



ENVIRONMENTAL DEFENSE

finding the ways that work

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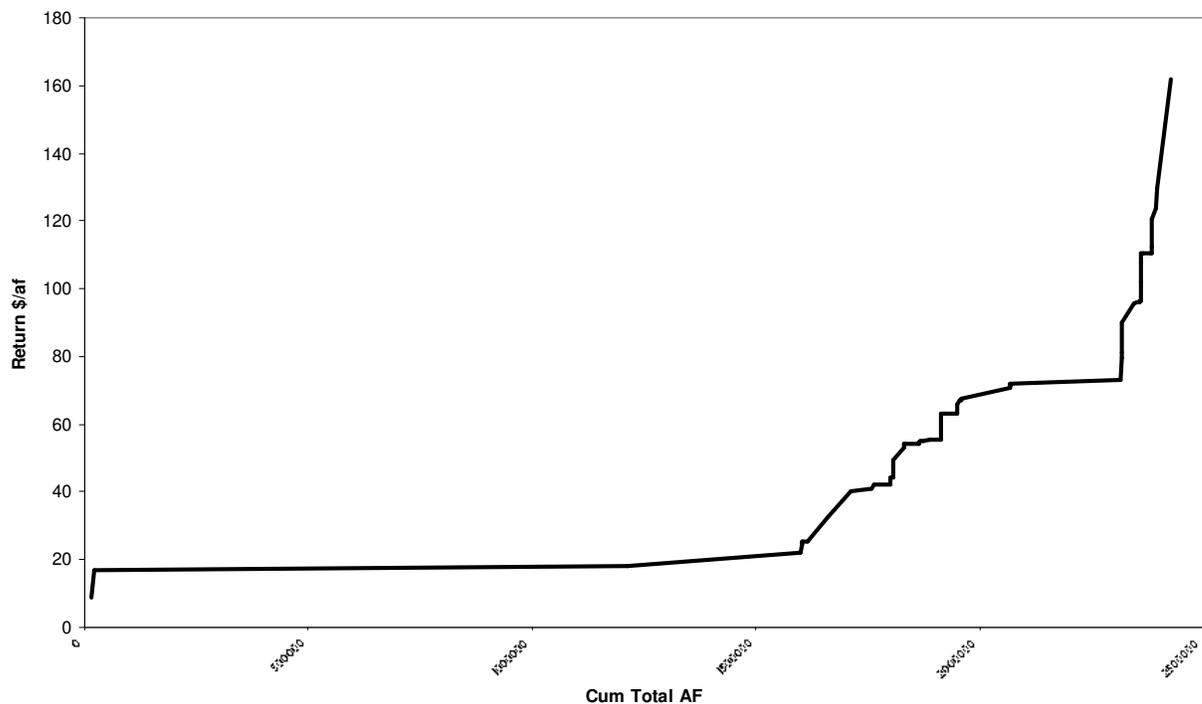
What is the Water Worth? Net Economic Returns for Colorado River Water Used to Grow Selected Crops in the Lower Basin

One way to determine the value of water is to look at the net economic return of a given quantity of water. Net economic return on use is not necessarily equivalent to the price for which a user would be willing to sell water. However, in the absence of well-developed markets, where price can be determined by examining numerous transactions, net economic return on use of water helps give definition to an otherwise hard-to-answer question: what is the water worth?

An analysis of selected crops grown with Colorado River water in the Lower Colorado River Basin shows that more than 1.5 million acre-feet of water produces a net return to the farmer of about \$20 per acre-foot. Figure 1 illustrates the net return per acre foot for select crops grown in the Lower Colorado River Basin (Arizona and California).

Figure 1:

Net economic return for water used to produce select Lower Colorado River Crops



Methodology

Return per acre foot was determined for specific crops or crop types using the following calculation:

$$V = N/W$$

where V is the net return of water in dollars per acre foot, N is the net cash return per acre for a particular crop, and W is the quantity of water applied in acre-feet per acre.

Data for crop acreages and volumes of water applied per acre are from the Bureau of Reclamation Lower Colorado River Accounting System (LCRAS) reports.¹ In instances where data are not provided by LCRAS (such as consumptive use figures for the Imperial Valley), we used data from University Cooperative Extension Reports.² Acreage for Wellton Mohawk Irrigation and Drainage District (WMIDD) in Arizona and Coachella Valley Water District (CVWD) in California are from the BOR Annual Production Reports 1995-1998.³ Some of these data are reported as average figures for several years. Where data is reported annually, we used the average value for a five-year period.

Information on economic return for each crop is from crop budget reports from both the University of Arizona and the University of California Cooperative Extension Offices. Most acreage data for crops are taken from LCRAS. LCRAS reports group crops together by type, such as “small grain,” whereas crop budget reports provide return information on individually named crops. To simplify our calculations, economic data given for some individual crops was averaged together to represent a mean value for the crop types reported by LCRAS.

Net cash return is defined as returns over cash operating expenses. Returns are the sum of the contributions toward projected income of all products produced by the cropping system, including any subsidies. Income estimates are based on multi-year county averages for yields for most crops, and multi-year state averages for commodity crops. Operating costs include total cash land preparation expenses such as labor, chemical and custom application, farm machinery and vehicles, irrigation water, and other purchased inputs and services; total harvest and post-harvest expenses including labor, chemical and custom application, farm machinery and vehicles, custom harvest/post harvest cotton ginning if appropriate, crop assessments, and other materials; and pickup use. Net return does not include costs for overhead, land ownership, management, or risk.

¹ US Bureau of Reclamation; Lower Colorado River Accounting System, Demonstration of Technology (LCRAS), Documentation for Calendar Year 1998,1999, 2000. Appendix I

² Production Practices and Sample Costs to Produce.1996-2001. Univ. of California Cooperative Extension; Arizona Field Crop Budgets- University of Az. Cooperative Extension.1996-2000.

³ US Bureau of Reclamation (BOR). 1991-98a. *Compilation of Records in Accordance with Article V of the Decree of the United States in Arizona v. California dated March 9, 1964*. [Published annually]. Referred to as “BOR Annual Production Report”

The amount of water applied to specific crops is reported in LCRAS as well as the University of California Cooperative Extension Reports. LCRAS is used in all counties where data are provided. However, where counties or irrigation districts did not report return flow information, LCRAS data are not available. Data for WMIDD are obtained from BOR annual consumption reports while data for Imperial Irrigation District and CVWD are taken from the University of California Extension office reports.