COLORADO WATER CONSERVATION BOARD

ALERNATIVE AGRICULTURAL WATER TRANSFER METHODS COMPETITIVE GRANT PROGRAM

GRANT APPLICATION FORM

Compact Water Bank Feasibility Study	*Colorado River Basin*

Program/Project Name **River Basin Name**

$180,000	$135,000 in cash plus extensive in kind
Amount of Funds Requested	Amount of Matching Funds

Instructions: This application form must be submitted in electronic format (Microsoft Word or Original PDF). The application can be emailed or a disc can be mailed to the address at the end of the application form. The Alternative Agricultural Water Transfer Methods Competitive Grant Program, Criteria and Guidelines can be found at http://cwcb.state.co.us/LoansGrants/alternative-agricultural-water-transfer-methods-grants/Pages/main.aspx. **The criteria and guidelines must be reviewed and followed when completing this application**. You may attach additional sheets as necessary to fully answer any question, or to provide additional information that you feel would be helpful in evaluating this application. Include with your application a cover letter summarizing your request for a grant. If you have difficulty with any part of the application, contact Todd Doherty of the Water Supply Planning Section (Colorado Water Conservation Board) for assistance, at (303) 866-3441 x3210 or email at todd.doherty@state.co.us.

Generally, the applicant is also the prospective owner and sponsor of the proposed program/project. If this is not the case, contact Todd before completing this application.

Alternative Agricultural Water Transfer Methods – Grant Application Form
April 2013

Part A. - Description of the Applicant(s) (Program/Project Sponsor);

1. Applicant Name(s): *Colorado River Water Projects Enterprise of the Colorado River Water Conservation District*

Mailing address: *PO Box 1120*
Glenwood Springs, Co 81601

Taxpayer ID#: *98-05001* Email address: dbirch@crwcd.org

Phone Numbers: Business: 970-945-8522
Home:
Fax: 970-945-8799

2. Person to contact regarding this application if different from above:

Name: Daniel R. Birch

Position/Title Deputy General Manager

3. If the Contracting Entity is different then the Applicant, please describe the Contracting Entity here.

4. Provide a brief description of your organization. The applicant may be a public or private entity. Given the diverse range of potential applicants, not all of the following information may be relevant. Where applicable and relevant the description should include the following:

    a) Type of organization, official name, the year formed, and the statutes under which the entity was formed, a contact person and that person's position or title, address and phone number. For private entities, a copy of the Articles of Incorporation and By-laws should be appended to the application.

The Colorado Water Conservation District (River District) was chartered by the General Assembly in 1937. Pursuant to its organic statute, the River District is charged with "the conservation, use and development of the water resources of the Colorado river and its principal tributaries…to which the state of Colorado is equitably entitled under the Colorado river compact." (CRS 37-46-101)

Contact: Dan Birch, Deputy General Manager
Colorado River Water Conservation District
P.O. Box 1120
Glenwood Springs, CO 81601
(970) 945-8522 (w)
(970) 945-8799 (fax)

    b) For waters suppliers, information regarding the number of customers, taps, service area, and current water usage, and future growth plans, water related facilities owned or used, funding/revenue sources (existing service charges, tap fees, share assessments, etc.), the number of members or shareholders and shares of stock outstanding or a description of other means of ownership.

    c) For other entities, background, organizational size, staffing and budget, and funding related to water that is relevant in determining whether the applicant has the ability to accomplish the program/project for which funding is sought.

The River District has an annual budget of $8.5MM and a staff of approximately 20. Staff includes managers, attorneys, engineers, water resource specialists, accountants, dam operators and administrative staff members who are experts in water matters. In addition to the River District staff, our partners in this effort will work cooperatively to ensure that the project is completed. (See below for information on project partners.)

    d) A brief history of the Applicant(s).

The River District has been working on Colorado River issues since 1937. It has a broad mission to serve residents living within the district's boundaries and to the State of Colorado. The River District has been working in partnership with the Southwestern Water Conservation District, the State of Colorado, the Nature Conservancy, the Front Range Water Council, and of late Tri-State Generation and Transmission, in the exploration of the feasibility of a Compact Water Bank. The Coalition will continue to work collaboratively to complete the work identified in this grant application. The Coalition asked the River District to act as the contracting entity for the contract because it has the ability to do so under TABOR.

e) Please include any relevant Tabor issues relating to the funding request that may affect the Contracting Entity.

The River District operates a governmental enterprise (Enterprise) that would receive the grant, if awarded. Pursuant to TABOR, the Enterprise may not receive more than 10% State grant funds annually. This effectively limits the Enterprise to receive no more than about $400,000 annually from the State. Given current and anticipated State grant revenues, including this grant, the River District sees no difficulty maintaining compliance with TABOR's outside revenue limitations.

Part B. - Description of the Alternative Water Transfer Program/Project –

1. Purpose of the Program/Project

Please provide a summary of the proposed program/project, including a statement of what the program/project is intended to accomplish, the need for the program/project, the problems and opportunities to be addressed, the expectations of the applicant(s), and why the program/project is important to the applicant(s). The summary must include a description of the technical, institutional (i.e., how the program/project will be organized and operated), and legal elements that will and/or have been addressed by the applicant and proposed program/project. The summary should also discuss relevant project history, if applicable, and any other relevant issues.

Preface

In 2011 the Coalition received an Alternative to Agricultural Transfers Grant to begin the study of the feasibility of a Compact Water Bank. This grant continues the work begun in 2011.

Phase I of the 2011 feasibility study estimated potential demands for the bank and potential supplies. Phase II was a reconnaissance level evaluation of 8 actual irrigation systems. The 2011 Study concluded more detailed studies were necessary to properly evaluate the feasibility of a bank.

Summary

Under the Colorado River Compact of 1922, the states of the Upper Division (Colorado, New Mexico, Utah and Wyoming) are obligated to not cause the flow of the Colorado River at Lee Ferry, Arizona to drop below 75 million acre-feet (maf) during any consecutive 10-year period. While the mechanics of a curtailment are unclear, both within the Upper Division and within any Upper Division state, all parties agree that a curtailment would cause significant social and economic disruption. In Colorado, the Colorado River Water Conservation District, the Southwestern Water Conservation District, The Nature Conservancy, and Front Range Water Providers (collectively "The Coalition"), have worked with CWCB staff to explore how a "Water Bank" could help Colorado prevent, address, and respond to a compact curtailment and its effects on Colorado water users. The proposed water bank seeks to provide a means for pre-compact water rights to be used to allow critical post-compact water uses to continue under a Compact curtailment order. Specifically, certain lands that are irrigated by pre-

compact water rights would be temporarily fallowed, and these water rights would be used to offset depletions associated with critical post-compact water uses. This proposal funds further investigation of how a bank would operate to reduce consumptive use either by fallowing or deficit irrigation on three or four actual irrigation systems that were evaluated in the 2011 Phase 2 study.

Need for the Project

Under Article III of the Colorado River Compact of 1922, Colorado shares an obligation with the other states of the Upper Division of the Colorado River Basin (New Mexico, Utah, and Wyoming) to "not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years." In the event that the Upper Division states cause flows to fall below that threshold, the Upper Division states may be required to curtail consumptive water uses in order to comply with Article III of the Compact.

Article VIII of the 1922 Colorado River Compact contains the provision that "present perfected rights to the beneficial use of waters of the Colorado River System are unimpaired by this compact." The common interpretation, which is used here, is that water uses perfected at the time of the signing of the 1922 Compact could continue in use, and post-compact water uses may be curtailed.

While the mechanics of a curtailment process are unclear in either the Upper Division or within any Upper Division state, a curtailment would be felt statewide, as water from the Colorado River Basin is used nearly statewide in Colorado. Front Range municipalities may be particularly vulnerable to a curtailment, as a significant portion of the water from the Colorado River in Colorado is diverted to the Front Range for municipal use, as the associated water rights are predominantly junior to the Compact.

Absent a mechanism to respond proactively to a Compact curtailment, water providers on both sides of the Divide may be compelled to purchase pre-compact water rights. The majority of pre-compact water rights serve irrigated agriculture. The proposed water bank would provide for or facilitate a free market mechanism for pre-compact water uses to be used for compact compliance, while allowing critical post-compact water rights to continue to divert rather than be curtailed, in the event of a compact curtailment. The Bank is also intended to provide both certainty and equity to post-curtailment water use. Without a Water Bank in place, one can envision pre-compact water rights being controlled by a select few who could presumably then use those rights without regard to criticality of use or lack of supply to other Colorado water users.

The purpose of the water bank is three-fold: 1) proactively develop interruptible supply agreements to temporarily cease irrigation during a Compact curtailment and then return it to irrigation afterwards to minimize disruption 2) develop the bank before there is a curtailment to minimize the impacts, and 3) create a trusted broker for transactions to minimize the risk to buyers, sellers, and the State of Colorado.

The Coalition believes the chance of a compact curtailment is low in the next 10 years. However, the past ten years have been dry and the major droughts of 2002 and 2003 and now 2012 and 2013, have resulted in a decline in the 10-year running average of the flow at Lee Ferry and have resulted in reduced storage in Lakes Powell and Mead, heightening the potential for compact compliance situation. In addition, climate models suggest a further reduction of flows in the Colorado River. With

basin-wide demands already exceeding the River's supply, reduced hydrology for any reason, coupled with increasing demands may hasten a compact curtailment. The Coalition believes it is important to have a mechanism in place before curtailment occurs.

The 2011 Phase I study identified approximately 350,000 acre-feet of post-compact municipal and industrial water use that could be protected by a water bank.

Phase 1 also estimated approximately 1 million acre-feet of pre-compact irrigation water use, only about 70,000 acre-feet of which is used for row crops which are suitable for fallowing. The vast majority of use – over 900,000 acre-feet – is for hay, either for grass pasture or alfalfa. These crops are not readily fallowed but it is possible, at least theoretically, to achieve reduced consumptive use by "deficit irrigation", applying less than a full supply of water, and thereby developing water supplies that can be banked. However, the means and methods for successful deficit irrigation and the methods for measuring reduced consumptive use are not well understood and have not been studied extensively. Therefore, feasibility for a compact water bank cannot be ascertained without more study and a better understanding of deficit irrigation.

The study to be funded pursuant to this proposed grant is to engage in further and more detailed studies of three or four of the irrigation system evaluated in Phase 2. This next study is referred to as Phase 2B.

Phase 2B includes a focus on deficit irrigation and a portion of the project funds will be used to support field research by Joe Brummer of Colorado State University on deficit irrigation and fallowing.

This phase of the study does not include other elements that eventually will need to be studied in order to develop a complete picture of feasibility for a bank. These include regional economic evaluations, environmental evaluations, further definition of how a bank would operate and function, and further evaluation of the post-compact demands the bank would serve to protect.

Importance of a Compact Water Bank:

In our review, we have concluded that a water bank as proposed by the Coalition could be an effective way to reduce the risk and impacts associated with a Compact curtailment not only for water users which rely on pre-compact water supplies, but also for the adverse consequences to Colorado agriculture in the absence of a water bank. Although we cannot answer all questions prior to putting the bank in place, one of the primary benefits of a bank is that it is an adaptable solution to the challenges posed by compact compliance. It will allow water users to adjust their participation in the bank according to the hydrologic conditions, economic needs, and risk tolerance.

Previous Studies

To the maximum extent possible, the results of any previous studies and investigation should be utilized and incorporated into the proposed program/project. The application for funding should include a brief summary of the results of previous studies and how they will be utilized.

Previous Studies

In late 2009 a report was completed by Tom Iseman, then at The Nature Conservancy, in conjunction with the Property Environment Research Center and WestWater Research (Iseman Report) on behalf of the Coalition which made an initial examination of issues surrounding a compact water bank.

Also, as mentioned above, this study is a continuation of the Phase 1 and Phase 2 studies, funded by a 2011 Alternative to Agricultural Transfers Grant, and focuses on the gaps in knowledge and understanding identified in the earlier studies.

2. Study Area/Service Area Description

The study area/service area is generally the geographic area that is the subject of the proposed program/project (include both the source of supply and location and type of new use). The description should include the following items:

a) A narrative description of the study area/service area including: the county, the location of towns or cities, topography, and locations of major surface and ground water features.

The study area is the entirety of Colorado's West Slope and Front Range municipalities from Pueblo to Fort Collins. Several Front Range water providers are expected to be key participants of a water bank and this water bank study.

b) An area map showing each of the items above, as well as the locations of existing facilities, proposed project facilities and boundaries of lands involved in the proposed program/project.

c) Information regarding the irrigated lands that are involved in the program/project. This must include a tabulation of total irrigated acreage, description of cropping types, crop yields, and total average annual water diversions for existing agricultural lands.

Information about irrigated lands that are irrigated using pre-compact water rights and are possibly suitable and available for incorporation in a Compact Water Bank will be developed as an integral part of the grant study. The study will rely upon information developed by the CWCB Compact Compliance Study to the extent possible.

d) Information regarding the location of the new water use(s) that will be served by transferred water including the estimated number of users/taps and/or uses served.

The Water Bank aims to protect critical uses of water from being shut off if Compact curtailment were to occur. Information about those essential uses will eventually be developed.

e) Socio-economic characteristics of the area such as population, employment and land use.

This effort encompasses a vast area -- all of the West Slope of Colorado and all of the area of the Front Range that utilizes Colorado River water to meet municipal and industrial water demands. A meaningful and brief description of the socioeconomics of such a vast area is not possible in this application.

3. Description of the Alternative Water Transfer Method

Please describe the type(s) of water transfers that will be examined/utilized (i.e., conceived transfer methods include, but are not limited to: 1) interruptible water supply agreements; 2) long-term agricultural land fallowing; 3) water banks; 4) reduced consumptive use through efficiency or cropping changes while maintaining historic return flows; and 5) purchase by end users with leaseback under defined conditions). In addition, please describe how the transferable consumptive use will be calculated and quantified, and how return flow patterns will be addressed/maintained.

The working assumption for the Coalition is that the preferred method would be interruptible supply agreements, although other methods are possible and are not being precluded at this point.

Phase 2B will examine how reduced consumptive use will be quantified and will also examine issues related to maintaining return flow patterns and amount.

4. Program/Project Eligibility

Please describe how the proposed program/project meets each of the following eligibility requirements (please see Criteria and Guidelines for additional information regarding the alternative water transfer methods/strategies that qualify for funding). Note: If these requirements are addressed in other parts of the application you may simply reference the applicable section(s).

a) A description of how, if implemented, the proposed program/project will protect property and water rights.

If curtailment occurred without a water bank or similar mechanism in place, there would be a significant impact on agricultural property and water rights. There would be increasing uncertainty and there could be a rush by post-compact rights holders to buy pre-compact rights. The purpose of the water bank is to provide certainty and insurance in the event of a curtailment situation. Without a water bank, the impacts of a Compact curtailment in Colorado would be significant. In one basic scenario, a curtailment would last several years and require so much water that all water rights in Colorado junior to the Colorado River Compact would be curtailed at the same time. This would affect cities in the Front Range of Colorado and resort communities in Western Colorado, ski areas, and even many agricultural water users in both Western and Eastern Colorado. The implementation of a Compact water bank would allow water managers to use the water bank to facilitate trades between pre- and post- Compact water rights, allowing critical post-Compact water rights to continue to divert without permanently removing irrigation from the pre-1922 irrigated lands. A bank could also help preserve and protect pre-compact rights and the agricultural uses and economy relying on those rights by setting aside funds to ensure the continued use and maintenance of those pre-Compact water rights.

b) Identified group(s) of agricultural users that are or may be willing to transfer a portion of their water and identified entity(s), group(s) or area(s) where the transferred water could or would be put to the new use and a description of the new use.

The project team interviewed major water users in several of the water basins in Western Colorado who could potentially offer water supplies into a compact water bank. Most of these are water districts or irrigation companies that use significant pre-compact water rights. The following water user groups participated in these interviews: Grand Valley Water Users, Orchard Mesa Irrigation District, Montezuma Valley Irrigation Company, Dolores Water Conservancy District, Yampa Valley, and Uncompahgre Valley Water Users. Generally, these senior, west-slope agricultural water users recognized the significant potential disruption to post-compact water users, particularly front-range cities, of a Compact-curtailment in Colorado. They indicated a willingness to consider how a water bank could help to address these impacts through willing-participant, free-market transactions.

c) The program/project must at a minimum conceptually describe the technical, institutional, and legal elements of the water transfer. Grant monies may be used to address one or more of these elements. If grant monies are not requested for all three elements, the grant applicant must describe how the applicant has or intends to address the elements, which are not included in the grant request, through other efforts.

The Coalition plans to use the grant funds to answer certain technical questions as outlined in the Scope of Work. Grant funds will not be used to address a variety institutional and legal questions associated with the development of a Compact Water Bank. The Coalition plans to examine these matters separate from the grant, principally using in-kind resources.

d) If grant monies are proposed for use for legal assistance then the use of those funds shall be oriented toward advancing the knowledge of alternative agricultural water transfer methods and techniques; not for preparation of a specific water court case. The total requested funds for legal assistance shall not exceed 40 percent of the total grant request. In addition, grant monies proposed for use for legal assistance must be used to collaboratively address issues and concerns related to agricultural water transfer. Funds shall not be used to solely advance the cause of the project proponents.

Grant funds will not be used for legal assistance. As explained above, the Coalition may use in-kind resources to explore certain legal issues associated with the development of a Compact Water Bank.

e) A minimum of a 10 percent cash match of total project cost (past expenditures and "in kind" cannot be counted toward the 10 percent match).

The Coalition partners have each committed to contribute at total of $135,000 as cash match. See attached letters of commitment included as Attachment A.

5. Program/Project Evaluation Criteria

The following grant evaluation criteria will be used by the CWCB to evaluate and make recommendations to fund, partially fund or not fund a grant application. The criteria are aimed at advancing alternative transfer methods from the literature and studies to actual on the ground projects/programs that provide reliable water supply and sustain key elements of the agricultural area from which the water is transferred. The applicant should fully address and explain in detail in the application how, and the extent to which, the proposed project/program meets each of the criteria.

However, it should be noted that the project does not have to meet all of the criteria to be eligible to receive funding and the criteria below are not listed in any order of important or priority.

a. The proposed project/program builds upon the work of former alternative water transfer methods efforts and addresses key areas that have been identified. For more detailed information on this work, please refer to the draft report: *Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update*, November 2012.

This proposal builds on the Phase 1 and Phase 2 studies and the 2009 Reconnaissance Study mentioned previously. In addition this proposal complements the CWCB's Compact Curtailment Study that is underway.

b. The proposed project addresses one or more key recommendation(s) in the report: *Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update*, November 2012.
c. Preference will be given to projects that provide additional matching resources in the form of cash, past expenditures and in-kind contributions that are in addition to the required 10% cash match.

The Coalition proposes to provide $135,000 (40% of the total) in cash to serve as matching funds. In addition, every partner is prepared to provide extensive in-kind support. Please see attached letters of commitment (Attachment A).

d. The proposed project/program has the ability/potential to produce a reliable water supply that can be administered by the State of Colorado, Division of Water Resources.

While this project is not aimed at producing a new supply of water, it is critically important to protect critical water uses in time of extreme drought. This project will focus providing a system to allow "critical juniors" to continuing diverting while mitigating the impacts on West Slope irrigated agriculture. The project proponents will work closely with the Division of Water Resources to address questions concerning administration of the water bank and to ensure protection of water that is critical to health, safety and welfare.

e. The proposed project/program produces information that is transferable and transparent to other users and other areas of the state (i.e., would provide an example "template" or roadmap to others wishing to explore alternate transfer methods).

While some of the issues associated with developing a Compact Water Bank will be unique, the project will certainly provide a template for dealing with many issues associated with creating a successful water bank in Colorado. For example, the Coalition must work through many issues that any water bank would need to address. These include, but are not limited to, how to quantify consumptive uses on a ditch or irrigation system, if and how the U.S. Bureau of Reclamation will administer or contract for project water rights in a water bank, how Reclamation project beneficiaries can participate in a water bank, how to quantify supply and demands, how to develop

the appropriate market approach for a water bank in Colorado, and how to quantify and mitigate third party impacts.

f. The proposed project/program addresses key water needs identified in SWSI 2010 or as identified in a basin's needs assessment.

As stated in other parts of the application, this project is unique in that it is meant to protect critical uses from Compact curtailment. The project's primary purpose is to establish a mechanism that ensures critical junior water rights can continue to divert if curtailment were to occur while protecting irrigated agriculture on Colorado's West Slope.

g. The proposed project/program advances the preservation of high value agricultural lands. Value can be viewed as: the value of crops produced, the value the agriculture provides to the local community, and the value the agricultural area provides for open space and wildlife habitat.

This is one of the key objectives of the Water Bank. The proposed project aims to ensure that important West Slope agriculture, including orchards, vegetable and vineyards are protected as much as possible. The alternative is to allow the market to drive permanent dry-up of large blocks of pre-1922 irrigation without regard to the impacts on surrounding communicates and economies. The Water Bank can provide a market for better designed transitions to occur that do not require such permanent dryups that instead sustain the surrounding communities, environment, and economies.

h. The proposed project/program addresses water quality, or provides other environmental benefits to rivers, streams and wetlands.

In particular, the Coalition believes it is important in the event of a compact curtailment that measures are put in place to provide some level of protection for endangered fish species of the Colorado River. A considerable amount of time and money has been expended to promote recovery of these species and the Coalition would not want to see a decline in the fish species as a result of a curtailment. By way of example, pre-compact supplies could be stored on a space available basis and released downstream in the late summer and fall when the additional flows would help preserve and protect the species. These and other approaches will be examined during the grant study.

In addition, the Coalition will examine the potential for fallowing the most unproductive lands first that are currently contributing to salinity and selenium loading. By taking those lands out of production first could provide additional water quality benefits in Colorado, as many segments are currently listed on the impaired water bodies list, and to the endangered fish.

i. The proposed project/program increases our understanding of and quantifies program/project costs. This could include: institutional, legal, technical costs, and third party impacts.

The Coalition fully expects to address important questions, including but not limited to the following: 1) What kind of institution would best work in Colorado for a water bank? 2) How do we structure

the market to make the bank successful? 3) Who owns the water rights associated with Reclamation facilities and how much flexibility is associated with those rights regarding fallowing and use of water in a bank? 4) Do we need federal legislation to use Reclamation facilities? 5) What are the technical costs associated with setting up a successful water bank? and 6) How do we quantify and mitigate third party impacts? The project associated with this application will provide important information to address these issues.

j. The proposed project/program does not adversely affect access to other sources of water (not subject to/participating in the program) where owners of these water rights may wish to pursue traditional transfer of their rights to other users.

The Water Bank would be voluntary. The Coalition does not believe that the project will adversely affect a water rights holder from pursuing traditional transfers. In fact, the bank is conceived with the express purpose of protecting water rights and water uses both currently and in the event of a Compact curtailment.

k. The proposed project/program provides a perpetual water supply for the new and/or alternate use and preserves agricultural production and/or helps sustain the area's economy from which the transfer is occurring.

The Water Bank is not meant to provide a perpetual water supply, but instead aims to ensure that critical uses can continue if curtailment were to occur. The Coalition is very much concerned with preserving production and sustaining the West Slope's agricultural economy while enlisting the pre-1922 agricultural water rights holders' help in solving a statewide problem.

l. The quantity of water produced by the proposed project/program. Preference will be given to programs that can address larger water supply needs.

While the Water Bank will not produce new supply, the Coalition contemplates that it could produce a very substantial supply of water for deposit in the Water Bank, which would replace depletions of many critical post-1922 water rights. The bank could also support West Slope agriculture by providing direct financial assistance for those senior water users willing to participate in the bank.

m. Applicants are encouraged to develop projects demonstrating participation and/or support from a diverse set of stakeholders and interests.

6. Statement of Work

Provide the proposed statement of work. On the following page there is an example format for the statement of work. You can use the example format or your own format, provided that comparable information is included. The statement of work should outline by task how the proposed program/project will be accomplished. It is important that the statement of work detail the specific steps, activities/procedures that will be followed to accomplish each individual task and the overall program/project and the specific products/deliverables that will be accomplished. The statement of work must include but not be limited to: task description, key personnel, budget, schedule and

deliverables and the final report/project documentation upon completion of the water activity.

The statement of work will form the basis for the contract between the Applicant and the State of Colorado. In short, the Applicant is agreeing to undertake the work for the compensation outlined in the statement of work and budget, and in return, the State of Colorado is receiving the deliverables/products specified. Please note that costs incurred prior to execution of a contract or purchase order are not subject to reimbursement.

Please provide a detailed statement of work using the following template. Additional sections or modifications may be included as necessary. Please define all acronyms. If a grant is awarded an independent statement of work document will be required with correct page numbers.

Statement of Work

Attachment B is the proposed Scope of Work under the grant.

REPORTING AND FINAL DELIVERABLE

Reporting: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the tasks identified in the statement of work including a description of any major issues that have occurred and any corrective action taken to address these issues.

Final Deliverable: At completion of the project, the applicant shall provide the CWCB a final report that summarizes the project and documents how the project was completed. This report may contain photographs, summaries of meetings and engineering reports/designs.

Alternative Agricultural Water Transfer Methods – Grant Application Form
April 2013

BUDGET

Provide a detailed budget by task including number of hours and rates for labor and unit costs for other direct costs (i.e. mileage, $/unit of material for construction, etc.). A detailed and perfectly balanced budget that shows all costs is required for the State's contracting and purchase order processes. Sample budget tables are provided below. Please note that these budget tables are examples and will need to be adapted to fit each individual application. Tasks should correspond to the tasks described above.

See Attachment C for the budget.

SCHEDULE

Provide a project schedule including key milestones for each task and the completion dates or time period from the Notice to Proceed (NTP). This dating method allows flexibility in the event of potential delays from the procurement process. Sample schedules are provided below. Please note that these schedules are examples and will need to be adapted to fit each individual application.

A detailed schedule has not yet been prepared. It is expected that work under the scope of work would commence by July 1, 2013 and continue through the 2013 and 2014 growing seasons. Final report writing would occur in early 2015.

PAYMENT

Payment will be made based on actual expenditures and invoicing by the applicant. Invoices from any other entity (i.e. subcontractors) cannot be processed by the State. The request for payment must include a description of the work accomplished by major task, and estimate of the percent completion for individual tasks and the entire water activity in relation to the percentage of budget spent, identification of any major issues and proposed or implemented corrective actions. The last 5 percent of the entire water activity budget will be withheld until final project/water activity documentation is completed. All products, data and information developed as a result of this grant must be provided to the CWCB in hard copy and electronic format as part of the project documentation. This information will in turn be made widely available to the public and help promote the development of alternative agricultural transfer methods.

Additional Information – If you would like to add any additional pertinent information please feel free to do so here.

The above statements are true to the best of my knowledge:

Signature of Applicant: 

Print Applicant's Name: Daniel R. Birch

Project Title: Colorado River Compact Water Bank Feasibility Study

Return this application to:

Mr. Todd Doherty
Colorado Water Conservation Board
Water Supply Planning Section
1580 Logan Street, Suite 200
Denver, CO 80203
Todd.Doherty@state.co.us

TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.
HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

April 12, 2013

Colorado Water Conservation Board
Attn: Todd Doherty
1313 Sherman Street
Suite 723
Denver, Colorado 80203

RE: Colorado River Compact Water Bank Project

Dear Colorado Water Conservation Board Members:

Tri-State Generation and Transmission Association, Inc. holds a significant water portfolio throughout the State. As such, water rights, including direct flow, storage or other methods of water conservation and beneficial use are very important to our business success. Therefore, we are pleased to contribute $30,000 to the support the 2013-2014 Colorado River Compact Water Bank Project. We believe that this project helps preserve the future of the Colorado River, its tributaries, and the communities that rely upon Colorado River water for their sustainability and success.

We look forward to additional discussion and activities related to this next phase of the Water Bank Project. Should you have any questions, please feel free to contact me at (303) 254-3208.

Sincerely,

Michael G. Sorensen

Michael G. Sorensen
Senior Manager, Fuel and Water Resources

MGS:jkm

Cc: Dan Birch, Colorado River District

FRONT RANGE WATER COUNCIL

1600 West 12th Avenue
Denver, CO 80204-3412

April 15, 2013

Mr. John McClow, Chairman of the Board
Colorado Water Conservation Board
1313 Sherman St., Rm. 721
Denver, CO. 80203

RE: Support for ATM Grant for Compact Water Bank Study

Dear Mr. McClow and Members of the Board:

On behalf of the Front Range Water Council, I am writing in support of the Colorado River District's Alternative Agricultural Water Transfer Methods grant request for $180,000 to continue studying the feasibility of a Compact Water Bank. We recognize that this is an important study, and we are committed to participate productively and provide funds in Phase 2B.

We trust that this letter will serve as a demonstration of our continued determination to cooperate on efforts that explore ways to reduce the risk and impacts associated with a Compact curtailment.

Please don't hesitate to contact me if you have any questions.

Sincerely,

FRONT RANGE WATER COUNCIL

James S. Lochhead

The Nature Conservancy
Colorado River Program
2424 Spruce Street
Boulder Colorado 80302

April 15, 2013

Colorado Water Conservation Board
Attn: Todd Doherty
1313 Sherman Street
Denver, CO

Re: CWCB Alternative Agricultural Water Transfer Methods Grant Application for a Colorado River Compact Water Bank

Dear Colorado Water Conservation Board Members:

Please accept this letter of commitment from The Nature Conservancy to contribute **$30,000** in cash and additional in kind to support the above referenced grant application to be submitted by April 15, 2013. This commitment will be effective upon finalization of the grant agreement between the State and the Colorado River District.

We believe that this application is tremendously important to the sustainability of the Colorado River Basin and look forward to strengthening the partnership needed to develop and implement the proposed Water Bank in the State of Colorado. Please feel free to contact me at thawes@tnc.org or 303-541-0322 if you have any questions or require additional specification about this commitment.

Sincerely,

Taylor Hawes
Colorado River Program Director

cc: Tim Sullivan, Acting State Director, The Nature Conservancy of Colorado
Dan Birch, Colorado River District

COLORADO RIVER COMPACT WATER BANK FEASIBILITY STUDY

PHASE 2B SCOPE OF WORK
DRAFT April 1, 2013

INTRODUCTION

Background

Phases 1 and 2 of the Colorado River Compact Water Bank Feasibility Study have been completed by the Water Bank Group and MWH Americas, Inc. These studies have investigated potential supply and demand for the Water Bank, hydrologic conditions that could trigger its use, operational scenarios, methods of fallowing and deficit irrigation, and on-farm interviews with a variety of landowners and irrigation system managers. Phases 1 and 2 have clarified many of the basic issues associated with forming and operating the Water Bank, but additional work is needed to understand and address these issues and numerous other issues remain to be defined and evaluated. Phase 2B of the Feasibility Study is intended to "drill down" into a number of the important issues in greater detail than previously studied in Phase 2 and as identified as "next steps" in the Phase 2 report. In particular, Phase 2B will focus on improving the understanding of the effects of West Slope fallowing and deficit irrigation on crop yield and health, and on actual CU savings It is not expected that Phase 2B will provide final answers for all feasibility questions, but it will advance the discussion and provide additional information for the State of Colorado, the West Slope agricultural community, and those water users exploring use of a Colorado River Compact Water Bank as part of their future water supply portfolios.

Phase 3 of the Water Bank study process, when initiated, will address regional economic and environmental issues.

Principles and Objectives of Phase 2B

The key questions to be answered in Phase 2B of the Water Bank Feasibility Study are:

1. What is the state of the science in understanding fallowing and deficit irrigation of high elevation grass pastures and other West Slope irrigated areas, and can that be advanced through this process?
2. What short-term and long-term impacts could fallowing and deficit irrigation have on crop yield and field health?
3. What methods would be recommended to estimate CU savings for a wide range of crop types, irrigation practices, and climates that could be a surrogate for on-farm measurements of saved CU?
4. How can the CU on-farm savings within an irrigation system be conveyed or transferred or left in the original stream channel?
5. In general, how can irrigators under Reclamation projects participate in the Water Bank, and what role will Reclamation play?
6. How could specific irrigation systems implement fallowing or deficit irrigation to participate in the Water Bank, and what would be the primary economic, environmental and other impacts and benefits to their operations and surrounding areas?
7. What are the readily available data on leasing prices and transaction costs for water banks in other states and what can they indicate about agricultural water values in Colorado and the volatility of the market?

Coordination of Activities of Water Bank Group, Consultant, and Other Parties

It is anticipated that Phase 2B of the Feasibility Study will involve coordinated activities conducted by several different parties. Some tasks will be performed by the Water Bank Group members, some will be assigned to the Water Bank Consultant team, and others will be performed by outside parties as part of separate but coordinated research efforts. This approach will allow use of outside funding opportunities and leveraging of other parallel studies for the benefit of the Feasibility Study. The task descriptions below indicate proposed assignments to the Water Bank Group, the Consultant, or others.

SCOPE OF WORK

Task 1. Detailed Test Case Irrigation System Analyses

1.1 Select Detail Systems

Three or four irrigation systems will be selected and evaluated in detail ("Detail Systems"). Selection of the Detail Systems will be coordinated with the on-farm fallowing and deficit

irrigation research described in Task 2, and the same systems will be used for both parts of the analysis if possible. Ideally the Detail Systems will be selected from among the eight test case irrigation systems analyzed in Phase 2. These are:

Group 1
- Ekhart Ditch
- Trampe Ranch
- Cold Mountain Ranch

Group 2
- Colorado Cooperative Ditch
- Dr. Morrison Ditch

Group 3
- Grand Valley Irrigation Company
- Uncompahgre Project
- Grand Valley Project

If possible, Detail Systems will include representative systems from each of the three groups. The selection of the 3 or 4 Detail Systems will be based on criteria such as: interest in participating in detailed study, previous commitment to participate in on-farm research described in Task 2, a variety of types of irrigation systems (water tied to specific land or shares can be moved around), various crops, elevation, amount of water potentially provided to the Water Bank, and availability of data for the system. For each Detail System, the analyses described for the rest of the subtasks in Task 1 will be performed. (WATER BANK WORK GROUP AND CONSULTANT)

1.2 Water Bank Operation Schemes

Specific, potentially feasible fallowing or deficit irrigation schemes will be described based on the information gathered during the Phase 2 analyses and interviews. This will consist of the location, acreage, crop types, duration and frequency of fallowing or deficit irrigation. The options of fallowing and/or deficit irrigation will be explored for the types of crops in each Detail System. The range of potential CU that might be available from these operations and used in the Water Bank will be estimated to the extent possible. (CONSULTANT)

1.3 Consumptive Use and Return Flow Effects

StateMod will be used to compute the consumptive use savings and to the extent possible the changes in amount and timing of return flows created by the fallowing or deficit irrigation programs for each Detail System. This desktop type of analysis is a preliminary estimate leading to the detailed site analysis and site specific studies. The 2013 irrigation season is shaping up to have shortages due to drought in some areas of the West Slope. The studies of the Detail

Systems will attempt to include the evaluation of shortages and de facto fallowing and deficit irrigation resulting from drought and how such shortages may affect consumptive use and return flow. (CONSULTANT)

1.4 On-Farm Economic Effects

On-farm economic effects of the fallowing or deficit irrigation schemes will be estimated using the information provided by the Detail System owners/managers, regional farm economics data prepared for Phase 2, and results of other available research. One or more standard templates for organizing economic data related to farming enterprises (e.g., as available from *Understanding the Value of Water in Agriculture: Tools for Negotiating Water Transfers* by B. Colby) will be reviewed with the landowner/manager for applicability to their system, as a way to understand financial implications of changes in irrigation practices without needing specific information on these businesses. (CONSULTANT)

1.5 Hydrologic Effects

Changes in typical hydrologic conditions downstream of the affected headgates will be estimated based on the results of the StateMod analysis. Possible effects of the altered hydrologic conditions due to modified return flows and/or diversions on environmental flows and immediate downstream water rights will be qualitatively described, without additional modeling or quantitative analysis. (CONSULTANT)

1.6 Administration of Saved CU within Detail Systems

Specific administration issues for each Detail System associated with the potential fallowing and deficit irrigation schemes will be discussed. Examples include accounting for saved CU at the farm level that would be contributed to the Water Bank, and methods of conveying or transferring the saved CU to the stream. Options for internal accounting of CU within each Detail System will be explored and described. A subjective estimate of whether the administrative structure of each Detail System would allow participation in the Water Bank will be prepared. (CONSULTANT)

1.7 Update Potential Water Bank Supply Estimates

Based on the findings for the Detail Systems in the above tasks, an estimated range of total CU on the West Slope that might be available for the Water Bank will be prepared as appropriate, realizing this would still be a wide range. (CONSULTANT)

Task 2. On-Farm Fallowing and Deficit Irrigation Research on West Slope

Phase 2B of the Water Bank Feasibility Study will be coordinated with planned research by Joe Brummer and Denis Reich of Colorado State University (CSU) into the feasibility of fallowing and deficit irrigation for the variety of cropping situations that may be encountered within the

Water Bank operations on the West Slope. While past research has investigated effects of deficit irrigation of alfalfa and the types of row crops grown in Colorado, little research has been performed on high elevation grass pastures which represent a large portion of the West Slope irrigated acreage and potential CU. In addition, little research is currently available for specific sites in the West Slope region.

The CSU research team plans to perform on-farm fallowing and deficit irrigation studies to assess the impacts of one year of these practices on crop yields and health for selected irrigation systems that are yet to be determined. Side-by-side comparisons of fully irrigated and reduced-irrigation fields will be performed, and the impacts on crop yield will be evaluated over a single irrigation season. The intent is to perform studies on fields with grass pasture, alfalfa and row crops in a variety of elevations and climates on the West Slope.

2.1 Coordination with CSU Research

The Water Bank team will coordinate Phase 2B activities with the CSU research team to assure that each study supplements the goals of the other study. This will include holding common status meetings and teleconferences to coordinate study plans and ongoing activities. (WATER BANK GROUP)

2.2 Supplemental On-Farm Studies

A portion of Water Bank Phase 2B funding will supplement CSU's on-farm research effort in one or more of the following ways depending on available funding, Water Bank research priorities, preferences of the CSU research team, and support from the irrigators.

a. Extend the research program to track recovery of crop yields and health on fields that had reduced irrigation over one or more additional seasons when full irrigation has been restored.
b. Improve estimates of saved CU from fallowing or deficit irrigation in the year with reduced irrigation and in subsequent years after full irrigation has been restored.
c. Expand the research program to include multiple years of fallowing and deficit irrigation, followed by multiple years of measurement of crop yield recovery and CU.
d. Expand the research program to include additional research sites and irrigation systems.

The Water Bank Group will work together with the CSU research team to determine the most valuable near-term research needs for evaluating the Water Bank and other alternative agricultural water transfer methods. (WATER BANK GROUP)

Task 3. Technical Memorandum for Each Detail System

A technical memorandum (TM) will be prepared for each of the irrigation systems studied to summarize the results for the work conducted in Tasks 1 and 2 above. This will integrate the

desktop studies and on-farm studies performed by the Water Bank team and CSU. The TMs will be included in the final Phase 2B report. (CONSULTANT)

Task 4. Operational Evaluations

This task will investigate further details identified at a conceptual level in Phase 2 about issues associated with Water Bank operation and administration.

4.1 Fallowing and Deficit Irrigation Feasibility Literature Review Update

The fallowing and deficit irrigation research literature review summaries prepared for Phase 2 of the Feasibility Study by the Consultant and by TNC will be tracked, updated, and expanded by incorporating information on other studies and recent findings from ongoing research projects. (CONSULTANT AND TNC)

4.2 Methods of Measuring Reduced Consumptive Use]

The Phase 2 discussion of the difficulty in measuring reduced CU will be expanded to investigate use of alternative measurement or estimation methods. These will include crop yield differences, remote sensing (aerial and satellite photography), meteorological calculations, and standard crop water requirements. Procedures of applying each method will be described, and the advantages and disadvantages of each will be identified. Experience with methods for CU accounting used in other water markets in the Western U.S. will be researched and summarized. This work will be correlated with the CU estimates for the Detail Systems. (CONSULTANT)

4.3 Investigation of Reclamation Project Issues

Investigation will be conducted into potential issues associated with participation in the Water Bank by selected irrigation systems that are a part of a Reclamation project. If possible, the irrigation systems selected for this investigation will also be Detail Systems evaluated in Task 1. To the extent appropriate, the issues associated with the selected systems will be extrapolated to other Reclamation projects on the West Slope. (WATER BANK WORK GROUP WITH POSSIBLE ASSISTANCE FROM OTHERS)

Task 5. Evaluate Supply Side Economics

Summarize previous available research on market values of interruptible supplies from the literature and from current or proposed water markets in Colorado and other Western States. Assemble readily available data on transaction costs for water banks in other states, and index them to agricultural water values in Colorado. To the extent available, the assembled data should include historic patterns in the market values to indicate the volatility of the market. (CONSULTANT)

Task 6. Phase 2B Feasibility Report (CONSULTANT)

A Phase 2B Feasibility Study Report will be prepared to document the studies and findings of the Phase 2B tasks. The report will include a section on conclusions, recommendations, and proposed next steps in the Water Bank feasibility study process.

A draft report will be prepared from the TMs and other documentation prepared for the foregoing tasks. Comments from the Water Bank Group will be incorporated into the final report. Draft and final reports will be distributed in electronic format.

COLORADO RIVER WATER BANK PHASE 2B
PROJECT BUDGET ESTIMATE - PRELIMINARY DRAFT FOR REVIEW
Revised April 2, 2013

	Task	Principal Engineer	Superv Engineer	Senior Engineer	Engineer	Assoc Engineer	Senior Admin	Admin	Total Hours	Labor Cost	APC	ODCs	NRCE	West Water	Colorado State University	Total Cost	Comments
		$185	$150	$120	$100	$80	$85	$65			$ 10.00	12%	12%	12%			
1.0	Detailed Test Case System Analysis																4 Detail Systems
1.1	Select Detail Systems	12			24				36	$ 4,620	$ 360					$ 4,980	
1.2	Water Bank Operation Schemes	24			40	16			80	$ 9,720	$ 800	$ 1,500	$ 6,000			$ 18,920	3 schemes/system; onsite meetings
1.3	Consumptive Use / Return Flow Effects	16			160	32			208	$ 21,520	$ 2,080					$ 23,600	
1.4	On-Farm Economic Effects	32							32	$ 5,920	$ 320		$ 15,000			$ 23,040	With assistance from WB WG
1.5	Hydrologic Effects	8	60		160				228	$ 26,480	$ 2,280					$ 28,760	
1.6	Administration of Saved CU	12			40				52	$ 6,220	$ 520		$ 12,000			$ 20,180	
1.7	Update WB Supply Estimates	4			16				20	$ 2,340	$ 200					$ 2,540	
	Subtotal Task 1	108	60	0	440	48	0	0	656	$ 76,820	$ 6,560	$ 1,500	$ 33,000	$ -		$ 122,020	
2.0	On Farm Research on West Slope																
2.1	Coordination with CSU Research															$ -	WB WG In-Kind
2.2	Supplemental On Farm Studies														$ 50,000	$ 50,000	Brummer-Reich research support
	Subtotal Task 2	0	0	0	0	0	0	0	0	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ 50,000	
3.0	TMs for Detail Systems	48	24	30	80	32	16		230	$ 28,000	$ 2,300		$ 8,000			$ 39,260	4 Detail Systems
4.0	Operational Evaluations																
4.1	Fallowing and DI Lit Review Update	4		40					44	$ 5,540	$ 440					$ 5,980	TNC to update literature summary
4.2	Methods of Measuring Reduced CU	16					8		24	$ 3,640	$ 240		$ 8,000			$ 12,840	Include TM
4.3	Investigate Reclamation Project Issues								0	$ -	$ -					$ -	WB WG In-Kind
	Subtotal Task 4	20	0	40	0	0	8	0	68	$ 9,180	$ 680	$ -	$ 8,000	$ -		$ 18,820	
5.0	Evaluate Supply Side Economics	24		40			8		72	$ 9,920	$ 720			$ 10,000		$ 21,840	Include TM
6.0	Phase 2B Feasilibity Report																
6.1	Draft Report	24		40	40	8	8		120	$ 14,560	$ 1,200		$ 3,000	$ 2,000		$ 21,360	
6.2	Final Report	16		30	24	8	8		86	$ 10,280	$ 860		$ 2,000			$ 13,380	
	Subtotal Task 5	40	0	70	64	16	16	0	206	$ 24,840	$ 2,060	$ -	$ 5,000	$ 2,000		$ 34,740	
7.0	Project Management and QA/QC	36	40	72			12	24	184	$ 23,880	$ 1,840					$ 25,720	12 months
	TOTAL	**276**	**124**	**252**	**584**	**96**	**60**	**24**	**1416**	**$172,640**	**$14,160**	**$1,500**	**$ 54,000**	**$12,000**	**$50,000**	**$312,400**	