly 700 foot-long bankfull bench with slash, transplanted willow and toe rock. A boat ramp and associated parking lot were also constructed to provide an access area for river users.

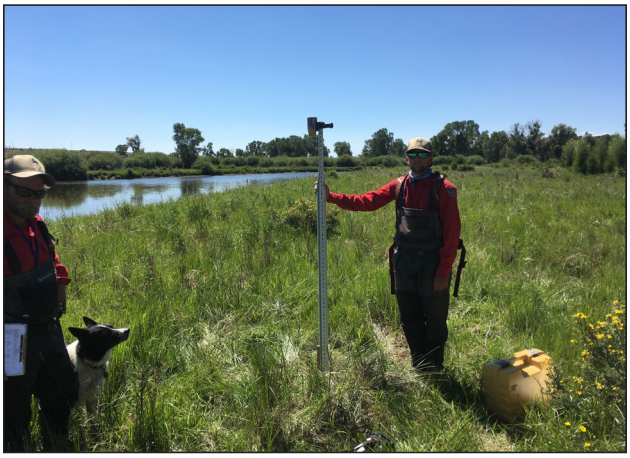


Figure 129. Using surveying equipment to establish a benchmark at the New Fork Gas Wells.

Spring runoff in 2021 and 2022 both reached or exceeded bankfull flows, allowing a reliable evaluation of performance of in-stream structures to inform Phase II designs. All structures appear to be functioning as intended, providing support for the continued use of these approaches.

Additional river assessments were conducted in August 2022 on the remaining 1.5 miles of the reach. Surveys were used to quantify conditions of the river and develop designs. In fall 2022 we updated existing conceptual designs with these new survey data to assemble a final design. The design is currently being reviewed by external partners, and will be finalized in early 2023. Additional tree and rock materials will be mobilized to the site in 2023 with a targeted construction date of either April/May 2024 or August 2024 for Phase II. Partners include WWNRT, DEQ, BOR, WGBGLC, TU, JIO, WLCI and the BLM.

North Horse Creek Meander Reconnection (Goal 2) - Luke Schultz

North Horse Creek is a priority conservation area and home to what is likely the highest population of Colorado River cutthroat trout in the region. Between the Mill Creek confluence and the USFS boundary, a series of channel avulsions for more than 1.5 miles of the river valley have reduced the channel length by roughly 1 mile. At least six different avulsions are evident in the aerial imagery and spoils from active channelization are evident in the valley floor, suggesting that channelization near the USFS bridge in the mid-1900s triggered instability up and down the valley. The most recent avulsion appeared to occur on the downstream end of the reach in 2013 or 2014, but most of the straightening appeared to occur prior to 1994. Angler use in this reach of river appears to be relatively high. The USFS is interested in reconnecting these abandoned meanders and doing stream restoration on the remainder of the channel. This work would not only add about a mile of river, but substantially increase the habitat value in the rest of the reach.

Figure 130. Taking bed elevation readings in North Horse Creek.

Surveys to inform restoration designs were conducted in July 2022. Data will be analyzed in greater detail in winter 2023 and used to develop conceptual restoration designs. The goals of the restoration will be to reconnect many of the abandoned meanders, increase floodplain connectivity, and increase fish cover in the reach. Additional surveying will be conducted in 2023 to describe the entire reach and develop final designs.

Pinedale Region Feedground Maintenance (Goal 1) - Miles Anderson, Kyle Berg and Kevin Pousson

Pinedale elk feedground maintenance encompasses 11 of the 22 WGFD-managed elk feedgrounds. Habitat and Access's 2022 activities included annual repairs and maintenance to feedground structures, corrals, stackyards, elk migration fences, stock fences and grounds. Nine upright poles were replaced this year on various haysheds and one new draft horse corral was built and underground water line added from the solar well addition for Fall Creek WHMA/Feedground. In addition, access roads to feedgrounds were maintained and roads resurfaced or otherwise improved at Scab Creek, Muddy, Finnegan and Fall Creek feedgrounds. Feeding areas were harrowed at Black Butte and Soda Lake and 22 miles of elk migration fence maintained.

Pinedale Region PAA Annual Maintenance (Goal 1) - Miles Anderson, Kyle Berg, Kade Clark and Kevin Pousson

Annual maintenance on signs, parking areas, roads, comfort stations, boat ramps and fences was per-

formed by habitat and access personnel in the Pinedale Region. At the new Raymond Mountain PAA a waterline for horse corrals and gravel hauling for the parking area was completed. Concrete erosion control matting was used to improve primitive boat ramps at Upper Fremont Lake ramp, and Boulder Bridge and Mesa Bridge PAAs on the New Fork River. At the Green River Daniel/40-Rod PAA a new Flex-A-Mat boat ramp was installed and parking and overnight camp area was graveled in conjunction with the river restoration project and wildlife friendly pipe fence was constructed on the PAA boundary.

Pinedale Region WHMA Annual Maintenance (Goal 1) - Miles Anderson, Kyle Berg, and Christopher Evans

Annual maintenance on Soda Lake, Half Moon, Black Butte, Fall Creek and Luke Lynch WHMAs was performed by Habitat and Access personnel. In 2022, activities included sign replacements, road maintenance and repairs and fence maintenance. Comfort stations, boat ramps, parking areas, wetlands, WHMA structures, watering systems and campsites were maintained and improved. The last one-quarter mile of a 12-mile boundary fence was completed on Half Moon WHMA.

Figure 131. Installing wildlife friendly fencing.

Black Butte Landowners Wildlife Friendly Fencing (Goal 3) - Jim Wasseen

Since 2019 the Sublette County Conservation District has used WLCI funds to complete approximately 46 miles of wildlife friendly fence conversions on several private properties within the Red Desert to Hoback mule deer migration corridor. Wildlife friendly fencing specifications lower the top wire and raise the lower wire to allow wildlife to pass over or under the fence without being tangled. The number of strands of wire, typically, three or four strands, depends on landowner preferences. In areas of heavy snow loads a pole top may be added. The wildlife friendly conversions reduce the amount of stress in wildlife needing to cross the myriad of fences along their migration route. This year funds were used to complete wildlife friendly fence conversions on two landowner properties associated with the Black Butte Landowners. Approximately 3.5 miles of fence were modified to 3-wire, 4-wire and pole-top wildlife friendly fence styles.

Figure 132. New wildlife friendly fencing installed along the Black Butte Landowners Group.

Soda Lake Wetlands Well Development (Goals 1 and 2) - Miles Anderson, Kyle Berg, Kade Clark and Kevin Pousson

A 820-foot, 120 gallons-per-minute water well was drilled and cased on Soda Lake WHMA for supplying additional water to the Soda Lake Wetlands. When solar power and pump systems are completed in 2023, the well will supply additional water to the wetlands that were just renovated and provide for more flexible management capabilities in the six wetlands ponds. An underground water supply line was buried from the well to a cistern in the bottom of wetland pond no. 3, this will allow the pump to run during winter daylight hours.

The wetlands when fully functional will provide waterbirds with seasonal shallow water wetlands that would provide optimal foraging habitat. Seasonal management will promote the growth of early successional vegetation communities that provide the seeds and substrate for invertebrates that will attract and nourish foraging waterfowl species. Funding was provided by WFW and WGFD.

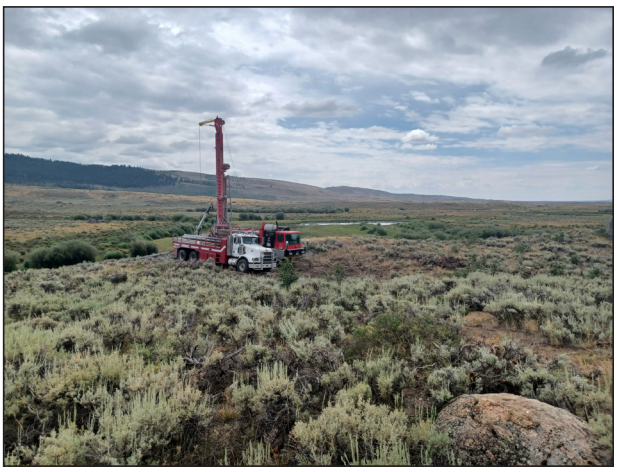


Figure 133. Well drilling at Soda Lake Wetlands.

Sublette Cheatgrass (Goal 2) - Troy Fieseler

Cheatgrass treatments continued throughout the region during the 2022 field season. Spearheaded by the Sublette County Invasives Taskforce and the Sublette County Weed and Pest District, 28,365 acres were aerially treated on the west slope of the Wind River Range and the east slope of the Wyoming Range across all land ownerships. Approximately 75,000 acres to date have been treated for invasive annual grasses throughout the region utilizing various methods. Moving forward, the herbicide Rejuvra is the primary tool that will be utilized with local long-term monitoring showing that this herbicide is effective at maintaining control of cheatgrass for up to four years-extending the length of time needed between follow-up treatments. A robust monitoring program is one of the cornerstones of this project that has been cooperatively collected on an annual basis over the last decade. Approximately 55 transects spread across multiple ecological sites contribute to this dataset and inform managers of treatment effectiveness and provides knowledge of re-treatment needs.

Figure 134. Helicopter applying herbicide along the foothills of the Wind River Mountains.

Monitoring results indicate that this area has a resilient native plant community that responds well after treatment. Funding contributed for this phase of the project includes WWNRT, WLCI, BLM, PAPO, Sage-Grouse Local Working Group, USFWS, USFS and OSLI.

Sublette Mule Deer Habitat (Goal 2) - Troy Fieseler, Miles Anderson, Kyle Berg, Kade Clark and Ashleigh Rhea

Sublette Mule Deer Habitat Projects are a direct response to cumulative declines across the Sublette Mule Deer Herd range in addition to declines associated with natural gas development in the Pinedale

Anticline Project Area near Pinedale. Projects consist of more than 7,400 acres of habitat treatments and monitoring on federal, state and private lands, mainly in decadent sagebrush, mixed mountain shrub and aspen communities. Treatments are designed to enhance successional diversity on a landscape scale while improving habitat forage quality and quantity for mule deer in summer and winter ranges within the Sublette Mule Deer Migration Corridor. In 2021 work featured habitat treatments, pretreatment monitoring, post-treatment monitoring and planting of native seedlings for habitat restoration. Projects under the NEPA planning effort for BLM lands commenced in 2016 and will continue through 2023. Projects on private lands are ongoing, and additional projects are identified annually.

On BLM and state owned land north of Pinedale, within the Sublette Mule Dear Migration Corridor and mule deer crucial winter range, pretreatment monitoring for shrub canopy cover was completed for a 2,000-acre habitat enhancement located in mountain big sagebrush habitat. With an average canopy cover of 38%, mowing to reduce sagebrush canopy cover to no less than 15% to facilitate annual forb and grass is planned in the next one to two years.

Post-treatment monitoring and livestock rest was conducted for numerous treatments on public and private lands in 2022. Previously implemented projects included in 2022 monitoring activities consisted of several erosion control structures, shrub plantings, shrub mowing, herbicide and aeration treatments and fence improvements. Approximately 1,800 acres of 2019 and 2020 shrub mowing,

Figure 135. Shrub monitoring.

aeration, and herbicide treatments were rested from livestock grazing in 2022. Five-year post treatment monitoring commenced on vegetation treatments implemented in 2017 on 1,700 acres of BLM lands located in mule deer crucial winter range. These treatments consisted of shrub mowing, aeration, prescribed fire and herbicide applications. Monitoring was conducted using line-point-intercept, shrub density belt and annual production/utilization methods, in addition to photopoint documentation. Post-treatment monitoring is ongoing until vegetation objectives are met.

Cooperators and funders include: PAPO, JIO, WWNRT, WGFD, NFWF, USFWS Partners for Fish and Wildlife, BLM, Sublette County Conservation District, NRCS and numerous private landowners.

Sublette Mule Deer and the Red Desert to Hoback Collaring Study (Goal 3) - Dean Clause, Brandon Scurlock and Ashleigh Rhea

The Red Desert to Hoback Migration Assessment is an ongoing research project facilitated by UW and Dr. Matthew Kauffman, in collaboration with WGFD and the BLM, which seeks to understand the migratory strategies of the Sublette Mule Deer herd. The study maintains 90 GPS-collared doe mule deer, with captures occurring each March and December. In conjunction with this study, WGFD deployed 35 additional GPS collars in March 2022 and will deploy an additional 10 GPS collars in March 2023 in the flank areas of the Pinedale Anticline Project Area. These collars allow WGFD to monitor survival of deer closely associated with energy development and assess where the biological boundaries lie between herd units. Funding was provided by PAPO.

Sublette Pronghorn Research (Goal 3) - Jill Randall and Brandon Scurlock

Within the Sublette pronghorn herd, a total of 127 doe pronghorn were captured and equipped with GPS collars from 2019-22. These collars were strategically dispersed in areas of this large herd where little or no GPS collar data existed to fill in knowledge gaps of movement and behavior of pronghorn. We worked with the Wyoming Migration Initiative to use these new data, along with existing GPS collar data, to delineate a migration corridor for Sublette pronghorn and are currently using all the collar data to update winter and crucial winter range delineations. The last of the collars will drop off in December 2026.

Figure 136. Sublette pronghorn captures conducted with net-gunning operations.

New Fork Tatro Meander Bend Restoration (Goal 2) - Luke Schultz

The Tatro Meander Bend on the lower New Fork River contained a 5-7-foot vertical eroding right bank, one of the most active erosional banks in the area. The bank annually migrated 1-2 feet laterally due to instability along the 1,700-foot-reach. Restoration designs were developed in 2019 and in 2020 construction occurred to ameliorate the bank erosion and improve trout habitat. A 500-foot-long bankfull bench was constructed with rootwads embedded in the bank in the upstream portion of the reach, and four evenly spaced rock vanes were placed in the downstream, riffle, end of the reach. In 2021, the site experienced the first runoff following construction and generally held up. Minor erosion (less than two feet laterally) along the bank line in the pool was noted in 2021, but vegetation was quickly establishing.

Figure 137. The Tatro Meander Bend Restoration during spring runoff, June 2022.

Additional efforts were undertaken to assist vegetation establishment in 2022. Prior to runoff, wetland sod mats were installed along the bankfull bench and upstream and downstream of where the rock vanes tied into the bank. This was done to address concerns about the river eroding around the vanes and to facilitate additional wetland vegetation establishment on the bankfull bench. The site again experienced a runoff even in excess of bankfull, peaking at approximately 4,700 cfs on June 14, 2022. Site visits during runoff suggested that structures were functioning well, but several of the sod mats were dislodged in high flows. However, no maintenance was needed on any of the structures and vegetation continued to establish on the disturbed banks. Willows that were planted as cuttings in fall 2020 had sprouts that were more than 12 inches tall in some cases and appeared to be surviving well, and herbaceous vegetation had established over 50% foliar cover.

This work has proven to be valuable not just in terms of habitat conservation, but in building re-

lationships with private landowners on the New Fork River, and for designing other restoration work throughout the watershed. It would not have been possible without the assistance of the private landowner, as well as project partners Pinedale Habitat and Access and Fish Management, USFWS Partners program, and WWNRT.

Thompson Butte Mowing (Goal 2) - Troy Fieseler, Kade Clark and Rick Harmelink

In 2020 property owners reached out to the WGFD with an interest in pursuing options for habitat improvements. After completing an assessment, a treatment area was identified for improvement due to the diminished understory of herbaceous plant species and lack of age-class diversity of sagebrush and other shrubs. During 2022 WGFD personnel mowed 120 acres in a mosaic pattern to reduce overstory dominance, allowing for increased production on remaining shrubs while creating opportunities for seedling establishment and increasing resources for improved grass and forb composition. All treatment polygons occur within transitional habitats of the Sublette Mule Deer Migration Corridor and also intersect migration habitat of the Sublette pronghorn herd.

Figure 138. WGFD Statewide crew implementing mowing project.

Upper Green Fence Initiative (Goal 3) - Troy Fieseler and Ashleigh Rhea

The focus of this project is working with private landowners and permittees to replace existing fences with designs that will meet their needs as well as reduce wildlife impacts. While fencing is an essential component of our landscape, particularly for livestock management, it can create severe hazards for wildlife. Fences not only impede seasonal migrations, but also can restrict daily movements and access to key habitats as well as result in death and physical injury. During 2022 WGFD assisted with converting approximately 13 miles of fence and permanently removing another 4.75 miles from the landscape across 5 separate projects. With the help of the Upper Green Wildlife-Friendly Fence Initiative, NGOs and federal partners, cumulative efforts in the region have resulted in almost 700 miles of fencing converted to wildlife-friendly standards since 2010. Numerous funding partners and volunteers have contributed over the years with NFWF, WWNRT, WGFD, PAPO, USFWS, Knobloch Family Foundation and private landowners providing funds for the most recent accomplishments.

Figure 139. Partners and volunteers work to modify an existing fence.

Whiskey Mountain Bighorn Sheep: The West Side Story (Goal 3) - Jill Randall, Dean Clause and Brandon Scurlock

The Whiskey Mountain bighorn sheep herd encompasses the northern Wind River Mountain Range in west-central Wyoming and is divided into three hunt areas. Once one of the most numerous herds

of Rocky Mountain bighorn sheep in the United States, the herd has been an important component in bighorn sheep management for Wyoming and other western states for decades. Traditionally, the bulk of sheep in the herd winter in Hunt Areas 9 and 10 on the northern side of the unit near Dubois. These sheep are largely migratory, moving to higher-elevation summer ranges as snow recedes. A smaller sub-population of the Whiskey Mountain bighorn sheep herd residing in Hunt Area 8 that winter on high-elevation, wind-swept slopes in the Upper Green River drainage, is the focus of this recent addition to the project.

The overall herd has experienced poor lamb recruitment since a pneumonia outbreak in the early 1990s and the population has dropped from an estimated 1,500 individuals to fewer than 400 today. In contrast to the other bighorn sheep die-off events throughout the West that gradually recover from pneumonia outbreaks, the Whiskey Mountain bighorn sheep herd has continued to slowly decline.

Figure 140. Lamb with collar.

To determine the potential interplay among density, nutrition, and immune function for disease, the WGFD and UW Monteith Shop initiated a lamb survival study in Hunt Areas 9 and 10 during 2019. Efforts started during March 2021 within Hunt Area 8.

Pinedale RHAs (Goal 2) - Troy Fieseler

Throughout the Pinedale and Jackson regions, RHAs are conducted within the Wyoming Range and Sublette Mule Deer herd units within summer and transitional habitats as well as on winter range complexes. During 2022 an additional 10 assessments were completed totaling 4,401 acres that included two aspen, five special and three rangeland surveys. The data collected will be used for Herd Objective Reviews and compiled annually in Job Completion Reports. Furthermore, this data provides managers and the public with documentation of the current state of mule deer habitat across herd units.

Wyoming Range Mule Deer Habitat Project (Goal 2) - Troy Fieseler

This is a cooperative project 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 15-year period, which started in 2014. Winter and transitional ranges are targeted with more than 30,000 acres of vegetation treatments. Wyoming and mountain big sagebrush, antelope bitterbrush, true mountain mahogany, salt desert shrub and aspen are the main vegetation types targeted. Implementation techniques have included mowing, Lawson aerator, seeding, herbicide application, fencing, conifer thinning and prescribed burning.

Figure 141. Prescribed fire within aspen community.

In 2022, accomplishments include: 5,000 acres of cheatgrass herbicide application, spot treatments

of noxious weeds within prescribed burn areas, 225 acres surveyed and treated for spotted knapweed, 305 acres surveyed and treated for dyers woad, maintenance of 5 miles of temporary electric fencing to defer livestock grazing on approximately 19,000 acres of rangeland and 83 acres of conifer thinning within aspen communities. In conjunction with the electric fence, two livestock riders were hired to manage cattle distribution post-treatment. Cumulative accomplishments (2014-22) include: 18,963 acres of sagebrush thinning, 3,232 acres of aspen mechanical preparation, 1,451 acres of aspen prescribed burns, 57,503 acres of cheatgrass herbicide application (includes re-treatment acres), 2,032 acres of cheatgrass hand grubbing, 19 livestock riders, 11 miles of fence construction, 5 miles of temporary electric fencing installed and one reservoir renovated to influence livestock distribution. Funding contributions provided by WWNRT, WGBGLC, BLM, WGFD, Denbury Energy, Exxon and MFF.

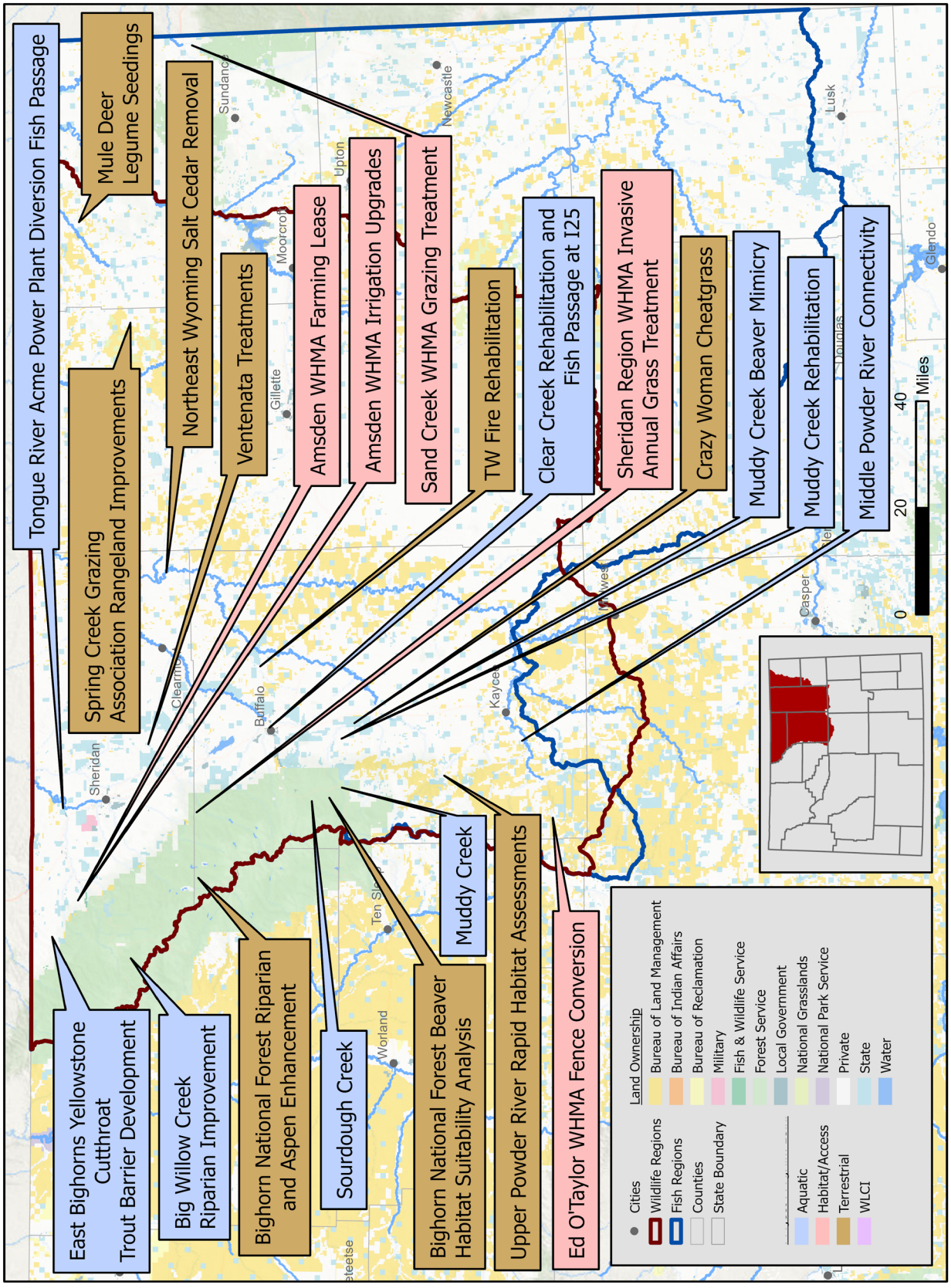
Wyoming Range Mule Deer Research and Focal Herd (Goal 3) - Jill Randall, Troy Fieseler, Brandon Scurlock, Jeff Short, Gary Fralick and Ashleigh Rhea

Research on the Wyoming Range mule deer herd has been on-going for the past 10 years, and works towards disentangling the relationships between nutritional condition, carryover effects, movement ecology and population dynamics. Questions pertaining to how winter conditions influence population distribution, whether maternal condition may influence antler growth and if helicopter capture influences survival have been addressed. Being a multi-year study, this research also has provided insights on how deer learn seasonal migration routes and the factors that drive fawn survival. Future directions will investigate how deer body size may indicate habitat quality and whether doe condition and age influences decision making and fawn behavior.

This work has been spearheaded by UW and Dr. Kevin Monteith and his research group since 2013, but is expanding with the addition of the Mule Deer Focal Herd Monitoring Project conducted across the state by WGFD. For the first year of the focal herd study, 131 GPS collars were deployed within the Wyoming Range herd in December 2022.

Figure 142. A mule deer fawn is measured as part of fawn survival study.

SHERIDAN REGION



The Sheridan Region covers much of northeast Wyoming, from the summit of the Bighorn Mountains, east to the Black Hills and from the Montana/Wyoming state line, south to the northern portions of Natrona and Converse counties. It encompasses the Powder, Tongue, Little Bighorn, Belle Fourche, Little Missouri and Cheyenne River drainages.

Eighty-five percent of land in the Sheridan Region is privately owned, requiring good working relationships with landowners, as well as partnerships with a variety of governmental agencies, and non-governmental organizations.

Terrestrial habitat projects in the Sheridan Region this year included rehabilitation of native grassland in an area that experienced a significant wildfire in a sage grouse core area, application of herbicide to control invasive annual grasses and the continuation of a long term effort to remove invasive salt cedar from the Powder River. A technician was hired in partnership with the U.S. Bighorn National Forest for summer 2022 to map hundreds of acres of aspen stands in the Bighorn Mountains for future management projects and an educational workshop was offered for landowners, government and nonprofit personnel on implementing low-tech options for improving damaged mesic landscapes.

Fish passage continues to be a priority for the Sheridan Region. In 2022, work on a fish passage project on Clear Creek near Buffalo neared completion, opening more than nine miles of stream for upstream movement of trout and native suckers. The project also enhanced stream habitat available to the public along 3.5 acres of the stream corridor upstream of I-25. Through a partnership with the Powder River Conservation District, an additional 25 miles of fish passage was gained through the work at three irrigation diversions on the Middle Fork of the Powder River.

Habitat and Access personnel focused on irrigation improvements on region WHMAs to increase forage production for wintering big game and on fence modifications to facilitate easier wildlife movement across the landscape. Considerable time was also spent on identifying new locations of and controlling annual invasive grasses, including medusahead and ventenata. Annual maintenance efforts included access road improvements, replacement of damaged or faded signage and repairs of more than 40 miles of fence.

Aquatic and terrestrial personnel are also cooperating on various stream corridor improvements to benefit fish and wildlife. Riparian rehabilitation efforts using beaver transplants and beaver dam analog treatments are ongoing on Sourdough, Muddy and Big Willow creeks. Additional gully rehabilitation treatment options are being explored on Muddy Creek.

Multiple research and movement studies are ongoing in the Sheridan Region, collecting data on movement, survival rates and habitat preferences for moose in the Bighorn Mountains, pronghorn northeast of Gillette and mule deer in Hunt Area 10.

Amsden WHMA Farming Lease (Goal 1) - Nathan Lindsey

The Amsden Creek WHMA has historic hay meadows and a gravity-fed irrigation system that allows for the successful growing of an alfalfa/grass crop. To fully benefit and utilize these lands and water rights WGFD has determined it most beneficial to lease the farming/hay rights to a lessee for a single, annual cutting. The lessee irrigates and harvests a single hay cutting annually and irrigates for a second growth of forage left for wildlife. The lessee also is responsible for all noxious weed control efforts within the cultivated fields.

Figure 143. Amsden WHMA hayfield.

Amsden WHMA Irrigation Upgrades (Goal 1) - Nathan Lindsey

Forage production on the Amsden WHMA directly relates to the amount of time and effort WGFD personnel spend managing and mitigating elk issues on neighboring private lands. Increasing forage production through irrigation improvements and water right utilization increases the ability of the Amsden WHMA to provide sufficient forage for wintering wildlife. Irrigation improvements also help to increase irrigation efficiencies, reducing labor costs and allow more time to be spent on other wildlife improvement projects. These improvements also have environmental benefits through reduced water consumption, uniform water spread and increased hay and forage production.

Figure 144. Irrigation on Amsden WHMA.

Big Willow Creek Riparian Improvement (Goal 2) - Todd Caltrider and Travis Cundy

In August 2022 a cooperative effort was initiated with the Bighorn National Forest and Backcountry Hunters and Anglers to construct 20 BDAs structures along a reach of Big Willow Creek lined with willow communities. The treatment reach is located southwest of Burgess Junction. A Wyoming Conservation Corps crew helped complete the BDA treatments while Bighorn National Forest sawyers removed conifer encroachment from the treatment corridor. Funding support came from the WGFD and a Good Neighbor Authority agreement between the WGFD and the Bighorn National Forest. The BDAs were constructed to promote overbank flooding and attenuate high flows along the treatment corridor, raise the riparian water table, promote riparian plant expansion, provide a foundation for future beaver dam building and improve security habitats to entice beavers dispersing from lower in the watershed to take up residence.

Bighorn Moose Study (Goal 3) - Jill Randall, Tim Thomas, Sam Stephens and Zach Turnbull

This ongoing project is nearing completion and includes GPS movement data from 74 cow moose, and lab fecal sample analysis for establishing pregnancy rates. Fieldwork was completed in 2020 and only seven active GPS collars remained on female moose in 2022. Analysis is underway of the data collected. Funding partners include WGBGLC, WGFD and Wyoming Community Foundation.

Figure 145. Moose with GPS collar in the Bighorn Moose research project.

Bighorn Mule Deer Research (Goal 3) - Jill Randall, Tim Thomas, and Eric Maichak

In 2022 we documented the year-round movements of 202 mule deer. This included 17 migrants and 55 residents on the east side of the mountain range as well as 123 migrants and 3 residents on the west side of the mountain range. The second part of this project began in March 2023. This marked the sixth round of captures for the study where we captured and collared an additional 39 mule deer on west side winter ranges. Thirty-two of these captures were nine-month-old juveniles. We also added an additional seven adult does to our study connected with the captured juveniles. We have documented the movement of five genetically confirmed doe-fawn pairs. The anticipated completion of data collection is March 2025. Funding partners include the Knobloch Family Foundation, MDF, TNC, Sheridan Community Land Trust, BLM, WWNRT, Department of the Interior Secretarial Order 3362, Cody Chapter of MFF, BOW, UW Research and Extension Center and WGBGLC.

Bighorn National Forest Beaver Habitat Suitability Analysis (Goal 2) - Todd Caltrider and Travis Cundy

WGFD, with assistance from the Bighorn National Forest, conducted four Beaver Habitat Suitability analysis surveys on the Powder River District. The purpose of these surveys was to assess the ecological capacity of sites to provide habitat for beavers. These surveys will provide the WGFD and USFS information on which streams may be capable of supporting beaver translocations and which sites need additional habitat work conducted prior to future beaver releases.

Bighorn National Forest Riparian and Aspen Enhancement (Goal 2) - Todd Caltrider

In cooperation with the Bighorn National Forest, WGFD hired a habitat technician in the summer of 2022 to map and inventory potential habitat treatment units in Clear Creek, Crazy Woman Creek,and the North Tongue River drainages. Most habitat projects focused on conifer encroachment in aspen and riparian stands. A total of 340 acres of potential aspen units were assessed and 117 pre-treatment monitoring sites were established on the Crazy Woman Creek watershed. On the Clear Creek watershed, 441 acres of potential aspen treatment sites were mapped and 127 aspen pre-treatment monitoring plots were established. In the North Tongue River unit, 932 acres of conifer removal

in wet meadow/riparian habitat were mapped and 215 acres of aspen units that were identified via aerial imagery were ground-truthed. Funding for this position was provided by the USFS and these assessments will result in future habitat enhancement opportunities in this area.

Figure 146. Pre-treatment monitoring.

Clear Creek Fish Passage Above I-25 (Goal 2) - Travis Cundy

For decades fish could swim downstream past the concrete grade control structure located in Clear Creek upstream of the I-25 box culvert crossing, but then could not swim back upstream to spawn or seek refuge from seasonally warming stream temperatures. In 2021, the structure was removed and replaced with a series of alternating riffle structures and pool features along 700 feet of stream corridor above the culvert crossing. The resulting channel slope reduction provided over the course of riffle to pool features allows adult life stages of trout and native suckers to access upstream habitats mostly unimpeded along 9.7 miles of creek. The work also enhanced stream habitat available to the public along 3.5 acres of the stream corridor owned by WYDOT.

Figure 147. Runoff along Clear Creek rehabilitation reach.

Damage occurred to segments of the rehabilitation reach during spring runoff, which eroded segments of streambank and floodplain before riparian vegetation established. A remediation plan was devised in August 2022 that includes stabilizing eroded segments, restoring pool depths and anchoring sod mats to stabilize floodplain surfaces. Implementation using Barnum Construction, who completed the original rehabilitation in 2021, is expected in early 2023.

Partners involved with the rehabilitation included the Clear Creek Conservation District, WYDOT, WWNRT, Wyoming Water Development Commission, WGBGLC, Wyoming Sportsmans Group and Powder River Flycasters.

Crazy Woman Cheatgrass (Goal 2) - Todd Caltrider

The area surrounding the lower Crazy Woman/Poison Creek drainages is important for the management of mule deer in the Upper Powder River Herd Unit. This area contains a mixture of native grassland, sagebrush steppe, riparian areas and agricultural fields. The combination of these habitat

types allows for a high density of mule deer to live year-round in this area. In addition to high-quality habitat, this area contains large tracts of publicly-accessible state land, which allow for public mule deer and other big game hunting opportunities. In 2021 WGFD treated an additional 3,202 acres of rangeland with a cheatgrass herbicide. Funding for this project was provided by WGFD, WGBGLC, private landowners and WWNRT.

Figure 148. Spraying cheatgrass.

Area 10 Mule Deer Study (Goal 3) - Erika Peckham

More life history information on the mule deer inhabiting Hunt Area 10 is needed to better manage this unique area. Hunt Area 10 is of high interest to hunters and the public due to good public land access, and the historic numbers and quality of buck deer it formerly produced. Demand for the limited number of available licenses is high (36% resident draw odds), and recruitment into this herd increased with favorable weather the past few years. Information gathered would likely be applicable to other areas in the herd unit. In addition, the WGFD has an interest in learning how deer use the unique habitat types in this area, and how that use may be impacted by increasing elk numbers. Lastly, active coal mining and associated reclamation provides an opportunity to assess mule deer behavior and habitat selection in relation to coal mining. Overall, this study presents an opportunity to garner more information on life history parameters and interactions to improve management practices including movements, habitat selection and cause of mortality.

Figure 149. Collared mule deer.

The study of 35 individuals will run from 2019-24 and has several objectives and outcomes: 1. Identify and refine mule deer seasonal habitats and timing of use; 2. Identify movement, corridors and critical habitats; 3. Estimate annual survival and reproductive potential; 4. Identify potential habitat improvement projects; 5. Evaluate habitat condition at preferred sites; 6. Formulate management strategies to address identified habitat concerns/opportunities and risks; 7. Assess CWD status of captured/collared mule deer; 8. Identify potential barriers to movement; and 9. Identify seasonal deer use of reclaimed coal mining areas. Funding was provided by MDF.

East Bighorns Yellowstone Cutthroat Trout Barrier Siting (Goals 1 and 2) - Andrew Nikirk

During November and December, site showing and interviews occurred with consultants vying for the East Bighorns Yellowstone cutthroat trout isolation barrier design and siting assessment contract. Funding for this siting phase was secured through a State Wildlife Grant. The siting phase involves establishing site locations and concept designs for fish isolation barriers on Elkhorn, Red Gulch

and Columbus creeks located west of Parkman. Constructing barriers on Elkhorn and Red Gulch creeks would secure 4.5 stream miles with endemic Yellowstone cutthroat trout populations from potential recolonization of nonnative trout present in the Little Bighorn River. Constructing a barrier on Columbus Creek would allow expanding trout populations access to six stream miles through translocation efforts and isolate those trout from nonnative trout present in lower Columbus Creek and the Tongue River. WWC Engineering won the contract. Work will commence upon final contract approval in 2023.

Ed O. Taylor WHMA Fence Conversion (Goal 3) - Nathan Lindsey

Unused and dilapidated fencing across Wyoming is a safety concern to wildlife, livestock, public users and managers. Efforts to remove or repair these fences help to improve these areas for a wide variety of users. Much of the work is done through physical labor and these projects have been very successful for involved volunteer groups. Approximately one-half mile of buck and pole fence was removed and converted to wildlife friendly, and fireproof fence on the Ed O. Taylor WHMA.

Figure 150. North fireproof fence.

Gillette Pronghorn Study (Goal 3) - Erika Peckham

Northeast Wyoming contains some of the highest densities of pronghorn in Wyoming. These big game animals are an icon of the West and an important part of the sagebrush landscape. Because they appear to be prolific, they can often be overlooked as a conservation priority. In recent years, however, numbers have fallen due to prolonged, extreme drought conditions and disease impacts from Mycoplasma bovis, epizootic hemorrhagic disease and bluetongue virus outbreaks. WGFD is implementing a GPS collaring project with pronghorn in the North Black Hills Herd Unit that began in November 2022. The goal is to better understand movement patterns and survival rates of pronghorn in this herd unit. Field observations suggest migratory movements are occurring in the area, including inter-state movements, which has recently been corroborated in the northern portion of the area by an on-going collaring project in Montana. Local wildlife managers also have observed high numbers of pronghorn wintering in the southern portion of the herd unit, concentrated on the north side of the I-90 corridor, which warrants further investigation. This could provide information regarding potential severe winter relief habitats and roadway impacts. Additionally, there is a disease component to this study. In 2019, a Mycoplasma bovis outbreak occurred in portions of this herd unit. It again surfaced in 2020. While fairly commonly found in cattle, this disease had

Figure 151. Collaring pronghorn.

not ever been documented in pronghorn prior to this localized outbreak and resulted in high mortalities for pronghorn. The Wyoming State Vet Lab was the lead on documenting this disease "Mycoplasma bovis Infections in Free-Ranging Pronghorn: Wyoming, USA", Malmberg et. al) as well as research conducted through the University of Wyoming ("Source and Seasonality of Epizootic Mycoplasmosis in Free-ranging Pronghorn (Antilocapra Americana)" Johnson et.al), and will be a partner in this current research.

The M. bovis outbreak resulted in the first and only research project that has occurred in pronghorn in the Gillette area, which magnified the lack of empirical data for pronghorn movement and survival in the area. All information obtained will be novel and will assist wildlife and land managers to make informed decisions regarding pronghorn and their habitats in this area. Additionally, it could shed light on transmission of M. bovis, of which little is known.

Johnson County Zeedyk Workshop (Goal 2) - Todd Caltrider and Travis Cundy

WGFD, in partnership with the Clear Creek Conservation District, hosted a low-tech restoration workshop July 7-8 in Johnson County. Paul Jones, of Tomichi Creek Eco Systems Services, led workshop participants through a detailed training outlining the importance, need and application of low-tech restoration techniques for mesic habitat restoration. The workshop was held on the Fieldgrove Ranch, northeast of Buffalo. Around 30 participants attended and contained a mixture of natural resource professionals and private landowners. Funding was provided by Pheasants Forever, Sage-Grouse Local Working Group, WGFD, Clear Creek Conservation District and the Northern Great Plains Joint Venture.

Figure 152. Participants learning about a log and fabric step fall structure.

Middle Powder River Connectivity (Goal 2) - Travis Cundy

Renovations to improve irrigation water delivery and restore upstream fish passage continued at three irrigation diversions along the Middle Powder River west of Kaycee during 2022. Rehabilitation of the Harland and Gosney diversions was completed by Barnum Construction before spring runoff. Together, these renovations restored upstream fish passage along 20.9 river miles. Additional repairs were completed at the Gosney and Moffett diversions during fall 2022 to correct deficiencies discovered after spring runoff and one season of irrigation operations. The Moffet Diversion renovation was originally completed in fall 2021 and restored upstream fish passage to a 12.2 mile long river segment.

The renovations involved replacing ditch infrastructure and installing a series of constructed riffles below each head gate to gain the lift needed to deliver water to the ditches while providing upstream fish passage past the diversions. The work also improved bank and streambed stability, connectivity and vegetation growth on the floodplain

Figure 153. Renovations completed at the Harlan Diversion.

and holding areas for fish along each of the rehabilitation reaches.

The Powder River Conservation District directed these renovations. Funding assistance was provided from the WGFD, Wyoming Natural Resource Foundation, NRCS, USFWS, Resource Legacy Trust and WWNRT.

Muddy Creek Beaver Releases (Goal 2) - Todd Caltrider, Travis Cundy and Zach Turnbull

During September and October, five adult and two sub-adult beavers were released in cooperation with the Bighorn National Forest in Muddy Creek upstream of the USFS Muddy Guard Station west of Buffalo. The goals are to use the dam-building activities of beaver to help attenuate flows or detain water from significant precipitation events longer before flowing downstream, raise riparian water tables and in turn support more lush vegetation along the floodplain corridor. An additional goal is to re-establish and support multiple beaver colonies dispersed along the length of Muddy Creek on Forest Service land.

Figure 154. Releasing beaver on Muddy Creek.

Muddy Creek Beaver Mimicry (Goal 2) - Travis Cundy

Assistance was provided to the Wyoming Cooperative Fish and Wildlife Research Unit early in 2022 to support elements of their research project entitled "Climate Refugia and Restoration for Native Fishes." Its research includes documenting the effects of beaver dam analog and woody debris placement treatments in providing base flow refugia for native fish and in expanding wet areas along treated stream corridors. Funding was provided through a North Central Climate Adaptation Science Center grant.

During July cooperative research unit personnel completed 13 BDAs and 13 woody debris treatments along a quarter-mile segment of Muddy Creek within the foothill to prairie transition zone south of Buffalo. Monitoring of the research objectives will continue through 2024.

Muddy Creek Rehabilitation Design (Goal 2) - Todd Caltrider and Travis Cundy

A cooperative effort began with the Clear Creek Conservation District during spring to select a design consultant to develop rehabilitation alternatives along a three-mile-long degraded segment of Muddy Creek within the foothill to prairie transition zone south of Buffalo. WWC Engineering won the contract and commenced reach feasibility assessment surveys during November. The objectives of rehabilitation are to stabilize active and potential incision points, and rehabilitate degraded segments to improve bank stability, channel conditions, floodplain connectivity, and riparian habitat diversity and productivity. The ultimate goals are to improve stream and wetland features along the stream corridor for the benefit of fish, wildlife

Figure 155. Example of channel degradation along Muddy Creek.

and the ranching operations involved. The completion of rehabilitation design recommendations is expected by April 2023. Funding contributions to implement the concept design phase include WGFD, WGBGLC, Northern Great Plains Joint Venture, Clear Creek Conservation District and the landowner.

Sheridan Region Mule Deer Legume Seedings (Goal 2) - Todd Caltrider

A total of 196 acres of alfalfa were planted in the spring of 2022 in Crook County on the McDonald and Jolley ranches. The plantings will provide high quality forage for mule deer. This project was funded in part by WGFD.

Northeast Wyoming Salt Cedar Removal (Goal 2) - Todd Caltrider

Salt cedar is a highly invasive plant that is gaining a foothold in the Powder River drainage. Salt cedar removal started in the upper Powder River Basin in Johnson County. Since 2007, Johnson County Weed and Pest District has removed a total of 3,350 acres of salt cedar between Kaycee and the Sheridan County line through a mixture of mechanical mowing and chemical herbicide treatments. In conjunction with Johnson County, Sheridan County Weed and Pest District began the process of salt cedar removal in 2010. Salt cedar density increases greatly downstream of Johnson County. Due to limited funding and increasing density of salt cedar farther downstream on the Powder River, Sheridan County Weed and Pest has been limited in the number of acres of salt cedar removal that can be completed each year. In spring 2018, WGFD partnered with Sheridan County Weed and Pest District to seek grant funding to treat more acres per year. Since partnering, 789 acres of salt cedar have been removed from the Powder River. During winter 2021-22, a total of 220 acres were removed. Work will continue during winter 2022-23. Funding was provided by WGBGLC, WWNRT, WGFD and Sheridan County Weed and Pest District.

Powder River/Pumpkin Buttes Mule Deer GPS Collar Study (Goal 3) - Jill Randall, Tim Thomas and Zach Turnbull

After three years of field work and monitoring, the I-90, I-25 and U.S. Highway 16 deer research projects culminated in 2022. During the three-year period, 114 mule deer were collared. Of particular note, mortalities were observed in 65 (57%) of the collared does. Annual survival across the project areas ranged from a low of 66% to a high of 79%. Vehicle collisions, CWD and epizootic hemorrhagic disease, accounted for nearly half of all known mortality. These primary causes of mortality had clear spatial patterns, with 76% (n=13) of vehicle collisions occurring along I-90, 71% (n=5) of CWD mortality occurring along Highway 14/16, and 100% (N=5) of epizootic hemorrhagic disease mortality occurring in the I-90 portion of the project. Sawyer and Telander processed and analyzed data, producing annual reports and a report titled "Surface Disturbance and Mule Deer Seasonal Range Use along the Interstate-90 Corridor."

Sand Creek WHMA Grazing Treatment (Goal 2) - Nathan Lindsey

A spring grazing treatment is conducted annually to help manage noxious weeds on Sand Creek WHMA. In exchange for the grazing, the public gains access to 2.5 miles of fishing on Sand Creek through private lands.

Healy Reservoir PAA Road Maintenance (Goal 1) - Nathan Lindsey

PAAs serve as critical recreational areas for the general public and sportsmen alike. Yearly maintenance and upgrades are necessary to preserve these habitats and infrastructure. Parking lots and access roads were bladed, fences maintained and weeds were sprayed. Signage was replaced and updated as needed and maintenance performed on comfort stations, boat ramps, docks and other WGFC-owned infrastructure on the PAAs.

Sheridan Region WHMA Invasive Annual Grass Treatments (Goal 1) - Nathan Lindsey

Efforts to manage the establishment and spread of invasive annual grass on Sheridan WHMAs took place in 2022. Priority treatment focuses on areas of ventenata and medusahead followed by those areas susceptible to infestation and spread such as areas of high cheatgrass concentrations, roadways and access routes. Funding provided by WGFD and RMEF.

Figure 156. Spraying invasive annual grass.

Sheridan Region WHMAs (Goal 1) - Nathan Lindsey

Annual maintenance and improvements continued on the five WHMAs in the Sheridan Region in 2022. The Kerns, Amsden, Bud Love, Ed O. Taylor and Sand Creek WHMAs received annual fence maintenance on a total of 40 miles to reduce trespass livestock and minimize wildlife conflicts with private landowners. About 104 acres of irrigation water rights were spread on the Amsden and Bud Love WHMAs. Annual parking lot and road maintenance was performed. More than 20,000 acres of WGFC-managed property rights were monitored. Approximately 200 acres of noxious weeds were treated by WGFD personnel and contract applicators.

Supplemental Beaver to Sourdough Creek (Goal 2) - Travis Cundy and Zach Turnbull

During fall 2020 and 2021, nine beaver were released to Sourdough Creek west of Buffalo in cooperation with the Bighorn National Forest. The goals were to establish new colonies in the unoccupied watershed and allow their dam building activities to help raise the streamside water table, increase soil moisture availability and improve riparian vegetation growth. During 2022 two dams and some aspen cuttings were observed in August about one mile downstream of the previous release sites. A camera trap placed near the aspen cutting activity detected one beaver. A supplemental release with two adults and one sub-adult occurred in September to improve the likelihood of establishing multiple mated pairs in the watershed. This release occurred about a half-mile upstream of the previous release sites within a reach with abundant, tall willow communities lining the floodplain corridor. Later in October, additional dam building was observed immediately upstream of U.S. Highway 16 crossing.

Figure 157. Beaver entering water after release.

Spring Creek Grazing Association Rangeland Improvements (Goals 2 and 3) - Todd Caltrider

This project assists the Spring Creek Grazing Association with rangeland improvements designed to facilitate better grazing management and improve wildlife habitat and connectivity in Thunder Basin National Grasslands. The Grazing Association is a collaborative comprised of private landowners in the Spring Creek drainage who lease grazing on USFS land northeast of Gillette. The Spring Creek portion of the Thunder Basin National Grasslands lies in the Gillette Sage-Grouse Core and Connectivity Areas. In addition to providing valuable habitat for sage-grouse, this area also hosts large numbers of big game animals and is a popular hunting area for the public. Project activities include providing cost share to the Grazing Association for livestock water development and associated pipelines and materials for building wildlife friendly cross fences. With the addition of supplemental livestock water facilities and cross fencing, permittees can better manage livestock grazing within these pastures and address problem areas that were previously over utilized. Decreasing utilization on highly productive areas, such as mesic draws, will benefit wildlife by increasing hiding cover and increasing production of forage available for wildlife. Other project activities include assisting with retrofitting existing woven-wire fences to a wildlife friendly, four-wire fence design. This will increase habitat connectivity for a variety of wildlife species, especially big game. In 2022, 1 water well was drilled, 11 livestock watering tanks were placed and 30,005 feet of livestock watering pipeline were installed. Funding was provided by NFWF and WWNRT.

Figure 158. Water tank installed.

Tongue River Acme Power Plant Diversion Fish Passage (Goal 2) - Travis Cundy

A derelict sheet piling structure is located in the Tongue River alongside the decommissioned Acme Power Plant. The structure served as the cooling water diversion intake for the power plant. It impedes upstream fish passage and boating along the Tongue River. It occurs at river mile 32 above Tongue River Reservoir and is the last unaddressed impediment to fish movements in the river between the mouth of Tongue Canyon at river mile 60 and the Interstate Diversion at river mile 23.

A design was completed in spring to remove the diversion structure and place a downstream grade control to limit potential channel degradation from progressing upstream post structure removal. The DEQ expressed concern the structure removal would mobilize contaminated sediments retained above the structure. A ramp placement alternative was developed during fall that eliminates excavation within the active channel, and in turn limits the likelihood of mobilizing contaminants. The ramp option includes lowering the sheet piling structure to the existing bed elevation and placing a two percent sloping, contoured rock ramp below the structure to facilitate fish and boater passage. The ramp will fill the plunge pool below the diversion structure, stabilize the bed and contain contaminated sediments in-place. Implementation is expected in 2023.

The Sheridan County Conservation District is leading the rehabilitation. WGFD is assisting with permitting and funding from the WGFD. Additional funding partners include the Wyoming Department of Agriculture, Resource Legacy Fund, TNC, Musser Fund, NWTF and WWNRT.

TW Fire Rehabilitation (Goal 2) - Todd Caltrider

In July 2022 a human-caused wildfire initiated in Dry Creek Johnson County called the TW Fire. This wildfire burned over one sage-grouse lek and came within two miles of two others. Before the wildfire, the area contained a mosaic of sagebrush grasslands with medium to high levels of invasive annual grass infestation. This wildfire lies in the Buffalo Sage-Grouse Core Area. The fire was treated with imazapic herbicide at a rate of six ounces per acre via helicopter on October 7, 2021. This recent wildfire is located within a mile from the Cato Fire, which burned approximately 27,000 acres in 2012, and the Double Cross Fire, which burned in 2020. The invasive grass herbicide treatment in the TW Fire will help restore the native grassland community and reduce the future threat of wildfire through the reduction of fine fuels associated with cheatgrass infestation. Funding for this project was provided by WGFD, Clear Creek Conservation District and private landowners.

Figure 159. TW Fire.

Upper Powder River RHAs (Goal 2) - Todd Caltrider

Sheridan Region personnel completed a total of 20 RHAs in key mule deer habitats in the Upper Powder River mule deer herd unit in 2022. Eight riparian RHAs (414 acres), 11 shrub/rangeland RHAs (4,110 acres), two aspen RHAs (145 acres) and three special RHAs (1,161 acres) were completed. 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 (compiled annually). These data provide population managers and the public with documentation of the current state of mule deer habitat conditions in the Upper Powder River mule deer herd.

Ventenata Treatments (Goal 2) - Todd Caltrider

Recently, ventenata grass was discovered in northeast Wyoming. Ventenata is a highly invasive annual grass that is a huge concern to land managers in the West. Similar to cheatgrass, it is a winter annual that reproduces rapidly, decreases rangeland productivity and increases the risk of wildfire. What separates ventenata from invasive brome grasses is its extremely aggressive rate of invasion and limited palatability. Ventenata has been known to outcompete monoculture stands of cheatgrass and quickly become the dominant species. Ventenata has limited forage value to livestock or wildlife, due to its high silica content. The purpose of this project is to reduce the spread of ventenata in Sheridan County in an effort to maintain quality wildlife habitat and reduce the risk of sportsmen carrying the seed to other areas of Wyoming. During summer 2022, WGFD treated 11,922 acres of publicly-accessible

Figure 160. Ventenata herbicide treatments.

private and state lands. Treatments occurred via helicopter with indaziflam (Rejuvra) herbicide applied at a rate of five ounces per acre. Funding was provided by RMEF, WGFD, WGBGLC, WWNRT, NRCS, NFWF, Sheridan County Weed and Pest, Pheasants Forever and BLM.

Ellis WHMA (Goal 1) - Lands Administration Branch

The Ellis WHMA is located in the southern Big Horn mountains in Johnson and Washakie counties, and consists of 2,640 acres of fee title property, along with 1,264 acres of BLM lease. The property boasts populations of big game, and is located in the Upper Powder River MDI area as a priority habitat area. Along with the big game habitat and access, the property includes two rivers that are suitable for fishing. The acquisition of the property offers better fishing access to the Middle Fork of the Powder River, and offers new public access to Sullivan Creek. Furthermore, the property is located a short distance to the west of the Ed O. Tayler WHMA.

The property was listed for sale and the Lands Branch executed a purchase agreement in early 2022. The WGFC approved the acquisition at their meeting in November, and the property was purchased in December 2022. This property will provide improved access for the public in the Sheridan Region, which has proven a difficult area to acquire access areas for the WGFD. WGFD personnel are excited to open this area to the public in the Spring of 2023.

Figure 161. Ellis WHMA.

MANY PERSONNEL CONTRIBUTED TO THE CONTENT OF THE 2022 STATEWIDE HABITAT PLAN ANNUAL REPORT. THANK YOU TO ALL THOSE WHO CONTRIBUTED. THIS REPORT WAS COMPILED AND EDITED BY IAN TATOR, PAUL DEY, RAY BREDEHOFT AND CHELSEA RAMAGE.

APPENDIX A
STATEWIDE HABITAT PLAN IMPLEMENTATION

The SHP, found at https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan, is implemented annually by biologists and managers from throughout the WGFD. The Habitat Technical Advisory Group, comprised of program managers, is responsible for updating the plan, annually reviewing project proposals, making funding recommendations, and ensuring that WGFD activities are directed toward achieving SHP goals, strategies, and actions. To track progress toward achieving SHP actions, in 2021 the HTAG began assessing progress on goals as a standing agenda item for each meeting. The team started by reviewing progress toward Goal 1, Strategies I-III in March and progressed through Goal 2, Strategy II at the December meeting. Meeting notes document discussions and status. The team identified progress occurring on 23 of the 30 Strategies or Actions reviewed (77%). This includes progress on seven of nine actions considered especially relevant to address climate change resiliency. Actions for which little to no progress has occurred include:

- Goal 1.IV.C. Identify IF segments for assessment to determine if they have been impacted by junior water users.
- Goal 1. V.A. Create or re-assign a position devoted to water management issues.
- Goal 1. V.C. Work with partners and legislators to find and implement water management solutions.
- Goal 1. V.E. Pursue acquisition of water rights as water law and public acceptance allow.
- Goal 2. I. B. Conduct a statewide riparian habitat assessment to determine resilience and c limate vulnerability.
- Goal 2. I. C. Conduct a widespread stream channel assessment to locate and characterize incisions and other functional aspects and identify areas with significant departure from functioning condition.
- Goal 2. I. F. Promote and support the development and refinement of stream, riparian and wetland GIS data products like the National Hydrography Database.

Lack of progress on the Goal 1 actions above is unlikely until additional staff time can be secured with a new position or with re-assignment of duties. The Goal 2 actions should be considered prospects for research projects. In 2022-25 the HTAG will continue reviewing and pushing for progress on all SHP actions.

APPENDIX B
HABITAT PROGRAM EXPENDITURES

WGFD funds (figures rounded to the nearest $1,000.00) expended for the on-the-ground projects primarily directed at implementation of Statewide Habitat Plan goals and management on WGFC lands during calendar year 2022 (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: $4,666,000

Non-WGFD funds expended for implementation of SHP goals for calendar year 2022 from or in collaboration with various sources including: 1) Wyoming Wildlife and Natural Resources Trust, 2) USDA Farm Bill federal government funds, 3) other federal government funding programs, 4) other state and local government funding sources, 5) non-governmental organizations, 6) Wyoming Governors Big Game License Coalition, 7) private landowner contributions (including in-kind), 8) corporations and businesses, and 9) private donors.

Non-WGFD Funds Expended on SHP Goals: $10,187,000

Grand Total for SHP Goals: $14,853,000

WGFD applied funding from outside sources amounting to approximately $2.18 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 $13,778,000 of WGFC funds, State Wildlife Grants from US Fish and Wildlife Service, WGFC Trust Funds, and other Grant monies. This figure includes wages, benefits, equipment, operation expenses, supplies and on-the-ground improvement material expenses allocated as follows: approximately 53% for personnel, which includes habitat inventories, monitoring, project contract oversight, project design and implementation and promoting collaborative habitat management efforts with the general public, conservation partners, private landowners and land management agencies. Without the dedication and passion of field personnel, none of these habitat projects would happen. The remainder of the funding was allocated as follows: 5% for vehicles and heavy equipment and 42% for materials and supplies.

Personnel overseeing the WGFD Education, Information and Publications Programs spent approximately 12% of their time in 2022 on SHP goal activities, totaling just over $340,000 of WGFD maintenance and operating funds.

Lastly, personnel within the Lands Administration Branch conduct WGFC property rights monitoring, property rights acquisition and disposal, payment of WGFC property taxes on each county and lease payments to the OSLI. Property taxes paid to counties by the WGFC in 2022 totaled approximately $757,000.00. These taxes include WGFC owned state offices, fish hatcheries, bird farms, houses, WHMAs and PAAs.

APPENDIX C
HPP WER TABLES

During the calendar year 2022, HPP completed 539 Wildlife Environmental Reviews (WERs) for federal, state, local government and private sector proponents. The majority of these reviews were completed for private sector and state proponents (43.41% and 33.02% respectively). HPP completed 172 WERs for SGEO compliance and 10 WERs for MCEO compliance. The project types most frequently reviewed by HPP were related to roadwork/fences, mining, oil and gas, and linear/utilities.

FEDERAL WERS			
SENDER	# OF WERS	%	% OF TOTAL
Animal and Plant Health Inspection Service	2	2.27%	0.37%
Bureau of Land Management	46	52.27%	8.53%
Bureau of Reclamation	1	1.14%	0.19%
Federal Energy Regulatory Commission	2	2.27%	0.37%
National Park Service	2	2.27%	0.37%
Natural Resources Conservation Service	2	2.27%	0.37%
U.S. Army Corps of Engineers	3	3.41%	0.56%
U.S. Fish and Wildlife Service	16	18.18%	2.97%
U.S. Forest Service	11	12.50%	2.04%
WY Army National Guard	3	3.41%	0.56%
Total	**88**		**16.33%**

STATE WERS			
SENDER	# OF WERS	%	% OF TOTAL
Office of State Lands and Investments	43	24.16%	7.98%
Community Development Authority	2	1.12%	0.37%
Department of Environmental Quality	39	21.91%	7.24%
Department of Transportation	86	48.31%	15.96%
Game and Fish Department	2	1.12%	0.37%
State Engineer's Office	6	3.37%	1.11%
Total	**178**		**33.02%**

LOCAL GOVERNMENT WERS			
SENDER	# OF WERS	%	% OF TOTAL
City/Town	16	41.03%	2.97%
County	23	58.97%	4.27%
Total	**39**		**7.24%**

PRIVATE SECTOR WERS			
SENDER	# OF WERS	%	% OF TOTAL
Company	129	55.13%	23.93%
Consultant	104	44.44%	19.29%
Landowner	1	0.43%	0.19%
Total	**234**		**43.41%**

APPENDIX D

HABITAT PROGRAM ACCOMPLISHMENTS: THE NUMBERS

Activities resulting in on-the-ground accomplishments and promotion of collaborative habitat efforts, directed toward the habitat program during the calendar year 2022 are summarized below:

ACTIVITY	2022 ACCOMPLISHMENTS	5 YEAR AVERAGE ACCOMPLISHMENTS
STREAM AND RIPARIAN ACTIVITY		
BDAs installed	77	27.4
BDAs maintained	70	29.6
Beaver transplanted	18	18.6
Detailed stream assessments	33 on 11.3 miles	24 on 5 miles
Detailed stream channel and riparian monitoring	28 on 13.7 miles	15.8 on 9 miles
Fish barrier installed	1	0.7
Fish barriers inventoried	514	166.8
Fish passage structures installed	9	10.4
Fish passage structures maintained	6	10.8

ACTIVITY	2022 ACCOMPLISHMENTS	5 YEAR AVERAGE ACCOMPLISHMENTS
Fish passage structures monitored	3	16
Fish passage upstream miles connected	127.6 miles	68.5 miles
Fish screens installed	1	1
Fish tracking or entrainment investigations	16	6
Instream flow segments	0 on 0 miles	1 on 5 miles
Instream flow studies	1	1
Instream structures installed	45	46.6
Post-stream project reach channel/riparian monitoring	28 miles	16 miles
Public fishing access projects	9	13.8
Riparian protection and management	4 on 3 miles	2.8 on 1.7 miles
Stream flow measurements	5	52.4
Stream restoration projects maintained	6	5
Stream restorations or bank enhancements	7 on 1.4 miles	15.4 on 3.5 miles
Stream temperature monitoring sites	44	29.3
Survey or design for stream restoration	23 on 4.3 miles	15.6 on 4.8 miles
Watershed stream assessments	28 on 72.4 miles	19 on 63.8 miles
HABITAT AND UPLAND ACTIVITY		
Annual vegetation production utilization sites	24	29
Aspen Rapid Habitat Assessment	43; 2,143 acres	60.8; 4,059
Aspen ripping	5 acres	256.8 acres
Aspen, cottonwood, willow browse monitoring	3	4
BLM, RMP, or USFS Cooperator Status	4	3.2
Conservation easements in progress and acquired	0 acres	79.4 acres
Exclosures maintained	25	47.3
Fences installed	57 miles	56 miles
Fences maintained	168 miles	216.6 miles
Funding applications prepared for other entities	37	24.6
Funding sources/contracts/grants administered	229	206
Group training and continuing education	26	14
Herbicide vegetation to thin sagebrush	742.5 acres	468.5 acres
Herbicide weed treatments	101,846 acres	75,386.4 acres
Land management plan participation	0	1.5
Livestock Grazing Management or Wildlife Habitat Stewardship Plans	33	16
Mechanical shrub treatments	2,421.8 acres	1,525 acres

ACTIVITY	2022 ACCOMPLISHMENTS	5 YEAR AVERAGE ACCOMPLISHMENTS
Mowing, chopping, ripping, aerator treatments	3,488 acres	2,608.6 acres
Noxious weed control	89,141 acres	65,729 acres
Post-management prescription monitoring	1 on 30 acres	9.8 on 31,644.8 acres
Post-vegetation treatment monitoring	99 sites; 183,060.9 acres	144.8 sites; 121,961 acres
Pre-vegetation treatment monitoring	261 sites; 12,452.6 acres	118.8 sites; 28,338.7 acres
Prescribed burns	460 acres	953 acres
Private landowner contacts	14	330
Private landowner/permittee contacts yielding projects	106	89
Rangeland Rapid Habitat Assessment	51; 48,976.7 acres	64; 31,470.9 acres
Riparian Rapid Habitat Assessment	4 on 1,049 acres	24.4 on 735 acres
Riparian research studies	2	2.7
Special Rapid Habitat Assessment	11; 3,809.7 acres	12; 3,736.9 acres
Spring developments	0	1.8
Technical assistance requests	73	97.6
Trees or shrubs planted	8,151 on 112.8 acres	11,799.8 on 3,644 acres
Upland exclosure developed	1	4
Upland grass, forb, and food plot seeding	196 acres	426 acres
USDA Farm Bill contract involvement	7	11
Upland habitat inventories (e.g. GIS)	32 on 16,928 acres	44.6 on 30,799.6 acres
Water guzzlers or water tanks installed	16	6
Water pipelines installed	0.1 miles	0.7 miles
Water wells converted to solar pumps	1	0.6
Water wells drilled	3	2.2
Wetland delineations	10 on 18 acres	5.5 on 17.9 acres
Wetland development and renovation	14 on 244 acres	37 on 236.8 acres
Wildlife crossing assessment	8	3.3
Wildlife crossing monitoring	3	6
Wildlife crossing structure installed	5	8.7
Wildlife field cooperative research projects	48	44.6
Feedgrounds maintained	22	19.5

APPENDIX E

ACCOMPLISHMENTS ON WYOMING GAME AND FISH COMMISSION OWNED LAND

WGFD accomplished the following metrics on WGFC-owned land in 2022:

ACTIVITY	2022 ACCOMPLISHMENTS	5 YEAR AVERAGE ACCOMPLISHMENTS
Access improvements	14	9.7
Farming contracts	7 on 835 acres	9 on 1,176.6 acres
Fence maintained	62 on 270 miles	56.2 on 989.5 miles
Fences installed or converted	12 miles	8.8 miles
Food plot	19 on 200 acres	9.4 on 245.8 acres
Lands grazed	20,126 acres	61,016.4 acres
Lands irrigated	1,020 acres	2,577 acres
Irrigation upgrades	3 on 15,840 feet	10 on 41,556 feet
Livestock/forage reserve/meadow rejuvenation grazing	12 on 46,409 acres	20.4 on 61,362.4 acres
Meadow enhancement	5 on 211 acres	4 on 78.7 acres
Meadow mowed/farmed	20 on 1,034 acres	13 on 955 acres
Noxious weed control	6,461 acres	4,347.4 acres
Prescribed burn	85 acres	82.8 acres
Property right monitoring	77 on 105,210 acres	50.8 on 61,123.6 acres
Road maintenance	79 on 102 miles	66.8 on 126.9 miles
Sign installation	280	157.5
Spring development	2	1
Water control structures	25	13.3
Weeds treatments	86,395 acres	48,056 acres
Wells converted	1	1

APPENDIX F
SHP REPORT MILES AND ACRES SUMMARY METHODOLOGY

Miles and acres summaries reported in the annual Statewide Habitat Plan Report, and used for reporting progress toward department statewide plan goals, are generated from information provided by aquatic, terrestrial and habitat and access biologists. Biologists, as part of their annual reporting duties, enter information into the SHP Habitat Plan project database (also referred to as the Project Viewer). This web-based database was developed and is maintained by the Wyoming Geographic Information Science Center at the University of Wyoming. Project data entry occurs in February and covers activities from the previous calendar year. Entries are solicited via an early January email request, typically from the Statewide Habitat Manager Office Manager, to employees who work on habitat issues. Biologist enter information about projects (project defined as an effort requiring at least three days effort), and "widgets" (efforts less than 3 days or items that are not project-related). The entry information for projects includes text and photos to use in the annual printed report. Other entered information identifies the project lead, funding partners and amount expended in the calendar year, and goals.

Source data for miles and acres is from project activities and widgets entered by biologists. Biologists identify a category for each project entry: Assessment and Inventory, Habitat Protection, Maintenance, Monitoring, Project Implementation, Research, and Technical Assistance. Within each category, biologists choose project activity type. The entry is completed by entering a point, or drawing a line or polygon indicating project location and extent. Depending on activity type, the user is prompted to indicate a count (e.g. number of structures), and an amount (e.g. stream miles of restoration). The program also calculates counts and amounts from the number and extent of points, lines or areas. Most miles and acres come from projects; however, there are a few monitoring activities under widgets that also contribute. These include: "Post-stream project reach channel/riparian monitoring" (miles), "post-management prescription monitoring" (acres), "post-vegetation treatment monitoring" (acres), and "post-treatment monitoring" (acres).

Three individuals, consisting of the aquatic and terrestrial program managers, and the habitat and access section chief, review all entries from the employees in their respective programs. Reviewers edit report text and ensure all the fields are fully completed. This includes ensuring adequate photos are attached and shape files were created or attached. Entries are examined to ensure the proper category and activities are identified for the given project. For example, if a project is entered under the "Project Implementation" category, but no on-the-ground work occurred in the calendar year, the category might be changed to "Assessment and Inventory." For individual biologists, program managers review projects and widgets to ensure that the same activity is not counted twice. When done reviewing, program managers either send the project back to the biologist for further editing or approve it. Approving the project signals the Office Manager that the report text is ready for compilation into the annual report, and the funding and activity information is ready for summarization.

The terrestrial and aquatic program managers perform independent summaries of miles and/or acres activities, focused on the activities that largely occur within their respective programs. The terrestrial program manager compiles the acres summary and the aquatic program manager completes the miles of stream summary. Summaries are generated through a reporting feature in the SHP database that generates a CSV file containing all project and widget activities.

For compilation of aquatic miles, the CSV file is sorted by the Aquatic Habitat Program manager to isolate the ten stream length activities to be summed (Table 1). Entered stream distances, rather than stream distances calculated from traced line segments, were used to determine overall total stream mileage. Ideally, calculated values would be used because they can easily be verified. However, biologists commonly already have previously measured stream distances that accurately represent lengths. In fact, these are often directly measured in the field. Therefore, only entered values were used.

For compilation of riparian and upland habitat acres, the CSV file is sorted by the Terrestrial Habitat Program manager to isolate the 27 activities to be summed (Table 2). Entered acres, rather than acreage calculated from traced polygons, were used to determine overall total acres treated.

Table 1. Categories and activities summed to generate miles of stream habitat activity

CATEGORY	ACTIVITY
ASSESSMENT AND INVENTORY	Stream reach assessment (Rosgen survey, HQI, etc.)
	Stream restoration or passage design
	Watershed assessment (WHAM)
PROJECT IMPLEMENTATION	Beaver dam analogs installed (stream distance influenced)
	Beaver restoration (stream distance influenced)
	Fish passage miles connected
	Stream restoration or bank enhancement
	Riparian protection, enhancement or management (<0.5 mile wide along stream)
MONITORING	Post-stream project reach channel/riparian monitoring
HABITAT PROTECTION	Instream flow filing segments

Use the following table for acres.

Table 2. Categories and activities summed to generate acres of riparian and upland habitat activity.

CATEGORY	ACTIVITY
ASSESSMENT AND INVENTORY	Aspen Rapid Habitat Assessment
	Rangeland Rapid Habitat Assessments
	Riparian Rapid Habitat Assessments
	Special Rapid Habitat Assessments
PROJECT IMPLEMENTATION	Herbicide treatment to thin sagebrush
	Herbicide weed treatments
	Livestock grazing management plans or wildlife habitat stewardship plans
	Mechanical shrub treatment
	Mechanical tree removal
	Mowing, chopping, and Lawson aerator treatments
	Noxious weed control
	Prescribed burns

PROJECT IMPLEMENTATION	Riparian habitat protection, enhancement, and management
	Trees or shrubs planted
	Upland exclosure developed
	Upland grass, forb, and food plot seeding
	Upland habitat assessment (GIS)
	Wetland development or major renovation
	WGFC managed lands farming contract
	WGFC managed lands food plot
	WGFC managed lands forage reserve
	WGFC managed lands grazed
	WGFC managed lands irrigated
	WGFC managed lands meadow mowed/farmed
	WGFC managed lands noxious weed control
	WGFC managed lands weed treatment
	WGFC prescribed burns
MONITORING	Aspen, cottonwood, and willow browse monitoring
	Post-management prescription monitoring
	Post-vegetation treatment monitoring
	Pre-vegetation treatment monitoring
HABITAT PROTECTION	Conservation easements in process and acquired
	Fee title acquisition

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Troy Fieseler, Terrestrial Habitat Biologist	(307) 367-4353
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Habitat Mitigation

Ashleigh Rhea, Habitat Mitigation Biologist, Jonah Interagency Office	(307) 323-8243

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Habitat and Access Maintenance

Nathan Lindsey, Coordinator	(307) 675-5483

Terrestrial Habitat/Wildlife Research

Cheyenne Stewart, Wildlife Management Coordinator	(307) 672-7418
Todd Caltrider, Terrestrial Habitat Biologist, Gillette	(307) 283-3410
Tim Thomas, Wildlife Biologist	(307) 627-7418
Zach Turnbull, Wildlife Biologist, Buffalo	(307) 684-2801
Erika Peckham, Wildlife Biologist, Gillette	(307) 670-8164

AHAB - AQUATIC HABITAT BIOLOGIST

AIS - AQUATIC INVASIVE SPECIES

AUM - ANIMAL UNIT MOUTH

BANCS - BANK ASSESSMENT FOR NON-POINT SOURCE CONSEQUENCES OF SEDIMENT

BDA - BEAVER DAM ANALOG

BLM - BUREAU OF LAND MANAGEMENT

BOR - BUREAU OF RECLAMATION

BOW - BOWHUNTERS OF WYOMING

CFS - CUBIC FEET PER SECOND

CWD - CHRONIC WASTING DISEASE

DBH - DIAMETER AT BREAST HEIGHT

DDCT - DENSITY DISTURBANCE OF ENVIRONMENTAL QUALITY

DU - DUCKS UNLIMITED

EPA - ENVIRONMENTAL PROTECTION AGENCY

HMA - HUNTER MANAGEMENT AREA

HPP - HABITAT PROTECTION PROGRAM

HTAG - HABITAT TECHNICAL ADVISORY GROUP

I-25 - INTERSTATE 25

I-80 - INTERSTATE 80

I-90 - INTERSTATE 90

JIO - JONAH INTERAGENCY OFFICE

LaVA - LANDSCAPE VEGETATION ANALYSIS

MDF - MULE DEER FOUNDAITON

MDI - MULE DEER INITIATIVE

MFF - MULEY FANATICS FOUNDATION

MIM - MULTIPLE INDICATOR MONITORING

NEPA - NATIONAL ENVIRONMENTAL POLICY ACT

NFWF - NATIONAL FISH AND WILDLIFE FOUNDATION

NRCS - NATURAL RESOURCES CONSERVATION SERVICE

NWTF - NATIONAL WILD TURKEY FEDERATION

OSLI - OFFICE OF STATE LANDS AND INVESTMENTS

PAA - PUBLIC ACCESS AREA

PAPO - PINEDALE ANTICLINE PROJECT OFFICE

PIT - PASSIVE INTEGRATED TRANSPONDER

PVHP - PLATTE VALLEY HABITAT PARTNERSHIP

RHA - RAPID HABITAT ASSESSMENT

RMEF - ROCKY MOUNTAIN ELK FOUNDATION

ROW - RIGHT-OF-WAY

SHP - STATEWIDE HABITAT PLAN

THAB - TERRESTRIAL HABITAT BIOLOGIST

TNC - THE NATURE CONSERVANCY

TU - TROUT UNLIMITED

USFS - UNITED STATES FOREST SERVICE

USFWS - UNITED STATES FISH AND WILDLIFE SERVICE

UW - UNIVERSITY OF WYOMING

WFW - WATER FOR WILDLIFE

WGBGLC - WYOMING GOVERNOR'S BIG GAME LICENSE COALITION

WGFC - WYOMING GAME AND FISH COMMISSION

WGFD - WYOMING GAME AND FISH DEPARTMENT

WHMA - WILDLIFE HABITAT MANAGEMENT AREA

WLCI - WYOMING LANDSCAPE CONSERVATION INITIATIVE

WMA - WILDLIFE MANAGEMENT AREA

WSF - WYOMING STATE FORESTRY

WVC - WILDLIFE-VEHICLE COLLISIONS

WWNRT - WYOMING WILDLIFE AND NATURAL RESOURCE TRUST

WY-WSF - WYOMING WILD SHEEP FOUNDATION

WYDOT - WYOMING DEPARTMENT OF TRANSPORTATION