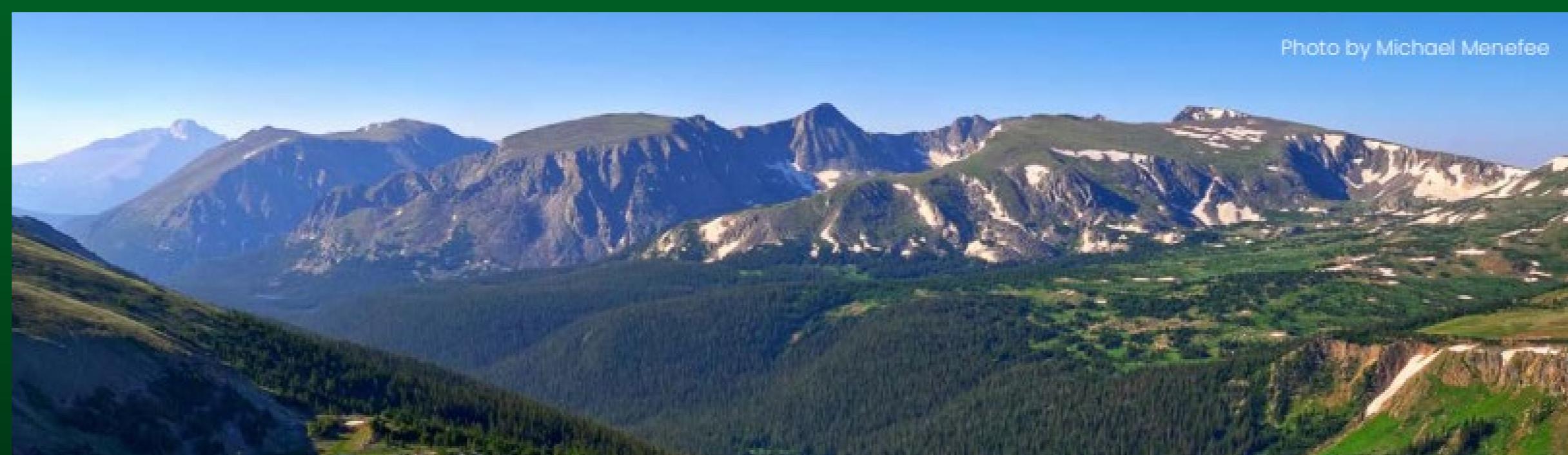


# Nature's bounty: Public returns to investments in Colorado's working landscapes



COLLEGE OF  
AGRICULTURAL SCIENCES  
COLORADO STATE UNIVERSITY

# Why study benefits to the public?

- Awareness raising:
  - Real estate market failure results in too little land conservation.
- Informing policy:
  - Budget, objectives, compensation levels and mix
- Informing stakeholders:
  - Mapping tool and scenario builder



# Colorado Incentives for CE Acquisition

## Two Major Incentive Efforts:

- ❖ The Conservation Easement Tax Credit Program
- ❖ Great Outdoors Colorado (GOCO)

Table 1. Formulae and caps for Colorado's Conservation Easement Tax Credit Program.

Tax Year	Formula for calculating tax credit for the donated (uncompensated) portion of conservation easement	Tax Credit Cap Per donation	Annual Program Cap
2000-02	100% of FMV	\$100,000	No cap
2003-06	100% of the first \$100,000 of FMV, plus 40% of any remaining FMV	\$260,000	No cap
2007-10	50% of FMV	\$375,000	No cap
2011-12	50% of FMV	\$375,000	\$22,000,000
2013	50% of FMV	\$375,000	\$34,000,000
2014	50% of FMV	\$375,000	\$45,000,000
2015-16	75% of the first \$100,000 of FMV, plus 50% of any remaining FMV	\$1,500,000	\$45,000,000
2017-20	75% of the first \$100,000 of FMV, plus 50% of the next \$4,900,000. The payments issued cannot exceed \$1,500,000 per year, so more valuable easements are paid out in \$1.5 m increments.	\$5,000,000	\$45,000,000
2021-present	90% of FMV up to a maximum of \$5,000,000 per donation	\$5,000,000	\$45,000,000

Values through 2016 adapted from "Conservation Easement Tax Credit Program After Changes in 2014." [https://leg.colorado.gov/sites/default/files/documents/audits/1561p\\_conservation\\_easement\\_tax\\_credit\\_program\\_0.pdf](https://leg.colorado.gov/sites/default/files/documents/audits/1561p_conservation_easement_tax_credit_program_0.pdf)

Values through 2027 adapted from DORA. <https://conservation.colorado.gov/>

**Public returns to private lands conservation in Colorado:  
The Conservation Easement Tax Credit Program**

Andrew Seidl, Cole Crossett, Amy Greenwell, Drew Bennett, and Michael Menefee

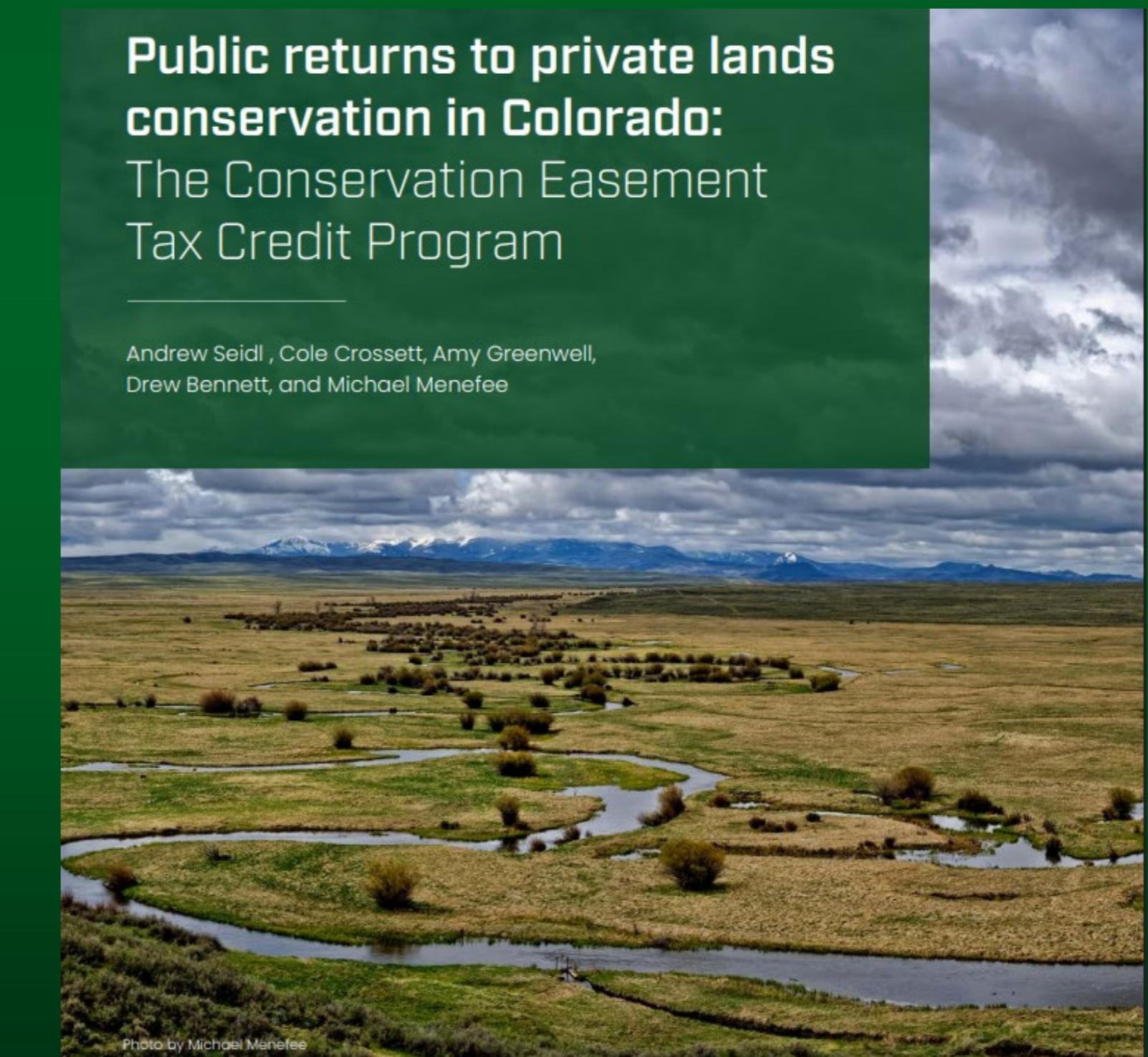


Photo by Michael Menefee



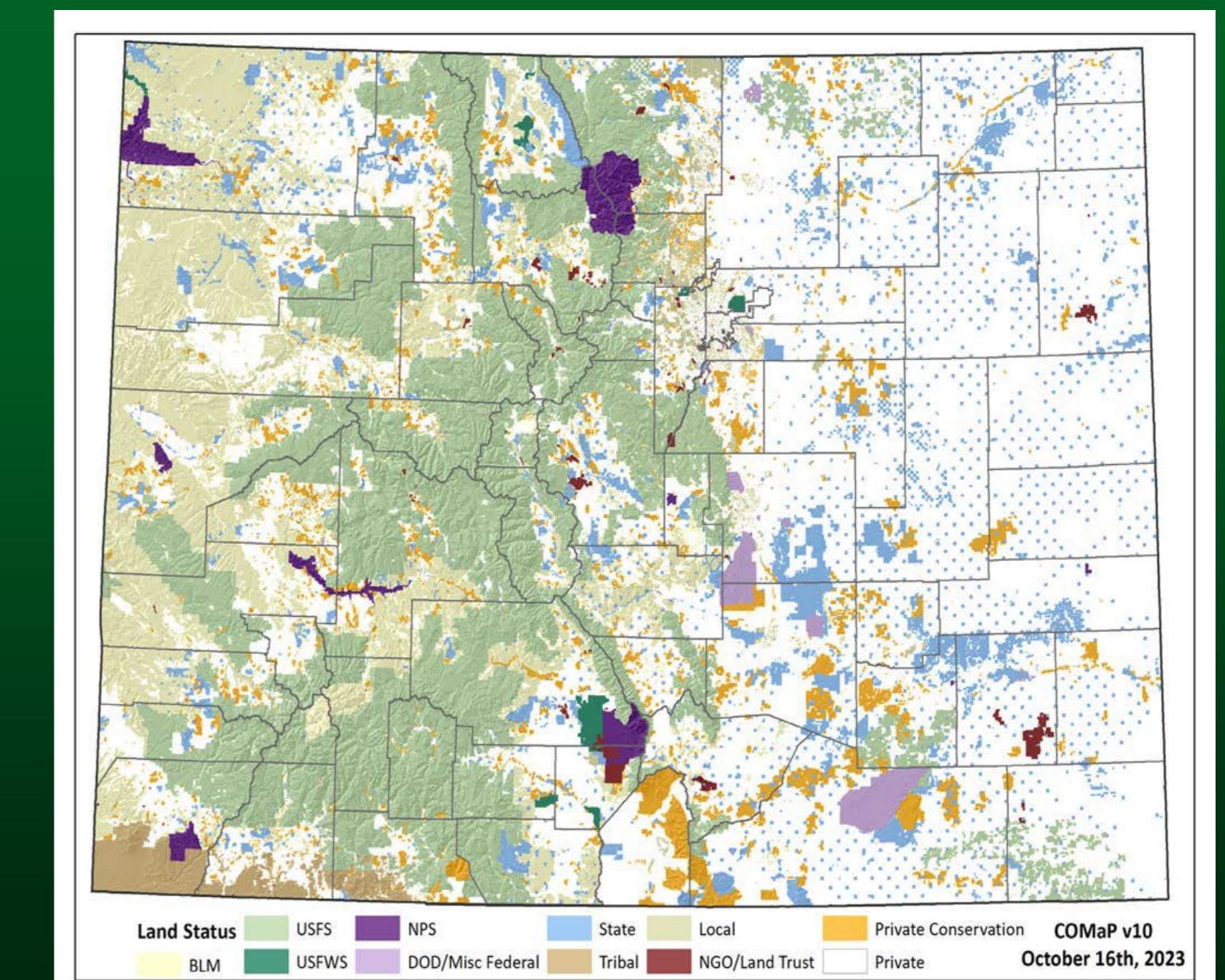
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# What is the Public Return on Public Investments?

- 2.3 million acres of CO easements have received GOCO funding or a state tax credit (out of a total of roughly 2.6 million acres)
- Quantitative information needed about what benefits were received for these incentives
- Answering questions raised by the Office of the State Auditor, legislature, and congressional delegation
- Both ecological and economic benefits should be considered

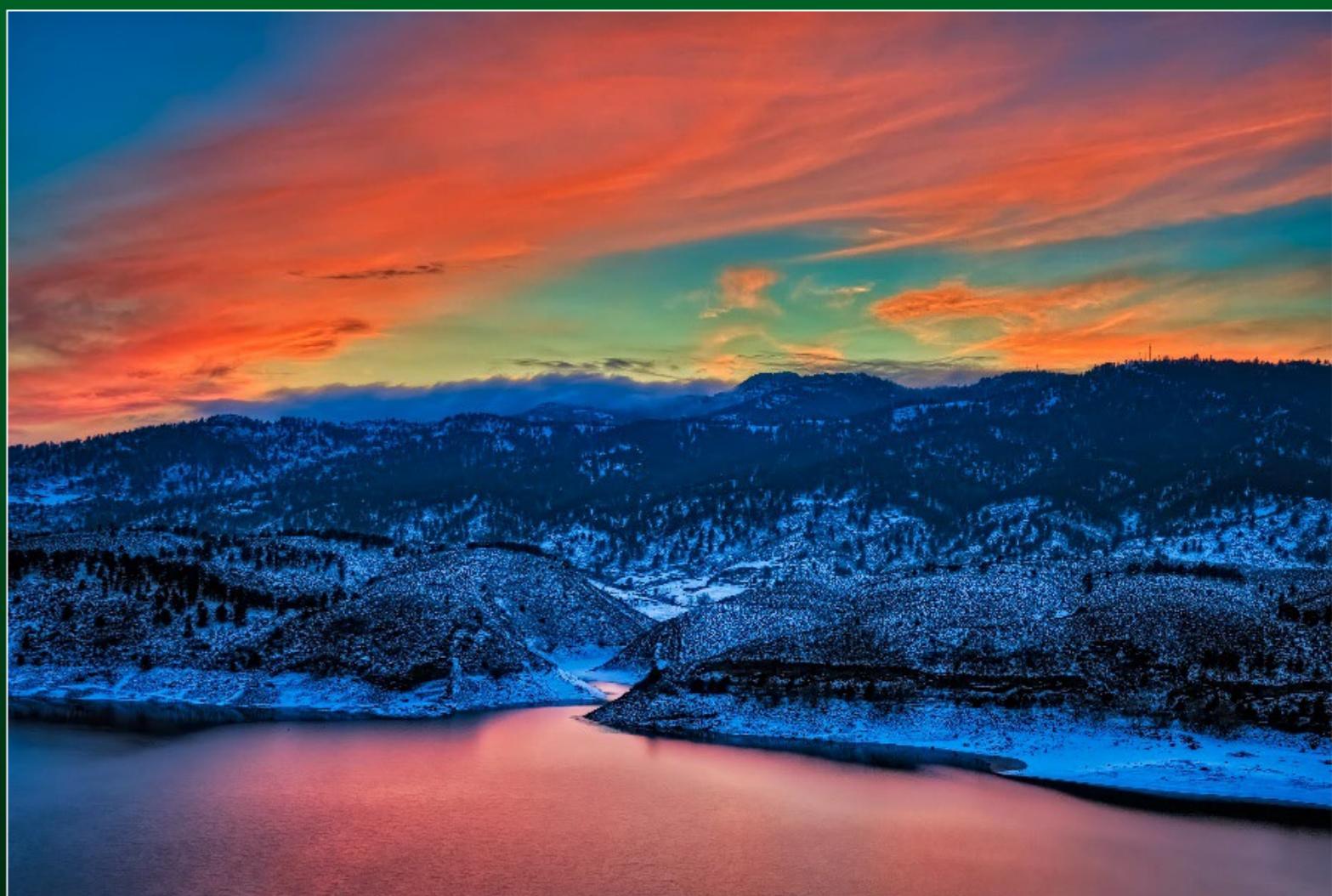


Photo by Michael Menefee

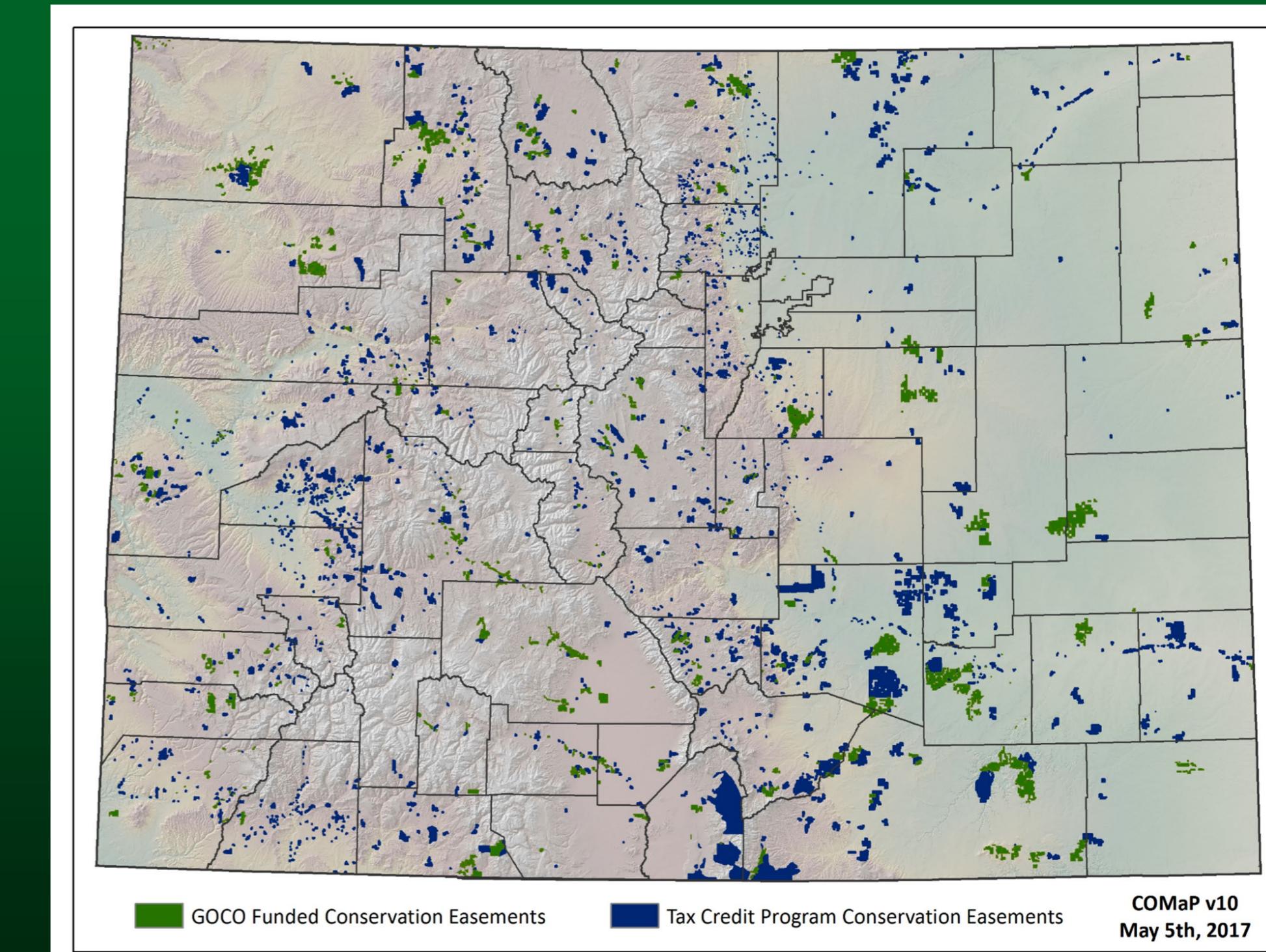
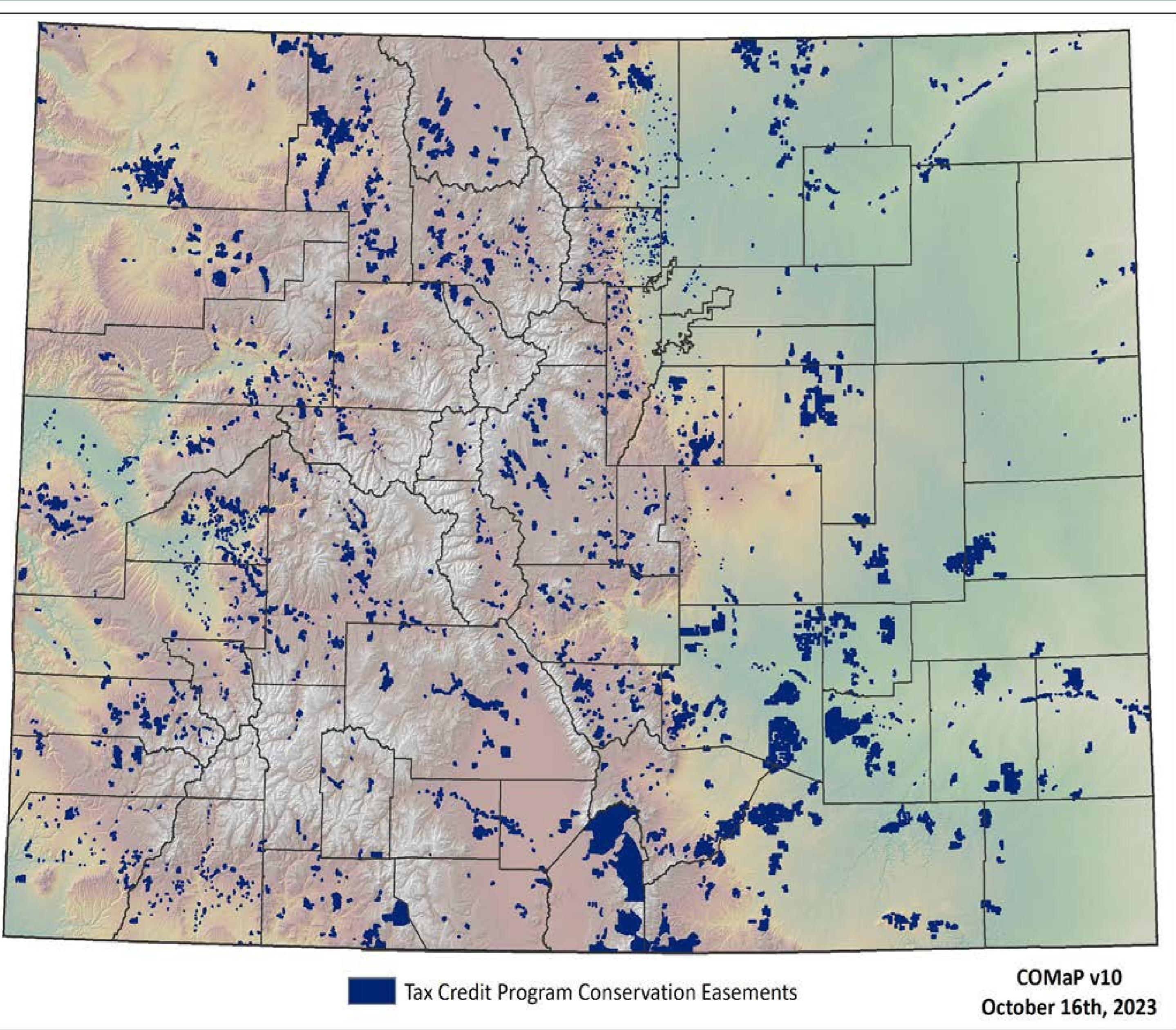


# Converting Ecosystem Services to Economic Values: What did we do?

- Easement map → Ecosystems protected → Ecosystem services stewarded → Ecosystem service values generated → Returns to taxpayer investments
- Update 2017 meta-analyses for benefits transfer
- Net present value estimate, from 1995 to 2024;
  - Real value 1995-2022;
  - Present value 2022-2030
- Calculated PV, NPV, (R)ROI, (R) Benefits & Costs (investments) per acre & BC Ratio
- Sensitivity analysis;
  - 3 full scenarios;
  - Variable ranges



# Conservation Easements Studied



# Ecosystem service types

**Table 2: Classification and brief definition of ecosystem services included in this analysis (adapted from de Groot et al., 2002)**

Regulation Functions	Ecosystem processes and components
Aesthetic information	Attractive landscape features
Biological control	Population control through trophic-dynamic relations
Carbon sequestration and storage	Role of ecosystems in bio-geochemical cycles (e.g., CO <sub>2</sub> /O <sub>2</sub> balance, ozone layer, etc.)
Energy and raw materials	Conversion of solar energy into biomass for human construction and other uses
Soil erosion control	Preserving the integrity and stability of the soil (e.g., vegetative cover)
Flood risk reduction	Attenuate floodwaters, enhance water absorption and provide natural buffers
Food/Grazing	Conversion of solar energy into edible plants/animals
Habitat and nursery/biodiversity	Providing suitable living and reproducing space for wild plant and animal species.
Nutrient cycling	Role of biota in storage and re-cycling of nutrients
Pollination	Role of biota in movement of floral gametes
Recreation and tourism	Variety in landscapes with (potential) recreational uses
Soil formation	Weathering of rock, accumulation of organic matter
Water quality	Biological interactions and sedimentation to promote filtration/stabilization of water
Water regulation	Role of land cover in regulating runoff & river
Water supply	Filtering, retention, and storage of fresh water (e.g., in aquifers)

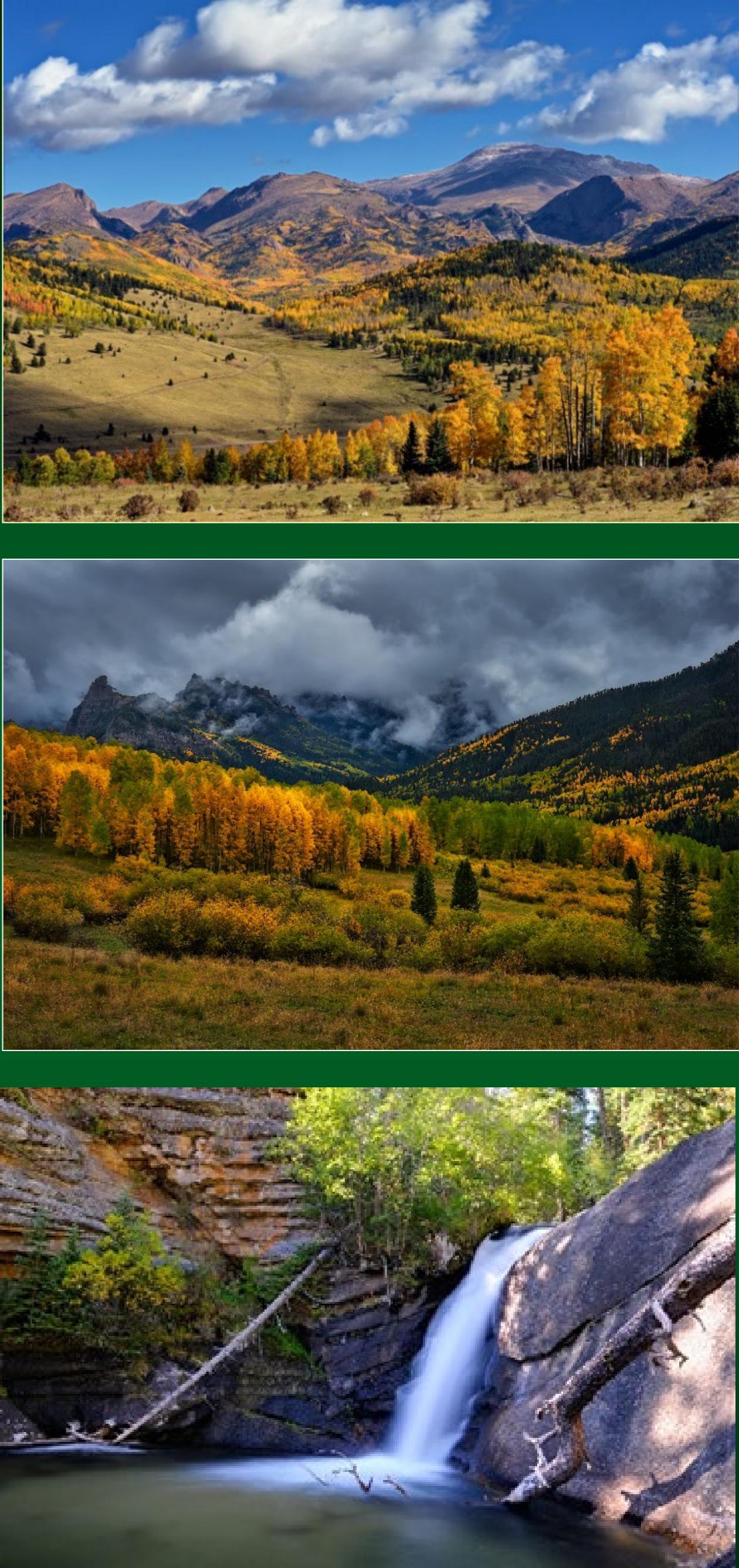


# Converting Ecosystem Services to Economic Values

**Table 4. Conservation Easement Tax Credit Program conservation in Colorado**

Ecosystem (NLCD 2019)	Acres conserved	Acres in CO	Ratio of conserved to total acreage	Average value (\$2022) by ecosystem/acre
1. Emergent Herbaceous Wetlands	72,318.29	714,849	10.12%	\$7,052.98
2. Woody Wetlands	42,721.66	622,252	6.87%	\$6,619.49
3. Developed, Low Intensity	3,471.57	504,040	0.69%	\$5,905.39
4. Developed, Open Space	14,840.13	948,369	1.56%	\$5,905.39
5. Deciduous Forest	194,817.11	4,345,388	4.48%	\$3,586.74
6. Open Water	5,087.48	266,705	1.91%	\$3,266.50
7. Cultivated Crops	90,907.76	8,275,088	1.10%	\$3,048.34
8. Evergreen Forest	322,892.01	13,364,428	2.42%	\$1,747.99
9. Mixed Forest	20,627.04	539,745	3.82%	\$1,381.24
10. Grassland/Herbaceous	833,222.99	19,270,980	4.32%	\$1,077.53
11. Hay/Pasture	65,165.88	761,261	8.56%	\$574.60
12. Shrub/Scrub	615,019.82	15,975,290	3.85%	\$222.24
13. Barren Land	8,698.49	501,711	1.73%	\$1.37
14. Developed, High Intensity	95.63	115,420	0.08%	\$0.00
15. Developed, Medium Intensity	785.50	355,756	0.22%	\$0.00
16. Perennial Snow/Ice	19.79	57,662	0.03%	\$0.00
<b>Total</b>	<b>2,290,691.15</b>	<b>66,618,944</b>	<b>3.44%</b>	

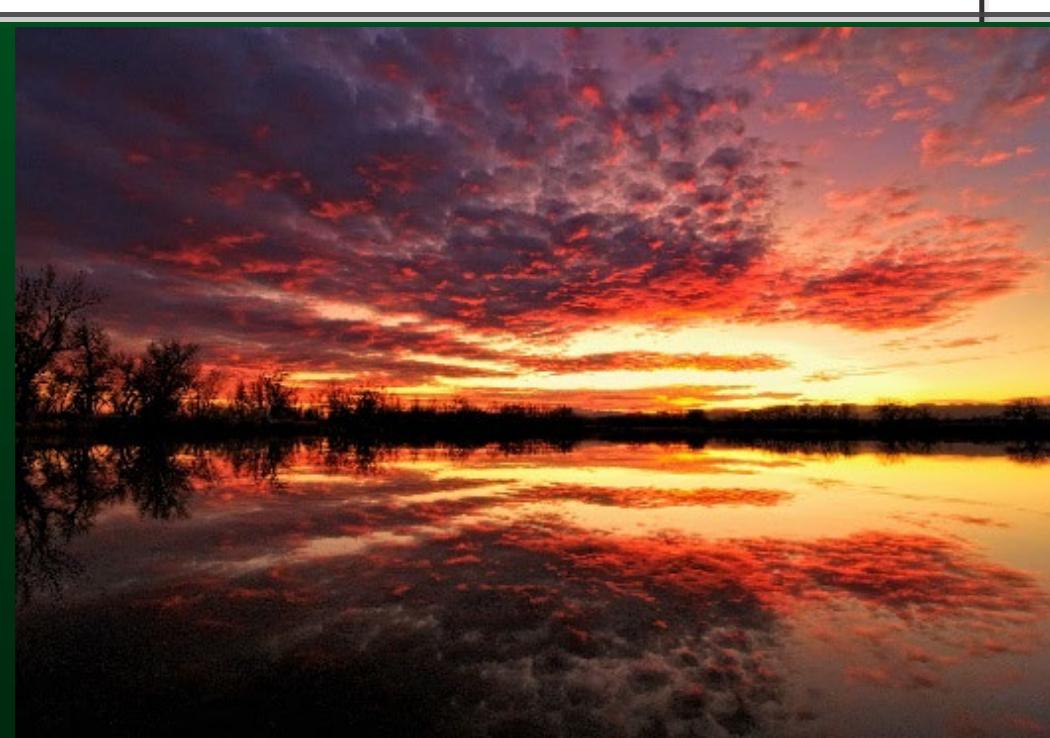
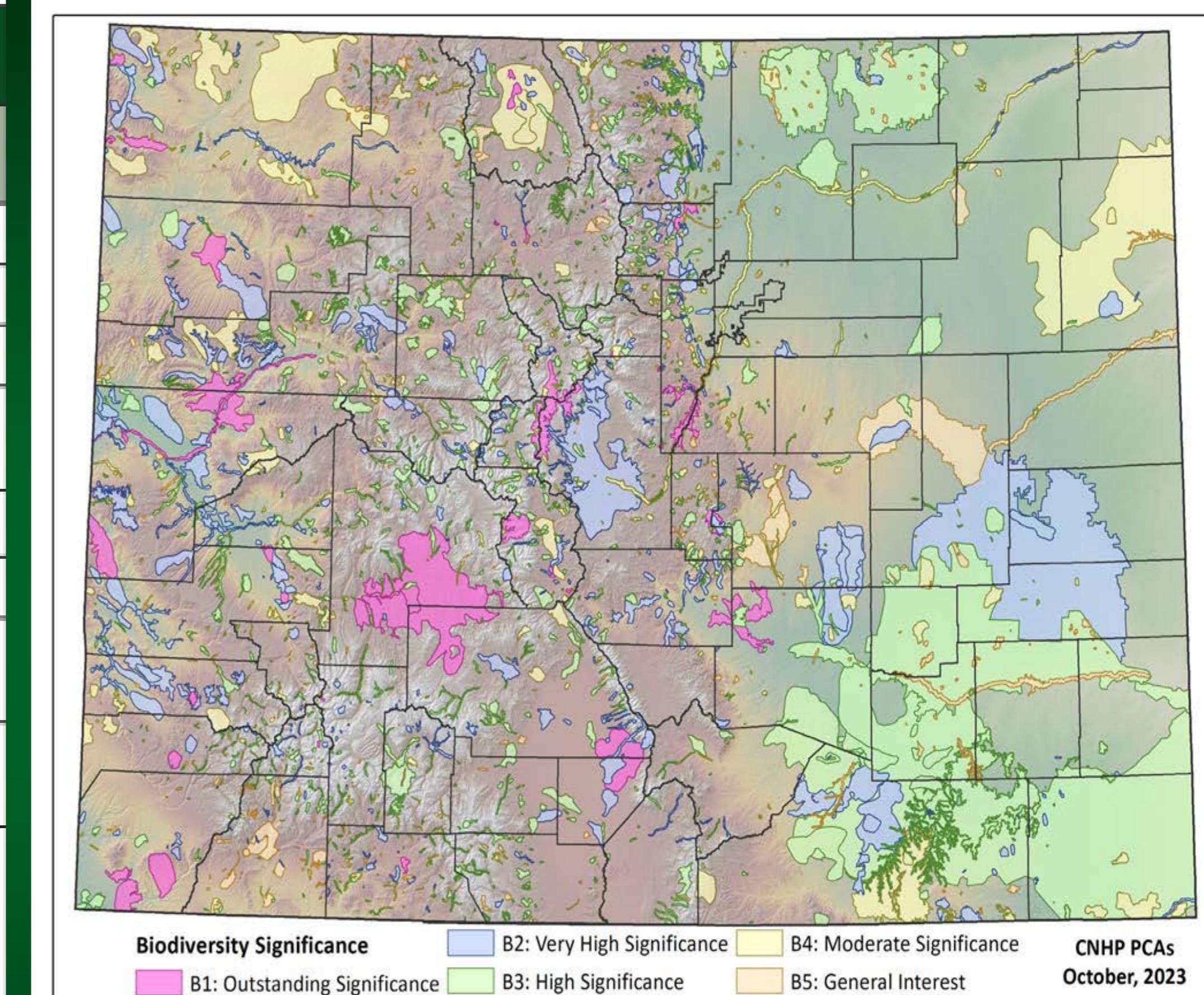
\*Acreage for Perennial Snow/Ice is based on NLCD ecosystem types. A Comprehensive Valuation of the Ecosystem Services of the Arctic National Wildlife Refuge, Alaska, listed nine ecosystem services provided by protected Polar-alpine ecosystems with a total value of \$368.22/acre. Since there are few acres identified by Colorado state data for the investment year, values are not included.



# Critical Habitat: What has been protected?

**Table 5. Additional values protected through the Colorado Conservation Easement Tax Credit Program, 3.4% of Colorado land area.**

Conservation Values	Acres Conserved*	Miles Conserved*	Percentage of total Conserved
CNHP Potential Conservation Areas (CNHP 2023)	748,820		4%
Prime Farmland (USDA 2023)	449,220		3%
FWS Critical Habitat (FWS 2023)	29,710		2%
Greater Sage-Grouse Priority & General Habitat (CPW 2022)	187,590		5%
Greater Sage-Grouse Production Areas (CPW 2022)	119,850		5%
Gunnison Sage-Grouse Production Areas (CPW 2022)	83,570		9%
Designated Scenic Byways within 250 meters of Conserved CEs (CDOT 2023)		230	9%
Gold Medal Streams within 250 meters of Conserved CEs (CPW 2023)		50	13%
Rivers, Streams, Canals and Ditches Mapped in the National Hydrography Dataset Plus High-Resolution National Release within 250 meters of Conserved CEs (USGS 2022)		15,800	6%



# Converting Ecosystem Services to Economic Values

**Table 6: Public value of private lands conservation due to the Colorado conservation easement tax credit program**

Ecosystem Service (ES)	Low value ecosystem/ ac	Avg value ecosystem/ ac	High value ecosystem/ ac	Low total	Average total	High total
(\$2022)				('000)		
Emergent Herbaceous Wetlands	6,492	7,053	7,614	6,252,017	6,792,731	7,333,445
Woody Wetlands	5,728	6,619	7,511	3,178,122	3,673,051	4,167,975
Developed, Low Intensity	3,997	5,905	7,814	166,433	245,888	325,349
Developed, Open Space	3,997	5,905	7,814	750,020	1,108,080	1,466,141
Deciduous Forest	3,522	3,587	3,651	8,459,751	8,615,181	8,770,636
Open Water	3,130	3,267	3,403	187,331	195,528	203,727
Cultivated Crops	635	3,048	5,462	758,379	3,641,888	6,525,409
Evergreen Forest	1,491	1,748	2,005	6,358,303	7,456,726	8,555,192
Mixed Forest	1,311	1,381	1,451	322,202	339,436	356,670
Grassland/Herbaceous	774	1,078	1,381	8,537,466	11,882,889	15,228,310
Hay/Pasture	573	575	576	483,335	485,049	486,298
Shrub/Scrub	2.53	222	442	18,956	1,665,152	3,311,348
Barren Land	1.37	1.37	1.37	170	170	170
Total benefits				35,472,485	46,101,769	56,730,665
Total costs				(1,156,149)	(1,156,149)	(1,156,149)
Net benefit				34,316,336	44,945,620	55,574,516
B/C ratio				31	40	49
Benefits/acre conserved				15,485	20,126	24,766
Costs/acre conserved				(505)	(505)	(505)
Net benefits/acre conserved				14,981	19,621	24,261





## Summary of results

- State tax incentive programs have **invested nearly \$1.2 billion** on conservation easements since 1995, and the **residents of Colorado have received an estimated \$35-\$57 billion of economic benefits** from and conserved by conservation easements.
- We found **public benefits of \$30 to \$50 stewarded on protected working lands for each \$1 invested** by the State.
- **Substantial acreages of identified conservation priorities are protected** by conservation easements.

# PUBLIC RETURNS TO PRIVATE LAND CONSERVATION



## 2.3 MILLION

acres of Colorado land conserved with an easement and received tax credits since 2000



## \$35-57 BILLION

cumulative public benefits of conservation easement credits to Colorado taxpayers

## PUBLIC BENEFITS

## \$31-\$49

in benefits for every \$1 invested in the tax credit program



- Carbon sequestration and storage
- Food and grazing
- Habitat biodiversity
- Water quality
- Soil erosion control



## WETLANDS

generate the greatest public value per acre

## IF RECREATION AND TOURISM BENEFITS ARE INCLUDED...



## \$43-\$74 BILLION

cumulative public benefits of credits to Colorado taxpayers

## \$37-\$64

in benefits for every \$1 invested

# Estimated Economic Impact of Federal Agricultural Conservation Easement Programs (ACEP-ALE) on Colorado, 2008-2017

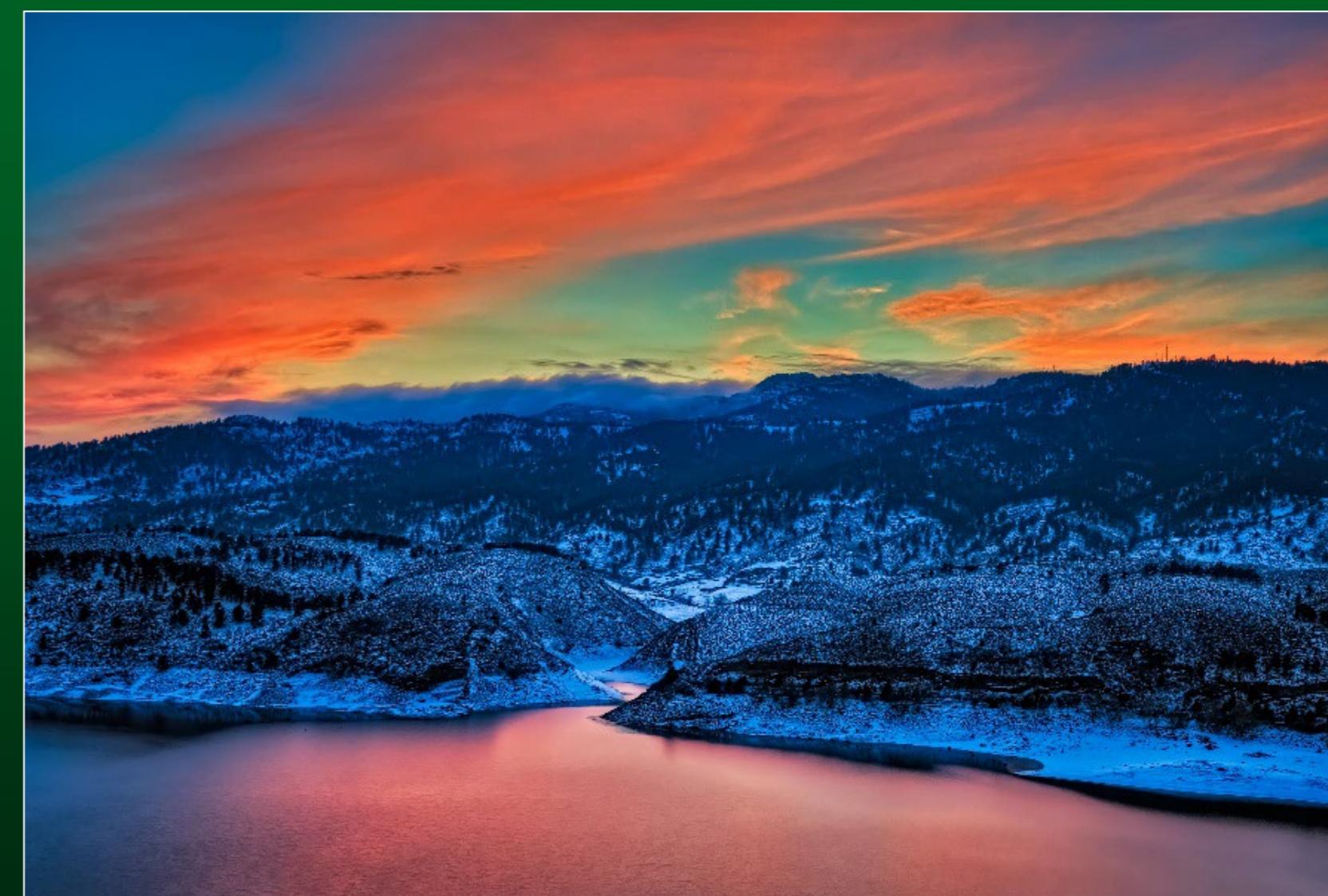
Two primary parts:

- ❖ Survey of owners of all Colorado ACEP participants
- ❖ Input-output analysis of survey results



# Landowner survey: What did we do?

- ❖ 68 easements, 66 addresses, 44 responses → 66% return rate.
- ❖ Survey of 10 questions:
  - ❖ how participants spent their easement payment;
  - ❖ how their production practices changed;
  - ❖ new sources of income resulting from the easement payments



# Results: Where do ACEP-ALE participants invest their payments?

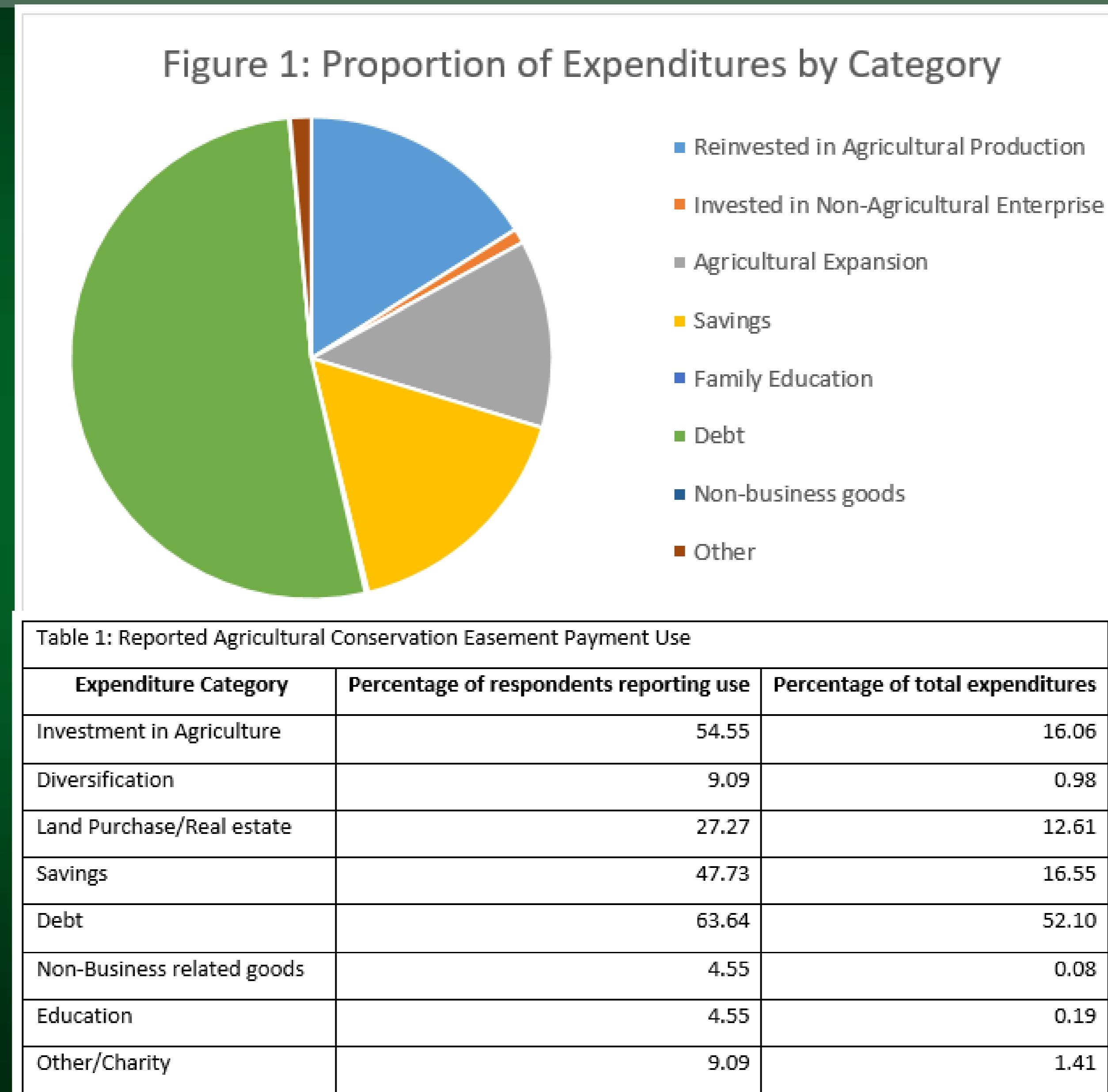


Table 4: Economic Impacts of Federal Conservation Easement Payments on Colorado, 2018\$

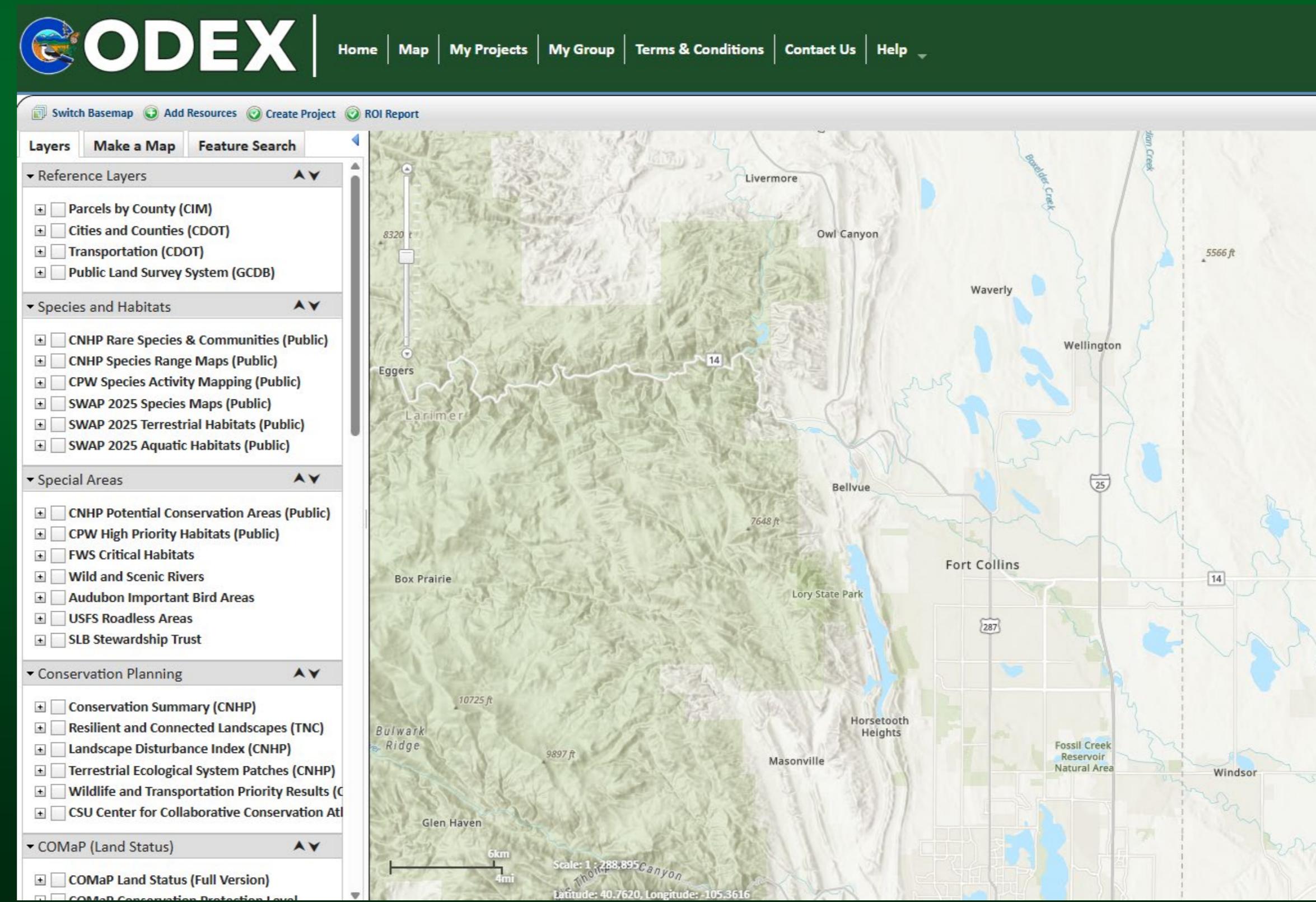
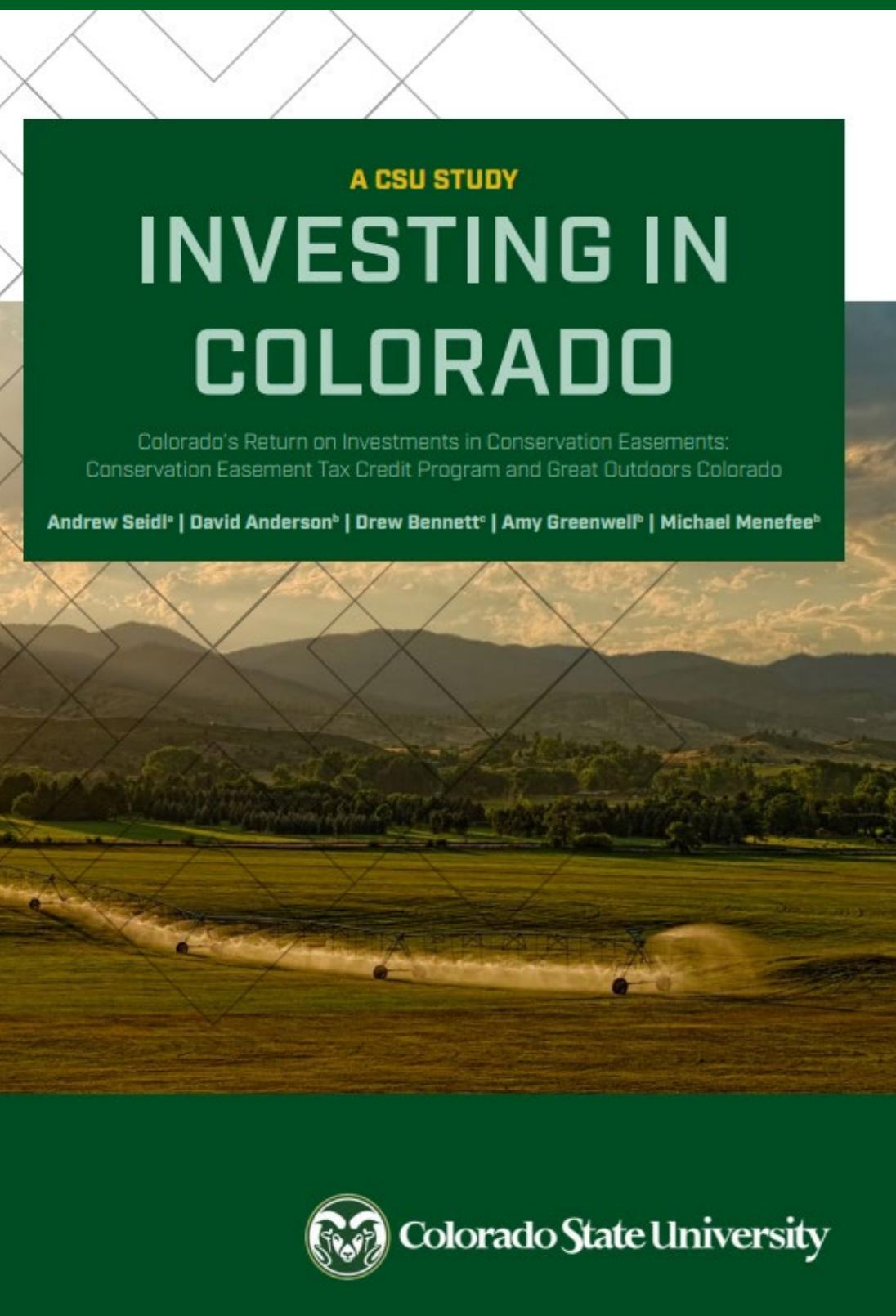
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	227.2	\$10,881,877	\$16,260,653	\$36,468,942*
Indirect Effect	155.5	\$8,799,246	\$13,071,700	\$25,318,138
Induced Effect	128.5	\$5,953,079	\$10,501,506	\$18,291,511
Total Effect	511.2	\$25,634,203	\$39,833,858	\$80,078,591

\*Note that this value is slightly lower than the total easement payments due to margining in the retail sectors



# Who is using this work?

- Congressional delegations
- State legislature
- County programs
- Private sector
- Land trusts in Colorado +
- Courts
- Farmers and ranchers
- Media and news outlets



**Public returns to private lands conservation in Colorado:**  
The Conservation Easement Tax Credit Program

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