

# EVALUATING ECOSYSTEM SERVICES

*Values and Return on Investment of  
Conservation Easements held by the  
California Rangeland Trust*

CALIFORNIA  
RANGELAND  
*Trust*

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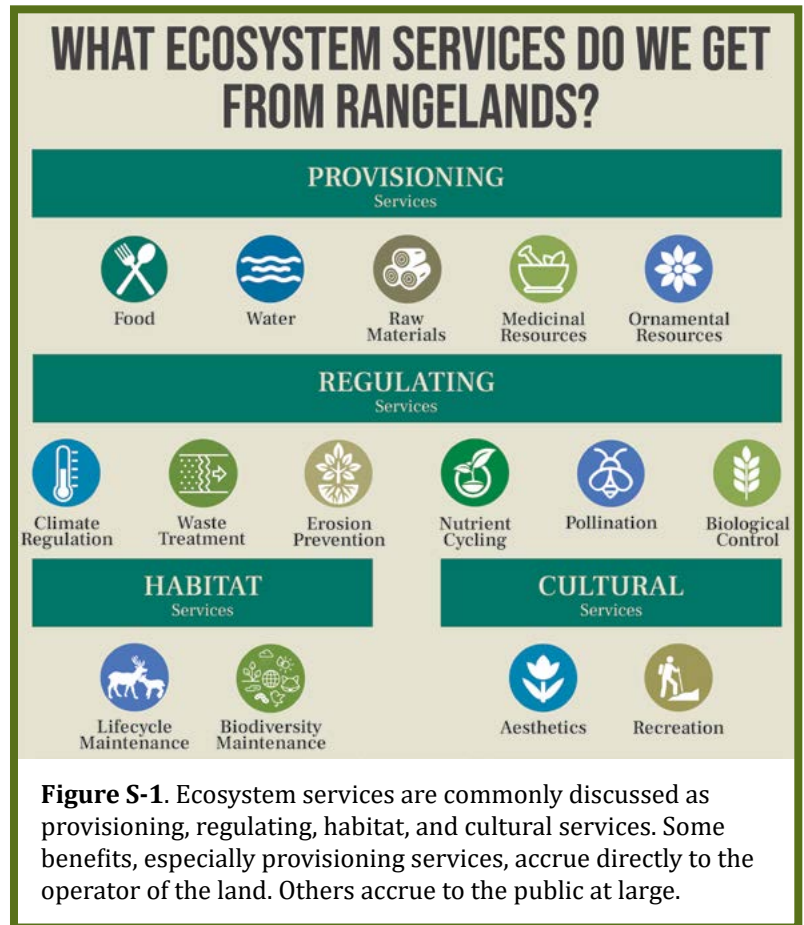
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# INTRODUCTION

California's historical, working landscapes contain intact plant and wildlife communities that provide valuable ecosystem services – goods and services produced in nature – including habitat, carbon sequestration, food, fuelwood, open space, views, and watersheds to communities across the Golden State (Figure S-1). These ecosystem services offer myriad benefits to Californians, but their monetary value is often overlooked by society.

While working rangelands produce an abundance of ecosystem services, ranchers seldom earn any income from these. Further, ranches are particularly vulnerable to development, primarily because of high land prices.

Since 1984, over 1.4 million acres of agricultural land in California have been converted to other uses – 78 percent of which has been lost to urban development (California Department of Conservation 2015). Conversion of rangeland to more intensive uses, such as housing, threatens the production of ecosystem services in California (Cameron et al. 2014).





Payne Ranch, Colusa County

**Figure S-2.** The sale or donation of a conservation easement by a landowner preserves the landscape and the ecosystem services produced by that landscape. A conservation easement may cover all or part of a ranch. As a voluntary agreement between a landowner and a qualified land trust, conservation organization, or government agency, a conservation easement limits the development or conversion in perpetuity (California Civil Code § 815). The landowner may donate all or part of the easement value or choose to be compensated. Once established, the easement restricting conversion to residential, commercial, or more intensive cultivated agricultural uses is recorded on the property’s title, and it “runs with the land,” binding current and future landowners. The landowner continues to own and steward the land. Rangeland Trust easements are “working lands” agreements that allow for continued livestock production.

Conservation easements on ranch properties – created when a rancher sells or donates the right to develop a property to a non-profit land trust or government agency – are effective tools to help mitigate the loss of ecosystem services due to land development (**Figure S-2**). The land remains part of a working livestock ranch but cannot be subdivided or converted to other uses. The California Rangeland Trust (Rangeland Trust) is an example of this work as a statewide, non-profit conservation organization created by ranchers to preserve and protect rangelands through conservation easements.

The Rangeland Trust understands the needs and constraints of ranchers and supports their desire to see ranch lands remain as an important and productive part of California’s landscapes. To protect priority agricultural lands and intact ecosystems, the Rangeland Trust has conserved more than 340,000 acres across the state. While the value of these conserved working lands to those who love rangelands may seem obvious, there has never been a credible economic assessment of the ecosystem services provided by ranches conserved through the Rangeland Trust. Using state-of-the-art economic techniques, this report estimates the value of ecosystem services provided by 56 conserved ranches and calculates the return on investment of the Rangeland Trust’s conservation easements.

The Rangeland Trust sponsored this study, conducted by researchers at the University of California, Berkeley, to understand the monetary value of ecosystem services derived from conserved ranches and to evaluate the factors influencing the return on investment, dollars returned for dollars invested, from those easements. The results of this report show the effectiveness of conservation easements in meeting broader environmental and economic goals.

# METHODS

To conduct this study, the researchers reviewed the ecosystem services literature to develop a database of monetary values for different ecosystems found on 56 ranches conserved by the Rangeland Trust, identified gaps in available valuations, used spatial analysis to apply values to ecosystems on Rangeland Trust easements, and calculated the return on conservation easement investments.

## *Valuation of Ecosystem Services*

This study used both “Traditional Benefits Transfer” (TBT) and Global Average methods to calculate the estimated values of ecosystem services produced on the 56 ranches conserved by the Rangeland Trust. In TBT ecosystem service values are collected from studies that use surveys or interviews asking people how much they value specific ecosystem services from various ecosystems. These values are then used to estimate the ecosystem services produced by the ecosystems on Rangeland Trust easements.

Using the Global Average method, values for various ecosystems were derived by De Groot et al. (2012) from the internationally recognized Economics of Ecosystems and Biodiversity (TEEB) Ecosystem Services Valuation Database (ESVD). Those values are then applied to ecosystems on ranches conserved by the Rangeland Trust. The ESVD consists of ecosystem service values generated by researchers using a host of methods and then averages these values globally (Ecosystem Services Partnership 2019).

## *Return on Investment*

Calculating “Return on Investment” (ROI) is not usually done in this type of study, so its inclusion is an innovative approach. ROI, conventionally a Wall Street term, is defined as the return from an investment that would not have been earned without the investment. In the case of purchasing a conservation easement, the researchers considered the “return” to be production of ecosystem service values that would have been lost to land use conversion if the property had not been conserved. This tells us how much ecosystem service value the conservation easement protected—the return on the initial investment in the easement. A property that would never have been developed shows no ROI in this analysis, because even without the investment in the easement, no ecosystem services would be lost. On the other hand, for a parcel that would be fully developed, the ecosystem service values that the easement would protect is large.

# LIMITATIONS

As in all ecosystem services studies, values in this study were derived from the best available information and many ecosystem service values were not accounted for. Location specific attributes and easement specific values, like endangered species habitat, are out of the scope of this report. However, these can have an influence on ecosystem services. The ecosystem service values and impacts that come directly from grazing were not included. As a result, the ROI values calculated in this study do not include these ecosystem services values. While these results underscore the economic return on investment, current investments from the Rangeland Trust still produce positive ROI, even when we assume minimal conversion in the absence of an easement.

# FINDINGS

1. The 56 Rangeland Trust conservation easements – protecting a total of 306,781 acres – **provide between \$364 million and \$1.44 billion in ecosystem services annually**, depending on whether a Traditional Benefits Transfer or Global Average method was used to estimate these values (**Table S-1**). Both methods determine ecosystem services values by transferring values from other sources to the ecosystems on conserved ranches using a Geographic Information System drawing on the Rangeland Trust’s map database.
2. By assuming the 56 ranches would develop to the maximum density allowed by current zoning, the conservation easements were estimated to **return \$1.35 to \$3.47 for every dollar invested** (Table S-1).
3. When assuming, as do most studies conducted to date, that all ecosystem services would be completely lost without a conservation easement in place, returns rise to **\$42.20 to \$167.76 per dollar invested**.

*While these are tremendous results, they underscore the economic value of preserving wide-open spaces to benefit generations to come because not all ecosystem services could be valued as part of this study.*

**Table S-1.** Total ecosystem services values and return on investment (ROI) for 56 properties with conservation easements held by the Rangeland Trust.

		Total easement ecosystem service value produced per year	Current highest and best use as defined by an appraisal		Maximum development under current zoning		Full development	
			ROI	Dollars returned per dollar invested	ROI	Dollars returned per dollar invested	ROI	Dollars returned per dollar invested
Purchased easements	Traditional Benefits Transfer approach	\$1.17 B	-0.08	\$0.92	1.85	\$2.85	134.52	\$135.52
	Global Average approach	\$274 M	-0.95	\$0.05	0.15	\$1.16	30.83	\$31.83
All easements including donated easements	Traditional Benefits Transfer approach	\$1.44 B	0.08	\$1.08	2.47	\$3.47	166.76	\$167.76
	Global Average approach	\$364 M	-0.92	\$0.07	0.35	\$1.35	41.20	\$42.20

# CONCLUSION

California's rangelands provide many services to communities across the state, but most of these are not monetized in the marketplace by ranchers. As the state's population approaches 40 million people, these rangelands and the services they provide are under constant threat of conversion and development. The California Rangeland Trust has successfully conserved over 342,000 acres of rangeland using conservation easements so they will continue to provide ecosystem services in perpetuity.

Using rigorous economic techniques, the researchers found that ranches conserved by the Rangeland Trust provide tremendous ecosystem services that are highly valued. Depending on the methodology used, they valued the ecosystem services at approximately \$1 billion annually. They also determined that Rangeland Trust easements return up to \$3.47 for every dollar invested, under current zoning restrictions. These results highlight the economic value and efficiency of preserving these open spaces for the future.

# ACKNOWLEDGEMENTS

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## WE MUST ACT NOW!

**Conserving rangeland is a smart investment, especially as we look for ways to protect our environment and ensure a greener future.** With the rapid loss of agricultural lands posing an existential threat to California, we must take action to conserve the lands that are critical to our state's social, cultural, and economic well-being.

**For more information about these findings and to learn how you can help conserve more of California's precious rangelands visit: [www.rangelandtrust.org](http://www.rangelandtrust.org)**