

STATE OF COLORADO

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TO: Colorado Water Conservation Board Members

FROM: Andy Moore, Water Information Section

SUBJECT: **Agenda Item 11, July 12-13, 2011 Board Meeting
Water Information Section – Arkansas River DSS – Proposed
Implementation from the Feasibility Study**

Staff Recommendation

Staff recommends that the Board approve the proposed implementation plan for the Arkansas River Decision Support System (ArkDSS).

Background

The ArkDSS will be part of Colorado's Decision Support Systems (CDSS). CDSS is a water management system being developed by CWCB and DWR to assist in making informed decisions regarding water resources planning and management in the State. Currently there are DSSs in place for the Colorado River and Rio Grande Basins, and the development of the South Platte DSS is ongoing. Water users and planners, as well as the State, will benefit from the data and tools developed as part of the ArkDSS.

The ArkDSS feasibility study began in January 2010. The purpose of the feasibility study was to define the ArkDSS's purposes, users, components, data requirements, costs and the schedule required to develop such a system. The feasibility study has resulted in a proposed plan for implementation. Staff presented the proposed plan to the Arkansas Basin Roundtable in May 2011 and received their endorsement. A draft report will be available for review in July, with comments accepted through the end of August.

The proposed plan for implementation includes four phases, beginning primarily with data collection followed by development of analytical tools and models. Each phase stands on its own and builds on previous phases. The proposed plan would occur over a period of six to eight years, with a total approximate cost of \$7,590,000.

For more information, please see the following two attachments from the feasibility study draft report:

- Executive Summary
- Figure 6-1. Proposed Implementation Flow Diagram.

Arkansas River DSS Feasibility Study

Executive Summary

Beginning in 1992, the Colorado Water Conservation Board and Division of Water Resources embarked on an effort to establish a common and accepted framework of information and tools to help facilitate informed decision-making in water resources planning in the State of Colorado. Since that time, the development of decision support systems in the Colorado River Basin (CRDSS), Rio Grande Basin (RGDSS) and South Platte River Basin (SPDSS) have provided data-centered systems that integrate relational and spatial databases with analytical tools and models to assist water users and water managers in water resources planning and management.

The purpose of this study is to determine the feasibility of developing and implementing a decision support system for the Arkansas River Basin in Colorado. This Arkansas River Decision Support System (ArkDSS) is intended to provide State agencies, water providers and water users the appropriate data and analytical tools to assist water resources planning and management in the basin. Consequently, the ArkDSS Feasibility Study objectives are to:

- Determine the feasibility of developing a DSS for the Arkansas River Basin using standards similar to the decision support systems developed for the Colorado River and Rio Grande Basins and being developed for the South Platte River Basin.
- Identify the scope, functions, elements, data needs, costs and schedule to develop a DSS for the Arkansas River Basin.

In order to achieve the objectives of this study, the following tasks were addressed:

- Needs Assessment – Meet with stakeholders and identify needs to be met by ArkDSS
- Data Collection and Assessment – Assess the availability and quality of existing data and determine what new data are necessary or desirable to develop an ArkDSS that accurately and effectively addresses the needs identified.
- ArkDSS Components – Review CRDSS, RGDSS and SPDSS, as well as existing efforts in the Arkansas Basin, and identify components that can be utilized in ArkDSS. Identify the components required to develop an ArkDSS that addresses the identified needs in a cost-effective manner.
- Options for Implementation – Develop options for implementation of the ArkDSS considering needs, data availability, costs, and other appropriate factors.
- Proposed Implementation - From the implementation options, formulate a recommended proposed implementation plan in consultation with the State and the ArkDSS Advisory Committee.

Based on the recommendations of data and components to address the needs of stakeholders in the basin, three levels of effort and cost, or tiers, were developed as options for implementation of an ArkDSS. These three tiers represent varying levels of data collection and analytical capability for the ArkDSS. Tier 1 provides a foundational DSS that meets many data needs, as well as some basic analytical needs. Tier 2 tasks, which can be developed subsequent to Tier 1 tasks in a cost-effective manner, meet a majority of the identified data and analytical component needs. Tier 3 tasks provide significantly enhanced modeling capabilities, but at an expensive level.

In considering the three levels of data collection and analytical capability of each tier, the tasks in Tier 1 and Tier 2 provide the most benefit to users at reasonable cost. Therefore, these tasks are recommended at this time for the implementation of the ArkDSS. Although Tier 3 tasks are not recommended at this time, elements at this level of analytical capability may be included in the ArkDSS in the future, if warranted by basin needs and if additional funding is available.

A phased approach for the proposed implementation will provide an efficient, step-wise process for completing tasks that build upon one another, and it will allow for periodic assessment of progress to date, whether there is a need for modifications to future implementation activities, and funding availability. Phases for ArkDSS implementation have been developed based on the data-centered approach for ArkDSS implementation, as well as the flow of information required between components.

The proposed ArkDSS implementation is divided into four major phases:

Phase 1: Initial Funding Tasks (\$500,000)

- **ArkDSS tasks approved for CWCB funding in November 2010:**
 - Water resources data collection/analysis, including consumptive use data in the upper basin
 - Water rights and administration components development, including H-I Model process enhancements
 - Spatial data collection/analysis, including irrigated lands data collection and analysis in upper basin

Phase 2: Data Compilation and Collection (\$3,810,000)

- **Existing Data Compilation:** Compile and review data for surface water, groundwater, consumptive use, and GIS components
- **New Data Collection:** Install gages and monitoring wells

Phase 3: Initial Components Development (\$1,260,000)

- **Consumptive Use Analysis:** Enhance StateCU, develop basin model and calculate basin CU
- **Water Budget Analysis:** Develop basin water budgets
- **GIS and Irrigated Lands:** Develop GIS component

Phase 4: Additional Components Development (\$2,020,000)

- **Surface Water Planning:** Develop basin-wide model
- **Groundwater Planning:** Develop analytical tools for the upper and lower basin
- **Water Quality Analysis:** Develop conceptual model and make recommendations for further analysis

These four phases will allow the proposed data collection and components development tasks to be completed in a period of six to eight years. The total cost for the proposed ArkDSS implementation is estimated at \$7,590,000.

Figure 6-1. Proposed Implementation Flow Diagram

