



COLORADO WATER CONSERVATION BOARD



WATER SUPPLY RESERVE ACCOUNT

Today's Date: 07/28/2015

Agricultural Improvements and Sustainable Water Supply using Horizontal Wells

Name of Water Activity/Project

Box Springs Canal and Reservoir Company

Name of Applicant

Arkansas Basin Roundtable

Amount from Statewide Account: \$150,000

Amount from Basin Account(s): \$50,000

Approving Basin Roundtable(s)

(If multiple basins specify amounts in parentheses.)

Total WSRA Funds Requested: \$200,000

FEIN:

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Required Exhibits

- A. Statement of Work, Budget, and Schedule
- B. Project Map
- C. As Needed (i.e. letters of support, photos, maps, etc.)

Appendices – Reference Material

- 1. Program Information
- 2. Insurance Requirements
- 3. WSRA Standard Contract Information (Required for Projects Over \$100,000)
- 4. W-9 Form (Required for All Projects Prior to Contracting)

Instructions

To receive funding from the Water Supply Reserve Account (WSRA), a proposed water activity must be approved by the local Basin Roundtable **AND** the Colorado Water Conservation Board (CWCB). The process for Basin Roundtable consideration and approval is outlined in materials in Appendix 1.

Once approved by the local Basin Roundtable, the applicant should submit this application **with a detailed statement of work including budget and schedule as Exhibit A** to CWCB staff by the application deadline.

WSRA applications are due with the roundtable letter of support 60 calendar days prior to the bi-monthly Board meeting at which it will be considered. Board meetings are held in January, March, May, July, September, and November. Meeting details, including scheduled dates, agendas, etc. are posted on the CWCB website at: <http://cwcb.state.co.us> Applications to the WSRA Basin Account are considered at every board meeting, while applications to the WSRA Statewide Account are only considered at the March and September board meetings.

When completing this application, the applicant should refer to the WSRA Criteria and Guidelines available at: <http://cwcb.state.co.us/LoansGrants/water-supply-reserve-account-grants/Documents/WSRACriteriaGuidelines.pdf>. In addition, the applicant should also refer to the [Supplemental Scoring Matrix](#) applied to Evaluation Criteria Tiers 1-3 for Statewide Account requests .

The application, statement of work, budget, and schedule **must be submitted in electronic format** (Microsoft Word or text-enabled PDF are preferred) and can be emailed or mailed on a disk to:

Craig Godbout - WSRA Application

Colorado Water Conservation Board

1313 Sherman St., Room 721

Denver, CO 80203

Craig.godbout@state.co.us

If you have questions or need additional assistance, please contact Craig Godbout at: 303-866-3441 x3210 or craig.godbout@state.co.us.

Part I. - Description of the Applicant (Project Sponsor or Owner);

1.	Applicant Name(s):	Box Springs Canal and Reservoir Company			
	Mailing address:	19677 County Road W, Ordway, CO 81063			
	FEIN #:				
	Primary Contact:	Garrett Markus	Position/Title:	Treasurer	
	Email:	garrett.markus@gmail.com			
	Phone Numbers:	Cell:	719-980-3441	Office:	719-267-3439
	Alternate Contact:	Ricky Markus	Position/Title:	President	
	Email:	rkmarkus311@gmail.com			
	Phone Numbers:	Cell:	719-980-3439	Office:	719-267-3439

2. Eligible entities for WSRA funds include the following. What type of entity is the Applicant?

☐ Public (Government) – municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities and the local entity should be the grant recipient. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.

☐ Public (Districts) – authorities, Title 32/special districts, (conservancy, conservation, and irrigation districts), and water activity enterprises.

☒ Private Incorporated – mutual ditch companies, homeowners associations, corporations.

☐ Private individuals, partnerships, and sole proprietors are eligible for funding from the Basin Accounts but not for funding from the Statewide Account.

☐ Non-governmental organizations – broadly defined as any organization that is not part of the government.

3. Provide a brief description of your organization

Box Springs Canal and Reservoir Company (BSCRC) was originally formed around 1898 to provide farmers in Otero County (currently known as Crowley County), with a reliable and secure source of water for irrigation. The first BSCRC reservoir right was appropriated on 10/24/1898, with a total decree of approximately 6,500 ac-ft. of storage rights in five reservoirs and the first surface right was appropriated on 10/24/1899 with a total decree of 449.5 cfs. By February 10, 1904 there were 27 shareholders of 600 shares and 6,000 acres were irrigated under the BSCRC system. There were originally 23 decreed hand dug wells with appropriation dates starting in March 1, 1914. Currently there are 8 shareholders of 600 BSCRC Shares with approximately 240 acres solely irrigated under the BSCRC system. Out of the 23 wells, 17 maintained their irrigation use and are decreed as follows: Battery of 4 wells, battery of 5 wells, battery of 6 wells, and 2 wells stand alone.

The primary shareholder in the early years of BSCRC was D.V. Burrell of the D.V. Burrell Seed Company of Rocky Ford, Colorado. He grew many different crops and due to the BSCRC system's isolated location from cross pollination, Burrell was known for the development of new varieties of produce such as the Ordway "Pink Meat" Cantaloupe, which is considered the first pink/salmon-colored cantaloupe produced. During Mr. Burrell's tenure, D.V. Burrell Seed Company supplemented crop water requirements with groundwater and constructed the first battery of wells in 1914.

Also in 1914, E.W. Travers and daughter Augusta moved here from California and purchased land/wells from Burrell. Working for botanist Luther Burbank in California, Travers had learned about BSCRC land through Burbank's business relationship with Burrell involving plant genetics. In 1918, Augusta Travers married B.O. Carter and they purchased land under the BSCRC system. By 1938, Mr. Burrell had sold 460.5 shares to the Carter's in addition to the shares already owned by Travers. By this time, 600 acres were considered productive, primarily growing sugar beets, corn, milo and alfalfa. The Carter's son Kenneth, married Clara Arnpriester and they settled down farming and raising livestock to support their family of five children.

The Carter land under the BSCRC system is now owned and operated by Kenneth & Clara's son-in-law and daughter, Ricky & Kay Markus and their son & daughter-in-law Jade & Stacey Markus, and son, Garrett Markus. Currently there are 8 shareholders of 600 BSCRC Shares with approximately 240 acres solely irrigated under the BSCRC system. Collectively, the Markus Family owns 452.5 BSCRC shares and leases the remaining 147.5 BSCRC shares for other family members and neighbors. Throughout the past 70 years, many changes have taken place which have affected the overall dynamics of BSCRC.

In the 1940's, a large expansion in water usage and irrigated acreage in the upper Horse Creek basin resulted in the overall reduction in stream flows to BSCRC. The stream flows were also affected by the development of rural electricity in the 1950's. In the late 1980's, the Division of Water Resources (DWR) began to curtail some wells and by early 1990 the State filed its' Horse Creek Basin Study Phase I. The Water Court, in Case No. 86CW91, ruled that illegal wells be curtailed prior to any administration of junior decreed wells, this ruling was affirmed by the Colorado Supreme Court. In 1998, to satisfy well usage in the upper Horse Creek basin, BSCRC came to an unsatisfying and obligatory agreement with Horse Creek Water Users Association (HCWUA) to sell 30 cfs to HCWUA for well augmentation. At that time, using several conclusive studies, the State Engineer's office determined that Horse Creek ground water would include HCWUA and Carter Wells, and was deemed a closed basin non-tributary to Arkansas Rules and Regulations.

4. If the Contracting Entity is different than the Applicant (Project Sponsor or Owner) please describe the Contracting Entity here.

N/A

5. Successful applicants will have to execute a contract with the CWCB prior to beginning work on the portion of the project funded by the WSRA grant. In order to expedite the contracting process the CWCB has established a standard contract with provisions the applicant must adhere to. A link to this standard contract is included in Appendix 3. Please review this contract and check the appropriate box.

☒

The Applicant will be able to contract with the CWCB using the Standard Contract

☐

The Applicant has reviewed the standard contract and has some questions/issues/concerns. Please be aware that any deviation from the standard contract could result in a significant delay between grant approval and the funds being available.

6. The Tax Payer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect the applicant

The applicant does not have any issues associated with triggering Tabor limits

Part II. - Description of the Water Activity/Project

1. What is the primary purpose of this grant application? (Please check only one)

☐

Nonconsumptive (Environmental or Recreational)

☒

Agricultural

☐

Municipal/Industrial

☐

Needs Assessment

☐

Education

☐

Other

Explain:

2. If you feel this project addresses multiple purposes please explain.

Agricultural improvements will provide immense environmental benefits for the land as well as the wildlife. Moving to pivot irrigation allows for conservation farming practices that will provide benefits including: water conservation, soil moisture conservation, wind and water erosion protection, increased organic matter and nutrient retention making for ideal growing conditions. Since pivot irrigation allows water to be applied appropriately, synthetic fertilizers and other chemicals are not deep percolated in the ground water, but reserved for plant consumption. If enough water is available, pivot coverage will be increased to approximately 350 acres from current operations of 240 acres. Rehabilitation and creation of new wells are not limited to continually farmed land, they will be used on irrigated grassland that will amplify these benefits. The wells higher capacity over domestic wells provide a rare but necessary source of water for regional fire protection. Additional ground cover, sustainable cropping and less farming traffic will allow for various habitats to coexist. Wildlife that would most benefit would be upland birds, antelope, deer, and water fowl.

3. Is this project primarily a study or implementation of a water activity/project? (Please check only one)

☐

Study

☒

Implementation

4. To catalog measurable results achieved with WSRA funds can you provide any of the following numbers?

New Storage Created (acre-feet)

913

New Annual Water Supplies Developed, Consumptive or Nonconsumptive (acre-feet)

Existing Storage Preserved or Enhanced (acre-feet)

Length of Stream Restored or Protected (linear feet)

18,000

Length of Pipe/Canal Built or Improved (linear feet)

180

Efficiency Savings (acre-feet/year OR dollars/year – **circle one**)

350

Area of Restored or Preserved Habitat (acres)

Other -- Explain:

4. To help us map WSRA projects please include a map (Exhibit B) and provide the general coordinates below:

Latitude:

38.407665

Longitude:

-103.714213

5. Please provide an overview/summary of the proposed water activity (no more than one page). Include a description of the overall water activity and specifically what the WSRA funding will be used for. A full **Statement of Work** with a detailed budget and schedule is required as **Exhibit A** of this application.

This grant application is to request funding to assist with agricultural improvements and securing a sustainable water supply that will ensure the success and integrity of farming practices in the BSCRC area. Specifically, this grant is to assist in the final stages of necessary well rehabilitation and implementation of an innovative new well drilling technology (horizontal wells). Farm improvements in 3 main areas could dramatically change the current farming management practices. These include: moving from flood irrigation with earthen ditches to center pivot irrigation; construction of pipeline to deliver surface water and fully capture underground spring water when it surfaces in the winter and early spring; and the construction of horizontal well batteries.

Farm ground that's currently farmed in this area is limited irrigation due to the ephemeral nature of Horse Creek. It can neither be farmed fully irrigated, nor is it dry land. This land is currently operated using flood irrigation with earthen ditches. Under the current system, it is estimated that as much as one ac-ft. of water per day is lost due to transfer efficiency during winter and early spring months when the underground springs surface. This does not include various flood events throughout the summer. There are seventeen existing irrigation wells on these lands that are decreed in battery configuration with the exception of two wells. Majority of the wells have collapsed and were placed on the inactive list. There are only three wells currently in production, but given the hand dug construction and age, all wells are in desperate need of replacement.

Since 2013, the BSCRC has been dedicated to implementing irrigation efficiency improvements. They have installed 2 center pivots that include a 5.34 ac-ft. and 10.0 ac-ft. regulating reservoir and a 6,440 ft. pipeline that supplies gravity flowed water from the largest BSCRC reservoir. They are currently installing a 3rd center pivot that will also include the installation of a 10,000 ft. pipeline that will allow for the diverted spring water to be transferred to the farm ground without the large losses of the earthen ditch system in place now. Given enough water development, 50% or more of these pivots will cover expired CRP ground and bring it back into production. The remaining ground that is currently farmed will be fully irrigated opposed to limited irrigation, increasing its yield potential by more than double. Within 3 short years the farming practices on these lands have already dramatically changed. Moving from flood irrigation with earthen systems to center pivots can improve efficiency by 35%. The installation of pipeline to transport underground spring water will help save more than 180 ac-ft per year, not including water saved from surface water transport and flood events.

The final component of this project and purpose for this application is the installation of horizontal wells. Since Horse Creek is an ephemeral stream, wells are necessary to cover the period of irrigation between underground spring flows and flood events to minimize crop stress, maximize yield, and allow consistent cropping management. Vertical wells are customary, but due to a shallow water table and water producing layer with low transmissivity extracting the water into the well is limited. Typical drilling diameters aren't conducive to the groundwater geology and could take several months before completion. On the other hand, horizontal wells maximize the ability to extract water from the alluvium with only one point of withdrawal for an entire bank of wells. The installation technology is relatively new with great success in other states. It is estimated that production may be as high as 2-3 times that of a vertical well with less draw down during fall months and an installation time of only one week per site.

This final phase of this project is crucial to the overall success, integrity and sustainability of farming practices in the BSCRC area. The employment of horizontal wells will greatly increase the ability to fully extract and use this water to its fullest extent. If pumped at full decree, these wells could produce approximately 900 ac-ft. of water per year. This project has the ability to lead as an example and be transferable across the state. This project would also be progressive in Colorado ground water and would fully unleash an invaluable resource.

Part III. – Threshold and Evaluation Criteria

1. Describe how the water activity meets these **Threshold Criteria**. (Detailed in Part 3 of the Water Supply Reserve Account Criteria and Guidelines.)

- a) The water activity is consistent with Section 37-75-102 Colorado Revised Statutes.¹

During the ruling in Case No. 86CW91 by the Colorado Supreme Court, using several conclusive studies, the State Engineers office determined that Horse Creek ground water was deemed a closed basin non-tributary to the Arkansas Rules and Regulations. The BSCRC is in compliance with the Rule 10 Irrigation Improvement Rules and are not required to replace any gained efficiency due to their location. All re-drill permits for all the inactive wells are valid. The BSCRC is in a very unique water situation due to the Supreme Court ruling in Case No. 86CW91 and have various documents separating the Horse Creek Basin from Arkansas Basin Rules and Regulations.

- b) The water activity underwent an evaluation and approval process and was approved by the Basin Roundtable (BRT) and the application includes a description of the results of the BRT's evaluation and approval of the activity. At a minimum, the description must include the level of agreement reached by the roundtable, including any minority opinion(s) if there was not general agreement for the activity. The description must also include reasons why general agreement was not reached (if it was not), including who opposed the activity and why they opposed it. Note- If this information is included in the letter from the roundtable chair simply reference that letter.

See attached Arkansas Basin Roundtable Letter of Support

¹ 37-75-102. Water rights - protections. (1) It is the policy of the General Assembly that the current system of allocating water within Colorado shall not be superseded, abrogated, or otherwise impaired by this article. Nothing in this article shall be interpreted to repeal or in any manner amend the existing water rights adjudication system. The General Assembly affirms the state constitution's recognition of water rights as a private usufructuary property right, and this article is not intended to restrict the ability of the holder of a water right to use or to dispose of that water right in any manner permitted under Colorado law. (2) The General Assembly affirms the protections for contractual and property rights recognized by the contract and takings protections under the state constitution and related statutes. This article shall not be implemented in any way that would diminish, impair, or cause injury to any property or contractual right created by intergovernmental agreements, contracts, stipulations among parties to water cases, terms and conditions in water decrees, or any other similar document related to the allocation or use of water. This article shall not be construed to supersede, abrogate, or cause injury to vested water rights or decreed conditional water rights. The General Assembly affirms that this article does not impair, limit, or otherwise affect the rights of persons or entities to enter into agreements, contracts, or memoranda of understanding with other persons or entities relating to the appropriation, movement, or use of water under other provisions of law.

- c) The water activity meets the provisions of Section 37-75-104(2), Colorado Revised Statutes.² The Basin Roundtable Chairs shall include in their approval letters for particular WSRa grant applications a description of how the water activity will assist in meeting the water supply needs identified in the basin roundtable's consumptive and/or non-consumptive needs assessments.

See Attached Arkansas Basin Roundtable Letter of Support

- d) Matching Requirement: For requests from the **Statewide Fund**, the applicants will be required to demonstrate a **25 percent** (or greater) match of the total grant request from the other sources, including by not limited to Basin Funds. **A minimum match of 5% of the total grant amount shall be from Basin funds. A minimum match of 5% of the total grant amount must come from the applicant or 3rd party sources.** Sources of matching funds include but are not limited to Basin Funds, in-kind services, funding from other sources, and/or direct cash match. Past expenditures directly related to the project may be considered as matching funds if the expenditures occurred within 9 months of the date the contract or purchase order between the applicant and the State of Colorado is executed. Please describe the source(s) of matching funds. (NOTE: These matching funds should also be reflected in your Detailed Budget in **Exhibit A** of this application)

BSCRC will be matching a third of the requested funding. Additionally BSCRC has expenditures of \$260,803 within the last 9 months and \$616,253 within the last 2 years.

Account	Amount	% of Total
WSRA Statewide Account	\$150,000	% 50
WSRA Basin Account	\$50,000	% 17
BSCRC Matching Funds	\$100,000	% 33
Project Total	\$300,000	% 100

² 37-75-104 (2)(c). Using data and information from the Statewide Water Supply Initiative and other appropriate sources and in cooperation with the on-going Statewide Water Supply Initiative, develop a basin-wide consumptive and nonconsumptive water supply needs assessment, conduct an analysis of available unappropriated waters within the basin, and propose projects or methods, both structural and nonstructural, for meeting those needs and utilizing those unappropriated waters where appropriate. Basin Roundtables shall actively seek the input and advice of affected local governments, water providers, and other interested stakeholders and persons in establishing its needs assessment, and shall propose projects or methods for meeting those needs. Recommendations from this assessment shall be forwarded to the Interbasin Compact Committee and other basin roundtables for analysis and consideration after the General Assembly has approved the Interbasin Compact Charter.

2. For Applications that include a request for funds from the **Statewide Account**, describe how the water activity/project meets all applicable **Evaluation Criteria**. (Detailed in Part 3 of the Water Supply Reserve Account Criteria and Guidelines and repeated below.) Projects will be assessed on how well they meet the Evaluation Criteria. **Please attach additional pages as necessary.**

Evaluation Criteria – the following criteria will be utilized to further evaluate the merits of the water activity proposed for funding from the Statewide Account. In evaluation of proposed water activities, preference will be given to projects that meet one or more criteria from each of the three “tiers” or categories. Each “tier” is grouped in level of importance. For instance, projects that meet Tier 1 criteria will outweigh projects that only meet Tier 3 criteria. The applicant should also refer to the Supplemental Scoring Matrix applied to Evaluation Criteria Tiers 1-3 for Statewide Account requests. WSRA grant requests for projects that may qualify for loans through the CWCB loan program will receive preference in the Statewide Evaluation Criteria if the grant request is part of a CWCB loan/WSRA grant package. For these CWCB loan/WSRA grant packages, the applicant must have a CWCB loan/WSRA grant ratio of 1:1 or higher. Preference will be given to those with a higher loan/grant ratio.

Tier 1: Promoting Collaboration/Cooperation and Meeting Water Management Goals and Identified Water Needs

- a. The water activity addresses multiple needs or issues, including consumptive and/or non-consumptive needs, or the needs and issues of multiple interests or multiple basins. This can be demonstrated by obtaining letters of support from other basin roundtables (in addition to an approval letter from the sponsoring basin).

This project addresses agricultural needs, environmental needs and has the ability to address fire mitigation (see Tier 1: Section c below).

- b. The number and types of entities represented in the application and the degree to which the activity will promote cooperation and collaboration among traditional consumptive water interests and/or non-consumptive interests, and if applicable, the degree to which the water activity is effective in addressing intrabasin or interbasin needs or issues.

(See Tier 1: Section c below)

- c. The water activity helps implement projects and processes identified as helping meet Colorado’s future water needs, and/or addresses the gap areas between available water supply and future need as identified in SWSI or a roundtable’s basin-wide water needs assessment.

The Arkansas Basin Implementation Plan (ArkBIP) was distributed in April of 2015. In section 1.6.2.2. the ArkBIP states:

“Agricultural economic activity is significant in the Arkansas Basin, contributing an estimated \$1.5 billion annually to the economy. Agriculture has always been critical to the culture and economy of Colorado, and the agricultural goals of the Arkansas Basin reflect a desire to protect existing water supplies while making water available for growing demands.” Also, “Coloradans find that the current rate of purchase and transfer of water rights from irrigated agriculture is unacceptable.”

The four goals of the ArkBIP section 1.6.3 concerning agriculture include:

1. Sustain an annual \$1.5 billion agricultural economy in the basin;
2. Provide increasing quantities of augmentation water for increased farm efficiencies;
3. Develop a viable rotational fallow and/or leasing program between agricultural and municipal interests to address drought and provide risk-management for agriculture; and,
4. Sustain recreational and environmental activities that depend on habitat and open space associated with farm and ranch land.

The ArkBIP also included a policy statement concerning agriculture in section 4.6.5 titled Summary and Challenges:

“The preservation of irrigated agriculture in the Arkansas Basin shall be given a high priority in the state water plan. It is too important to tourism, the preservation of food production, recreation, the environment and the health and well-being of our citizens as well as the economy of the State of Colorado to be ignored.”

Funding for BSCRC will help ensure the preservation of historically irrigated agricultural lands. These farms contribute not only to the economy, but also to the preservation of culture, environment and food production. This project addresses many goals identified in the ArkBIP. Specifically, it helps address the agricultural goals in section 1.6.3. This project helps support the goal to sustain an annual \$1.5 billion agricultural economy by giving these lands the security to not only stay in production, but also increase production by more than double. Due to a Supreme Court ruling the BSCRC was deemed separate from the Arkansas Rules and Regulations and is not required to replace any gained efficiency thus, causing no concern or need for return flow augmentation. Additional decreed water supplies produced through horizontal well drilling will provide essential water for drought protection, risk management and regional fire protection. This project will also have vast environmental benefits for the lands and wildlife in the BSCRC area.

The Arkansas Basin has no unused water, so finding new sources of water must come from already existing water rights. The BSCRC project is a prominent example of how this can be done. The BSCRC project helps to address the “gap” by allowing for the full extraction of decreed water rights from horizontal wells and increased water supply through efficient irrigation practices. The BSCRC will be using their historically decreed amount of water that they have been unable to use, due to the nature of the existing wells and irrigation practices. The BSCRC has the most senior water rights, have historically pumped at these rates, and are deemed a closed basin. All of these factors show that there will be no harm caused to other water users due to this project. This project could lead as an example of how irrigation improvements and implementation of new technology can help fully utilize state waters.

The table below represents how the BSCRC project aligns with Arkansas Basin Implementation Plan 2015 Agricultural Goals:

ArkBIP Agricultural Goals	How BSCRC Meets ArkBIP Agricultural Goals
Sustain Agricultural Economy	This projects main purpose is to help sustain agriculture. Through this project more than 50% of expired CRP lands will be put back into production, increasing the yield production by more than double. If enough water is available, pivot coverage will be increased to approximately 350 acres from current operations of 240 acres. This project is a key example of how to find creative ways to meet agricultural demands. Through efficiency and new technology this project showcases how existing water rights can be utilized to their fullest extent and is a prime example of how to address the agricultural “gap”.
Increased Augmentation for Increased Efficiency	During the ruling in Case No. 86CW91 by the Colorado Supreme Court, using several conclusive studies, the State Engineers office determined that Horse Creek ground water was deemed a closed basin non-tributary to the Arkansas Rules and Regulations. The BSCRC is in compliance with the Rule 10 Irrigation Improvement Rules and are not required to replace any gained efficiency due to their location. All re-drill permits for all the inactive wells are valid. The BSCRC is in a very unique water situation due to the Supreme Court ruling in Case No. 86CW91 and have various documents separating the Horse Creek Basin from Arkansas Basin Rules and Regulations. There would be no reason for concern for historical return flows and no need for augmentation for this project.
Lease Following to Address Drought and Provide Risk Management for Agriculture	This project will allow the BSCRC to fully extract their decreed water rights and increase water supply through irrigation efficiency. This will allow for additional water to be put in storage and used for drought protection and risk management. The increased supply of water will give these lands the security and protection they need in the face of drought, while also securing a water supply for regional fire protection and possible collaborations.
Sustain Recreational and Environmental Activities that Depend on Open Space	If enough water is available, pivot coverage will be increased to approximately 350 acres from current operations of 240 acres. Rehabilitation and creation of new wells are not limited to continually farmed land, they will be used on irrigated grassland that will amplify these benefits. Additional ground cover, sustainable cropping and less farming traffic will allow for various habitats to coexist. Protection of open space will ensure the continued existence of important wildlife and migration corridors for upland birds, water fowl, antelope and deer.

The table below describes the areas where this project aligns with the SWSI 2010 Management Goals:

SWSI Management Goals	How BSCRC Project Meets SWSI Management Goals
Meet M&I Demands	This project has the ability to produce additional water through irrigation efficiency and construction of horizontal wells. Creating a sustainable and dependable water supply could open the door for future collaborations such as ATM's. The wells higher capacity over domestic wells provide a rare but necessary source of water for regional fire protection.
Meet Agricultural Demands	This project is a key example of how to find creative ways to meet agricultural demands. Through efficiency and new technology this project showcases how existing water rights can be utilized to their fullest extent and is a prime example of how to address the agricultural "gap". This project showcases an exciting new approach to the traditional uses of vertical well drilling. Vertical well drilling has limitations and could be obstructing water users from being able to fully utilize their resources. Horizontal well drilling could be a solution to these issues and help reduce the agricultural "gap" by fully extracting water from the well. This project can lead as an example and be transferable across the state.
Meet Colorado's Environmental and Recreational Demands	This project will provide vast environmental benefits for the lands as well as the wildlife in the BSCRC area. These benefits include: water conservation, erosion protection, water quality, open space, migration corridors, sustainable cropping and less farming traffic.
Optimize Existing and Future Water Supplies	By improving irrigation efficiency and tapping in to innovative technology, this project could lead as an example of how to fully optimize existing supplies and create a sustainable water supply in the future. Through these improvements, the BSCRC will be able to improve efficiency by 35% with center pivots, capture 180 ac-ft. of lost spring water through transfer upgrades; and rehabilitate 15 wells through 3 new horizontal well extraction points that will have the ability to produce 2 to 3 times that of historical production.

Promote Cost-Effectiveness	Initial costs are high, but the benefits are immense. Moving to center pivots will allow for 50% or more of expired CRP lands to be put back into production increasing the yield production by more than double. The horizontal wells are very cost effective when matched with their benefits. Although vertical well drilling appears cheaper, you have to pay for each individual well. Horizontal well drilling will cover multiple wells with one extraction point and will fully unleash an invaluable resource. New improvements will reduce field preparation from 5 operations down to 2 operations saving in fuel, labor and repairs.
Minimize the Net Energy Used to Supply Water	These improvements will dramatically change the current management practices on these lands.
Protect Cultural Values Linked to Water Resources	The Arkansas Basin Needs Assessment listed “Maintain agricultural viability in the lower basin.” As their number one priority. The SWSI 2010 report listed “Concerns over agricultural transfers and its impact on rural economies are significant in the lower portion of the basin downstream of Pueblo Reservoir.” as an issue facing the Arkansas Basin. Especially in the lower Arkansas Basin, agriculture is a key element of the culture and heritage of its people. This is true for the farmers and families in the BSCRC. This land has been historically farmed for generations and is striving to continue this important existence into the future.
Comply With all Applicable Laws and Regulations	The BSCRC is in compliance with all applicable laws and regulations.
Educate all Coloradoans on the Importance and Scarcity of Water	A summary report will be submitted at the end of the project that could help educate Coloradoans on agricultural efficiency and the use and benefits of horizontal well drilling.

Tier 2: Facilitating Water Activity Implementation

- d. Funding from this Account will reduce the uncertainty that the water activity will be implemented. For this criterion the applicant should discuss how receiving funding from the Account will make a significant difference in the implementation of the water activity (i.e., how will receiving funding enable the water activity to move forward or the inability obtaining funding elsewhere).

Given the scope of the project from resurrecting wells and optimizing the surface right to efficient farming practices and sustainable cropping, the projects complement each other to such a degree that they’re all essential to developing fully irrigated cropland. Each element is a piece of the puzzle to maximize efficiency and reliability. When orchestrated into one manageable and

comprehensive system, the benefits of these projects are far-reaching and the farm becomes sound.

However, initial capital is large and may seem risky with such an aggressive approach making the debt load enormous. The BSCRC has successfully financed the first two pivot projects with NRCS EQIP cost-share and a lease-purchase contract. The BSCRC has pursued local bank loans, leasing options, and NRCS EQIP cost-share for all elements of this project and will continue to search for all possibilities until this project is complete. Since financing well structures has proven difficult given that most lenders won't use the well as collateral, this grant would greatly help the BSCRC to develop their water rights to their full potential.

The BSCRC's ability to produce crops with a reliable irrigation system directly affects their ability to manage their cattle herd and their ability to prove profitable. Two record dry years in the span of the last 10-year drought have taken their toll on every aspect of the BSCRC's operations. During this period, the BSCRC underground spring flows in the winter and spring could not be beneficially used due to transfer losses. Due to lack of feed for the cattle during these years, $\frac{3}{4}$ of the herd had to be sold and wasn't even enough crop to hold the farmland from blowing.

This grant is specifically to help with the costs associated with the horizontal wells. This is a new technology and new to the state and therefore quite expensive. Estimates for horizontal well drilling average \$100,000+ per well bank plus drilling of the independent wells. Maximum cost ranges from \$320,000 to \$500,000 with an installation time of one week. Although initial costs for horizontal well drilling are expensive, the benefits are vast and would provide an opportunity to fully unleash an invaluable resource. A drawing was submitted to the Colorado Division of Water Resources to verify that a variance would be obtainable.

- e. The amount of matching funds provided by the applicant via direct contributions, demonstrable in-kind contributions, and/or other sources demonstrates a significant & appropriate commitment to the project.

The BSCRC is committed to the overall success of this project and has demonstrated this commitment through matching one third of the cost requested from Basin and State Funding. The BSCRC also shows its commitment through fully funding the first two phases of this project with other sources. The BSCRC has tapped into every resource to ensure that these improvements and the future of these operations will have the greatest outcome. The BSCRC is now asking for assistance in the final stages of this project. This final stage of the project will bring all of these elements together and ensure the sustainability and soundness of this project as a whole.

The table below represents the needed funding to install 3 horizontal wells and complete this project. The table includes requested funds from both Statewide and Basin Water Reserve Accounts and includes matching funds provided by BSCRC. The BSCRC is willing to match % 33.33 of total project costs. By supplying matching funds equal to funding requests, the BSCRC demonstrates a significant commitment to this project. Additionally, BSCRC has expenditures of \$260,803 within the last 9 months and \$616,253 within the last 2 years. Funding was received through NRCS cost shares and BSCRC matching funds.

Account	Amount	% of Total
WRSB Statewide Account	\$150,000	% 50
WRSB Basin Account	\$50,000	% 17
BSCRC Matching Funds	\$100,000	% 33
Project Total	\$300,000	% 100

Tier 3: The Water Activity Addresses Other Issues of Statewide Value and Maximizes Benefits

- f. The water activity helps sustain agriculture & open space, or meets environmental or recreational needs.

This projects main purpose is to help sustain agriculture. Through this project more than 50% of expired CRP lands will be put back into production, increasing the yield production by more than double. This land has been historically farmed for generations and preservation of agriculture is at the heart of this project. Securing a sustainable and reliable supplemental water supply will ensure the future security of this agricultural community and its cultural values. Not only will this project protect and sustain agriculture, it will also provide immense environmental benefits for the lands and wildlife. The project also has the ability to provide a rare but necessary source of water for regional fire protection.

Moving to pivot irrigation allows for conservation farming practices that will provide benefits including: water conservation, soil moisture conservation, wind and water erosion protection, increased organic matter and nutrient retention making for ideal growing conditions. Since pivot irrigation allows water to be applied appropriately, synthetic fertilizers and other chemicals are not deep percolated in the ground water, but reserved for plant consumption. If enough water is available, pivot coverage will be increased to approximately 350 acres from current operations of 240 acres. Rehabilitation and creation of new wells are not limited to continually farmed land, they will be used on irrigated grassland that will amplify these benefits. Additional ground cover, sustainable cropping and less farming traffic will allow for various habitats to coexist. Wildlife that would most benefit would be upland birds, antelope, deer, and water fowl.

- g. The water activity assists in the administration of compact-entitled waters or addresses problems related to compact entitled waters and compact compliance and the degree to which the activity promotes maximum utilization of state waters.

During the ruling in Case No. 86CW91 by the Colorado Supreme Court, using several conclusive studies, the State Engineers office determined that Horse Creek ground water was deemed a closed basin non-tributary to the Arkansas Rules and Regulations. The BSCRC is in compliance with the Rule 10 Irrigation Improvement Rules and are not required to replace any gained efficiency due to their location. All re-drill permits for all inactive wells are valid (see appendix C). The BSCRC is in a very unique water situation due to the Supreme Court ruling in Case No. 86CW91 and have various documents separating the Horse Creek Basin from Arkansas Basin Rules and Regulations.

- h. The water activity assists in the recovery of threatened and endangered wildlife species or Colorado State species of concern.

Wildlife that would most benefit from this project would be upland birds, antelope, deer, and water fowl.

- i. The water activity provides a high level of benefit to Colorado in relationship to the amount of funds requested.

Horizontal well drilling is a new innovative technology that has been very successful in other states. This project could lead as an example for this new technology that could be transferable across the state. This technology has the ability to fully optimize existing and future water supplies.

- j. The water activity is complimentary to or assists in the implementation of other CWCB programs.

This project is complimentary and assists with CWCB's water efficiency programs. It also addresses issues and assists with solutions associated with the State Water Plan, Arkansas Basin Implementation Plan 2015, and SWSI 2010.

Part IV. – Required Supporting Material

1. **Water Rights, Availability, and Sustainability** – This information is needed to assess the viability of the water project or activity. Please provide a description of the water supply source to be utilized, or the water body to be affected by, the water activity. This should include a description of applicable water rights, and water rights issues, and the name/location of water bodies affected by the water activity.

During the ruling in Case No. 86CW91 by the Colorado Supreme Court, using several conclusive studies, the State Engineers office determined that Horse Creek ground water was deemed a closed basin non-tributary to the Arkansas Rules and Regulations. The BSCRC is in compliance with the Rule 10 Irrigation Improvement Rules and are not required to replace any gained efficiency due to their location. All re-drill permits for all the inactive wells are valid. The BSCRC is in a very unique water situation due to the Supreme Court ruling in Case No. 86CW91 and have various documents separating the Horse Creek Basin from Arkansas Basin Rules and Regulations.

The BSCRC surface right is not the most senior on the Horse Creek stream reach, but given that senior rights are either influenced by main stem irrigation systems or inactive, the BSCRC diverts primarily on a futile call determination during flood events. However, in the winter and early spring when there is limited pumping in the Upper Horse Creek basin, there is usually varying amounts of stream flow for irrigation from the BSCRC underground springs which surface directly above their diversion.

2. Please provide a brief narrative of any related studies or permitting issues.

There are multiple studies on the BSCRC in relation to injury of junior upstream pumping. Several basin studies have been confirmed by the Colorado Supreme Court, that both directly and indirectly affect the BSCRC. These studies can be supplied upon request.

3. Statement of Work, Detailed Budget, and Project Schedule

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.** All WSRA funds are disbursed on a reimbursement basis after review invoices and appropriate backup material.

Please provide a detailed statement of work using the template in Exhibit A. Additional sections or modifications may be included as necessary. Please define all acronyms and include page numbers.

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.

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 10 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 Basin Roundtables and the general public and help promote the development of a common technical platform

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

Signature of Applicant:



Print Applicant's Name:

Garrett J. Markus

Project Title:

Agricultural Improvements and Sustainable Water Supply using Horizontal Wells

Date:

July 30, 2015

Return an electronic version (hardcopy may also be submitted) of this application to:

Craig Godbout – WSRA Application

Colorado Water Conservation Board

1313 Sherman St., Room 721

Denver, CO 80203

303-866-3441, ext. 3210 (office)

303-547-8061 (cell)

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