**Water Supply Reserve Fund – Grant and Loan Program**
**Water Activity Summary Sheet**
**March 20-21, 2019**
**Agenda Item 24(b)**

| | |
|---|---|
| **Co-Applicants:** | NEIRBO Hydrolgeology/Colorado Corn Administrative Committee |
| **Grantee:** | Colorado Corn Administration |
| **Water Activity Name:** | Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources |
| **Water Activity Purpose:** | Multipurpose/Study (Ag/M&I/Needs Assessment) |
| **County:** | Multiple-South Platte Basin Counties |
| **Drainage Basin:** | South Platte |
| **Water Source:** | South Platte River |
| **Amount Requested:** | $39,000 South Platte Basin Account |
| **Matching Funds:** | Applicant & 3rd Party Match (cash & in-kind) = $17,500<br>• 45% of the Basin Account request (meets 25% min) |

**Staff Recommendation:**

Staff recommends approval of up to $39,000 from the South Platte Basin Account to help fund the project titled: Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources.

**Water Activity Summary:** WSRF grant funds, if approved, will assist NEIRBO Hydrogeology and the Colorado Corn Administrative Committee investigate current salinity and the historical salinity trends along the South Platte River. Total Dissolved Solids (TDS) is an indicator of salts in irrigation water that can damage soils, reduce crop yields, and negatively impact the sustainability of irrigated agriculture. South Platte River sampling in September 2018 confirmed that TDS concentrations increase dramatically through the Denver Metro area and reach levels that can damage crops. Potential salinity sources include Municipal waste water treatment facility sewage effluent, agricultural return flows, road deicing solutions, geologic formations, livestock waste, and produced water from oil and gas development.

Project objectives are to determine if salinity concentrations are a concern for irrigated agriculture, identify salinity severity and trends, evaluate the influence of historical water management practices, and to identify potential salinity sources. This project will analyze historical TDS concentrations to identify trends over time and along the South Platte River. Long-term, seasonal, and spatial trends will be used to identify potential salinity sources. Trends will be analyzed for correlations with major water-management policies.

**Discussion:** This project supports the goals of maintaining, enhancing and proactively manage water quality for all use classifications as called for in the South Platte Basin Implementation Plan, as well

as assisting the state to promote protection and restoration of water quality as called for in Chapter 10, Section 10.3 F. Watershed Health. Environmental, and Recreation in Colorado's Water Plan.

**Issues/Additional Needs:** No issues or additional needs have been identified

**Eligibility Requirements:** The application meets requirements of all eligibility components: General Eligibility, Entity Eligibility, Water Activity Eligibility, and Eligibility Based on Match Requirements.

**Evaluation Criteria:** This activity has undergone review and evaluation and staff has determined that it satisfies the Evaluation Criteria. Please refer to Basin Roundtable Chair's Recommendation Letter and the WSRF Grant Application for applicant's detailed response.

**Funding Summary/Matching Funds:**

| **Funding Sources** | **Cash** | **In-kind** | **Total** | **Status** |
|---|---|---|---|---|
| Colorado Corn Administrative Committee | $15,000 | $0 | $15,000 | Secured |
| Central Colorado Water Conservancy District | $0 | $2,500 | $2,500 | Secured |
| Subtotal | $15,000 | $2,500 | $17,500 | |
| WSRF South Platte Basin Account | $39,000 | n/a | $39,000 | Secured |
| **Total Study Costs** | **$54,000** | **$2,500** | **$56,500** | |

**CWCB Project Manager:** Craig Godbout

South Platte Basin Roundtable
Garrett Varra, Chair
February 1, 2019

Craig Godbout
Water Supply Planning Section
Colorado Water Conservation Board
1313 Sherman Street, Room 718
Denver, CO 80203

**VIA EMAIL to craig.godbout@state.co.us**

RE: Approval Recommendation for Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources

Dear Craig,

At the January meeting of the South Platte Basin Roundtable (SPBRT) the membership voted to recommend that the Colorado Water Conservation Board (CWCB) approve funds for the Water Supply Reserve Fund (WSRF} grant application titled "Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources". A quorum was present at the meeting. The SPBRT WSRF basin fund contribution is $39,000. The total project budget is $56,500. The Colorado Corn Administrative Committee (CCAC) is the co-applicant and they have provided $15,000 cash matching funds. The Central Colorado Water Conservancy District (Central) is providing $2,500 cash matching funds.

This grant application has received strong support from several agricultural organizations in the basin. The CCAC recognizes the damage salinity can cause to irrigated agriculture. The cumulative nature of salinity impacts increases the urgency to understand and address salinity in the basin. The CCAC proactively provided $15,000 in matching funds to obtain field water quality measurements in September 2018 that confirm high salinity concentrations in the South Platte River. Based on these sampling results Central has also provided $2,500 cash matching funds and access to their water-quality database. Letters of support, urging funding for this proposal, have been provided by the Colorado Farm Bureau, Colorado Livestock Association, and the Colorado Ag Water Alliance. Central and Northern water districts have also provided support and cooperation by providing access to water-quality data for analysis.

The Colorado Water Plan (2015) and the South Platte Basin Implementation Plan (SP-BIP) address water-shortage concerns by encouraging water reuse, storage, conveyance, and conservation. Increasing salinity concentrations have the potential to make the current water supplies unusable for many water users, which further compounds the water shortages.

Municipalities have obtained approved exchange decrees that allow them to divert fresh water upstream of the Metro area, with low TDS concentrations, and use it in public water supply systems. The municipalities are required to replace the river depletions with Waste Water Treatment Facility (WWTF) water stored in gravel pits. Diverted flows that are not consumed result in WWTF sewage effluent that has higher TDS than the source water. As the SPR and groundwater flows through the basin it is reused due to repeated diversions and pumping. The water accumulates additional salts with each use. Upstream water users have the benefit of a lower-salinity water source that is diverted from the river upstream of the WWTF discharges.

The result is downstream diversions delivering higher-salinity flows, which impact all water users. In addition to direct crop irrigation, there are numerous existing and planned water storage, recharge, augmentation, and pipeline projects that will need to manage these higher salt concentrations.

The design, construction, and management of current and future facilities need to understand and consider water quality in general and salinity specifically. This study addresses the suitability of water for the SP-BIP high priority projects, irrigated agriculture sustainability, and the environment. There will also be an educational component as the results can be used to inform water providers and water uses of this currently under scrutinized problem. The results of this study can guide future water management actions that improve the sustainability of water resources in the South Platte Basin and other state-wide basins.

The South Platte Basin Roundtable, therefore, recommends that the CWCB approve funds for this WSRF grant application. Understanding salinity severity, trends, and potential sources is the first step in addressing the problem and ensuring that current water management policies will not unintentionally exacerbate the water-supply problem.

Sincerely,

Garrett Varra

Last Update: August 3, 2017

| Colorado Water Conservation Board |
|---|
| **Water Supply Reserve Fund**<br>**Grant Application** |

## Instructions

All WSRF grant applications shall conform to the current 2016 WSRF Criteria and Guidelines.

To receive funding from the WSRF, a proposed water activity must be approved by a Roundtable(s) **AND** the Colorado Water Conservation Board (CWCB). The process for Roundtable consideration and recommendation is outlined in the 2016 WSRF Criteria and Guidelines. The CWCB meets bimonthly according to the schedule on page 2 of this application.

If you have questions, please contact the current CWCB staff Roundtable liaison:

| **Arkansas** | **Gunnison \| North Platte \| South Platte \| Yampa/White** | **Colorado \| Metro \| Rio Grande \| Southwest** |
|---|---|---|
| Ben Wade | Craig Godbout | Megan Holcomb |
| ben.wade@state.co.us | craig.godbout@state.co.us | megan.holcomb@state.co.us |
| 303-866-3441 x3238 | 303-866-3441 x3210 | 303-866-3441 x3222 |

| WSRF Submittal Checklist (Required) | |
|---|---|
| ✓ | I acknowledge this request for funding was recommended for CWCB approval by the sponsoring Basin Roundtable(s). |
| ✓ | I acknowledge I have read and understand the 2016 WSRF Criteria and Guidelines. |
| ✓ | I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.(1) |
| Exhibit A | |
| ✓ | Statement of Work(2) *(Word – see Exhibit A Template)* |
| ✓ | Budget & Schedule(2) *(Excel Spreadsheet – see Exhibit A Template)* |
| ✓ | Letters of Matching and/or Pending 3rd Party Commitments(2) |
| Exhibit C | |
| ✓ | Map(2) |
| | Photos/Drawings/Reports |
| ✓ | Letters of Support |
| | Certificate of Insurance(3) (General, Auto, & Workers' Comp.) |
| Contracting Documents | |
| | Certificate of Good Standing(3) |
| | W-9(3) |
| | Independent Contractor Form(3) (If applicant is individual, not company/organization) |
| | Electronic Funds Transfer (ETF) Form(3) |

(1) Click "Grant Agreements". For reference only/do not fill out or submit/required for contracting
(2) Required with application if applicable.
(3) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

Last Update: August 3, 2017

| Schedule | | |
|---|---|---|
| **CWCB Meeting** | **Application Submittal Dates** | **Type of Request** |
| January | December 1 | Basin Account; BIP |
| March, 2019 | February 1, 2019 | Basin/Statewide Account; BIP |
| May | April 1 | Basin Account; BIP |
| July | June 1 | Basin Account; BIP |
| September | August 1 | Basin/Statewide Account; BIP |
| November | October 1 | Basin Account/BIP |

| Desired Timeline | |
|---|---|
| Desired CWCB Hearing Month: | March 2019 |
| Desired Notice to Proceed Date: | May, 2019 |

| Water Activity Summary | |
|---|---|
| Name of Applicant | Colorado Corn Administrative Committee<br>127 22nd Street<br>Greeley CO 80631<br><br>NEIRBO Hydrogeology<br>231 S Howes St<br>Fort Collins, CO 80521 |
| Name of Water Activity | Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources |

| Approving Roundtable(s) | Basin Account Request(s)(1) |
|---|---|
| South Platte Basin | $39,000 |
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| | |
| Basin Account Request Subtotal | $39,000 |
| Statewide Account Request(1) | $0 |
| Total WSRF Funds Requested (Basin & Statewide) | $39,000 |
| Total Project Costs | $56,500 |

(1) Please indicate the amount recommended for approval by the Roundtable(s)

Last Update: August 3, 2017

| Grantee and Applicant Information | |
|---|---|
| Name of Grantee(s) | Colorado Corn Administrative Committee |
| Mailing Address | 127 22nd Street<br>Greeley CO 80631 |
| FEIN | 84-1074476 |
| Grantee's Organization Contact(1) | Mark Sponsler |
| Position/Title | Executive Director |
| Email | msponsler@coloradocorn.com |
| Phone | (970) 351-8201 |
| Grant Management Contact(2) | Mark Sponsler |
| Position/Title | Executive Director |
| Email | msponsler@coloradocorn.com |
| Phone | (970) 351-8201 |
| Name of Applicant (if different than grantee) | Co-Applicants – Grantee above and the following: |
| Mailing Address | NEIRBO Hydrogeology, 231 S HOWES ST, FORT COLLINS, CO 80521 |
| Position/Title | GRADY O'BRIEN, MEMBER / PRINCIPAL |
| Email | grady@neirbo.com |
| Phone | (970) 817-0630 |

**(1)** Person with signatory authority
**(2)** Person responsible for creating reimbursement invoices (Invoice for Services) and corresponding with CWCB staff.

| Description of Grantee |
|---|
| Provide a brief description of the grantee's organization (100 words or less). |
| The Colorado Corn Administrative Committee (CCAC) was established by the 1987 Corn Marketing Order (a legislative action that provided the framework) to manage a one-penny-per-bushel assessment collected from corn producers by first handlers from sales of field corn for grain in Colorado. Those funds are allowed to be used specifically for market development, promotion, research and education on behalf of corn producers in this state. |

Last Update: August 3, 2017

| Type of Eligible Entity (check one) | |
|---|---|
| | **Public (Government):** municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. 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, any organization that is not part of the government |
| | **Covered Entity:** as defined in Section 37-60-126 Colorado Revised Statutes |

| Type of Water Activity (check one) | |
|---|---|
| ✓ | Study |
| | Implementation |

| Category of Water Activity (check all that apply) | | |
|---|---|---|
| | Nonconsumptive (Environmental) | |
| | Nonconsumptive (Recreational) | |
| ✓ | Agricultural | |
| ✓ | Municipal/Industrial | |
| ✓ | Needs Assessment | |
| | Education & Outreach | |
| | Other | Explain: |

| Location of Water Activity | |
|---|---|
| Please provide the general county and coordinates of the proposed activity below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable. | |
| County/Counties | South Platte Basin, Northeastern Colorado |
| Latitude | |
| Longitude | |

Last Update: August 3, 2017

| Water Activity Overview |
|---|
| Please provide a summary of the proposed water activity (200 words or less). Include a description of the activity and what the WSRF funding will be used for specifically (e.g. studies, permitting, construction). Provide a description of the water supply source to be utilized or the water body affected by the activity. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, area of habitat improvements. If this project addresses multiple purposes or spans multiple basins, please explain.<br>The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, and Schedule. |
| This activity investigates the current salinity and the historical salinity trends along the South Platte River (SPR). Total Dissolved Solids (TDS) is an indicator of salts in irrigation water that can damage soils. reduce crop yields, and negatively impact the sustainability of irrigated agriculture. SPR sampling in September 2018 confirmed that TDS concentrations increase dramatically through the Denver Metro area and reach levels that can damage crops. Potential salinity sources include Municipal waste water treatment facility (WWTF) sewage effluent, agricultural return flows, road deicing solutions, geologic formations, livestock waste, and produced water from oil and gas development.<br><br>Project objectives are to determine if salinity concentrations are a concern for irrigated agriculture, identify salinity severity and trends, evaluate the influence of historical water management practices, and to identify potential salinity sources. This project will analyze historical TDS concentrations to identify trends over time and along the SPR. Long-term, seasonal, and spatial trends will be used to identify potential salinity sources. Trends will be analyzed for correlations with major water-management policies.<br><br>The Colorado South Platte River Basin data sources for this study will include Central and Northern Colorado Water Conservation Districts, Colorado Department of Public Health and Environment (CDPHE), U.S. Geological Survey, U.S. Environmental Protection Agency, and the Colorado Department of Agriculture. Additional data sources may be used if the data can be readily obtained. |

| Measurable Results | | |
|---|---|---|
| To catalog measurable results achieved with WSRF funds please provide any of the following values. | | |
| | New Storage Created (acre-feet) | |
| | New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive | |
| | Existing Storage Preserved or Enhanced (acre-feet) | |
| | Length of Stream Restored or Protected (linear feet) | |
| | Efficiency Savings (indicate acre-feet/year OR dollars/year) | |
| | Area of Restored or Preserved Habitat (acres) | |
| | Length of Pipe/Canal Built or Improved | |
| ✓ | Other | Explain: Document South Platte River salinity severity, trends, and sources |

Last Update: August 3, 2017

| Water Activity Justification |
|---|
| Provide a description of how this water activity supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the respective Roundtable Basin Implementation Plan and Education Action Plan [(1)]. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers).<br><br>For applications that include a request for funds from the Statewide Account, the proposed water activity shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan criteria for state support (CWP, Section 9.4, pp. 9-43 to 9-44;) (Also listed pp. 4-5 in 2016 WSRF Criteria and Guidelines). |
| This project meets the following goals of the South Platte Basin Implementation Plan (SP-BIP):<br><br>Page 1-27. Section 1.9.5 Water Quality<br>***Goal:*** Maintain, enhance and proactively manage water quality for all use classifications.<br>*MO#1* – Maintain or improve the delivery of safe water supplies throughout the basin.<br>*E&R MO#1* – Monitor, protect and improve watershed water quality and identify and document progress and improvements.<br>*E&R MO#2* – Improve areas where water quality may be limiting the suitability of focus areas identified by BRTs through environmental and recreational mapping efforts.<br><br>Page 3-7. 3.1.11 Water Quality Management<br>Higher quality water sources are essentially fully tapped and municipal water suppliers are facing the challenges of using lower quality, more distant water sources. …After current IPPs are implemented, greater use of the lower quality water sources may be significantly constrained depending on whether the industry's technological advancements satisfy regulatory requirements for disposal of highly concentrated waste streams from advanced water treatment processes.<br><br>Page 4-12. 4.2.3 Water Quality Overview<br>From a water quality perspective in the South Platte Basin, the following examples demonstrate the diversity of concerns relative to current and future Statewide planning:<br>1. Wastewater treatment and reuse are important facets of the Basin's water supplies. Innovative systems are being developed in the Basin to increase water availability for various beneficial uses.<br>11. There are salinity concerns related to wastewater treatment plant discharges and salted roads. These salinity issues can impact both surface water and groundwater supplies.<br><br>Colorado Water Plan,<br>Page 7-18 Water Quality and Quantity Connections: Managing water quantity may cause a change in water quality. When entities divert water to farms or cities, store it for future use or flood control, or manage it as return-flows to address downstream water rights, water quality can change<br><br>Page 7-19: One option for addressing future municipal water supply needs is the use of alternative agricultural transfers, such as rotational fallowing and interruptible supply options. High concentration of salts and other pollutants from this source water, however, may require advanced water-treatment technologies, such as reverse osmosis, to make the water usable for communities.<br><br>page 7-20: Cause-and-effect connections related to water quality and quantity are integral to the State's ability to make sound water management decisions. The State considers these connections during decision-making processes that are dependent on statutory, regulatory and management relationships related to water quality and quantity. |

Last Update: August 3, 2017
(1) Access Basin Implementation Plans or Education Action Plans from Basin drop down menu.

| Matching Requirements: Basin Account Requests | |
|---|---|
| **Basin (only) Account** grant requests require a 25% match (cash and/or in-kind) from the Applicant or 3rd party and shall be accompanied by a **letter of commitment** as described in the 2016 WSRF Criteria and Guidelines (submitted on the contributing entity's letterhead). Attach additional sheet if necessary. | |
| Contributing Entity | Amount and Form of Match (note cash or in-kind) |
| Colorado Corn Administrative Committee | $15,000 (cash) |
| Central Colorado Water Conservation District | $2,500 (cash) |
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| Total Match | $17,500 (cash) |
| If you requested a Waiver to the Basin Account matching requirements, indicate the percentage you wish waived. | |

| Matching Requirements: Statewide Account Requests | |
|---|---|
| **Statewide Account** grant requests require a 50% match as described in the 2016 WSRF Criteria and Guidelines. A minimum of 10% match shall be from Basin Account funds (cash only). A minimum of 10% match shall be provided by the applicant or 3rd party (cash, in-kind, or combination). The remaining 30% of the required match may be provided from any other source (Basin, applicant, or 3rd party) and shall be accompanied by a **letter of commitment.** Attach additional sheet if necessary. | |
| Contributing Entity | Amount and Form of Match (note cash or in-kind): |
| Currently not being pursued | |
| | |
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| | |
| Total Match | $ |
| If you requested a Waiver to the Statewide Account matching, indicate % you wish waived. (Max 50% reduction of requirement). | |

Last Update: August 3, 2017

| Related Studies |
| --- |
| Please provide a list of any related studies, including if the water activity is complimentary to or assists in the implementation of other CWCB programs. |
| Northern Colorado Water Conservation District (Northern) conducted a salinity study from 2002-2006 and produced a report, which will be used in this study.<br><br>Northern and Central Colorado Water Conservation District (Central) are collecting electrical conductivity data that will be used in this study.<br><br>The USGS and the Department of Agriculture are collecting data and have produced reports that will be used. |

| Previous CWCB Grants |
| --- |
| List all previous or current CWCB grants (including WSRF) awarded to both the Applicant and Grantee. Include: 1) Applicant name; 2) Water activity name; 3) Approving RT(s); 4) CWCB board meeting date; 5) Contract number or purchase order |
| Not applicable |

| Tax Payer Bill of Rights |
| --- |
| 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. |
| Not applicable |

Last Update: August 3, 2017

Last Update: January 9, 2018

| Colorado Water Conservation Board | |
|---|---|
| **Water Supply Reserve Fund** | |
| **Exhibit A - Statement of Work** | |
| **Date:** | **February 1, 2019** |
| **Water Activity Name:** | **Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources** |
| **Grant Recipient:** | **Colorado Corn Administrative Committee** |
| **Funding Source:** | **Water Supply Reserve Fund, South Platte Basin** |

**Water Activity Overview:** (Please provide brief description of the proposed water activity (no more than 200 words). Include a description of the overall water activity and specifically what the WSRF funding will be used for.

This activity investigates the current salinity and the historical salinity trends along the South Platte River (SPR). Total Dissolved Solids (TDS) is an indicator of salts in irrigation water that can damage soils. reduce crop yields, and negatively impact the sustainability of irrigated agriculture. SPR sampling in September 2018 confirmed that TDS concentrations increase dramatically through the Denver Metro area and reach levels that can damage crops. Potential salinity sources include Municipal waste water treatment facility (WWTF) sewage effluent, agricultural return flows, road deicing solutions, geologic formations, livestock waste, and produced water from oil and gas development.

Project objectives are to determine if salinity concentrations are a concern for irrigated agriculture, identify salinity severity and trends, evaluate the influence of historical water management practices, and to identify potential salinity sources. This project will analyze historical TDS concentrations to identify trends over time and along the SPR. Long-term, seasonal, and spatial trends will be used to identify potential salinity sources. Trends will be analyzed for correlations with major water-management policies.

The Colorado South Platte River Basin data sources for this study will include Central and Northern Colorado Water Conservation Districts, Colorado Department of Public Health and Environment (CDPHE), U.S. Geological Survey, U.S. Environmental Protection Agency, and the Colorado Department of Agriculture. Additional data sources may be used if the data can be readily obtained.

**Objectives:** (List the objectives of the project)

1. Obtain concurrent water samples from upstream of the Denver Metro area to the state line near Julesburg to determine if salinity concentrations are a concern for irrigated agriculture sustainability
2. Identify salinity severity and trends in the South Platte River from approximately 1990 through 2017, or a period feasible with the available data
3. Correlate salinity trends with changes in water-management policy
4. Use long-term, seasonal, and spatial salinity trends to identify potential salinity sources.

Last Update: January 9, 2018

| Tasks |
|---|
| Provide a detailed description of each task using the following format: |
| **Task 1 - Water-quality Sampling** |
| Description of Task: |
| South Platte River sampling from upstream of Denver Metro area to near State line at Julesburg, including major tributaries. Field parameters (EC, Specific Conductance, pH, RDO, temperature) measured with a multiparameter sonde. Water-samples collected and analyzed by a laboratory for TDS, cations, anions, and Sodium Absorption Ratio. (Completed, September 2018) |
| Method/Procedure: |
| • Sampling site selection<br>• Daily multiparameter sonde calibration<br>• GPS location and photographs at each site<br>• Field parameter data collection at sampling sites<br>• Obtain water grab sample, filter, and ice sample<br>• Water-samples shipped to laboratory for chemical analysis<br>• Data processing and analysis, including piper diagrams, Stiff diagrams, maps, tables, and graphs |
| Grantee Deliverable: (Describe the deliverable the grantee expects from this task) |
| Database with compiled and organized data (Excel spreadsheets). Table(s), graphs, and map(s) illustrating data collected. |
| CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task) |
| Completion of this task will be documented in the project status reports. Working copies of table(s), graphs, and map(s) illustrating data collected. |

| Tasks |
|---|
| Provide a detailed description of each task using the following format: |
| **Task 2 - Data Compilation & Evaluation** |
| Description of Task: |
| TDS, electrical conductivity, and equivalent data from sources listed below will be compiled. Based on data availability and quality, monitoring locations will be selected for detailed analysis in task 3.<br><br>1. Central Colorado Water Conservation District (CCWCD);<br><br>2. Northern Colorado Water Conservation District (NCWCD);<br><br>3. Colorado Department of Public Health and Environment (CDPHE);<br><br>4. U.S. Geological Survey (USGS; and<br><br>5. Colorado Department of Agriculture. |
| Method/Procedure: |
| • Obtain data from agency staff or on-line databases. Data to include water quality, stream flows, groundwater levels, precipitation;<br>• Evaluate data period of record, data quality, and completeness<br>• Identify monitoring locations that can be used to identify salinity sources (e.g. near WWTF, agricultural return flows, geologic formation outcrops, stormwater runoff, de-icing runoff, tributaries)<br>• Convert database values to common units and measurements (e.g. electrical conductivity converted to Total Dissolved Solids) |
| Grantee Deliverable: (Describe the deliverable the grantee expects from this task) |
| Database with compiled and organized data (MS Access or Excel spreadsheets). Table(s), graphs, and map(s) illustrating data availability and data quality. |
| CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task) |
| Completion of this task will be documented in the project status reports. Working copies of table(s), graphs, and map(s) illustrating data availability and data quality. |

| Tasks |
|---|
| Provide a detailed description of each task using the following format: |
| **Task 3 – Data Analysis** |
| Description of Task: |
| TDS from the selected sites will be analyzed for trends and correlations. Seasonal influences may include precipitation, streamflows (spring runoff, stormwater runoff), road de-icing, irrigation season (ditch flows, river diversions, infiltration), groundwater recharge. Long-term trends will be analyzed for correlations with historic water management policies (e.g. curtailing groundwater pumping, augmentation plans, water reuse, water conservation, etc.). Results will be presented in maps, graphs, and tables. Basic statistics will be computed. |
| Method/Procedure: |
| • Data will be analyzed statistically on a site-by-site basis, spatially, and temporally to identify the salinity severity and trends;<br>• Geographic Information System software, graphing software, and statistical software will be used;<br>• Maps, graphs, and tables will be created to illustrate the analysis results and trends. |
| Grantee Deliverable: (Describe the deliverable the grantee expects from this task) |
| Tables, graphs, and maps illustrating trends and correlations. |
| CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task) |
| Completion of this task will be documented in the project status reports. Working copies of table(s), graphs, and map(s) illustrating trends and correlations. |

Last Update: January 9, 2018

| Tasks |
|---|
| Provide a detailed description of each task using the following format: |
| **Task 4 – Final Report** |
| Description of Task: |
| A final report (electronic format) will be prepared and submitted to the SPBRT and contributing entities, including recommendations for future actions. |
| Method/Procedure: |
| • Results of Tasks 1, 2, and 3 will be finalized<br>• Salinity severity, trends, and spatial distribution will illustrated using maps, graphs, and tables<br>• Descriptive text will be prepared to explain the results<br>• Recommendations for future actions will be prepared<br>• Report will be provided in electronic format for distribution |
| Grantee Deliverable: (Describe the deliverable the grantee expects from this task) |
| Report (electronic format) with text, maps, tables, and graphs documenting TDS concentrations, trends, and correlations in the Basin. |
| CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task) |
| Completion of this task will be documented in the project status report and an electronic copy of the final report. |

| Tasks |
|---|
| Provide a detailed description of each task using the following format: |
| **Task 5 – Grant Administration** |
| Description of Task: |
| Administrative tasks required to obtain grant funding, meet reporting requirements, and distributing funding. Specific tasks may include:<br>• Grant contract documentation submittals;<br>• Creating reimbursement invoices;<br>• Submitting contractor payments;<br>• Preparation and submittal of reporting documents; and<br>• CWCB staff correspondence. |
| Method/Procedure: |
| • Compiling organization documents;<br>• Processing invoices for payment;<br>• Preparing and compiling activity reports;<br>• Coordination between Colorado Corn, CWCB, South Platte Basin Roundtable, and contractors |
| Grantee Deliverable: (Describe the deliverable the grantee expects from this task) |
| • Submittal of contracting documents;<br>• Submittal of invoices for reimbursement;<br>• Confirmation that all grant conditions have been met with each invoice; and<br>• Progress Report submittal at least once every 6 months. |
| CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task) |
| A Final Report indicating that the project has been completed will be submitted to the CWCB. Report documentation may include:<br>• Summarizes the project and how the project was completed.<br>• Description of obstacles encountered, and how these obstacles were overcome.<br>• Confirmation that all matching commitments have been fulfilled. |

Last Update: January 9, 2018

## Budget and Schedule

**Exhibit B - Budget and Schedule:** This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format. A separate excel formatted Budget is required for engineering costs to include rate and unit costs.

## Reporting Requirements

**Progress Reports:** The grantee shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status 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. The CWCB may withhold reimbursement until satisfactory progress reports have been submitted.

**Final Report:** At completion of the project, the grantee shall provide the CWCB a Final Report on the grantee's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

## Payments

Payment will be made based on actual expenditures, must include invoices for all work completed and must be on grantee's letterhead. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions.

The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the water activity and purchase order or contract will be closed without any further payment. Any entity that fails to complete a satisfactory Final Report and submit to CWCB within 90 days of the expiration of a purchase order or contract may be denied consideration for future funding of any type from CWCB.

## Performance Requirements

Performance measures for this contract shall include the following:
(a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit B. Per Grant Guidelines, the CWCB will pay out the last 10% of the budget when the final deliverable is completed to the satisfaction of CWCB staff. Once the final deliverable has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.
(b) Accountability: Per the Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per the Grant Guidelines, Progress Reports must be submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment.
(c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary.
(d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

Last Update: 10/17/17

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

# Colorado Water Conservation Board

**Water Supply Reserve Fund**
**EXHIBIT B - BUDGET AND SCHEDULE**

**Date: February 1, 2019**

**Water Activity Name: Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources**

**Grantee Name: Colorado Corn Administrative Committee**

| Task No.[1] | Description | Start Date[2] | End Date | Matching Funds (cash & in-kind)[3] | WSRF Funds (Basin & Statewide combined)[3] | Total |
|---|---|---|---|---|---|---|
| 1 | Water-quality Sampling | -- | -- | $15,000 | $0 | $15,000 |
| 2 | Data Compilation & Evaluation | 5/1/2019 | 6/30/2019 | $2,500 | $10,000 | $12,500 |
| 3 | Data Analysis | 7/1/2019 | 8/31/2019 | | $20,000 | $20,000 |
| 4 | Final Report | 9/1/2019 | 10/31/2019 | | $6,500 | $6,500 |
| 5 | Grant Administration | 5/1/2019 | 10/31/2019 | | $2,500 | $2,500 |
| | | | **Totals** | $17,500 | $39,000 | $56,500 |

**(1)** The single task that include costs for Grant Administration must provide a labor breakdown (see Indirect Costs tab below) where the total WSRF Grant contribution towards that task does not exceed 15% of the total WSRF Grant amount.

**(2)** Start Date for funding under $100K - 45 Days from Board Approval; Start Date for funding over $100K - 90 Days from Board Approval.

**(3)** Round values up to the nearest hundred dollars.

• Reimbursement eligibility commences upon the grantee's receipt of a Notice to Proceed (NTP)

• NTP will not be accepted as a start date. Project activities may commence as soon as the grantee enters contract and receives formal signed State Agreement.

The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of the CWCB staff project manager. Once the Final Report has been accepted, the final payment has been issued, the water activity and purchase order (PO) or contract will be closed without any futher payment. Any entity that fails to complete a satisfactory Final Report and submit to the CWCB with 90 days of the expiration of the PO or contract may be denied consideration for future funding of any type from the CWCB.

• Additonally, the applicant shall provide a progress report every 6 months, beginning from the date of contract execution

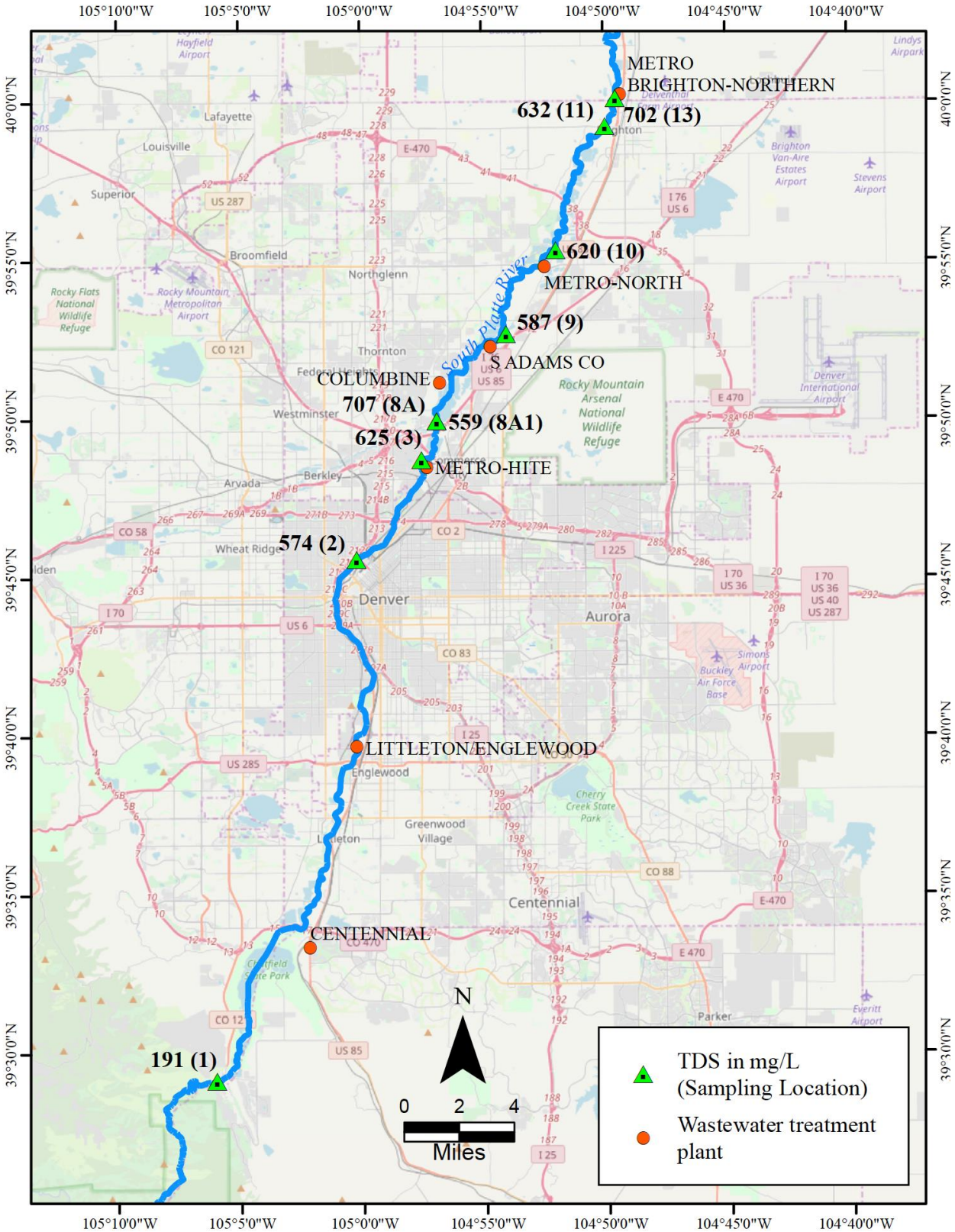


**Figure 1. South Platte River total dissolved solids concentrations measured in the Denver Metro area (September, 2018)**

**Table 1. Sample site descriptions and measured TDS**

| Site | Description | Field[1] | Laboratory[2] |
|---|---|---|---|
| | | Total Dissolved Solids (mg/l) | Total Dissolved Solids (mg/l) |
| 1 | SPR AT WATERTON CANYON | 162 | 191 |
| 2 | SPR-AT 19th ST, USGS GAGE, DENVER | 580 | 574 |
| 3 | SPR-NEAR CCWCD MD01 | 626 | 625 |
| 8A | SPR-DS 74Th AVE | 707 | |
| 8A1 | SPR-DS 74TH AVE | 562 | 559 |
| 9 | FULTON DITCH NEAR SPR | 587 | |
| 10 | SPR AT HENDERSON 124TH AVE | 620 | |
| 11 | SPR-DS BRIGHTON PONDS AT HWY 7 | 638 | 632 |
| 13 | SPR-BRIGHTON NORTHERN WWTF | 724 | 702 |
| 17 | SPR-DS HWY 52 | 654 | 643 |
| 20A | SPR AT CR 325 | 691 | 702 |
| 22 | SVR AT CR 34 | 734 | 733 |
| 23 | SVR-USGS GAGE AT CR 38 | 750 | 744 |
| 27A | EVANS DITCH | 849 | |
| 27A1 | BTR-CR 396 | 867 | 849 |
| 28 | SPR-US OF BTR CONFLUENCE | 757 | |
| 29 | SPR-US OF HWY 85 NEAR LASALLE | 701 | |
| 29-Ditch | SPR AT LATHAM DITCH NEAR | 761 | 688 |
| 33A | CLP-US OF SPR CONFLUENCE | 802 | 728 |
| 34A | SPR-DS CLP CONFLUENCE | 749 | 751 |
| 35A | SPR AT CR 61 | 772 | 788 |
| 37 | SPR NEAR PLAMASCO | 817 | |
| 38 | SPR AT CR 19 NEAR ORCHARD | 756 | 831 |
| 39A | SPR AT CR 9 NEAR WELDONA | 877 | |
| 41 | SPR AT CO 52 NEAR FORT MORGAN | 909 | 912 |
| 42A | SPR AT CR 24 DODD BRIDGE | 979 | 976 |
| 47A | SPR-DS STERLING BRAVO WILDLIFE | 1209 | 1210 |
| 50 | SPR DS CO 385 NEAR JULESBURG | 1310 | 1275 |
| 52A | CLP-US CO 68 NEAR TIMNATH | 475 | 508 |
| 52A-pond | STORAGE POND-AT SPR US CO 68 | 396 | |
| 53 | SPR AT COLLEGE AVE (HWY 287) FORT | 100 | |
| 54 | CLP AT OVERLAND TRAIL FORT | 121 | 125 |

[1] Measured in the field with an In-situ smarTROLL Multiparameter Handheld

[2] Water sample analyzed by Ward Laboratory, Inc.

Abbreviations: SPR: SOUTH PLATTE RIVER; CLP: CACHE LA POUDRE RIVER; SVR: SAINT VRAIN RIVER; BTR: BIG THOMPSON RIVER; DS: DOWN STREAM; US: UPSTREAM; CR: COUNTY ROAD CO: COLORADO HIGHWAY; HWY: HIGHWAY

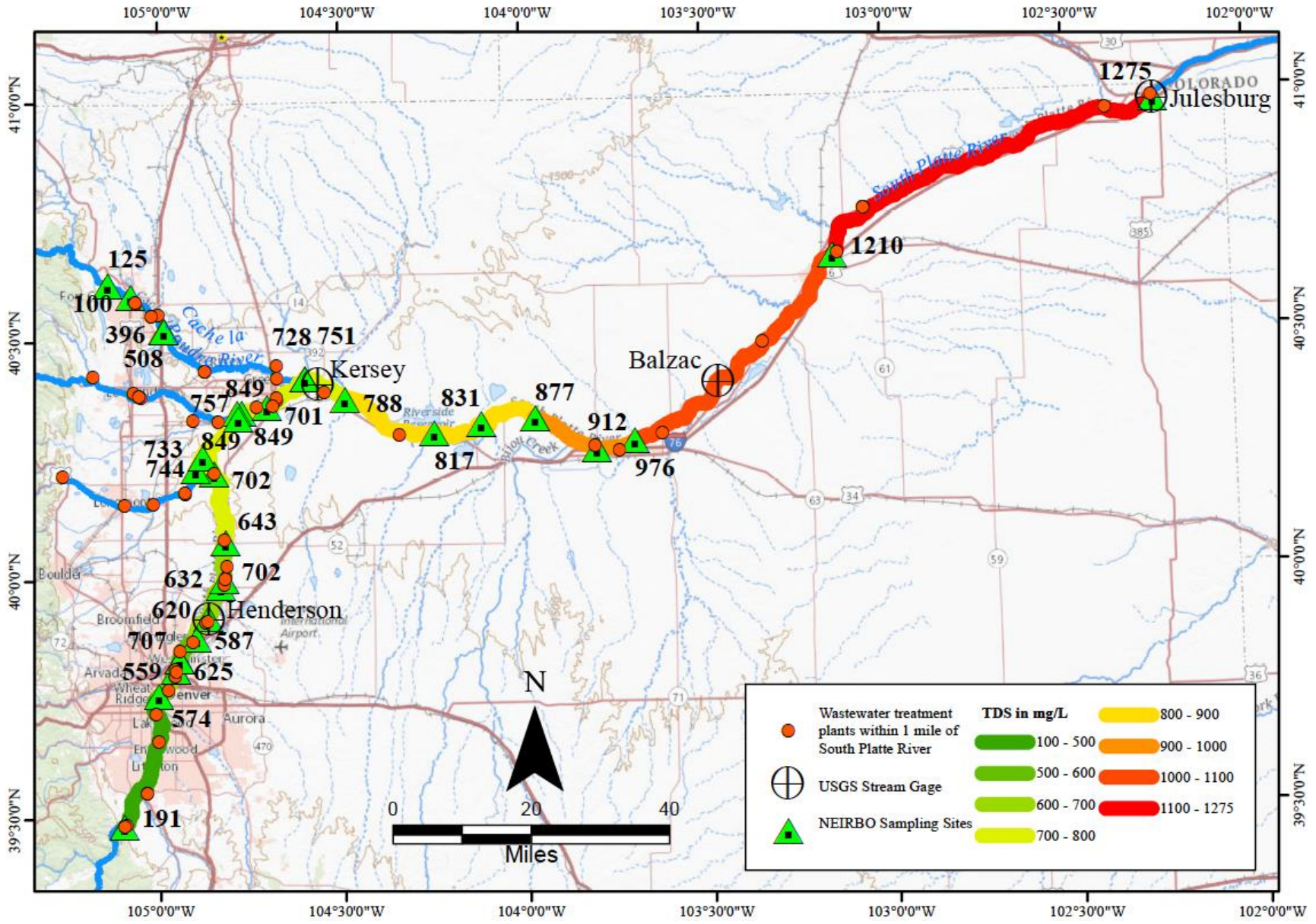


**Figure 2. South Platte River total dissolved solids concentrations measured in September, 2018**

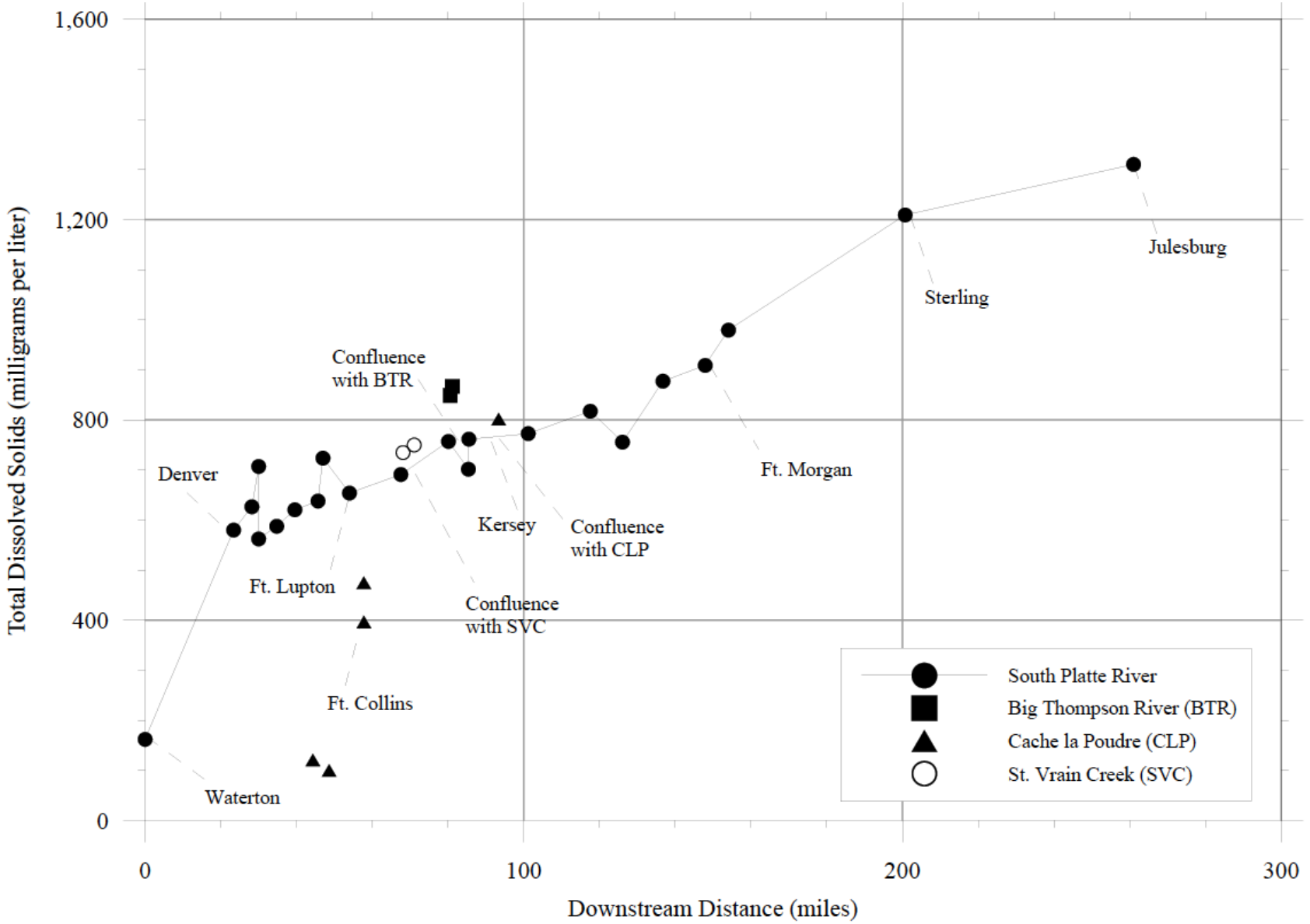


**Figure 3. Changes in Total Dissolved Solids concentrations with distance along the Sourth Platte River**

Administrative Committee
127 22nd Street
Greeley, CO 80631
Phone: (970) 351-8201
FAX: (970) 351-8203
www.coloradocorn.com

February 11, 2019

Grady O'Brien, Principal
NEIRBO Hydrogeology
231 S Howes St
Fort Collins, CO 80521

Subject: Salinity Project Funding

Dear Mr. O'Brien,

The Colorado Corn Administrative Committee Research Action Team authorized funding in the amount of $15,000 for NEIRBO to investigate salinity in the South Platte River.

Your technical contact for this project is Mark Sponsler, Chief Executive Officer for Colorado Corn (msponsler@coloradocorn.com).

Mark Sponsler
Executive Officer
Colorado Corn
127 22nd Street
Greeley, CO 80631
(970) 351-8201 office
(970) 380-1604 mobile

CENTRAL COLORADO WATER CONSERVANCY DISTRICT
3209 W 28 STREET | GREELEY, CO 80634 | WWW.CCWCD.ORG
LOCAL: 970-330-4540 | METRO: 303-825-0474 | FAX: 970-330-4546

Mr. Grady O'Brien, P.G.
Principal Hydrogeologist
Neirbo Hydrogeology
231 S. Howes Street
Fort Collins, CO 80521

December 18, 2018

Dear Mr. O'Brien,

On November 20, 2018, the Central Colorado Water Conservancy District's Board of Directors approved a $2,500 dedication of matching funds for the requested WSRF grant. As a project partner, Central eagerly awaits the final report and believes the findings of this study will greatly benefit Central's membership and the agricultural community in the South Platte Basin. As reuse in the South Platte Basin increases, irrigators in the South Platte Basin will rely on the findings of this investigation to guide cropping and irrigation methodologies to respond to changing water quality conditions. If desired, Central is willing to assist with data collection and water quality sampling in addition to the $2,500 dedication.

Sincerely,

William Mihelich, P.E.
District Engineer

# Colorado Ag Water Alliance

"Commited to the preservation of agriculture through the wise use of Colorado's water resources"

December 9, 2018

To: Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, CO 80203

From: Greg Peterson, Executive Director
Colorado Ag Water Alliance

The Colorado Ag Water Alliance (CAWA) supports the grant application "Historical Analysis of South Platte River Salinity to Identify Trends and Evaluate Potential Salinity Sources." submitted by Grady O'Brien of NEIRBO Hydrogeology to acquire funding for this research based on the following:

- Dissolved salts in irrigation water is a threat to long-term sustainability of irrigated agriculture in the South Platte River Basin due to injury to crop, which in turn impacts revenue, operational costs, and production.
- With water reuse, water has an opportunity to accumulate more salts and further increasing salinity levels in the system. As municipalities continue to pursue and increase their capacity of water reuse, salinity will become an even more significant issue.
- It is best for agricultural organizations like CAWA to be involved at the forefront of these issues because of the potential impact to the agricultural community and to be involved in equitable and effective solutions.

The Colorado Ag Water Alliance will support NEIRBO Hydrogeology by:

- Including the results of this study in our education and outreach to farmers and ranchers in the South Platte River Basin

We appreciate your consideration of this grant application and encourage your approval.

**Member Organizations**
Colorado Aquaculture
Colorado Association of Conservation Districts
Colorado Cattlemen's Association
Colorado Corn Growers Association
Colorado Dairy Farmers
Colorado Egg Producers
Colorado Farm Bureau
Colorado Fruit & Vegetable Growers Association
Colorado Horse Council
Colorado Livestock Association
Colorado Pork Producers Council
Colorado Potato Administrative Committee
Colorado State Grange
Colorado Association of Wheat Growers
Green Industries of Colorado
Rocky Ford Growers Association
Rocky Mountain Farmers Union

**Staff**
Greg Peterson

www.coagwater.org

2425 35th Avenue, Suite 202
Greeley, Co 80634
Office (970) 378-0500
Fax (970) 378-1962
www.coloradolivestock.org

December 5, 2018

South Platte Basin Roundtable Colorado Water Conservation Board

% Jeffrey Boring

RE: WSRF Grant Proposal – Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources.

To Whom It May Concern:

The Colorado Livestock Association (CLA) is a multi-species livestock organization representing beef (cow-calf and feedlot), dairies, swine and sheep operators throughout the State of Colorado.

As a livestock association whose members produce a variety of protein products, we recognize how incredibly detrimental the buildup of salts can be to crop production and to Colorado's agricultural productivity overall.

Initial studies indicate the high salt levels already in the South Platte, particularly the lower reaches of the river are causing concern about the seriousness of this issue.

On behalf of the Colorado Livestock Association, we urge your consideration of funding the Water Supply Reserve Fund (WSRF) Project.

Please feel free to contact us if you have any questions about our support of the proposed project. Bill may be reached at (970) 378-0500 or bhammerich@coloradolivestock.org .

Sincerely,

Mike Veeman, President

William Hammerich, CEO

**COLORADO FARM BUREAU**
9177 East Mineral Circle · Centennial, CO 80112
Mailing Address: PO Box 5647, Denver, CO 80217
(303) 749-7500 · Fax (303) 749-7703
www.ColoradoFarmBureau.com

November 1, 2018

To: South Platte Basin Roundtable Colorado Water Conservation Board

Re: WSRF Grant Proposal – Historical Analysis of South Platte River Salinity to Identify Severity, Trends, and Potential Sources

Colorado Farm Bureau has long been concerned about the water available for agriculture in the South Platte River Basin. Both quantity and quality are important for the efficient and profitable production of Ag products and the future of the communities along the South Platte River.

We encourage you to fund this study that will give a historical and factual background for future decisions that will impact our members' interests in this basin.

We look forward to seeing the results of this project and expect to be involved in any discussions of potential actionable suggestions from the study.

Thank you for your work on this and other important issues in the South Platte River Basin.

Sincerely,

Donald Shawcroft
President
Colorado Farm Bureau