

1. EXECUTIVE SUMMARY

The term “nature’s value” refers to the reality that healthy ecosystems provide a broad range of services—such as air quality, water storage and filtration, and biological control—which benefit local, regional, and even global communities. Integrating the economic value of such services into land use planning and resource management could result in more informed decisions about resource allocation and the balance of strategies needed to achieve a range of desired objectives, including those related to agricultural productivity and ecosystem health. Yet today, consideration of a full range of ecosystem service values in conservation planning and policy decision-making is often limited by the lack of comprehensive, rigorous empirical information regarding the economic value of the services provided.

This study focuses on establishing a potential framework for identifying and valuing the ecosystem services derived from conservation actions on rangelands in the Central Great Plains. Due to data limitations, we focused on two conservation practices—Brush Management and Prescribed Grazing—and on a subset of potential ecosystem services, including biological control, soil retention, air quality, and others. This methodology integrates consideration of a broad range of potential benefits of conservation on local communities and economies. It highlights the range of data types, assumptions, and linkages required to produce rigorous ecosystem services valuation estimates in a comprehensive manner.

This study revealed important data gaps and challenges to linking conservation practices on the landscape with improved ecosystem function and increased ecosystem service value. While limitations in data, data granularity, and critical assumptions about the relationships between elements of the framework constrain its precision, the framework and estimates provide a broad sense of the economic importance of NRCS conservation actions.

We developed this potential framework to explore plausible links between ecosystem services and NRCS conservation practices, and to offer NRCS an economic approach to quantify the effects of those practices on the value of non-market ecosystem services. The need to quantify the value of non-market benefits has been recognized in several key pieces of legislation, departmental memos and agency handbooks. The 2019 H.R. 2748, Safeguarding America’s Future and Environment Act,¹ the 2015 M-16-01, Incorporating Ecosystem Services into Federal Decision Making,² 2014 CEQ Final Interagency Guidelines,³ and guidance in the 2012 NRCS National Resource Economics Handbook⁴ all support the valuation and support of ecosystem services throughout the nation.

Tying practices to ecosystem services to estimate the economic value of conservation practices offers NRCS a more relevant way to communicate conservation successes and accomplishments to the American public, as well as those farmers and ranchers who voluntarily implement conservation practices. NRCS currently reports conservation success in terms of acres-treated or numbers of practices applied, but such metrics rarely show how ecosystem services produce off-

site public benefits that are of interest to the public. In addition to reporting “NRCS treated x-acres of invasive plants,” this framework—and associated value estimates—allows NRCS to add to reports, “this resulted in improved (or maintained) habitat, water quality, water storage, and other ecosystem services that benefit downstream residents. Voluntary conservation actions by ranchers increased the per acre value provided by nature between \$X and \$Y dollars.” We used peer-reviewed literature and NRCS technical metrics on land health and economic value to develop and test a standardized approach that could be applied to other ecological regions, throughout the country as a means of generating more robust estimates of the benefits supported by NRCS conservation practices, both on and off the ranch.

Ecosystem service valuations could be integrated into conservation planning and policy decision-making in several important ways:

- Improving field-level conservation planning through with more-comprehensive assessments of the potential practice benefits.
- Informing resource allocation into and across conservation efforts, based on improved understanding of the benefits of conservation to local communities and economies.
- Broadening financial assistance programs to include incentive payments to producers for improving ecosystem functioning.
- Refining landscape-level assessment of conservation planning priorities, based on better understanding the complementarities across conservation practices.
- Making reporting metrics more robust to convey the breadth of voluntary conservation effects, beyond individual farms and ranches to downstream communities (and others) who benefit when ecosystem services are maintained or improved.

This analysis relies upon available NRCS data, published academic literature, and multiple assumptions about complex functional relationships to bridge gaps in existing research on ecosystem valuation, the impacts of conservation practices, and ecosystem health. Nevertheless, these estimates suggest that rangeland conservation practices—specifically Brush Management and Prescribed Grazing—may significantly improve the ability of rangelands to provide a range of ecosystem services. It also identifies critical areas for future research to strengthen analyses of this kind. An improved understanding of the broader value of ecosystem services provided by conservation practices may support goals shared by producers who implement conservation practices, as well as those living downstream and in nearby communities. This can lead to better-informed decision making, and support innovative funding mechanisms that ensure that both producers and their neighbors benefit from conservation practices.



Implementing this framework, we estimated that between 2008 and 2016, Brush Management and Prescribed Grazing on private rangelands in Land Resource Region H (LRR H, the Central Great Plains Winter Wheat and Range Region) increased the value of selected ecosystem services by a total between \$15 million and \$33 million, averaging \$1.7 to \$3.5 million per year. **That represents an average increase of \$2.28 to \$4.93 per acre per year of ecosystem services from baseline estimates prior to when those practices were applied.**

The ecosystem services that contributed most to the total value include: air quality (35%); water quality (19%); climate stability (12%); disaster risk reduction (10%); recreation and tourism (7%); water capture, conveyance and supply (7%); soil retention (4%); habitat (3%); and aesthetics (3%).

