



# Economic Development Report



Department of Agricultural and Resource Economics, Fort Collins, CO 80523-1172

May 2006-EDR 06-03

*Ranching may contribute to all five categories of economic value*

*Ranchlands may provide endangered species & wildlife habitat, water quality and quantity benefits, recreational opportunities, rural lifestyle, and open views, in addition to pasture for cattle*

*The financial returns to beef production are likely to undervalue the contribution of ranchlands to mountain communities*

*Economic valuation methods can be used to reveal these values and inform public and private land use decisions*

## Assessing the Total Economic Value of Ranching in Mountain Communities: An Overview

Andy Seidl<sup>1</sup>

### Introduction

Livestock (mostly beef cattle and sheep) ranches have been dominant private land use in the high valleys of the Rocky Mountains for more than a century. As other natural resource based industries, including mining, forestry, oil and gas, tourism and retirees have risen, fallen, and, in some cases, risen again, ranching has filled a rather consistent and widespread, if not always clearly dominant, role throughout the local economies of the Rocky Mountain region.

Within the past three decades, tourism, and its closely related cousins, retirees and other ‘amenity migrants,’ have come to play an increasingly important role in both the economies and the landscapes of mountain communities. The decade of the 1990s brought unprecedented rates of population growth and wealth to the Intermountain West, particularly in mountain communities with desirable natural features and recreational opportunities. The links between the land and the economic health of communities have rarely been more closely linked.

Growth and demographic change have brought new challenges to mountain communities. Among the most important and pervasive challenges is in how (perhaps, whether) to manage their private lands. In part due to the relatively low proportion of private lands to total land area and due to the high quality of private lands for multiple and, sometimes competing, land uses, making community level decisions about appropriate land use and, potentially irreversible, land use change is particularly challenging to land owners and community decision-makers alike. As working ranches

<sup>1</sup> Seidl is Associate Professor and Extension Specialist—Public Policy with the Department of Agricultural and Resource Economics at Colorado State University. Questions and/or comments can be directed to him at: (T) 970-491-7071; (F) 970-491-2067; or (E) [Andrew.Seidl@colostate.edu](mailto:Andrew.Seidl@colostate.edu). For other work from DARE agricultural and resource economists designed for outreach audiences, please see: <http://dare.agsci.colostate.edu/csusagecon/extension/pubstools.htm>

are increasingly converted into vacation homes and formerly pastoral landscapes are transformed into low density residential development, communities increasingly ask whether what is good for the individual landowner is best for the community.

Economics can help to inform these decisions through a thorough understanding of the values expressed directly and indirectly in marketplace as well as those economic values that are not adequately reflected in market transactions. In this paper, I will provide an overview of economic valuation as applied to ranching in mountain communities. Five distinct types of economic value and the common approaches to revealing those values will be discussed. A better notion of the value of an economic activity like ranching and its contribution to the economic health of a community when compared to a similar assessment of alternative land uses, such as tourism infrastructure, commercial development, or outright land protection, can help communities make appropriate decisions about land use planning and to craft policies that encourage land uses that are in line with community objectives.

### **Types of economic value**

There are five different types of economic value in two general categories. Identifying the sources or types of economic value present helps us to understand whether we are making decisions based on complete or incomplete economic information and what sort of information might improve our ability to make natural resource allocation decisions.

The two general categories of economic value are use, or active, value and nonuse, or passive value. Use value is further divided into consumptive use and non-consumptive use value, while nonuse value is divided into existence and bequest value. Option value, the final source of economic value, was traditionally considered a nonuse value, but is now increasingly categorized as a use value.

#### **Use value**

The concept of use value implies that individuals derive direct benefit from being in the presence or vicinity of the natural resource. Consumptive use value is when the resource is, through its use, consumed or used up such that other people or economic activities do not have an opportunity to enjoy the resource. Non-consumptive use value implies that users do not consume, or use up, the resource in the process of enjoying it. As such, non-consumptive uses of resources do not preempt current or future non-consumptive uses or future consumptive uses of the resource. However, consumptive uses of resources do preempt current or future consumptive or non-consumptive uses.

The livestock industry demonstrates aspects of both consumptive and nonconsumptive use values of the land resources in mountain communities. If land is occupied by hay or pasture, which are in turn used as inputs to the production of beef cattle, its use in some other economic activities is preempted (e.g., houses, roads, schools), but potentially not others (e.g., fishing, hiking, wildlife viewing). However, while the activity is not preempted, it also might not be exploited as fully as if it were the only activity undertaken on the land. That is, land managed for pasture is not going to provide the same quality elk habitat as land specifically managed for that purpose. In addition, ranching provides views of pastoral working landscapes that some people find appealing. In addition, relatively low intensity land uses like ranching may create intended or unintended broader community benefits including flood control, water filtration and storage, wildlife habitat, and/or community separators, creating potential savings in community infrastructure costs and air pollution.

Broader society (locals and nonlocals), not the landowner, enjoys these nonconsumptive use values, generated by the use of the land in hay or pasture. Moreover, the landowner is compensated for his consumptive use values in the marketplace, but is probably not compensated for providing these nonconsumptive use values to broader society. As a result, the incentives facing the landowner and those facing broader society are not necessarily coincident.

---

### **Non use value**

The concept of nonuse value implies that people derive benefit from the natural environment without having direct contact with it. Their value is independent of their use of the resource, but dependent on the quality and/or quantity of the resource in question. Existence value is found when individuals experience benefits from aspects of the natural environment that they do not reasonably expect to experience personally in any direct or indirect manner. Bequest value is the value that individuals derive from providing desirable features of the natural environment to future generations. Although closely related, existence value relates to the current generation, while bequest value relates to the amount of value current generations ascribe to future generations. Similarly, option value carries this time dimension. Option value has to do with choosing not to use a resource today, while retaining the option to use it in the future. As a result, it can be considered a nonuse value in the current period with an option for (consumptive or non-consumptive) use value in the future. Quasi-option value is the benefit derived from waiting to make an economically irreversible decision until more information is obtained. Cattle ranching in mountain communities may generate non use values including a “traditional western” way of life (bequest value), threatened and endangered species habitat (existence and/or bequest value), or preserve the potential for future, more intensive uses (option value).

### **Types of valuation**

Economic valuation is based upon the revealed or stated willingness to pay for benefits derived from the natural environment or the willingness to accept payment to avoid changes in those benefits. Some types of economic value are well accounted for in markets. Other types of economic value may not be adequately reflected in markets or may not find their way into markets at all. Since market values are the “easiest” to observe, they often get more weight in resource allocation decisions than they deserve. Market values are no more real or important than any other type of economic value in helping to inform resource allocation decisions. Economists employ a number of techniques to reveal social and individual values for natural resources. These techniques include direct and indirect market based methods and non-market valuation methods.

#### **Direct market analysis**

Direct market price analysis is an appropriate technique to assess the use value of natural resources. It is best used when the good or service in question is commonly traded in the open market and can be considered the total value of the good, and if there are no important external effects in its production or consumption. That is, the price is generated through purchase behavior and price equals value.

For all cattle industry products that have a well defined market, we can calculate the annual per acre value of production by multiplying the quantity of each of the goods by its respective price. Profit, value added or resource rent, is the market value less the cost to get the good or service to the marketplace. Profit is the increase in income that may or may not be reinvested in the local economy.

However, now consider the land market for residential properties. The price of the residential properties probably reflects the private benefits and costs of a home, but not the social costs of the public infrastructure and services required by that home, any alternations to the visual quality of mountainsides or valleys, or effects on water or wildlife habitat quantity or quality. In this case, the direct market price approach would overestimate the value of the industry to society and the derived value should be diminished by the value of the environmental damage caused by the industry. Some approaches to the valuation of the fiscal impacts and environmental damage could employ the direct price method, such as the cost of restoration, but other aspects (e.g., damage to the view or downstream fish populations) would not be appropriately accounted for using this technique.

#### **Indirect market techniques**

Indirect market price analysis also allows the analyst to value use values, but typically the value in question is embedding in the market price of another good or a closely related good is traded in the market. It can be that markets are malformed due to the features of the goods and services themselves or due to the institutions evolved for their management. The two most common indirect market valuation techniques are the travel cost method (TCM) and the hedonic price method (HPM).

---

The travel cost method (TCM) is a commonly employed analytical tool to facilitate understanding of the demand for tourism services. TCM employs surveys of tourists to obtain a profile of their actual trip expenditures and elicits sensitivity to an exogenous change in travel costs, demographic characteristics, and trip characteristics in order to derive a demand curve for tourism visitation. TCM allows us to extrapolate survey results to broader populations, infer willingness to pay for tourism services, explore the effect of local, national, or industry policy changes on tourism behavior and, therefore, economic impact. This technique could be applied to fishing, hunting, camping, birdwatching and other tourist activities to the extent that their quality is affected by private rural land use.

The hedonic price method is a commonly employed analytical tool used to understand the housing market, but it has applications to all products with multiple separable and valuable features. The direct market price method gives the value of the house, but not the features that make up the value, like safety, natural amenities, or public services. Using the hedonic price method, the value is not simply assigned directly to a house, but is based on things such as the number of bedrooms and bathrooms, the land size, the condition of the house, the proximity to a school, the view, traffic in the neighborhood, commute times, parks, and other open space, etc. This is the same process that a person goes through in deciding whether a certain piece of property is desirable and if the price is acceptable.

Using this concept, an economist works backwards from the price paid to discover the value of one specific characteristic. For instance, if housing prices in a neighborhood increased by 3% per year for 10 years and after 10 years a park was established in the neighborhood and housing prices jumped 5 percent, 2% of the increase in housing value was due to the park all other things equal. Alternatively, comparisons can be made across neighborhoods or communities rather than over time to reveal similar information. Such techniques allow homeowners and local elected officials to evaluate the potential impacts of policies on both housing prices and the local tax base. If ranchlands provide open space benefits to private homes in the form of view, recreational opportunities, reduced school or other public service costs for which there is no direct market, it can be expected that those effects would be possible to reveal within the housing market.

### **Non market economic valuation techniques**

For many issues concerning stewardship of natural environment there are few market signals of any kind to provide guidance as to its relative social value. This is particularly the case with expressions of nonuse value. However, without attempting to derive a usable economic value, it is tempting for policy makers to ignore the social worth of the environment or to assume that it is essentially zero. Nothing could be further from the truth as most often these non-market valuation techniques are criticized for attempting to place a value on the priceless, the infinitely valued.

In the market based methods, people reveal their preferences for environmental goods and services through their purchase decisions. With non-market techniques, consumers are enticed (in a survey) to state their preferences through construction of a hypothetical, or contingent, market. The contingent valuation method elicits a stated willingness to pay for, or willingness to accept payment to avoid a, change in environmental quality. Alternatively, the contingent behavior method elicits a stated change in behavior due to a hypothetical change in environmental quality. Both of these techniques are commonly used in conjunction with revealed preference survey methods, like the travel cost method, and are often applied to understand tourism and recreation behavior and the likely impact of policies to increase entry fees or tourist services in parks and protected areas or for the higher intensity management of open working landscapes in mountain valleys.

Contingent valuation and behavior have enjoyed a great variety of applications, some of them rather high profile and typically involving the “jobs vs the environment” debate and some dealing with local control concerns with regard to the management of federally owned lands. Endangered species habitat in the path of development seems to be a particularly common application for this technique as well as valuation of environmental benefits with substantial non-local value. To the extent that ranch lands in mountain communities are creating valuable benefits to people who do not expect to experience these places, a nonmarket valuation technique can help these people to reveal their values for those benefits and potentially, through policy, to encourage management of those lands toward broader social objectives.

---

**Export base analysis**

An export base analysis traces the sale of goods and services to customers outside of the focal region (an export) through the local economy using an input-output model. Impacts can be traced in terms of income, jobs, and/or taxes generated and discussed in terms of direct, indirect and induced effects on the local economy. The direct effect is the amount of income and jobs generated by the sale of the export good. The indirect effect is the amount of local goods and services purchased in order to produce the export good (e.g., animal feed, machinery, legal services). The induced effect is the expenditures, made by local people who were paid in the production process of the export good, otherwise unrelated to the production of that good or service (e.g., restaurants). The sum of the indirect and induced effects is called a multiplier. Leakage is the proportion of total expenditures that are nonlocal. It is in the interests of a community to reduce leakage and, thereby, increase local multipliers.

**Conclusions**

Economics is a study of relative values or tradeoffs among possible states of nature under conditions of finite resources and infinite demand. Without an adequate notion of the relevant tradeoffs, it is impossible to make an informed decision about the dispensation of natural resources, daily decisions undertaken by individuals, nongovernmental organizations, and governments around the world. It should now be clear that market signals provide neither an accurate nor an adequate assessment of the social value many features of our natural environment. However, economics provides powerful valuation tools and concepts to facilitate the stewardship of the Earth's resources.

Here, I have briefly described the economic concepts and methods commonly employed by economists to inform resource management decisions regarding cattle ranching in mountain communities. Although ranch owners are typically only compensated for producing beef, cattle ranching provides a great variety of valuable goods and services well beyond the farm gate. Pastoral landscapes, rural lifestyle, water quantity and quality, air quality, community buffers, wildlife habitat, and recreational opportunities are among the many valuable characteristics of ranch lands that may not be provided in the same quality or quantity as alternative uses for that land. A total economic valuation of alternative land uses in a community would facilitate rational local economic policy to encourage optimal land use at the community scale. Current landowner incentives may or may not be in line with community objectives. If they are not, in time land use and management in mountain communities will not create the communities where current residents most want to live.

---

