Water Supply Reserve Account – Grant and Loan Program
Water Activity Summary Sheet
March 16-17, 2016
Agenda Item 14 (ac)

Co-Applicants:	CSU Colorado Climate Center & Colorado Division of Water Resources
Fiscal Agent:	CSU Colorado Climate Center
Water Activity Name:	Continuation of lysimeter operations and consumptive use quantification in high-altitude, irrigated meadows in the Yampa/White Basin.
Water Activity Purpose:	Agricultural & Needs Assessment
County:	Basin-wide
Drainage Basin:	Yampa/White/Green
Water Source:	Basin-wide
Amount Requested/Source of Funds:	$11,304 Yampa/White/Green Basin Account $11,304 Statewide Account $22,608 Total Grant Request
Matching Funds:	Basin Account Match ($11,304) = 50% of total grant request (meets 5% min); Applicant Match ($26,854) = 118% of total grant request (meets 5% min); Basin Account & Applicant Match ($38,158) = 168% of total grant request (meets 25% min) (refer to *Funding Summary/Matching Funds* section)

Staff Recommendation:

Staff recommends approval of up to $11,304 from the Yampa/White/Green Basin Account; and $11,304 from the Statewide Account to help fund the project titled: Continuation of lysimeter operations and consumptive use quantification in high-altitude, irrigated meadows in the Yampa /White Basin.

Water Activity Summary: WSRA funds, if approved, will be expended to continue efforts to improve lysimeter operations in the Yampa Basin and to come up with better crop coefficients that can be applied to weather-based calculations of grass-reference ET. In late 2010, the Yampa-White Roundtable provided support for instrumentation, operation and maintenance for an integrated data collection system consisting of an automated weather station specifically designed for estimating evapotranspiration via the ASCE Standardized Penman-Monteith method and small bucket lysimeters designed to directly measure the amount of water lost from the soil due to evapotranspiration. The weather station was purchased and installed in 2011. Severe drought conditions in 2012 limited vegetation growth and establishment, delaying the lysimeters use, but by 2013 the vegetation was established enough to allow representative ET measurements to begin.

This project will allow 5 years of uninterrupted lysimeter data to be collected and another lysimeter load cell to be purchased for accurate weighing of the buckets. From the lysimeter data a more accurate crop coefficients can be calculated, which can then be applied to the weather station data for accurate ET estimates for the Yampa basin.

Objectives

• Review lysimeter data collection to date and identify data quality issues and the likely causes of data quality deficiencies.
• Review lysimeter operations plan and instructions.
• Obtain new load cell to assure high quality bucket weight measurements.
• Perform daily quality control assessment of Hayden CoAgMet (Colorado Agricultural Meteorological Network) weather station data.
• Conduct annual maintenance and calibration of all meteorological sensors.
• Perform emergency maintenance and calibration as needed based on weather station performance to assure high quality and continuous data collection, particularly during the growing season.
• Based on lysimeter measurements and in collaboration with the staff of the Colorado Division of Water Resources Division 6, compute crop water use for each bucket at the end of each growing season year. Intercompare data and compare to weather station ET (Evapotranspiration) estimates. Also compare with preliminary results from the ongoing North Platte Roundtable ET study.
• As opportunities appear, also use data to assist and support other ET research currently underway in the Upper Colorado River Basin (in collaboration with Dr. Perry Cabot).
• Make annual estimates of hay meadow consumptive use, sample variability and relationship to weather data-based methods. Estimate appropriate crop coefficients and compare to other available estimates. Provide updates to the Yampa-White Roundtable.

Discussion: This project aligns with well with several of the Goals and Measurable Outcomes as addressed in the Yampa/White/Green Basin Implementation Plan, such as: Protect and encourage agriculture uses of water in the YWG Basin within the context of private property rights; Improve agricultural water supplies to increase irrigated land and reduce shortages (The agricultural needs study of the YWG BRT identified an additional 14,805 acres of potential new agricultural production in the future); Develop an integrated system of water use, storage, administration and delivery to reduce water shortages and meet environmental and recreational needs (YWG BIP; Section 1.2.2: YWG Basin Goals, page 1-7). While this project has not been identified as an IPP in the YWG BIP, it is staff's opinion that this activity furthers the Goals of the YWG BIP and Colorado's Water Plan.

In addition this effort advances Agricultural Viability as presented in Colorado's Water Plan by: Develop and implement policies and strategies that support meaningful agricultural viability statewide (CWP; Chapter 6.5.2, pages 6-138 thru 6-144). Furthermore, this activity supports the goals of Colorado's Water Plan as presented in Section 6.5.4: Maintenance of Existing Projects and Methods (CWP; pages 6-153 thru 6-156). The continuation of this activity also furthers several of the Measurable Objectives, such as: D. Agriculture (CWP; Chapter 10.2: Measurable Goals and Adaptive Management; pages 10-5 thru 10-7); and Critical Goals and Actions introduced in Colorado's Water Plan, such as: A. Supply-Demand Gap: Meet Colorado's Water Gaps: Use a grassroots approach to formulate projects and methods that avoid some of the undesirable outcomes of the supply-demand gaps. The plan addresses the gap from multiple perspectives (e.g., water storage, reuse, recycling, integrated water management, restoration, and conservation); and D. Agriculture: Maintain Agricultural Viability: Maintain Colorado's agricultural productivity, support of rural economies, and food security (through meaningful incentives and grassroots efforts); and

Support Agricultural Conservation and Efficiency: Support Colorado's agricultural industry to make it more efficient, resilient, and able to reduce water consumption without impacting agricultural productivity (CWP: Chapter 10.3: Critical Goals and Actions; ages 10-8 thru 10-15).

Previous WSRA funding for this activity, approved by CWCB in Sept 2010 consisted of: $10,000 Yampa/White/Green Basin Account funds, and $10,978 Statewide Account funds; for a total of $20,978. This project component was completed in June 2015.

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

Threshold and Evaluation Criteria: The application meets all four Threshold Criteria.

Tier 1-3 Evaluation Criteria:
This project has undergone review and evaluation and staff has determined that this request satisfies the Evaluation Criteria. Further analysis of the project, and how the project will meet Tiered Evaluation Criteria, is provided by the applicant in the WSRA Application.

Funding Summary/Matching Funds:

Funding Source	Cash	In-kind	Total
Colorado Division of Water Resources	$0	$26,854	$26,854
WSRA Yampa/White/Green Basin Account	$11,304	n/a	$11,304
WSRA Statewide Account	$11,304	n/a	$11,304
Total Project Costs	**$22,608**	**$26,854**	**$49,462**

CWCB Project Manager: Craig Godbout

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 will help promote the development of a common technical platform. In accordance with the revised WSRA Criteria and Guidelines, staff would like to highlight additional reporting and final deliverable requirements. The specific requirements are provided below.

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 scope 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.

Engineering: All engineering work (as defined in the Engineers Practice Act (§12-25-102(10) C.R.S.)) performed under this grant shall be performed by or under the responsible charge of professional engineer licensed by the State of Colorado to practice Engineering.