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Water Allocation in the Klamath Reclamation Project

Brief # 1

The Value of Irrigation Water Varies Enormously Across the Upper Klamath Basin

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In order to understand the economics of the 2001 irrigation curtailment in the Upper Klamath Basin, and the prospects for lower-cost solutions to future irrigation shortfalls, one must appreciate just how much the economic value of irrigation water varies from one piece of land to another throughout the Upper Basin. In any given location, the net revenue from irrigated agriculture depends fundamentally on the productivity of the soil—the main factor that determines what crops can be grown. Irrigated soils in the Upper Basin range from Class II (most productive) to Class V (least productive). These differences in soil quality (and climatic conditions) produce net revenues that vary by a factor of 20.

How much does the value of water vary in the Upper Basin?

Land prices reflect differences in agricultural productivity. As a result, market prices range from as high as $2,600 per acre for Class II lands in the Tule Lake area, Malin, and the Poe Valley, to as low as $250 to $300 per acre for Class V lands along the Sprague and Williamson rivers (see the OSU–UC report,[1] p. 371). Prices for nonirrigated land in the Upper Basin are about $200 per acre, suggesting that the annualized value of irrigation water on 1 acre of land ranges from as high as $120 per year to less than $6 per year—a range of 2,000 percent.[2]

Even this range, however, understates the variation in per-acre net revenues because it does not account for year-to-year variation caused by crop rotations. The range of $120 to $6 per acre is based on market land prices and thus reflects the average expected net revenue over time, not the net revenue on a specific piece of land in a particular year. In a given year of a crop rotation, net revenue might be higher if the crop is highly profitable or lower if a low-value crop is planted. High-value crops on Class II lands can produce net revenues as high as $400 per acre. Even higher net revenues can result from fluctuations in crop prices (e.g., the high potato prices in 2001–2002).

Based on market prices for land, as well as information on crop rotations, values for the 430,000 acres of irrigated lands in the Upper Basin can be estimated. In Figure 1 (page 2), the

[1]Braunworth, Jr., W.S., Welch, T., and Hathaway, R. eds. *Water Allocation in the Klamath Reclamation Project, 2001: An Assessment of Natural Resource, Economic, Social, and Institutional Issues with a Focus on the Upper Klamath Basin*, SR 1037 (Oregon State University and the University of California, 2002).

[2]We can infer that the difference between the purchase prices of similar irrigated and nonirrigated land reflects the benefits resulting from irrigation. Then, we can use a formula to estimate the annual net benefit of irrigation (annual net benefit = the purchase price of land *x* an interest rate). For a land price difference of $1,000 and an interest rate of 6 percent, the annual net benefit of irrigation water is $60 (0.06 x $1,000).

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lowest value lands are on the left-hand side, and the highest value lands are on the right-hand side. Figure 2 shows the same distribution of acres and land values, but only the acres within the Klamath Reclamation Project are shown.

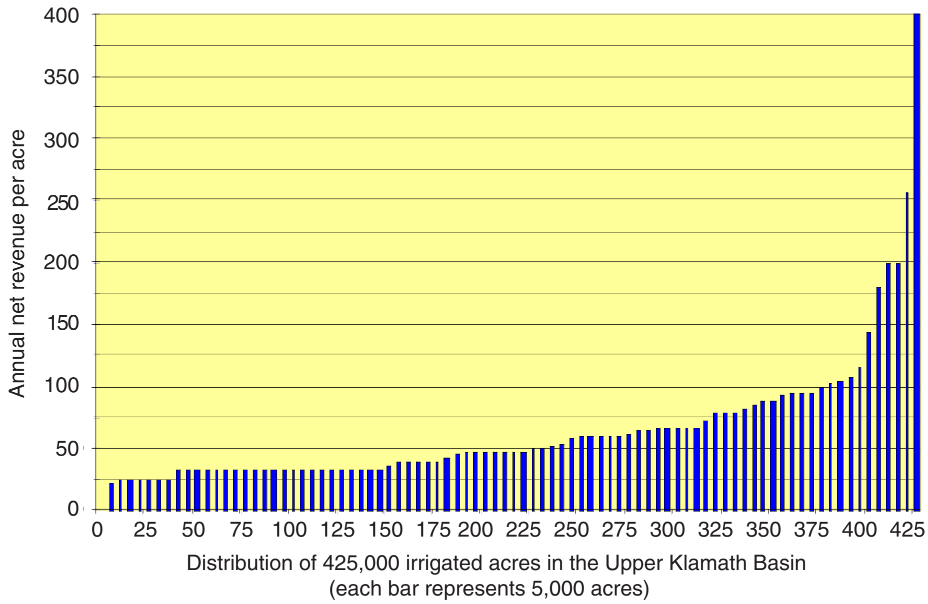

Figure 1.—Irrigation water values in the Upper Klamath Basin: annual net revenue per acre across location, soil class, and crop rotation.

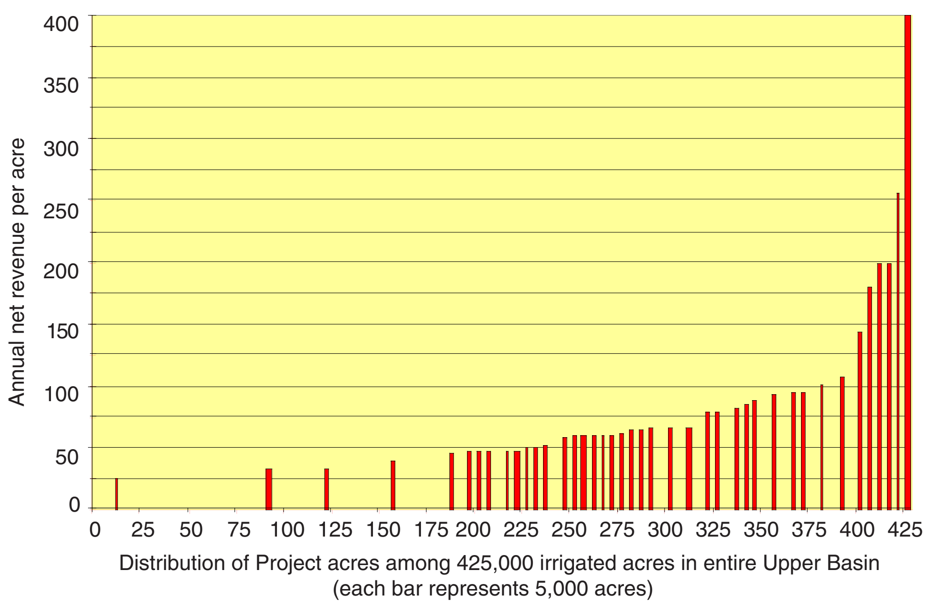

Figure 2.—Irrigation water values in the Klamath Reclamation Project: annual net revenue per acre across location, soil class, and crop rotation.

What are the implications of these variations?

Figures 1 and 2 make several important points very clear. First, it is misleading to use “average” data to characterize the economics of irrigated agriculture in the Upper Klamath Basin. Second, the Klamath Reclamation Project represents fewer than half of the irrigated acres in the Upper Basin. Third, the Project includes most of the high-value acres in the Upper Basin, whereas most of the acres with low productivity and low net revenue are located outside the Project.

As a result, the economic cost of a water shortage will depend greatly on which lands end up without water; a lower-cost approach to dealing with a shortage must include off-Project irrigators. For example, if 50,000 acre-feet of water are withheld from acres on the left-hand side of Figure 1, the cost will be 85 percent lower than if the same amount of water is withheld from acres on the right-hand side of Figure 1.

For more information

Braunworth, Jr., W.S., Welch, T., and Hathaway, R. eds. *Water Allocation in the Klamath Reclamation Project, 2001: An Assessment of Natural Resource, Economic, Social, and Institutional Issues with a Focus on the Upper Klamath Basin*, SR 1037 (Oregon State University and the University of California, 2002).

Water Allocation in the Klamath Reclamation Project, Brief #2: *Potential Benefits of Water Banks and Water Transfers,* EM 8844-E (Oregon State University, 2004).

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