



## Estimating Market Prices for Public Land Purchases

Based on the research of John Loomis, Vicki Rameker and Andy Seidl  
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Public land purchases allow for both public and private benefits including wildlife habitats, buffers between towns, open space for public use, protection of water and other natural resources, flood control, and other public benefits. In the purchase of public land, whether by purchasing property or by purchasing development rights, public officials must consider the cost of the transaction and compare it to the public benefits.

The research of John Loomis, Vicki Rameker and Andy Seidl explores features that determine the cost of public land purchases and the variety of benefits that accrue from such purchases. Their study of open space purchased in the Denver metro area between 1990 and 1998 identifies specific land features that increase costs and benefits to the public. For example, they found that land adjacent to public parks was worth \$26,352 on average per acre, while land not adjacent to an existing park was only worth \$15,313 per acre to purchase. Table 1 explores some of the cost differences based on adjacency to parks. The model developed also includes other attributes, e.g. access to water, number of beneficiaries of the public land (based on nearby population), land values based on residential and agricultural value, and the size of the property.

This *public hedonic price function* model is useful for appraisers and public officials seeking to estimate the price per acre of parcels with open space attributes. The relative prices, as calculated in the model developed by Loomis, Rameker and Seidl, can be a guide to assessing the cost of different features of open space (see page 2). It also has three important policy implications:

1. The significant price difference between purchase of land and purchase of development rights (easements) suggests decision-makers should make careful comparisons of the total public benefit prior to making the decision to purchase land over easements.
2. Certain features, such as adjacency to public parks and water, suggest greater public value for purchasing land versus purchasing development rights.
3. Public agencies do not presently track sufficient information to fully assess the value of their public land (e.g. total park and open space acreage by jurisdiction; development appraisals of land purchased for open space; and size of water bodies on public lands).

**Table 1.**

Purchase Type	Transaction Cost	Property if Adjacent to Public Parks	Implicit Value of being Adjacent to Park
Land	\$15,313	\$26,352	\$11,039
Development Rights	\$8,530	\$14,680	\$6,150

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**Research Methods and Findings**

Loomis, Rameker, and Seidl studied 133 public transactions on Colorado's Front Range using data from Greater Outdoors Colorado and county and city agencies. They used a model, the *hedonic price function*, typically used for understanding private, market-based prices, to determine the value of public natural resource goods. The model assumes a consumer is competing among other buyers for parcels that have a higher level of desirable characteristics (parcel size, location, and attributes such as access to water). When applied to public purchases, the model assumes competition between public officials on behalf of citizens, motivated by the protection of natural resources and maximizing the benefits to the public of open space purchases. Public agencies in the model face budget constraints, similar to a private purchaser.

The researchers selected variables to include in the model that reflect public demand for the open space:

- Protection of ground water quality;
- Total number of individuals who will benefit from the open space, measured in nearby population; and
- Adjacency of the open space to existing parks, increasing the value of existing open space.

They included variables that relate to the availability of parcels to purchase for open space in each county, specifically:

- The average value of agricultural land, based on the best predictor among variables such as the average value of flood irrigated land, non-irrigated land, and grazing land; and
- The value of residential development on the parcel.

Finally, they included variables related to both the supply and demand for the land:

- Access to water;
- Total acres and total acres with access to water; and
- The type of purchase: either land purchase or purchase of development rights (easements).

Combining the variables into the hedonic model resulted in findings noted on page one, namely the significant increase in price for parcels adjacent to parks. It also found that:

- cost per acre decreases as total acreage increases;
- access to water increases per acre cost for land purchases; and
- the higher the dry agricultural land value and residential development value, the higher the cost of land.

Additionally, protecting ground water was found to increase price, but the finding was not statistically significant, suggesting additional studies need to be conducted.

Loomis, Rameker and Seidl's study of public land purchases has some limitations. Lack of complete public data resulted in:

- some variables measurable only dichotomously (e.g. access to water or no access to water) rather than as interval or scale (e.g. number of acres on a parcel with access to water)
- some variables not measured at all (e.g. development value of the specific parcels purchased by public agencies).

Despite this limitation, the article demonstrates the increasing value of land as a result of key attributes and offers a model for estimating the value of land purchased for public purposes.

**Based on: Loomis, John Vicki Rameker and Andy Seidl. 2004. A hedonic model of public market transactions for open space protection. *Journal of Environmental Planning and Management*, 47(1): 81-94.**