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Wind River Export Study - Level I
Phase I and II
Executive Summary

Submitted to:
Wyoming Water Development Commission

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January 2002
Wind River Export Study - Level I
Phase I & II
Executive Summary

Submitted to Wyoming Water Development Commission

Submitted by ECI
January, 2002
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Wind River Export Study – Level 1
Executive Summary

PURPOSE

The objective of this Level 1 Reconnaissance Study of the Wind River Export Project is to assess the potential of exporting water from the Wind River basin into adjacent basins to benefit the Wind River Indian Tribes. Many issues complicate this concept of exporting water and thus the study. Tension among water users, including Native Americans, other agricultural irrigators in the basin, hydropower, environmental, and recreational interests have resulted in a challenging water resource management arena. Managers and water regulators must now balance water use among a wide array of natural resources benefits, while still meeting contractual water delivery and other legal requirements. Interstate compacts and tribal reserved water rights further complicate water use issues in the Wind River Basin. This summary presents the results of the two-phased study that covered eighteen months of investigations and careful consideration of the many issues involved with this subject.

INTRODUCTION

Settlement and economic development of Western United States was largely the result of successful development of the region’s water resources. Transbasin water transfers linked to construction of large water storage dams to provide firm yield or drought insurance were an important component of this development. Changes in regulatory requirements, federal funding, environmental and institutional issues during the last 30 years have significantly increased the cost and time needed to permit and construct a transbasin water diversion and the associated large storage projects. A successful new diversion project must balance public sentiment, in terms of structuring a win-win (cooperation for mutual benefit) strategy for both the basin of origin and the receiving basin stakeholders. If this is done, it is possible to obtain the requisite permits and build a project like the Wind River Export alternatives being analyzed in this study.

The value of water rights now available to the Northern Arapaho and Eastern Shoshone Tribes (Tribes) has been recognized by the recent settlement of the court case between the state of Wyoming and the tribes. The tribes were awarded substantial amounts of water with an 1868 water right for development within the Wind River Reservation. The Wyoming Water Development Commission (WWDC) formulated the Wind River Export Study (Study) to assess the potential for leasing or potentially selling some of the Tribes’ water rights to other users. From the onset, it was known that a successful export project would depend on appropriate legislation being passed to permit this type of out-of-state transaction. With that understanding, it was agreed that the Study’s goal is to analyze the feasibility of exporting water to other areas that need water through water conveyance systems that potentially might yield a fair return on the investment.

For the purpose of first looking at alternatives then developing more detail on a selected alternative the study is divided into two phases. The objectives of the study are to:

- Determine quantifiable water demands outside the basin and predict that demand’s growth into the future.
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- Develop and cost at the prefeasibility level, water conveyance systems (diversions, pumps, pipelines, tunnels and power) to move the water out of the Wind River basin and into the Platte basin or the Upper Colorado River watershed.
- Analyze and define the firm water yield available for potential export alternatives.
- Assess the potential of the receiving entity willingness to defray the cost of developing the supply system.
- Assess the environmental concerns and permit requirements.
- Help build the relationships required to develop a potential transbasin diversion and associated storage project.

PHASE I – ALTERNATIVE ROUTE EVALUATION AND COMPARISON

Phase One consists of eleven tasks that deal with need assessment; water availability analysis; diversion and water conveyance route identification, layout, sizing, and costing; field work; constraint identification; and screening to help select an alternative to carry into Phase Two. High points of Phase One are in the following paragraphs.

Needs Analysis and Demand Projections

Utilizing master plans, planning studies, pre-feasibility and feasibility studies obtained from the WWDC, the State of Wyoming and others, plus documentation on the potential environmental water needs within the Platte River basin in Wyoming, Nebraska and Colorado, a list of growing water needs were developed. Additional surface water needs within northern Colorado were also identified through discussions with personnel familiar with future water supply requirements. California and Nevada water resource agencies were asked and did provide documents that indicate growing future water demands.

After a thorough review it was determined that the municipal need in the North Platte River basin should grow to over 18,000 acre-feet per year over the next 40 years, there is already an environmental need of over 80,000 acre-feet per year on the Platte River system, and there is growing demand documented in the Northern Colorado region.

Evaluation of Potentially Available Wind River Supplies

The objective of this part of the study is to estimate the availability of water that could be diverted from the Wind River basin. An important study consideration is the firm yield of a supply that may be sold or leased during a drought period. Drought protection water, firmed by storage, to meet the municipal needs during a 30 to 50 year frequency drought, will result in a very valuable commodity.

Leasing and Water Marketing

The physical ability to export water is directly tied to how the State/federal/tribal end-user agreements will have to be structured to protect the marketed water in order to insure its delivery at the proper flow rate and timing to the agreement. Because this conveyed water will co-mingle with native waters in the receiving streams (i.e., the North Platte River or Colorado River) that
extend beyond Wyoming, the federal government, through the Bureau of Reclamation (USBR), becomes involved and river Compact issues must be considered. To achieve this protection means negotiations, legislative action, and legal challenges to achieve concurrence of the Compact states involved. It is important to note that the issue of the Tribes leasing a portion of the Wind River water assets may prove to be less politically challenging for the USBR.

The only method deemed possible that will not cause the Tribes to lose their water rights under the existing Wyoming State Law is through potential tribe leases. When the tribes want to utilize the water in the basin they will need to wait until the lease agreement is up and not renew it. Again it is important to note due to the chance that a lease is not renewed, the value of a water lease would be small.

**Water Availability Analysis and Results**

The evaluation of the availability of flows for export is through the use of the existing Wind River Wyoming Integrated River System Operation Study (WIRSOS) model. This model was developed specifically for evaluation of Wind River Basin water resources to provide the most easily obtained accurate assessment of flow availability and project impacts. Summarized in Table ES 1 is the amount of water available on an average per year from the model flow records for export to existing water rights before the existing water diversion and storage decrees are satisfied.

<table>
<thead>
<tr>
<th>Source Name</th>
<th>Storage (AF)</th>
<th>Avg. Ann. Yield (cfs)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boysen Reservoir</td>
<td>549,867</td>
<td></td>
<td>This water is available first to senior water right holders, second to junior right holders, and finally to the project.</td>
</tr>
<tr>
<td>Bull Lake</td>
<td>151,015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind River</td>
<td>798,016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Wind River</td>
<td>403,132</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Papo Agie</td>
<td>256,490</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bull Lake Creek</td>
<td>215,320</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The WIRSOS Model and Study Approach

The WIRSOS Model is a computer model developed for the State of Wyoming as a tool for defining and quantifying the impact to water rights, which result from changes in the general allocation of water rights in the river basins of Wyoming. The State of Wyoming also uses WIRSOS as a tool for evaluating water resource projects and administering the State’s water resources. For this Study the model is run with new diversion points established to export flow in accordance with set assumptions as outlined below. Analysis focuses on various potential diversion points for the best conveyance routes to a potential water market. Potential export routes and diversion points are described below.

Export scenarios vary according to:
Wind River Export Study – Level 1
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- Diversion rate 50, 100, 200, or 300 cfs;
- Period of diversion year-round (diverting when in priority throughout a 12-month period) or summer only (diverting, when in priority, the six months from April through September);
- Type of water right direct flow only or direct flow with ability to call on stored water in case of shortages; and
- Future Developments with or without senior demands for the proposed Riverton East Irrigation Project

All runs follow a set of assumptions and conditions as shown below:

1. All runs were conducted using the 50-year historical modeling period of 1946 to 1995.
2. All direct flow diversions for export occur with a year 2000 priority date available in the existing model used in the court case. Evaluation of scenarios in which transferred future water rights with an 1868 priority date are used for export was not conducted.
3. All export scenarios, in which storage from reservoirs is available, first diverted directed flows under a 2000 priority date and then requested additional supplies as needed from storage to make up any shortages that may exist. Additionally, only the reservoir storage volume limits the amount of reservoir storage available for export under these conditions. The six-month limit was used to facilitate a shorter supply and demand cycle.

Conclusions drawn from the water supply investigation and WIRSOS model operational studies include:

1. A firm or normal drought proof water supply does not exist at any of the proposed diversion points to support an export diversion with a 2000 priority date unless new reservoirs are constructed, except for the ones at Boysen Reservoir using a 50 cfs diversion rate. At Boysen Reservoir, firm yields between 21,000 and 188,000 acre-feet per year are available for export depending on all the other constraints.
2. The availability for diversion under an 1868 priority date is unknown. Based on the data evaluated, however, it can be assumed that a firm supply would be available in all except very dry years when averages are below 25 percent. Also, because of the amount of excess waters apparently available under a 2000 priority in most years, it can be assumed that impacts to existing rights would not be significant in most years. During dry years, however, impacts could be very severe.
3. In terms of ranking the various potential diversion locations listed below by water availability: Boysen Reservoir is the best, followed by Riverton, Wyoming Canal (both on the Wind River), and Bull Lake.
4. The current results indicate that some modeling discrepancies exist. In particular, those scenarios in which a reservoir supply is used to support export diversions are believed to require additional analyses. Additional effort in future investigations would be required to fully resolve these issues.
Potential Diversion Points

For this study, the WIRSOS model examines the water availability at potential export diversion points throughout the basin. Potential export diversion points selected for analysis include:

- At or below Boysen Reservoir;
- Near Riverton and the confluence of the Little Wind and the Wind River;
- Upstream of the Wyoming Canal Diversion Dam;
- At Bull Lake; and
- Above Bull Lake in the Alpine area.

All diversion points take water from the Wind River basin, which in turn will impact the US Bureau of Reclamation facilities. All diversion points were located in areas of minimum cultural and environmental impact except for the Alpine diversion point.

Diversion point selection was based on the ability to support a pumping plant with a suitable intake and supply of water. Diversions on Boysen, Bull Lake, Seminoe, and near the Diversion Dam for the Wyoming Canal, support pumping without significant draw down of an existing reservoir water level. Diversions on Boysen and Seminoe are in a deep reservoir inlet. Those at the Diversion Dam and Bull Lake are downstream of the dams and connected to the reservoir with an outlet pipe.

Diversion points on rivers like Riverton require a diversion structure like a weir. Such structures are sized to store at least 12 acre-feet of water.

Potential Pipeline Routes

Route selection considers the siting and operational issues of locating pumping stations to minimize power line extensions and substation construction. Other factors influencing the routing are construction cost estimates and easement acquisitions. Plan and profiles developed using USGS Quadrangle maps in electronic format supported this analysis effort. Following the water conveyance route analyses, reconnaissance-level construction cost estimates of the pipelines and diversion structures were developed.

Selection of two potential corridors to convey water from the Wind River Basin to the North Platte River followed the identification of the potential water markets areas and diversion points. In general these two corridors, Routes A and B, are East (from Boysen Reservoir to Casper, Wyoming) or South (from the Wind River near Riverton, Wyoming to the Sweetwater River near the Highway 287 bridge) respectively. A third potential corridor, Route C, to the Green River was also investigated. Route C would convey water from the Wind River at the Diversion Dam (near Crow Heart) or Bull Lake or near Alpine Lake southwest across the Divide using a tunnel to the Green River. An extension of the Wind River basin to North Platte River transbasin system added later uses a pipeline from Seminoe Reservoir via Laramie to Northern Colorado, this was called Route D.
For potential route locations see Figure ES -1 and ES - 2. A lengthy discussion of the pipeline route alternatives and sub-alternatives is in the report.

**Permitting/Environmental Constraints and Mitigation**

In today’s regulatory environment, there is an ever-increasing necessity to strike a balance between needed transbasin diversion and associated water storage projects and environmental mitigation and enhancement strategies. When the stakeholders ultimately negotiate this balance, a successful project usually develops. To assist that effort this task includes the identification of permits and clearances necessary for construction of the identified alternatives. It is likely that a long pipeline/pumping station system would require full NEPA compliance requiring an EIS for project construction. The following is what would be required at a minimum to permit an export project of this magnitude:

1. Cultural Resources Investigations.
2. Section 404 Dredge and Fill permit from the U.S. Army Corps of Engineers, Omaha District. This permit will be required to construct the intake. It would also be required for each stream crossing.

In addition to the U.S. Army Corps of Engineers Section 404 Permit, there are a host of additional permits/approvals required for new dam [weir] construction. Presented below are the primary additional permits/approvals needed:

1. Wyoming State Engineer’s Office Surface Water Storage Permit.
2. Wyoming Department of Environmental Quality – National Pollution Discharge Elimination System (NPDES) permit and Section 401 Certification.
3. U.S. Fish and Wildlife Service Endangered Species Act Compliance (Section 7)
4. U.S. Department of Interior – Advisory Council on Historic Preservation (Section 106)
5. State of Wyoming Historic Preservation Office (SHPO) Archaeological Clearance

Environmental investigations postponed to the second phase to allow a focus of this type of work on the selected alternative were minimized since a selection of a preferred alternative was never made. For costing purposes based on our experience on similar projects, the permitting and mitigation would cost about 15 percent of construction cost estimates.

**Recommended Alternatives**

In general, the cost per acre-foot of water decreases as the quantity of water increases. Specific comparison of the costs between water conveyance routes A, B and C indicates that the capital cost and cost per acre-foot for Route B are the lowest and overall, the costs for Route B2 is the most economical. Table ES 2 gives the construction cost of a mid-size project.
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Table ES 2: Alternative B2 Detailed Construction Cost Estimate for 150 cfs system

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>No.</th>
<th>Unit Cost</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversion Dam &amp; Intake Structure</td>
<td>L.S.</td>
<td>1</td>
<td>$2,114,400</td>
<td>$2,114,400</td>
</tr>
<tr>
<td>Pump Stations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Parts</td>
<td>L.S.</td>
<td>4</td>
<td>$5,080,400</td>
<td>$20,321,600</td>
</tr>
<tr>
<td>Structural</td>
<td>L.S.</td>
<td>4</td>
<td>$864,500</td>
<td>$3,458,000</td>
</tr>
<tr>
<td>Civil</td>
<td>L.S.</td>
<td>4</td>
<td>$33,000</td>
<td>$132,000</td>
</tr>
<tr>
<td>Electrical/Switchgear/MCC</td>
<td>L.S.</td>
<td>4</td>
<td>$1,097,400</td>
<td>$4,389,600</td>
</tr>
<tr>
<td>Electrical Substation, Switchyard</td>
<td>L.S.</td>
<td>4</td>
<td>$2,377,400</td>
<td>$9,509,600</td>
</tr>
<tr>
<td>Pipe, 70” Diameter.</td>
<td>L.F.</td>
<td>184,320</td>
<td>$710</td>
<td>$130,866,700</td>
</tr>
</tbody>
</table>

Capital Cost of Project Components in 2001 Dollars $170,791,900

The combination of B2 and D1 provides a reasonable option if larger quantities of water can be leased or sold, this combination could serve Laramie, Cheyenne, and the Northern Colorado needs. Such a combination could lead to a coalition that may be willing to pay $1000 per acre-foot per year for a firm yield under a long term lease.

During several meetings with the Tribal Water Board, discussions were held to explore the potential of developing a high value branded water export program centered on bottling water as contrasted to large “bulk water” export. There was strong interest in the concept because bottled water is Americans general public fastest-growing drink. As discussed with the Tribes and WWDC, the current bottle of choice is shipped 5,500 miles across the Pacific Ocean from the Fiji Islands. The Tribes appear to have a parallel opportunity to provide a similar product, but with a far greater sales story to market. After September 11, the visibility of sabotaging public drinking water is on the news frequently. This will accelerate the market for high quality bottled water.

The recommendation was to carry B2 into Phase II to better define the economics, permit issues, and environmental concerns. Also, the potential of developing and effectively marketing the product through a water bottling plant on the Wind River Reservation is more fully explored.

PHASE II - EVALUATION OF RECOMMENDED ALTERNATIVES

Phase Two consists of five tasks that finalized the hydrology, water rights, funding sources and conceptual design for the selected alternative. High points are in the following paragraphs.

Hydrologic/Water Rights Analysis

At a minimum, about 36,000 acre-feet per year of Wind River Tribal water may be available for export if the legal, permitting and institutional framework can be developed to allow these types of transactions. This total is based on the modeling of export water with storage available in an existing reservoir and using a 2000 water right. If the 1868 water rights granted for irrigation were converted to export purposes under a new agreement with the State then this yield could increase. The current Wyoming legal framework does not allow sale of water outside the State.
Additionally, any depletion caused by transbasin diversion from the Wind River would be of concern to the signatories of the Yellowstone River Compact. Issues with the Yellowstone River Compact signers [Wyoming, Montana and North Dakota] who have apportioned the flows of the Clarks Fork and developed Article 10 of the compact, which restricts out-of-basin diversion, would also need to be addressed.

Conceptual Designs and Cost Estimates

Transbasin analysis used various flow rates over six month and year-round durations, to capture a range of potential delivery option's costs, size, impacts, and constraints.

Of the alternatives studied, the pipeline route to the North Platte, Route B-2, via the Sweetwater River is the more economical and less environmentally sensitive. When combined with Route D-1, the potential to provide water to areas of high demand in Colorado is realized. Table ES 2 shows the capital cost breakdown for B2 at 150 cfs to be $170,791,690. The capital cost of the D1 piece is $481,256,900. These capital costs do not include necessary development costs associated with bringing a project to fruition, nor do they include the annual operation and maintenance cost.

The estimated annualized capital cost in 2001 dollars of an acre-foot at an average discharge exported under Alternative B2 is $228.5 [$170.8 million annualized and divided by 54,300 acre-feet per year], with the assumption that 100 percent of the cost is payable through a 30-year loan. The estimated annualized capital cost of an acre-foot of water exported under Alternative D-1 is $643.9. Both of these costs could be reduced if grant money is found.

Project costs include engineering/permitting/legal/construction management and the associated probable years of litigation that a “ground-breaking” project of this magnitude would engender. This process would probably take 10 years or more to align the legal, permitting and institutional issues in order to move the project forward. Tables ES 3 and ES 4 show the “project” cost breakdown for the two alternatives [B2 and B2 with D1] respectively.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (in $ Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of Final Designs and Specifications</td>
<td>$17.1</td>
</tr>
<tr>
<td>Permitting and Mitigation</td>
<td>$12.0</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$12.0</td>
</tr>
<tr>
<td>Acquisition of Access and Rights of Way</td>
<td>$2.0</td>
</tr>
<tr>
<td>Cost of Project Components</td>
<td>$170.8</td>
</tr>
<tr>
<td>Construction Cost Sub-Total # 1</td>
<td>$213.9</td>
</tr>
<tr>
<td>Construction Supervision Costs = CCS # 1 x 10%</td>
<td>$21.4</td>
</tr>
<tr>
<td>Construction Cost Subtotal # 2</td>
<td>$235.3</td>
</tr>
<tr>
<td>Contingency – CCS # 2 x 25 Percent</td>
<td>$35.3</td>
</tr>
<tr>
<td><strong>Project Cost Total in 2001 Dollars</strong></td>
<td><strong>$270.6</strong></td>
</tr>
</tbody>
</table>
Table ES 4: Alternative B2 and D1 Combined Final Cost Estimate

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (in $ Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of Final Designs and Specifications</td>
<td>$65.2</td>
</tr>
<tr>
<td>Permitting and Mitigation</td>
<td>$45.6</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$45.6</td>
</tr>
<tr>
<td>Acquisition of Access and Rights of Way</td>
<td>$7.6</td>
</tr>
<tr>
<td>Cost of Project Components</td>
<td>$652.0</td>
</tr>
<tr>
<td>Construction Cost Sub-Total # 1</td>
<td>$816.0</td>
</tr>
<tr>
<td>Construction Supervision Costs = CCS # 1 x 10%</td>
<td>$81.6</td>
</tr>
<tr>
<td>Construction Cost Subtotal # 2</td>
<td>$897.6</td>
</tr>
<tr>
<td>Contingency – CCS # 2 x 25 Percent</td>
<td>$134.6</td>
</tr>
<tr>
<td>Project Cost Total in 2001 Dollars</td>
<td>$1032.2</td>
</tr>
</tbody>
</table>

The costs for these activities increase the delivered water price by nearly 60 percent. Under Alternative B2, this results in a unit cost of $315/acre-foot/year. These costs do not include the annual operations and maintenance costs which, when included, increase the total annual cost. Under the combined Alternative B2 and D1, the cost per acre-foot per year is about $1,200.

Additionally, an enterprise to develop export water must also show a reasonable profit on the invested capital. A minimum return on investment of about 15 percent appears reasonable. Thus, the total project costs is about $362 acre-feet/yr and $1,380 acre-feet/yr, respectively.

The market for transbasin water at $370 per acre-foot/yr is limited to within Wyoming. Water at $1,065 per acre-foot/yr is double what most would pay in northern Colorado.

Funding Sources

The potential to finance and for garner of strong public support, an export project from the Wind River through the Wyoming Water Development Commission has challenges unless there is no injury to other water users. The loan/grant mix criterion presently applied by the WWDC limits grant funding for project sponsors to 50 percent of the total project cost. It may be difficult for the agricultural water users to make the payments on even a smaller percent WWDC loan while also paying for the operation and maintenance of a dam, reservoir and conveyance system.

One has to be mindful that supplemental agricultural water typically has a value in central Wyoming of $5 to $20/af/yr. However, in northern Colorado, one acre-foot of firm yield water will support two new houses. The price of these homes is $300,000 plus. Simply stated, if no firm or drought yield water is available, this results in no water tap being issued, thus no house is built. Thus, the capital cost for one-half acre foot at a price of about $7,000 to $10,000 is a small percentage of the total investment.

A major additional issue is that there is a very limited market for short-term (one to two years) leased water. The value of this water along the Platte River is perhaps in the $50 to $100/af/yr range. Water at this price will not be adequate to finance new storage projects, coupled with long export conveyance systems, without a massive subsidy.
Other funding sources that would not commit to a total amount or assurance of participating due to political reasons include the Bureau of Indian Affairs, U.S. Bureau of Reclamation and North Platte entities like irrigation districts or cities.

The Tribes can generate considerable income from a bottling plant as well as provide some employment opportunity. The associated costs for bottling 0.75 and 1.0 liter containers at the respective bottling speeds of 150 bottles per minute (approximately 0.0883 cfs) for one filling line is approximately $753,600. The bottled water wholesale price is estimated at $1.00 per liter.

Conclusion

Some of the more attractive markets for the Tribes’ water may be for mitigation strategies under the on-going Platte River Cooperative Agreement Governance Committees work. Of particular interest is the cost of firm yield per acre-foot from planned water storage facilities required to meet the mitigation needs. Water from the Tribes’ resources may directly offset the need for this storage, minus conveyance losses. There is a potential for exchanges up the South Platte River to access the potential market for the Tribes’ water in the very high priced Denver metropolitan market where senior surface rights have a value of about $15,000 to $20,000 acre-foot, equivalent capital cost. Leasing rates range from the short-term rates of under $100 per acre-foot per year to longer-term rates with those approaching 25 to 30 years at $500 per acre-foot per year. As noted, from this study, the cost of exporting water in a pipeline is more than most are willing to pay.

This Level I Reconnaissance Study concludes that its mission has been achieved. The results are an important benchmark in terms of establishing the technical viability of a bulk transbasin water project. On a periodic basis, this report can be updated as the western water markets and the legal/institutional framework shifts.

This export study concludes that:

1. The best export alternative is through a bottling plant. The associated costs and risks are low and the gains of employment and financial return for the Tribes is high.
2. The best conventional export alternative is a concept that will bring water in a pipe from the Wind River over the rim to the Sweetwater River and allow it to move into Pathfinder Reservoir. The capital cost for such a system with the capacity to deliver 150 cfs or about 54,000 acre-feet per year would be approximately $170 million. The total cost of the project would be about $271 million. For such a project to succeed, a user willing to pay about $362 per acre-foot per year for 30 years would need to be identified and help permit and fund the project.
3. The success of an export project depends on the need being developed and the State and the Tribes working out legal agreements.
4. The existence of other pipes and limited environmental impacts would facilitate the permitting of the pipeline construction.
5. New or additional storage is critical to the success of an export project.
6. Agreements with other states and compact agreements are essential in order for an export project to succeed.

The process of permitting and constructing transbasin diversions and their associated storage facilities has become lengthy, unpredictable and expensive. The successful water manager must respond to the social pressures and be more sensitive to environmental issues. The key for new water projects is to strike a balance between water needs and environmental needs, thus leading to preservation of our quality of life in concert with environmental values. The practice of transbasin diversion and associated dam engineering needs to continue to adjust to the emergence of new technical concepts with innovative and responsive permitting and design strategies.

In summary, the future work on the potential of export should include:

- Refinement of level one cost estimates to confirm the feasibility of the export project.
- An effort by the Tribes to secure the right to export water,
- The development of storage to secure the necessary water to export.
- A union between the Tribes and the State to resolve the legal and institutional issues.
- No further effort to export Wind River water to the Green River until the State can secure a use for their excess water in the Green River.
- Further study of the bottling plant alternative.
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WIND RIVER EXPORT STUDY

POTENTIAL WATER EXPORT ROUTES
A-1, B-1, B-2, C-1, C-2 AND C-3

FIGURE ES1
WIND RIVER EXPORT STUDY
POTENTIAL WATER EXPORT ROUTES
ROUTE D1
FIGURE ES2