

**Deschutes Water Alliance
Formation and Pilot Water Bank Project**

**Deschutes Basin Board of Control
Central Oregon Cities Organization
Deschutes Resources Conservancy
Confederated Tribes of Warm Springs**

**A proposal to the Bureau of Reclamation for
WATER 2025 Challenge Grant Program**

April 7, 2004

Executive Summary

Date: April 7, 2004

Applicant Name: Central Oregon Irrigation District, Redmond, Oregon
Swalley Irrigation District, Bend, Oregon

Partners: Deschutes Basin Board of Control (7 irrigation districts)
City of Bend
City of Redmond
Deschutes Resources Conservancy

Project Name: Deschutes Water Alliance: Formation and Pilot Water Bank Project

2004 Funding Request: * In-kind contribution

FUNDING SOURCE	FUNDING AMOUNT
Non-Federal Entities:	
Deschutes Basin Board of Control	\$63,500 *
Central Oregon Cities Organization	\$212,000 *
Deschutes Resources Conservancy	\$79,500 *
Non-Federal Subtotal	\$355,000
Reclamation Funding	\$233,750
TOTAL PROJECT FUNDING	\$588,750

An official Irrigation/Water District Board of Directors Resolution has been received and has been included as part of the proposal.

Yes: Resolutions from Central Oregon and Swalley Irrigation Districts are attached.

A. PROJECT SUMMARY

Four major partners in the Deschutes Basin propose to form the Deschutes Water Alliance as follows:

1. Deschutes Basin Board of Control (DBBC): Seven basin irrigation districts including Reclamation's Deschutes (North Unit Irrigation District) and Ochoco Projects, formed under ORS 190.125.
2. Central Oregon Cities' Organization (COCO): basin cities (e.g. Bend, Redmond, Madras, Prineville) and affiliated regional drinking water suppliers (municipal, quasi-municipal and private drinking water entities)
3. Deschutes Resource Conservancy (DRC): a 501(c)(3) non-profit corporation carrying out ecosystem restoration projects in the basin (with federal authorization and representation Under PL106-270, Deschutes Resources Conservancy Reauthorization Act of 2000) and its sub-entity, the Deschutes Water Exchange (DWE)
4. Confederated Tribes of Warm Springs (CTWS): a tribal entity representing Warm Springs, Paiute and Wasco Tribes

The Alliance proposes a pilot water bank to implement water sales and transfers with goal of addressing long-term basin water needs for urban water supply, irrigation, industrial use and instream needs for fishery, recreation and water quality enhancement. The specific tasks and activities to be undertaken are grouped under their respective components below:

Alliance Formation and Operation. The initial step develops agreements among Alliance members, the mission statement and strategic plan. It also facilitates initial communications functions and support of Alliance operations and management

Alliance Planning. Several planning efforts will provide the technical and governance foundation of the Alliance and the Water Bank such as assessing means of increasing water availability through (a) on-farm and off-farm water conservation in irrigation districts, (b) marketing to allocate surplus waters from urbanization of irrigable lands and (c) optimized of reservoir management. Assessment of municipal water needs over the near and long-term is also necessary. This planning will quantify water supply, demand and reallocation needs. Scenarios to meet near-term benchmarks and long-term targets will be developed to establish the Alliance's Operational Plan

Pilot Activities. Develop governance structure, policies, procedures, and market tools and begin implementation of water bank for water reallocation and management among the Alliance members. Support initial bank capitalization including (a) a \$10 million project using saved water from piping to shore up North Unit water rights, save pumping costs and improve flows and water quality in the Middle Deschutes and Lower Crooked Rivers, (b) develop and fund trials for implementation of an On-Farm Conservation Program and (c) a reservoir optimization project with management program. Existing and new market and transaction tools will be applied and developed to build Alliance market infrastructure.

Project Management and Administration. As much of the work under this project will be contracted to a number of Alliance members or consultants, project management and administration is an important component of the project.

B. SUMMARY OF PROJECT CRITERIA

Conservation, Efficiency, Markets

1. The degree to which conserved water contributes toward established or new water markets or banks: The Deschutes River was withdrawn from appropriation in 1913. In 2002 the Oregon Water Resources Commission ruled groundwater in the Deschutes Basin is restricted from further appropriation unless mitigation counterbalances any extraction for additional water supply. The ruling was based upon 1998 USGS study findings indicating surface water and groundwater are interconnected. Accordingly, the only available additional supply must come from transfers (one use to another) or from conservation. Oregon law (ORS 537.455-.510) provides the opportunity for water conservers to allocate conserved water between instream use (25% minimum) and additional consumptive use (up to 75%). Additional water supply for cities and drinking water providers, irrigation districts and individuals can be made available while providing instream protection as part of the same process.

2. Briefly describe water marketing or banking elements included in the proposal: A water bank for water reserves and water marketing will be set up by the Deschutes Water Alliance. The irrigation districts (Deschutes Basin Board of Control under Oregon law – ORS 190.125) will be primary bank suppliers with their ability to conserve and distribute water and store and release that water under a voluntary plan. Water purchasers include (a) irrigation districts with unreliable water supply (b) the Central Oregon Cities Organization (COCO) and affiliated regional drinking water suppliers with water needs; (b) Deschutes Resource Conservancy with water needs to restore stream flow and improve water quality for fish and water quality, and (c) other prospective groundwater users that require water for consumptive uses. The Confederated Tribes of Warm Springs may also have water to supply to the Bank. Suppliers and purchasers will develop bank operation policy to meet water needs according to federal and state law.

3. Briefly describe amount of water conserved as a percentage of normal water supplies: A 1997 U.S. Bureau of Reclamation study of canal lining and piping for the DBBC districts verified that seepage losses basin-wide in unlined canals are on the order of 38.8% of total district diversions. Seepage losses can be converted to additional water supply through conservation projects resulting from canal lining, piping or change in diversion point. Total annual district diversions are 841,630 a.f. There are opportunities to save up to 326,522 a.f., (up to 700 cfs) according to study results. Costs of canal modifications would require incremental conservation toward basin goal over decades. Planning would identify, quantify and integrate water rights from urbanization and conservation with drinking water suppliers' mandated 20 year planning horizon.

4. Briefly describe the reasonableness of costs for the benefits gained – cost/benefit analysis: Groundwater is the source of future municipal water supply, requiring mitigation of groundwater pumping effects on stream flow. About 10,000 to 12,000 acre-feet of mitigation water is needed for 20-year demand. Irrigation districts are being urbanized with loss of assessment base, increase in O&M costs and increasing public safety concerns with open canals in populated areas. Districts can provide water for mitigation, other districts with low-reliability supply and stream flow/water quality through conservation. Costs are very reasonable for benefits gained considering the following:

- ? Water rights could be purchased for \$300 to \$1,500 per acre-foot. Canal piping costs to save 1 acre-foot are \$300 to \$1,200. Costs to pipe canals do not reflect avoided costs of district O&M in urbanizing areas, protected assessment base through partnering on conservation projects, reduced public safety issues, benefits of pressurized water and small-scale hydropower opportunities. The overall benefits for the cost are relatively high in contrast to simple water right purchase.
- ? The North Unit Irrigation District (NUID) presently pays over \$350,000 per year to pump water from the Crooked River. The Alliance project will address the opportunity to transfer water from urbanized land in irrigation districts and from conservation projects to NUID, reducing or eliminating dependency on Crooked River flows and related pumping costs.
- ? Optimized reservoir management opportunities exist for storing conserved water and allocating the water through the bank for stream flow and water quality enhancement in the upper and middle Deschutes River, expanding project benefits over a very comprehensive range for the cost.
- ? The range of benefits for the cost is very broad considering the district urbanization issues, opportunities to relieve NUID pumping costs, resolution of water supply needs of cities and water-short irrigation districts, and responding to low-flow/water quality issues of the Deschutes and Crooked Rivers.

There are currently 6,632 acres served by irrigation districts within the Urban Growth and Urban Reserve Area boundaries of the Cities of Bend and Redmond. Approximately 33,160 acre-feet could be transferred from these urbanized lands to municipal or other uses if certain transactions occur between the city and the districts. An economic process is necessary to keep district assessments whole and free the water for municipal or other purposes.

Performance Management

The project goal is to identify how to increase carryover storage, provide enhanced protection during periods of drought, improve reliability of water supply for the various uses in the basin and improve stream flow and water quality. The water bank pilot project will address procedures to meet the basin goals. A number of relevant assessments will identify supply and demand for the bank and develop a plan for wheeling the banked water to other water uses in the basin. The Alliance will set up policy and mechanisms for effective bank operation, including performance and transaction monitoring and evaluation systems.

Project Financing and Cost-Sharing

1. Please briefly describe your financial ability to operate and maintain the proposed action: The Deschutes Resource Conservancy received and leveraged federal funds to purchase water through other basin partnerships. The Deschutes Basin Board of Control (DBBC-local irrigation districts) can supply in-kind costs to this project (studies, assessments and staff) to match funds for materials supplied by other partners desiring to share in conservation savings. The cities of Bend and Redmond will also provide in-kind costs as well as dollars from water service connections and water users. Leadership and Alliance staffing by these three groups will facilitate water bank implementation to meet the project's goals.

2. Does your project include more than one non-Reclamation partner? Yes: Arnold Irrigation District, Central Oregon Irrigation District, Squaw Creek Irrigation District, Swalley Irrigation District, Tumalo Irrigation District (DBBC members) are non-Reclamation partners. North Unit and Ochoco Irrigation Districts are Reclamation partners. The cities affiliated with Central Oregon Cities Organization, associated residential/rural water

districts/companies, Confederated Tribes of the Warm Springs Reservation and Deschutes Resources Conservancy are additional non-Reclamation partners.

3. Is the project or proposed action likely to go forward without Water 2025 funding? No: Water 2025 funding would provide necessary planning and infrastructure for the bank to meet the first phase objectives. Funding in this year of the Water 2025 program will allow first phase completion (planning, studies, bank set-up). Without these assessments, the Alliance members would not have adequate information to address risks, cost-benefits and other factors relative to successful bank implementation.

Relevance to Water 2025

1. Is your proposal located in a “hot spot” area [Red, Orange or Yellow] as described in the Water 2025 illustration “Potential Water Supply Crises by 2025”? The project is in a “yellow” (“moderate conflict”) zone. However, the project responds to a unique combination of irrigation district urbanization, municipal water supply issues and stream flow/water quality issues. The project will protect the districts subject to urbanization, help satisfy municipal water needs and improve stream flow and water quality with existing water rights. The project will reduce potential for “yellow” moving to “orange” or “red”.

2. Does your project demonstrate an innovative approach to water conservation and water management? This project provides a new tool to distribute needed water supply to basin water users through voluntary conservation and protects the assessment base of irrigation districts even though agricultural lands are removed from irrigable lands within their boundaries. The project demonstrates collective partnering of basin interests to resolve water supply, district urbanization, stream flow and water quality issues. It will address the institutional constraints of transfer and mitigation procedures in the state as a model to work through the same issues in other basins.

3. If the proposed project is not on Reclamation-served lands, but is in a basin with connections to Reclamation project activities, identify how your project will benefit the Reclamation project. The North Unit Irrigation District (Madras, Oregon) and the Ochoco Irrigation District (Prineville, Oregon) are Reclamation projects. The North Unit Irrigation District has the junior water rights and faces supply shortages on a regular basis. The project can improve water supply reliability needed for North Unit’s water users and it can enhance its cyclical storage supply. This would also reduce dependency on Crooked River flows, which provide water to the Ochoco Irrigation District. Increased flows would benefit both districts from a water quality and ESA standpoint.

4. Please identify how your project demonstrates stakeholder involvement and acceptance the likelihood that the project would reduce water management conflict. Water from conservation and transfers of existing water rights are currently the only source of water available to the basin. This water can be put to beneficial use, reducing competition among varied users. Proposed bank funding will provide resources for the irrigation districts to conserve and market water from lands no longer irrigable due to urbanization.

Several water supply issues face basin stakeholders. These issues require partnering among the stakeholders for timely and cost-effective resolution. The Alliance will develop and implement creative, market-driven solutions to these issues. All major basin stakeholders as applicants or supporters of the application have the common vision of conservation/efficiency and market methods for resolving basin water supply issues.

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1. Background Data

Regional urban water suppliers, irrigation districts and other private, government and individual water users are dependent upon one another in the use, management and protection of Deschutes Basin water resources. Key basin issues include water supply needs, water quality enhancement, flow stability, habitat restoration, protection of flows for fishery, recreation and other basin needs. Water users, water suppliers and other stakeholders have a common vision that compels commitment of energy and resources to development of a process that resolves water resource issues, avoids competition, and accounts for present and future needs of the basin. This proposal's goal is to set up an Alliance that will result in an enhanced water supply to meet the common vision.

The Alliance will invest in management of the Deschutes Basin in a unified way to provide:

- ? Reliable and safe water supply for the region's future agriculture and municipal needs and sustained economic viability considering growth, urbanization and related effects on water resources
- ? Financial stability for the Basin's irrigation districts and their patrons
- ? Protection of the fishery, wildlife, existing water rights, recreational and aesthetic values of the Deschutes River along with stream flow and water quality improvements
- ? Focus on maintaining the resource land base in the Basin, consistent with acknowledged comprehensive land use plans
- ? An institutional framework that supports the orderly development of local water markets so as to protect participants and create an even playing field for water transactions

Water supply, water quality, flow depletion and irrigation district urbanization issues in the upper and middle Deschutes Basin establish the framework for need for the Deschutes Water Alliance. Mutually beneficial opportunities exist for municipalities and flow restoration interests to obtain needed water supply and for irrigation districts to resolve urbanization and conservation issues. These opportunities are inherent in the following management considerations:

- ? Full appropriation of surface waters
- ? Declaration of groundwater restrictions and related mitigation requirements
- ? Dependency of municipal water providers on groundwater for future needs
- ? Diversion of substantial river flows by irrigation districts
- ? TMDL water quality parameters for the Deschutes and Crooked Rivers
- ? Protection of scenic waterway flows in the lower reaches of the Deschutes and Crooked Rivers
- ? Potential Endangered Species Act issues
- ? Rapid growth, urbanization and land-use change in the basin

These considerations are key elements to be incorporated into development of the integrated water resources management and restoration program.

2. Scope of Work

The project includes three components necessary to successful implementation of the Alliance: (1) formation and operation of the Alliance (2) planning necessary to direct Alliance actions and (3) pilot projects that demonstrate and test different Water 2025 approaches. In addition, there is a project administration and management component to the project.

The specific tasks and activities to be undertaken are grouped under their respective components below:

Alliance Set-up and Operation

- a. Formation of the Alliance – including development of inter-institutional memoranda of understanding, development of mission statement and strategic plan
- b. Alliance Communications – including Alliance communications strategy and plan; public relations, dissemination and outreach activities (including activities to promote learning and sharing of lessons with other Water 2025 / BOR participants)
- c. Alliance Operations and Management – including day-to-day O&M

Alliance Planning

- d. District Water Conservation Cost Analysis and Prioritization – an evaluation and prioritization of opportunities to save water through piping and lining of canals, laterals and ditches, as well as through on-farm conservation technologies
- e. Impacts of Urbanization on Irrigable Lands – an inventory of amounts, patterns and rates of district water rights becoming surplus due to urbanization or other changes in land use patterns in Central Oregon and corresponding impact on district assessments.
- f. Reservoir Optimization Study and Water Quality – prepare rapid assessment of potential gains from optimization of existing reservoirs and their potential impact on improving flow and quality, and prepare terms of reference for more formal and rigorous assessment
- g. Municipal Water Needs – assessment of the water supply needs, quantity and timeline of the Basin’s regional urban suppliers
- h. Measurement, Monitoring and Evaluation Systems – assessment of the suitability and completeness of existing flow measurement sites and existing Water Quality and Monitoring Plan for the Upper Deschutes Basin and prepare funding and implementation action plan
- i. Water Supply, Demand and Reallocation Synthesis – employs planning studies to assess existing opportunities and alternatives to provide for agricultural, urban and instream needs and set five-year benchmarks and 20-year targets (with an initial focus on the Deschutes River)

Pilot Activities

- j. Deschutes River Water Bank Pilot – Develop governance structure, policies, procedures, and market tools and begin implementation of water bank for water reallocation and management among the Alliance members.

Bank Capitalization: Transaction Flows into the Bank:

- k. Deschutes/Crooked Conservation and Water Rights Exchange – preparation and agreements for \$10 million project that will pipe COID canals so as to provide conserved water to North Unit (Deschutes Project) patrons, reduce NUID demand on the Lower Crooked River and increase flows in the Middle Deschutes

- l. Storage Reallocation from Transfers: assessment of the best use or reallocated storage as part of preparation for a \$5 million project of conserved water and transfers from an irrigation district
- m. Deschutes On-farm Conservation Program – development and funding of trials for the implementation of on-farm conservation projects, coordination with irrigation districts and the transfer of saved water instream to supplement flows and improve water quality, with prospects for annual turnover in the program of \$500,000.
- n. Market and Administrative Tools for Transactions – development and application of existing and new market tools (including such approaches as auctions and electronic bulletin board trading systems for operation of the Water Bank in compliance with state administrative procedures for water reallocation.

Project Management and Administration

- o. Project Management and Administration – provides for management and administrative tasks of associated with carrying out the grant and sub-contracts to Alliance members or consultants.

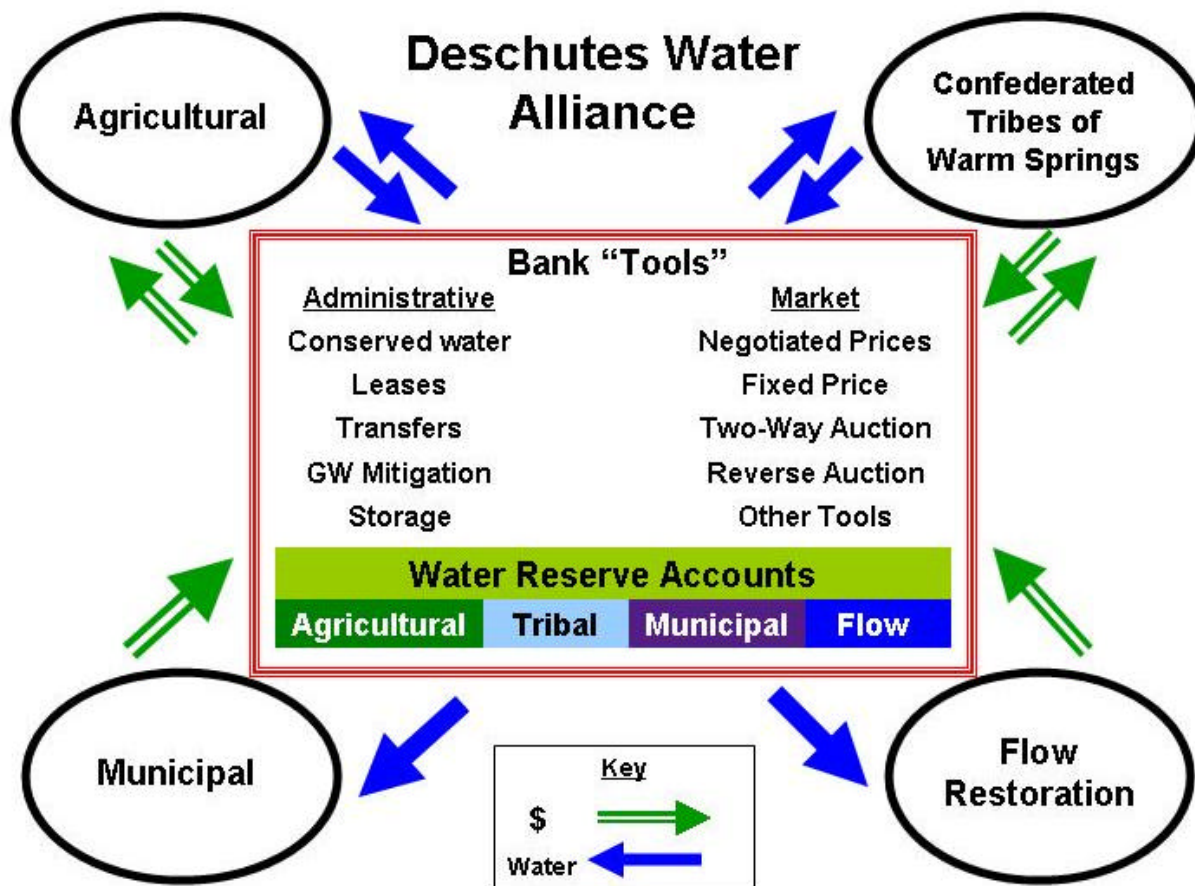
2.1 Alliance Set-up and Operation

Description of the Alliance

Four major partners in the Deschutes Basin propose to form the Deschutes Water Alliance. The partners include:

1. Deschutes Basin Board of Control (DBBC): represents 7 irrigation districts in the basin including Reclamation’s Deschutes (North Unit I.D.) and Ochoco Projects as formed under ORS 190.125.
2. Central Oregon Cities’ Organization (COCO): which is comprised of cities in the basin (e.g. Bend, Redmond, Madras, Prineville, Sisters and Culver) and affiliated drinking water districts and private companies providing potable water supply
3. Deschutes Resource Conservancy (DRC): a 501(c)(3) non-profit corporation carrying out ecosystem restoration projects in the basin (with federal authorization and representation Under PL106-270, Deschutes Resources Conservancy Reauthorization Act of 2000) and its sub-entity, the Deschutes Water Exchange (DWE)
4. Confederated Tribes of Warm Springs (CTWS): a tribal entity representing the Warm Springs, Paiute and Wasco Tribes

The Alliance proposes a pilot water bank that will implement water sales and transfers toward the goal of addressing long-term water needs in the basin for drinking water supply, irrigation, industrial use and instream needs for fishery protection, recreation and improved flows for water quality enhancement (see figure below).



Formation of Alliance

The Alliance currently exists as an ad-hoc planning group formed by a number of representatives of the entities that will constitute the Alliance. It is necessary to formally create and constitute the Alliance so that it may realize its potential to meet agricultural, municipal, tribal and instream needs. This requires the development of the necessary documents, including the mission statement of the Alliance, an agreement among the parties, development of an appropriate institutional arrangement for the Alliance and the development of a Strategic Plan.

Communications

An important component of the overall effort will be publicity, outreach and community education to inform the Central Oregon community about the goals, plans and efforts of the Alliance. Existing experience in the basin shows that implementing water conservation and efficiency projects and developing water markets require tact and diplomacy in order to assuage concerns from interest groups, agencies and individual citizens. A pro-active public information campaign will be vital to the success of the Alliance.

Working in partnership, Alliance members have already accomplished a number of significant achievements relevant to Water 2025. Water leasing by DBBC and DRC, as well as conservation projects undertaken by North Unit Irrigation District, Central Oregon Irrigation District, Tumalo Irrigation District and Squaw Creek Irrigation District in conjunction with the DRC are already making important contributions to flow restoration and avoidance of future regulatory compliance issues. Working with the

DRC, the Ochoco Irrigation District has held a reverse auction for the leasing program in each of the last two years, providing a significant test of an innovative market transaction tool. The development of the activities provided for in this project will only further serve to build the local experience with approaches sought by Water 2025. As part of the Communications program it is expected that the Alliance will assist other Water 2025 recipients, other Bureau Projects, and the wider water community in accessing the tools and lessons learned in the Deschutes.

Alliance Operations and Management

Regardless of the institutional arrangements and organizational structure chosen for the Alliance, there will be running costs to ensure that the Alliance continues to develop following its formal establishment. These core activities will need to be funded in order to ensure that the Alliance prospers. In the long run the Alliance will likely need to develop its own sources of operational finance, but in the initial two-year startup phase, Water 2025 monies will be essential.

2.2 Benefits

Formation of the Alliance provides the institutional setting and formalizes cooperation between the principal water users in the Basin: agricultural, urban, tribal and instream. Without this critical step the planning and implementation activities do not have the required institutional backing to ensure that they can reach fruition and provide a truly integrated framework for water reallocation and management in the basin

2.3 Budget, Cost-Share and Timeline

Formation of the Alliance is expected to require \$57,500 in resources. Of this total \$35,000 would be contributed by the Water 2025 grant. Non-federal match of \$22,500 is expected from the contribution of district, city, tribal and DRC staff time to this effort. (Refer to project budget.)

3. Planning

A number of planning studies will be instrumental in directing the Alliance in its initial water bank pilot phase. These efforts will draw on existing studies and indeed reflect the need to fill gaps in the current knowledge base in order to fashion a comprehensive plan for reallocation and management of water resources in the basin.

3.1 District Water Conservation Cost Analysis and Prioritization

Seven irrigation districts in the upper Deschutes River Basin divert surface water from the Deschutes and Crooked Rivers, Squaw Creek and Tumalo Creek for irrigation of approximately 150,000 acres of farmland. Main canals, laterals and ditches convey water to irrigated lands. Most of the water distribution system is unlined and leaks substantial volumes of water into the permeable volcanic terrain through which it was constructed. Canal seepage ranges from 30 to more than 50 percent of the diversions, requiring more substantial river diversions to get water to the irrigated lands. Accordingly, several conservation studies and canal lining evaluations have been conducted by the Bureau of Reclamation since the 1970's to determine lining/piping projects, amount of seepage reduction that can be achieved and project costs.

Diversions for five main canals are located inside the City of Bend Urban Growth Boundary (UGB). Urbanization of lands within the UGB removes irrigated lands from district assessment roles, promotes

encroachment on district easements and right-of-ways for maintenance and increases safety hazards with higher population densities near open canals. The existing diversions in the UGB are located at the last point on the river at which gravity diversion is possible. Relocation of diversions to areas outside the UGB for continued water delivery to outlying farmland is not possible from an energy conservation standpoint. Therefore, canals, laterals and ditches will remain inside the UGB to convey water from the diversions to the remaining irrigated farmlands outside the UGB areas of Bend. Canals, laterals and ditches also pass through the UGB of Redmond and other growing central Oregon communities.

Canal piping and lining would reduce seepage and consequently, the amount of water that would have to be diverted from the source stream to account for both seepage and irrigation needs. Water that otherwise seeps into the ground can be left instream by piping or lining of canals, laterals and ditches. Water left instream will augment stream flow and will provide water to help other districts with junior water rights meet their water needs.

Canal piping responds to urbanization issues facing irrigation districts and provides many other benefits as listed below.

- ? Piping reduces liability exposure from safety hazards inherent in open canals in urbanizing areas;
- ? Piping/lining provides water for instream flow, other district water needs and for mitigation needs of municipalities to obtain groundwater permits for future water supply needs;
- ? Piping can eliminate conflict between urban/suburban landowners;
- ? Piping will substantially reduce or eliminate operations and maintenance requirements;
- ? Piping can provide gravity pressure with energy conservation benefits;
- ? Piping improves reliability of water delivery and improves control of water delivery to more closely match demand fluctuations, which reduces need for additional transport flows;
- ? Piping provides the opportunity to develop small hydropower facilities for revenue opportunities;
- ? Piping is a logical and practical solution for water conservation, improved delivery efficiency, energy conservation, reduced operations and maintenance and reduced safety concerns in urbanizing areas.

Evaluation of irrigation district canal systems, urbanization patterns, seepage losses, future water distribution patterns and district operations and maintenance programs will be conducted as a key planning step to determine the type and location of conservation projects that are most appropriate in responding to conservation, efficiency and market criteria. Urbanization and future water use patterns will be evaluated to avoid implementation of piping or lining projects in canals that would otherwise be abandoned due to future land use changes. Seepage data from previous BOR and consulting firm studies will be evaluated to select project locations with higher potential for cost and time effective conservation, efficiency and market benefits. The evaluation process will develop a priority system for implementation of conservation projects. Priority considerations include timeliness of stream flow augmentation and water availability for use by irrigation districts and municipalities, increased operations and maintenance efficiency by districts, energy conservation and hydropower opportunities, urbanization impacts on district operations and maintenance and costs. Finally, a set of conservation/efficiency projects will be determined and prioritized. Preliminary cost information will be provided for the projects and a funding and implementation plan will be prepared.

3.2 Impacts of Urbanization on Irrigable Lands and Irrigation District Finances

Impacts on Irrigable Lands

Deschutes County continues to experience the most rapid population growth in Oregon. The 7 irrigation districts in the basin serve approximately 150,000 acres of agricultural-use land. These irrigable lands

continue to be impacted by urban area development as city boundaries expand into the irrigation districts' service boundaries.

Urban growth can take district irrigable acres out of production, causing district water rights to become subject to forfeiture or surplus to the districts' needs. The loss of water rights damages the district's assessment base, diminishing its financial health and sustainability.

Understanding the patterns of land use actions collectively within the entire middle Deschutes Basin is necessary for the cities and the districts to plan and implement long-term strategies to effectively cope with urban growth while diminishing growth's impact on agricultural areas, both socially and economically. A first step is to analyze the impact of urban activity by identifying the quantity, rate, and patterns of irrigation water rights within those areas delineated by "urban growth boundaries", additional "urban reserve areas" or other zoning classifications anticipated to be developed for urban or industrial uses. Districts facing a deteriorating assessment base must specifically identify the land areas to be effected by urban planning and develop a strategic plan to respond to these changes as a fundamental issue of survivability.

Development of Financial Long-Term Assessment Model

A long-term solution is necessary to sustain the irrigation districts' assessment base to respond to continuing, accelerated urban growth in the Deschutes Basin. Development of an economic model that can protect the districts' assessment base while meeting increasing municipal water demand is an important tool to sustain the irrigation districts' financial health.

In the last five years, the amount of irrigable acreage diminished by urban growth exceeded the irrigation districts' capacity to absorb and retain the water rights for beneficial use. The water rights removed from irrigable lands are surplus and if they cannot be put to beneficial use by transfer to other irrigable lands, these rights will become subject to forfeiture and are at risk to be permanently removed from the districts' assessment base. The surplus acreage balance in the basin has significantly increased and is not expected to diminish due to the continued high population growth rates of the area.

While the aggregate agricultural surface water demand is declining, the cities' population growth demand for groundwater is increasing. Fundamentally, the districts can collaboratively work with the basin's cities to develop an economic model that can be used within the "water bank" concept identified in this application to balance the assessment value of lost irrigable acres with long-term permanent water transactions that accommodate urban demand. This project embodies the challenge to develop a financially effective pricing model to provide the districts with the ability to maintain their economic capacity through voluntary market provisions while urbanization continues.

3.3 Reservoir Optimization Study and Water Quality

While conservation/efficiency improvements (canal piping/lining, etc) can generate substantial quantities of water for increasing flows in the middle Deschutes River through mitigation and flow restoration, these improvements also provide opportunities to improve flow and water quality in the upper Deschutes River below Wickiup Reservoir. Water conserved by irrigation districts can be left instream at the diversions and/or it can be left in the reservoirs for flow and water quality enhancements in the upper and middle reach of the river. A key Alliance objective is to move river flows toward the historic hydrograph. Accordingly, flows in the upper reach could be increased in the winter and decreased in the summer. Flows in the middle reach could be increased in the summer and the winter.

The optimization study will conduct an initial assessment of potential opportunities for reservoir management that could extend benefits of conservation/efficiency improvements and the water market to the upper Deschutes River below Wickiup Reservoir and to the middle reach of the river. The July 2002 report “*Operations Description of the Deschutes River Basin Projects – Draft*” was prepared by the BOR to describe the current operation and maintenance of the Deschutes River Basin Project (the Project) as a precursor to preparation of a biological assessment. The report also describes basic operating strategies for the Project. The initial study will consider biological assessment considerations and the operating strategies and determine potential methods for accommodating them in a reservoir optimization program. Potential impacts on flow and water quality will be assessed on a preliminary basis. The study will also conduct a preliminary assessment of the potential to augment water supply for the North Unit Irrigation District and reduce the districts dependency on Crooked River water and related power costs. Finally, the study will lay out the key conclusions and the specific elements that require more formal and rigorous assessment to develop and implement a reservoir management program in conjunction with the conservation/efficiency/market objectives of the Alliance.

3.4 Municipal Water Needs

The Central Oregon Cities Organization is currently embarking on long-term needs, defined as 20-year plans as required under State Land Use Law.

Population growth is explosive in the Upper Deschutes Basin, requiring pro-active examination of future water needs and planning to obtain the required supply. The rate of population growth in Deschutes County during the late 1990s and early 2000s was one of the highest in the state. The March 2004 Deschutes County Coordinated Population Forecast for 2000-2025 states that population growth occurred faster than contemplated under previous forecasts. Steady growth rates of more than 5% per year prevail in the cities of Bend and Redmond. Recent annual average growth is in the 9-11% range for these communities.

Preliminary assessments of municipal water needs indicates that Upper Basin communities will need about 25,000 to 30,000 acre feet of additional water by the year 2025. Mitigation of potential groundwater pumping effects on stream flow is required for the consumptive use portion of new groundwater permits under the Oregon State Administrative Rules Chapter 690 Division 505. Based on the rule requirements, basin communities will need about 10,000 to 12,000 acre-feet of water to mitigate for consumptive portion of their 2025 water demand. This volume of water could be obtained from irrigation districts subject to urbanization.

Urbanization is occurring on irrigated lands within municipal urban growth boundaries. Land uses are changed from farming to urban uses, reducing the assessment base of the effected irrigation districts. Urbanization also brings a substantial list of other O&M, safety and water distribution issues to the districts. Therefore, opportunities exist for municipalities to obtain mitigation water from the districts. These opportunities include direct water purchase through a water market system (bank) or through financial support to districts for canal piping or lining projects in exchange for mitigation water.

Population growth and urbanization are increasing the water supply needs of municipalities in the upper Deschutes Basin. Population growth and urbanization are having adverse effects on irrigation districts through loss of assessment base, increased O&M costs, ROW and easement encroachments and safety issues. Therefore, the foundation exists for a joint water conservation/efficiency/market program between municipalities and agriculture that will help resolve municipal water needs and irrigation district urbanization issues, while putting water instream for water quality, habitat and use by other irrigation districts.

A planning evaluation will be conducted to determine more specifically the future water needs of the municipalities in the upper Basin and the timing of the needs. The evaluation will then compare water needs and related mitigation water needs with the amount of water available from irrigation districts through conservation projects and irrigated lands subject to urbanization. Finally, the evaluation will develop a schedule of water need over time integrated with irrigation district plans and schedules for providing mitigation water to municipalities through the Alliance Water Bank.

3.5 Measurement, Monitoring and Evaluation Systems

A principal objective of the Alliance is to increase flows in the middle Deschutes River to the 250 cfs flow requested by the Oregon Department of Fish and Wildlife (ODFW). Water quality is also a significant basin issue and the Oregon Department of Environmental Quality (ODEQ) is in the process of establishing Total Maximum Daily Loads (TMDL's) for the Deschutes and Crooked Rivers. Therefore, measurement, monitoring and evaluation are critical to documenting performance of conservation, efficiency and market programs.

Flow measurement and monitoring systems will be evaluated in conjunction with the Oregon Water Resources Department (OWRD), considering existing measurement infrastructure at the irrigation district diversions that effect flows in the middle Deschutes River. The evaluation will determine the criteria for a suitable measurement and monitoring program, suitability of existing infrastructure and reporting for project needs and types of improvements necessary for measurement, documentation, timing and market needs.

The evaluation will include reviews of the TMDL process with the ODEQ to obtain input and a basis for development of a water quality-monitoring program. Based on this information, water quality monitoring points along the middle Deschutes River and Crooked River will be determined. A water quality-monitoring program will then be developed in conjunction with ODEQ TMDL planning.

3.6 Water Supply, Demand and Reallocation Synthesis: Deschutes River

The planning studies described above will each contribute specific elements necessary for structuring and implementing the pilot bank project on the Deschutes River. The results of the planning studies will provide the necessary criteria for structuring and implementing the pilot bank according to the Alliance goal, key irrigation district urbanization issues, municipal water needs, conservation/efficiency project priorities and measurement/monitoring requirements. The planning studies will also provide the structure for implementing the water marketing component of the bank.

The district water conservation cost analysis and prioritization study will provide a list of priority conservation/efficiency projects, assessment of benefits for each project and planning-level cost estimates.

The study to determine impacts of urbanization on irrigable lands and irrigation district finances will provide information necessary to plan and schedule conservation/efficiency projects in conjunction with municipal water supply needs. The total area of urbanization will be determined which will reflect the amount of water that will be available for municipal, instream, or other uses. Timing of urbanization will also be determined, which will show when various amounts of water will become available for other uses. The financial impact on districts of urbanization will be identified. This combined package of information will be used to identify conservation/efficiency projects and set their priorities.

Reservoir optimization study results will provide information necessary to help account for instream flow needs of the upper, middle and lower Deschutes River. The combined results of the district water

conservation analysis and study of urbanization impacts on districts will provide the amount of water potentially available for storage and use as flow augmentation. This information will be used in conjunction with the BOR biological assessment results and operating strategies to formulate an optimized reservoir management plan as an integral part of the Alliance and pilot bank.

The municipal water needs study will provide the amount of additional water supply needed by municipalities, the amount of mitigation water needed and the timing of these needs. This information will then be used in conjunction with the results of the district conservation analysis, study of urbanization impacts on districts and the reservoir optimization study to formulate a Water Supply Implementation and Marketing Plan (the Plan) to be administered by the pilot bank. This Plan will integrate results of the various studies into a cohesive program that allocates water to the various needs of the districts, municipalities and the Deschutes and Crooked Rivers through a market-driven system. The study results will also provide the framework for developing the financial and market elements of the Plan

Finally, the integration of study results into the Plan will also establish benchmarks for monitoring and measuring performance of the proposal. These benchmarks will include not only Deschutes River stream flows and water quality, but will include:

- ? Schedules for completing priority conservation/efficiency project including irrigation district piping/lining and on-farm projects based on incremental 5-year and 20-year water needs of municipalities for mitigation.
- ? Schedules for completing conservation/efficiency project based on timing to reduce North Unit Irrigation District dependency on Crooked River flows.
- ? Schedules for completing and implementing the reservoir optimization program to allocate conserved water through the bank for flow restoration in the upper and middle reaches of the Deschutes River and for allocation to other needs.
- ? Schedules for completing conservation/efficiencies projects to generate conserved water for allocation through the bank to general market needs.
- ? Implementation schedule for measurement and documentation program to demonstrate flow increases in the middle and upper Deschutes River relative to target flows, including the Oregon Department of Fish and Wildlife (ODFW) target flow of 250 cfs in the middle reach.
- ? Implementation schedule for monitoring and documentation of increased flow and related water quality benefits in the middle and upper Deschutes River in conjunction with the Oregon Department of Environmental Quality (DEQ) TMDL program.

3.7 Benefits

The immediate benefit of undertaking this series of studies will be to provide the Alliance with both near term (5 years) and long-term (20 years) operational plans for fulfilling the Alliance mission with respect to the Deschutes River. An additional benefit of these studies is the opportunity for Alliance members to work together on a common framework and plan. While each Alliance member has some experience with elements of these plans efforts to date have not been comprehensive and have often been from the perspective of particular Alliance members. These planning efforts provide the Alliance with a way to participate in the formulation of an operational plan that will demonstrate to the Alliance (and others in the basin) that the Alliance's cooperative approach is grounded in the best knowledge available and that it accommodates different perspectives in a transparent manner.

3.8 Budget, Cost-Share and Timeline

The total cost of these activities is expected to be \$362,500 of which \$87,500 will be Water 2025 funds and the remaining \$275,000 non-federal match. In addition, a number of supporting studies currently underway – particularly studies of potential conservation and mitigation projects increase the match on these activities substantially. A rough estimate is that \$1 million is being spent on additional studies at present. These activities will be initiated upon receipt of Water 2025 monies and will be completed within one year of project initiation.

4. Deschutes River Water Bank Pilot

4.1 Bank Set-up

Objective

The water bank will be designed to meet the Deschutes Basin’s emerging need for a flexible, market-based mechanism to manage water rights. For irrigation districts, this means maintaining the ability to deliver irrigation water in the face of rapid urbanization, and thus protecting their assessment bases. For other water users, it means creating an institution that will allow for the equitable reallocation of water rights among conservation, mitigation and municipal demand. Unprecedented population growth, water shortages, historical over-allocation of surface water rights, and potential environmental regulation all drive the need to optimize water allocation.

Rationale

The traditional demand for water in the Deschutes Basin has been irrigated agriculture. Irrigation districts carefully husband the water rights they hold in trust for their patrons. However, districts in Central Oregon are currently experiencing rapid urbanization, a shift in land use patterns and a weak farm economy. An ongoing study for the City of Bend indicates that 3,694 acres of irrigation district lands now lie with the Urban Growth Boundary (UGB) and the Urban Reserve Area (URA) of the City of Bend. It is anticipated that an additional 1,873 acres of irrigation district lands will be added to current 1,065 UGB and URA acres of the City of Redmond. However, small incremental irrigation users will place an additional strain on irrigation districts’ systems in the future.

Municipal, district and private water companies have a growing need for water supply given the Oregon Water Resources Commission moratorium on new groundwater and surface water rights in the basin. Deschutes County is the fastest growing county in the State of Oregon. From 1990 to 2003, the population of the county has grown by 74%.

Account Structure and Reserve Requirements

Accounts in the bank can be divided into four major categories: Agriculture, Municipal, Tribal and Instream. The Agricultural sector of the bank will include irrigation districts, the Municipal sector will include cities as well as quasi-municipal water providers, and the Instream sector will include conservation interests such as the DRC. Each will have a variety of transaction types available to it, as described in more detail below.

Given the uncertainty about water supply and demand in the short and medium-term for all categories of accountholders, it is likely that each category might want to segment their accounts into tradable and reserve accounts. The water in the tradable accounts would be immediately available, and may be moved

between accountholders with ease. Water in reserve accounts would be held back in from being readily tradable, and leased instream through policies and procedures established by the bank as well as bilateral agreements between the parties.

Bank Operations

It is anticipated that the Deschutes Water Exchange would facilitate water bank transactions under the Deschutes Water Alliance's management. The Deschutes Water Exchange is a non-profit brokerage operated by the Deschutes Resources Conservancy. The Exchange operates a successful Annual Water Leasing Program with local irrigation districts (leasing 16,000 ac-ft in 2003), runs the sole state-chartered Groundwater Mitigation Bank, and is an active member of the Columbia Basin Water Transactions Program (operated by the National Fish and Wildlife Foundation for Bonneville Power Administration). The Exchange would offer its skills and staff-time in the market arena to the Alliance in order to further develop market infrastructure in the basin and facilitate efforts to restore stream flow and improve water quality by the Alliance.

4.2 Bank Capitalization: Transaction Flows into the Bank

Inflows of water into the bank will be deposited in the bank through purchases of 'quit-claimed' irrigation water rights from willing agricultural sellers. The buyers of this quit-claimed water will then become accountholders within the district for a certain period of time, preserving the assessment base of the district. Over time, it is foreseeable that there will be water will be immediately tradable among accountholders. The following are pathways and projects through which water could enter the bank.

4.2.1 COID/NUID Crooked River/Deschutes River Piping and Water Rights Exchange

Summary

This partnership between the Deschutes Resources Conservancy, Central Oregon Irrigation District and North Unit Irrigation District funds the piping of canals, as well as subsequent conserved water applications and transfers. Conservation from piping of main canals will enable (a) improved water supply, (b) the retirement of NUID's Crooked River pumps with associated costs savings to the district of \$350,000 per year, (c) creation of an instream water right in the Lower Crooked River (approximately 62 cfs) to enhance fish habitat and water quality, and (d) water savings dedicated to instream flows in the Deschutes River (approximately 21 cfs) under Oregon's Conserved Water Statute (ORS 537.455-.550).

Project Description

NUID operates a series of large pumps on the Lower Crooked River upstream from Smith Rock State Park (~RM 28) to divert water for approximately 8,800 acres of land in Jefferson County. In an average year, NUID will pump 22,000 acre feet of water from the Crooked River. NUID's water rights carry a 1968 priority date and give them a right to divert up to 200 cfs. Due to pumping costs, water availability and other factors, NUID generally only diverts about 62 cfs. Of the water that is diverted, roughly half is lost to groundwater seepage before it can be delivered on farm.

NUID and COID are evaluating the feasibility of implementing a conservation project on COID's NC-2 Canal that would provide enough conserved water (approximately 22,000 acre feet) to service NUID's Crooked River lands and allow them to eliminate pumping from the Crooked River. The project would be similar to a 1996 project constructed by NUID in which 11.5 miles of canal were lined resulting in 22,000 acre feet of conserved water.

Benefits

The discontinuation of pumping from the Crooked River would allow NUID to transfer its Crooked River water rights instream. The rights would carry a 1968 priority date. NUID pumping records indicate that the instream benefit would be around 22,000 acre feet annually, or about 62 cfs during low river summer flows.

In addition, by using Oregon's Conserved Water Statute to allow additional acres to be irrigated, a minimum of 25% of the conserved water would be transferred instream as a protected right in the Middle Deschutes River. Assuming NUID would need 22,000 acre feet, the project would need to transfer approximately 7,500 acre feet instream. Over the irrigation season, this would average about 21 cfs or about 8% of the DRC's 250 cfs target. The Deschutes River instream water right would be from COID's certificate and carry 1900 and 1907 priority dates.

Instream flow enhancement in the Lower Crooked River and the Middle Deschutes will improve habitat for resident populations of redband and bull trout as well as enhance the viability of the anadromous fish reintroduction efforts currently planned by the Confederated Tribes of Warm Springs and Portland General Electric.

Costs and Cost-share

Preliminary cost estimates indicate the project would cost approximately \$10 million. A mix of funding sources will be employed. Water 2025 funds will be used to develop the project concept for financing.

4.2.2 On-Farm Conservation Program

In addition to surplus irrigation water deposited into the Bank, water may become available through the completion of on-farm conservation projects (under Oregon's Conserved Water Statute which allows saved water to be dedicated instream or used for other purposes). These projects may include technology improvements, piping, or other measures that create water which may be used by others. Currently, local Soil and Water Conservation Districts, Watershed Councils and the Oregon Watershed Enhancement Board are working on pilot efforts to carry out on-farm projects. In order to make this a more pro-active result the Alliance proposes to bring the resources of members to bear in funding and packaging these projects for instream benefit. Irrigation District participation in comprehensive system planning will lead to timely and efficient projects and increase the cost-effectiveness per dollar spent. The DRC will assist with carrying out administrative paperwork for the conserved water and municipalities may choose to participate in funding of these efforts as part of their contribution to conservation efforts.

The ultimate cost of such a program is not known, although it is likely that an annual expenditure of as much as \$500,000 could be possible once the program is accepted and underway. Water 2025 funds will be used to support bringing these different groups together to develop a formal On-Farm Conservation Program.

4.2.3 Reservoir Optimization


As water is conserved or transferred off of land, in some cases there are supplemental storage rights which accompany the primary live flow rights. Optimizing reservoir flows and storage will create efficiencies and conservation. In addition, part of the project will explore what happens to these storage rights once if water is transferred instream or is converted into mitigation credits. It is anticipated that storage could comprise a tradable element of water availability within the Bank, and this option is currently being explored through a collaborative process. The project will cost about \$5 million depending on the balance of system improvements and transfers. Water 2025 funds will be used to develop a reservoir management program including the specific elements of conservation, efficiency and market objectives of the Alliance.

4.3 Market and Administrative Tools for Transactions

The water bank will be the clearinghouse through which all trades occur that lead to the building of reserve accounts or in moving water from one district to another or to instream purposes. Water may be acquired and deposited in the bank through several market-based mechanisms including the following:

- ? Direct negotiation
- ? Fixed price programs (employed in the DWE leasing program in many districts)
- ? Reverse auction process (already tested by the Deschutes Water Exchange leasing program with Ochoco Irrigation District in 2003 and successfully repeated in 2004).
- ? An Electronic Bulletin Board (to be developed)

In addition to direct negotiation or the reverse auction methods of transferring water between accountholders, the Bulletin Board system is envisioned to be the most promising method for price discovery and transparency. The bulletin board will be operated through the DWE, under the auspices of the Deschutes Water Alliance. As the Australian example below illustrates, the Board will list buyers, sellers and recent trades that have taken place while maintaining the anonymity of the participants, much like the operations of the world’s major exchanges.

 MURRAY IRRIGATION LIMITED <i>"Where water flows, our food grows"</i>									
For Sale			Buyers			Past Sales			
Serial No	MIs	\$/MI	Reg No	MIs	\$/MI	Date Sold	Serial No	MIs	\$/MI
MX0801	300	\$74.00	B024	46	\$60.00	07-Jan-04	MX0788	10	\$70.00
MX0581	300	\$75.00	B025	100	\$60.00	07-Jan-04	MX0476	100	\$70.00
MX0787	100	\$75.00	B023	400	\$55.00	06-Jan-04	MX0446	10	\$75.00
MX0187	45	\$77.00	B197	38	\$55.00	06-Jan-04	MX0187	30	\$77.00
MX0742	34	\$78.00	B021	63	\$53.00	05-Jan-04	MX0371	120	\$75.00
MX0238	100	\$79.00	B019	50	\$51.00	05-Jan-04	MX0575	50	\$75.00
MX0249-1	20	\$79.00				05-Jan-04	MX0788	50	\$78.00
MX0741	22	\$80.00	[Full List...]		Updated 08 Jan 08:03	29-Dec-03	MX0371	10	\$75.00
MX0782	100	\$80.00				22-Dec-03	MX0156	50	\$65.00
MX0740	21	\$80.00				22-Dec-03	MX0785	50	\$65.00
MX0800	55	\$80.00				22-Dec-03	MX0785	94	\$65.00
MX0772	350	\$80.00				22-Dec-03	MX0344-1	29	\$60.00
MX0789	66	\$85.00				22-Dec-03	MX0344	71	\$60.00
MX0378	22	\$90.00				22-Dec-03	MX0344	4	\$60.00
MX0421	200	\$90.00				21-Dec-03	MX0727	100	\$79.00
Total	5433								
[Full List...]		Updated 08 Jan 08:03				[History Summary...]			Updated 08 Jan 08:03

Source: <http://www.murrayirrigation.com.au/watexch/>

Reserves and Outflows: Options for Reallocation Transactions

The banked water rights may be held in the specific accounts and leased instream under a multi-year no opt out lease, while the lesser plans for the final dispensation of the water. At the end of the lease period, the water in the bank in the specific district account could either be returned to agricultural use on land, transferred to other uses in the basin (e.g. for a permanent instream right and/or mitigation credits), or could remain in the bank as part of a longer-term lease.

Ways in which water could be transacted out of the bank include:

- ? Groundwater mitigation banking
- ? Permanent instream transfers
- ? Land transfers
- ? Storage reassignments
- ? Surface to groundwater transfers

Once reserves for particular accounts are met an open trading system may be feasible where water is no longer ‘parked’ in reserves but immediately acquired and dedicated to the accountholders desired use.

Costs and Cost-share

Water 2025 funds will be used to support the development and implementation of market methods chosen by the Alliance. Considerable in-kind and non-federal cash match is expected, particularly through ongoing work undertaken by the Deschutes Water Exchange.

4.4 Benefits

District Assessments

As stated earlier, district assessments would be covered by the accountholder on an annual basis for rights held in the bank. A pre-condition of becoming an accountholder would be signing of an agreement that provided for agreement to the operation rules and the provision for an assessment payment on water that is removed from the district. This could be paid in perpetuity or be a one-off exit payment.

Cooperative, Cost-Effective Approach

The pilot water bank offers potential to meet the needs of all water users in the Basin through an inclusive, cooperative mechanism. By providing an outlet for transferable water, the bank will support district property values and maintain assessment bases while creating a tool for the management of district water rights. In addition, the price discovery and transaction history of the bank will help develop the economic model for pricing of long-term water sales from districts that allow permanent sales while providing assessment value to the districts.

4.5 Pilot Bank Budget and Cost-Share

It is estimated in the budget that the startup and operation of the pilot water bank will require \$147,500 of which \$90,000 would come from Water 2025 funds and \$57,500 from cash and in-kind match by Alliance members. Obviously as the initial set of projects go forward, as indicated above, the non-federal match will be measured in millions of dollars.

5. Project Management and Administration

Project management and administration will be carried out by an Alliance member with the requisite management and financial skills. Cost is estimated at 10% of the subtotal of formation, planning and water bank pilot costs, or \$21,250.

6. Regulatory Compliance

With respect to fulfilling Bureau of Reclamation NEPA requirements Alliance members collectively have substantial experience in working with NEPA requirements, the requirements of the Endangered Species Act and the Clean Water Act. .

7. Budget: Funding Plan

(See budget.)