STATE OF COLORADO

Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, Colorado 80203
Phone: (303) 866-3441
Fax: (303) 866-4474
www.cwcb.state.co.us

March 12, 2009

Colorado State University
Department of Sponsored Programs
601 S. Howes Street, Room 408
Fort Collins, CO 80523-2002

RE: Notice to Proceed—Monitoring the Effects of Weather Conditions on Evapotranspiration North Platte River Basin

Dear Colorado Climate Center:

This letter is to inform you that the contract for your grant request of $100,818.00 to assist in the funding of monitoring the effects of weather conditions on evapotranspiration North Platte River Basin was signed on March 4, 2009. An original signed copy of the contract is attached.

With the executed contract, you are now able to proceed with the project and begin invoicing the State of Colorado for costs incurred from March 4, 2009 through June 30th, 2014. Upon receipt of your invoice(s), the State of Colorado will provide payment no later than 45 days. I wish you much success in your project.

Sincerely,

/s/

Greg Johnson, CWCB
(303) 866-3441 ext. 3249

INTERAGENCY AGREEMENT

State of Colorado

Department of Natural Resources

Colorado Water Conservation Board

PDA

Routing Number 09 PDA 0085

THIS contract, Made this 4th day of February 2009, by and between the State of Colorado for the use and benefit of the Department of Natural Resources, Colorado Water Conservation Board, hereinafter referred to as CWCB, and The Board of Governors of the Colorado State University System, acting by and through Colorado State University, hereinafter referred to as CSU.

Recitals:

Authority exists in the Law and Funds have been budgeted, appropriated and otherwise made available and a sufficient uncommitted balance thereof remains available for encumbering and subsequent payment of this contract under Encumbrance Number C150438.

Authority for the CWCB entering into this agreement arises from Colorado Revised Statutes (CRS) 39-29-109(2)(c), 37-75-102 and 37-75-104(2)(c) and Senate Bill 06-179 adopted by the 2006 General Assembly.

Required approval, clearance and coordination has been accomplished from and with appropriate agencies; and

NOW THEREFORE, it is hereby agreed that

1. Statement of Work and Responsibilities. CWCB awarded a grant to CSU at its September 2008 Board Meeting to monitor the effects of weather conditions on evapotranspiration in the North Platte River Basin. A description of the project including the project budget and deliverables is attached hereto as **Exhibit A, Scope of Work.**

2. Payment Amount and Billing Procedure. In consideration of the obligation of CSU to perform in accordance with paragraph one, CWCB will pay up to $100,818 upon satisfactory work conducted on the project according to the **Scope of Work.**

3. Performance Term. The term of this interagency agreement is the date approved by the State Controller or his designee through June 30, 2014.

4. Availability of Funds. Payment pursuant to this agreement, if in any part federally funded, is subject to and contingent upon the continuing availability of federal funds for the purposes hereof. If any of said federal funds become unavailable, as determined by the department, either party may immediately terminate or seek to amend this agreement.

Financial obligations for the State of Colorado payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted and otherwise made available.

5. Record Keeping Requirements. CSU shall maintain a complete file of all records, documents, communications and other material which pertain to this agreement for a period of three (3) years from the date of final payment under this agreement, unless CWCB requests that the records be retained for a longer period.

6. CSU shall permit CWCB and federal agency, if any, monitoring and auditing of records and activities which are or have been undertaken pursuant to this agreement.

7. Except as otherwise provided, the duties and obligations of CSU shall not be assigned, delegated or subcontracted except with the express prior written consent of CWCB. All subcontractors will be subject to the requirements of this agreement.

8. Except as otherwise stated this agreement shall inure to the benefit of and be binding only upon the parties hereto and their respective successors and assigns. No third party beneficiary rights or benefits of any kind are expressly or impliedly provided herein.

9. This Interagency Agreement constitutes the entire Agreement between the parties. All amendments and/or changes shall be by written instrument executed by the parties hereto. The parties hereto have caused this Interagency Agreement as of the date set forth below by their duly authorized representatives. The rights and responsibilities of the parties under this contract shall not be assignable without the prior written approval of the CWCB.

10. Any failure of either party to performance in accordance with the terms of this agreement shall constitute a breach of the agreement. Any dispute concerning the performance of this agreement which cannot be resolved at the divisional level shall be referred to superior departmental management staff designated by each department. Failing resolution at that level, disputes shall be presented to the executive directors of each department for resolution. Failing resolution by the executive directors, the dispute shall be submitted in writing by both parties to the State Controller, whose decision on the dispute shall be final.

11 Any of the parties shall have the right to terminate this agreement by giving the other party thirty (30) days notice. If notice is given, the agreement will terminate days from the date of such notice, and the liabilities of the parties hereunder for further performance of the terms of the agreements shall thereupon cease, but the parties shall not be released from duty to perform up-to-the-date of termination.

12. For the purpose of this contract, the individuals identified below are hereby designated representatives of the respective parties. Either party may from time to time designate in writing new or substitute representatives:

For CSU:

Colorado State University
Department of Sponsored Programs
601 S. Howes Street, Room 408
Fort Collins, Colorado 80523-2002
(970) 491-6355

For the CWCB:

State of Colorado
Department of Natural Resources
Colorado Water Conservation Board
Attn: Eric Hecox
1313 Sherman Street, Suite 721
Denver, Colorado 80203
(303)866-3441 ext. 3217
email: eric.hecox@state.co.us

13. Controller's Approval. This interagency agreement shall not be deemed valid until it has been approved by the State Controller or a designated delegate of the State Controller.

Contract Routing Number 09 PDA 10085

THE PARTIES HERETO HAVE EXECUTED THIS INTER-AGENCY AGREEMENT

Persons signing for Parties hereby swear and affirm that they are authorized to act on behalf of their respective Party and acknowledge that the other Party is relying on their representations to that effect.

STATE OF COLORADO
Bill Ritter, Jr. GOVERNOR

The Board of Governors of the Colorado State University System, acting by and through Colorado State University
Douglas L. Jones, Chairman of the Board

Signature
By: Betty Eckert, Interim Director of Sponsored Programs

Date: 1/30/09

Department of Natural Resources
Harris D. Sherman, Executive Director

Signature
By: Mike Serlet, Section Chief

Date: 2/4/09

ALL CONTRACTS REQUIRE APPROVAL by the STATE CONTROLLER

STATE CONTROLLER
David J. McDermott, CPA

By: Dianne C Stamp

Date: 3-4-09

Exhibit A

Scope of Work

WATER ACTIVITY NAME – Monitoring the effects of weather conditions on evapotranspiration North Platte River Basin

GRANT RECIPIENT – Colorado Climate Center

FUNDING SOURCE - $50,409 North Platte Basin Account
$50,409 Statewide Account

BACKGROUND
The Colorado Climate Center at Colorado State University will work the North Platte Basin Roundtable and the Citizens of North Park to monitor evapotranspiration in representative areas of the basin to provide consistent and quantitative data for assessing consumptive use from hay meadow irrigation. We will establish and maintain for 5 years a network of three automated weather stations equipped for the purpose of monitoring weather conditions on an hourly and daily basis. From these data, estimates of evapotranspiration from irrigated hay meadow environments will be computed and displayed. In addition, ten "atmometers," simple instruments that directly measure evapotranspiration, will be distributed to cooperators across the basin to monitor ET from a broader and more diverse range of locations and conditions. All data collected in the North Platte Basin will be available, accessible and public and will be provided and updated on a daily basis on the Colorado Climate Center website – http://ccc.atmos.colostate.edu.

SUMMARY OF TASKS
The following tasks and actions will be performed to accomplish this work:

Task 1) Meet with NPB Roundtable representatives at the beginning of the project to begin identifying optimal sites for ET monitoring. Set goals for data display and distribution. Also identify list of potential cooperators for atmometer data collection and CoCoRaHS rain gauge measurements.

Task 2) Acquire weather station hardware for three complete automated weather stations. (Work with CoAgMet team and Campbell Scientific from Logan, UT). Acquire 10 atmometers, three automated and seven manual gauges.

Task 3) Conduct site surveys and establish agreements with land owners to host weather stations.

Task 4) Install, test and verify weather station operations - begin data collection.

Task 5) Make modifications and upgrades to the COAGMET website to archive and display data from the North Platte Basin. Update station maps to show new stations. Add grass reference to the existing alfalfa reference evapotranspiration coding according the ASCE standardized methods.

Task 6) Develop a Web-based data entry form for precipitation and atmometer evapotranspiration data utilizing the infrastructure of CoCoRaHS (www.cocorahs.org).

Task 7) For the period late May - early September, each year provide instruction for setting up and reading atmometers
- hold an annual late spring meeting for atmometer volunteers to train and review,
- annually recruit and train CoCoRaHS volunteers for mapping summer precipitation over the Basin.

(This is a water education opportunity for the youth as well as the adults of the basin, so emphasis will be placed on involving local students in measuring precipitation and evaporation.)

Task 8) Conduct annual CoAgMet weather station maintenance, site preparation, and instrument calibration. Make additional weather station site visits as required to maintain high quality data collection.

Task 9) Work with District 47 Water Commissioner and review lysimeter operations and historic data. Relationships between the lysimeter, Class A evaporation pan, weather station estimates and atmometers will be assessed numerically. Statistical summaries will be prepared each month during the first year of the project for the collocated instruments at the Wildlife Refuge. Scatterplots of ET derived from the various measurements will be generated to graphically describe results. Results will be sent electronically prior to each North Platte Basin Roundtable to keep membership informed of progress and early findings. As we gain familiarity with how the new ET monitoring compares to the traditional approaches at one point, we will then be able to emphasize the analysis of spatial variations in ET using results from the 3 automated CoAgMet ET stations and the larger number of cooperative atmometer readings across the North Platte basin. Once it is understood how these ET monitoring activities relate to one another, they all can be used to quantify and describe the patterns of ET from the hay meadows in the North Platte Basin. The improved monitoring will enable the North Platte Basin to manage irrigation and maximize their water use efficiency.

Task 10) All data collected in this project will be updated and online and most will be updated and available on a daily basis. Daily ET summaries will be accessible via the CoAgMet website at http://www.coagmet.com. Atmometer data tables and summaries will be updated and displayed on the Community Collaborative Rain, Hail and Snow network website at Colorado State University: http://www.cocorahs.org. It is anticipated that this local pilot test for atmometer ET monitoring may quickly be expanded to other locations in Colorado, particularly the Yampa River Basin. In addition to short summaries sent to the Roundtable prior to each of their regularly scheduled meetings, we will also prepare an annual growing season summary at the end of each year beginning with 2009. Adjustments to data collection efforts and ET information products will be made as necessary to meet the needs of the NTB Roundtable.

Personnel

Nolan Doesken, State Climatologist and Senior Research Associate in the Department of Atmospheric Science, has 30 years of experience with the climate of Colorado. He will oversee this effort and work with Roundtable to find appropriate sites for weather stations. Nolan will also be responsible for providing annual reports and presentations.

CoAgMet Field Technician (to be determined) will install and maintain weather stations to the standards required for monitoring and reporting hourly weather conditions throughout the year and evapotranspiration measurements during the growing season.

John Kleist, computer programmer, will manage and update the CoAgMet computer system in support of this effort. He has been involved with CoAgMet since the Colorado Climate Center began archiving and displaying data on the website in the early 1990s.

Julian Turner, web developer, will create the web entry and display system for atmometer data and will combine this effort with the functions of the CoCoRaHS website. For the past several years, he has maintained and created data entry and webpages for the Collaborative Community Rain, Hail and Snow Network project.

Budget

See attached budget sheet.

Schedule

Notice to Proceed -- Begin site selection process for CoAgMet weather stations. Review historic weather data and lysimeter/pan evaporation data from River Commissioner. Develop website for ET data collection and display from atmometers (Tasks 1,5,6).

March 2009 -- Complete site selection process. Install 3 stations after ground dries out. Begin weather station operations. Modify CoAgMet website and data archives to accommodate new North Platte Basin weather data (Tasks 2,3,4).

May 2009 -- Recruit local cooperators for atmometers and recruit additional volunteers for precipitation measurements (CoCoRaHS). Conduct training for collecting and reporting data. Provide update report on early activities to the basin Roundtable (Task 7).

June 2009 -- Monitor weather data continuously. Display data and compare ET results from different parts of the basin. Evaluate weather station performance and make additional station visits as needed. Begin combining and comparing weather station grass reference ET to North Park lysimeter results (Task 8,9,10).

September 2009 -- Summarize first year results and present to Roundtable.

2010 -- Continue data collection and comparison efforts. Perform annual weather station site visits for station maintenance and instrument calibration Prepare archive and graphical display of weather data and ET results for North Platte Basin COAGMET, atmometer and CoCoRaHS precipitation network data. Adjust activities as needed to assure representative and complete data. Compare results with COAGMET stations in other parts of the state. Provide annual reports to NPRBRT (Tasks 8,9,10).

PAYMENT

Payment will be made based on actual expenditures and invoicing by the water activity sponsor. 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 CWCB in hard copy and electronic format as part of the project documentation.

Monitoring the Effects of Weather Conditions on Evaportranspiration

North Platte River Basin, Proposed Budget
Nolan Doesken, Project Manager

			Yearly Inflation Rate	4%	4%	4%	4%	
			Year 1	Year 2	Year 3	Year 4	Year 5	Accumulated Total
Task 2	**Equipment**							
	CoAgMet stations from CSI, Inc	3 stations x $8000	24,000	0	0	0	0	24,000
	Atmometers Manual	7 x $200/ea	1,400	0	0	0	0	1,400
	Atmometers Automated	3 x $600/ea	1,800	0	0	0	0	1,800
Task 4	**Operation & Maintenance**							
	Communication Charges	(3 sta x $8/mo) x 12mo	288	300	312	324	337	1,560
Task 2, 3, 4, 7, 8	**Technician Salary/Fringe**	1.0 mm x $4300/month	4,300	4,472	4,651	4,837	5,030	23,290
	Travel to Walden to Service Sites	3 trips per year x 2 days (Y1); 2 trips x 2 days (Y2-5)						
	Mileage	400 miles x 3 trips x $0.50/mi (Y1); 2 trips (Y2-5)	600	300	312	324	337	1,874
	Lodging	$100 night for 2 nights x 3 trips (Y1); 1 night (Y2-5)	600	200	208	216	225	1,449
	Per diem	$39/day for 3 days (Y1); 2 days (Y2-5)	351	156	162	169	175	1,013
Task 8	**Calibration/Replacement/Miscellaneous Repair to Stations**		0	200	208	216	225	849
	Webpage/Programmer							
Task 5, 6	Webmaster Salary/Fringe	1.2 mm(Y1); 0.25 mm (Y2-5) x $4000	4,800	1,040	1,082	1,125	1,170	9,216
Task 5, 10	Programmer Salary/Fringe	15 hrs / year x $32/hr	480	499	519	540	562	2,600
Task 1, 3,7, 9	**Management of Project**							
	Director's Salary/Fringe	0.5 mm (Y1); 0.25 mm (Y2-5) x $9100	4,550	2,366	2,461	2,559	2,661	14,597
	Travel to North Park/Walden	2 trips overnight / 1 day trip						
	Mileage	300 miles x 3 trips x $0.50 mile	450	468	487	506	526	2,437
	Lodging	$100 night for 1 nights x 2 trips	200	208	216	225	234	1,083
	Per diem	$39/day for 2 trips for 2 days	156	162	169	175	182	845
	Subtotal		43,975	10,371	10,786	11,217	11,666	88,015
	Overhead (MTDC)	20%	3,995	2,074	2,157	2,243	2,333	12,803
	Total Project Budget		**47,970**	**12,445**	**12,943**	**13,461**	**13,999**	**100,818**

Note:A reduced overhead rate of 20% mtdc has been approved by Colorado State University for this project per the "Request for University Contribution of Indirect Cost" form. The Sponsor will pay a maximum of 20% on this award.

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