



## Valuation of Rangeland Ecosystem Services

Economic valuation lends itself well to the anthropocentric orientation of ecosystem services. An economic perspective on ecosystems portrays them as natural assets providing a flow of goods and services valuable to individuals and society collectively. A few examples include the purification of drinking water, reduced risk from flooding and other extreme events, pollination of agricultural crops, climate regulation, and recreation opportunities from plant and animal habitat maintenance, among many others. Once these goods and services are identified and quantified, they can be monetized to complete the valuation process. The monetization of ecosystem goods and services (in the form of dollars) provides a common metric that allows for cross-comparison of attributes and evaluation of differing ecological scenarios.

Complicating the monetization process is the fact that most of these goods and services are public and non-market in nature; meaning they are non-rival and non-exclusive and are typically not sold in a traditional market setting where monetary values are revealed. Instead, one must employ non-market valuation techniques, with primary valuation methods typically being very time and resource consuming, intimidating to non-economists, and often impractical. For these reasons, benefit transfer methods have gained popularity. This methodology harnesses the primary collection results of existing studies to make inferences about the economic values of non-market goods and services at an alternative policy site (in place and/or in time). For instance, if a primary valuation study on oak reestablishment on rangelands in southern California yielded a value of \$30 per-acre associated with water regulation, this result can be transferred, with some adjustments, to say something about the value of an acre of oaks on rangelands in northern portions of the state.

The economic valuation of rangeland ecosystem services has many roles. Economic values may be used as input into analyzing the costs and benefits associated with policies being proposed, or possibly already implemented. For example, with monetized values acting as a common metric, one could compare the 'benefits' of converting a rangeland ecosystem for commercial development (perhaps estimated at the market value of the developed land) with the foregone ecosystem service values (in addition to any land income lost) resulting from that land conversion. Similarly, ecosystem service values can be used to determine the level of return on an investment. This is a primary objective for private land conservation organizations who typically have very limited resources. Ecosystem service valuation can also have a role in damage assessments from incidents that require compensation such as oil spills. Additionally, valuation can be very informative when investigating regulatory programs that trade ecological assets such as wetland mitigation programs. Typically these programs are based simply on an 'acre for acre' criterion, and do not take into consideration varying welfare values associated with that ecosystem. Lastly, and most fundamental, ecosystem service valuation serves as a recognition tool for people of all backgrounds. Identifying and valuing ecosystem goods and services on rangelands brings to light the value these natural assets have to human welfare that often remain hidden do to their public and non-market attributes. This type of recognition is vital to the preservation of rangeland ecosystems in the future and the many ecological benefits they provide.

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