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THIRD PARTY COMPENSATION FOR OUT-OF-BASIN WATER TRANSFERS: COMMENTS ON HB 03-1113

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Water is a limited resource in Colorado, but has the productive capacity to generate wealth and income, whether it is used for agricultural, industrial or municipal uses. Water utilization is measured in two ways: diversion and/or consumptive use. A diversion is the movement of water from one location to another via a conduit such as a canal, ditch or pipe. Consumptive use refers to a diversion of water with no return flow. In 1995, the US Geological Survey estimated that 15.5 million-acre feet of water was diverted in Colorado of which 92% (14.3 million acre feet) was intended for agriculture. Likewise, agriculture's consumptive use was 5.5 million-acre feet in 1995, about 93% of the state's consumptive use. Recent population growth has fueled water transfers from agriculture to municipalities, a trend that will likely continue. Indeed, an additional 500,000 acre feet of water (roughly 9% of agriculture's consumptive use) will be needed to supply Colorado's population in 2020 if current consumption levels² and population trends continue.

An economic incentive exists for buyers and sellers to negotiate water transfers. Typically, agricultural producers net between \$30 and \$50 per acre foot of water for their crops.³ Municipalities routinely charge their citizens more than \$500 per acre foot for their use, and are often willing to pay more for securing water resources. The difference between the net value produced in agriculture and the willingness to pay of municipalities is substantial, so much so that buyers and sellers of water stand to gain from out-of-basin water transfers.

Water transfers also have "third party effects"; that is, water transfers can impact local governments, allied industries and households by reducing economic activity in the location it leaves and increasing economic activity in its new location. Third party effects are central to HB 03-1113, which suggests every permanent water transfer be evaluated according to the economic impact it has on the basin of origin. If third party

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² It is assumed that an acre foot will support 4 to 8 people, and that Colorado's population will be roughly 4 million people in 2020.

³ Net values are typically \$30 to \$50 for irrigated feed grains and forages. Vegetable and fruit crops as well as vineyards and ornamentals will generate a higher net return per acre foot of water.

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effects are deemed large enough, compensation must be made to the board of commissioners of the county in which the water was used. Compensation may only be used for economic development. This report discusses the economic losses central to compensation in HB 03-1113, and explores the manner in which economic losses might be measured.

Water Transfers: Who are the stakeholders and what are the stakes?

As mentioned previously, an economic incentive exists for water transfers, and the water resource's buyer and seller are fully compensated by the sale's proceeds else this voluntary transaction would not occur. But water is a resource with productive capacity, and its transfer alters economic activity both in the basin receiving the water and the basin losing the water. Transferring productive capacity affects more than just the buyer and seller; third parties such as local governments and businesses are affected as well.

A manufacturing analogy is useful when describing the shift in productive capacity. Suppose that a company decides to relocate its manufacturing plant from one locale to another in Colorado. The move does not dramatically impact the state's economy, but economic activity in the plant's original location is altered. County governments experience a decline in tax revenues, and may experience lower costs as fewer services are provided (e.g., road maintenance to the plant). Allied industries, those that sell the manufacturing plant its inputs and buy the plant's final goods, also experience less revenue. In addition, manufacturing workers who do not relocate to the new plant experience a loss of household income. Declining incomes reduce household spending at local grocery stores, drugstores, gas stations etc. Clearly, the local government, allied businesses and households all suffer from the plant's relocation. The size of these third party impacts depends importantly on the size of the plant (How important is the plant to the local community in terms of tax revenues, employment, purchases and sales?), the adjustments that allied industries make (Are there opportunities to substitute new sales for the old?), and the timing of the move (Is the move announced early enough to allow the third parties to make contingency plans?)

Of course, additional economic activity is generated at the plant's new location, and the third party beneficiaries are the same: local government, allied industry, and

household spending. To the extent that the plant is producing the same product at its original capacity, no net loss exists in Colorado due to the relocation. Consequently, the distribution of the economic activity is of primary concern to stakeholders both in the new and old location. Furthermore, the stakeholders that gain in one location may not be the same group that loses in another location.

The previous example illustrates effects similar to those found in out-of-basin water transfers. In many cases, water is the foundation for the agricultural "plant." And just as with the previous example, the transfer's scale and timing, as well as stakeholders' responses, dictate the level of reduced economic activity.

Consider the case of a producer who sells irrigation water rights to a buyer outside the basin. In the absence of irrigation, the farmer chooses to grow dryland crops rather than irrigated crops buying fewer (and perhaps less costly) inputs from allied industries. Because dryland crops are less labor intensive than irrigated crops, fewer workers are needed during the cropping season. In addition, the appraised value of the farmer's land decreases, reducing tax revenues to the local government. Overall, the economic activity generated by the cropping enterprise is smaller.

The reduction in economic activity depends proportionally on the water quantity's contribution to the local economy. For instance, a large-scale transfer might significantly reduce economic activity if the land that is shifted from irrigated cropping to dryland cropping comprises a large share of the local government's tax base, or if the landowner's purchases comprise a large share of local businesses' gross sales, or if the landowner is a relatively large employer.

Third parties might mitigate economic losses by developing new lines of business, and local governments might consider public investments that ultimately lead to increased tax revenues. Given enough time, workers can seek other employment or training in a new occupation. Of course, the ability to respond depends importantly on how economically diverse the community might be. In addition, the time that passes between when the water transfer occurs and when the economic impact is felt is important. The greater the time between the transfer and the economic effect, the better able third parties will be to adapt to the economic loss.

Compensation Principles

If third party compensation is deemed appropriate, a number of principles might be applied to estimate the reduction in economic activity including:

Local Government Impacts

Governments experience decreased tax revenues because the appraised value of irrigated land decreases as it is converted to dryland cropping. One estimate of tax revenue losses is the difference between taxes on comparable irrigated and dryland farms. Of course, the tax revenues are lost for multiple years, so the net present value of the tax differences might be used as a compensation measure. This calculation is relatively straightforward.

Local governments experience indirect tax revenue losses in addition to the direct effects mentioned previously. If the water transfer is large enough, property values may fall throughout the basin whether irrigation exists or not. In addition, local governments may experience increased costs if they assist displaced workers. Offsetting these losses might be a reduction in services that follow a shift from irrigated to dryland crops. In addition, if irrigated land is placed in a

Local governments could use compensation as a safety net for displaced workers or local businesses. The government might also seek to invest in projects that replace the lost revenue stream associated with the water resource. Of course, local governments might spend money for investigating the best way to generate economic development. In some instances, the economic activity generated by local government investment might be greater than that lost from the out-of-basin transfer.

Allied Businesses and Households

Allied businesses and households might be considered for compensation when suffering losses from water transfers. Economic impact analysis can gauge the importance of irrigated agriculture to the basin, and provide insight into a water transfer's indirect effects. Indirect effects include the lost revenues to crop consultants, fertilizer dealers, and other agricultural businesses. Indirect effects also include household spending of employees whose income is derived from the water resource.

An economic impact estimate can be derived using "multipliers." A multiplier is a term referring to the total amount of economic activity or the impact gener-

ated by a dollar of sales. Multipliers are generated from input/output analysis, and this analysis is based on historical economic data. A multiplier can be derived for use of the water resource; however, caution must be taken when using multipliers. As such multipliers are a snapshot of the basin's economic activity. A sufficiently large water transfer will alter the input/output relationships beyond that represented by historical data. Further, impact multipliers do not take into account new lines of business that might be generated in response to water transfers. Consequently, these multipliers typically overstate the economic losses for large-scale events.

Compensation in HB 03-1113

The legislation HB 03-1113 suggests that compensation be equal to the difference between appraised value of land in its irrigated or its dryland state. This net appraised value approach accurately depicts the economic loss of productive capacity to the landowners who sell water rights. However, the landowners are compensated for their loss by sale proceeds else they would not complete this voluntary transaction. At the same time, third party effects can be significant for large water transfers, and compensation may be appropriate. A local government's compensation might be based on the net present value of lost taxes, and these taxes are derived from a change in land value. Losses to allied business and households are not directly attributable to land; rather, these effects are based on lost sales revenues, input purchases, and employee compensation. Thus compensation found in HB 03-1113 will not be directly tied to allied business losses for out-of-basin water transfers. Impact multipliers are more appropriate for gauging these losses because they are based on sales revenues and employment compensation rather than land values.

Several sources of information exist to calculate compensation measures. As an example, county governments regularly appraise the value of irrigated and non-irrigated land. Tax assessment, based on comparable lands, might be used to approximate the net present value of lost tax revenues to local governments. Input-output analysis can be performed for Colorado counties using publicly available data, as has been employed by the Center for Research on the Colorado Economy (CRCE). With time, additional labor, and additional research, standard input-output models can be adopted to address third party impacts of water transfers.