

1989

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Recommended Citation

Easter, K. W., & Becker, N. (1989). Interbasin Water Transfers: An Economic Panacea or a Political Ploy?. *Journal of the Minnesota Academy of Science*, Vol. 55 No. 1, 154-157.
Retrieved from <https://digitalcommons.morris.umn.edu/jmas/vol55/iss1/26>

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Interbasin Water Transfers: An Economic Panacea or a Political Ploy?

K. WILLIAM EASTER and NIR BECKER

ABSTRACT—New concern about the open access nature of the Great Lakes was sparked by the 1982 Sporhase Supreme Court Decision which limited states' power to prevent interbasin water transfers and was intensified by the 1988 drought in the Midwest. In response to the court decision, the Great Lakes Charter was adopted which established a set of management rules for new interbasin water transfers and other consumptive water uses. However, not all Great Lakes states have implemented the Charter provisions and, even if they did, it is not clear that the Charter objectives could be reached. The big losers from a large interbasin water transfer would be hydropower and navigation interests. The states most affected would be New York and Michigan, along with the two Canadian provinces, since they produce and use most of the hydropower on the Great Lakes. It appears that, given the high costs of large interbasin water transfers, they could not be economically justified, particularly those designed to provide irrigation water for the southwestern states. Only small water transfers for urban or industrial uses would have a chance of passing any economic efficiency or political test.

Transferring water over long distances is nothing new for the United States. Even within the Great Lakes basin, there are five major water transfers (see Table 1). The ones we hear the most about are the Chicago diversion out of Lake Michigan and the Long Lac and Ogaki diversions into Lake Superior. During the drought in 1988, there were attempts by the Governor of Illinois to have the Chicago diversion increased so that transportation would be improved downstream in the Illinois and lower Mississippi rivers. Similarly, the Governor of Minnesota attempted to increase the flow of water in the upper Mississippi by requesting larger water releases from northern Minnesota lakes in the Mississippi headwaters. In contrast, during the record-high Great Lakes levels in the middle 1980s, there were calls to reduce the Long Lac and Ogaki diversions because they were causing some increase in already excessive lake levels.

Thus wet periods and droughts both seem to raise the issue of water transfers. In addition, two 1980 court decisions intensified the level of concern among Great Lakes states legislators. "The Supreme Court ruled in *Sporhase v. Nebraska, ex rel. Douglas*, (1), that groundwater is an article of commerce and subject to the commerce clause of the U.S. constitution. As a result, Nebraska could not forbid the transfer of groundwater across its state line. Upholding and reinforcing the Sporhase decision, the 1983 *El Paso v. New Mexico* decision (2) struck down a New Mexico prohibition of water exports. Thus any attempt by the Great Lakes states to legislatively embargo interstate water transfers strictly for economic reasons will likely be held in conflict with the U.S. commerce clause (3)."

These court decisions have heightened concerns because of the growing water problems facing southwestern states and the continued shift of U.S. population to the sun belt. This increased population in the Southwest means that their

political power relative to the Great Lakes states will increase. In addition, since the Great Lakes contains over 90 percent of the fresh surface water available in the 48 contiguous states, areas with water deficits look at the lakes as a source of new water. Thus the Great Lakes states and Canadian provinces are concerned that, as the political power of the southwestern states grows, these states will be able to take "their" water. Now that perceived legal blocks to such bans on water transfers no longer exist, the concern has reached new levels.

New Rules for Managing the Great Lakes

In response to new restrictions on the states' ability to use their policy power, two actions were taken to help eliminate the possibility of new water transfers. In 1985, the eight governors and two premiers agreed to coordinate water quantity management among all Great Lakes states and provinces by signing the Great Lakes Charter. This was important because the Sporhase decision requires that any effort to regulate water withdrawals had to regulate intra- and

Table 1. Water diversions involving the Great Lakes

Diversion	Quantity (cfs)	Benefits	Average Change in Lake Levels
Long Lac and Ogaki (into Lake Superior)	5,600	Hydro-electric power and transportation of logs	8 cm
Lake Michigan-Chicago River	4,167 (before 1980) 3,200 (1980 to Present)	Navigation, recreation, water quality, and hydro-electric power	-6 cm
Welland Canal (from Lake Erie to Lake Ontario)	8,000	Navigation, water quality, hydroelectric power and water supply	-13 cm
NY-Barge Canal (Niagara River to Lake Ontario)	700	Navigation	No Change

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interstate diversions in the same manner. States could protect against unwanted diversions by enacting statewide water plans that make water preservation an integral part of the plan (4). The charter encourages all states and provinces to adopt water plans that include water preservation as an integral part of the plan. It also requires that states and provinces provide prior notice and consult with other states and provinces before water transfers or new large consumptive uses are approved. Yet to be effective, the provisions of the charter must be adopted by each state legislature. Thus far, five of the eight U.S. Great Lakes states and the two Canadian Great Lakes provinces have essentially adopted the charter provisions: Minnesota, Wisconsin, New York, Illinois, Ohio, Ontario and Quebec. The other three states have not acted, which is surprising, particularly for the State of Michigan.

The second action involves *U.S. Public Law 99-662* which prohibits any interbasin water diversion from the Great Lakes, unless it is approved by all the governors in the Great Lakes states. The public law essentially prohibits all diversions; in comparison, the Charter seeks to regulate all water withdrawals out of the Great Lakes larger than a specified size. The public law makes the Charter's non-binding principle of notification binding for interbasin diversions but not for other consumptive uses or intrabasin diversions. In addition, the public law applies only to the U.S., while the Charter applies to both the U.S. and Canada.

Neither the Charter nor *Public Law 99-662* were needed in the summer of 1988, when attempts were made to increase the Chicago diversion. The 1967 U.S. Supreme Court limitation of 3,200 cfs on the diversion was enough to stop any increase. Canadians, as well as some of the U.S. governors, complained when the possibility of increasing the diversion was first suggested. Even if the Canadians and all eight Great Lakes states governors had supported the increased diversion, it is not clear that the increase could have been implemented due to the Supreme Court limitation.

Economic Considerations

From an economic perspective, should the Great Lakes states be interested in trying to trade or sell their water? If some western state were willing to pay \$400/ac · ft of water, why not sell the water and use the revenues to pay for roads, schools, and health care? For example, the State of South Dakota was willing to sell Missouri River water to the ETSI Pipeline Company for a coal slurry pipeline from Wyoming to Arkansas. This sale was to occur between two parties and ignored downstream uses which could have been precluded by the transfer during periods when water was not in surplus. In other words, such simple trades are much like private market transactions which ignore important negative externalities. Only the drop in energy prices and the resulting abandonment of the coal slurry project stopped the sale.

Water is not like other goods that can be consumed or used to produce other commodities without having a direct impact on other individuals. In addition, there are no markets for Great Lakes water that would discourage water consumption and encourage conservation. The value of water also varies by location, quality, and time of availability. Excess water in the spring may actually have a negative value to the Great Lakes during years of high lake levels. Finally, non-consumptive water use makes it difficult to obtain an appropriate value for water. The use of runoff, return flows, and seepage water may make it impossible even for a state to capture the full value of a given quantity of water.

“The quantity and quality of water available for use at one location may be affected by water use, waste disposal, or weather modification practices at another location. It is this interdependence of water users that gives rise to many water issues and complicates the ‘rules of the game’ by which water is managed (5).”

Thus, in general, it is not good water policy to allow the “market” to determine the question of interstate water transfers. Of course, that is not to say that the water should not be priced or that the markets should not play a role in allocating water. To better understand the economic issues, let us consider the economic model suggested by Howe and Easter (6). They point out that many proposed water transfers would involve large investments which are long-lived and have major impacts on the environment. The long life means that the water systems will be unable to incorporate future technological innovations and may involve irreversible changes (e.g., the central Arizona project). The Howe-Easter model involves a two-stage test of the economic feasibility of water transfers. The first stage requires total benefits derived from the transfer to exceed the project costs plus any costs imposed on others by the project.

$$DB_m + SB_m > DC_x + SC_x + SC_c + TC + S + PB(1 + \alpha)^t$$

In other words, the increase in net incomes [direct project benefits (DB_m) + secondary project benefits (SB_m)] in the importing states (m) must exceed the loss of income in other states [direct losses in exporting region (DC_x) + secondary losses in exporting region (SD_x) + displacement costs in other regions (SC_c)] plus the project construction and management costs (TC) and any losses in preservation benefits (PB) all discounted at the appropriate rate. The second condition requires that the discount project costs (TC) be lower than the discounted costs of the next best alternative (TC_a).

$$TC < TC_a$$

In other words, if there is a cheaper way to provide the water, then the transfer is not the economically efficient choice.

The direct project benefits (DB) are the direct economic gains from the project such as improved navigation or increased irrigation. The secondary project benefits (SB) are those increases in net incomes from activities related through the market either as input suppliers for, or processors of, project outputs. These income increases must be ones which would not have occurred without the project. On the other side of the equation are all the losses caused by the projects such as the loss in the direct and secondary economic benefits to the exporting states ($DC_x + SC_x$). In other words, what is the value of water uses precluded in the exporting region by the water transfer? An added cost may also arise in other regions when the exported water is used to increase agricultural crop production. This will occur when the U.S. has surplus agricultural production capacity and the transfer displaces crop production in other regions or raises federal commodity program costs (SC_c). Finally, the largest cost, in most cases, will be the cost of building and managing the project (TC).

Losses in preservation benefits involve two aspects. First, the demand for preservation benefits is likely to increase more rapidly than the demand for development benefits from most diversion projects. Thus preservation benefits (PB) are multiplied by a factor $(1 + \alpha)$ which accounts for this difference in demand growth. Second, when there are

irreversibilities and uncertainties regarding the project's outcome, there is a benefit from delaying development until more is learned about the possible outcome (7). Thus Krutilla and Fisher (8) suggest that a shadow tax (S), which represents the value of information gained by waiting, be included in the investment criteria.

If we apply this criterion to the Great Lakes, the likely impacts on the Great Lakes will involve: navigation, hydropower, shoreline erosion, recreation, waste disposal capacity, and domestic and industrial water supplies. The major losers from a diversion will be navigation and hydropower. For example, a major diversion of 10,000 cfs would cause lake levels to drop from 5 to 8 inches and would involve a loss of about \$70 million annually to hydropower and navigation. Ninety percent of this loss would be due to reduced hydropower production, and the remainder would be caused by lighter loads in cargo ships (9). In contrast, the same diversion could reduce shoreline erosion costs and may have some impacts on domestic and industrial water supplies and recreation.

Depending on how the diverted water is used, its value can range from \$10 to \$400/ac · ft (10). For large transfers, the only feasible uses appear to be irrigation and possibly in a few dry years, navigation (the major benefit from increasing the Chicago diversion in 1988 would have been improved navigation). If the transfer is for irrigation, then the range in water values will not exceed \$50/ac · ft.

Rough cost estimates put the cost of large water transfers out of Lake Superior just to the Missouri River basin at \$200 to \$300/ac · ft (11), depending on the discount rate. This, of course, is much different from the cost of releasing a little more water out of the Chicago diversion. A new transfer would involve digging new channels as well as pumping water out of the Great Lakes basin. These costs would rise by another \$200 to \$300/ac · ft if the diversion was designed to deliver water to agricultural areas facing increased water shortages, such as the high plains of Texas (12). Such diversion would involve major capital costs, as well as high power costs required to lift the water to the high plains.

However, the situation may be quite different if we are talking about small diversions within the Great Lakes region. For example, what if New York wanted to transfer water to New York City, which is outside the Great Lakes basin, or Illinois wanted to transfer water south for urban water use? When the transfer is small, the negative impacts on the Great Lakes, DB_m and SB_m , are likely to be small. In addition, if the water is for urban use, the benefits will be high and there will not be any displacement effects in agriculture. Consequently, the major concern should be the cost of the transfer and the cost of alternative sources of water. Environmental impacts of the project will also have to be considered, since even small transfers might have significant environmental impacts in the areas where the pipeline or canal is built. The bottom line will be whether or not the benefits can cover project construction and management costs as well as environmental costs.

Political and Distributional Concerns

Since water transfers from the Great Lakes can have impacts on eight states and two Canadian provinces, political considerations may be more important than economic considerations. The politics is complicated by the fact that the distribution of benefits and costs of proposed transfers is not uniform. For example, the major losers in a large water transfer would be the two Canadian provinces and the states

of New York and Michigan, since they produce and use most of the hydropower in the Great Lakes. Other states would lose some from navigation, but this is small relative to the possible hydropower losses (9).

On the benefits side, those that stand to gain the most would be the states like Illinois, which have the easiest means of transferring water. In periods of drought, Illinois can obtain significant benefits from increasing the Chicago diversion but the other states would lose. To illustrate, an increase of 5,000 cfs in the Chicago diversion would have a small but significant impact on Minnesota. The annual losses could reach about \$250 thousand during periods of low lake levels. A similar diversion out of Lake Superior would have a slightly larger negative impact on Minnesota, but Minnesota could receive some benefits from using or selling the diverted water.

Because of these distributional impacts, it will be difficult to get all the Great Lakes states and provinces to agree to support any water transfer, even if it would produce substantial net benefits. In such cases, only the U.S. and Canadian federal governments might be able to impose an economically efficient solution on the region. Yet the Great Lakes states and provinces seem to fear such an outcome because they may have to bear most of the costs.

Another possibility would be for the states receiving most of the benefits from a transfer to share the benefits with other Great Lakes states and provinces. How this could be done is not clear and would have to be negotiated. It would mean developing new institutional arrangements within the Great Lakes, possibly through the International Joint Commission. This might be done by developing a system of transferable permits that would allow a sharing of benefits as well as allow water to be allocated to its highest valued uses (3). As discussed above, five of the states already require water permits, although their transferability is limited. Such institutional arrangements could pay high dividends, particularly in a future with greater water demands.

Conclusion

The Great Lakes states and provinces will, in the future, face increasing pressure to make more efficient use of their water. This could mean use of Great Lakes water in new areas with growing water demands. How the Great Lakes states and provinces will respond to such pressures is not completely clear. In the past, their reaction has been to say "no." However, if new institutional arrangements could be developed so that the benefits and costs from water transfers are more evenly shared, this reaction might change. Certainly, we should not reject, without careful study, the possibility of raising our standard of living by selling Great Lakes water. This assumes that the Great Lakes states and provinces have the legal rights to sell or trade the Great Lakes water, an issue which is has not yet been resolved.

We should stop worrying about large scale water diversions that are so uneconomical as to be nonsensical, and concentrate instead on more important issues that are facing the Great Lakes. Specifically, more emphasis is needed on managing consumptive water uses within the basin and on evaluating small water transfers that might be beneficial to the region.

Acknowledgements

Journal Reprint No. 237. This work is the result of research sponsored by the Minnesota Sea Grant College Program supported by the NOAA Office at Sea Grant, Department of

Commerce, under Grant No. NA86AA-D-SG112. The U.S. government is authorized to reproduce and distribute reprints for government purposes, notwithstanding any copyright notation that may appear hereon.

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