

## **Exhibit A**

### **Statement of Work**

**WATER ACTIVITY NAME – Arkansas Basin Implementation Plan (formerly Arkansas River Basin Plan)**

**GRANT RECIPIENTS – Southeastern Colorado Water Conservancy District**

**FUNDING SOURCE - Statewide Account \$205,691**

### **INTRODUCTION AND BACKGROUND**

The Arkansas Basin Implementation Plan (Plan) will identify actions, programs, and projects that will provide a comprehensive strategy to optimize the use of the Arkansas Basin water supplies and meet 2050 demands.

Existing reports and information relevant to the Basin Implementation Plan (e.g., SWSI 2010 demands, IPPs, vulnerabilities from the drought plan) will be summarized. This information will help the BRT measure how it is meeting its goals and objectives as well as identify methods to meet those needs.

An analysis of Consumptive and Nonconsumptive Constraints and Opportunities will help the BRT understand the constraints and opportunities within the basin to meet their needs. The components will include an analysis of constraints and opportunities based on existing data, water rights administration policies and procedures, hydrologic modeling, and current and future shortage analysis.

The Plan will identify the projects and methods needed to meet the BRT's consumptive and nonconsumptive needs. The Plan will identify water management challenges and opportunities within the basin and provide a framework for meeting the challenges. In addition the Plan will describe how the projects and methods identified will meet the gaps and water supply shortages, in relation to the goals and measurable outcomes.

### **OBJECTIVES**

#### **Section 1: Arkansas Basin Goals and Measurable Outcomes**

##### **Specific Nonconsumptive Goals and Measureable Outcomes**

- Nonconsumptive goals will be based on the Statewide Water Supply Initiative (SWSI) 2010 reports for the Arkansas Basin Roundtable (BRT) and existing goals and measurable outcomes.

##### **Specific M&I Goals and Measureable Outcomes**

*(Outcomes to be provided later)*

**Goals –** Meet the Arkansas Basin municipal supply gap:

- Reach enhanced levels of municipal conservation and reuse
- Successful permitting and development of planned municipal supply projects
- Continued research, testing, and use of agricultural and municipal water sharing partnerships
- New water storage in the basin using environmentally beneficial methods
- Preserve the ability to develop Colorado's allocation of Colorado River water
- When it is needed, development of state water project(s) using Colorado River water for municipal uses on the East and West Slopes
- Develop projects and methods within the basin that meet as much of the future municipal and industrial (M&I) gap as possible

- Identify and reach concurrence on agreements to share infrastructure, reuse projects, conjunctive use projects, and alternative agricultural water transfer methods (ATM) projects

### **Specific Agricultural Goals and Measurable Outcomes**

*(Outcomes will be provided later)*

- Minimize the permanent dry up of irrigated agricultural lands in the basin except for those being urbanized or are already planned in Identified Projects and Processes (IPPs)
- Assure compliance with the Arkansas River Compact

## **Section 2: Evaluate Consumptive and Nonconsumptive Needs**

### **2.1 Nonconsumptive Needs**

This section will review nonconsumptive needs and assess how much of the needs are being met in relation to the goals and measurable outcomes. It will utilize the work of the BRT and SWSI 2010 by reassessing this data in the context of the BRT's goals and measurable outcomes. Using the nonconsumptive project and methods database, the BRT can work to understand how much of its nonconsumptive needs are being met through existing projects and methods. For instance, data could indicate that 80 percent of cutthroat trout currently enjoy protection in the basin/identified reaches, leaving a remaining target of 10 percent to meet the BRT's goal. This effort is further described in the Nonconsumptive Toolbox.

### **2.2 Consumptive Needs**

This section will provide an update to the Consumptive Needs Assessments that were developed as part of SWSI 2010 and will include vulnerabilities from the State Drought Plan. This section includes municipal, industrial, and agricultural needs.

## **Section 3: Evaluate Consumptive and Nonconsumptive Constraints and opportunities**

This section will provide an update to the Consumptive Needs Assessments that were developed as part of SWSI 2010 and will include vulnerabilities from the State Drought Plan. This section includes municipal, industrial, and agricultural needs.

The purpose of this section is to help the BRT better understand the constraints and opportunities within the basin to meet their identified needs. The components of this section include:

- Consumptive and Nonconsumptive Constraints and Opportunities
  - 3.1 Analysis of Constraints and Opportunities Based on Existing Data
  - 3.2 Water Rights Administration Policies and Procedures
  - 3.3 Hydrologic Modeling
  - 3.4 Current and Future Shortage Analysis

## **Section 4: Projects and Methods**

The CWCW will assist the BRTs in identifying projects for the major water sectors as well as multi-purpose projects. The section will include the following subsections:

- 4.1 Education, Participation, and Outreach
- 4.2 Watershed Health

- 4.3 Conservation and Reuse Projects and Methods
- 4.4 New Multi-Purpose, Cooperative, and Regional Projects and Methods
- 4.5 M&I Projects and Methods (i.e., projects, conservation, reuse, drought planning, etc.)
- 4.6 Agricultural Projects and Methods
- 4.7 Nonconsumptive Projects and Methods
- 4.8 Interbasin Projects and Methods

## **Section 5: Implementation Strategies for the Projects and Methods**

The Plan will identify water management challenges and opportunities within the basin and provide a framework for meeting the challenges.

- Description of any cross-basin recommendations or needs for additional cooperation
- Description of what is needed to fully implement the projects and methods. This may include:
  - Identifying strategies to ensure public education and acceptance
  - Identifying funding mechanisms and strategies for implementing water supply projects and methods
  - Additional feasibility analysis and identifying partnerships/sponsors
- Timelines for identified projects and key tasks/milestones

## **Section 6: How the Plan Meets the roundtable's Goals and Measurable Outcomes**

This section describes how the projects and methods identified in the Plan meet the gaps and water supply shortages, in relation to the goals and measurable outcomes. This will inform SWSI and the State Water Plan on how we are meeting our municipal, industrial, agricultural, environmental, and recreational gaps in a meaningful way.

## **TASKS**

### **3.1 Analysis of Constraints and Opportunities Based on Existing Data**

#### ***Consultant Responsibility***

#### ***Task A – Water Data Review***

##### Description of Task

The purpose of this task is to review and identify all water use data that is available that support this study for the selected study period, 1982 to 2012.

##### Method/Procedure

The consultant will review the Arkansas Basin Decision Support System (DSS) Feasibility Study where water resources data (surface water and groundwater) has been inventoried and assessed. This comprehensive inventory is expected to be very useful in identifying data sources. In addition, the consultant will use the Division of Water Resources (DWR's) HydroBase data where applicable. Other data bases used by the Division Engineer will be evaluated for data that may be needed. Major municipal water providers will be contacted to obtain any water resources data that will be needed if not in

HydroBase. The Bureau of Reclamation will be contacted to obtain any data that is not in HydroBase that may be needed for the study.

#### Deliverable

A technical memorandum containing the list and sources of data needed to complete the study.

### ***Consultant Responsibility***

#### ***Task B – Basin Water Operations Report***

##### Description of Task

The purpose of this task is to provide a report describing historical water operations in the basin by major water users for 3 years in the study period that reflect dry, average, and wet hydrology/conditions.

##### Method/Procedure

The consultant will identify major water users in the basin and obtain historical monthly data on water diversions, storage, exchanges, groundwater withdrawals, and use for the study period. The monthly data will be obtained from the sources identified in Task 1. The monthly data will be input to Excel spreadsheets for analyses and presentation of data for the report.

#### Deliverable

- A report describing historical monthly water diversions, storage, exchanges, and uses for major water users in the basin for 3 selected years that would reflect dry, average, and wet hydrology/conditions. The report would use Excel spreadsheets to help depict water operations.
- Basin maps that show the location of the diversion and storage of water by major water users. The maps will show irrigated areas under the major irrigation diversions included in the study.
- A map with the amount of water diverted, stored, released, and exchanged by annual totals for the 3 hydrologic years for each major water user.

### **3.2 Water Management and Water Administration**

### ***Consultant Responsibility***

#### ***Task C – Water Administration***

##### Description of Task

The purpose of this task would be to provide a common understanding of water administration and the Arkansas River Compact administration policies. The BRT can utilize this common understanding to refine and develop the Basin Implementation Report accordingly.

##### Method/Procedure

The consultant will conduct meetings with the Division Engineer and his staff to obtain information on current water rights administration, compact administration, and promulgated rules implementation policies and procedures. Any reports that have been published by DWR or the Division Engineer will be reviewed for useful information that will assist in describing these policies and procedures. DWR has published official policies on water rights administration, implementation of promulgated rules, and groundwater administration. These official policies will be reviewed for content that will assist in describing water rights administration.

### Deliverable

A technical memorandum describing water rights administration and compact administration policies and an explanation of how they impact water use in the basin.

## 3.3 Hydrologic Modeling

### ***Consultant Responsibility***

#### ***Task D – Model Development***

### Description of Task

The purpose of this task is to develop a hydrologic model of the basin and develop a visualization tool that can be used to support this study. The hydrologic model and visualization tool will be used in subsequent tasks to meet the overriding objectives of this study in a practical and cost-effective manner.

### Method/Procedure

The consultant will develop a hydrologic model of the Arkansas Basin for use in this study. This model will include the key operational water resources elements in the basin such as:

- Major rivers and streams
- Major reservoirs
- Major diversions

The consultant will develop the hydrologic model using CDM Smith's Simplified Water Allocation Model (SWAM) to support the study. SWAM is a generalized water allocation modeling tool, written in Visual Basic for Applications within Microsoft Excel and developed with partial funding from the State of Colorado. It was designed as a simplified, more user-friendly alternative, or companion, to the Colorado DSS. SWAM calculates physically and legally available water, diversions, storage, consumption, and return flows at user-defined nodes in a networked river system. The software is best suited for planning applications, rather than water rights administration or detailed simulations of system operations.

In addition, a visualization tool will be developed that will be dynamically linked to the SWAM model. This tool will process SWAM simulation output as they are generated to allow for quick and easy spatial visualization of projected water resources in the Arkansas Basin under varying basin operations. This tool will assist in the visualization of flows and water resources operations in the basin simulated in the hydrologic model.

### Deliverables

- A technical memorandum describing the hydrologic model and visualization tool developed for this study
- A hydrologic model and visualization tool developed to assist in the spatial assessment of water resources in the Arkansas Basin under varying basin operations and hydrologic conditions

## Section 3.4 Current and Future Shortage Analysis

### ***Consultant Responsibility***

#### ***Task E – Shortage Analysis***

##### Description of Task

The purpose of this task is to analyze water supply availability and uses for current conditions and a future planning horizon (2050) in order to gain a better understanding of both. Analyses will incorporate a range of hydrologic conditions and demand projections associated with the selected planning horizon. The analyses will include a shortage analysis as described above.

##### Method/Procedure

The model or models developed in Task D will be used to analyze basin water availability and uses. Models will be constructed using the best available information and data collected under Task 1. To the extent possible, historical data will be used to verify the constructed models with respect to their ability to provide realistic simulations of water resources in the basin. The constructed model(s) will simulate native flows, reservoir storage, return flows, exchange agreements, and transbasin projects across a network of key locations, or nodes, in the basin. The model(s) will also simulate a range of hydrologic conditions subject to both current and future demands. Model output will include physical availability of water (stream flows), legal availability of water (to identify legal constraints), reservoir storage levels, diversions, return flows, and water supply shortfalls. Output will be provided for locations throughout the basin and likely on a monthly timestep. Additionally, the model(s) will allow for the simulation of various "what if" scenarios associated with management options aimed at addressing quantified shortfalls.

The model(s) will be used to evaluate operations of important reservoirs for revised operations that would improve the usability or reliability of the reservoirs. The PSOP proposal for Pueblo Reservoir would be included in the analysis.

Multiple models could be used in concert for this task. For example, output from one could serve as input to another. Lastly, as noted above, model simplifications will be required to provide useful and practical simulations of basin water resources within constraints imposed by data, budget, and schedule limitations. These simplifications may include aggregation of water use nodes and/or simplified representation of legal exchange agreements or operating rules.

##### Deliverable

- A technical memorandum describing the constructed model(s), model simulation results, and conclusions drawn with respect to the ability to meet future water use needs in the basin
- Copies of the constructed and parameterized numerical model(s) for potential use in future BRT planning studies

## Section 4: Projects and Methods

### **4.1 Education, Participation, and Outreach**

#### ***Consultant Responsibilities***

##### ***Task F – Education, Participation, and Outreach***

- None.

## **4.2 Watershed Health**

### ***Consultant Responsibilities***

#### ***Task G: Critical Community Watershed Health Plans***

- None.

## **4.3 Conservation and Reuse Projects and Methods**

### ***Consultant Responsibilities***

#### ***Task H – Conservation and Reuse***

- None.

## **4.4 New Multi-Purpose, Cooperative, and Regional Projects and Methods**

### ***Consultant Responsibilities***

#### ***Task I – Multi-Purpose Projects and Methods***

- None.

## **4.5 M&I Projects and Methods**

### ***Consultant Responsibilities:***

#### ***Task J: M&I Projects and Methods***

- J.2: Technical support to develop initial outlines of additional projects and methods
  - Include the work to date by nonconsumptive groups
  - Update IPP lists
  - Cross check nonconsumptive, agricultural, and M&I IPPs to ensure coordination and facilitation

## **4.6 Agricultural Projects and Methods**

### ***Consultant Responsibilities***

#### ***Task K: Agricultural Projects and Methods***

- K.1: Quantify agricultural water needs, supplies, and gaps using existing data from SWSI 1, SWSI 2010, and 2011 Basin Reports
- K.2: Build a database for the above similar to M&I database

## **4.7 Nonconsumptive Projects and Methods**

### ***Consultant Responsibilities:***

#### ***Task L: Nonconsumptive Projects and Methods***

- None.

## **4.8 Interbasin Projects and Methods**

### ***Consultant Responsibilities:***

#### ***Task M: Interbasin Projects and Methods***

- M.3: Provide water yield estimates and costs for a selected concept
- M.4: Provide other technical support as needed

## Section 5: Implementation Strategies for the Projects and Methods

### *Consultant Responsibilities:*

#### *Task N – Implementation Strategies*

- N.2: Technical support to develop strategies and a framework for meeting the challenges

## Section 6: How the Plan Meets the Roundtable's Goals and Measurable Outcomes

### *Consultant Responsibilities*

#### *Task O: Measurable Evaluation*

- None.

### *Consultant Responsibilities*

#### *Task P: Coordination with CWCB and Technical Team and Reporting*

- P.1: Coordination with CWCB and technical team
- P.2: Prepare final Basin Implementation Plan

### **Budget/Costs**

|              |                  |
|--------------|------------------|
| Task A       | \$15,288         |
| Task B       | \$50,401         |
| Task C       | \$15,188         |
| Task D       | \$20,175         |
| Task E       | \$58,000         |
| Task F       | \$0              |
| Task G       | \$0              |
| Task H       | \$0              |
| Task I       | \$0              |
| Task J       | \$10,000         |
| Task K       | \$11,525         |
| Task L       | \$0              |
| Task M       | \$4,750          |
| Task N       | \$4,730          |
| Task O       | \$0              |
| Task P       | \$15,635         |
| <b>Total</b> | <b>\$205,691</b> |

## **REPORTING AND FINAL DELIVERABLE**

Reporting: Southeastern Colorado Water Conservancy District 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, Southeastern 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.



## SCHEDULE

| <b>Arkansas River Implementation Plan</b> |   |                   |                 |
|---|---|-------------------|-----------------|
| <b>Task</b>                               | <b>Task Description</b>                                 | <b>Start Date</b> | <b>End Date</b> |
| A   | Water Data Review                                       | Upon NTP          | 3/1/2014        |
| B   | Basin Water Operations Report                           | Upon NTP          | 4/30/2014       |
| C   | Water Administration                                    | Upon NTP          | 4/30/2014       |
| D   | Model Development                                       | Upon NTP          | 4/30/2014       |
| E   | Shortage Analysis                                       | Upon NTP          | 5/31/2014       |
| J   | M&I Projects and Methods                                | Upon NTP          | 6/30/2014       |
| K   | Agricultural Projects and Methods                       | Upon NTP          | 6/30/2014       |
| M   | Interbasin Projects and Methods                         | Upon NTP          | 6/30/2014       |
| N   | Implementation Strategies                               | Upon NTP          | 7/31/2014       |
| P   | Coordination with CWCB and Technical Team and Reporting | Upon NTP          | 7/31/2014       |
| Notes:                                    |   |                   |                 |
| NTP - Notice to Proceed                   |   |                   |                 |

## PAYMENT

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

Arkansas River Basin Study Budget

Updated: Nov 7, 2013

| Total Costs |   |               |                    |                     |
|-------------|---|---------------|--------------------|---------------------|
| Task        | Description   | Labor         | Other Direct Costs | Total Project Costs |
| Task A      | Water Data Review                                       | \$ 15,160.00  | \$ 127.97          | \$ 15,287.97        |
| Task B      | Basin Water Operations Report                           | \$ 50,000.00  | \$ 401.01          | \$ 50,401.01        |
| Task C      | Water Administration                                    | \$ 14,890.00  | \$ 297.51          | \$ 15,187.51        |
| Task D      | Model Development                                       | \$ 20,000.00  | \$ 175.01          | \$ 20,175.01        |
| Task E      | Shortage Analysis                                       | \$ 57,640.00  | \$ 360.02          | \$ 58,000.02        |
| Task J      | M&I Projects and Methods                                | \$ 9,940.00   | \$ 60.00           | \$ 10,000.00        |
| Task K      | Agricultural Projects and Methods                       | \$ 11,390.00  | \$ 135.00          | \$ 11,525.00        |
| Task M      | Interbasin Projects and Methods                         | \$ 4,630.00   | \$ 120.01          | \$ 4,750.01         |
| Task N      | Implementation Strategies                               | \$ 4,630.00   | \$ 99.50           | \$ 4,729.50         |
| Task P      | Coordination with CWCB and Technical Team and Reporting | \$ 15,285.00  | \$ 349.95          | \$ 15,634.95        |
|             | Total Cost:   | \$ 203,565.00 | \$ 2,126.00        | \$ 205,691.00       |

| Labor  |   |                  |          |           |              |             |              |               |              |               |              |                   |              |           |                  |
|--------|---|------------------|----------|-----------|--------------|-------------|--------------|---------------|--------------|---------------|--------------|-------------------|--------------|-----------|------------------|
|        |   | Project Director |          | Principal |              | Sr Eng/Geo. |              | Proj. Eng/Geo |              | Staff Eng/Geo |              | Clerical/Drafting |              | Total Hrs | Total Labor Cost |
|        |   |                  | 225      |           | 175          |             | 150          |               | 130          |               | 100          |                   | 85           |           |                  |
| Task   | Description   | Hrs              | Cost     | Hrs       | Cost         | Hrs         | Cost         | Hrs           | Cost         | Hrs           | Cost         | Hrs               | Cost         |           |                  |
| Task A | Water Data Review                                       | 2                | \$ 450   | 10        | \$ 1,750.00  | 16          | \$ 2,400.00  | 40            | \$ 5,200.00  | 40            | \$ 4,000.00  | 16                | \$ 1,360.00  | 124       | \$ 15,160.00     |
| Task B | Basin Water Operations Report                           | 4                | \$ 900   | 32        | \$ 5,600.00  | 80          | \$ 12,000.00 | 178           | \$ 23,140.00 | 70            | \$ 7,000.00  | 16                | \$ 1,360.00  | 380       | \$ 50,000.00     |
| Task C | Water Administration                                    | 4                | \$ 900   | 24        | \$ 4,200.00  | 16          | \$ 2,400.00  | 31            | \$ 4,030.00  | 20            | \$ 2,000.00  | 16                | \$ 1,360.00  | 111       | \$ 14,890.00     |
| Task D | Model Development                                       | 2                | \$ 450   | 4         | \$ 700.00    | 16          | \$ 2,400.00  | 93            | \$ 12,090.00 | 30            | \$ 3,000.00  | 16                | \$ 1,360.00  | 161       | \$ 20,000.00     |
| Task E | Shortage Analysis                                       | 8                | \$ 1,800 | 8         | \$ 1,400.00  | 120         | \$ 18,000.00 | 200           | \$ 26,000.00 | 84            | \$ 8,400.00  | 24                | \$ 2,040.00  | 444       | \$ 57,640.00     |
| Task J | M&I Projects and Methods                                | 2                | \$ 450   | 8         | \$ 1,400.00  | 10          | \$ 1,500.00  | 25            | \$ 3,250.00  | 30            | \$ 3,000.00  | 4                 | \$ 340.00    | 79        | \$ 9,940.00      |
| Task K | Agricultural Projects and Methods                       | 2                | \$ 450   | 12        | \$ 2,100.00  | 16          | \$ 2,400.00  | 20            | \$ 2,600.00  | 35            | \$ 3,500.00  | 4                 | \$ 340.00    | 89        | \$ 11,390.00     |
| Task M | Interbasin Projects and Methods                         | 2                | \$ 450   | 4         | \$ 700.00    | 6           | \$ 900.00    | 8             | \$ 1,040.00  | 12            | \$ 1,200.00  | 4                 | \$ 340.00    | 36        | \$ 4,630.00      |
| Task N | Implementation Strategies                               | 2                | \$ 450   | 4         | \$ 700.00    | 6           | \$ 900.00    | 8             | \$ 1,040.00  | 12            | \$ 1,200.00  | 4                 | \$ 340.00    | 36        | \$ 4,630.00      |
| Task P | Coordination with CWCB and Technical Team and Reporting | 8                | \$ 1,800 | 15        | \$ 2,625.00  | 30          | \$ 4,500.00  | 30            | \$ 3,900.00  | 11            | \$ 1,100.00  | 16                | \$ 1,360.00  | 110       | \$ 15,285.00     |
|        | Totals  | 36               | \$ 8,100 | 121       | \$ 21,175.00 | 316         | \$ 47,400.00 | 633           | \$ 82,290.00 | 344           | \$ 34,400.00 | 120               | \$ 10,200.00 | 1,570     | \$ 203,565.00    |

| Other Direct Costs |   |            |           |                    |          |             |
|--------------------|---|------------|-----------|--------------------|----------|-------------|
| Item:              |   | Copies     | Materials | Equipment/Supplies | Mileage  | Total       |
| Units:             |   | No.        |           |                    | Miles    |             |
| Unit Cost:         |   | \$ 0.25002 |           |                    | \$ 0.565 |             |
| Task A             | Water Data Review                                       | 200        |           |                    | 138      | \$ 127.97   |
| Task B             | Basin Water Operations Report                           | 700        |           |                    | 400      | \$ 401.01   |
| Task C             | Water Administration                                    | 738        |           |                    | 200      | \$ 297.51   |
| Task D             | Model Development                                       | 700        |           |                    | 0        | \$ 175.01   |
| Task E             | Shortage Analysis                                       | 762        |           |                    | 300      | \$ 360.02   |
| Task J             | M&I Projects and Methods                                | 240        |           |                    |          | \$ 60.00    |
| Task K             | Agricultural Projects and Methods                       | 88         |           |                    | 200      | \$ 135.00   |
| Task M             | Interbasin Projects and Methods                         | 254        |           |                    | 100      | \$ 120.01   |
| Task N             | Implementation Strategies                               | 172        |           |                    | 100      | \$ 99.50    |
| Task P             | Coordination with CWCB and Technical Team and Reporting | 950        |           |                    | 199      | \$ 349.95   |
|                    | Total Units:  | 4,804      |           |                    | 1637     |             |
|                    | Total Cost:   | \$ 1,201   | \$ -      | \$ -               | \$ 925   | \$ 2,126.00 |