



**A RETURN ON INVESTMENT:
THE ECONOMIC VALUE OF
COLORADO'S CONSERVATION EASEMENTS**



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EXECUTIVE SUMMARY

This report, by Jessica Sargent-Michaud, an economist with The Trust for Public Land, analyzes the State of Colorado's financial return on public investments in conservation easements. A conservation easement is a restriction placed on a piece of property to protect its associated resources. The easement is voluntarily donated or sold by the landowner and constitutes a legally binding agreement that limits certain types of uses or prevents development from taking place on the land in perpetuity while the land remains in private hands.

Public Benefits of Privately-Protected Lands

Permanently protected privately-owned lands provide a multitude of public benefits, such as water supply protection; scenic views; flood control; fish and wildlife habitat; recreation (including hunting, fishing, hiking, bird watching and other outdoor activities); aesthetics; carbon sequestration; dilution of waste water; erosion control; and agricultural crop production. Economists have estimated the monetary value of the benefits provided by land of various ecosystem types. By categorizing all of the Colorado conservation easements according to the ecosystem type those easements protect, it is possible to calculate the dollar value of the public benefits provided by those protected lands.

Methodology

Using geographic information system (GIS) data of publicly and privately held conservation easements¹, The Nature Conservancy (TNC) determined the underlying ecosystem type of each acre of land placed in a conservation easement in Colorado. TNC used the National Land Cover Dataset (NLCD) to group the conservation easements into 16 distinct ecosystems. Economist Jessica Sargent-Michaud then conducted a thorough literature review of the per acre value previously calculated by other economists for the 16 ecosystem types and the kinds of benefits these ecosystems provide. Then Ms. Sargent-Michaud gathered information on Colorado's investment in conservation easements through the Great Outdoors Colorado (GOCO) and conservation easement tax credit programs and estimated the return on potential future investments.

Results

Since GOCO began investing in conservation easements in 1994, and with the addition of the conservation easement tax credit incentive in 2001, 1.41 million acres in Colorado have been placed under conservation easement. Citizens of Colorado have invested \$511 million in conservation easements; the lottery-funded Great Outdoors Colorado program has made \$138 million in grants for conservation easement purchases and the State issued \$373 million of Colorado tax credits through the conservation easement tax credit program for donated conservation easements.² Adjusting these sources to today's dollars results in a total investment of \$595 million. According to our report, this investment returned \$3.52 billion in public benefits, a return of \$6 for every \$1 invested.

¹ GIS mapping from Colorado Ownership Management and Protection (COMaP) and Colorado Cattlemen's Agricultural Land Trust.

² Great Outdoors Colorado and Annual Reports by the Colorado Department of Revenue.

THE RETURN ON THE STATE OF COLORADO'S INVESTMENTS IN CONSERVATION EASEMENTS

The Trust for Public Land (TPL) conducted an analysis of the return on the State of Colorado's investments in conservation easements through the Great Outdoors Colorado (GOCO) and conservation easement tax credit programs. We estimated the economic benefits of land protection via conservation easements retrospectively from when the first easements were funded (i.e. 1994 to 2008 for GOCO; and 2001 to 2008 for the conservation easement tax credit program) and prospectively 10 years for the programs.

Colorado's Investment

From 1995 to 2008 the State of Colorado invested \$500 million in conservation easements, \$128 million through GOCO and \$373 million through the conservation easement tax credit program.³ To eliminate double counting we combined GOCO and conservation easement tax credit programs, due to the likelihood that projects may receive funding from both.

Return to the Citizens of Colorado

Since GOCO began investing in conservation easements in 1994, and with the addition of the conservation easement tax credit incentive in 2001, 1.41 million acres in Colorado have been placed under conservation easement. These protected areas provide a multitude of ecosystem services. Ecosystem services are the products of nature that benefit people. The ecosystem service categories considered in this analysis include: water supply; flood control; fish and wildlife habitat; recreation; aesthetics; carbon sequestration; dilution of waste water; erosion control; grazing; and agricultural crop production. The category and level of ecosystem service provided by an acre of conservation easement depends on the ecosystem type.

The Nature Conservancy (TNC) performed an analysis of the underlying ecosystem types of each acre of conservation easement in Colorado. First, TNC determined the number of acres under conservation easement using geographic information system (GIS) data of publicly and privately held conservation easements from the Colorado Ownership Management and Protection (COMaP) and Colorado Cattlemen's Agricultural Land Trust (CCALT). Then TNC, used the National Land Cover Dataset (NLCD) to estimate the number of acres under conservation easement in 16 distinct ecosystems (see Table 1).

³ Great Outdoors Colorado and Annual Reports by the Colorado Department of Revenue.

Exhibit 1. Ecosystem Types for Acres Under Conservation Easement	
Ecosystem Type	Conservation Easement Acres
Barren	10,600
Emergent Herbaceous Wetland	16,400
Woody Wetland	42,500
Deciduous Forest	78,900
Evergreen Forest	334,000
Mixed Forest	20,500
Scrub/Shrub	189,000
Sagebrush	125,000
Grassland/Herbaceous	129,000
Shortgrass Prairie	231,000
Open Water	5,090
Developed - Low Intensity Urban/Open Space	1,790
Developed - High Intensity Urban	872
Altered or Disturbed	31,200
Agriculture	191,000
Developed - Oil/Mine/Quarry	250
TOTAL	1,410,000

The ecosystem services provided, and their monetary values, by lands under conservation easement were determined using the benefits transfer methodology.⁴ That is, TPL conducted a thorough literature review of the types of services provided by the 16 ecosystem types identified by TNC conserved by easements in Colorado. We then used that literature to estimate a per acre economic value of those services (Exhibit 2).

⁴ The benefits transfer method is used to estimate economic values for ecosystem services by transferring available information from published studies in another location and/or context. The basic goal of benefit transfer is to estimate benefits for one context by adapting an estimate of benefits from some other context. Benefit transfer is often used when it is too expensive and/or there is too little time available to conduct an original valuation study, yet some measure of benefits is needed. It is important to note that benefit transfers can only be as accurate as the initial study.

Exhibit 2. Estimated Annual Per Acre Value of Ecosystem Services By Ecosystem Type			
Ecosystem Type	Ecosystem Service(s)	Value Per Acre Per Year (2008\$)	Source
Barren	None	N/A	
Emergent Herbaceous Wetland	Flood control, water supply; fish and wildlife habitat; recreation; aesthetics	\$784	Roberts & Leitch, 1997
Woody Wetland	Flood control, water supply; fish and wildlife habitat; recreation; aesthetics	\$784	Roberts & Leitch, 1997
Deciduous Forest	Grazing; carbon sequestration; habitat provision	\$879	Ingraham & Foster, 2008
Evergreen Forest	Grazing; carbon sequestration; habitat provision	\$879	Ingraham & Foster, 2008
Mixed Forest	Grazing; carbon sequestration; habitat provision	\$880	Ingraham & Foster, 2008
Scrub/Shrub	Carbon sequestration	\$610	Ingraham & Foster, 2008
Sagebrush	Dilution of waste water; natural purification of water; erosion control; habitat for fish and wildlife; recreation	\$82	Loomis et al, 2000
Grassland/Herbaceous	Grazing; dilution of waste water; natural purification of water; erosion control; habitat for fish and wildlife; recreation	\$85	Loomis et al, 2000
Shortgrass Prairie	Grazing; dilution of waste water; natural purification of water; erosion control; habitat for fish and wildlife; recreation	\$87	Loomis et al, 2000
Open Water	Fresh water regulation and supply; habitat provision	\$267	Ingraham & Foster, 2008
Developed - Low Intensity Urban/Open Space	Gas and Climate Regulation; Water Regulation	\$194	McPherson, 1992
Developed - High Intensity Urban	Gas and Climate Regulation; Water Regulation	\$194	McPherson, 1992
Altered or Disturbed Agriculture	None	N/A	
Agriculture	Aesthetics; crop production; grazing	\$283	Rosenberger & Walsh, 1997
Developed - Oil/Mine/Quarry	None	N/A	
Note: All grazing values were estimated by TPL using stocking and lease rates from Colorado State University Extension Agents, and land cover data from TNC.			

Finally, TPL estimated the return on Colorado's investment over time. The present value of Colorado's \$500 million investment from 1994 to 2008 is \$595 million resulting in ecosystem service benefits of \$3.52 billion, that is for every \$1 invested by Colorado achieved a \$6 benefit. In addition, these benefits will continue to accrue into perpetuity on protected lands.

Using historical rates of spending and acquisition, TPL estimates that Colorado will continue to invest about \$58.0 million annually in GOCO and the conservation easement tax credit program collectively accruing 165,000 acres each year in easement. Over the next 10 years, a total present value investment of \$470 million for the acquisition of 1.65 million acres of easement will generate \$3.11 billion in economic benefits. That is, for every \$1 invested in conservation easements generates \$7 in economic return. Again, these benefits will continue to accrue into the future on protected lands.

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APPENDICES

1. Present Value of Ecosystem Services Provided by Easements Under GOCO and the Conservation Easement Tax Credit Program
2. Conservation Easement Tax Credits Issued by State of Colorado
3. Great Outdoors Colorado Funding for Conservation Easements
4. Acreage Under Land Conservation by Cover Type