



WYOMING  
open spaces

William D. Ruckelshaus  
Institute of Environment  
and Natural Resources

Department of Agricultural  
and Applied Economics

Wyoming Natural Diversity  
Database

Wyoming Geographic  
Information Science Center

Cooperative Extension Service

For more information:

307.766.5080

[www.uwyo.edu/openspaces](http://www.uwyo.edu/openspaces)



## Economic Contributions of the Wyoming Wildlife and Natural Resource Trust

David T. Taylor, Department of Agricultural and Applied Economics, University of Wyoming; Jill Lovato, Ruckelshaus Institute of Environment and Natural Resources, University of Wyoming; Jessica Sargent-Michaud, The Trust for Public Land; Daniel Stevens, The Trust for Public Land

*In 2004 and 2007, the Ruckelshaus Institute of Environment and Natural Resources partnered with the Wyoming Stock Growers Association and The Nature Conservancy to conduct public opinion polls on open space and natural resource conservation and development. The polls show growing interest in setting aside public money to protect water, wildlife habitat, and rangelands (from 53 percent in 2004 to 69 percent in 2007; Boelter and Mays 2004, Hulme et al. 2008). In 2005, the Wyoming Legislature made such an investment by creating the Wyoming Wildlife and Natural Resource Trust. This report analyzes the return on that investment to Wyoming residents over the past six years.*

### Wyoming Wildlife and Natural Resource Trust

The purpose of the Wyoming Wildlife and Natural Resource Trust (WWNRT) is to enhance and conserve wildlife habitat and natural resource values throughout the state. Any project designed to improve wildlife habitat or natural resource values is eligible for funding. The program is funded by interest earned on a permanent account, donations, and legislative appropriations.

WWNRT is an independent state agency governed by a nine-member citizen board appointed by the Governor. Legislative oversight is guided by a select committee of six members, three each from the House and Senate. Six major categories of projects are funded by the WWNRT: 1) water development, 2) wetland creation, 3) river restoration, 4) invasive species, 5) rangeland enhancement, and 6) conservation easements. Over 323 projects in all 23 Wyoming counties have been completed to date (Figure 1). More than \$35 million has been allocated from WWNRT funds for these projects. Including matching contributions from other sources, expenditures for these projects have totaled approximately \$200 million. Every dollar spent by the WWNRT is matched on average with \$5 or more of contributions from other sources. There have been more than 200 separate project contributors, including federal agencies, national corporations, non-profit organizations, and interested individuals (see Box 1).

### Economic Contributions Analysis

While the mission of the WWNRT is to enhance and conserve wildlife habitat, it has also positively impacted the Wyoming economy. We conducted the analyses reported in this publication to better understand how projects funded by the WWNRT have contributed to our state's economy.

## BOX 1

### Contributors to the Wyoming Wildlife and Natural Resource Trust

More than 200 separate entities have helped fund WWNRT projects. Federal matching funds come from a variety of sources, including Natural Resource Conservation Service (NRCS) programs, the Bureau of Land Management (BLM), the U.S. Forest Service (USFS), and the U.S. Fish & Wildlife Service (USFWS), among others.

Non-federal contributions come from local governments, private landowners, private businesses, and non-profit organizations. Significant private contributors include Shell Oil, The Nature Conservancy, Cameco Resources, and Babs Kruse.

## BOX 2

### Tracking dollars: Example of typical restoration project – Muddy Creek, Ray Weber Pond

#### Total project contributions

\$121,668

#### Total expenditures made in Wyoming

\$116,930

#### Portion of expenditures made in Wyoming

96 percent

#### Sectors supported:

excavation, trucking, small retail

#### Businesses supported:

Willie's Dirt Services (Wamsutter, WY)

NSA Excavation (Baggs, WY)

Sheehan Trucking (Baggs, WY)

Hacketts (Baggs, WY)

### Table 1. Selected WWNRT habitat restoration projects

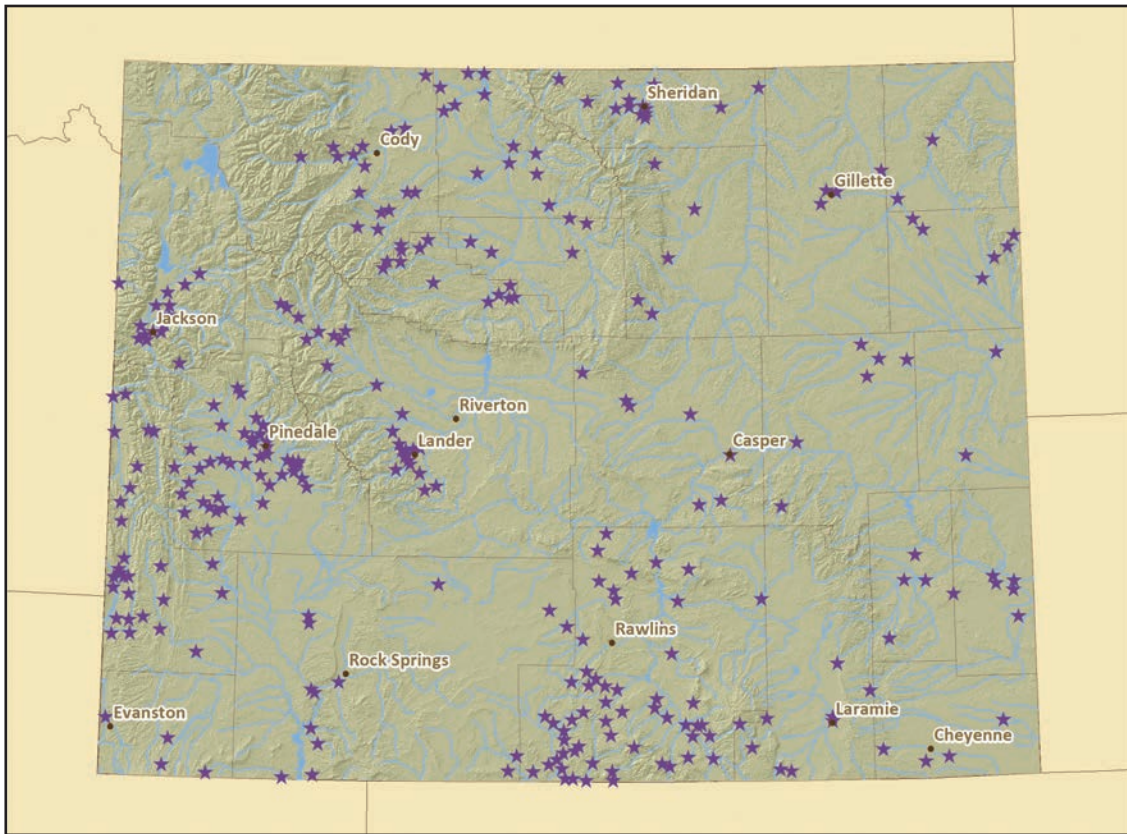
1. JO Ranch Water	14. Savery Creek IV
2. South Highway Pipeline	15. Battle Creek
3. Martinez Spring	16. Gooseberry Creek II
4. Grizzly – Dennison Pipeline	17. Yellowtail CRM II
5. Inyan Kara Water	18. Goshen Weed & Pest
6. Muddy Creek Wetlands	19. Goshen Weed & Pest II
7. Muddy Creek Wetlands III	20. Yellowtail CRM
8. Friendly Pond Wetlands	21. Dry Quad Aspen
9. NE Wyoming Wetlands	22. West Barrett RX Fire
10. Muddy Creek – Ray Weber Pond	23. Lander Front Mule Deer
11. Hartt Creek	24. Wyoming Front Aspen
12. Laramie River Restoration	25. Little Snake Aspen
13. Franc's Fork Fish Passage	

Habitat restoration projects have different purposes and outcomes than conservation projects. Restoration projects involve physical activities to enhance habitat, while conservation projects protect existing habitat from future development through the use of conservation easements. Because of these differences, we used two different types of economic analyses to measure their contributions. For habitat restoration projects, we conducted an economic impact analysis to measure how much Wyoming citizens benefit from WWNRT projects in terms of local jobs and labor income. For habitat conservation projects, we estimated the economic value of the natural goods and services resulting from WWNRT projects.

### Part I: Wildlife Habitat Restoration Projects

The main purpose of these projects is to enhance wildlife habitat and natural resource values; however, spending directly associated with the projects also generates positive economic impacts (i.e., employment and labor earnings) in the local economies where projects are sited. These projects also generate additional public benefits, such as the provision of ecosystem services. The purpose of the analysis of restoration projects, however, was to quantify the direct economic benefits of dollars spent on these projects.

We conducted this analysis on the expenditures for 25 randomly selected completed restoration projects (Table 1). The 25 cases represent five projects from each of five WWNRT project categories: 1) water development, 2) wetland creation, 3) river restoration, 4) invasive species, and 5) rangeland enhancement. We selected only



**Figure 1. WWNRT project sites, 2007–2011**

completed projects for analysis, and the expenditure information was summarized from invoices submitted for each project. We based the economic impacts of the restoration projects only on funding from matching contributions, which represents a net gain to the Wyoming economy. We did not consider WWNRT contributions since they represent a redistribution of existing revenue. Further, we considered only actual expenditures based on invoices. In-kind contributions that did not involve an actual expenditure, such as volunteer labor, were excluded.

We estimated both the direct and secondary economic impacts of the projects on employment, labor earnings, and total economic activity. We assumed that restoration expenditures were made primarily in Wyoming and that matching contributions from other funding sources would not have occurred without the WWNRT funding (Box 2).

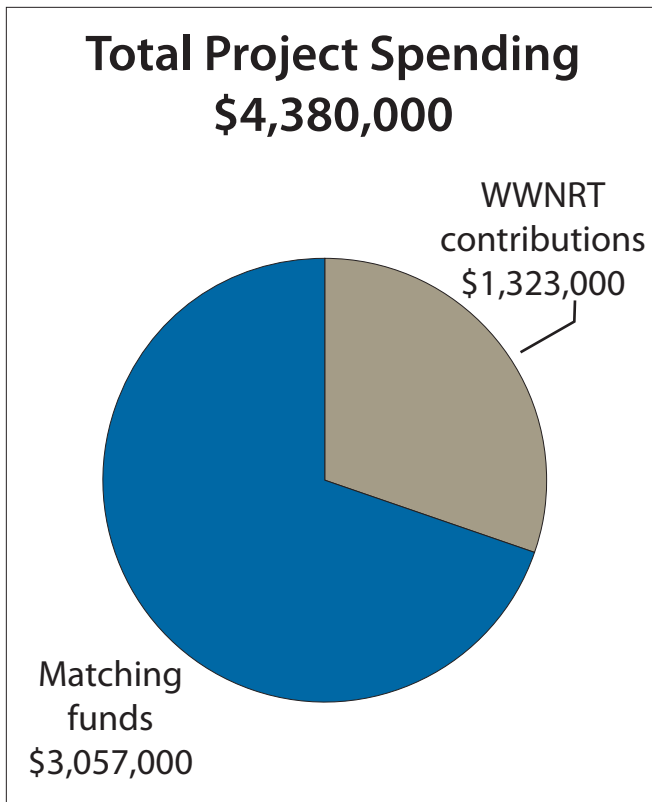
Total expenditures for the 25 projects were \$4.4 million, with \$1.3 million (30 percent) from WWNRT funding and \$3.1 million (70 percent) of matching

contributions from other funding sources (Figure 2). The average combined expenditure per project was \$175,000, with \$53,000 coming from WWNRT funding and \$122,000 coming from matching contributions.

We estimate that the \$3.1 million in matching contributions from other sources for the WWNRT projects analyzed has generated an additional \$1.1 million in secondary business activity in the Wyoming economy, for a total economic impact of \$4.2 million from these 25 projects. This total economic activity supported the equivalent of 38 annual jobs (455 months of employment) and \$1.6 million in labor earnings within the Wyoming economy (Table 2). The average annual earnings per job were about \$42,000, which was 93 percent of the state average (\$45,000) in 2009.

## **Part II: Wildlife Habitat Conservation Projects**

The primary purpose of WWNRT habitat conservation projects is to protect wildlife habitat and open



**Figure 2. Sources of funding for 25 WWNRT restoration projects selected for analysis**

space by providing funding for conservation easements, which are voluntary agreements between landowners and land trusts or other third parties where development limits are purchased from willing sellers. Land under a conservation easement remains privately owned, and other existing private property rights and uses remain intact. The natural goods and services provided by these protected lands—such as livestock grazing, agricultural goods, water quality protection, and wildlife habitat—have real and measurable economic value. In addition to providing natural goods and services, land conservation also contributes to the Wyoming economy in terms of jobs and income from industries such as agriculture and recreation. The purpose of the analysis of wildlife habitat conservation projects, however, was to determine the return on investment of wildlife habitat conservation projects through the value of the natural goods and services conserved by these projects.

We used the benefits transfer method, which included a thorough literature review relevant to Wyoming's ecosystems types and the natural goods and services each provides, to determine the natural goods and services and associated monetary values provided by WWNRT-funded

**Table 2. Summary of 25 WWNRT restoration projects selected for analysis**

<b>Project Costs</b>			
	<b>Total All 25 Projects</b>	<b>Average All Projects</b>	<b>Per \$100,000 WWNRT</b>
WWNRT Contribution	\$1,323,000	\$53,000	\$100,000
Matching Contribution	\$3,057,000	\$122,000	\$231,000
Total Expenditure	\$4,380,000	\$175,000	\$331,000

<b>Economic Impact (Excluding WWNRT Contribution)</b>			
Matching Contribution	\$3,057,000	\$122,000	\$231,000
Total Economic Activity	\$4,163,000	\$167,000	\$315,000
Employment (Annual jobs)	38	1.5	2.9
Employment (Months)	455	18.2	34.4
Labor Income	\$1,579,000	\$63,000	\$119,000
Average Earnings/Job	\$42,000	\$42,000	\$42,000

conservation projects. The benefits transfer method is a commonly used approach in environmental economics analyses that uses existing studies on economic value of natural goods and services provided by ecosystems (Rosenberger and Loomis 2003). We then estimated a per-acre economic value of these natural goods and services to determine the economic values of the different ecosystem types identified from those sources.

Through 2009, WWNRT funded 25 conservation easements on a total of approximately 76,600 acres. From its inception in 2006 through 2009, WWNRT has protected an average of 19,200 acres of land, using an average of \$1.81 million each year (Table 3). The average cost per acre conserved during this time was \$95. The most common land cover type preserved was native range, which was 49 percent of all land placed in conservation easement.

Based upon the per-acre values (Table 4), 76,600 acres of conserved land provide \$33.2 million in total economic value in the form of natural goods and services from date of purchase to 2021. When this is compared to

**Table 3. WWNRT conservation spending**

<b>Year</b>	<b>Acres</b>	<b>Spending</b>
2009	34,900	\$2,870,000
2008	30,900	\$3,480,000
2007	5,820	\$728,000
2006	4,950	\$160,000
Total	76,600	\$7,230,000

*Source: Wyoming Game and Fish Department; Wyoming Land Trust; Wyoming Wildlife and Natural Resource Trust*



WWNRT’s investment of \$7.23 million—or\$8.69 million in today’s dollars—every \$1 invested returns \$4 in economic value in natural goods and services.

### Conclusion

In sum, for every \$100,000 of funding from the WWNRT for the 25 restoration projects analyzed, matching funding of over \$231,000 was contributed from other sources (Table 2). We estimated that the \$231,000 in matching contributions generated a total of \$318,000 of economic activity in Wyoming. This total economic activity supported the equivalent of about 2.9 jobs (34.6 months of employment) and \$120,000 of labor earnings in the Wyoming economy. If the 25 restoration projects considered in this analysis are representative of the remainder of the restoration projects supported by WWNRT, this would mean that the WWNRT has generated more than 500 annual jobs and \$20.9 million in labor earnings since 2006. Due to the small scale of most

of these projects, it is likely that most of this employment occurred within the local economies where the projects were sited. These figures do not account for the jobs and labor earnings generated by WWNRT conservation projects, which were not quantified by this analysis but are likely substantial.

Additionally, analysis of past (since 2006) and predicted future (over the next 10 years) economic returns generated by WWNRT spending on wildlife habitat conservation projects found that every \$1 invested returns \$4 in economic value in natural resource goods and services alone.

Based on these analyses, the WWNRT substantially and positively contributes to Wyoming’s economy in the form of employment and labor earnings, as well as very favorable returns on investments in the form of natural goods and services.

**Table 4. Estimated annual per acre value of natural goods and services by land cover type<sup>1</sup>**

Land Cover Type	Acres Protected by WWNRT	Ecosystem Good(s) and/or Service(s)	Annual Value Per Acre <sup>2</sup>
Native Range <sup>3</sup>	37,300	Livestock grazing (forage production); wildlife habitat; carbon sequestration	\$20
Pasture/Hay	15,600	Livestock grazing (forage production); wildlife habitat; carbon sequestration	\$60
Grassland	11,200	Livestock grazing (forage production); wildlife habitat; carbon sequestration	\$21
Wetland <sup>4</sup> (Emergent/Woody)	9,530	Fish and wildlife habitat; water quality improvement; flood reduction	\$59
Forest (Evergreen/Deciduous/Mixed)	2,100	Wildlife habitat; firewood; carbon sequestration	\$61
Cultivated Crops	525	Food production; carbon sequestration	\$50
Developed Open Space	162	none	N/A
Barren Land	145	none	N/A
Developed, Low Intensity	15	none	N/A

<sup>1</sup>For calculation details see TPL analysis

<sup>2</sup>All values adjusted for inflation to 2010 dollars

<sup>3</sup> Shrub/Scrub

<sup>4</sup>Wetland Land Cover Type includes a statistically insignificant amount of open water (<1 percent of all conserved acres)

## Literature Cited

Boelter, A.M., and K.D. Mays. 2004. *Public Opinion in Wyoming on Conserving Agricultural Lands and Open Space*. University of Wyoming Cooperative Extension Service Bulletin B-1160, Laramie, Wyoming.

Hulme, D.G., A. Mellinger, J. Magagna, and A. Erickson-Quiroz. 2008. *Wyoming Public Opinion on Natural Resource Conservation and Development*. University of Wyoming Cooperative Extension Service Bulletin B-1189, Laramie, Wyoming.

Rosenberger, R., and J. Loomis. 2003. Benefit Transfer. Pages 445–482 in P. Champ, K. Boyle, and T. Brown, eds. *A Primer on Nonmarket Valuation*. Norwell, Massachusetts: Kluwer Academic Publishers.



*Funding for the Wyoming Open Spaces Initiative is provided by private individuals and foundations. If you would like to contribute, please contact us at (307) 766-5080 or [ienr@uwyo.edu](mailto:ienr@uwyo.edu)*

*Persons seeking admission, employment or access to programs of the University of Wyoming shall be considered without regard to race, color, religion, sex, national origin, disability, age, veteran status, sexual orientation or political belief.*

PRE-SORTED STANDARD  
U.S. POSTAGE PAID  
LARAMIE, WY 82072  
PERMIT No. 1

UNIVERSITY OF WYOMING  
Wyoming Open Spaces Initiative  
Ruckelshaus Institute  
of Environment and Natural Resources  
804 E. Fremont Street  
Laramie, WY 82072