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# Potential Cost of Agricultural Water for Meeting In-stream Flow Demands

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# Cornhusker Economics

## Cooperative Extension

Institute of Agriculture & Natural Resources  
Department of Agricultural Economics  
University of Nebraska – Lincoln

### Potential Cost of Agricultural Water for Meeting In-stream Flow Demands

Market Report	Yr Ago	4 Wks Ago	11/24/00
<b><u>Livestock and Products,</u></b>			
<b><u>Average Prices for Week Ending</u></b>			
Slaughter Steers, Ch. 204, 1100-1300 lb Omaha, cwt.....	\$70.85	\$69.63	\$72.68
Feeder Steers, Med. Frame, 600-650 lb Dodge City, KS, cwt. ....	87.50	86.19	90.50
Feeder Steers, Med. Frame 600-650 lb, Nebraska Auction Wght. Avg. ....	92.44	69.63	97.20
Carcass Price, Ch. 1-3, 550-700 lb Cent. US, Equiv. Index Value, cwt. ....	109.69	105.81	111.37
Hogs, US 1-2, 220-230 lb Sioux Falls, SD, cwt. ....	37.50	35.50	38.50
Feeder Pigs, US 1-2, 40-45 lb Sioux Falls, SD, hd. ....	*	*	*
Vacuum Packed Pork Loins, Wholesale, 13-19 lb, 1/4" Trim, Cent. US, cwt. ....	92.50	119.05	105.75
Slaughter Lambs, Ch. & Pr., 115-125 lb Sioux Falls, SD, cwt. ....	73.25	62.25	*
Carcass Lambs, Ch. & Pr., 1-4, 55-65 lb FOB Midwest, cwt. ....	157.00	150.50	149.00
<b><u>Crops,</u></b>			
<b><u>Cash Truck Prices for Date Shown</u></b>			
Wheat, No. 1, H.W. Omaha, bu. ....	2.76	3.15	*
Corn, No. 2, Yellow Omaha, bu. ....	1.74	1.81	1.93
Soybeans, No. 1, Yellow Omaha, bu. ....	4.46	4.35	4.79
Grain Sorghum, No. 2, Yellow Kansas City, cwt. ....	2.74	3.28	3.42
Oats, No. 2, Heavy Sioux City, IA, bu. ....	*	1.30	1.31
<b><u>Hay,</u></b>			
<b><u>First Day of Week Pile Prices</u></b>			
Alfalfa, Sm. Square, RFV 150 or better Platte Valley, ton. ....	82.50	120.00	115.00
Alfalfa, Lg. Round, Good Northeast Nebraska, ton. ....	32.50	70.00	72.50
Prairie, Sm. Square, Good Northeast Nebraska, ton. ....	*	82.50	82.50
* No market.			

In 1997 the states of Colorado, Nebraska and Wyoming signed a Cooperative Agreement (CA) which called for making 130,000 to 150,000 acre feet of additional water available for meeting endangered species needs along the Big Bend Reach of the Platte River. Three projects, one in each state, will contribute 70,000 acre feet towards this goal. The remaining 60,000 to 80,000 acre feet must be acquired thorough other means, the most likely being the purchase or leasing of rights to what is now irrigation water. If the CA is eventually implemented, all purchases and leases of irrigation water will be negotiated on a willing buyer and willing seller basis. The cost of the endangered species water will be shared by the three states and the federal government. Those interested in buying endangered species water are concerned about what it might cost, and those interested in selling are interested in potential profits.

Recent research by Ryan Fuchs, Senior Natural Resource Major in the Department of Agricultural Economics, UNL, suggests that the economic value of irrigation water in Central Nebraska lies between 34 and 118 dollars per acre foot consumed per year (Figure 1). These values represent the annual economic returns to irrigation water. Any specific value depends on the profitability of irrigation as influenced by crop prices, irrigation costs, other production costs and on dryland versus irrigated yields. Irrigation costs in turn depend primarily on the type of irrigation system and on the source of water. The highest values are for surface water irrigation with gated pipe, and the lowest are for deep well irrigation with center pivots.

The first set of values in Figure 1 are annual values for irrigation water. If the party who purchases the water from irrigation for long-term endangered species use pays what the water is worth for irrigation, the cost will be the capitalized value of the annual economic return. Assuming that the annual values shown in Figure 1 represent long-term real net economic returns to water and that the appropriate capitalization rate is 5.0 percent, then the corresponding capitalized values can be computed by dividing the annual values by 0.05. This yields a range of 680 to 2,360 dollars per acre foot consumed. The capitalized values represent what the irrigation water right is worth to producers, assuming that the estimated annual returns continue indefinitely and that a five percent real economic rate of return is acceptable.



What irrigation water rights actually sell for will also depend on the bargaining strategies of buyers and sellers. Some sellers will demand a relatively high price because they have optimistic expectations about future yields and prices, while others will demand a premium above what the water is worth in agriculture before they are willing to sell to a non-agricultural user. Some buyers may choose to pay a premium to maintain good public relations. The experience in other states where water rights are freely marketed between uses suggests that premiums of more than 50 percent above actual agricultural use values are relatively common. These considerations suggest that the outright fee simple purchase of irrigation rights to meet endangered species needs will be quite expensive. It may be possible, however, to reduce the costs some by leasing rather than purchasing irrigation rights.

Although long-term leasing of irrigation water rights should theoretically cost as much in present value terms as a fee simple purchase, economic uncertainties and the need for public acceptance may make leasing a much less costly option. It offers agriculture a way of getting something more than the current expected returns in agriculture without gambling over future prices and yields, and permits the state to experiment with water

right transfers in ways that may lead to public acceptance without paying large long-term premiums. With a leasing approach the long-term average costs are likely to be near the middle part of the range in Figure 1, whereas purchasing costs are likely to be near the high end of the range.

Irrespective of whether endangered species water is purchased or leased from agriculture, the costs will be significant. Leasing or purchasing 70,000 acre feet of agricultural water under the auspices of the CA is likely to cost from 4.5 to 7.0 million dollars per year, plus administrative costs. This translates to a present value range of 35 to 54 million dollars over a 10 year period, or to a range of from 90 to 150 million dollars over an infinite time horizon. If it turns out that still more water is needed, as many observers believe, the costs will be proportionately higher. Many people believe that this is a small price to pay for protecting endangered species and maintaining the Middle Platte ecosystem, while many others disagree. Eventually, our elected representatives will face the daunting task of deciding this critical issue.

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**Figure 1. Economic Value of Irrigation Water**

<b>Irrigation Case</b>	<b>Average Prices<sup>a</sup> Average Yield<sup>b</sup></b>	<b>Prices + 20% Average Yields</b>	<b>Average Prices Yields + 20%</b>	<b>Prices + 20% Yields + 20%</b>
----- Annual Value: \$/Acre-foot Consumed per Year -----				
<b>Groundwater</b>				
<b>Electric Pivot</b>				
<b>150 Feet Head</b>	33.63	58.56	60.02	89.95
<b>Gated Pipe</b>				
<b>50 Feet Head</b>	40.42	65.35	66.81	96.74
<b>150 Feet Head</b>	28.22	53.15	54.61	84.54
<b>Surface Water</b>				
<b>Gated Pipe</b>	61.74	86.68	88.13	118.06
----- Capitalized Value: \$/Acre-foot Consumed -----				
<b>Groundwater</b>				
<b>Electric Pivot</b>				
<b>150 Feet Head</b>	673	1,171	1,200	1,800
<b>Gated Pipe</b>				
<b>50 Feet Head</b>	808	1,307	1,336	1,934
<b>150 Feet Head</b>	564	1,063	1,092	1,690
<b>Surface Water</b>				
<b>Gated Pipe</b>	1,234	1,734	1,763	2,361

<sup>a</sup> The average prices used were: corn, \$2.56/bushel; soybean, \$6.17/bushel; and alfalfa, \$60.83/ton.

<sup>b</sup> The yields used were the 1992 to 1997 averages for Dawson and Hall counties as reported by Nebraska Ag Statistics: irrigated corn, 145 bushels/acre; dryland corn, 87 bushels/acre; irrigated alfalfa, 4.7 tons/acre; and dryland alfalfa 3.6 tons/acre.