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The Role of Private Lands in Conserving Yellowston'e Wildlife in the Twenty-First Century

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I. INTRODUCTION

Yellowstone National Park (YNP) and Grand Teton National Park (GTNP) lie at the core of the Greater Yellowstone Ecosystem (GYE), one of the world's largest, nearly intact temperate-zone ecosystems and a globally significant model for natural resource management.[1] Over the past half-century, the GYE has played a major role in the introduction, evolution, and popularization of the ecosystem concept, and in its application through the paradigms of ecosystem management and large-scale conservation.[2] The GYE concept implies that the integrity of core protected areas depends on a larger landscape encompassing multiple-use federal, state and private lands, making coordination essential to maintaining the larger ecosystem.[3]

Wide-ranging wildlife has played a fundamental role in the evolution of the GYE concept. Not long after the establishment of YNP in 1872, during a period of management by the U.S. Army, General Philip Sheridan recognized that the park was simply too small to protect some of its key wildlife populations year-round.[4] In 1882, Sheridan recommended that Congress extend the park's boundary about 65 kilometers east to "make a preserve for the large game of the West."[5] Congress

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[1] *See* PAUL SCHULLERY, SEARCHING FOR YELLOWSTONE: ECOLOGY AND WONDER IN THE LAST WILDERNESS 202–12 (Mariner Books 1999); SUSAN G. CLARK, ENSURING GREATER YELLOWSTONE'S FUTURE: CHOICES FOR LEADERS AND CITIZENS 5–7 (2008).

[2] *See* Aaron M. Hohl et al., *Approaches to Large-Scale Conservation: A Survey*, *in* LARGE-SCALE CONSERVATION IN THE COMMON INTEREST 29, 40–41 (Susan G. Clark et al. eds., 2014).

[3] *See* SCHULLERY, *supra* note 1, at 202–12; CLARK, *supra* note 1, at 8–15, 30–33; Robert B. Keiter, *The Greater Yellowstone Ecosystem Revisited: Law, Science, and the Pursuit of Ecosystem Management in an Iconic Landscape*, 97 U. COLO. L. REV. 1, 33 (2020). The "core" of the GYE consists of YNP, GTNP, nearby Wilderness areas, and other federal lands. *Id.* at 126.

[4] *See* RICHARD A. BARTLETT, YELLOWSTONE: A WILDERNESS BESIEGED 35 (1985).

[5] *Id.*

declined, opting to avoid new restrictions on land use and economic activity in the area.[6] Yet, Sheridan's vision was partially fulfilled over the early 20th century through a variety of means. As newly established agencies found their footing in the region, they created a variety of game preserves and then national forests—including the Shoshone National Forest, the nation's first—adjacent to YNP.[7] Later, wilderness designations, state and tribal hunting and fishing regulations, state and federal endangered species laws, and other policy and management actions expanded land and wildlife protections in the GYE.[8]

This trend toward large-scale conservation further evolved through the establishment of the Greater Yellowstone Coordinating Committee (GYCC) in 1964.[9] The GYCC was created to foster relationships and coordination among federal land managers in the GYE,[10] crystallizing the concept of a "Greater Yellowstone Ecosystem" in the 1980s. The concept gained traction among environmental advocates and some agency personnel who recognized that the recovery of a viable population of grizzly bears would require habitat expansion and corresponding interagency management coordination across an area much larger than YNP and GTNP.[11] The reintroduction of the gray wolf into YNP and nearby areas of Idaho in the 1990s further underscored the importance of cooperation beyond protected areas and across jurisdictions to maintain the long-term viability of a suite of wide-ranging carnivores.[12]

More recently, evidence of long-distance ungulate (hoofed mammal) migrations has supported calls for more coordinated large-landscape conservation in the GYE.[13] While these migrations have long been known by Native American tribes and some

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6 *Id.*

7 *Shoshone National Forest: History and Culture*, U.S. FOREST SERV., https://www.fs.usda.gov/main/shoshone/learning/history-culture [https://perma.cc/ZF2S-3W8Y] (last visited Apr. 3, 2022).

8 *See* Keiter, *supra* note 3, at 48–96, 124–37.

9 Bob Pahre, *Fifty Years of the Greater Yellowstone Coordinating Committee*, NAT'L PARKS TRAVELER (Apr. 20, 2015), https://www.nationalparkstraveler.org/2015/04/fifty-years-greater-yellowstone-coordinating-committee26507 [https://perma.cc/HW3D-ASS6]; *see also* Keiter, *supra* note 3, at 6, 27 (noting that the "GYCC consists of the managers from the GYE's two national parks and five national forests, along with more recently added representatives from the FWS and the BLM, plus an Executive Coordinator who staffs the commission").

10 Pahre, *supra* note 9; *see also* Keiter, *supra* note 3, at 6, 27.

11 Keiter, *supra* note 3, at 4.

12 *See Wolf Restoration*, NAT'L PARK SERV., https://www.nps.gov/yell/learn/nature/wolf-restoration.htm [https://perma.cc/F8HR-VSGB] (last visited Apr. 3, 2022).

13 *See* Joel Berger, *The Last Mile: How to Sustain Long-Distance Migration in Mammals*, 18 CONSERVATION BIOLOGY 320, 320–21 (2004); HALL SAWYER ET AL., THE RED DESERT TO HOBACK: MULE DEER MIGRATION ASSESSMENT 2–6 (2014), https://migrationinitiative.org/sites/migration.wygisc.org/themes/responsive_blog/images/RDH_Migration_Assessment_Final.pdf [https://perma.cc/8HQ5-A2V5]; Arthur D. Middleton et al., *Conserving Transboundary Wildlife Migrations: Recent Insights from the Greater Yellowstone Ecosystem*, 18 FRONTIERS ECOLOGY & ENV'T 83, 84 (2020) [hereinafter Middleton et al., *Conserving Transboundary Wildlife Migrations*].

local biologists, guides, and ranchers, the advent of GPS tracking allowed them to be mapped with greater breadth and detail over the past two decades.[14] One of the most widely known examples of a GPS mapped migration is the path of 300–400 pronghorn (*Antilocapra americana*) that travel more than 160 kilometers between their winter range in the Green River Basin and their summer range in and around GTNP.[15] Five other ungulate species migrate between 30 and 260 kilometers seasonally across the GYE: elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), bison (*Bison bison*), and moose (*Alces alces*).[16] The scope of these ungulate migrations is expanding scientists', managers', and the public's understanding of the GYE once again.[17] Since these species can strongly influence ecological and economic outcomes in the region and rely on a patchwork of lands across a large area, conservation groups' calls for individual and collective action to conserve them will likely grow louder in the coming years.

This article posits that achieving large-scale, cooperative conservation across the GYE will hinge critically on the inclusion of private lands, for several basic reasons we elaborate throughout. First, and most simply, private lands comprise a very large portion of the GYE—about six million acres, or 30% of the total land area.[18] Second, private lands often provide higher-quality habitat than public lands.[19] Early American and European settlers laid claim to the most hospitable and productive lands, often at low elevations along valley bottoms[20]—areas that are also preferred by many wildlife species.[21] Third, human-wildlife conflicts, many of which occur on private lands, can reduce social tolerance and lead to wildlife "population sinks" (i.e., areas with lower rates of survival and/or reproduction

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[14] Joel Berger & Steven L. Cain, *Moving Beyond Science to Protect a Mammalian Migration Corridor*, 28 CONSERVATION BIOLOGY 1142, 1143–44 (2014).

[15] Berger, *supra* note 13, at 320; Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 86; *see also* MATTHEW J. KAUFFMAN ET AL., WILD MIGRATIONS: ATLAS OF WYOMING'S UNGULATES 136–37 (2018).

[16] Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 84.

[17] Keiter, *supra* note 3, at 92–96. Note that the GYE is also included in discussions of other large ecosystems and large-scale conservation efforts in the intermountain West, such as the Northern Great Plains, Yellowstone to Yukon, and the Crown of the Continent. *See generally* Mark Hebblewhite et al., *Can a Large-Landscape Conservation Vision Contribute to Achieving Biodiversity Targets?*, 4 CONSERVATION SCI. & PRAC. 1 (2021); Charles C. Chester, *Yellowstone to Yukon: Transborder Conservation Across a Vast International Landscape*, 49 ENV'T SCI. & POL'Y 75 (2015); Julia H. Haggerty et al., *Rural Land Concentration & Protected Areas: Recent Trends from Montana and Greater Yellowstone*, SOC'Y & NAT. RES. 1 (2022) [hereinafter Haggerty et al., *Rural Land Concentration and Protected Areas*]; Dena Pedynowski, *Prospects for Ecosystem Management in the Crown of the Continent Ecosystem, Canada-United States: Survey and Recommendations*, 17 CONSERVATION BIOLOGY 1261 (2003) (describing other large ecosystems in which the GYE is often included or associated).

[18] Andrew J. Hansen & Linda Phillips, *Trends in Vital Signs for Greater Yellowstone: Application of a Wildland Health Index*, 9 ECOSPHERE 1, 5 (2018).

[19] *See* Keiter, *supra* note 3, at 137; Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 88.

[20] Keiter, *supra* note 3, at 137.

[21] *Id.*; Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 88.

that can reduce overall population viability).[22] Large carnivores can kill livestock and raise quality-of-life concerns, such as grizzly bears which can kill or badly injure people.[23] Large ungulates also create concerns as they may transmit costly diseases such as brucellosis,[24] compete with cattle for forage, depredate hay fields, and damage or destroy fences.[25] Fourth, some private landowners in the GYE seasonally graze livestock on nearby U.S. Forest Service (USFS) or Bureau of Land Management (BLM) allotments.[26] This grazing activity can have both positive (e.g., weed suppression, fire fuels reduction)[27] and negative (e.g., stream damage, increased carnivore-livestock conflict) effects on the landscape.[28] Finally, private lands in the GYE are vulnerable to fragmentation and development.[29] Landowners may even be motivated to sell or subdivide their land in response to challenges with wildlife, which fragments land, and further hinders conservation goals.[30]

The need for large-scale conservation encompassing private lands in the GYE is consonant with several broader trends in ecology, conservation science, and public understanding. A large body of work conducted since the 1980s has shown the

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[22] *See infra* notes 111–177 and accompanying text.

[23] *See, e.g.*, Abigail A. Nelson et al., *Native Prey Distribution and Migration Mediates Wolf* (Canis Lupis) *Predation on Domestic Livestock in the Greater Yellowstone Ecosystem*, 94 CAN. J. ZOOLOGY 291, 291–92 (2016).

[24] *See, e.g.*, P.C. Cross et al., *Probable Causes of Increasing Brucellosis in Free-Ranging Elk of the Greater Yellowstone Ecosystem*, 20 ECOLOGICAL APPLICATIONS 278, 286 (2010).

[25] Impacts to agriculture include forage competition with cattle, depredation of hay fields, and destruction of fences. *See, e.g.*, Lynn R. Irby et al., *Economic Damage to Forage Crops by Native Ungulates as Perceived by Farmers and Ranchers in Montana*, 49 J. RANGE MGMT. 375, 376, 379 (1996); ARTHUR MIDDLETON & LESLI ALLISON, BEYOND BOUNDARIES IN THE GREATER YELLOWSTONE ECOSYSTEM: FINAL REPORT 3 (2016), https://nature.berkeley.edu/middletonlab/wp-content/uploads/2017/11/WLA-Beyond-Boundaries-Final-Report-No-Appendices.pdf [https://perma.cc/FH82-JNS6].

[26] *See infra* notes 150–153, 269–274 and accompanying text.

[27] *See, e.g.*, Derek W. Bailey et al., *Synthesis Paper: Targeted Livestock Grazing: Prescription for Healthy Rangelands*, 72 RANGELAND ECOLOGY & MGMT. 865, 868 (2019).

[28] *See* ROBERT H. NELSON, PUBLIC LANDS AND PRIVATE RIGHTS: THE FAILURE OF SCIENTIFIC MANAGEMENT 222 (1995) (suggesting that "[n]o other area of public land management has been the subject of as much controversy as the grazing lands"); Shawn Regan, *Managing Conflicts over Western Rangelands*, 54 PERC POL'Y SERIES 1, 2 (2016), https://www.perc.org/wp-content/uploads/old/pdfs/PERC_PS54_FINAL.pdf [https://perma.cc/2VFM-NQG4] (describing how competing interests over federal rangeland management can result in conflict).

[29] *See infra* notes 72–101 and accompanying text.

[30] *See* Claire A. Runge et al., *Unintended Habitat Loss on Private Land from Grazing Restrictions on Public Rangelands*, 56 J. APPLIED ECOLOGY 52, 53 (2019) (finding that restricting grazing on public lands can have the unintended consequence of increasing the conversion of private rangeland to cropland, causing greater land fragmentation of sage-grouse habitat). *But see* Haggerty et al., *Rural Land Concentration and Protected Areas*, *supra* note 17, at 1, 4, 6–7 (2022) (noting that when land ownership is consolidated, larger landowners may be more willing to implement conservation practices and less prone to fragmenting their ownership). *See generally* James L. Huffman, *American Prairie Reserve: Protecting Wildlife Habitat on a Grand Scale*, 59 NAT. RES. J. 35 (2019) (providing an example of a consolidated ownership that has resulted in conservation benefits).

limits of parks and protected areas in conserving biodiversity.[31] Indeed, some recent research has even shown that protected areas may cause development that *harms* biodiversity: across 306 protected areas in 45 countries in Africa and Latin America, average human population growth rates on the borders of protected areas were almost twice average rural population growth.[32] Meanwhile, the recent revolution in wildlife tracking has, by illuminating long-distance wildlife movements[33] and their ecological importance, further exposed the limitations of parks and protected areas for biodiversity conservation.[34] Finally, interdisciplinary research in conservation science, economics, forest and range science, and other fields has highlighted the role that multiple-use public and private working lands—which often surround parks and protected areas—can, and must, play in biodiversity conservation.[35] A major challenge in contemporary conservation, then, is developing policies that can increase the pace and scale of large-landscape conservation while maintaining sustainable uses for food, fuel, and fiber production and the associated livelihoods.[36]

The opportunities and challenges ahead for large-landscape conservation in the GYE are encapsulated by a goal of many conservation scientists and practitioners to conserve 30% of the world's land and water by 2030 (known as 30x30).[37] In 2021, President Biden committed the United States to this goal through Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad,"[38] which directed the Council on Environmental Quality and the Departments of the Interior, Agriculture, and Commerce to propose guidelines for how to achieve the 30x30 goal and to identify qualifying lands and waters.[39] Though the Administration has

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[31] *See* William D. Newmark, *A Land-Bridge Island Perspective on Mammalian Extinctions in Western North American Parks*, 325 NATURE 430, 432 (1987); Justin S. Brashares et al., *Human Demography and Reserve Size Predict Wildlife Extinction in West Africa*, 268 PROC. ROYAL SOC'Y B 2473, 2474–75 (2001); Rosie Woodroffe & Joshua R. Ginsberg, *Edge Effects and the Extinction of Populations Inside Protected Areas*, 280 SCI. 2126, 2126–28 (1998).

[32] George Wittemyer et al., *Accelerated Human Population Growth at Protected Area Edges*, 321 SCI. 123, 123 (2008).

[33] Roland Kays et al., *Terrestrial Animal Tracking as an Eye on Life and Planet*, 348 SCI. 1222, 1222 (2015).

[34] *See* S. Bauer & B.J. Hoye, *Migratory Animals Couple Biodiversity and Ecosystem Functioning Worldwide*, 344 SCI. 54, 60–61 (2014).

[35] *See* C. Kremen & A. M. Merenlender, *Landscapes That Work for Biodiversity and People*, 362 SCI. 1, 1 (2018).

[36] Arthur Middleton & Justin Brashares, *More Than Twice the Size of Texas*, N.Y. TIMES (Dec. 21, 2020), https://www.nytimes.com/2020/12/21/opinion/biden-climate-change-conservation.html [https://perma.cc/E5LG-U8P4]; MATTHEW MCKINNEY ET AL., PF026, LARGE LANDSCAPE CONSERVATION: A STRATEGIC FRAMEWORK FOR POLICY AND ACTION 6–13 (2010), https://www.landconservationnetwork.org/sites/default/files/Large%20Landscape%20Conservation-%20A%20Strategic%20Framework%20for%20Policy%20and%20Action.pdf [https://perma.cc/ATM6-MPRT].

[37] *See* E. Dinerstein et al., *A Global Deal for Nature: Guiding Principles, Mile-Stones, and Targets*, 5 SCI. ADVANCES 1, 1 (2019); Tackling the Climate Crisis at Home and Abroad, Exec. Order No. 14008, 86 Fed. Reg. 7619, § 201, at 7622, § 207, at 7624 (Jan. 27, 2021).

[38] Exec. Order No. 14008, 86 Fed. Reg. 7619.

[39] *Id.* § 216, at 7627. Several states have also committed to the goal of 30x30. *See* N.Y.

expressed a commitment to achieve this goal by supporting locally-led collaborative efforts and building on existing approaches while honoring private property rights,[40] it has encountered skepticism in the western U.S. In Wyoming, an opinion article in the Casper Star-Tribune called the 30x30 effort a federal "land grab" that will result in the removal of "developable lands" from the land base.[41] Nebraska Governor Pete Ricketts issued an executive order aimed at "stopping the implementation of 30x30."[42] The order suspends the identification of state endangered species, limits state spending on conservation easements, and provides for workshops to "advise counties of their rights in reviewing conservation easements."[43] The clear tension between large-scale conservation and local autonomy will require policy makers to address concerns over real and perceived implications for traditional livelihoods, economic opportunity, and property rights.[44]

This article brings together insights from several fields, including environmental history, ecology, economics, human geography, and law, to identify the necessary conditions for a successful expansion of private-lands conservation in the GYE.[45] First, Part II establishes important context by exploring how land was originally privatized in the GYE, who owns this land today, and what is known about how different types of landowners (e.g., traditional versus "amenity" owners) use land, and view conservation efforts.[46] Part III uses two wildlife case studies—the grizzly

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ENV'T CONSERV. §§ 49-0205, -0207 (2021); MICH. COMP. LAWS §§ 324.5301, .5403, .5405 (2021); A.J.R. 3, 2021 Leg., 81st Sess. (Nev. 2021) (passed). California's E.O. was the first in the nation and preceded the federal E.O. by several months. *See* Office of Governor Gavin Newsom, Exec. Order N-82-20 (2020); *Progress Toward 30x30*, ROAD TO 30, https://www.roadto30.org/30x30progress#StateLocalMomentum [https://perma.cc/Q4YZ-R6RT] (last visited Apr. 6, 2022). *But see* S. 220, 124th Gen. Assemb., Reg. Sess. (S.C. 2021) (introduced and residing in the Senate Committee on Agriculture and Natural Resources).

[40] U.S. DEP'T OF THE INTERIOR ET AL., CONSERVING AND RESTORING AMERICA THE BEAUTIFUL 13–16 (2021), https://www.doi.gov/sites/doi.gov/files/report-conserving-and-restoring-america-the-beautiful-2021.pdf [https://perma.cc/LX4J-54DV] [hereinafter AMERICA THE BEAUTIFUL]. The plan outlines eight principles: (1) pursuing a collaborative and inclusive approach to conservation; (2) conserving America's land for the benefit of all; (3) support locally led conservation efforts; (4) strengthen tribal sovereignty; (5) pursue conservation approaches that create jobs and support healthy communities; (6) support private property rights and voluntary stewardship efforts; (7) use science as a guide; (8) and emphasize flexibility and adaptive approaches while building on existing tools and strategies. *Id.*

[41] Harriet Hageman, *Biden's Land Grab—the federal policy for intentional decline*, CASPER STAR-TRIBUNE (Sept. 19, 2021), https://trib.com/opinion/columns/harriet-hageman-biden-s-land-grab----the-federal-policy-for-intentional-decline/article_5434cac9-59c9-517b-8b56-52ea8055e086.html [https://perma.cc/5LXS-67C4].

[42] Office of Governor Pete Ricketts, Stop 30 X 30—Protect Our Land & Water, Exec. Order 21-08 (2021).

[43] *Id.*

[44] Arun Agrawar et al., *An Open Letter to the Lead Authors of 'Protecting 30% of the Planet for Nature: Costs, Benefits and Implications.'*, https://openlettertowaldronetal.wordpress.com/ [https://perma.cc/V9K7-U6V6] (last visited Apr. 6, 2022).

[45] *See infra* notes 46–52 and accompanying text.

[46] *See infra* Part II.

bear and the elk—to explore how the use and management of private lands affects the ecology of the GYE and the experiences of residents and visitors, and conversely, how these wildlife and efforts to conserve them affect private landowners.[47] Part IV explores legal authorities and policy precedents for conservation on private lands, and analyzes the degree of public versus landowner responsibility.[48] Importantly, Part IV considers whether it may be necessary to re-evaluate the "bargain" between the public and the private landowner in the GYE.[49] Next, Part V inventories the range of regulatory and voluntary, incentive-based tools available for private lands conservation in the GYE. This Part also answers Robert Keiter's recent call, in a comprehensive article on the GYE, for new work evaluating what voluntary, incentive-based approaches may be employed to decrease habitat loss, increase habitat quality, and reduce human-wildlife conflicts in the ecosystem.[50] Finally, Part VI concludes our article by discussing the opportunities and challenges ahead in the GYE, including the importance of a "policy portfolio" approach that is centered on voluntary tools, the need for greater coordination across multiple levels of governance, and the need for creativity and innovation in the very near term in this ecosystem.[51] As YNP passes its 150th anniversary, meeting the goal of the National Park Service (NPS) to recruit "residents of communities near parks" as their "co-stewards" and advance large-landscape conservation will require greater attention to the special demands of private-lands conservation.[52] While diverse stakeholders are well-positioned to take on this challenge, they face a critical test in the coming years. Given the hold of the GYE on the public imagination, their work could have broad impact.

II. Origins, Ownership, and Use of Private Land in the GYE

Traditionally, as many as 27 tribes, including the Lakota, Shoshone, Crow, Bannock, Nez Perce, Flathead, and Blackfeet, utilized the lands and resources in YNP and the surrounding ecosystem.[53] Despite heavy intermittent use, the area now comprising the park and immediately adjacent areas operated as a transitional region between the Great Plains, Great Basin, and the Rocky Mountains, and was likely a consistent homeland only to small and relatively dispersed bands of Mountain Shoshone known as the Sheep Eaters, or Tukudika.[54] While the lands

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47 *See infra* Part III.

48 *See infra* Part IV.A.

49 *See infra* Part IV.B.

50 *See infra* Part V; Keiter, *supra* note 3, at 153–54.

51 *See infra* Part VI.

52 Nat'l Park Sys. Advisory Bd. Sci. Comm., Revisiting Leopold: Resource Stewardship in the National Parks 11 (2012), https://www.nps.gov/calltoaction/PDF/LeopoldReport_2012.pdf [https://perma.cc/6HY3-LWPX] [hereinafter Revisiting Leopold].

53 *Yellowstone: Associated Tribes*, Nat'l Park Serv., https://www.nps.gov/yell/learn/historyculture/associatedtribes.htm [https://perma.cc/YBM5-ZYCY] (last visited Apr. 4, 2022).

54 Robert H. Keller & Michael F. Turek, American Indians and National Parks 21–23 (1998); *Yellowstone: The Tukudika Indians*, Nat'l Park Serv., https://www.nps.gov/yell/learn/historyculture/the-tukudika-indians.htm [https://perma.cc/2V8U-7BCZ] (last visited Apr. 4, 2022).

comprising some national parks were taken by settlers through outright conflict, indigenous claims to the GYE were ceded primarily through treaty.[55] The Fort Laramie Treaty of 1851 recognized Blackfeet and Crow claims to the area.[56] These rights, however, were extinguished by later treaties, including the Fort Laramie Treaty of 1868 with the Crow, the Fort Bridger Treaty of 1868 with the Eastern Shoshone and Bannock, and the Crow Agreement in 1880.[57]

Private land claims in the GYE first began in 1871 in Montana, in 1875 in Idaho, and in 1880 in Wyoming.[58] The majority of private mineral and land claims were issued between 1900 and 1920, with a few claims continuing into the 1930s.[59] From 1900 to 1920, many lands on the three Native American reservations within the GYE—the Fort Hall Reservation in Idaho, the Crow Reservation in Montana, and the Wind River Reservation in Wyoming—were allotted to individual Native American households under the Dawes Act.[60] Most land privatization concluded

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[55] KELLER & TUREK, *supra* note 54, at 20–23.

[56] First Treaty of Fort Laramie with Sioux, etc., Sept. 17, 1851, *in* 4 CHARLES J. KAPPLER, INDIAN AFFAIRS: LAWS AND TREATIES 1065–67 (1929); Treaty of Fort Laramie, 11 Stat. 749 (1851), https://memory.loc.gov/ll/llsl/011/0700/07950749.tif [https://perma.cc/8JQS-BVZK].

[57] *See* KELLER & TUREK, *supra* note 54, at 22; Treaty with the Crows, Crow-U.S., May 7, 1868, 15 Stat. 649; Treaty with the Eastern Band Shoshoni and Bannock, Eastern Shoshoni and Bannock-U.S., July 3, 1868, 15 Stat. 673; Agreement with the Crow Indians, ch. 74, 22 Stat. 42 (ratified 1882).

[58] The history of land privatization and white settlement throughout the GYE can be explored in some depth using recently digitized General Land Office Records. *See The Official Land Records Site*, U.S. DEP'T OF INTERIOR: B.L.M., https://glorecords.blm.gov/ [https://perma.cc/U9MA-XT6J] (last visited Apr. 26, 2022). These records contain an entry for each private land title issued by the U.S. Government and report the name of the claimant, the authorizing legislation, the date of the title transfer, the modern county that contains the land in question, and the precise location of the claim within the Public Land Survey System (PLSS). *Id.* For recent applications using these data, see Douglas W. Allen & Bryan Leonard, *Property Right Acquisition and Path Dependence: Nineteenth-Century Land Policy and Modern Economic Outcomes*, 131 ECON. J. 3073 (2021) [hereinafter Allen & Leonard, *Property Right Acquisition and Path Dependence*]; Douglas W. Allen & Bryan Leonard, *How Many Rushed During the Oklahoma Land Openings?*, 14 CLIOMETRICA 397 (2020); Douglas W. Allen & Bryan Leonard, *Rationing by Racing and the Oklahoma Land Rushes*, 16 J. INST. ECON. 127 (2020). For the purposes of this discussion, the GYE is defined as the 20 counties directly adjacent to Yellowstone and Grand Teton National Parks. This includes Bear Lake, Bonneville, Caribou, Clark, Franklin, Fremont, Madison, and Teton Counties in Idaho; Carbon, Gallatin, Madison, Park, Stillwater, and Sweet Grass Counties in Montana; and Fremont, Hot Springs, Lincoln, Park, Sublette, and Teton Counties in Wyoming. This is consistent with previous literature. *See, e.g.*, Patricia H. Gude et al., *Biodiversity Consequences of Alternative Future Land Use Scenarios in Greater Yellowstone*, 17 ECOLOGICAL APPLICATIONS 1004, 1005 (2007) [hereinafter Gude et al., *Biodiversity Consequences*].

[59] *See* Allen & Leonard, *Property Right Acquisition and Path Dependence*, *supra* note 58, at 3077–78; *The Official Land Records Site*, U.S. DEP'T OF INTERIOR: B.L.M., https://glorecords.blm.gov/ (last visited Feb. 11, 2022) (to locate, click "Reference Center"; then click "Web Services Introduction" on the bottom left; then click "Here" under "Bulk Data"; then download .zip files for Idaho, Montana, and Wyoming). These files contain every land patent issued in these three states. Once downloaded, the data may be sorted to determine the dates of claims. To produce the figures quoted in the text, all land claims data was extracted from the 20 GYE counties identified in Gude et al., *Biodiversity Consequences*, *supra* note 58, at 1005.

[60] These claims account for about 3% of total land privatization in the GYE during this period. For additional discussion of allotment under the Dawes Act, see Leonard A. Carlson, *Land*

with the passage of the Taylor Grazing Act in 1934, which enclosed and regulated grazing access to the remaining public lands (now managed by the BLM).[61]

Roughly 60% of private lands within the GYE were claimed as homesteads under the Homestead Act of 1862, granting settlers 160 acres if they agreed to live on and "improve" a plot for five years.[62] Another 12.5% of private lands were settled under the Stock-Raising Homestead Act of 1916.[63] This act allowed settlers to homestead 640 acres on land the Secretary of Interior designated "stock-raising lands" if settlers' "improvements" included ranching.[64] Direct cash sales comprised roughly 18% of land titling, and the remaining 9.5% of land claims were issued under various other statutes, such as the Desert Lands Act and the Timber Culture Act, and grants to railroads.[65]

The average parcel size has changed considerably since initial settlement. Based on land patent records for the General Land Office, initial holdings averaged 280 acres per settler in Idaho, 275 acres in Montana, and 348 acres in Wyoming.[66] By 1930, just before the Taylor Grazing Act, the Census of Agriculture reported average farm sizes across GYE counties had consolidated to 396 acres in Idaho, 857 acres in Montana, and 907 acres in Wyoming.[67] Farm operations have further consolidated in the intervening 90 years. According to the 2017 Census of Agriculture, the average farm size had grown to 738 acres in Idaho, 1,435 acres in Montana, and

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Allotment and the Decline of American Indian Farming, 18 EXPLORATIONS ECON. HIST. 128, 141 (1981); Bryan Leonard et al., *Land Quality, Land Rights, and Indigenous Poverty*, 143 J. DEV. ECON. 1, 2 (2020).

[61] J. Russell Penny & Marion Clawson, *Administration of Grazing Districts*, 29 LAND ECON. 23, 24 (1953); PAUL W. GATES, HISTORY OF PUBLIC LAND LAW DEVELOPMENT 608–15 (1968).

[62] *See* GATES, *supra* note 61, at 393–99; Allen & Leonard, *Property Right Acquisition and Path Dependence*, *supra* note 58, at 3073–74.

[63] *See* GATES, *supra* note 61, at 512–19; *The Official Land Records Site*, *supra* note 59 (duplicating the same process described in note 59 will generate information on authorizing legislation for each claim in each of the counties in the GYE).

[64] GATES, *supra* note 61, at 516–17. 640 acres equals 2.6 square kilometers.

[65] *See* GATES, *supra* note 61, at 385, 399–401, 638–43; *The Official Land Records Site*, *supra* note 59 (duplicating the same process described in note 59 will generate information on authorizing legislation for each claim in each of the counties in the GYE).

[66] *See The Official Land Records Site*, *supra* note 59 (duplicating the same process described in note 59 will generate acreage information for the counties in the GYE). Many settlers claimed land under one of the various homestead acts and then supplemented it by purchasing additional lands for cash. *See* Allen & Leonard, *Property Right Acquisition and Path Dependence*, *supra* note 58, at 3074.

[67] BUREAU OF THE CENSUS, U.S. DEP'T OF COM., AGRICULTURE, IN FIFTEENTH CENSUS OF THE U.S.: 1930, at 73–77, 119–22, 157–58 (1932), https://www2.census.gov/library/publications/decennial/1930/agriculture-volume-3/03337983v3p3ch3.pdf [https://perma.cc/6C8F-9HHB] (reported figures come from averaging average farm size across GYE counties in each of the three states); *see also* Taylor Grazing Act, Pub. L. No. 73-482, 48 Stat. 1269 (1934) (codified as amended at 43 U.S.C. § 315–315*o*-1).

1,110 acres in Wyoming.[68] While many remaining working lands have been consolidated, others have been subdivided to accommodate residential land uses ranging from "amenity ranches" to subdivisions.[69] A growing trend of consolidation in the region has also concentrated ownership of multiple properties into single "mega-estates."[70]

Motivations for land ownership in the region have also shifted from agricultural production toward investment and amenities, such as ambience, recreation, and general enjoyment.[71] Although there is no simple way to characterize the modern landowner in the GYE, a 2006 study explored this population.[72] Through an analysis of property sales of at least 400 acres between 1990 and 2001 and interviews with key informants, the study's authors identified eight types of landowners in the region.[73] Traditional ranchers accounted for only a quarter of ranch sales during the study period, while 39% of sales went to amenity owners, and 20% to investors or developers.[74] Large corporate and institutional interests (e.g., private equity firms, hedge funds, and foundations) also own several well-known and historic ranches in the GYE.[75] Portions of the GYE have additionally been a magnet for celebrities, and lands within those areas have been bought by ultra-high-net-worth individuals.[76] Kayne West's recent purchase and subsequent sale of a ranch outside

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[68] NAT'L AGRIC. STAT. SERV., U.S. DEP'T OF AGRIC., AC-17-A-51, 2017 CENSUS OF AGRICULTURE 256, 259, 263 (2019), https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf [https://perma.cc/5HCK-5GMA].

[69] Julia H. Haggerty et al., *Land Use Diversification and Intensification on Elk Winter Range in Greater Yellowstone: Framework and Agenda for Social-Ecological Research*, 71 RANGELAND ECOLOGY & MGMT. 171, 174 (2018) [hereinafter Haggerty et al., *Land Use Diversification and Intensification*]. "Amenity ranches" includes a variety of rural land, which were previously used for livestock grazing or other commodity production, but have since been removed from production and are valued for their natural features, "ambience," and recreation. Hannah Gosnell & Jesse Abrams, *Amenity Migration: Diverse Conceptualizations of Drivers, Socioeconomic Dimensions, and Emerging Challenges*, 76 GEOJOURNAL 303, 303–04 (2009); Jesse Abrams & John C. Bliss, *Amenity Landownership, Land Use Change, and the Re-Creation of "Working Landscapes"*, 26 SOC'Y & NAT. RES. 845, 845, 850 (2013).

[70] Haggerty et al., *Rural Land Concentration and Protected Areas*, *supra* note 17, at 4.

[71] Hannah Gosnell et al., *Ranchland Ownership Change in the Greater Yellowstone Ecosystem, 1990–2001: Implications for Conservation*, 19 SOC'Y & NAT. RES. 743, 744, 747 (2006).

[72] *Id.* at 747.

[73] *Id.*

[74] *Id.* at 750 (documenting that "[t]raditional ranchers" accounted for 26% of sales; "part-time ranchers" accounted for 6%; "amenity buyers" accounted for 39%; "investors" accounted for 14% and "developers" accounted for 6%).

[75] *See* Kathleen Epstein et al., *With, Not For, Money: Ranch Management Trajectories of the Super-Rich in Greater Yellowstone*, 112 ANNALS AM. ASS'N GEOGRAPHERS 432, 432–33 (2021) [hereinafter Epstein et al., *Ranch Management Trajectories*]; Andrew Gunnoe, *The Political Economy of Institutional Landownership: Neorentier Society and the Financialization of Land*, 79 RURAL SOCIO. 478, 479 (2014).

[76] *See* Zac Taylor & Leo Wolfson, *Goodbye, Kanye West. Wyoming Hardly Knew Ye.*, WASH. POST (Oct. 27, 2021, 5:36 PM), https://www.washingtonpost.com/opinions/2021/10/27/goodbye-

of Cody, Wyoming is a prominent example of the turnover in properties acquired for their amenity values, with nearly 50% changing hands each decade in some GYE counties.[77]

High-net-worth landowners can have an outsized influence in the GYE. These individuals may control thousands or tens of thousands of acres of private land.[78] Land ownership by individuals with amenity and recreational motivations may lead to direct conservation benefits if landowners make investments that improve the habitat and maximize resources for wildlife.[79] Additionally, ranches controlled by high-net-worth individuals are generally not as resource-limited as those of "traditional ranchers," who fund ranch management through their agricultural income.[80] The money and time resources of the high-net-worth individuals can more adequately support restoration projects to improve fisheries or retrofit fences to improve animal passage.[81] Moreover, new owners in the region are often more willing to allocate water rights to instream uses and to pursue riparian restoration projects benefiting fisheries.[82]

Changing land ownership patterns can also create new challenges for wildlife managers and for conservation. One 2006 study described the challenge of managing elk on properties owned for amenity values in the Upper Yellowstone Valley, showing that many new owners encouraged elk to congregate on their properties, while denying access to hunters.[83] This change, representing a change in social norms from when the lands were managed for livestock production,[84] limited the utility of hunting as a management tool—effectively placing elk "out of administrative control."[85] Indeed, non-agricultural owners often have very different social networks, and are less familiar with traditional management approaches and

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kanye-west-wyoming-hardly-knew-ye/ [https://perma.cc/K4ZR-TUPW]; Jonah E. Bromwich, *'We'll Move On': Kanye West Lists Wyoming Ranch for Sale and Residents Shrug*, N.Y. TIMES (Oct. 12, 2021), https://www.nytimes.com/2021/10/12/style/kanye-west-wyoming-ranch-sale.html [https://perma.cc/QM38-9NNN].

77 Gosnell et al., *supra* note 71, at 748.

78 *See* Epstein et al., *Ranch Management Trajectories*, *supra* note 75, at 432; Haggerty et al., *Rural Land Concentration and Protected Areas*, *supra* note 17, at 1, 4, 6–7.

79 Epstein et al., *Ranch Management Trajectories*, *supra* note 75, at 444.

80 Abrams & Bliss, *supra* note 69, at 856–57; Epstein et al., *Ranch Management Trajectories*, *supra* note 75, at 437–43.

81 *See* Hannah Gosnell et al., *Ranch Ownership Change and New Approaches to Water Resource Management in Southwestern Montana: Implications for Fisheries*, 43 J. AM. WATER RES. ASS'N 990, 990 (2007); Epstein et al., *Ranch Management Trajectories*, *supra* note 75, at 437–43.

82 Gosnell et al., *supra* note 71, at 990.

83 *See* Julia Hobson Haggerty & William R. Travis, *Out of Administrative Control: Absentee Owners, Resident Elk and the Shifting Nature of Wildlife Management in Southwestern Montana*, 37 GEOFORUM 816, *passim* (2006).

84 *Id.* at 816.

85 *See id.* at 816–17, 821–22.

conservation programs (e.g., Farm Bill programs or wildlife damage compensation programs).[86] Further, local norms and customs can have a significant influence on landowners' decisions regarding land use and conservation. As a result, new owners may require other pathways to learn about and join conservation efforts, such as information-sharing by ranch brokers and other intermediaries.

The turnover of ranch properties in the GYE also creates potential for subdivision and small-acreage development as land becomes available to new owners with differing values and management priorities.[87] Monitoring the social-ecological dynamics of the amenity transitions underway in the GYE is important for anticipating change and adapting conservation programs.[88] Landowners with diverse reasons for owning land will require a suite of strategies and programs to achieve conservation goals in the GYE. Given the critical role of private lands (discussed further in Part III) and the pressures on them, ownership changes have ever-growing implications for wildlife management. While it is important to consider the role of individual landowners' decisions regarding management or purchase and sale of land, the collective of landowners in a region or community also have the power to greatly influence the ecosystem.[89] Landowner-led and collaborative groups hold significant weight in helping make decisions and implement conservation practices that impact the larger ecosystem.[90]

With respect to land use on private lands in the GYE, there has been growth in suburban and exurban development in recent years.[91] A recent study reported that from 1970 to 2015, the population doubled and housing density tripled in the GYE.[92] If current trends continue, both population and housing density will double again by 2050.[93] The same study revealed that a 2007 model—projecting

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[86] *See infra* notes 364–452 and accompanying text.

[87] Haggerty et al., *Land Use Diversification and Intensification*, *supra* note 69, at 174.

[88] *Id.*; *see also* Kathleen Epstein et al., *Super-Rich Landowners in Social-Ecological Systems: Opportunities in Affective Political Ecology and Life Course Perspectives*, 105 GEOFORUM 206, 206–07 (2019).

[89] *See generally* Drew E. Bennett et al., *The Evolution of the Rangeland Trusts Network as a Catalyst for Community-Based Conservation in the American West*, 3 CONSERVATION SCI. & PRAC. 1 (2020) [hereinafter Bennett et al., *Rangeland Trusts Network*]; Enrique Calfucura, *Governance, Land and Distribution: A Discussion on the Political Economy of Community-Based Conservation*, 145 ECOLOGICAL ECON. 18 (2018); Craig W. Thomas & Thomas M. Koontz, *Research Designs for Evaluating the Impact of Community-Based Management on Natural Resource Conservation*, 3 J. NAT. RES. POL'Y RSCH. 97 (2011).

[90] *See generally* Edward P. Weber, *Unleashing the Potential of Collaborative Governance Arrangements: Getting to Robust Durability in the Blackfoot Valley*, 5 J. SUSTAINABLE DEV. 35 (2012) (describing the success of the Blackfoot Challenge, a collaborative effort to reduce conflict in Montana).

[91] *See* Hansen & Phillips, *supra* note 18, at 9. Exurban development occurs at lower densities (0.063–1.45 houses per square hectare), and suburban development occurs at higher densities (more than 1.45 houses per square hectare). *Id.*

[92] *Id.* at 11.

[93] *Id.*

that 180,000 new homes could be built in a "boom scenario" of population growth and land-use change by 2020 in the GYE—was dramatically exceeded with 227,000 homes built by 2016.[94] Land-use change during this period not only encompassed urban, suburban, and exurban housing, but also commercial and industrial development, road infrastructure, and agriculture.[95] Certainly not all of the recent housing and infrastructure development is occurring on lands formerly used for agriculture, and in ecologically sensitive areas, but much is.[96] Remote work opportunities and the COVID-19 pandemic may further accelerate fragmentation and development in the GYE, with more people moving into rural areas and mountain towns.[97] These trends are consistent with global trends in land conversion and development and the expansion of associated infrastructure (e.g., buildings, roads, fences), which are known to reduce the quantity and quality of wildlife habitat and restrict animal movements.[98]

Simultaneously, in some parts of the GYE, land conversion and fragmentation are accompanied by contrasting efforts to consolidate land ownership, which can result in net ecological benefits.[99] As landowners continue to accumulate large tracts of land, the newly combined parcels generally have less development and associated infrastructure than fragmented parcels.[100] Thus, the consolidated ownership of large blocks of private land may help maintain landscape connectivity and avoid land use conversion for development.[101] These simultaneous trends in fragmentation and consolidation have the potential to greatly impact environmental quality in the GYE, but there is not yet a comprehensive understanding of their net effects.

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94 Gude et al., *Biodiversity Consequences*, *supra* note 58, at 1011.

95 Hansen & Phillips, *supra* note 18, at 10 (basing estimate on an approach that assumes a 1-kilometer buffer of habitat loss around observed human disturbances).

96 JEFFERY D. HAMERLINCK ET AL., RUCKELSHAUS INST., UNIV. OF WYO., B-1244, UNDERSTANDING WYOMING'S LAND RESOURCES: LAND-USE PATTERNS AND DEVELOPMENT TRENDS 9 (2013), http://www.uwyo.edu/haub/_files/_docs/ruckelshaus/open-spaces/2013-land-use-patterns.pdf [https://perma.cc/MB6M-S7VA]; Patricia H. Gude et al., *Rates and Drivers of Rural Residential Development in the Greater Yellowstone*, 77 LANDSCAPE & URB. PLAN. 131, 138 (2006) (noting that by 1999 roughly 33% of exurban developments were found in remote locations, often near riparian areas or national park boundaries).

97 *See* Christine Dimke et al., *COVID-19 and the Renewed Migration to the Rural West*, 19 W. ECON. F. 89, 89 (2021).

98 *See, e.g.*, Peter M. Vitousek et al., *Human Domination of Earth's Ecosystems*, 277 SCI. 494, 494 (1997); Jonathan A. Foley et al., *Global Consequences of Land Use*, 309 SCI. 570, 570 (2005); Marlee A. Tucker, *Moving in the Anthropocene: Global Reductions in Terrestrial Mammalian Movements*, 359 SCI. 466, 466–67 (2018).

99 *See, e.g.*, Haggerty et al., *Rural Land Concentration and Protected Areas*, *supra* note 17, at 6–7.

100 *See id.*; Huffman, *supra* note 30, at 45–51.

101 *See, e.g.*, Epstein et al., *Ranch Management Trajectories*, *supra* note 75, at 434, 442–44.

III. IMPORTANCE OF PRIVATE LANDS TO WIDE-RANGING WILDLIFE IN THE GYE

The GYE is home to the highest diversity of large, wide-ranging mammals in North America.[102] Its large carnivores, such as grizzly bears, wolves, and mountain lions, roam widely across large home ranges to find prey.[103] The GYE's migratory ungulates, such as elk, pronghorn, and mule deer, undergo long-distance annual migrations to take advantage of available forage on the landscape.[104] Both groups are ecologically important because they impact trophic interactions and move nutrients across landscapes, affecting the structure and function of the entire ecosystem.[105] The GYE's core protected areas provide considerable habitat, but these species also require expansive habitats well beyond the boundaries of core protected areas like YNP, GTNP and even the adjacent wilderness areas.[106]

Wide-ranging carnivores and migratory ungulates in the GYE provide ecosystem services and disservices from nature to society.[107] Ecosystem services provided by the species include food, nutrient cycling, and enjoyment and other social benefits.[108] While some private landowners may enjoy these benefits, the benefits accrue disproportionately to others, such as national park visitors and hunters.[109] Importantly, carnivores and ungulates can also become "pests" that create

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[102] Helen R. Morgan et al., *Trophic Cascades and Dingoes in Australia: Does the Yellowstone Wolf-Elk-Willow Model Apply?*, 12 FOOD WEBS 76, 81 (2017); Douglas A. Frank & Samuel J. McNaughton, *The Ecology of Plants, Large Mammalian Herbivores, and Drought in Yellowstone National Park*, 73 ECOLOGY 2043, 2044 (1992).

[103] *See infra* notes 111–129 and accompanying text; LARGE CARNIVORE CONSERVATION: INTEGRATING SCIENCE AND POLICY IN THE NORTH AMERICAN WEST 4 (Susan G. Clark & Murray B. Rutherford eds., 2014) [hereinafter LARGE CARNIVORE CONSERVATION].

[104] Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 84.

[105] *See* James A. Estes et al., *Trophic Downgrading of Planet Earth*, 333 SCI. 301, 301 (2011); Bauer & Hoye, *supra* note 34, at 54.

[106] Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 83.

[107] *See* Samantha Maher et al., A Mixed Methods Assessment of the Ecosystem Services and Disservices Associated with Ungulate Migrations in the Greater Yellowstone Ecosystem (2022) (unpublished manuscript) (on file with the author); Darius J. Semmens et al., *Accounting for the Ecosystem Services of Migratory Species: Quantifying Migration Support and Spatial Subsidies*, 70 ECOLOGICAL ECON. 2236, 2237–38 (2011); Kenneth J. Bagstad et al., *Ecosystem Service Flows from a Migratory Species: Spatial Subsidies of the Northern Pintail*, 48 AMBIO 61, 61 (2019); John Bongaarts, *IPBES, 2019. Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*, 45 POPULATION & DEV. REV. 680, 680–81 (2019); SANDRA DIAZ ET AL., SUMMARY FOR POLICYMAKERS OF THE GLOBAL ASSESSMENT REPORT ON BIODIVERSITY AND ECOSYSTEM SERVICES OF THE INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES 22 (2019), https://www.biologicaldiversity.org/programs/biodiversity/pdfs/Summary-for-Policymakers-IPBES-Global-Assessment.pdf [https://perma.cc/MRC4-WTFW].

[108] *See* Maher et al., *supra* note 107.

[109] *See* Leslie Richardson et al., *The Economics of Roadside Bear Viewing*, 140 J. ENV'T MGMT. 102, 102 (2014); DOUG HOWLETT, SOUTHWICK ASSOCS., BIG MONEY: BIG GAME HUNTING AND OUTFITTING ECONOMIC CONTRIBUTIONS IN WYOMING 4–5 (2017), https://wyoga.org/wp-content/uploads/pdf/studies/southwick-study/SouthwickWyoming_report_WEB.pdf [https://perma.cc/

substantial costs for landowners, especially on agricultural land through livestock and crop depredation, among other impacts.[110] In the GYE, private landowners and the state agencies, responsible for most wildlife habitat and management, bear most of the costs of wildlife damage.

Understanding the use of private land by wildlife—as well as the magnitude and distribution of the benefits and costs generated by wildlife—is critical to conservation and conflict reduction. The next two subsections describe case studies of representative species of wide-ranging carnivores and migratory ungulates in the GYE to highlight the role that private lands play in wildlife ecology and related ecosystem services and disservices.

A. The Grizzly Bear

Since the grizzly bear was listed as threatened under the Endangered Species Act (ESA) in 1975, the population within the GYE has grown from 136 bears to an estimated 1,069 bears in 2021.[111] Concurrently, the species' range has expanded in the GYE, encompassing more private land. In 1990, the grizzly bear ranged over an area including about 600 square kilometers of private land; in 2020, that range had expanded across 1,200 square kilometers of private land.[112]

Grizzly bear population growth and viability is very sensitive to the survival rate of adult female bears.[113] Thus, it is critical for managers to conserve suitable habitats for females to forage, breed, and raise their cubs.[114] Because grizzly bears hibernate during the winter, most bear activity occurs from April through October.

ZFD9-KXJW]; *Hunting, Fishing and Wildlife Viewing are Economic Drivers for Wyoming*, WYO. GAME & FISH DEP'T (Mar. 3, 2018, 3:33 PM), https://wgfd.wyo.gov/News/Hunting,-fishing-and-wildlife-viewing-are-economic [https://perma.cc/Y3K8-B9YU].

110 *See* Arthur D. Middleton et al., *Harnessing Visitors' Enthusiasm for National Parks to Fund Cooperative Large-Landscape Conservation*, 3 CONSERVATION SCI. & PRAC. 1, 1–2 (2021) [hereinafter Middleton et al., *Harnessing Visitors' Enthusiasm*]; Alexander L. Metcalf et al., *Public Wildlife Management on Private Lands: Reciprocity, Population Status, and Stakeholders' Normative Beliefs*, 22 HUM. DIMENSIONS WILDLIFE 564, 566 (2017).

111 U.S. GEOLOGICAL SURV. ET AL., YELLOWSTONE GRIZZLY BEAR INVESTIGATIONS 2020: ANNUAL REPORT OF THE INTERAGENCY GRIZZLY BEAR STUDY TEAM 1 (Frank T. van Manen et al. eds., 2021), https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/media/files/2020%20IGBST%20Annual%20Report%20%28508%29.pdf [https://perma.cc/B4AF-PK3A] [hereinafter YELLOWSTONE GRIZZLY BEAR INVESTIGATIONS]; *Yellowstone: Grizzly Bear*, NAT'L PARK SERV., https://www.nps.gov/yell/learn/nature/grizzlybear.htm [https://perma.cc/EG2B-N6BX] (last visited Mar. 15, 2022); Frank van Manen et al., Interagency Grizzly Bear Study Team, Presentation of Interagency Grizzly Bear Study Team Research and Monitoring Summary 2021, to the Yellowstone Ecosystem Subcommittee, at 15 https://igbconline.org/wp-content/uploads/2021/11/211108-IGBST-YES-Fall-2021-monitoring-update-v5-presented_Sec.pdf [https://perma.cc/5KA3-NTTA] (last visited Apr. 18, 2022).

112 YELLOWSTONE GRIZZLY BEAR INVESTIGATIONS, *supra* note 111, at 24.

113 Charles C. Schwartz et al., *Temporal, Spatial, and Environmental Influences on the Demographics of Grizzly Bears in the Greater Yellowstone Ecosystem*, 161 WILDLIFE MONOGRAPHS 1, 6 (2006).

114 *Id.*

Therefore, the risk of anthropogenic bear mortality varies seasonally.[115] Grizzly bears are especially susceptible to mortality on private lands, with 63% of grizzly bear mortalities from 2009 to 2018 occurring on private lands.[116] Future human development on private lands may be particularly influential for the population because even low levels of development can create additional potential for conflicts with people, reducing bear survival.[117] As a result, conservation strategies that focus on maintaining large, undeveloped areas of private lands, or conversely, on limiting the density of people residing in the habitat of grizzly bears, could greatly influence the continued recovery of this species.

The prevalence of grizzly bears in the GYE generates economic benefits for visitors and local economies. Grizzly bears are "charismatic megafauna," providing both material services from their economic contributions to the GYE tourism and non-material services for their role in creating a feeling of wonder and excitement in visitors and residents alike.[118] Grizzly bears are also frequently anthropomorphized, with many people becoming invested in individual bears' well-being and assigning human traits, characteristics, and narratives to them.[119] The economic implications of the grizzly bear's charisma are considerable. For instance, one study conducted inside YNP found that, on average, visitors were willing to pay an additional $41 in entrance fees to ensure the continued viewing of bears from the road.[120] Based on recent visitation levels at YNP, this willingness-to-pay could accumulate more than $100 million per year.[121] Grizzly bears likely provide regulatory services as well, due to their ability to influence the abundance and distributions of other species.[122] Indeed, some of the ecological changes attributed to wolf restoration—including the patchy recovery of trees and shrubs in riparian areas—are also linked to the concurrent recovery of grizzly bears and their predatory behavior.[123]

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[115] *Id.*

[116] YELLOWSTONE GRIZZLY BEAR INVESTIGATIONS, *supra* note 111, at 73. These mortalities occurred outside of the Demographic Monitoring Area. *Id.*

[117] Charles C. Schwartz et al., *Impacts of Rural Development on Yellowstone Wildlife: Linking Grizzly Bear* Ursus Arctos *Demographics with Projected Residential Growth*, 18 WILDLIFE BIOLOGY 246, 250 (2012).

[118] Richardson et al., *supra* note 109, at 102; *see also* Cindy Sorg Swanson et al., *Insights into the Economic Value of Grizzly Bears in the Yellowstone Recovery Zone*, 9 BEARS: THEIR BIOLOGY AND MGMT. 575, 576–77 (1994).

[119] Leslie Richardson & Lynne Lewis, *Getting to Know You: Individual Animals, Wildlife Webcams, and Willingness to Pay for Brown Bear Preservation*, 104 AM. J. AGRIC. ECON. 673, 674–75 (2022).

[120] Richardson et al., *supra* note 109, at 109.

[121] *See id.*

[122] *See generally* Arthur D. Middleton et al., *Grizzly Bear Predation Links the Loss of Native Trout to the Demography of Migratory Elk in Yellowstone*, 280 PROC. ROYAL SOC'Y B 1 (2013) (describing how, as trout populations shift, grizzly bears predate on elk more frequently).

[123] *See* Joel Berger et al., *A Mammalian Predator-Prey Imbalance: Grizzly Bear and Wolf Extinction Affect Avian Neotropical Migrants*, 11 ECOLOGICAL APPLICATIONS 947, 951 (2001).

At the same time, the recovery of grizzly bears in the GYE, and the associated increase in their dispersal from core protected areas onto private lands, has generated substantial costs for nearby landowners and communities. Disservices from grizzly bears include the killing and injuring of livestock and poultry, damage to property, especially as bears access food and garbage, and confrontations including occasional maulings of humans or pets.[124] For example, although grizzly bears represent a small fraction of overall livestock losses from predators, 3,070 livestock deaths were attributed to grizzly bears across the U.S. in 2015 alone.[125] A high proportion of these costs were, and continue to be borne by particular private landowners.[126] State and federal agencies have developed policies and programs to help share this burden, particularly via livestock damage compensation programs.[127] Still, this compensation often fails to cover the full costs of managing lands in the presence of large carnivores, which can cause high levels of psychological stress that lowers social tolerance for grizzly bears, inhibits landowner buy-in to conservation programs, and contributes to bear mortalities.[128] As a result, conflict-related bear mortalities are on the rise, and there are calls for proactive, rather than reactive, management techniques. Depredation prevention and so-called "carnivore coexistence" programs are being piloted, including carnivore monitoring via camera trap networks, range riding to deter carnivores from livestock, and livestock carcass removal—but these programs can be costly.[129] The future of the bear (and other carnivores) in the GYE depends partly on further engaging landowners in both habitat conservation and proactive conflict reduction efforts.

B. The Elk

Many migratory ungulates in the GYE spend the summer in YNP, GTNP, and

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[124] *See* RICHARD B. HARRIS, MONT. FISH, WILDLIFE, & PARKS, LITERATURE REVIEW OF LIVESTOCK COMPENSATION PROGRAMS: CONSIDERING WAYS TO ASSIST LIVESTOCK PRODUCERS WITH GRIZZLY BEAR CONSERVATION EFFORTS IN MONTANA 1–5 (2020), https://westernlandowners.org/wp-content/uploads/2020/05/Review-of-livestock-compensation-programs-052620.pdf [https://perma.cc/4V37-4BV9]; ANDREW PILS ET AL., RECOMMENDATIONS FOR REDUCING BEAR-HUMAN CONFLICTS AND GRIZZLY BEAR MORTALITIES IN THE YELLOWSTONE ECOSYSTEM: A REPORT TO THE YELLOWSTONE ECOSYSTEM SUBCOMMITTEE 14 (2020), https://igbconline.org/wp-content/uploads/2021/08/2020_7_YES_MortReductionRecom_FINAL-1.pdf [https://perma.cc/QQ4A-8GVL]; Seth M. Wilson et al., *Human-Grizzly Bear Coexistence in the Blackfoot River Watershed, Montana: Getting Ahead of the Conflict Curve*, *in* LARGE CARNIVORE CONSERVATION, *supra* note 103, at 121, 195.

[125] U.S. DEP'T OF AGRIC., #745.1217, DEATH LOSS IN U.S. CATTLE AND CALVES DUE TO PREDATOR AND NONPREDATOR CAUSES, 2015, at 53, 59 (2015), https://www.aphis.usda.gov/animal_health/nahms/general/downloads/cattle_calves_deathloss_2015.pdf [https://perma.cc/BR4N-4WKG]. The report attributed 1,260 cattle deaths to grizzly bears and 1,810 calf deaths. *See id.*

[126] Aaron J. Enriquez & David C. Finnoff, *Managing Mortality of Multi-Use Megafauna*, 107 J. ENV'T ECON. & MGMT. 1, 8–9 (2021).

[127] *See* HARRIS, *supra* note 124, at 10–15.

[128] Charles R. Anderson et al., *Grizzly Bear-Cattle Interactions on Two Grazing Allotments in Northwest Wyoming*, 13 URSUS 247, 247 (2002); PILS ET AL., *supra* note 124, at 17.

[129] Middleton et al., *Harnessing Visitors' Enthusiasm*, *supra* note 110, at 6.

nearby wilderness areas, then migrate to winter ranges that include private and multi-use lands.[130] Elk are particularly important among these ungulates, because they are so highly visible; so prized by wildlife-watchers, recreational hunters, and commercial hunting guides; and so important as prey for many carnivores and scavengers such as grizzly bears, wolves, mountain lions, and eagles.[131]

Elk in the GYE can migrate up to 113 kilometers, but some elk herds are only partially migratory, meaning some individuals migrate and some individuals do not.[132] A recent study of elk in the GYE estimated that there are some 26 migratory elk herds that spend at least a portion of the year in YNP, GTNP, and adjacent public lands.[133] Although elk are only one of several migratory ungulates in this system, their large body size, substantial food requirements, and propensity to gather in large herds mean that they interact strongly with private lands, requiring the habitat they provide and creating significant conflicts.[134] Past land-use change around the GYE probably caused some elk migrations to be truncated or entirely lost, and there are concerns about the long-term persistence of extant elk migrations because of future habitat fragmentation, particularly on private lands.[135] The proportion of elk winter range that is privately owned varies widely by herd, from 3.3% up to 85.4%.[136] The number of private landowners that own land located in elk ranges also varies widely by herd, from 21 up to 5,657.[137] The Cody elk herd, for example, spends summers in YNP and adjacent national forests, but relies on a winter range that is 34% private land, held by more than 1,000 landowners—though 75% of this private land is owned by just 20 landowners, and 50% by 6 landowners.[138]

Migratory elk have a complex relationship with private lands. They can take advantage of high-quality forage on private lands, and can find security from

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130 *See* Arthur D. Middleton et al., *Animal Migration Amid Shifting Patterns of Phenology and Predation: Lessons from a Yellowstone Elk Herd*, 94 ECOLOGY 1245, 1246 (2013) [hereinafter Middleton et al., *Animal Migration Amid Shifting Patterns*].

131 *See* Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 88.

132 *Id.* at 86; Gregory J.M. Rickbeil et al., *Plasticity in Elk Migration Timing is a Response to Changing Environmental Conditions*, 25 GLOBAL CHANGE BIOLOGY 2368, 2369 (2019).

133 Laura C. Gigliotti et al., Wildlife Migrations Highlight Importance of Both Private Lands and Protected Areas in the Greater Yellowstone Ecosystem (2022) (unpublished manuscript) (on file with the author).

134 *See* W. David Walter et al., *Management of Damage by Elk* (Cervus Elaphus) *in North America: A Review*, 37 WILDLIFE RSCH. 630, 630–32 (2010); Haggerty et al., *Land Use Diversification and Intensification*, *supra* note 69, at 174; Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 86.

135 Berger, *supra* note 13, at 322–23; Matthew J. Kauffman et al., *Causes, Consequences, and Conservation of Ungulate Migration*, 52 ANN. REV. OF ECOLOGY, EVOLUTION & SYSTEMATICS 453, 467–72 (2021).

136 Gigliotti et al., *supra* note 133.

137 *Id.*

138 *Id.*

hunting pressure on some properties.[139] However, private lands also contain higher building and development densities than public lands, and generally have potential for future land development. This development can eliminate or fragment habitat for elk (and many other wildlife species). In recent research involving 26 major elk herds in the GYE, the highest building densities occur on the lower-elevation winter ranges, where densities range from 0.03 to 7.75 buildings per square kilometer.[140] On the same herds' migratory ranges (corridors), building densities range from 0.05 to 2.05 buildings per square kilometer.[141] While the direct habitat loss associated with the footprint of buildings and infrastructure can have important effects on elk, the "indirect habitat loss" may in some cases be more important than direct habitat loss.[142] Indirect habitat loss occurs when animals avoid the area around buildings, roads, and other sources of human disturbance, and in so doing, forgo valuable foraging opportunities over potentially large areas.[143] Recent work suggests that elk decrease their use of areas when human development and infrastructure encompasses more than 3% of the nearby land cover[144], a finding that was strikingly similar to another recent study showing a sharp decline in habitat use by migratory mule deer when surface development exceeded 3% in a natural gas field in the southern GYE.[145]

Migratory elk can face other challenges on private lands. As private lands are developed, associated fences and roads can create physical and behavioral barriers to wildlife movement. Based on an analysis of 26 elk herds in the GYE, elk ranges contained an estimated 25,562 kilometers of fences and 1,442 kilometers of interstate roads, with 1,217 kilometers of interstate roads within migratory ranges alone.[146] While the effects of fences and roads on elk are not well-studied, research on other GYE ungulates can provide insight into their general effects. One recent study found that individual pronghorn encountered fences an average of 250 times a year, and mule deer about 120 times per year, with each species failing to cross the fence about 40% of the time—potentially incurring lost foraging opportunities,

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[139] *See* Kelly M. Proffitt et al., *Effects of Hunter Access and Habitat Security on Elk Habitat Selection in Landscapes with a Public and Private Land Matrix*, 77 J. WILDLIFE MGMT. 514, 521–23 (2013); Kristin J. Barker et al., *Native Forage Mediates Influence of Irrigated Agriculture on Migratory Behaviour of Elk*, 88 J. ANIMAL ECOLOGY 1100, 1105–08 (2019) [hereinafter Barker et al., *Native Forage*].

[140] *See* Gigliotti et al., *supra* note 133. The mean density in winter ranges is 1.24 buildings per square kilometer. *Id.*

[141] *See id.* The mean density in migratory ranges is 0.69 buildings per square kilometer. *Id.*

[142] *Id.*

[143] *Id.*; Simone Ciuti et al., *Effects of Humans on Behaviour of Wildlife Exceed Those of Natural Predators in a Landscape of Fear*, 7 PLOS ONE 1, 9 (2012).

[144] Laura C. Gigliotti et al., Elk Multi-level Habitat Use Thresholds of Irrigated Agriculture and Human Development (2022) (unpublished manuscript) (on file with the author).

[145] Hall Sawyer et al., *Migratory Disturbance Thresholds with Mule Deer and Energy Development*, 84 J. WILDLIFE MGMT. 1, 1 (2020). Recent research on elk is showing similarly low thresholds of human development associated with reduced habitat use. Gigliotti et al., *supra* note 144.

[146] *See* Gigliotti et al., *supra* note 133.

energetic costs, and other forms of stress.[147] With their larger body size and ability to jump over fences, elk may be less impacted by fences, except in summer when fences may restrict the movements of young calves and (by association) their mothers.[148] For some migratory herds, this effect could be significant, because many elk depart on spring migration with relatively young calves at heel.[149]

Agriculture and livestock grazing can also affect elk herds, both directly and indirectly. Most seasonal elk ranges are comprised of 10% or less of agricultural lands.[150] Yet, elk gain substantial nutritional value from foraging in these areas, particularly where there are irrigated hay or alfalfa fields that remain green and productive after the late-summer "brown down" of native grasses.[151] Over time, these nutritional subsidies may reduce an elk's propensity to migrate and contribute to declines of migratory behavior.[152] Meanwhile, livestock grazing within elk ranges varies seasonally, with winter ranges generally containing a higher amount of cattle grazing compared to summer ranges where livestock may be present on federal grazing allotments that may not overlap with elk summer ranges.[153]

Elk provide ecosystem services in all three primary categories:[154] material services in which there is an economic or physical contribution to human society (e.g., hunting and tourism); regulatory services, in which herds support important ecosystem functions (e.g., biodiversity and soil nutrient and carbon cycling); and non-material services (e.g., cultural, recreational, and aesthetic contributions of wildlife to society).[155] Tourism in and around YNP and GTNP is largely dependent on the reliable viewing of wildlife, which contributed, as a cumulative benefit, $642 million to local economies in 2019.[156] The Wyoming big-game hunting

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147 Wenjing Xu et al., *Barrier Behaviour Analysis (BaBA) Reveals Extensive Effects of Fencing on Wide-Ranging Ungulates*, 58 J. APPLIED ECOLOGY 690, 696 (2021).

148 *See* Justin L. Harrington & Michael R. Conover, *Characteristics of Ungulate Behavior and Mortality Associated with Wire Fences*, 34 WILDLIFE SOC'Y BULL. 1295, 1299 (2006).

149 *See* Rickbeil et al., *supra* note 132, at 2369.

150 Gigliotti et al., *supra* note 133.

151 Middleton et al., *Animal Migration Amid Shifting Patterns*, *supra* note 130, at 1254; Kristin J. Barker et al., *Land Management Alters Traditional Nutritional Benefits of Migration for Elk*, 83 J. WILDLIFE MGMT. 167, 167–68 (2019); Erica L. Garrououtte et al., *Using NDVI and EVI to Map Spatiotemporal Variation in the Biomass and Quality of Forage for Migratory Elk in The Greater Yellowstone Ecosystem*, 8 REMOTE SENSING 1, 2 (2016).

152 Barker et al., *Native Forage*, *supra* note 139, at 1101.

153 *See* Gigliotti et al., *supra* note 133. Mean cattle density for individual elk herds ranges from 0 to 5.9 head per square kilometer in winter ranges (mean of 1.9 head per square kilometer), 0.03 to 6.0 cows per square kilometer in migratory ranges (mean of 1.9 head per square kilometer), and 0 to 5.9 head per square kilometer in summer ranges (mean of 1.6 head per square kilometer). *Id.*

154 Bongaarts, *supra* note 107, at 680–81; DIAZ ET AL., *supra* note 107, at 2, 22.

155 Maher et al., *supra* note 107.

156 Morgan Warthin, *Tourism to Yellowstone Creates $642 Million in Economic Benefits; Report Shows Visitor Spending Supports 7,000 Jobs in Local Economy*, NAT'L PARKS SERV. (June 17,

industry, valued at $300 million annually, also relies heavily on elk and other migratory ungulates.[157] Meanwhile, the population productivity associated with migratory herds is thought to play a key role sustaining both large carnivores and hunting opportunities in the GYE,[158] and grazing by migrating elk and bison has been shown to increase carbon capture in grasslands.[159] Private landowners may also benefit from elk on their properties through hunting and compensation for hunting access,[160] increases in property values or guest ranches services linked to the aesthetic values of wildlife,[161] and from simply enjoying the proximity to wildlife.[162] Importantly, the benefits and services elk provide, particularly on private land, likely fluctuate temporally as elk abundance on the landscape varies with annual migrations and environmental change.[163] The full value of ecosystem services linked to elk in the GYE has yet to be quantified, but even basic knowledge of the substantial time spent by elk on private lands suggests that a significant proportion of this ecosystem services value is generated by private lands.[164]

Conversely, sustaining elk populations in the GYE also comes with costs, or disservices, most of which are experienced by private landowners during the winter and spring months when elk use lowland habitat on working lands.[165] Interviews with landowners in the GYE provide insight into the challenges of co-existing with elk.[166] Elk are able to jump all but the tallest fences and may congregate in groups of hundreds or thousands in agricultural fields and pastures; and each

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2020), https://www.nps.gov/yell/learn/news/20025.htm [https://perma.cc/4KK9-9U89]; *see also* Carol Mansfield et al., *Preferences for Public Lands Management under Competing Uses: The Case of Yellowstone National Park*, 85 LAND ECON. 282 (2008).

157 HOWLETT, *supra* note 109, at 3–4.

158 Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 88.

159 *See* Chris Geremia et al., *Migrating Bison Engineer the Green Wave*, 116 PNAS 25707, 25707 (2019); Douglas A. Frank, *Manipulating the System: How Large Herbivores Control Bottom-up Regulation of Grasslands*, 106 J. ECOLOGY 434, 435 (2018).

160 MICHAEL TIPTON & NORMA P. NICKERSON, INST. FOR TOURISM & RECREATION RSCH., 2011-3, ASSESSMENT OF HUNTER ACCESS ON MONTANA PRIVATE LANDS: LANDOWNER/OUTFITTER RESPONSE TO INITIATIVE 161, at 3–6 (2011), https://scholarworks.umt.edu/cgi/viewcontent.cgi?article=1209&context=itrr_pubs [https://perma.cc/9RSM-UV5H].

161 *See* JUSTIN FARRELL, BILLIONAIRE WILDERNESS: THE ULTRA-WEALTHY AND THE REMAKING OF THE AMERICAN WEST 77–94 (2020).

162 *See* Haggerty et al., *Land Use Diversification and Intensification*, *supra* note 69, at 173–74; Maher et al., *supra* note 107.

163 *See* Arthur D. Middleton et al., *Green-Wave Surfing Increases Fat Gain in Migratory Ungulate*, 127 OIKOS 1060, 1060–61 (2018); Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 85–88.

164 *See* Maher et al., *supra* note 107.

165 *See infra* notes 166–169 and accompanying text.

166 *See* MIDDLETON & ALLISON, *supra* note 25, at 19; WHITNEY TILT, ELK IN PARADISE: CONSERVING MIGRATORY WILDLIFE AND WORKING LANDS IN MONTANA'S PARADISE VALLEY 20–25 (2020), https://www.perc.org/wp-content/uploads/2020/07/Elk-In-Paradise.pdf [https://perma.cc/FJS6-MFAV]; Maher et al., *supra* note 107.

individual in a group of elk can eat as much as a full-grown domestic cow in a day.[167] Wildlife-friendly fencing can reduce damage to fences and increase landscape permeability, but it is costly to install and maintain this fencing, at approximately $8,000 to $15,000 per kilometer.[168] Aside from the financial costs of property damage and crop loss, elk may also carry brucellosis, a highly contagious bacterial disease spread during the spring calving season when elk and cattle are more likely to occupy the same areas.[169] Ninety-eight percent of brucellosis transmission occurs on private lands and outbreaks can cost cattle producers as much as $150,000, making brucellosis a persistent source of financial risk and psychological stress.[170] The impacts of forage competition and disease transmission from elk to livestock can seriously reduce landowners' tolerance for abundant herds.[171]

The spatial and temporal attributes of wildlife occupancy on public and private lands determine how elk populations interact with different groups of people (e.g., ranchers, hunters, tourists); and therefore, which groups receive services or disservices.[172] The same elk herds that create costs for private landowners during the winter months, migrate onto public lands during the summer and fall.[173] During these times, elk benefit the public by underpinning the hunting and tourism industries, for example, by sustaining large carnivores and scavengers within core protected areas.[174] Landowners effectively subsidize these benefits by providing much of the seasonal habitat.[175]

Looking ahead, habitat fragmentation could impede or alter elk movement between protected areas and private lands, potentially changing the distribution of ecosystem services.[176] For example, documented shifts in elk migration linked to changes in forage availability, landscape permeability, and relative predation pressure suggests that some herds will spend an increasing portion of the year on private lands. The increased time spent on private lands will likely exacerbate conflicts with landowners and create fewer benefits to the public.[177]

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167 TILT, *supra* note 166, at 18; Maher et al., *supra* note 107.

168 *See* Middleton et al., *Harnessing Visitors' Enthusiasm*, *supra* note 110, at 6.

169 *See* Kari Boroff et al., *Risk Assessment and Management of Brucellosis in the Southern Greater Yellowstone Area (II): Cost-Benefit Analysis of Reducing Elk Brucellosis Prevalence*, 134 PREVENTIVE VETERINARY MED. 39, 39 (2016); Nathaniel D. Rayl et al., *Modeling Elk-to-Livestock Transmission Risk to Predict Hotspots of Brucellosis Spillover*, 83 J. WILDLIFE MGMT. 817, 817–18, 824–27 (2019).

170 Boroff et al., *supra* note 169, at 41; Rayl et al., *supra* note 169, at 817.

171 *See* MIDDLETON & ALLISON, *supra* note 25, at 9; TILT, *supra* note 166, at 18.

172 Maher et al., *supra* note 107.

173 *Id.*; Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 86–88.

174 Middleton et al., *Conserving Transboundary Wildlife Migrations*, *supra* note 13, at 88.

175 *See* Semmens et al., *supra* note 107, at 2236; Bagstad et al., *supra* note 107, at 62–63.

176 *See supra* notes 130–175 and accompanying text.

177 *See* Middleton et al., *Animal Migration Amid Shifting Patterns*, *supra* note 130, at 1246;

Ultimately, private lands in the GYE are ecologically important to wide-ranging wildlife because they extend the habitat available to many species to meet nutritional and reproductive needs.[178] In turn, healthy wildlife populations provide ecosystem services, such as hunting, tourism, and wellbeing, which benefit the public.[179] Simultaneously, wildlife on private lands can cause human-wildlife conflict and create costs for landowners, who are being asked to support growing wildlife populations, including predators—effectively subsidizing the public's interest in healthy wildlife.[180] Given the importance of private lands to wildlife in the GYE, it is important to clarify what the public and landowners can expect from one another;[181] what tools are available to deliver conservation at the public-private interface;[182] and what policy innovations are needed in the future.[183]

IV. Conceptual Basis for Wildlife Conservation on Private Lands

One of the major challenges of wildlife law has been to define the legal relationship between the private owner of land and public wildlife.[184] Charlie Facemire and Karen Bradshaw have identified wildlife law and policy as "the great paradox of American land use policy" because despite the idealization of wildlife, the American legal system has generally not conceptualized wildlife as having use-rights to resources on private lands."[185] It is helpful to look at historic English law as the original source of the U.S. legal system to understand the legal status of wildlife on private lands.

In medieval England, wildlife, and specifically huntable "game," was owned by the Crown.[186] Landowners and hunters could only pursue and harvest game with the Crown's permission.[187] The Crown granted hunting rights to favored individuals.[188] For example, landowners sometimes received the exclusive right to hunt on their land, but the Crown could instead separately give someone besides

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Eric K. Cole, *Changing Migratory Patterns in the Jackson Elk Herd*, 79 J. Wildlife Mgmt. 877, 877–78 (2015); Maher et al., *supra* note 107.

178 *See supra* notes 111–177 and accompanying text.

179 *See supra* notes 111–177 and accompanying text.

180 *See supra* notes 111–177 and accompanying text.

181 *See infra* notes 202–287 and accompanying text.

182 *See infra* notes 289–466 and accompanying text.

183 *See infra* notes 468–508 and accompanying text.

184 Eric T. Freyfogle et al., Wildlife Law: A Primer 57 (2d ed. 2019).

185 Challie Facemire & Karen Bradshaw, *Biodiversity Loss, Viewed Through the Lens of Mismatched Property Rights*, 14 Int'l J. Commons 650, 653 (2020) (noting that on one hand people "idealize wildlife and yet refuse to incur the costs of the millions of incremental choices affecting biodiversity and species preservation" resulting in "biodiversity loss at a breath-taking rate").

186 Freyfogle et al., *supra* note 184, at 20.

187 *Id.*

188 *Id.* at 21.

the landowner the right to hunt on the land.[189] Over time the law evolved, and it was eventually determined that wildlife in England was owned by the Crown in a sovereign capacity, rather than in a proprietary capacity.[190] Consequently, the Crown had an obligation to manage wildlife in the interests of the entire realm, rather than for personal benefit.[191] This evolution of law included the determination that landowners could control access to their land (i.e., the right to exclude), but wild animals living on private property were subject to the ownership rights of the sovereign, as a public resource.[192]

After the American Revolution, the sovereign authority over wildlife passed to the several states. United States courts and lawmakers embraced the English wildlife law precedent, confirming that states owned wild animals as a public resource in a sovereign capacity, in trust for the people generally.[193] This legal structure became known as the "state ownership of wildlife doctrine" and in 1896 the U.S. Supreme Court officially endorsed the doctrine in *Geer v. Connecticut*.[194] In *Geer,* the Supreme Court found that the state's authority to regulate wildlife existed as "a trust for the benefit of the people, and not as a prerogative for the advantage of the government as distinct from the people, or for the benefit of private individuals as distinguished from the public good."[195] Thus, states manage the people's wildlife as a public trust resource.

The notion of wildlife as a public trust resource has become a keystone component of wildlife management in the U.S. and is included as the first principle in the "North American Model of Wildlife Conservation."[196] Coinciding with the

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189 *Id.*

190 *Id.*

191 *Id.* at 20–21. The roots of this concept can be traced back to early Greek and Roman civil law. MICHAEL BEAN & MELANIE J. ROWLAND, THE EVOLUTION OF NATIONAL WILDLIFE LAW 8–9 (3d ed. 1997). The Justinian Institutes (sixth century Roman civil law) held that things common to all were common property and could be owned by no one, affording all citizens access to it. *Id.* Roman civil law was reaffirmed by the English Magna Carta in 1215 AD, but English law disfavored "ownerless property" thus the ownership of common property was vested with the Crown. *Id.*

192 BEAN & ROWLAND, *supra* note 191, at 8–9.

193 *See* Martin v. Waddell, 41 U.S. (16 Pet.) 367 (1842) (trustee status ascribed to the states); McGready v. Virginia, 94 U.S. 391 (1876) (declaring that the state owned not only the tidelands, but also the fish in them, so far as they are capable of being owned).

194 161 U.S. 519 (1896).

195 *Id.* at 529. In *Geer*, the Court held that the state's authority over wildlife was so great it included authority to pass laws that discriminated against interstate commerce. *Id.* at 534. In 1979, however, the U.S. Supreme Court held in *Hughes v. Oklahoma* that states' attempt to discriminate against interstate commerce was inconsistent with the commerce clause. 441 U.S. 322, 337–38. Moreover, while states still held vast power to protect and conserve wildlife within its borders, they could no longer violate the commerce clause when doing so. *Id.* Some had speculated that *Hughes* set aside the entire state ownership of wildlife doctrine, but it is clear today that *Hughes* had no such broad effect. FREYFOGLE ET AL., *supra* note 184, at 26. Since *Hughes*, several states have reiterated the basic elements of state ownership of wildlife. *Id.*

196 THE WILDLIFE SOC'Y, THE PUBLIC TRUST DOCTRINE: IMPLICATIONS FOR WILDLIFE MANAGEMENT AND CONSERVATION IN THE UNITED STATES AND CANADA 10 (2010). The North

claim of wildlife as a public trust resource is a management responsibility or duty of the states as a trustee to preserve and protect the public resources. Illustrative of this point, the Wyoming Supreme Court has interpreted the state's declaration of ownership of wildlife to entail ownership "in a sovereign capacity for the common benefit of all its people" and as "one of a trustee with the power and duty to protect, preserve and nurture the wild game."[197] Thus, Wyoming's sovereign ownership of its wildlife in trust includes a conservation responsibility for those trust resources.[198]

The effect of the states' ownership of wildlife results in states having extensive power over wild animals, including the authority to establish a variety of wildlife laws and regulations, such as hunting season timing, bag limits, and license requirements.[199] State wildlife laws apply to private land and most public land alike. These laws can include prohibitions on hunting on private lands and some ability to prevent landowners from degrading wildlife habitat, though the extent of that state power has not yet been tested.[200]

Over time, the federal government has ventured into the states' traditional realm of authority over wildlife management, particularly in the space of threatened and endangered species conservation and wildlife management on federal lands. Congress has used a variety of constitutional authorities to justify passing statutes that expand the federal wildlife law footprint, including the treaty clause, through the Migratory Bird Treaty Act of 1918; the property clause, through the Wild Horse and Burros Act of 1971; and the commerce clause, through the ESA of 1973.[201]

American Model of Wildlife Conservation is an umbrella term for a set of widely cited conservation policies and principles in the United States and Canada. *Id.* The model's core principles include: (1) wildlife resources are a public trust; (2) markets for game are eliminated; (3) allocation of wildlife is by law; (4) wildlife can be killed only for a legitimate purpose; (5) wildlife is considered an international resource; (6) science is the proper tool to discharge wildlife policy; and (7) democracy of hunting is standard. *Id.* The model has been subject to academic critique, including for its exclusion of the nonhunters and for being "antithetical to American Indian views of property, nonhuman personhood, and knowledge." Lauren Eichler & David Baumeister, *Hunting for Justice: An Indigenous Critique of the North American Model of Wildlife Conservation*, 9 ENV'T & SOC'Y 75, 76 (2018).

197 O'Brien v. State, 711 P.2d 1144, 1148–49 (Wyo. 1986).

198 *See id.*

199 Despite states often complete declaration of ownership of wildlife, that ownership is limited by federal law preemption, including tribal treaty rights to wildlife (on- and off-reservation), federal wildlife conservation statutes, as well as federal wildlife obligations arising on federal public land. *See* Martin Nie et al., *Fish and Wildlife Management on Federal Lands: Debunking State Supremacy*, 47 ENV'T L. 797, 803–04 (2017) (noting that the federal government has constitutional authority under the Property Clause, Treaty Clause, and Commerce Clause to manage wildlife on federal public land).

200 *See infra* notes 320–334 and accompanying text.

201 *See infra* notes 294–314 and accompanying text.

A. Responsibilities of Landowners Toward Wildlife; and of the Public Toward Landowners

In the U.S., the majority of lands and the resources they harbor are privately owned.[202] Thus, effective resource management requires private landowner participation.[203] Without the voluntary efforts of private property owners, land conservation and restoration would stop at public land borders, leaving wildlife habitats fragmented and disconnected. As mentioned in Part II, during Western settlement, much of the most fertile and productive land was transferred to private ownership.[204] These lands provide some of the best wildlife habitat in the West. Because of the quantity and quality of wildlife habitat on private lands, these lands play an outsized role in maintaining the public's wildlife resource.

Yet, wildlife on private land is often a source of conflict, as noted in the case studies above. Within the system of private property rights and the public wildlife resources, there exists an "inevitable tension between people who want to conserve wildlife and people who received or bought property rights that conflict with the wildlife resource."[205] As a result, "[c]onflict between humans and wildlife is woven into the fabric of the western U.S."[206]

The importance of private land in maintaining the public resource and the tension between "the public's wildlife" and private landowners leads to two key questions. First, what responsibilities do landowners have toward public wildlife? And second, what responsibilities does the public have toward landowners who provide habitat for public wildlife? Answering these questions is complex because of the need to balance private property rights alongside the protection of the public's wildlife resource. Answering these questions is also both urgent and important in the GYE because of its acute development pressures and human-wildlife conflicts, and its potential to model solutions for land and wildlife conservation nationally and globally.

1. Responsibilities of Landowners Toward Wildlife

While an oversimplification, Dean Leuck's helpful summary of the U.S. wildlife management framework notes that private landowners control access rights to habitat; state governments regulate hunting, trapping, and fishing; and

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202 Karen Bradshaw Schulz & Dean Lueck, *Contracting for Control of Landscape-Level Resources*, 100 IOWA L. REV. 2507, 2511 (2015).

203 *Id.*

204 *See* J. Michael Scott et al., *Nature Reserves: Do They Capture the Full Range of America's Biological Diversity?* 11 ECOLOGICAL ISSUES CONSERVATION 999, 999 (2001); Colin B. Talbert et al., *Private Ranchlands and Public Land Grazing in the Southern Rocky Mountains*, 29 SOC'Y FOR RANGE MGMT. 5, 5 (2007).

205 Facemire & Bradshaw, *supra* note 185, at 652.

206 *Id.*

federal agencies protect endangered species.[207] In general, landowners own the natural resources on their land and may use the land as they see fit, subject to few restrictions. Indeed, this control over the land and its resources is perhaps the most appealing aspect of land ownership.[208] Yet government regulations regularly restrict this default ownership rule of control, as is the case with wildlife. Despite the classification of wildlife as a public trust resource, scholars and policymakers generally do not conceptualize wildlife as having use rights to habitat and resources, and landowners can generally exclude wildlife accordingly.[209]

Landowners also generally have the right to restrict access to their property by enforcing trespass laws, although public opinion and the law on this topic have evolved over time.[210] After the American Revolution, in recognition of the importance of wild game as a food source, state laws commonly held that landowners could not exclude public hunters unless their lands were enclosed or tilled.[211] However, over the course of the 19th century, U.S. law and culture progressively changed as a result of various social and economic factors, and landowners ultimately gained the right to exclude public hunters and enforce trespass on private property.[212] By 2018, approximately half the states required landowner permission to enter private land and half recognized no trespassing signs as a restraint against public access.[213]

Although they play a critical role in wildlife health and management, landowners must still comply with wildlife laws and states yield power to protect wildlife on private property. The courts have repeatedly held that landowners do not possess an inherent right to hunt wildlife on their property. Instead, hunting is considered

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[207] Dean Lueck, *Ownership and the Regulation of Wildlife*, 29 ECON. INQUIRY 249, 254–58 (1991).

[208] Bradshaw Schulz & Leuck, *supra* note 202, at 2517 (noting that the appeal of property ownership comes from the sense of "complete master[ship], complete self-direction, and complete protection from the whims of others").

[209] Facemire & Bradshaw, *supra* note 185, at 651 (noting that the law essentially treats wildlife as discrete pieces of the natural world without attaching a property interest to the resource upon which they depend, although in reality landowners often make space for wildlife needs even though they are not required to).

[210] FREYFOGLE ET AL., *supra* note 184, at 10, 43–47.

[211] *Id.* at 10.

[212] *Id.* (noting that trespass laws indirectly decide who gets to harvest publicly owned wildlife, leading some to argue that the more rigorously private lands are protected, the more wildlife the public effectively give to the landowner at the expense of other citizens).

[213] Dean Lueck & Dominic Parker, *The Origins and Evolution of the First American Environmental Protection Agencies* (U. of Wisc., Working Paper, Mar. 2020), https://aae.wisc.edu/dparker/wp-content/uploads/sites/12/2020/03/Lueck-Parker-Origins-March-2020.pdf [https://perma.cc/SX64-XGUK] (suggesting that early weak trespass laws and weak enforcement of any wildlife laws likely frustrated private wildlife conservation efforts and provided motivation for the creation of state wildlife agencies, and additionally noting that state wildlife agencies emerged in response to the high costs of controlling a landscape scale asset: mobile wildlife.)

a privilege which the state can grant, deny, or regulate.[214] States also possess some ability to keep landowners from degrading wildlife habitat, although the extent of that state power has not yet been tested.[215] Yet, even though landowners do not own the wildlife on their land or have an automatic right to hunt, they can sometimes gain such a right (e.g., hunting licenses) by enhancing wildlife habitat or enforcing or selling access rights to their land for hunting, trapping, and fishing.[216]

Federal law has also evolved over time to create greater protections for wildlife on private property. The most notable federal law affecting wildlife on private property is the ESA.[217] The ESA prevents private property owners from harming threatened or endangered wildlife and their habitats, even if the harm occurs through customary land use practices.[218] While state and federal laws sometimes restrict the default ownership rule of control over natural resources on private land, state and federal laws may also grant landowners special privileges. For example, states often grant landowners extra hunting rights like exemptions from licensing requirements, transferable hunting tags, and longer hunting seasons.[219] States are more likely to grant these special rights if the landowner takes steps to improve their land's habitat value or otherwise build up game populations.[220] States also provide landowners with additional latitude to kill wildlife classified as predators or pests, such as coyotes, wolves, cougars, and bears, which all pose a risk to livestock.[221] Such latitude in predator reduction or eradication efforts sometimes includes the ability to use non-traditional hunting practices, such as aerial hunting and poisoning, and may receive federal and state support.[222]

Still, a fundamental policy question remains: what rights should landowners have to use their lands in ways that disrupt wildlife populations? This is a critical

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214 FREYFOGLE ET AL., *supra* note 184, at 9.

215 *Id.* at 57.

216 *Id.* at 10.

217 The Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 888 (codified as amended in scattered sections of 7 U.S.C., 16 U.S.C. §§ 1531–1544, 25 U.S.C. § 715c, 26 U.S.C. § 175).

218 16 U.S.C. § 1538(a)(1).

219 CATHERINE SEMCER & JACK SMITH, CONSERVING WILDLIFE HABITAT WITH LANDOWNER HUNTING PERMITS: LESSONS FROM WESTERN STATES TO ENHANCE VOLUNTARY CONSERVATION ON PRIVATE LANDS 1–2 (2021), https://www.perc.org/wp-content/uploads/2021/09/PERC-PolicyBrief-HuntingPermits-210902-WEB.pdf [https://perma.cc/U3YQ-AEUB].

220 *Id.* at 4–6.

221 *See* Adrian Treves et al., *Predators and the Public Trust*, 92 BIOLOGICAL REVS. 248, 255–57 (2017) [hereinafter, Treves et al., *Predators and the Public Trust*]. Recent scholarship has called into question the effectiveness of predator control, citing little scientific evidence that killing predators actually accomplished the goal of protecting livestock, suggesting that nonlethal predator-control methods might be more effective. *See* Adrian Treves et. al., *Predator Control Needs a Standard of Unbiased Randomized Experiments with Cross-Over Design*, 12 FRONTIERS ECOLOGY & EVOLUTION 1, 1–3 (2019).

222 Treves et al., *Predators and the Public Trust*, *supra* note 221, at 263–64.

question since habitat degradation is the leading threat to imperiled species in the U.S.[223] Since the 1970's the trend in land use law has been that a landowner is limited by what he/she can do on their land based upon the land's natural features.[224] Under this concept, a landowner should avoid land uses that entail altering the land in ecologically harmful ways.[225] For example, the Clean Water Act likely precludes the destruction of any lands that contain wetlands.[226] The ESA may also bar landowners from altering designated critical habitats of listed species.[227] Additionally, many states have passed state endangered species statutes containing similar habitat protection provisions for state-listed species.[228] Local governments, through planning and zoning regulations, also have the ability to require monitoring, minimization and mitigation of habitat loss for wildlife.[229]

Moral and ethical obligations also exist to manage land in a way so as not to impact wildlife, or at least to reduce the impact to wildlife. Private lands do not exist in isolation, but as part of a mosaic of other private lands and a variety of public lands.[230] This mosaic influences the management of both private and public land and the associated social, cultural, and economic systems.[231] Landowners must be aware of the context in which they manage land to uphold the moral and ethical obligations placed on them as land managers. Under the centuries-old basic land ownership principle, "do no harm," landowners have never had legal or moral rights to undertake activities that cause harm to their neighbors or the surrounding community.[232] In Aldo Leopold's "Land Ethic" essay, he called for moral responsibility toward the natural world.[233] Yet, this responsibility may be

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[223] David S. Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BIOSCIENCE, 607, 607–09 (1998) (noting habitat degradation is a threat to 85% of imperiled species).

[224] FREYFOGLE ET AL., *supra* note 184, at 66.

[225] *Id.*

[226] *Id.*

[227] *Id.*; *see also* 16 U.S.C. § 1532(4). If a landowner receives an incidental take permit, they can proceed with such projects even if they will take a listed species. § 1539(a).

[228] *See* Robert Fischman et. al., *State Imperiled Species Legislation*, 48 ENV'T L. 81, 100, 112 (2018). While states and local governments may be the logical implementing agencies for addressing habitat degradation and or loss, they often lack the political will and expertise to prevent habitat degradation. *Id.* Only five states have prohibited significant alteration of imperiled species habitat. *See id.*

[229] *Id.* at 92.

[230] Laurie Yung & Jill M. Belsky, *Private Property Rights and Community Goods: Negotiating Landowner Cooperation Amid Changing Ownership on the Rocky Mountain Front*, 20 SOC'Y & NAT. RES. 689, 689–91 (2007).

[231] *See id.* at 689–92. *See generally* STITCHING THE WEST BACK TOGETHER: CONSERVATION OF WORKING LANDSCAPES (Susan Charnely et al. eds., 2014) (describing the cultural and socio-economic systems that influence private lands, and vice versa).

[232] FREYFOGLE ET AL., *supra* note 184, at 58–59.

[233] ALDO LEOPOLD, SAND COUNTY ALMANAC, AND SKETCHES HERE AND THERE 203 (1949). The closest Leopold comes to articulating a land stewardship standard is when he notes "[a] thing

in tension with landowners' struggle to maintain their land and resources while ensuring that their way of life can be sustained for themselves and their successors. Ultimately, the goal of effective policy should be to support working landscapes that integrate into healthy and connected ecosystems.

Despite landowners' legal and moral obligations toward wildlife, it is untenable to require that landowners manage their lands chiefly for the benefit of public wildlife.[234] Private property rights are a vital public institution that should be maintained, as should the economic vitality of landowners, because both affect landowners' willingness and ability to engage in conservation.[235] Many landowners manage their land with this stewardship responsibility in mind, viewing their management of these landscapes as both a privilege and a responsibility.[236] Thus, many landowners manage their lands to sustain productivity and economic viability, while also maintaining habitat and sustaining wildlife populations.[237]

2. The Public's Responsibility to Landowners

Given the critical role that private land plays in maintaining wildlife habitat and populations, states cannot exercise effective responsibility for the public's wildlife without productive and collaborative relationships with private landowners. Private land does not conserve itself, and, inevitably, conservation imposes limits on human behavior. This begs the question, what responsibility does the public have toward landowners who conserve the public's wildlife?

Some argue that because landowners bear many of the burdens of conserving the public's wildlife, they should be compensated for their efforts and given maximum flexibility as to how to conserve their land and through what measures.[238] Others argue that taxpayers should not have to pay landowners to halt activities harmful to the common good.[239] One response to objections to taxpayers paying for landowner activities is that landowner incentive programs should focus on incentivizing activities that go beyond the baseline of do no harm, and take

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is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." *Id.*

234 *See* Holly Doremus, *Private Property Interests, Wildlife Restoration, and Competing Visions of a Western Eden*, 18 J. LAND RES. & ENV'T L. 41, 50 (1998) [hereinafter Doremus, *Competing Visions*] (noting that "[w]e are . . . unlikely to give up on our ingrained, and very human, urge to transform and control the landscapes we inhabit").

235 *See supra* notes 202–234 and accompanying text.

236 *See* Aaron M. Lien et al., *The Land Ethic of Ranchers: A Core Value Despite Divergent Views of Government*, 70 RANGELAND ECOLOGY & MGMT. 787, 792–93 (2017); Jerry J. Vaske et al., *Farmers' Value Orientations, Property Rights and Responsibilities, and Willingness to Adopt Leopold's Land Ethic*, 31 SOC'Y & NAT. RES. 1118, 1120, 1126–28 (2018).

237 *See supra* notes 202–234 and accompanying text.

238 *See, e.g.*, Holly Doremus, *A Policy Portfolio Approach to Biodiversity Protection on Private Lands*, 6 ENV'T SCI. & POL'Y 217, 217 (2003) [hereinafter Doremus, *Portfolio Approach*].

239 FREYFOGLE ET AL., *supra* note 184, at 58.

affirmative conservation actions, such as removing or modifying fencing to facilitate wildlife passage.[240] Despite these different perspectives, and in recognition of the great need for more conservation actions on private land, many wildlife conservation programs today seek to create optimal scenarios where both wildlife and landowners benefit.

Landowners' stewardship ethics toward wildlife are tested most when wildlife causes damage to private land, particularly to crops, livestock, and fences.[241] Landowners finding themselves in this unhappy situation are undoubtedly tempted to argue that the Fifth Amendment of the U.S. Constitution protects them against government taking of private property without just compensation. However, the Fifth Amendment requires a physical invasion of property by the government or a government restriction that denies all economically viable use of the property.[242] Claims that damage caused by wildlife amount to a physical taking of property have a long but unsuccessful history.[243] Both state and federal courts have consistently rejected the argument that the government bears responsibility for damages caused by the physical presence of wildlife (even introduced non-native wildlife), equating wildlife damage to the damage caused by fire, floods, or other natural disasters.[244] Courts have similarly rejected claims that wildlife damages have denied landowners all economically viable use of their property.[245] While landowners may lose the economic viability of the livestock or crops that have been damaged or consumed by wildlife, courts consider whether the property as a whole retains any economic viability.[246]

Even though landowners are unlikely to successfully bring a takings claim under the Fifth Amendment, states often provide relief to landowners whose property or livestock has been damaged or killed by wildlife.[247] This effort reflects a willingness of the public to compensate landowners for the impacts of wildlife.[248]

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[240] *See, e.g.*, Michael G. Sorice et al., *Increasing Participation in Incentive Programs for Biodiversity Conservation*, 23 ECOLOGICAL APPLICATIONS 1146, 1146–47 (2013).

[241] In 1989, 55% of agricultural producers in the United States reported some level of wildlife damage and total estimated damage for the country was as high as $1.26 billion. JONATHAN K. YODER, DAMAGE ABATEMENT AND COMPENSATION PROGRAMS AS INCENTIVES FOR WILDLIFE MANAGEMENT ON PRIVATE LAND 17 (2000).

[242] Doremus, *Competing Visions*, *supra* note 234, at 47–48.

[243] *Id.*

[244] *Id.*

[245] *Id.*

[246] *Id.*

[247] *See* Kimberly K. Wagner et al., *Compensation Programs for Wildlife Damage in North America*, WILDLIFE SOC'Y BULL. 312, 312–15 (1997); HARRIS, *supra* note 124, at 1–2, 12–14.

[248] In doing so, states waive their sovereign immunity by enacting wildlife damage laws. *See* Leonard R. Carlman, Note, *Wildlife-Private Property Damage Law—Once upon a Time in Wyoming There Was Room for Millions of Cattle and Enough Habitat for Every Species of Game to Find a Luxurious Existence—In the Aftermath of Parker, Can We Still Get Along*—Parker Land and Cattle Company v.

Compensation programs are viewed as a wildlife management technique aimed at increasing human tolerance for wildlife.[249] Such payments are common in large predator restoration programs to provide compensation for depredated livestock, as well as programs to compensate for crop and property damage caused by ungulates. In the context of wolf depredation to livestock, the public is generally in favor of compensation programs for livestock damages.[250] In many instances, these programs have helped ease political tension and reduce conflict between landowners and wildlife, and are intended to reduce the economic motivation for property owners to kill wildlife. Yet, the overall effectiveness of compensation programs remains a question because social tolerance for some wildlife species, particularly carnivores, remains low.

The two primary components of most wildlife compensation programs are abatement support and compensation.[251] Abatement support includes activities performed by agency personnel at a landowners request, as well as subsidies for abatement capital, such as fences and dispersal devices.[252] Compensation programs provide reimbursement for damage sustained by agricultural landowners who can provide adequate documentation and is usually available for damage inflicted on specific property types by specific wildlife species.[253] In return for compensation, wildlife agencies often require landowners to implement conflict reduction techniques, including abatement, changes in land use practices, and hunting access.[254]

Wyoming Game and Fish Commission, 845 P.2d 1040 (Wyo. 1993), 29 LAND & WATER L. REV. 89, 104–06 (1994).

[249] Such payments are common in large predator restoration programs to provide compensation for depredated livestock, as well as programs to compensate for crop and property damage caused by ungulates. *See* Wagner et al., *supra* note 247, at 312; HARRIS, *supra* note 124, at 25–26.

[250] *But see* Adrian Treves et al., *The Price of Tolerance: Wolf Damage Payments After Recovery*, 18 BIODIVERSITY & CONSERVATION 4003, 4015–19 (2009) (pointing out that the costs of compensation ratchet up as endangered species recovery and claims of entitlement expand, hence they recommend a sunset clause as an adaptive management of compensation programs).

[251] YODER, supra note 241, at 17.

[252] *Id.*

[253] *Id.* One source of scholarship provides six possible motivations for wildlife compensation programs: (1) to account for severe losses that may threaten the livelihood of agricultural producers; (2) to address common problems involving a large proportion of citizens, (3) to offset restrictions on abatement tools due to animal rights concerns; (4) to address wildlife problems made more severe by management actions taken by government agencies; (5) to address recently emerging or increasingly more severe wildlife damage problems; and (6) to address problems caused by highly valued species. Wagner et al., *supra* note 247, at 317. For example, Wyoming's damage compensation program compensates landowners for losses from wolves, grizzly bears, black bears, and mountain lions. HARRIS, *supra* note 124, at 12–13. Damage is compensable at different rates if wolf predation occurs in areas where wolves are "designated as trophy game animals," and where the topography of the area makes carcass recovery difficult. *Id.* Any claimants under the system must document the total number of livestock lost and will not be compensated for more than the total value of all livestock lost. *Id.* Further, to be eligible, claimants must allow for predator hunting to be eligible for compensation. *Id.*

[254] Wagner et al., *supra* note 247, at 317–18.

Landowners also sometimes seek to defend their property against wildlife, resorting to killing wildlife.[255] While courts typically side with the state in prosecuting landowners for illegal taking in these instances, landowners have been successful in arguing defense of property when they have taken all reasonable steps to protect their property against wildlife and when they have otherwise pursued all avenues for obtaining state help.[256]

B. Landowner Responsibilities and Public Expectations in the GYE

The tensions described above are evident in the GYE. Carnivore expansion, the spread of wildlife-livestock disease, and a growing human footprint on the landscape are elevating human-wildlife conflicts in the region, particularly on private lands.[257] Whether private landowners or the public should bear the responsibility for the costs of managing wildlife in the GYE is also a central concern for policymakers.[258] Recent research on the stewardship values of agricultural landowners and the public, as well as on the costs incurred by GYE landowners who coexist with wildlife, provides policymakers with helpful context.[259]

A growing body of research shows that agricultural landowners tend to view themselves as stewards of the land with a land ethic that acknowledges their responsibilities towards the natural world and future generations.[260] In many ways, landowner values and norms align with the public trust doctrine and public expectations of landowners. Yet, it is not uncommon for landowners to also hold a strong view of private property rights. Landowners view their private property rights as entitling them to use their property as they see fit, treating conservation and stewardship as an individual and voluntary choice.[261] This tension between

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[255] Cross v. State, 370 P.2d 371 (Wyo. 1962). The Wyoming Supreme Court held that Albert "AB" Cross of the H-Bar Ranch near Dubois, Wyoming could not be convicted of killing two moose without a license out of season because he had many previous times sought help from the Wyoming Game and Fish Department. *Id.* at 373–74, 378. Moose and elk annually did substantial damage to the defendant's ranch and over the years he sought the help of the Game and Fish Department, hired and paid private riders to drive away the animals and even hired an airplane to spook the animals. *Id.* at 373–74. He also engaged in litigation with the Game and Fish Department in an effort to induce them to enforce sufficient control of wildlife. *Id.*

[256] *Id.*

[257] *See* Smith L. Wells et al., *Grizzly Bear Depredation on Grazing Allotments in the Yellowstone Ecosystem*, 83 J. WILDLIFE MGMT. 556, 556 (2019); Haggerty et al., *Land Use Diversification and Intensification*, *supra* note 69, at 172–73.

[258] *See* Alexander L. Metcalf et al., *supra* note 110, at 564–65; Middleton et al., *Harnessing Visitors' Enthusiasm*, *supra* note 110, at 9–10.

[259] *See, e.g.*, Michael J. Manfredo et al., *Social Value Shift in Favour of Biodiversity Conservation in the United States*, 4 NATURE SUSTAINABILITY 323, 324–28 (2021) [hereinafter Manfredo et al., *Social Value Shift*]; Michael J. Manfredo et al., *Bringing Social Values to Wildlife Conservation Decisions*, 19 FRONTIERS IN ECOLOGY & THE ENV'T 355, 357 (2021) [hereinafter Manfredo et al., *Bringing Social Values to Wildlife Conservation*].

[260] *See, e.g.*, Lien et. al., *supra* note 236, at 792–93; Vaske et al., *supra* note 236, at 1124.

[261] Vaske et al., *supra* note 236, at 1124.

stewardship and property rights is evident in the context of endangered and threatened species.[262] For example, many landowners recognize a moral obligation to conserve at-risk species, yet perceive the ESA as an unfair and undue burden on landowners.[263] In the GYE, endangered or threatened species, including grizzly bears, can cause direct economic losses and threaten livelihoods. These costs further complicate landowners' willingness to comply with restrictions on their private property rights. Elk herds can also challenge landowners' stewardship intentions, as their presence creates the risk of spreading brucellosis to cattle herds.[264] Whether the historic expectations of landowners and the public remain tenable will increasingly be called into question as the costs and risks to landowners in the GYE become more widely known.

Livestock producers in the GYE commonly face economic and operational burdens not shared by ranching peers in other regions. Cattle and sheep depredation by carnivores is one of the most direct operational burdens that wildlife places on livestock producers in the GYE.[265] Depredation events have increased over the past several decades as wolf and grizzly bear populations have increased and their ranges have expanded.[266] State governments provide compensation to ranchers for direct losses to help offset replacement costs. The State of Wyoming, for example, paid an average of $358,492 annually for livestock losses from grizzly bears between 2012–2016.[267] Yet, some ranchers argue that due to the challenges in verifying depredations, the compensation ratios used, and other administrative processes, state compensation programs do not fully compensate ranchers for their losses.[268]

Depredation events and associated costs are not uniformly distributed amongst livestock producers, but instead are concentrated on a subset of the operations in the GYE. For example, in Wyoming's Upper Green River Basin, several livestock operations collectively run cattle on an allotment in the Bridger-Teton National Forest.[269] The producers in the Upper Green River Basin represent only a fraction of the producers in the GYE, but they bear a disproportionate burden of depredations. These producers estimate that 1,332 (4.5%) of calves on the Upper Green River grazing allotment were lost to depredation between 1995 and 2004.[270] Of the losses, 520 were confirmed grizzly bear depredations and

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262 *See, e.g.*, Andrea Olive, *It is Just Not Fair: The Endangered Species Act in the United States and Ontario*, 21 ECOLOGY & SOC'Y 1, 1 (2016).

263 Olive, *supra* note 262, *passim*.

264 *See supra* notes 130–177 and accompanying text.

265 HARRIS, *supra* note 124, at 17–20; Albert P. Sommers et al., *Quantifying Economic Impacts of Large-Carnivore Depredation on Bovine Calves*, 74 J. WILDLIFE MGMT. 1425, 1425 (2010).

266 *See* Wells et al., *supra* note 257, at 556; Sommers et al., *supra* note 265, at 1425.

267 Wells et al., *supra* note 257, at 557.

268 Sommers et al., *supra* note 265, at 1425.

269 *See id.* at 1426.

270 *Id.* at 1425.

177 were confirmed wolf depredations.[271] Researchers further estimate that the ranchers realized $222,500 in uncompensated losses between 1995 and 2004.[272] In addition to direct losses from depredation, researchers note that carnivores have indirect economic impacts on livestock operations from lower weaning and conception rates.[273] These indirect costs may be as large as, or greater than, the direct economic impacts. Indirect costs to ranchers, however, currently remain uncompensated by state compensation programs.[274]

To manage wildlife-livestock conflicts, many ranchers incorporate mitigation strategies such as range riding, using guard dogs, and placing fladry around livestock at night.[275] These strategies increase operational costs and have inconsistent success rates.[276] A survey of 274 Wyoming ranchers found that ranchers perceived lethal controls to be much more effective at reducing predation than nonlethal controls, which were seen as having only slight or no efficacy.[277] In the case of ESA-listed species, like the grizzly bear, lethal controls are only legal if in self-defense or defense of others.[278] In the absence of perceived effective nonlethal controls, and in the face of increased operational costs, some of which are uncompensated, many ranchers and private landowners feel that management policies unfairly place an undue burden on their livelihoods.[279]

The changing social and ecological dynamics in the GYE described in this article are occurring within the backdrop of broader shifts in societal values as many Americans' values shift toward valuing wildlife in the U.S.[280] A national longitudinal study of social values revealed a shift from a utilitarian mindset towards wildlife to a mindset valuing biodiversity conservation.[281] The study compared public survey data from 19 states collected in 2004 to data collected

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271 *Id.*

272 *Id.*

273 Jordan R. Steele et al., *Wolf* (Canis Lupis) *Predation Impacts on Livestock Production: Direct Effects, Indirect Effects, and Implications for Compensation Ratios*, 66 RANGELAND ECOLOGY & MGMT. 539, 540 (2013).

274 *Id.* at 539–40.

275 *See* RICK DANVIR ET AL., W. LANDOWNERS ALL., REDUCING CONFLICT WITH GRIZZLY BEARS, WOLVES AND ELK: A WESTERN LANDOWNER'S GUIDE 27–39 (2018), https://westernlandowners.org/wp-content/uploads/2019/01/ReducingConflict_WLA-Guide_low-res-1.pdf [https://perma.cc/GAR6-LBHU]. Fladry is made by tying red flagging to a line that is then used to encircle livestock. *Id.* at 27. Wolves are reluctant to cross below the line as the flagging is a strange object in their environment that they are suspicious of. *Id.* at 27–28.

276 *See id.*

277 J.D. Scasta et al., *Rancher-Reported Efficacy of Lethal and Non-lethal Livestock Predation Mitigation Strategies for a Suite of Carnivores*, 7 SCI. REP. 1, 2, 6 (2017).

278 50 C.F.R. § 17.40(b)(i)(B) (2022).

279 *See* Steele et al., *supra* note 273, at 539; Olive, *supra* note 262, *passim*.

280 Manfredo et al., *Social Value Shift*, *supra* note 259, at 328, *passim*.

281 *See id.* at 323, 328.

between 2017–2018, showing an increase in mutualism values (seeing wildlife as having intrinsic value and deserving of rights similar to humans) and a decline in domination values (seeing wildlife as a resource for humans to use for their benefit). The data showed that the value shift correlated with trends in urbanization.[282] These findings, along with related research, suggest increasing public support for wildlife conservation that may exacerbate landowner challenges in the GYE if pursued through regulatory policies.[283]

Public support for conservation may also enable new conservation efforts and sorely needed funding streams for voluntary and compensatory conservation programs.[284] Several studies show broad public support for wildlife conservation programs.[285] In Washington state, a public survey showed high willingness-to-pay for wolf-livestock coexistence programs, although the support varied depending on the details of the program and the specific funding mechanisms suggested.[286] A survey of registered voters in Wyoming also showed strong support for a range of conservation efforts to conserve big game migration corridors, including 82% of voters supporting programs that provide fair-market compensation to private landowners for voluntarily conserving land in migration corridors.[287] This support is important to maintaining and growing investments in conservation programs, as agencies and organizations now face tightening budget constraints.

V. Approaches To Wildlife Conservation On Private Land

Historically, policymakers have focused on public lands to conserve wildlife in the West.[288] Over the past 40 years, however, policymakers have increasingly turned their attention to private lands.[289] For example, recent policies and programs, ranging from regulatory to voluntary, encourage wildlife conservation on private lands.[290] On one end of the spectrum, uses deemed harmful to the public interest

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[282] *See id. passim*.

[283] Manfredo et al., *Bringing Social Values to Wildlife Conservation*, *supra* note 259, at 357–58.

[284] *See* Travis Brammer, *Using Land and Water Conservation Fund Money to Protect Western Migration Corridors*, 22 Wyo. L. Rev. 61, 78–84 (2022).

[285] *See infra* notes 286–287 and accompanying text.

[286] *See* Lily M. van Eeden et al., *Public Willingness to Pay for Gray Wolf Conservation that Could Support a Rancher-Led Wolf-Livestock Coexistence Program*, 260 Biological Conservation 1, 1 (2021).

[287] Nicole M. Gautier et al., Ruckelhaus Inst., Univ. of Wyo., Public Opinion On Wildlife And Migration Corridors In Wyoming: Wyo. Open Spaces Initiative 3 (2019), https://www.uwyo.edu/haub/_files/_docs/ruckelshaus/open-spaces/2019-migration-corridor-research-brief-final.pdf[https://perma.cc/L4D7-2EUJ].

[288] Lowell E. Baier with Christopher E. Segal, Saving Species On Private Lands: Unlocking Incentives To Conserve Wildlife And Their Habitats 7 (2020).

[289] *Id.*

[290] *See infra* notes 364–452 and accompanying text.

are prohibited or restricted by the government. On the other, incentive-based tools encourage voluntary conservation by private landowners. In the following sections, this article highlights existing regulatory and incentive-based conservation programs on private lands in the GYE, and several emergent efforts.

A. Regulatory Authorities over Private Land for Wildlife

Federal, state, local, and tribal governments all play a role in the regulation of wildlife on private lands. State governments maintain the greatest authority to manage wildlife, but under various constitutional provisions, the federal government also has a degree of regulatory authority.[291] States have delegated some of their authority to counties and municipalities to regulate private lands through planning and zoning laws, sometimes including policies aimed at wildlife or wildlife habitat conservation.[292] On reservations tribal governments maintain sovereign authority to manage land and wildlife.[293]

1. Federal Regulatory Authority over Private Land for Wildlife

Federal authority to regulate wildlife on private lands is fairly limited compared to federal authority to manage wildlife on federal lands. Several U.S. Constitutional clauses, however, provide the federal government broad authority to regulate wildlife on all lands, including private lands. The Interstate Commerce Clause, the Treaty Clause, and the Property Clause collectively grant the federal government broad power, which it has used to regulate wildlife.[294] Federal regulatory authority, while based in the Constitution, is exercised through statutes. The primary federal statutes regulating wildlife on private lands include the Lacey Act, the Migratory Bird Treaty Act, the Golden and Bald Eagle Protection Act, and the ESA.[295] Most

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[291] *See* FREYFOGLE ET AL., *supra* note 184, at 27, 96–102.

[292] *See generally* PARK COUNTY, MONTANA GROWTH POLICY 57–58 (2017), https://www.parkcounty.org/uploads/files/pages/36/Growth-Policy-with-Appendices-attached.pdf [https://perma.cc/99YH-UAW2] [hereinafter PARK COUNTY GROWTH POLICY] (stating that before the county can approve a subdivision plan, it must review the impacts of the subdivision on wildlife and wildlife habitat and reject the application if the impacts are "potentially significant, unmitigated, adverse"); SUBLETTE COUNTY, WYOMING, ZONING AND DEVELOPMENT REGULATIONS RESOLUTION 75 (2019), https://sublettewyo.com/DocumentCenter/View/428/Zoning-Reg?bidId= [https://perma.cc/V5HQ-8VT9] [hereinafter SUBLETTE ZONING] (requiring that before the county can approve a subdivision plat, it must find that the proposed subdivision will "not have any significant adverse impact on wildlife habitat, wildlife migration routes"); SUBLETTE COUNTY, WYOMING, COMPREHENSIVE PLAN 17–18 (2005), https://www.sublettewyo.com/DocumentCenter/View/206/ComprehensivePlan?bidId= [https://perma.cc/M42L-9H9M] [hereinafter SUBLETTE COMPREHENSIVE PLAN] (outlining a county policy of supporting and encouraging wildlife and wildlife habitat in all zoning and development decisions); BONNEVILLE COUNTY, IDAHO, COMPREHENSIVE PLAN 22–24 (2013), https://perma.cc/2LBC-CZNW (describing an environmental quality planning strategy that encourages development only in compatible areas, so as not to adversely affect wildlife and habitat resources in the county).

[293] FREYFOGLE ET AL., *supra* note 184, at 162.

[294] *See* Nie et al., *supra* note 199, at 819–29.

[295] FREYFOGLE ET AL., *supra* note 184, at 108.

of these statutes apply broadly to private, state, and federal lands and relate to protecting wildlife species.[296]

The 1900 Lacey Act, passed by Congress under the authority of the Interstate Commerce Clause, makes a federal offense of a perpetrator crossing state lines after a violation of state game laws.[297] This law punishes offenses that occur on private property.[298] Offenses in violation of the Lacey Act include hunting without a license, hunting out of season, or any violation of state or tribal game laws resulting in the unlawful taking of an animal.[299]

The 1918 Migratory Bird Treaty Act (MBTA), passed by Congress under the authority of the Treaty Clause, restricts the killing of listed bird species, including those on private land.[300] The MBTA also prevents the hunting of migratory birds over bait or with live bait.[301] Consequently, landowners who farm must be aware of the federal regulations regarding what is considered baiting and what are considered normal farming practices.[302] Another violation of the MBTA is any "direct, though unintended" action that kills migratory birds, otherwise known as "incidental take."[303] Federal policy has fluctuated over the years as to whether incidental take of migratory birds is precluded under the MBTA.[304] The Biden Administration's position is that incidental takings of migratory birds are not precluded from enforcement of the MBTA.[305] The U.S. Fish and Wildlife Service (USFWS) recently released a Director's Order "establishing criteria for the types of conduct that will be a priority for enforcement activities with respect to incidental

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296 *Id.* at 180.

297 Lacey Act of 1900, ch. 553, 31 Stat. 187 (codified as amended at 16 U.S.C. §§ 3371–3378, 18 U.S.C. §§ 42–43); *see also* KRISTINA ALEXANDER, CONG. RSCH. SERV., R42067, THE LACEY ACT: PROTECTING THE ENVIRONMENT BY RESTRICTING TRADE 1–5 (2014), https://sgp.fas.org/crs/misc/R42067.pdf [https://perma.cc/6JWU-2SA3].

298 18 U.S.C. §§ 42–43; 16 U.S.C. §§ 3371–3378; *see also* ALEXANDER, *supra* note 297, at 1–5.

299 18 U.S.C. §§ 42–43; 16 U.S.C. §§ 3371–3378; FREYFOGLE ET AL., *supra* note 184, at 181–86.

300 Migratory Bird Treaty Act, ch. 128, 40 Stat. 755 (1918) (codified as amended at 16 U.S.C. §§ 703–712); FREYFOGLE ET AL., *supra* note 184, at 192–99; *see also Migratory Bird Protection Treaty Act of 1918*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php [https://perma.cc/2AY6-6YS4] (last visited Apr. 27, 2022).

301 FREYFOGLE ET AL., *supra* note 184, at 192–99.

302 *Id.* at 199.

303 Andrew G. Ogden, *Dying for a Solution: Incidental Taking under the Migratory Bird Treaty Act*, 38 WM & MARY ENV'T L. & POL'Y REV. 1, 20 (2013); Seattle Audoubon Soc'y v. Evans, 952 F.2d 297 (1991).

304 *Compare* Regulations Governing Take of Migratory Birds, 86 Fed. Reg. 1134 (Jan. 7, 2021), *with* Regulations Governing Take of Migratory Birds; Revocation of Provisions, 86 Fed. Reg. 54642 (Oct. 4, 2021) (to be codified at 50 C.F.R. pt. 10).

305 86 Fed. Reg. at 54642.

take of migratory birds."[306] The order interprets the MBTA as prohibiting incidental take of migratory birds.[307]

The ESA, passed by Congress under the authority of the Interstate Commerce Clause, is another significant federal statute affecting wildlife on public and private lands.[308] The ESA is intended to conserve threatened or endangered species and the habitats upon which those species rely.[309] To achieve this goal, the ESA restricts the take of listed species and limits federal actions (including the issuance of federal permits for activities on private property) that may affect a listed species' habitat without first obtaining a permit.[310] In the GYE, federal authority to regulate wildlife has manifested most prominently in applications of the ESA. In particular, the endangered and threatened species listings of the grizzly bear and the gray wolf catalyzed these species' recoveries from near-extinction (grizzly bears)[311] and extinction in the GYE (wolves).[312] The success of each species' recovery effort, however, came with significant conflict between private landowners, conservation organizations, and the broader public.[313] This history illustrates why regulatory approaches to wildlife conservation on private land can be highly controversial, with inherent limits on their political support locally and regionally.[314]

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306 *Interior Department Ensures Migratory Bird Treaty Act Works for Birds and People* (Sept. 29, 2021), https://www.fws.gov/press-release/2021-09/interior-department-ensures-migratory-bird-treaty-act-works-birds-and-people [https://perma.cc/EX9U-EHT5]; *see also* MARTHA WILLIAMS, FISH & WILDLIFE SERV., DIRECTOR'S ORDER NO. 225, INCIDENTAL TAKE OF MIGRATORY BIRDS, https://downloads.regulations.gov/FWS-HQ-MB-2021-0105-0003/content.pdf [https://perma.cc/JF25-FWE3].

307 *See* WILLIAMS, *supra* note 306, at 1.

308 FREYFOGLE ET AL., *supra* note 184, at 233.

309 *Id.*

310 16 U.S.C. § 1538(a)(1); 50 C.F.R. § 17.32 (2017).

311 David J. Mattson & Troy Merrill, *Extirpations of Grizzly Bears in the Contiguous United States, 1850–2000*, 16 CONSERVATION BIOLOGY 1123, 1125, 1128–30 (2002); DANIEL D. BJORNLIE ET AL., YELLOWSTONE GRIZZLY BEARS: ECOLOGY AND CONSERVATION OF AN ICON OF WILDERNESS 5–7, 42–44, 167 (P.J. White et al. eds., 2007), https://www.nps.gov/yell/learn/nature/upload/Yellowstone_Grizzlies_Web.pdf [https://perma.cc/9YYF-LMAU].

312 Bryant Jones, *The Endangered Gray Wolf in Wyoming: Managing Wolf Populations after Endangered Species Act Delisting*, 15 POL'Y PERSP. 57, 57, 59–62 (2008); Manfredo et al., *Bringing Social Values to Wildlife Conservation*, *supra* note 259, at 358–59.

313 Orlinda Worthington & Seth Wyberg, *Wolf Reintroduction Program Still Controversial 25 Years Later*, NBC MONT. (Feb. 26, 2020), https://nbcmontana.com/news/local/wolf-reintroduction-program-still-controversial-25-years-later [https://perma.cc/38D8-VM5S]; *Prominent Scientists Push Back Against Delisting Grizzly Bear: Op-Ed*, MOUNTAIN J. (Jan. 13, 2022), https://mountainjournal.org/prominent-scientists-say-removing-grizzly-bears-from-federal-protection-in-west-is-bad-idea [https://perma.cc/MGH7-Q2TN]; Jessica L. Windh et al., *Contemporary Livestock-Predator Themes Identified Through a Wyoming, USA Rancher Survey*, 41 RANGELANDS 94, 94 (2019); DANVIR ET AL., *supra* note 275, at 7.

314 *See* Doremus, *Portfolio Approach*, *supra* note 238, at 217–21; Nathan Paulich, *Increasing Private Conservation through Incentive Mechanisms*, 3 J. ANIMAL L. & POL'Y 106, 116–31 (2010).

The Property Clause of the Constitution allows Congress to make rules or regulations to protect federal property.[315] The Property Clause grants Congress the power to "make all needful rules and regulations respecting the territory or other property belonging to the United States."[316] The courts have found that because wildlife use and "achieve and maintain a thriving natural ecological balance" on federal lands, the protection of species is an appropriate rule to protect the federal land.[317] In some situations, the federal government's authority under the Property Clause can include federal actions to restrict the use of private lands adjacent to federal public land, but only if the use affects or imperils federal property.[318] However, the federal government has been hesitant to expand the reach of the Property Clause too far into regulating private lands.[319]

2. State Regulatory Authority over Private Land for Wildlife

As a result of the state ownership doctrine, state fish and wildlife agencies regulate wildlife within states, except for those areas where management has been preempted by federal agencies.[320] States' regulation of wildlife on private lands has three primary regulatory components: hunting and fishing, habitat, and protected species.[321] States often grant the exclusive power to regulate wildlife to game and fish commissions,[322] which are appointed by governors.[323] The commissions are responsible for establishing and overseeing game and fish agencies, which are primarily responsible for managing wildlife.[324] This management structure allows the people of a state to exercise a degree of control over the commissions, but

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315 U.S. CONST. art. IV, § 3 cl. 2.

316 *Id.*

317 *See* Kleppe v. New Mexico, 426 U.S. 529 (1976); FREYFOGLE ET AL., *supra* note 184, at 99.

318 *See Kleppe*, 426 U.S. at 538, 546; Camfield v. United States, 167 U.S. 518 (1897); Herr v. U.S. Forest Service, 865 F.3d 351 (2017).

319 FREYFOGLE ET AL., *supra* note 184, at 99.

320 *Id.* at 119–23, 180. The NPS manages wildlife in Yellowstone National Park and primarily manages wildlife in Grand Teton National Park, although the creation legislation for Grand Teton includes language requiring cooperation with the Wyoming Game and Fish Department regarding the management of elk. 16 U.S.C. § 673(c). Additionally, the Fish and Wildlife Service has the primary authority to manage wildlife on the National Elk Refuge. *See* Wyoming v. United States, 279 F.3d 1214, 1221 (10th Cir. 2002).

321 Nie et al., *supra* note 199, at 808.

322 WYO. STAT. ANN. § 23-1-201, -302, -401 (2021); IDAHO CODE § 36-102, -104 (2022); MONT. CODE ANN. § 87-1-201, -301 (2021).

323 *Fish and Game Commission*, IDAHO DEP'T OF FISH & GAME, https://idfg.idaho.gov/about/commission (last visited Apr. 14, 2022) [https://perma.cc/5EMS-VXJG]; *Fish and Wildlife Commission*, MONT. FISH, WILDLIFE & PARKS, https://fwp.mt.gov/aboutfwp/commission [https://perma.cc/YQF9-ECMG] (last visited Apr. 14, 2022); *Game and Fish Commission Meetings*, WYO. GAME AND FISH DEP'T, https://wgfd.wyo.gov/About-Us/Game-and-Fish-Commission [https://perma.cc/Y2VX-TWWL] (last visited Apr. 14, 2022).

324 *Fish and Game Commission*, *supra* note 323; *Fish and Wildlife Commission*, *supra* note 323; *Game and Fish Commission Meetings*, *supra* note 323.

prevents citizens from being able to unduly influence the day-to-day management of the agency.[325]

The GYE states (Idaho, Montana, and Wyoming) value the state ownership of wildlife doctrine. Though none of the states specifically recognize the state ownership doctrine in their constitution, they all include provisions protecting the right to hunt and fish.[326] Primarily, these states have used their regulatory authority to create a system for orderly and ecologically sound allocation of wildlife for hunting.[327] The states have also used their authority to further protect species and habitat, by conserving habitat and identifying species (game and nongame) that require further protection.[328] Further, to help compensate landowners for any damage resulting from wildlife, these states offer mitigation and compensation programs. For example, Montana Fish, Wildlife and Parks permits landowners who allow hunting access to receive certain benefits, such as additional hunting tags.[329] The purpose is to reduce or mediate wildlife damage to crops.[330] In Idaho, landowners who take steps to prevent wildlife damage may be eligible for compensation from the Idaho Fish and Game Department.[331] The Idaho Fish and Game Department charges a fee to every hunter, angler, and trapper to cover the costs of wildlife damage.[332] These state regulatory actions have been important to managing wildlife populations and reducing human-wildlife conflicts on private lands in the GYE.

State regulation has generally resulted in the conservation of species and ecological benefits. Because the state ownership of wildlife doctrine establishes wildlife as a public trust resource, citizens have a right to enforce state regulations by suing the state for its own violations or petitioning the state to enforce regulations

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325 FREYFOGLE ET AL., *supra* note 184, at 119–21.

326 IDAHO CONST. art. I, § 23; MONT. CONST. art. 9, § 7; WYO. CONST. art. 1, § 39.

327 IDAHO CODE § 36-103, -104; MONT. CODE ANN. § 87-1-201, -301; WYO STAT. ANN. § 23-1-103, -302.

328 *Idaho Species: Species of Greatest Conservation Need*, IDAHO FISH & GAME DEP'T, https://idfg.idaho.gov/species/taxa/list/sgcn [https://perma.cc/T3FA-7J8S] (last visited Mar. 16, 2022); *Conservation: Montana's Species of Interest*, MONT. FISH, WILDLIFE & PARKS, https://fwp.mt.gov/conservation/species-of-interest [https://perma.cc/55VJ-HKF6] (last visited Mar. 16, 2022); *Habitat: Wyoming State Wildlife Action Plan Information*, WYO. GAME & FISH DEP'T, https://wgfd.wyo.gov/Habitat/Habitat-Plans/Wyoming-State-Wildlife-Action-Plan [https://perma.cc/M7Q9-EVRD] (last visited Mar. 16, 2022).

329 *Conservation: Game Damage Program*, MONT. FISH, WILDLIFE & PARKS, https://fwp.mt.gov/conservation/landowner-programs/game-damage-program [https://perma.cc/M3VV-9WGM] (last visited Mar. 16, 2022).

330 *Id.*

331 *Wildlife Damage Prevention & Compensation Program for Private Land*, IDAHO FISH & GAME DEP'T, https://idfg.idaho.gov/conservation/big-game-depredation [https://perma.cc/DG9S-7PWQ] (last visited Mar. 16, 2022).

332 *Id.*

against individuals who harm animals or habitat.[333] There are, however, gaps to the efficacy of the states' regulation of wildlife. One gap in the state's regulation of wildlife is the focus on game species and the reliance on hunting revenues for conservation activities.[334] For states to make the most of their regulatory authority over wildlife and private lands, they must address some of these limitations. As conservation continues to become more critical in the GYE, states can work to conserve species and habitat through their trustee power over wildlife. Citizens can also aid in the conservation of species through their role as potential enforcers and beneficiaries of wildlife regulations.

3. Local Regulatory Authority over Private Land for Wildlife

In the U.S., most states have delegated the power to regulate private land use to counties and municipalities who exercise that power through land use planning and zoning.[335] This power generally allows counties and municipalities to regulate where private landowners can build, how dense the buildings can be, and what types of uses are allowed in certain zones.[336] Idaho, Montana, and Wyoming all have such "enabling statutes," granting counties the power to implement planning and zoning in their jurisdiction.[337]

In all three GYE states, counties must develop a plan for how they will regulate land uses.[338] Based on that plan, they can develop specific zoning or subdivision rules limiting landowners' use of their land.[339] While many counties do not have zoning regulations, some relevant counties that do include: Park County, Montana;

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333 Michael C. Blumm & Aurora Paulsen, *The Public Trust in Wildlife*, 2013 UTAH L. REV. 1437, 1486–88 (2013).

334 *See* Temple Stoellinger et al., *Improving Cooperative State and Federal Species Conservation Efforts*, 20 WYO. L. REV. 183, 190, 211, 215 (2020); ASS'N OF FISH & WILDLIFE AGENCIES AND ARIZ. GAME & FISH DEP'T, THE STATE CONSERVATION MACHINE 9, 10 (2017), https://www.fishwildlife.org/application/files/3615/1853/8699/The_State_Conservation_Machine-FINAL.pdf [https://perma.cc/94GF-DVF9]; *Recovering America's Wildlife Act*, NAT'L WILDLIFE FED'N, https://www.nwf.org/Our-Work/Wildlife-Conservation/Policy/Recovering-Americas-Wildlife-Act [https://perma.cc/5RDP-NAP4] (last visited Nov. 23, 2021); Nathan Rott, *Decline in Hunters Threatens How U.S. Pays for Conservation*, NPR (Mar. 20, 2018, 6:31 AM), https://www.npr.org/2018/03/20/593001800/decline-in-hunters-threatens-how-u-s-pays-for-conservation [https://perma.cc/A385-QB6X]; SOUTHWICK ASSOCS., HUNTING IN AMERICA: AN ECONOMIC FORCE FOR CONSERVATION 4 (2018), https://www.fishwildlife.org/application/files/3815/3719/7536/Southwick_Assoc_-_NSSF_Hunting_Econ.pdf [https://perma.cc/HDW4-9MZV].

335 JOHN R. NOLON & PATRICIA E. SALKIN, LAND USE LAW IN A NUTSHELL 5–8 (2d ed. 2017); IDAHO CONST. art. XII, § 1; IDAHO CODE § 50-301 (2021); MONT. CONST. art. 11, § 3; MONT. CODE ANN. § 7-1-101 (2021); WYO. CONST. art. 13, § 1; WYO. STAT. ANN. § 15-1-103 (2021).

336 NOLON & SALKIN, *supra* note 335, at 5–8.

337 MONT. CODE ANN. § 76-2-101; IDAHO CODE §§ 67-6501 to -6539; WYO. STAT. ANN. §§ 15-1-601 to -611.

338 MONT. CODE ANN. § 76-2-101; IDAHO CODE § 67-6508; WYO. STAT. ANN. § 15-1-601.

339 NOLON & SALKIN, *supra* note 335, at 57.

Sublette County, Wyoming; and Bonneville County, Idaho. These counties have included wildlife values and habitat considerations in their planning process.[340] In Park County, Montana, for example, the county must review the potential impact that any new subdivision may have on wildlife or wildlife habitat.[341] If a new subdivision has a significant adverse impact to wildlife or wildlife habitat, and the impact cannot be mitigated through other means, the county may deny the subdivision permit.[342] Sublette County, Wyoming has a similar provision, requiring a finding that a proposed subdivision will have no "significant adverse impact on wildlife habitat, wildlife migration routes, or fisheries," before the county can approve a subdivision permit.[343] These local regulations limit private property rights for the benefit of wildlife.

Another source of restrictions on private land use comes from restrictive covenants (hereinafter, "covenants"), also known as deed restrictions. Covenants are contractual in nature and may be more tailored to specific properties than zoning regulations.[344] Covenants, as private contracts, are distinct from zoning regulations because they affect individual properties (bottom-up) instead of broad regulations that affect all properties in a zone (top-down).[345] The Wyoming Supreme Court has found that covenants are generally enforceable as long as any subsequent owner of the burdened land had notice of the contract.[346] When developers subdivide and build on land, it is common to maintain a certain character or quality of the neighborhood which they are developing.[347] Thus, a majority of subdivisions or residential developments have covenants.[348] To maintain the character or quality of a neighborhood or development, developers contractually bind all landowners in the development to meet certain requirements.[349] Since covenants are private contracts, it is difficult to access them and consequently, it is difficult to understand

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340 *See* PARK COUNTY GROWTH POLICY, *supra* note 292; SUBLETTE COMPREHENSIVE PLAN, *supra* note 292; SUBLETTE ZONING, *supra* note 292; BONNEVILLE COUNTY, *supra* note 292.

341 PARK COUNTY GROWTH POLICY, *supra* note 292, at 57.

342 *Id.* at 57–58.

343 SUBLETTE ZONING, *supra* note 292, at 75.

344 Noah M. Kazis, Note, *Public Actors, Private Law: Local Government's Use of Covenants to Regulate Land Use*, 124 YALE L.J. 1790, 1792 (2015); William T. Hughes, Jr. & Geoffrey K. Turnbull, *Restrictive Land Covenants*, 12 J. REAL ESTATE FIN. & ECON. 9, 9–10 (1996).

345 Kazis, *supra* note 344, at 1792; Hughes & Turnbull, *supra* note 344, at 9–10.

346 Michael R. Eitel, Comment, *Wyoming's Trepidation toward Conservation Easement Legislation: A Look at Two Issues Troubling the Wyoming State Legislature*, 4 WYO. L. REV. 57, 62 (2004).

347 *See* Kazis, *supra* note 344, at 1792; Hughes & Turnbull, *supra* note 344, at 9–10.

348 *See, e.g.*, *Welcome to First American Title in Wyoming*, FIRST AM. TITLE, https://www.firstam.com/title/wy/index.html (last visited Mar. 16, 2022) (to access information on covenants, select a county; then select "Subdivision Covenants & Restrictions;" then select a subdivision to review covenants affecting that subdivision).

349 Gerald Korngold, *The Emergence of Private Land Use Controls in Large-Scale Subdivisions: The Companion Story to* Village of Euclid v. Ambler Realty Co., 51 CASE W. RSRV. L. REV. 617, 617–18 (2001).

their impact to private lands in the GYE. With more than 400 subdivisions or subdivision expansions in just Sublette County, Wyoming, covenants could be impactful in managing private land use.[350] As development continues to accelerate in the GYE, local governments and private actors can play a much larger role in protecting wildlife habitat. With both local governments and citizens working to conserve wildlife and the essential private land habitat, private lands in the GYE can be a stronghold of conservation and ecological health.

4. Tribal Regulation of Wildlife

In addition to the regulatory authorities described above, Indian tribes also maintain sovereign authority to manage wildlife within the boundary of their reservations.[351] Through federal treaties, some tribes also retain authority to hunt beyond the boundaries of their reservation on traditional hunting grounds.[352] Tribes regulate wildlife within the boundary of reservations through the creation of regulatory codes governing hunting, fishing, and wildlife management.[353] State wildlife agencies typically maintain authority to manage wildlife on private property owned by non-Indians within the boundaries of the reservation.[354]

On the Wind River Reservation in Wyoming, part of the GYE, the Northern Arapahoe and Eastern Shoshone Tribes initially instituted a game code in 1948, building upon their previous efforts in the late 1930s to create the Wind River Roadless Area in part to preserve wildlife and wildlife habitat.[355] The 1948 game code instituted hunting season and game limits, however it was repealed in 1953.[356] A new game code was adopted in 1979, reinstating harvest quotas and game seasons.[357]

Following the enactment of the game code, the Tribal Game and Fish Department worked with the Wyoming Game and Fish Department and the

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350 *See Sublette County, WY—Subdivisions Abstract Book*, SUBLETTE CNTY., WYO., https://greenwoodmap.com/sublette/clerk/abstractbooks/subdiv.html [https://perma.cc/8K7W-3KK9] (last visited May 26, 2022).

351 FREYFOGLE ET AL., *supra* note 184, at 159–77 (discussing that tribes as sovereign entities possess distinct governance powers on their own, not derived from federal or state governments).

352 *See* Herrera v. Wyoming, 139 S. Ct. 1686 (2019) (finding the Crow Tribe retained the treaty right to hunt on the unoccupied lands of the United States despite Wyoming statehood and the reservation of the Bighorn National Forest).

353 FREYFOGLE ET AL., *supra* note 184, at 177–78.

354 *Id.*

355 Gregory Nickerson, *Managing Game on the Wind River Reservation*, WYOHISTORY (Jan. 22, 2019), https://www.wyohistory.org/encyclopedia/managing-game-wind-river-reservation [https://perma.cc/53JX-AS4Q]. The Wind River Indian Reservation is more than two million acres. *Id.*

356 *Id.*

357 *Id.* The Eastern Shoshone Tribe adopted the game code in 1979, but the Northern Arapahoe General Council rejected the game code as too restrictive. Adam R. Hodge, *Tradition, Sovereignty, and Conservation: The Controversy Surrounding the Wind River Indian Reservation Game*

USFWS to successfully release pronghorn and bighorn sheep on the reservation to boost numbers.[358] More recently, both the Eastern Shoshone and the Northern Arapahoe have successfully reintroduced bison to the reservation.[359]

B. Voluntary Approaches to Wildlife Conservation on Private Lands

Voluntary, incentive-based programs are a very important means of engaging private landowners in conservation. While regulations often infringe on private property rights, bringing a variety of implementation challenges, voluntary approaches allow private landowners to opt in to conservation when they believe the private benefits exceed the private costs. A wide range of voluntary approaches are available to agencies and non-profits. These tools typically provide incentives to landowners—often, though not always, in the form of payments—to protect land, improve wildlife habitat or reduce human-wildlife conflict.[360] These include the outright fee title acquisition of property from landowners, the acquisition of only certain property rights, standalone or recurring payments for specific conservation practices, conservation planning and technical assistance, and the simple, public recognition of high-quality private-land management.[361] Some are well-established tools already in use in the GYE, such as conservation easements and annual payments for habitat management through USDA's Environmental Quality Incentives Program (EQIP).[362] Others, such as habitat leases, rental agreements, and occupancy agreements, are being piloted now, with a goal of providing greater flexibility to landowners and the conservation community.[363]

Voluntary, incentive-based programs are distributed across a variety of federal and state agencies and non-profit organizations, and continue to evolve. Most of the federal government's human and financial capacity to deliver voluntary conservation on private lands sits in the U.S. Department of Agriculture (USDA),

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Code, 52 W. HIST. Q. 369, 382–84 (2021). However, in 1984 the Bureau of Indian Affairs imposed the Wind River Reservation Game Code to both tribes. *Id.* at 370. This was the first time the U.S. government had imposed a game code on any Indian Reservation. *Id.* The Northern Arapahoe sued the Secretary of the Interior and others, arguing the Secretary did not possess authority to impose the game code. *Id.* The Tenth Circuit ultimately ruled that the Secretary did possess the authority to impose a temporary game code on the reservation because research conducted by the U.S. Fish and Wildlife Service at the request of both tribes had shown a need for hunting regulations and because the rights of the two tribes overlapped in the area of game management. Northern Arapahoe Tribe v. Hodel, 808 F.2d 741, 747–48 (10th Cir. 1987).

358 Nickerson, *supra* note 355.

359 *Our Successful Bison Reintroduction and Conservation Efforts*, EASTERN SHOSHONE TRIBE, https://www.wyohistory.org/encyclopedia/managing-game-wind-river-reservation [https://perma.cc/9GGL-928U] (last visited Apr. 19, 2022); *The Story of Bison and Native Americans on Wind River Country*, WYOMING'S WIND RIVER COUNTRY (Nov. 20, 2019), https://windriver.org/bison-and-native-americans-wind-river/ [https://perma.cc/C7QX-4B8N].

360 *See infra* notes 364–452 and accompanying text.

361 *See infra* notes 364–452 and accompanying text.

362 *See infra* notes 364–452 and accompanying text.

363 *See infra* notes 364–452 and accompanying text.

and is authorized and funded through the Farm Bill, an omnibus piece of legislation that Congress updates every four to six years, most recently through the Agriculture Improvement Act of 2018.[364] The Farm Bill creates and funds food and agriculture programs, including a number of conservation programs.[365] Most are administered by the Natural Resource Conservation Service (NRCS), and the remainder by the Farm Service Agency.[366] They allow the USDA to fund a range of actions from permanent protection of an entire farm or ranch from development, to more focused management and restoration actions to improve key habitats.[367] Within the Department of the Interior, the USFWS also provides technical capacity and funding to support private lands conservation through its Partners for Fish and Wildlife Program.[368] Meanwhile, states in the GYE also provide financial and technical assistance to landowners, mainly, though not exclusively, through their fish and wildlife management agencies.[369] Some state programs, such as Idaho's "Access Yes!" Program, provide incentives for public access to private lands, while others fund habitat improvements on private lands.[370] In Wyoming, the Wyoming Wildlife and Natural Resources Trust (WWNRT), created by the state's legislature in 2005, awards up to $10 million in grants annually to conservation easements and habitat restoration projects.[371]

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364 Agriculture Improvement Act of 2018, Pub. L. No. 115-334, 132 Stat. 4490.

365 RENEE JOHNSON & JIM MONKE, CONG. RSCH. SERV., IF11126, 2018 FARM BILL PRIMER: WHAT IS THE FARM BILL? (2019), https://sgp.fas.org/crs/misc/IF11126.pdf [https://perma.cc/3TLG-FM78].

366 MEGAN STUBBS, CONG. RSCH. SERV., R45698, AGRICULTURAL CONSERVATION IN THE 2018 FARM BILL 1 (2019), https://sgp.fas.org/crs/misc/R45698.pdf [https://perma.cc/J43K-PQ68] [hereinafter STUBBS, AGRICULTURAL CONSERVATION].

367 *See infra* notes 379–452 and accompanying text.

368 *See Partners for Fish and Wildlife*, FISH & WILDLIFE SERV., https://www.fws.gov/program/partners-fish-and-wildlife [https://perma.cc/J96S-L9A5] (last visited Apr. 22, 2022).

369 *See infra* notes 436–445 and accompanying text.

370 *See, e.g.*, *Lands / Landowner Programs*, IDAHO FISH & GAME DEP'T, https://idfg.idaho.gov/wildlife/lands [https://perma.cc/28A3-Z2FY] (last visited Apr. 22, 2022); *Habitat Improvement Program*, IDAHO FISH & GAME DEP'T, https://idfg.idaho.gov/conservation/habitat/hip [https://perma.cc/6HGH-GPXP] (last visited Apr. 22, 2022); *Wildlife Habitat Improvement Program Grants*, MONT. FISH, WILDLIFE & PARKS, https://fwp.mt.gov/aboutfwp/grant-programs/wildlife-habitat-improvement [https://perma.cc/4UQV-U5W6] (last visited Apr. 22, 2022).

371 *See* WYO. WILDLIFE & NAT. RES. TR., ANNUAL REPORT: 2005–2021, at 2, 7–10, https://drive.google.com/file/d/1EQ1X_-Mf2FyVh3FJuqOY5OnlbG9joh_l/view [https://perma.cc/TBC9-5DV2]. In the 2022 budget session, the Wyoming Legislature appropriated $75 million to the Wyoming Wildlife and Natural Resource Trust, allowing annual grants from the trust to increase from $4 million to $10 million. *See* Siva Sundaresan, *A Win for Wyoming! Wyoming Invests $75 million in Wyoming Wildlife & Natural Resources Trust*, GREATER YELLOWSTONE COAL. (Apr. 7, 2022), https://greateryellowstone.org/blog/2022/wwnrt?utm_source=facebook&utm_medium=social&utm_campaign=wwnrt&fbclid=IwAR13EXM8OEQ7Bp9SXY6YHf6-eYOcjyWfZ9lr_J3iFqunD90Y9Op5OsCx9Zk [https://perma.cc/7XX4-FKCV]; General Appropriations of Government (SF0001), ch. 51, 2022 Wyo. Laws (to be codified at WYO. STAT. ANN § 9-15-103 (2022)).

Notably, many state programs are implemented in concert with federal or private programs, and used to meet financial matching requirements.[372]

Important as federal and state programs may be, they have well-known limitations. Adapting them to emerging needs or challenges can require new legislation or fiscal appropriations.[373] Administrative processes can create bottlenecks that slow the delivery of resources and the implementation of projects.[374] Some private landowners may hesitate to participate in government programs for ideological reasons.[375] For all these and other reasons, private programs, while often lacking the budget or durability of government programs, may be able to help further conservation on private lands.[376] In particular, private programs can introduce innovations that government programs may eventually adopt and help mold initiative to local contexts.[377] In the GYE, private organizations have advanced several emerging concepts and tools such as habitat leases and occupancy agreements, both of which are being piloted.[378]

1. Permanent Land Protection

Wildlife agencies and conservation organizations sometimes work with willing landowners to acquire their land in order to protect critical wildlife habitat across

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372 *See, e.g.*, ASS'N OF FISH & WILDLIFE AGENCIES, MATCHING FUNDS FOR GRANTS: A REPORT AND CATALOG OF PROVEN AND POTENTIAL MATCH SOURCES FOR THE RECOVERING AMERICA'S WILDLIFE ACT AND OTHER GRANT PROGRAMS 4–5, 16–17 (2021), https://www.fishwildlife.org/application/files/9916/3708/9758/RAWA_Match_Report_Version_1-Final_Draft_Report.pdf [https://perma.cc/36QT-U4MK] [hereinafter MATCHING FUNDS FOR GRANTS].

373 *See* JAMES V. SATURNO ET AL., R42388, THE CONGRESSIONAL APPROPRIATIONS PROCESS: AN INTRODUCTION 2–9 (2016), https://sgp.fas.org/crs/misc/R42388.pdf [https://perma.cc/R3VQ-87WR]; Drew Desilver, *Congress Has Long Struggled to Pass Spending Bills on Time*, PEW RSCH CTR. (Jan. 16, 2018), https://www.pewresearch.org/fact-tank/2018/01/16/congress-has-long-struggled-to-pass-spending-bills-on-time/ [https://perma.cc/ZHJ7-5JCE].

374 *See* SATURNO ET AL., *supra* note 373, at 2–9; Desilver, *supra* note 373; Thomas O. McGarity, *Some Thoughts on "Deossifying" the Rulemaking Process*, 41 DUKE L.J. 1385, 1394 (1992).

375 *See* DREW E. BENNETT & NICOLE GAUTIER, RUCKELSHAUS INST., UNIV. OF WYO., LANDOWNER PERSPECTIVES ON BIG GAME MIGRATION CORRIDOR CONSERVATION IN WYOMING 5–6 (2019), http://www.uwyo.edu/haub/_files/_docs/ruckelshaus/private-lands-stewardship/2019-landowner-pers-report-online-accessible.pdf [https://perma.cc/5W6W-KVYV]; Olive, *supra* note 262, *passim*.

376 MATCHING FUNDS FOR GRANTS, *supra* note 372, at 6, 10–12.

377 *See, e.g.*, *Defenders Shifts Focus to Wolf Coexistence Partnerships*, DEFENDERS OF WILDLIFE (Aug. 20, 2010), https://defenders.org/newsroom/defenders-shifts-focus-wolf-coexistence-partnerships [https://perma.cc/G4YG-STRP]. Starting in the 1980s, Defenders of Wildlife established a wolf damage compensation program to reimburse landowners for damages caused by wolves. Building on the success of the Defenders of Wildlife program, in 2010 the USFWS began a compensation program modelled off the program. *See id.*; Catherine E. Semcer, *Securing a Future for Wolves in the West*, PERCREPORTS, Winter 2021–22, at 36, 39–40 (2021), https://www.perc.org/wp-content/uploads/2021/12/PR-Winter21.22-21Nov24-WEB.pdf [https://perma.cc/MV4C-PNED].

378 *See infra* notes 404–417 and accompanying text.

the GYE.[379] For example, the Wyoming Game and Fish Department (WGFD) purchased over 41,000 acres to establish the Spence & Moriarity Wildlife Habitat Management Area (WHMA) near Dubois, WY, protecting crucial winter range for elk.[380] The Conservation Fund acquired 364 acres near Pinedale, WY and donated the property to WGFD to establish the Luke Lynch WHMA, protecting a critical bottleneck that is used by thousands of migrating mule deer along the Red Desert to Hoback Migration Corridor.[381] While the outright acquisition of property plays an important role in conservation, this approach tends to be limited by high costs and concerns in some communities that acquisitions reduce the land base for agriculture and development.[382]

Private land is more often protected via conservation easements, in which a landowner agrees with a land trust or governmental entity to permanently forgo development on some or all of the private land.[383] Easements are legally binding deed restrictions that can limit construction of residences or commercial facilities to densities below what zoning regulations would otherwise allow.[384] Conservation easements can also prevent or limit the subdivision of properties into smaller and separately owned parcels—keeping large parcels intact and under the same management.[385] Landowners granting an easement on their property continue to own the land and can still sell, bequest, or otherwise transfer the land.[386] Additionally, landowners may retain rights for certain activities, such as agricultural practices, while the land trust or agency holds, in perpetuity, the right to develop or subdivide in trust for the public benefit.[387]

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379 *See, e.g.*, *Land and Water Conservation Fund: FY 2007 Land Acquisition Request*, U.S. FOREST SERV., https://www.fs.fed.us/land/staff/LWCF/purchases07/16.shtml [https://perma.cc/CSS4-8PQP] (last visited Apr. 22, 2022).

380 *See Spence & Moriarty—Wildlife Habitat Management Area*, WYO. GAME & FISH DEP'T, https://wgfd.wyo.gov/Public-Access/WHMA/WHMA/Spence-Moriarity [https://perma.cc/RDY7-8G2C] (last visited Apr. 22, 2022).

381 *See Luke Lynch Wildlife Habitat Management Area*, THE CONSERVATION FUND, https://www.conservationfund.org/projects/fremont-lake [https://perma.cc/SH5E-H5KE] (last visited Apr. 22, 2022); Brammer, *supra* note 284, at 90–92.

382 *See, e.g.*, Michael Drescher & Jacob C. Brenner, *The Practice and Promise of Private Land Conservation*, 23 ECOLOGY & SOC'Y 1, 1 (2018).

383 Federico Cheever & Nancy A. McLaughlin, *An Introduction to Conservation Easements in the United States: A Simple Concept and a Complicated Mosaic of Law*, 1 J.L., PROP., & SOC'Y 107, 111–14 (2015).

384 *See id.* at 180–81.

385 NICOLE KORFANTA ET AL., RUCKELSHAUS INST., UNIV. OF WYO., B-1317, WYOMING CONSERVATION EASEMENT: LANDS, SERVICES, AND ECONOMIC BENEFITS 1–2 (2018), https://www.uwyo.edu/haub/_files/_docs/ruckelshaus/open-spaces/2018-wyoming-conservation-easements.pdf [https://perma.cc/MUL5-NW5L].

386 *See* Timothy C. Lindstrom, *A Guide to the Tax Aspects of Conservation Easement Contributions*, 7 WYO. L. REV. 441, 446 (2007).

387 Cheever & McLaughlin, *supra* note 383, at 120–24, n.48; KORFANTA ET AL., *supra* note 385, at 1–2.

A range of financial incentives exist to encourage landowners to grant an easement on their property. For example, when the value of the easement, or a portion thereof, is donated, the grantor can claim a federal income tax deduction and exclude a portion of the easement value from their taxable income or estate tax upon their death.[388] At the federal level, the USDA's Agricultural Conservation Easement Program (ACEP) is a major source of easement funding, in which landowners receive a cash payment for granting an easement.[389] Further, all GYE states also provide financial incentives to landowners for granting conservation easements, as do a number of counties in the ecosystem.[390]

The GYE is a priority for many conservation groups,[391] several of which have used conservation easements as their primary tool to protect private lands from development.[392] For example, over the past few decades, agencies and conservation

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[388] Tax benefits are under the tax code at the time of publication and subject to revision of tax law. *See* 26 C.F.R. § 1.170A-14 (2018); *Estate Tax Incentives for Land Conservation*, LAND TR. ALL., https://www.landtrustalliance.org/topics/taxes/estate-tax-incentives-land-conservation [https://perma.cc/BM57-RUZ8] (last visited Apr. 25, 2022).

[389] *Public Funding*, LAND TR. ALL., https://www.landtrustalliance.org/public-funding [https://perma.cc/3YA3-C2HR] (last visited Mar. 15, 2022); *Farm Bill Conservation Programs*, LAND TR. ALL., https://www.landtrustalliance.org/topics/federal-programs/farm-bill-conservation-programs [https://perma.cc/CJ7A-JD5J] (last visited Apr. 21, 2022); *see also* MEGAN STUBBS, CONG. RSCH. SERV., R40763, AGRICULTURAL CONSERVATION: A GUIDE TO PROGRAMS 5 (2020), https://sgp.fas.org/crs/misc/R40763.pdf [https://perma.cc/7Z8C-LNP9] [hereinafter STUBBS, AGRICULTURAL CONSERVATION].

[390] *See Montana Conservation Programs*, CONSERVATION ALMANAC, https://conservationalmanac.org/index.php/programs/montana/ [https://perma.cc/3R2L-5XEM] (last visited Apr. 13, 2022); *Habitat Montana*, MONT. FISH, WILDLIFE & PARKS, https://fwp.mt.gov/conservation/landowner-programs/habitat-montana [https://perma.cc/C2UM-JHH6] (last visited Apr. 13, 2022); *Idaho Conservation Programs*, CONSERVATION ALMANAC, https://conservationalmanac.org/index.php/programs/idaho/ [https://perma.cc/69FQ-H34T] (last visited Apr. 13, 2022); IDAHO CODE § 36-104(b)(7) (2020); *Wyoming Conservation Programs*, CONSERVATION ALMANAC, https://conservationalmanac.org/index.php/programs/wyoming/ [https://perma.cc/SC9U-GC82] (last visited Apr. 13, 2022); *Home*, WYO. WILDLIFE & NAT. RES. TR., https://wwnrt.wyo.gov/home [https://perma.cc/WCU3-V9PP] (last visited May 2, 2021); WYO. STAT. ANN. § 9-15-103 (2021); *Funding Application Guidelines*, WYO. WILDLIFE & NAT. RES. TR., https://wwnrt.wyo.gov/how-to-apply/how-to-apply [https://perma.cc/85FJ-MZPB] (last visited Apr. 27, 2022); *Open Lands Funding Application Process*, GALLATIN CNTY., MONT., https://gallatincomt.virtualtownhall.net/open-lands-board/pages/open-lands-funding-application-process [https://perma.cc/6BVU-6C7C] (last visited Apr. 27, 2022); OPEN SPACE RESOURCES RESOLUTION OF TETON COUNTY, WYOMING 3–5 (2015), https://www.tetoncountywy.gov/DocumentCenter/View/3233/Adopted-Open-Space-Resolution-PDF?bidId= [https://perma.cc/735J-BDMW].

[391] David N. Cherney, Environmental Saviors? The Effectiveness of Nonprofit Organizations in Greater Yellowstone 16 (2011) (Ph.D. thesis, University of Colorado) (on file with CU Scholar, University of Colorado Libraries) (estimating that in 2011, there were 183 environmental nonprofits that had a mission focused on an environmental issue in the GYE).

[392] *See* THE NATURE CONSERVANCY, MONTANA: 2021 ANNUAL REPORT 3, 12 (2021), https://www.nature.org/content/dam/tnc/nature/en/documents/MT_FY21AnnualReport.pdf [https://perma.cc/K2YN-R2CZ] [hereinafter MONTANA ANNUAL REPORT]; *Our Work*, MONT. LAND RELIANCE, https://mtlandreliance.org/our-work/ [https://perma.cc/WJ26-VN9C] (last visited Apr. 10, 2022); *What We Do*, WYO. STOCK GROWERS LAND TR., https://wsglt.org/whatwedo/ [https://perma.cc/N5XF-5FM3] (last visited Apr. 10, 2022); *Programs*, JACKSON HOLE LAND TR., https://

groups have secured over 190,000 acres of conservation easements within the seasonal ranges of partially migratory elk herds of the GYE.[393] However, given that 1.9 million acres of private lands within these same elk ranges do not have easements, it is clear that easements encompass a relatively small proportion of the private lands in the GYE.[394] The distribution of easements also varies around the ecosystem. Generally, easements are concentrated at lower elevations along the outer boundaries of the ecosystem, in areas where agencies and conservation groups have deliberately focused their efforts.[395] For example, in the Madison Valley in Montana, Montana Fish, Wildlife and Parks, USFS, Montana Land Reliance, The Nature Conservancy of Montana, and others have protected large areas with dozens of easements.[396] Similarly, in Wyoming's Upper Green River Basin, the NRCS, Wyoming Wildlife and Natural Resource Trust, Wyoming Stock Growers Land Trust, Jackson Hole Land Trust, and Conservation Fund have conserved a large proportion of the private land, with a focus on greater sage-grouse habitat and migration corridors for pronghorn and mule deer.[397] Meanwhile, conservation easements have not been used heavily in other portions of the GYE, such as the Absaroka Front near Cody, Wyoming.[398]

Conservation easements are typically considered negative easements because they limit certain rights or uses of property.[399] Conservationists perceive them as effective at reducing landscape fragmentation due to residential subdivision and development, but less effective at promoting management practices that benefit

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jhlandtrust.org/jhlt-programs/ [https://perma.cc/2XUX-C2TB] (last visited Apr. 10, 2022); *Upper Green River Valley Initiative*, THE CONSERVATION FUND, https://www.conservationfund.org/projects/upper-green-river-valley-initiative [https://perma.cc/3KYS-H294] (last visited Apr. 10, 2022); *Interactive Map*, NAT'L CONSERVATION EASEMENT DATABASE, https://site.tplgis.org/NCED/interactivemap/ (last visited Apr. 27, 2022) (to locate, zoom in to the GYE); *State Profiles*, NAT'L CONSERVATION EASEMENT DATABASE, https://www.conservationeasement.us/state-profiles/ (last visited Apr. 27, 2022) (to locate, select "Profile: Easement Holders by State"; then select WY from the dropdown menu).

393 Gigliotti et al., *supra* note 133.

394 *See id.*

395 *See Interactive Map*, *supra* note 392 (to locate, zoom in to the GYE).

396 *See id.*; *State Profiles*, *supra* note 392 (to locate, select "Profile: Easement Holders by State"; then select MT from the dropdown menu); MONTANA ANNUAL REPORT, *supra* note 392, at 5, 12; *Our Work*, *supra* note 392; *How the Forest Legacy Program Works*, U.S. FOREST SERV., https://www.fs.usda.gov/managing-land/private-land/forest-legacy/program [https://perma.cc/SYW5-YVEH] (last visited Apr. 10, 2022); *Habitat Montana—A Conservation Success Story*, MONT. FISH, WILDLIFE & PARKS, https://mtfwp.maps.arcgis.com/apps/MapSeries/index.html?appid=aa86de3d911449cc81c44dcd5748ff1b (last visited Apr. 10, 2022).

397 *See State Profiles*, *supra* note 392 (to locate, select "Profile: Easement Holders by State"; then select WY from the dropdown menu); *What We Do*, *supra* note 392; *Programs*, *supra* note 392; *Upper Green River Valley Initiative*, *supra* note 392.

398 *See Interactive Map*, *supra* note 392 (to locate, zoom in to the GYE).

399 Cheever & McLaughlin, *supra* note 383, at 135.

wildlife or wildlife habitat.[400] A study of 23 conservation easements in Wyoming, including southeastern portions of the GYE, found properties with easements had fewer structures and fewer roads than properties without easements, but found no differences in management practices.[401] Recently, there has been a shift among some land trusts and funding bodies to encourage contract terms that obligate landowners to implement specific practices that benefit wildlife.[402] For example, easement funders targeting ungulate migration corridors in Wyoming have worked with land trusts to develop easement language requiring landowners to adopt fencing designs which facilitate wildlife passage.[403] The benefits of conservation easements to wildlife should be considered in the context of the specific terms of individual easements, but the range of terms and specificity in agreements makes any comprehensive assessment challenging at this time. While easements are certainly important in limiting habitat loss, other tools are better suited to promoting specific management practices.

2. Long-Term Land and Wildlife Stewardship

Some approaches to private lands conservation aim to provide solutions for land and wildlife stewardship that, while not permanent, range in duration over many years. Habitat leases or rental agreements compensate landowners for maintaining wildlife habitat by reducing the impacts of development or agriculture.[404] Negotiated between a landowner and a state, federal, or nonprofit partner, such agreements are for a shorter term than a conservation easement—5 to 15 years—and may involve all or part of privately-owned land.[405] Although the terms can vary among leases, landowners are typically compensated for maintaining native habitat or altering the extent or timing of livestock grazing to reduce its effects on key habitats.[406]

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[400] Drew E. Bennett et al., *Using Practitioner Knowledge to Expand the Toolbox for Private Lands Conservation*, 227 BIOLOGICAL CONSERVATION 152, 157 (2018) [hereinafter Bennett et al., *Using Practitioner Knowledge*].

[401] *See* Amy Pocewicz et al., *Effectiveness of Conservation Easements for Reducing Development and Maintaining Biodiversity in Sagebrush Ecosystems*, 144 BIOLOGICAL CONSERVATION 567, 570–71 (2011).

[402] *See* Telephone Interview with Eric Schacht, Exec. Dir., Wyo. Stock Growers Land Tr. (Aug. 2020); Dianne Stroman & Urs P. Kreuter, *Factors Influencing Land Management Practices on Conservation Easement Protected Landscapes*, 28 SOC'Y & NAT. RES. 891, 891–92 (2015).

[403] Telephone Interview with Eric Schacht, *supra* note 402.

[404] *Habitat Leasing*, W. LANDOWNERS ALL., https://westernlandowners.org/policy/habitat-lease/ [https://perma.cc/UJH7-9KYS] (last visited Apr. 26, 2022).

[405] *See id.*; *Open Fields for Game Bird Hunters*, MONT. FISH, WILDLIFE & PARKS, https://fwp.mt.gov/conservation/landowner-programs/open-fields-for-game-bird-hunters [https://perma.cc/P3AP-GDKU] (last visited Apr. 26, 2022); Dave Brooks, *Life After CRP*, MONT. FISH, WILDLIFE & PARKS, Sept.–Oct. 2018, at 34, 36; *Grassland CRP*, U.S. DEP'T OF AGRIC., https://www.fsa.usda.gov/programs-and-services/conservation-programs/crp-grasslands/index [https://perma.cc/W9FF-3UTU] (last visited Feb. 11, 2022).

[406] *See infra* notes 408–417 and accompanying text.

Given its duration and impact on habitat, USDA's Conservation Reserve Program could be classified as a form of a habitat lease or rental agreement.[407] Recently, the USDA also implemented the Grassland Conservation Reserve Program (GCRP).[408] The GCRP is an iteration of the CRP that can be applied in rangelands, with two priority areas—the "Dust Bowl Priority Zone" of Colorado, Kansas, Oklahoma, Texas, and New Mexico and the "Greater Yellowstone Wildlife Corridor Priority Zone" of Wyoming, Montana, and Idaho.[409] The GCRP allows landowners to continue livestock grazing on enrolled lands, while requiring a formal conservation plan, limited development, and management of invasive species and noxious weeds for the benefit of grasslands and grassland species.[410] This program has a minimum payment of $13 per acre and, like other Farm Bill Programs that are intended mainly to benefit smaller family operations, has an annual payment cap (in this case, $50,000), potentially limiting its applicability to larger properties.[411]

Several non-profit organizations have been piloting wildlife occupancy agreements, which are akin to habitat leases, in the GYE. Under current pilot wildlife occupancy agreements, landowners work to improve wildlife habitat while reducing potential wildlife-livestock conflict, and are compensated for the resulting costs.[412] For example, a landowner may move livestock away seasonally or build a fence to ensure separation between livestock and wildlife.[413] In two cases, in Jackson Hole near GTNP and Paradise Valley north of YNP, the Property and Environment Research Center has partnered with the Greater Yellowstone Coalition to pilot occupancy agreements of this nature.[414] In both cases, the landowner agreed to

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[407] *See Conservation Reserve Program*, FARM SERV. AGENCY, https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/ [https://perma.cc/HLB4-VVLG] (last visited Apr. 24, 2022).

[408] *USDA Announces Dates for Conservation Reserve Program General and Grasslands Signups*, FARM SERV. AGENCY (June 14, 2021), https://www.fsa.usda.gov/news-room/news-releases/2021/usda-announces-dates-for-conservation-reserve-program-general-and-grasslands-signups [https://perma.cc/MA3V-CTDJ].

[409] *See* FARM SERV. AGENCY, U.S. DEP'T OF AGRIC., GRASSLAND CRP NATIONAL PRIORITY ZONES (2022), https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/Conservation/PDF/national_grassland_crp_priority_zones_su203.pdf [https://perma.cc/5KS4-E28Q].

[410] FARM SERV. AGENCY, U.S. DEP'T OF AGRIC., GRASSLAND CONSERVATION RESERVE PROGRAM (CRP) GRASSLANDS SIGNUP; FACT SHEET 1 (2021), https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/crp-grasslands-signup_fact-sheet.pdf [https://perma.cc/3Y5N-PKMJ].

[411] *USDA Encourages Producers to Enroll Grasslands into Working Land Conservation*, FARM SERV. AGENCY (Mar. 30, 2022), https://www.fsa.usda.gov/news-room/news-releases/2022/usda-encourages-producers-to-enroll-grasslands-into-working-land-conservation [https://perma.cc/S4KP-2C5J]; FARM SERV. AGENCY, PAYMENT ELIGIBILITY AND PAYMENT LIMITATIONS: FACT SHEET 4 (2021), https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/payment-elligibility-limitations-factsheet.pdf [https://perma.cc/UG4S-4GGB].

[412] *Elk Occupancy Agreements*, PERC, https://www.perc.org/elk-occupancy-agreements/ [https://perma.cc/L4HH-XQ79] (last visited Apr. 3, 2022).

[413] *See, e.g.*, *id.*

[414] *Id.*

separate their cattle from elk during the winter.[415] In one, the landowner must move cattle to a different location for winter, and in another, the landowner must build a two-kilometer-long fence to ensure separation of the livestock and elk.[416] In the latter case, the fence aims to reduce the risk of disease transfer from elk to livestock, while still providing winter habitat for the elk.[417]

Habitat leasing and occupancy agreements are a nascent but very active area of policy advocacy and innovation in the GYE and beyond.[418] These developments are consistent with calls in other settings for more dynamic conservation solutions to habitat conservation.[419] Proponents of dynamic conservation often reason that these can cost less, and can be more easily implemented, than permanent protections (e.g., conservation easements and acquisitions), while still providing a measure of predictability over multiple years for both landowners and conservation groups.[420] Another advantage of these shorter-term approaches is the potential to adjust the type and location of conservation investments if climate change alters the quality and spatial location of habitats.[421]

3. Land and Wildlife Restoration and Management

Some voluntary programs provide funding for landowners to take specific actions over one or several years to benefit wildlife and wildlife habitat. One of the most significant such programs is the USDA's Environmental Quality Incentives Program (EQIP), which is administered by the NRCS and offers landowners financial and technical assistance to address specific natural resource concerns on their land.[422] The NRCS maintains a list of approximately 200 conservation practices that are eligible for assistance under the EQIP program.[423] Several of the approved practices are intended partly or entirely for the benefit of wildlife or habitat,[424] including upland wildlife habitat management, conservation cover,

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415 *Id.*

416 *Id.*

417 *Id.*

418 Mark D. Reynolds et al., *Dynamic Conservation for Migratory Species*, 3 SCI. ADVANCES 1, 1 (2017); Cassidy C. D'Aloia et al., *Coupled Networks of Permanent Protected Areas and Dynamic Conservation Areas for Biodiversity Conservation Under Climate Change*, 7 FRONTIERS ECOLOGY & EVOLUTION 1, 1 (2019); *Habitat Leasing*, *supra* note 404.

419 Reynolds et al., *supra* note 418, at 1; D'Aloia et al., *supra* note 418, at 1.

420 *Habitat Leasing*, *supra* note 404.

421 Reynolds et al., *supra* note 418, at 1; D'Aloia et al., *supra* note 418, at 1.

422 NAT. RES. CONSERVATION SERV., U.S. DEP'T OF AGRIC., ENVIRONMENTAL QUALITY INCENTIVES PROGRAM 1 (2019), https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1469022&ext=pdf [https://perma.cc/Z8B7-FNTC].

423 *Conservation Practices*, NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849 [https://perma.cc/BE7Y-2FEP] (last visited Apr. 14, 2022).

424 MEGAN STUBBS, CONG. RSCH. SERV., R40197, ENVIRONMENTAL QUALITY INCENTIVES

wetland wildlife habitat management, fence modification, and access control.[425] The Conservation Stewardship Program (CSP) provides incentives to landowners to create comprehensive management plans for entire agricultural operations.[426] Unlike the EQIP, landowners enrolled in the CSP must implement several conservation practices across a large scale.[427] The CSP aims to improve three primary benefits, one of which is wildlife habitat, and contracts are for five years.[428]

Landowners can also receive significant assistance to manage or compensate for specific conflicts arising from wildlife on their properties. For example, landowners experiencing depredation of livestock by large carnivores or of crops by ungulates can engage USDA Wildlife Services or state wildlife agencies to assist with proactive, non-lethal actions or more reactive, lethal actions to limit further livestock or crop loss.[429] As discussed extensively in Sections III and IV, state governments in the GYE also provide compensation to ranchers for direct losses of livestock to help offset replacement costs.[430] The Property and Environment Research Center is planning to pilot a financial risk transfer tool in the Paradise Valley in 2023 which would operate similarly to insurance by buffering against the costs associated with quarantining a herd with a positive brucellosis case.[431] While the pilot effort will initially be funded through private and foundation money, an expanded program in other portions of the GYE could combine multiple sources of funding and operate similarly to a more conventional insurance product.[432]

4. Conservation Planning and Technical Support for Landowners

Many of the programs already discussed include conservation planning and technical support for landowners, in addition to financial support. Further, many conservation non-profits and land trusts provide significant conservation planning

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PROGRAM (EQIP): STATUS AND ISSUES 9 (2011), https://crsreports.congress.gov/product/pdf/R/R40197/13 [https://perma.cc/S2N3-G6QV].

425 *EQIP Data Page*, NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_eqip.html#wildlife [https://perma.cc/9BCV-Z5RQ] (last visited Apr. 14, 2022) (to locate, click "Fish and Wildlife Habitat").

426 STUBBS, AGRICULTURAL CONSERVATION, *supra* note 389, at 6–7.

427 *Conservation Stewardship Program*, NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/ [https://perma.cc/TGH5-AD6Z] (last visited Apr. 14, 2022).

428 *Id.*

429 *Wildlife Services*, ANIMAL & PLANT HEALTH INSPECTION SERV., https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/sa_program_overview [https://perma.cc/V262-VY5Y] (last visited Apr. 27, 2022).

430 *See supra* Parts III and IV.

431 Telephone Interview with Shawn Regan, Vice President of Rsch., Prop. & Env't Rsch. Ctr. (Feb. 11, 2022).

432 *Id.*; Ben Foster, A Financial Risk-Transfer Tool for Managing the Costs of Brucellosis to Cattle Ranchers (Feb. 11, 2020) (working draft) (on file with the Property and Environment Research Center).

and technical support via staffing to assist with project development and delivery. However, two federal programs are particularly notable for providing robust scientific and technical support.

Within the USDA, the 2018 Farm Bill created the Working Lands for Wildlife (WLFW) initiative, which combined multiple conservation programs.[433] Through this program, the NRCS can partner with other entities, notably the USFWS, to work with private landowners and implement conservation practices, often in the habitat of federally listed species.[434] The program's goal is to provide support and predictability for landowners who own land in critical habitat for threatened, endangered or otherwise imperiled species.[435] The WLFW program was an expansion of the Sage Grouse Initiative (SGI), which began in 2010 to conserve Greater Sage-Grouse habitat.[436] The SGI created more regulatory certainty around the listing of the Greater Sage-Grouse by allowing participating landowners to avoid regulatory oversight on their property if the species was ever listed as endangered.[437] In 2018, in GYE states, the SGI invested approximately seven million dollars in EQIP projects on 394,000 acres of land, and six million dollars in ACEP easements on 21,000 acres of land, for the benefit of the Greater Sage-Grouse.[438]

Another important federal program providing technical and financial assistance to support landowners in improving habitat on their properties is the USFWS Partners for Fish and Wildlife Program.[439] The program is staffed by biologists who work directly with landowners in identified focal areas of each state.[440] Focus areas in the GYE include Montana's Centennial Valley and Wyoming's Bear River, Upper Green River, Upper Sweetwater-Red Desert, and Wind River.[441] Biologists within the program have wide latitude to develop projects, with particular

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433 STUBBS, AGRICULTURAL CONSERVATION, *supra* note 389, at 16.

434 *Id.*

435 *Working Lands for Wildlife*, NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/?cid=stelprdb1046975 [https://perma.cc/ZW2P-VWCH] (last visited Apr. 12, 2022).

436 WORKING LANDS FOR WILDLIFE, U.S. DEP'T OF AGRIC., NAT. RES. CONSERVATION SERV., GREATER SAGE-GROUSE 1 (2018), http://www.sagegrouseinitiative.com/wp-content/uploads/2018/11/WLFW-Scorecard-GreaterSageGrouse-July-2018_Final.pdf [https://perma.cc/3DGF-8WXF].

437 *See* NAT. RES. CONSERVATION SERV., U.S. DEP'T OF AGRIC., SAGE GROUSE INITIATIVE 2.0: INVESTMENT STRATEGY, FY 2015–2018, at 6 (2015), http://www.sagegrouseinitiative.com/wp-content/uploads/2015/08/SGI2.0_Final_Report.pdf [https://perma.cc/D3FG-FUKQ]; *New Paradigm*, SAGE GROUSE INITIATIVE, https://www.sagegrouseinitiative.com/about/new-paradigm/ [https://perma.cc/NH4P-RUK8] (last visited Apr. 27, 2022).

438 WORKING LANDS FOR WILDLIFE, *supra* note 436, at 2.

439 *See Partners for Fish and Wildlife*, *supra* note 368.

440 *See id.*

441 U.S. FISH & WILDLIFE SERV., PARTNERS FOR FISH AND WILDLIFE PROGRAM: MOUNTAIN-PRAIRIE REGION STRATEGIC PLAN: 2017–2021, at 123, 251, 262 (2017), https://permanent.fdlp.gov/gpo79553/R6%20PFW%20SP2017-2021.pdf [https://perma.cc/7PQG-HQ46].

emphasis on instream and riparian restoration to improve fish habitat and passage, restoration of historically drained wetlands, and improvement of sagebrush and aspen ecosystems.[442] Although the program is small relative to USDA Farm Bill Programs, with a budget of less than $57 million nationally in 2021, it has a reputation for successfully improving habitat across focal areas and creating high levels of satisfaction among participating landowners.[443]

Some federal programs recognize the importance of "bundling" habitat protection, restoration tools, and technical assistance, such as USDA's relatively new Regional Conservation Partnership Program (RCPP). This program provides for combining Farm Bill conservation programs such as ACEP and EQIP to focus on specific needs and also leverage additional public and private funding to address them.[444] Notably, one active RCPP project in Wyoming has received about $20 million in USDA and partner resources to employ conservation easements, fence modifications, and habitat enhancements in critical areas, like bottlenecks along wildlife migration corridors within the GYE of western Wyoming.[445] Expanded deployment of bundled programs and technical assistance could be a promising approach to land and wildlife conservation on private lands.

5. Recognition of Landowners

In addition to providing financial incentives, agencies and non-profits can support landowners by promoting public recognition and understanding of their conservation efforts. One example is WGFD's Landowner of the Year Award that recognizes landowners across the Department's regions.[446] Similarly, Montana provides the Neighbor Awards to recognize landowners who "go the extra mile" to achieve cooperation, land access, land stewardship, and community leadership.[447] At the federal level, NRCS and the WLFW program within USDA maintain active communications efforts highlighting landowner-led conservation

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442 *Id.*

443 U.S. DEP'T OF THE INTERIOR, FISCAL YEAR 2022: THE INTERIOR BUDGET IN BRIEF, at BH-70, -79 (2021), https://www.doi.gov/sites/doi.gov/files/2022-highlights-book.pdf [https://perma.cc/TPM2-RZY3]; *see also* Drew E. Bennett, Landowner Engagement in Conservation Efforts in Core Greater Sage-Grouse Range (2022) (unpublished manuscript) (on file with the author).

444 NAT. RES. CONSERVATION SERV., U.S. DEP'T OF AGRIC., ADMINISTRATION AND STATUS OF THE REGIONAL CONSERVATION PARTNERSHIP PROGRAM: 2019 REPORT TO CONGRESS 3–4 (2019), https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1595617&ext=pdf [https://perma.cc/JPY9-6YRF].

445 NAT. RES. CONSERVATION SERV., U.S. DEP'T OF AGRIC., NRCS REGIONAL CONSERVATION PARTNERSHIP PROGRAM (RCPP): 2014–2018 PROJECT SUMMARIES 136, https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1386891&ext=pdf [https://perma.cc/UW8Y-H7M2].

446 *Landowner of the Year*, WYO. GAME & FISH DEP'T, https://wgfd.wyo.gov/Get-Involved/Landowner-of-the-Year [https://perma.cc/EUQ4-SMFW] (last visited Apr. 23, 2022).

447 MONTANA NEIGHBOR AWARDS: 2019 NOMINATION FORM, https://myfwp.mt.gov/getRepositoryFile?objectID=92048 [https://perma.cc/S3N4-FAME] (last visited Apr. 25, 2022).

projects.[448] Relatedly, large non-profits such as The Nature Conservancy and smaller regional non-profits such as Western Landowners Alliance often feature stories in membership magazines, newsletters, and social media about conservation efforts by private landowners.[449] Several land trusts that have worked to conserve private land in the GYE also recognize landowners.[450] This public recognition can encourage stewardship and conservation actions.[451] Such non-monetary incentives are important, yet often underappreciated and under-utilized as additional conservation tools to influence behavior.[452]

C. Balancing the Carrot and Stick: Approaches to Wildlife Conservation on Private Lands

Although many private landowners have stewardship values and preferences for conserving wildlife, the costs of conservation often necessitate interventions to align landowner incentives with the public interest.[453] Regulatory approaches require landowners to act in ways that do not harm wildlife, using penalties to incentivize compliance.[454] Such laws are important tools when landowner behavior can have significant impacts on wildlife and conservation outcomes, such as extinction. Yet, by constraining private property rights for public benefit, regulations effectively place the responsibility of wildlife conservation on private landowners. Moreover, many private landowners tend to resist mandates, particularly in the GYE where autonomy is highly valued.[455] As a result, regulatory actions can be difficult to implement.

Voluntary approaches to wildlife conservation typically provide financial incentives to private landowners for protecting or improving habitat. By

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[448] *Habitat Heroes*, NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/plantsanimals/fishwildlife/?cid=nrcseprd1264414 [https://perma.cc/UE8F-2RC8] (last visited Apr. 25, 2022); *Success Stories*, NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/wps/portal/nrcs/main/id/newsroom/stories/ [https://perma.cc/62B3-XW23] (last visited Apr. 25, 2022).

[449] *See Voices*, ONLAND: W. LANDOWNERS ALL., https://onland.westernlandowners.org/departments/voices/ [https://perma.cc/LR33-JYAC] (last visited Apr. 25, 2022); *Matchmaking on the Prairie*, THE NATURE CONSERVANCY, https://www.nature.org/en-us/get-involved/how-to-help/places-we-protect/northern-great-plains/?tab_q=tab_container-tab_element_194430172 [https://perma.cc/22YN-FRCC] (last visited Apr. 25, 2022).

[450] *Mike & Deb Delaney*, MONT. LAND RELIANCE, https://mtlandreliance.org/success-stories/mike-deb-delaney/ [https://perma.cc/THZ4-UXNS] (last visited Apr. 25, 2022); *Bucholz Conservation Award*, WYO. STOCK GROWERS LAND TR., https://wsglt.org/bucholz-award/ [https://perma.cc/RY3G-M56D] (last visited Apr. 25, 2022).

[451] Bruno S. Frey & Jana Gallus, *Towards an Economics of Awards*, 31 J. ECON. SURV., 190, 190, 196–98 (2017).

[452] Christian Langpap, *Conservation of Endangered Species: Can Incentives Work for Private Landowners?*, 57 ECOLOGICAL ECON. 558, 567–70 (2006).

[453] *See supra* notes 260–283 and accompanying text.

[454] *See supra* notes 291–384 and accompanying text.

[455] BENNETT & GAUTIER, *supra* note 375, at 5–6.

compensating private landowners for their conservation actions or the opportunity costs of foregone land uses, these programs help share the burden of conservation.[456] Due to political constraints in implementing regulations, voluntary approaches are generally more feasible on private lands, although some conservationists argue that these strategies are ineffective or insufficient.[457] Like other large-scale programs, many voluntary, incentive-based approaches can be hindered by administrative bureaucracy that creates barriers to participation.[458] The ecological outcomes of many voluntary, incentive-based approaches, including those used in the GYE, remain relatively empirically unexamined, and likely depend on specific social and ecological contexts.[459]

Both regulatory and voluntary interventions to induce conservation on private lands interact with and drive landowner motivations. Regulations may create perverse incentives when landowners act on private information, like the so-called "shoot, shovel, and shut up" response to the ESA.[460] Information asymmetries can also enable landowners to extract rents from conservation payments in voluntary programs where financial incentives exceed landowners' opportunity costs.[461] Both types of interventions apply extrinsic pressure on actions that may otherwise be intrinsically motivated, perhaps by stewardship values or reputational concerns.[462] These extrinsic incentives can "crowd out" intrinsic motivations and make conservation interventions less effective,[463] or "crowd in" conservation behaviors among landowners who may otherwise not be intrinsically motivated.[464] How programs are designed and delivered may affect participation, as well as a suite of other insights from behavioral science relevant to land managers' conservation decisions.[465] These insights could be leveraged to improve specific interventions and to expand the policy toolbox to advance wildlife conservation in the GYE.[466]

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456 *See supra* notes 364–452 and accompanying text.

457 Doremus, *Portfolio Approach*, *supra* note 238, at 217.

458 Adam P. Reimer & Linda S. Prokopy, *Farmer Participation in U.S. Farm Bill Conservation Programs*, 53 ENV'T MGMT. 318, 318, 326 (2014); Cass R. Sunstein, *Sludge Audits*, 1 BEHAVIOURAL PUB. POL'Y 1, 1–4 (2020).

459 Bennett et al., *Using Practitioner Knowledge*, *supra* note 400, at 157.

460 Langpap, *supra* note 452, at 559.

461 *See* David L. Lewis et al., *The Efficiency of Voluntary Incentive Policies for Preventing Biodiversity Loss*, 33 RES. & ENERGY ECON. 192, 195 (2011).

462 *See* Prasenjit Banerjee & Jason F. Shogren, *Material Interests, Moral Reputation, and Crowding out Species Protection on Private Land*, 63 J. ENV'T ECON. & MGMT. 137, 138 (2012).

463 Bruno S. Frey & Felix Oberholzer-Gee, *The Cost of Price Incentives: An Empirical Analysis of Motivation Crowding-Out*, 87 AM. ECON. REV. 746, 747 (1997).

464 *See* Julian Rode et al., *Motivation Crowding by Economic Incentives in Conservation Policy: A Review of the Empirical Evidence*, 117 ECOLOGICAL ECON. 270, 270 (2015).

465 Hilary Byerly et al., *Applications of Behavioral Science to Biodiversity Management in Agricultural Landscapes: Conceptual Mapping and a California Case Study*, 193 ENV'T MONITORING & ASSESSMENT 1, 3 (2021).

466 Rebecca S. Epanchin-Niell et al., *Private Land Conservation Decision-Making: An Integrative Social Science Model*, 302 J. ENV'T MGMT. 1, 1–2 (2022).

VI. Integrating Private Lands Into a Vision for the GYE

The past 150 years have seen major strides in large-scale land and wildlife conservation in the GYE. These include not only the establishment of America's first national park and national forest, but also the development of state and tribal hunting regulations, the application of federal endangered species law, conservation actions taken by private landowners and county governments, and countless projects implemented by private conservation organizations and land trusts.[467] As a result of these combined efforts, today the GYE is considered to be in relatively good health, and its residents and visitors still have the opportunity to vigorously debate its future and imagine a range of conservation trajectories.[468] Yet, an evaluation of the ecology and habitat needs of key wildlife, including the carnivore and ungulate case studies presented in Part III of this article, shows that the future health of this ecosystem is not certain.[469] This is in large part because wide-ranging wildlife in the GYE requires habitat on private land, but this land is being used to build homes, commercial buildings, and other infrastructure.[470] Cumulatively, this development is likely to reduce available habitat and constrain future conservation possibilities.[471] The development trends in GYE are consistent with research showing that globally, protected areas *attract* development—a perverse means by which parks can adversely impact biodiversity.[472] Without active and strategic efforts to scale up private lands conservation by the current generation of government, non-profit, and business leaders, the integrity of the GYE, including that of YNP and GTNP, could be seriously compromised.[473]

Scaling up private land conservation in the GYE will require identifying shared goals and priorities, and strengthening relationships with landowners, both individually and collectively. Yet doing so successfully can be particularly challenging. Wide-ranging wildlife like large carnivores and migratory ungulates generates benefits for society while generating significant costs for private landowners, and existing law and policy do not provide a clear framework for what portion of these costs should be borne by society, and what portion by the landowner.[474] The implication, then, is that the public and their federal, state, local, and non-profit representatives must negotiate and renegotiate with landowners the terms under which conservation is pursued, and develop new ways to reallocate key costs and benefits. It is not clear today that the public and key leaders fully appreciate the challenges many private landowners in and around the GYE face—that of

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467 *See supra* notes 291–466 and accompanying text.

468 *See* Hansen & Phillips, *supra* note 18, at 1.

469 *See id.*

470 *See supra* notes 72–101 and accompanying text.

471 *See supra* notes 72–101 and accompanying text.

472 Wittemyer et al., *supra* note 32, at 123.

473 *See* Keiter, *supra* note 3, at 175–77.

474 *See supra* notes 102–287 and accompanying text.

coexisting with the highest diversity and abundance of large mammals in North America—yet this understanding is a precursor to finding common ground.[475]

Policy makers and conservation groups who seek to advance private lands conservation in the GYE will need to emphasize voluntary, incentive-based approaches, deployed as a creative and flexible "policy portfolio."[476] This is because private property owners have wide latitude under U.S. law, and the people of the three GYE states greatly value property rights and independence.[477] A portfolio approach is important because private lands vary widely in their ecological and social context.[478] As shown in Part II, private landowners have different values, land management goals, and financial resources.[479] As shown in Part III, wildlife diversity, abundance, behavior, and movements vary widely across properties, shaping what conservation values and human-wildlife conflicts occur on each property.[480] A comprehensive portfolio of conservation interventions should include more active deployment of proven tools, such as conservation easements and certain conflict reduction methods, continued testing and adoption of new tools, such as habitat leasing, occupancy agreements, and risk transfer instruments, and concerted efforts to stimulate and incubate other new ideas.[481] At the same time, attempts to increase uptake of these tools through increased funding alone are unlikely to succeed.[482] Deploying programs across an ever-larger land area will require simultaneous investments in the capacity of agencies and non-profits to provide outreach, planning, monitoring, and other support to private landowners,[483] and in exploring and evaluating improvements to program design and delivery.[484] Such investments are critical to help avoid bottlenecks that can reduce the impact of investments in programs or tools.[485]

The extraordinary number and diversity of landowners in the GYE, along with their rapidly changing composition, also underline the importance of a broad

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475 Morgan et al., *supra* note 102, at 81; Frank & McNaughton, *supra* note 102, at 2044.

476 *See* Doremus, *Portfolio Approach*, *supra* note 238, at 228–31; Bennett et al., *Using Practitioner Knowledge*, *supra* note 400, at 157.

477 *See supra* notes 455–466 and accompanying text.

478 *See supra* notes 364–452 and accompanying text.

479 *See supra* notes 53–101 and accompanying text.

480 *See supra* notes 102–184 and accompanying text.

481 *See supra* notes 364–452 and accompanying text.

482 Sunstein, *supra* note 458, at 1–4; Telephone Interview with Joy Morris & Dave Smith, Intermountain West Joint Venture (Mar. 9, 2022).

483 Telephone Interview with Morris & Smith, *supra* note 482; Bennett et al., *Using Practitioner Knowledge*, *supra* note 400, at 156–58.

484 Leah H. Palm-Forster et al., *Behavioral and Experimental Agri-Environmental Research: Methodological Challenges, Literature Gaps, and Recommendations*, 73 ENV'T & RES. ECON. 719, 719, 729–735 (2019).

485 Reimer & Prokopy, *supra* note 458, at 318, 326; Sunstein, *supra* note 458, at 1–4; Telephone Interview with Morris & Smith, *supra* note 482.

conception of voluntary, incentive-based conservation. Financial incentives alone are no panacea, and must not be used in isolation.[486] Instead, financial incentives are one important piece of a broader strategy that also includes institutional support and capacity to assist landowners as well as reputational and normative approaches and regulatory assurances.[487] For government, non-profit, tribal, and business leaders, an inclusive portfolio should include efforts to build public appreciation for private land stewardship, as well as social connections among landowners and conservationists to foster peer-to-peer learning and trust-building.[488] Over the long term, collaborative efforts that tap into landowners' core values and engage them as true partners in stewarding the iconic wildlife of the GYE are likely to result in better and more durable social and ecological outcomes. Indeed, efforts to develop new programs and tools, like habitat leasing, occupancy agreements, and brucellosis risk transfer programs, are a direct outgrowth of conservation groups' collaborations with landowners and demonstrate co-investment in response to landowners' expressed needs.[489] For all these reasons, fostering existing and new landowner-led and collaborative conservation groups appears critical to the future of conservation in the GYE. Funding support for such collaborative groups is an important stepping-stone to including more landowners in conservation efforts because many landowners tend to appreciate grassroots or locally led initiatives.[490] Importantly, collaborative efforts can also help address challenges that are not well suited to decisions made by individual landowners.[491]

Coordination of conservation efforts at the ecosystem scale is also likely to mediate the expansion of private-lands conservation that benefits wildlife in the GYE, because the extent of alignment among federal, state, tribal, local and private partners around any given priority can influence the allocation of human capacity and funding. In the past, coordination of this nature has proven challenging. This is partly because of the system's inherent social, political, and jurisdictional complexity.[492] Authority over wildlife in the GYE is divided among at least eight agencies, each with multiple units.[493] Authority over land management in the

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[486] *See supra* notes 383–466 and accompanying text.

[487] *See supra* notes 364–452 and accompanying text.

[488] Bennett et al., *Rangeland Trusts Network*, *supra* note 89, at 6.

[489] *See supra* notes 364–452 and accompanying text.

[490] Bennett et al., *Rangeland Trusts Network*, supra note 89, at 1–2.

[491] *See, e.g.*, *Carcass Pick Up*, BLACKFOOT CHALLENGE, https://blackfootchallenge.org/carcass-pickup/ [https://perma.cc/QN6V-9XSE] (last visited Apr. 15, 2022). The Blackfoot Challenge is a collaborative landowner-led group in Montana that implements a number of practices across a varying landscape. *See id.* Many of these practices would have limited impact if implemented on a landowner-by-landowner basis and are difficult and expensive for landowners to implement alone. These practices have resulted in significant successes and broad participation in the community due to the Blackfoot Challenge's facilitation and coordination. *See* Weber, *supra* note 90, at 35–37.

[492] Keiter, *supra* note 3, at 169–75.

[493] *Id.* at 21–30. Those agencies include: the game and fish agencies of Wyoming, Idaho, and Montana, the Wind River Tribal Game and Fish Department, the federal Fish and Wildlife Service, the National Park Service, the U.S. Forest Service, and the Bureau of Land Management. *Id.*

ecosystem is divided among as many as 28 federal, state, and county agencies and thousands of private landowners.[494] In the non-governmental sector, public interest in conservation in the GYE is fractured among more than 180 organizations.[495] Approximately 500,000 people live within the boundaries of the 22 million-acre GYE, and many millions of others take an active interest in its future.[496] Coordination is also challenging due to the lingering and chilling effects of major, historic setbacks. Most notably, in the 1980s, the GYCC—which is comprised of federal land managers in the region—attempted to strengthen their coordination to protect the ecosystem through the so-called "Vision Document."[497] Some regional stakeholders saw this as an attempt to assert restrictive, preservationist values into the multiple-use concept of the surrounding area, or to "make the park bigger."[498] This fueled opposition and led to the highly public rejection of the Vision Document, leaving agencies reluctant to engage in such efforts.[499]

Overall, the GYE has seen great strides in conservation, but progress to include private lands has been slow, owing partly to the system's inherent complexity and political gridlock.[500] While proponents of the ecosystem concept have succeeded dramatically by highlighting the dependence of the parks and their wildlife on a larger landscape, its application to management has been seriously limited. Today, a combination of new scientific tools and information, growing public recognition of the needs of key wildlife, and widespread concern over the impacts of visitation and development are again prompting questions over the coordination of conservation and management in the ecosystem. Leaders who are willing to engage in coordination efforts across the GYE will find many lessons in the failures of the past. Where private lands are concerned, given their reluctance to overstep, federal and state agencies may need to actively seek out and resource existing grassroots coalitions and local collaboratives they share interests with. Conversely, community organizations desiring federal and state engagement may need to actively invite agencies to the table. Formal coordination bodies such as the GYCC

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494 *See* CLARK, *supra* note 1, at 31.

495 Cherney, *supra* note 391, at 16.

496 *See* Hansen & Phillips, *supra* note 18, at 11; Middleton et al., *Harnessing Visitors' Enthusiasm*, *supra* note 110, at 3.

497 *See* GREATER YELLOWSTONE COORDINATING COMM., VISION FOR THE FUTURE: A FRAMEWORK FOR COORDINATION IN THE GREATER YELLOWSTONE AREA 1–6 (1990), https://babel.hathitrust.org/cgi/pt?id=umn.31951p00916764y&view=1up&seq=5&skin=2021 [https://perma.cc/BMQ8-3HGP] [hereinafter VISION FOR THE FUTURE]; CLARK, *supra* note 1, at 41.

498 Robert Pahre, *Showdown at Yellowstone: The Victims and Survivors of Ecosystem Management*, 50 J. WEST 66, 67 (2011) [hereinafter Pahre, *Showdown at Yellowstone*]; Robert Pahre, *Political Opposition to Transboundary Cooperation in the Greater Yellowstone Area*, 17 J. TOURISM & LEISURE STUD. 99, 120–21 (2011) [hereinafter Pahre, *Political Opposition*]; CLARK, *supra* note 1, at 41–42, 75.

499 Pahre, *Showdown at Yellowstone*, *supra* note 498, at 67–70; Pahre, *Political Opposition*, *supra* note 498, at 121–27.

500 *See* VISION FOR THE FUTURE, *supra* note 497, at 1–6.

and the Interagency Grizzly Bear Committee and the agencies comprising them will need to make concerted efforts to better understand landowner needs, build and maintain trust, and follow through with the delivery of relevant programs, tools and funding. While grounded in the insights we have gleaned from the GYE, this approach is consistent with other recent scholarship advancing the concept of "socio-ecological fit," suggesting that local collaboratives (e.g., at the watershed scale) can be effective, but even more so when they have guidance and coordination from higher organizational levels (e.g., ecosystem-scale).[501] Supporting actions at a scale that fits the ranges of key wildlife and the social processes of landowners and their local partners could promote buy-in and be replicated across the GYE in a form of multi-level governance.[502] Ultimately, while greater coordination is not strictly required to achieve conservation success on private lands, it would likely increase the overall pace, scale, and effectiveness of this work.

The 150th anniversary of YNP provides an opportunity for key leaders and local communities to consider the future of this important national treasure and the adjacent lands. It is notable that this anniversary falls during a year when the federal administration is actively setting its course on an ambitious goal to conserve 30% of the nation's land and water by 2030.[503] In that sense, this anniversary provides an opportunity for the administration and its state, tribal, and local partners to move from concept to reality in providing clear demonstrations of their intent to advance the voluntary, locally led, and inclusive approaches to conservation that were sketched out in last year's America the Beautiful vision.[504] The USDA will likely have a natural opportunity to examine how Farm Bill resources can best be combined and applied to stimulate the expansion of private land conservation and stewardship in this important landscape. The DOI may find ways to engage in similar efforts, particularly through the expansion and deployment of voluntary private lands programs like Partners for Fish and Wildlife and active efforts by NPS leaders to champion this work in landscapes that most impact YNP and GTNP.[505] Through such efforts, the DOI agencies can find opportunities to elevate and amplify large-landscape conservation initiatives that hinge largely on private lands. Indeed, fulfilling the NPS' 2012 vision of encouraging park neighbors

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[501] Angela M. Guerrero et al., *Achieving Social-Ecological Fit Through Bottom-Up Collaborative Governance: An Empirical Investigation*, 20 ECOLOGY & SOC'Y 1, 1, 7–8 (2015); Graham Epstein et al., *Institutional Fit and the Sustainability of Social-Ecological Systems*, 14 CURRENT OP. ENV'T SUSTAINABILITY 34, 38 (2015) [hereinafter Epstein et al., *Institutional Fit*].

[502] Epstein et al., *Institutional Fit*, *supra* note 501, at 38; *see also* Graham R. Marshall, *Nesting, Subsidiarity, and Community-Based Environmental Governance Beyond the Local Level*, 2 INT'L J. COMMONS 75, 92–94 (2008).

[503] *See* Tackling the Climate Crisis at Home and Abroad, Exec. Order No. 14008, 86 Fed. Reg. 7619, § 201, at 7622, § 216, at 7627 (Jan. 27, 2021).

[504] *See* AMERICA THE BEAUTIFUL, *supra* note 40, at 13–16.

[505] *See* Joseph L. Sax, *Buying Scenery: Land Acquisitions for the National Park Service*, 1980 DUKE L.J. 709, 731–37 (1980); Robert B. Keiter, *On Protecting the National Parks from the External Threats Dilemma*, 20 LAND & WATER L. REV. 355, 356–57 (1985); *Partners for Fish and Wildlife*, *supra* note 368.

to be "co-stewards,"[506] will require working well beyond park boundaries. One recent suggestion by GYE state legislators and a variety of scholars and regional conservation groups is that the NPS should play a leadership role in establishing a "Conservation Fund" in the GYE.[507] This fund could use a fraction of park visitor fees or other DOI resources to leverage funding streams from other federal, state, and private sources; providing sustainable, long-term funding for habitat protection and conflict reduction efforts on the larger landscape.[508] While any such creative steps by the administration and partners would come with new questions and challenges, creativity and innovation are needed today to ensure the ecological integrity and public enjoyment of YNP, GTNP, and the GYE for tomorrow.

506 REVISITING LEOPOLD, *supra* note 52, at 11.

507 Middleton et al., *Harnessing Visitors' Enthusiasm*, *supra* note 110, at 9–10.

508 *See id.*

Surface of Water Presents a Different Texture in, "Fountain Geyser Pool, Yellowstone National Park," Wyoming, *in* Ansel Adams Photographs of National Parks and Monuments, 1941–1942 (National Archives and Records Administration).