COLORADO
Colorado Water Conservation Board
Department of Natural Resources

1313 Sherman Street
Denver, CO 80203

P (303) 866-3441
F (303) 866-4474

John Hickenlooper, Governor

Robert W. Randall, DNR Executive Director

Rebecca Mitchell, CWCB Director

TO: Colorado Water Conservation Board Members

FROM: Alexander Funk, Program Manager
Alternative Agricultural Water Transfer Methods Grant Program (ATM)
Interstate, Federal, and Water Information Section

DATE: September 20th, 2018

AGENDA ITEM: 28

Staff Recommendation/Action Items: ATM Grant Request

Applicant: Colorado Division of Water Resources
Project Name: HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data Verification to Support Applications across Colorado
Amount: $50,000

If this request is approved, it will constitute the 32nd ATM Grant approved by the CWCB. Of the previous 31 projects, 7 are in-progress and 24 have been completed or closed-out.

The current ATM balance is $619,373. If this grant request is approved and comes under contract, the remaining balance will be $569,373.

Staff's review of the applications involves the following steps:
1) Applications are reviewed for completeness based on the information requirements, which are primarily outlined in the Criteria and Guidelines (C&G).
2) Applications are reviewed to verify that the water activity meets the eligibility requirements in the C&G.
3) Staff then prepares the Water Activity Summary Sheet which documents the outcome of the review process and contains staff's recommendations.

Staff concludes these ATM Grant applications are complete and the proposed activity meets the eligibility requirements in the C&G. The Water Activity Summary Sheet, ATM Grant Application, Statement of Work, Budget and Schedule are attached.

Staff recommendation:
Staff recommends approval of up to $50,000 from the Alternative Agricultural Water Transfer Methods Grant Program to help fund the "HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data Verification to Support Applications across Colorado" project.

Alternative Agricultural Water Transfer Methods – Competitive Grant Program
Water Activity Summary Sheet
September 19 and 20, 2018
Agenda Item 28

Applicant & Grantee:	Colorado Division of Water Resources
Water Activity Name:	HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data Verification to Support Applications across Colorado
Water Activity Purpose:	To facilitate the improvement of the HB 13-1248 Lease Fallow Project Process
Drainage Basin:	All except the Rio Grande and Arkansas
Water Source:	N/A
Amount Requested:	$50,000
Matching Funds:	**$40,000** total cash match ($30,000 cash match, $10,000 in-kind)

Staff Recommendation
Staff recommends approval of up to $50,000 from the Alternative Agricultural Water Transfer Methods Program to help fund the "HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data Verification to Support Applications across Colorado" project.

Water Activity Summary: The purpose of this project is to facilitate the improvement of the House Bill (HB) 13-1248 Lease-Fallow Pilot Project process and encourage the development of additional pilot projects. HB13-1248 authorizes the Colorado Water Conservation Board to administer a pilot program to test the efficacy of fallowing-leasing as an alternative to permanent agricultural dry up. The original legislation allows for the approval of up to ten pilot projects, each lasting ten years in duration. A maximum of three of these pilot projects could be in each of the four major river basins—the South Platte, Arkansas, Rio Grande, and Colorado River basins. The original legislation was modified by SB15-198 and HB17-1219, which allow the leased water to be used for agriculture, environmental, recreational, and M&I uses and expands the program to fifteen projects, with no more than five projects in a basin, through 2023. To date, the Board has approved one pilot project, the Catlin Canal Fallowing-Leasing Pilot Project, which continues to operate successfully.

At the January 2018 CWCB Board meeting, the Board heard testimony that the existing HB13-1248 Lease Fallow Pilot Project Criteria and Guidelines (C&G) are not conducive to ATM project applications at higher elevations due to the underestimation of potential evapotranspiration (PET). The C&G requires the use of the Lease-Fallowing Tool and standard presentation of results, specifies a seasonal irrigation efficiency of 55 percent, and requires the modified Blaney Criddle (MBC) equation with TR-21 crop coefficients to calculate PET over a period of at least 30 years. The MBC equation provides a conservative method for computing potential crop water use, but increasingly underestimates PET at higher elevations and at drier/windier/sunnier locations. A comparison of MBC with alternative methods for calculating PET at weather stations in Colorado shows that the underestimation in PET with elevation is greater than 10 percent per 1,000 meters at more southerly latitudes and in high mountain valleys.

At the January Board meeting, the Board stated that it was receptive to modifying the existing MBC method in the C&G. The request made to the Board was to add a second streamlined method for the historical consumptive use analysis in addition to the current MBC method, so that pilot projects at higher elevations may obtain fair historical consumptive use quantifications using a streamlined method pursuant to the intentions of HB13-1248. In response, DWR has recommended to use the ASCE Standardized ET Equation (ASCE Std.) for lease-fallow pilot projects in every basin except for Division 3.[1] ASCE Std. estimates PET based on temperature, humidity, solar, and wind data. Due to the range of data considered, the PET does not need an additional adjustment for elevation, thus providing closer PET estimates.

CoAgMET and Northern Colorado Water Conservancy District weather stations have been collecting the data required for ASCE Std. since the 1990s for some stations with some installations occurring more recently. The lack of very long-term weather data has limited PET calculations using the ASCE Std. to only the most recent 25 years or less. However, full climate and crop evapotranspiration datasets extending back to 1950 or longer were recently simulated by DWR for all basins in Colorado (except Division 3) using data correction (QC) and simulation/calibration methods. These weather datasets are available for use in the Lease Fallow Tool, enabling calculations using the ASCE Std. over a longer period.

DWR, given the amount of data necessary to develop and/or review a pilot project application using the ASCE Std. Method, seeks to hire a consultant to review the data simulation processes and conduct an independent quality assurance review of the simulated climate datasets in Divisions 1,4,5,6, and 7. These processes include correction of the base data, selection and assignment of climate stations, simulation/calibration of missing data, and estimation of crop ET. A similar project covering the climate data for Division 2 is scheduled for completion as part of the Arkansas River Decision Support System (ArkDSS) by the end of 2018, and process improvements identified through ArkDSS will be incorporated into the other basin datasets prior to this project. Consultants will work closely with DWR to identify issues and make any needed changes, thus providing assurance to water users and engineers as to the technical integrity of the data being used as input for lease-fallow pilot projects and streamlining the HB13-1248 application process.

Discussion: Staff supports this application. A new streamlined, accurate method for calculating PET could potentially further the stated legislative goals of the pilot program, which include providing sufficient data for the CWCB board to evaluate the efficacy of using a streamlined approach for determining historical consumptive use. More accurate data could also help encourage more agricultural producers to participate in the pilot program across Colorado, ensure producers are fairly compensated for fallowing their land, and developing lease-fallow pilots benefiting multiple water users.

Issues/Additional Needs: Staff will work cooperatively with the applicant's team to hire a consultant, or consultants, to execute the tasks identified in the Statement of Work, otherwise no issues or additional needs have been identified.

CWCB Project Manager: Alexander Funk

[1] In Division 3, where weather data simulations for ASCE Std. are not completed, DWR recommends use of the Rio Grande DSS model results for the Second Streamlined Method. In Division 3, the potential elevation range for irrigation is narrower than other divisions, ranging only from about 7,500 to 9,000 feet. Therefore, the Rio Grande DSS method generally works well at all reasonable irrigation locations in Division 3 without any additional elevation adjustment.

COLORADO WATER CONSERVATION BOARD

ALERNATIVE AGRICULTURAL WATER TRANSFER METHODS COMPETITIVE GRANT PROGRAM

GRANT APPLICATION FORM

Program/Project Name	River Basin Name
HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data Verification to Support Applications across Colorado	All basins except for Rio Grande

Amount of Funds Requested:	Amount of Matching Funds:
$50,000	$30,000 funds + $10,000 in-kind

Instructions: This application form must be submitted in electronic format (Microsoft Word or Original PDF). The application can be emailed or a disc can be mailed to the address at the end of the application form. The Alternative Agricultural Water Transfer Methods Competitive Grant Program, Criteria and Guidelines can be found at HYPERLINK "http://cwcb.state.co.us/LoansGrants/alternative-agricultural-water-transfer-methods-grants/Pages/main.aspx" http://cwcb.state.co.us/LoansGrants/alternative-agricultural-water-transfer-methods-grants/Pages/main.aspx. **The criteria and guidelines must be reviewed and followed when completing this application.** You may attach additional sheets as necessary to fully answer any question, or to provide additional information that you feel would be helpful in evaluating this application. Include with your application a cover letter summarizing your request for a grant. If you have difficulty with any part of the application, contact Craig Godbout of the Water Supply Planning Section (Colorado Water Conservation Board) for assistance, at (303) 866-3441 x3210 or email at HYPERLINK "mailto:craig.godbout@state.co.us" craig.godbout@state.co.us.

Generally, the applicant is also the prospective owner and sponsor of the proposed program/project. If this is not the case, contact Craig before completing this application.

Alternative Agricultural Water Transfer Methods – Grant Application Form

Project: HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data verification to support applications across Colorado

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Part A. Description of the Applicant(s) (Program/Project Sponsor);

1. Applicant Name(s): Colorado Division of Water Resources

   Mailing Address: % Tracy Kosloff, Assistant State Engineer, 1313 Sherman Street, Denver, CO 80202

   Taxpayer ID#: 84-0644739 Email address: tracy.kosloff@state.co.us

   Phone Numbers: Business: 303-866-3581 ext 8211, Mobile: 720-353-8495

2. Person to contact regarding this application: same as above

3. If the Contracting Entity is different then the Applicant, please describe the Contracting Entity here.

The Colorado Division of Water Resources (DWR) will coordinate with CWCB staff to hire a consultant or consultants to execute the proposed scope of work.

4. Provide a brief description of your organization. The applicant may be a public or private entity. Given the diverse range of potential applicants, not all of the following information may be relevant. Where applicable and relevant the description should include the following:

DWR is a division of the Colorado Department of Natural Resources which does the following: administers water rights, issues water well permits, represents Colorado in interstate water compact proceedings, monitors streamflow and water use, approves construction and repair of dams and performs dam safety inspections, issues licenses for well drillers and assures the safe and proper construction of water wells, and maintains numerous databases of Colorado water information. In 1881, the General Assembly provided for a state hydraulic engineer (now known as the State Engineer) who was to be appointed by the governor. Section 37-80-102, Colorado Revised Statutes now describes the general duties of the State Engineer. With respect to the State Engineer's ability to receive and expend grants, Section 37-80-102(1)(I) states that the state engineer specifically has executive responsibility and authority with respect to, "Receiving and expending grants and distributions of money, property, and equipment from the Colorado water conservation board for use in making investigations, contracting projects, or otherwise carrying out the purposes of this article. The grants and distributions from the Colorado water conservation board are continuously appropriated to the state engineer for the purposes set forth in this section."

Contact Person: Tracy Kosloff, Assistant State Engineer (see contact information in No. 1 above)

a) Type of organization, official name, the year formed, and the statutes under which the entity was formed, a contact person and that person's position or title, address and phone number. For private entities, a copy of the Articles of Incorporation and By-laws should be appended to the application.

b) For waters suppliers, information regarding the number of customers, taps, service area, and current water usage, and future growth plans, water related facilities owned or used, funding/revenue sources (existing service charges, tap fees, share assessments, etc.), the number of members or shareholders and shares of stock outstanding or a description of other means of ownership.

c) For other entities, background, organizational size, staffing and budget, and funding related to water that is relevant in determining whether the applicant has the ability to accomplish the program/project for which funding is sought.

d) A brief history of the Applicant(s).

e) Please include any relevant Tabor issues relating to the funding request that may affect the Contracting Entity.

Alternative Agricultural Water Transfer Methods – Grant Application Form

Project: HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data verification to support applications across Colorado

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Part B. Description of the Alternative Water Transfer Program/Project –

1. Purpose of the Program/Project

The purpose of this project is to facilitate the improvement of the HB13-1248 Lease-Fallow Pilot Project process. At the January 2018 CWCB Board meeting, the Board heard testimony that the existing HB13-1248 Lease Fallow Pilot Project Criteria and Guidelines (C&G) are not conducive to ATM project applications at higher elevations. The goal of HB13-1248 was to enable development of methods and understanding of how to design rotational fallowing-leasing and test its efficacy as an alternative to permanent agricultural dry-up. The original legislation allows 10 rotational fallowing pilot projects; up to 3 in each basin. The legislation was modified by SB15-198 and HB17-1219, which allow the leased water to be used for agriculture, environmental, recreational, and M&I uses and expands the program to 15 projects with up to 5 in a basin if approved by 2023. One pilot project on the Catlin Canal near Rocky Ford is operating successfully.

A technical advisory group managed by DWR established the C&G Method for estimating transferrable consumptive use for pilot projects including the potential evapotranspiration (PET) equation and other assumptions that were meant to be conservative and protective to other water users. DWR cannot approve an ATM project plan if it does not follow this C&G Method. The C&G Method requires the use of the Lease Fallow model tool and standard presentation of results, specifies a seasonal irrigation efficiency of 55 percent, and requires the modified Blaney Criddle (MBC) equation with TR-21 crop coefficients to calculate PET over a period of at least 30 years.

As prescribed by Section 37-60-115(8)(b), C.R.S.,[1] the approach was streamlined by specifying use of the Lease Fallow model tool, and prescribing conservative assumptions. For ditches near Rocky Ford (located at an elevation of 4,180 ft) the C&G Method estimates historical depletions that are about 12% lower than what is

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[1] 37-60-115(8)(b) The purpose of the pilot program is to:
(I) In fallowing irrigated agricultural land for leasing water for temporary municipal, agricultural, environmental, industrial, or recreational use, demonstrate cooperation among different types of water users, including cooperation among shareholders, ditch companies, water user associations, irrigation districts, water conservancy districts, water conservation districts, and municipalities;
(II) Evaluate the feasibility of delivering leased water to the temporary municipal, agricultural, environmental, industrial, or recreational users;
(III) Provide sufficient data from which the board, in consultation with the state engineer, can evaluate the efficacy of using a streamlined approach, such as an accounting and administrative tool, for determining:
(A) Historical consumptive use;
(B) Return flows;
(C) The potential for material injury to other water rights; and
(D) Conditions to prevent material injury; and
(IV) Demonstrate how to operate, administer, and account for the practice of fallowing irrigated agricultural land for leasing water for temporary municipal, agricultural, environmental, industrial, or recreational use without causing material injury to other vested water rights, decreed conditional water rights, or contract rights to water.

calculated using the ASCE Standardized ET Equation (ASCE Std.). This level of conservatism was thought to be appropriate for the C&G Method.

The HB13-1248 legislation was not specific to any part of Colorado. However, the MBC equation specified in the C&G Method increasingly underestimates PET at higher elevations and at drier/windier/sunnier locations. A comparison of ASCE Std. with MBC ET methods at weather stations in Colorado shows that the underestimation in PET with elevation is greater than 10 percent per 1,000 meters at more southerly latitudes and in high mountain valleys.

At the January Board meeting, the Board stated that it was receptive to modifying the existing HB13-1248 C&G Method. The request made to the Board was to add an alternative streamlined method (Second Streamlined Method) for the historical consumptive use analysis in addition to the current C&G Method, so that pilot projects at higher elevations may obtain fair historical consumptive use quantifications using a streamlined method pursuant to the intentions of HB13-1248.

A Second Streamlined Method could potentially further the stated legislative goals of the pilot program, which include providing sufficient data for the CWCB board to evaluate the efficacy of using a streamlined approach for determining historical consumptive use.

DWR convened a Technical Committee in June of 2018 with the goal of selecting an acceptable Second Streamlined Method that is conservative so as to prevent material injury and attractive for pilot project Applicants across Colorado. At that meeting, the Technical Committee discussed DWR's recommendation to use the ASCE Std method for every river basin except for Division 3. ASCE Std. estimates PET based on temperature, humidity, solar, and wind data. Due to the range of data considered, the PET does not need an additional adjustment for elevation. CoAgMET and Northern Colorado Water Conservancy District weather stations have been collecting the required data since the 1990s for some stations with some installations occurring more recently. The lack of very long-term weather data has limited PET calculations using the ASCE Std. to only the most recent 25 years or less. However, full climate and crop evapotranspiration datasets extending back to 1950 or longer were recently simulated by DWR for all basins in Colorado (except Division 3) using data correction (QC) and simulation/calibration methods documented in ASCE-EWRI (2005), Kansas vs. Colorado litigation, and Allen and Robinson (2011), as described in Thompson (2016, 2018). These weather datasets are available for use in the Lease Fallow Tool, enabling calculations using the ASCE Std. over a longer period.

In Division 3, where weather data simulations for ASCE Std. are not completed, DWR recommends use of the Rio Grande DSS model results for the Second Streamlined Method. In Division 3, the potential elevation range for irrigation is more narrow than other divisions, ranging only from about 7,500 to 9,000 feet. Therefore, the Rio Grande DSS method generally works well at all reasonable irrigation locations in Division 3 without any additional elevation adjustment.

Some members of the Technical Committee were interested in additional peer review of the methods to QC climate data, simulate/calibrate missing data, and estimate crop evapotranspiration. Part of the concern was related to the large amount of data that would need to be reviewed by any party wanting to review a pilot project application. This review and data verification is currently planned for the Arkansas River Basin as part of the

ongoing DSS project. This grant application is to fund a similar review and verification of the QC, simulation/calibration, and crop evapotranspiration methods and data for Colorado, outside of the Arkansas and Rio Grande Basins. The reviewed and verified datasets can then be incorporated in the Lease-Fallow Tool and used with confidence by applicants for the HB13-1248 pilot projects and accepted by other water users.

Please provide a summary of the proposed program/project, including a statement of what the program/project is intended to accomplish, the need for the program/project, the problems and opportunities to be addressed, the expectations of the applicant(s), and why the program/project is important to the applicant(s). The summary must include a description of the technical, institutional (i.e., how the program/project will be organized and operated), and legal elements that will and/or have been addressed by the applicant and proposed program/project. The summary should also discuss relevant project history, if applicable, and any other relevant issues.

Previous Studies

To the maximum extent possible, the results of any previous studies and investigation should be utilized and incorporated into the proposed program/project. The application for funding should include a brief summary of the results of previous studies and how they will be utilized.

Alternative Agricultural Water Transfer Methods – Grant Application Form

Project: HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data verification to support applications across Colorado

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2. Study Area/Service Area Description

The study area/service area is generally the geographic area that is the subject of the proposed program/project (include both the source of supply and location and type of new use). The description should include the following items:

The study area is statewide with the exception of the Arkansas and Rio Grande basins. HB13-1248 is a statewide program and this data project supports potential applicants and other water users under that ATM pilot program.

a) A narrative description of the study area/service area including: the county, the location of towns or cities, topography, and locations of major surface and ground water features.
b) An area map showing each of the items above, as well as the locations of existing facilities, proposed project facilities and boundaries of lands involved in the proposed program/project.
c) Information regarding the irrigated lands that are involved in the program/project. This must include a tabulation of total irrigated acreage, description of cropping types, crop yields, and total average annual water diversions for existing agricultural lands.
d) Information regarding the location of the new water use(s) that will be served by transferred water including the estimated number of users/taps and/or uses served.
e) Socioeconomic characteristics of the area such as population, employment and land use.

3. Description of the Alternative Water Transfer Method

HB-1248 targets lease-fallow pilot projects, which must follow the criteria and guidelines in terms of HCU quantification and return flow.

Please describe the type(s) of water transfers that will be examined/utilized (i.e., conceived transfer methods include, but are not limited to: 1) interruptible water supply agreements; 2) long-term agricultural land fallowing; 3) water banks; 4) reduced consumptive use through efficiency or cropping changes while maintaining historic return flows; and 5) purchase by end users with leaseback under defined conditions). In addition, please describe how the transferable consumptive use will be calculated and quantified, and how return flow patterns will be addressed/maintained.

4. Program/Project Eligibility

Please describe how the proposed program/project meets each of the following eligibility requirements (please see Criteria and Guidelines for additional information regarding the alternative water transfer methods/strategies that qualify for funding). Note: If these requirements are addressed in other parts of the application you may simply reference the applicable section(s).

a) A description of how, if implemented, the proposed program/project will protect property and water rights.

Protection of property and water rights is pursuant to the Criteria & Guidelines.

b) Identified group(s) of agricultural users that are or may be willing to transfer a portion of their water and identified entity(s), group(s) or area(s) where the transferred water could or would be put to the new use and a description of the new use.

Pursuant to HB13-1248, participating farmers must be willing to enter into a lease-fallow agreement and the likely users would be municipal.

c) The program/project must at a minimum conceptually describe the technical, institutional, and legal elements of the water transfer. Grant monies may be used to address one or more of these elements. If grant monies are not requested for all three elements, the grant applicant must describe how the applicant has or intends to address the elements, which are not included in the grant request, through other efforts.

The HB13-1248 pilot projects are intended to investigate all three elements of water transfers. This data project will improve the technical platform for the transferable water calculation and make the program available to more of Colorado's farmers.

d) If grant monies are proposed for use for legal assistance then the use of those funds shall be oriented toward advancing the knowledge of alternative agricultural water transfer methods and techniques; not for preparation of a specific water court case. The total requested funds for legal assistance shall not exceed 40 percent of the total grant request. In addition, grant monies proposed for use for legal assistance must be used to collaboratively address issues and concerns related to agricultural water transfer. Funds shall not be used to solely advance the cause of the project proponents.

This request is not legal in nature.

e) A minimum of a 10 percent cash match of total project cost (past expenditures and "in kind" can not be counted toward the 10 percent match).

The match for this project is 37.5% of direct costs and 33% of total costs. The part of this project conducted for the Arkansas River Basin is funded through the Arkansas River DSS (ArkDSS) Task 3.2 and 3.3. Task 3 of the ArkDSS is to develop consumptive use analysis and modeling for the Arkansas River Basin. Subtask 3.2 specifically is to review climate data for the Arkansas River Basin which includes the development of the "back-casted" climate station data and the methodology to calculate estimates of alfalfa reference evapotranspiration using the ASCE Standardized equation. The review will ensure that the methodologies outlined by ASCE have been implemented correctly for the Arkansas River basin and to quality control the data that is generated. Subtask 3.3 is to develop crop coefficients and characteristics that are applied to alfalfa reference evapotranspiration to estimate crop evapotranspiration. Crop coefficients and characteristics developed for use with the ASCE Standardized alfalfa reference evapotranspiration should be transferable throughout the state regardless of elevation or location.

5. Program/Project Evaluation Criteria

The following grant evaluation criteria will be used by the CWCB to evaluate and make

recommendations to fund, partially fund or not fund a grant application. The criteria are aimed at advancing alternative transfer methods from the literature and studies to actual on the ground projects/programs that provide reliable water supply and sustain key elements of the agricultural area from which the water is transferred. The applicant should fully address and explain in detail in the application how, and the extent to which, the proposed project/program meets each of the criteria. However, it should be noted that the project does not have to meet all of the criteria to be eligible to receive funding and the criteria below are not listed in any order of important or priority.

a. The proposed project/program builds upon the work of former alternative water transfer methods efforts and addresses key areas that have been identified. For more detailed information on this work, please refer to the draft report: *Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update*, November 2012.

The project improves on an issue identified with the existing HB13-1248 pilot project process where the amount of transferable water is underestimated at elevations higher than the lower Arkansas River. This suggested change in the C&G may result in participation by more irrigators than are currently willing to participate.

b. The proposed project addresses one or more key recommendation(s) in the report: *Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update*, November 2012.

This project addresses several of the recommendations including:

- Recognizing that each municipal water system and each ditch company are unique, the CWCB should continue to promote and facilitate agreements between irrigators and municipal water providers.
- Continue to support demonstration/pilot projects to determine the feasibility of new concepts or techniques as needed.
- Complete the study by the Upper Arkansas Water Conservancy District (UAWCD) to develop a set of tools (Administration Tool) to simplify the engineering and reduce the costs related to a rotational fallowing ATM. If and when completed, support the promulgation of rules to determine how the Administration Tool can be applied in administrative approvals and/or water court cases.

c. Preference will be given to projects that provide additional matching resources in the form of cash, past expenditures and in-kind contributions that are in addition to the required 10% cash match.

The match for this project is 37.5% of direct costs and 33% of total costs. The part of this project conducted for the Arkansas River Basin is funded through the Arkansas River DSS (ArkDSS) Task 3.2 and Task 3.3.

d. The proposed project/program has the ability/potential to produce a reliable water supply that can be administered by the State of Colorado, Division of Water Resources.

Alternative Agricultural Water Transfer Methods – Grant Application Form

Project: HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data verification to support applications across Colorado

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HB13-1248 pilot projects are administered by DWR.

e. The proposed project/program produces information that is transferable and transparent to other users and other areas of the state (i.e., would provide an example "template" or roadmap to others wishing to explore alternate transfer methods).

This process is transparent and statewide. At completion of the project, DWR shall provide the CWCB a final report that summarizes the project and findings of the consultants review and verification; and documents the reviewed and finalized methods to QC climate data, simulate/calibrate missing data, and estimate crop evapotranspiration. The finalized dataset will be included in the Lease-Fallow Tool for direct use in pilot project applications and made available through DWR's website.

f. The proposed project/program addresses key water needs identified in SWSI 2010 or as identified in a basin's needs assessment.

This project could further the goals of additional municipal water supplies originating from projects that keep some of the land in agriculture.

g. The proposed project/program advances the preservation of high value agricultural lands. Value can be viewed as: the value of crops produced, the value the agriculture provides to the local community, and the value the agricultural area provides for open space and wildlife habitat.

The HB13-1248 pilot projects have a requirement to keep some of the farm in production, thus maintaining preservation of high value agricultural lands.

h. The proposed project/program addresses water quality, or provides other environmental benefits to rivers, streams and wetlands.

By keeping some of the land on farms in irrigated agriculture as part of HB13-1248 pilot projects, this project would have environmental benefits to rivers, streams, and wetlands.

i. The proposed project/program increases our understanding of and quantifies program/project costs. This could include: institutional, legal, technical costs, and third party impacts.

This project could indirectly provide an increased understanding of costs by facilitating the operation of more projects pursuant to HB13-1248.

j. The proposed project/program does not adversely affect access to other sources of water (not subject to/participating in the program) where owners of these water rights may wish to pursue traditional transfer of their rights to other users.

There is no adverse effect on access to other sources of water.

k. The proposed project/program provides a perpetual water supply for the new and/or alternate use and preserves agricultural production and/or helps sustain the area's economy from which the transfer is occurring.

There is a time limit on HB13-1248 pilot projects, but, the operation could potentially continue through another means.

l. The quantity of water produced by the proposed project/program. Preference will be given to programs that can address larger water supply needs.

The quantity of water can vary based on the actual HB13-1248 pilot project.

m. Applicants are encouraged to develop projects demonstrating participation and/or support from a diverse set of stakeholders and interests.

The HB13-1248 pilot projects and Technical Committee represent a diverse set of stakeholders and interests.

6. Statement of Work

Provide the proposed statement of work. On the following page there is an example format for the statement of work. You can use the example format or your own format, provided that comparable information is included. The statement of work should outline by task how the proposed program/project will be accomplished. It is important that the statement of work detail the specific steps, activities/procedures that will be followed to accomplish each individual task and the overall program/project and the specific products/deliverables that will be accomplished. The statement of work must include but not be limited to: task description, key personnel, budget, schedule and deliverables and the final report/project documentation upon completion of the water activity.

The statement of work will form the basis for the contract between the Applicant and the State of Colorado. In short, the Applicant is agreeing to undertake the work for the compensation outlined in the statement of work and budget, and in return, the State of Colorado is receiving the deliverables/products specified. Please note that costs incurred prior to execution of a contract or purchase order are not subject to reimbursement.

Please provide a detailed statement of work using the following template. Additional sections or modifications may be included as necessary. Please define all acronyms. If a grant is awarded an independent statement of work document will be required with correct page numbers.

Alternative Agricultural Water Transfer Methods – Grant Application Form

Project: HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data verification to support applications across Colorado

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Statement of Work

Water Activity Name: HB 13-1248 Lease Fallow Pilot Project Climate Data Verification To Support Applications across Colorado

Grant Recipient: Colorado Division of Water Resources (DWR)

Funding Source: Alternative Agricultural Water Transfer Methods Grant

INTRODUCTION AND BACKGROUND

As part of the implementation of the Lease Fallow Pilot Projects Program (HB-1248), DWR staff have developed a methodology to simulate/calibrate missing climate data for incoming solar radiation, vapor pressure, and wind speed for the 1950-2017 period at both CoAgMet[2]/NWCD[3] and primary NOAA[4] station locations throughout Colorado. DWR staff are completing a report that documents methods to ensure the quality of the base data, simulate/calibrate missing data, and estimate crop ET using mean crop coefficients and growing season parameters; and provides a comprehensive summary of the datasets that will be available by the start of this project.

By the end of 2018, the Arkansas River Decision Support Systems (ArkDSS) project is scheduled to complete an expert review of the methodology for calculating the simulated climate datasets and a quality assurance review of the simulated climate data in Division 2.

This grant request is for DWR to hire a consultant or consultants to review the data creation process and conduct an independent quality assurance review of the simulated climate datasets in Division 1,4,5,6, and 7.

OBJECTIVES

The primary objectives for this project are to:

- Improve and streamline the application process for the Lease Fallow Pilot Projects Program as directed under HB13-1248.
- Provide assurance to water users and engineers as to the technical integrity of the data being used as input for the Lease Fallow Pilot Projects.

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[2] CoAgMet: Colorado Agricultural Meteorological Network

[3] NCWCD: Northern WAter Conservancy District

[4] NOAA: National Oceanic and Atmospheric Administration

Alternative Agricultural Water Transfer Methods – Grant Application Form

Project: HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data verification to support applications across Colorado

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TASKS

Two major tasks will be performed under this project.

TASK 1 - Coordination and Kick-off Meeting

Task Description: Coordinate with DWR staff to 1) review the DWR ArkDSS and statewide ET reports and understand the methodology and data processing for creating the climate and ET datasets, and 2) obtain access to the final simulated climate and ET datasets in a format suitable for the consultant.

Method/Procedure: Meet with DWR staff to kick off project and familiarize work done under the ArkDSS contract and on the statewide dataset.

Deliverable: None

TASK 2 - Independent Data Review

Task Description: Perform an independent and comprehensive review of the dataset creation process and the final datasets for Divisions 1,4,5,6 and 7. These processes include correction of the base data, selection and assignment of climate stations, simulation/calibration of missing data, and estimation of crop ET. The details and approach for this review will be determined by the consultant/s in coordination with DWR. During this review, consultants will document potential issues in approach and and in the data and make recommendations for modifications. Consultant/s will work closely with DWR staff to identify issues and make any needed changes.

Method/Procedure: This is intended to be an independent review; therefore, the details and approach for this review will be determined by the consultant/s in coordination with DWR.

Deliverables:

1) Memorandum describing potential issues in approach or simulated data for each dataset. This memorandum will summarize the review process used by the consultant/s and include any recommendations for changes in the methodologies used to produce the climate and ET datasets.

Assumptions/Limitations

This project can not proceed until both the DWR statewide report and the expert review work on the methodology and quality review of Arkansas River (Division 2) data is complete. Currently, this work is scheduled to be completed by December 31, 2018. However, if this work is not completed on time the starting date for this project may need to be moved.

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REPORTING AND FINAL DELIVERABLE

Reporting: DWR 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, DWR shall provide the CWCB a final report that summarizes the project, and documents the climate data simulation process, and the findings of the verification and QC. The dataset will also be included in the Lease-Fallow Tool for direct use in pilot project applications and made available through DWR's website.

BUDGET

This grant request is for $50,000 with DWR providing an additional $10,000 in matching work and $30,000 in funding provided through ArkDSS, resulting in a total project budget of $90,000. An estimated budget is provided below,. A consultant or consultants will be hired to perform the actual work, and at that time a more detailed budget will be available.

Total Costs				
Tasks	Labor	Other Direct Costs	Matching Funds	Total Project Costs
1. Coordination and Kick-off Meeting	$15,000	$2,000		$17,000
2. Independent Data Review	$28,000	$5,000		$33,000
In-Kind Contributions	$10,000		$30,000	$40,000
Total Costs:	$53,000	$7,000	$30,000	$90,000

The matching direct costs will consist of the part of this project conducted for the Arkansas River Basin that is funded through the Arkansas River DSS. The matching in-kind contribution labor will be time committed by DWR staff.

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SCHEDULE

The start date for this project is January 1, 2019 and the end date is June 30, 2019. Significant lead time is needed for this project in order to incorporate State of Colorado purchasing timelines and requirements.

	2019					
Task	Jan	Feb	Mar	Apr	May	Jun
1. Coordination and Kick-off Meeting						
2. Independent Data Review						
Final Reports						

PAYMENT

Payment will be made based on actual expenditures and invoicing by DWR. 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 the public and help promote the development of alternative agricultural transfer methods.

The above statements are true to the best of my knowledge:

Signature of applicant: 

Print applicant's name: Tracy Kosloff

Project title: **HB 13-1248 Lease Fallow Pilot Project Climate and Evapotranspiration Data verification to support applications across Colorado**

Date: July 27, 2018