COLORADO
DEPARTMENT OF NATURAL RESOURCES

COLORADO WATER CONSERVATION BOARD

WATER SUPPLY RESERVE ACCOUNT
2006-2007 GRANT APPLICATION FORM

Name of Water Activity/Project | **River Basin Location**

$35,000.00	X	Basin Account	X	Yes
		Statewide Account		No

Amount of Funds Requested | Please Check Applicable Box | Approval Letter Signed By Roundtable Chair and Description of Results of Evaluation and Approval Process

*** For the Basin Account, the Application Deadline is 60 Days Prior to the Bimonthly CWCB meeting. The CWCB meetings are posted at www.cwcb.state.co.us and are generally the third week of the month.**

*** For the Statewide Account, the Application Deadline is 60 Days Prior to the March and September CWCB Board Meetings.**

*** In completing the application you may attach additional sheets if the form does not provide adequate space. If additional sheets are attached please be sure to reference the section number of the application that you are addressing (i.e., A.1. etc.).**

Instructions: This application form should be emailed, typed, or printed neatly. The Water Supply Reserve Account Criteria and Guidelines can be found at http://cwcb.state.co.us/IWMD/. **The criteria and guidelines should 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 Rick Brown of the Intrastate Water Management and Development (Colorado Water Conservation Board) for assistance, at (303) 866-3514 or email Rick at rick.brown@state.co.us.

Generally, the applicant is also the prospective owner and sponsor of the proposed water activity. If this is not the case, contact the Rick Brown before completing this application.

Water Supply Reserve Account – Grant Application Form

Form Revised October 2006

Part A. - Description of the Applicant (Project Sponsor or Owner);

1. Applicant Name(s): Hinsdale County and
Upper Gunnison River Water Conservancy District

Mailing address: Hinsdale County
P.O. Box 277
Lake City, CO 81235

Taxpayer ID#: 84-6000771 Email address: ralphlc@centurytel.net

Phone Numbers: Business: 970.255.6678
Home: 970.944.5666
Fax: 970.255.6678

2. Person to contact regarding this application if different from above:

Name: Ralph W. Grover

Position/Title Project Manager

3. Provide a brief description of your organization below: Refer to Part 2 of criteria and guidance for required Information. Attach additional sheet(s) as needed.

Hinsdale County was formed from portions of Conejos, Costilla and Lake Counties in 1874. Colorado became a state in 1876 and Hinsdale County was declared a political subdivision of the State of Colorado pursuant to the Colorado Constitution, article XIV, section 1 in 1877. Hinsdale County was named after George A. Hinsdale, a prominent citizen and former Lieutenant Governor of the Territory of Colorado.

Upper Gunnison River Water Conservancy District (UGRWCD) was established in 1959. The District is located in south-central Colorado in the headwaters of the Gunnison River Basin. The District boundaries encompass the portion of the Upper Gunnison Basin watershed that is tributary to Blue Mesa Reservoir, an area of approximately 3,450 square miles. The District includes nearly all of Gunnison County, and a portion of Hinsdale and Saguache Counties. The City of Gunnison, Towns of Crested Butte, Mount Crested Butte, and Lake City are located in the District. The full-time resident population of the District in 2000 was estimated to be 13,934 persons.

Part B. - Description of the Water Activity – Please Refer to Criteria and Guidance Document for Eligibly Criteria

1. Name of water activity/project:

Lake San Cristobal
Controlled Outlet Structure
Hinsdale County, Colorado

2. What is the purpose of this grant application? Check one.

	Environmental compliance and feasibility study
X	Technical assistance regarding permitting, feasibility studies, and environmental compliance
	Studies or analysis of structural, nonstructural, consumptive, nonconsumptive water needs, projects, or activities (Please specify)
	Structural and/or nonstructural water project or activity

3. Please provide an overview of water project or activity to be funded including – type of activity, statement of what the activity is intended to accomplish, the need for the activity, the problems and opportunities to be addressed, expectations of the participants, why the activity is important, the service area or geographic location, and any relevant issues etc. Please include any relevant Tabor issues. Please refer to Part 2 of criteria and guidance document for additional detail on information to include. Attach additional sheets as needed.

Hinsdale County and the Upper Gunnison River Water Conservancy District (UGRWCD) are examining the feasibility of constructing a new permanent control structure at the outlet of Lake San Cristobal. This control structure would serve to regulate the lake level, provide release of water from the lake, and prevent failure of the lake outlet structure during flood events.

The stored water resulting from this project will be used primarily for augmentation purposes within the Lake Fork of the Gunnison River. Other beneficial uses may include agriculture and recreation. Some discussions with CWCB staff have included allocating some of the releases to support instream flow water rights in the Lake Fork.

This is the second segment of an ongoing feasibility study and consists of two analyses that will be performed simultaneously. The first analysis is to estimate the firm yield of the 960 acre-feet of proposed storage and develop an engineering report to support the water right application in Case No. 03CW108. The second will analyze the current and future market for water impounded by the structure.

4. Please provide a brief narrative of any related or relevant previous studies. Attach additional sheets as needed.

See Attachment A

5. Please provide a copy of the proposed scope of work. Please refer to Part 2 of the criteria and guidance document for detailed requirements. Attach additional sheets as needed.

See Attachment B

6. List the names and addresses of any technical or legal consultants retained to represent the applicant or to conduct investigations for the water activity/project.

Name	Address/Phone Number
James E. Slattery Slattery Aqua Engineering, LLC	8357 Windhaven Drive Parker, CO 80134 970.851.1619
Randy L. Hendrix Helton & Williamsen, P.C.	Englewood, CO
Ralph W. Grover Keith & McKuhn, LLC	POB 3953, Grand Junction, CO 81502-3953 POB 113, Lake City CO 81235-0113 970.255.6678

7. Water Availability and Sustainability – this information is needed to assess the viability and effectiveness of the water project or activity. Please provide a description of each water supply source to be utilized for, or the water body to be affected by, the water activity. For water supply sources being utilized, describe its location, yield, extent of development, and water right status. For water bodies being affected, describe its location, extent of development, and the expected effect of the water activity on the water body, in either case, the analysis should take into consideration a reasonable range of hydrologic variation. Attach additional sheets as needed.

The project as originally proposed involved raising the lake level three feet above the CWCB natural lake level of 8,995 feet.

Beginning in the 1950's, Hinsdale County Road and Bridge Department crews constructed a rock and timber dam at the outlet of Lake San Cristobal that raised the water level in the lake above its natural level. The 2003 feasibility study established that the natural lake level is, in fact, approximately 8,990 feet and the dam raised the level to approximately 8,992.5 feet. Thus, storage has been historically occurring above the natural lake level, and the improved structure can impound the proposed 960 acre-feet without inundation of additional wetlands.

It was apparent that while the increase in lake level could be pursued, it would be cost prohibitive, primarily due to inundation of the wetlands. Consequently, the CWCB natural lake level water right was examined. It was determined that CWCB used inaccurate methods to determine a historical natural lake level when it obtained its water right. The inaccuracy of such methods provides the basis for modification of the CWCB natural lake level water right under Rule 9c (1) of the Rules Concerning the Colorado Instream Flow and Natural Lake Level Program.

8. If you have not specifically and fully addressed the Evaluation Criteria found in Part 3 of the criteria and guidance document please provide additional detail here. Attach additional sheet(s) if needed.

Not applicable

9. Additional Information – If you feel you would like to add any additional pertinent information please feel free to do so here. Attach additional sheets as needed.

None

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

Signature of Applicant: Ralph W Grover

Print Applicant's Name: Ralph W. Grover

Project Title: Lake San Cristobal Controlled Outlet Structure

Return this application to:

Mr. Rick Brown
Intrastate Water Management and Development Section
COLORADO WATER CONSERVATION BOARD
1580 Logan Street, Suite 600
Denver, CO 80203

To submit applications by Email, send to: rick.brown@state.co.us

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Reference Information

The following information is available via the internet. The reference information provides additional detail and background information regarding these criteria and guidelines and water policy issues affecting our state.

Colorado Water Conservation Board Policies

Loan and Grant policies and information are available at - http://cwcb.state.co.us/Finance/

Water Supply Reserve Account Criteria and Guidelines –

http://cwcb.state.co.us/IWMD/tools.htm#Water_Supply_Reserve_Account

Interbasin Compact Committee and Basin Roundtables

Interbasin Compact Committee By-laws and Charter –

http://dnr.state.co.us/Home/ColoradoWaterforthe21stCentury/Interbasin+Compact+Committee/IbccHomePage.htm

Basin Roundtable By-laws –

http://dnr.state.co.us/Home/ColoradoWaterforthe21stCentury/IbccHome.htm

Legislation

House Bill 05-1177 - Also known as the Water for the 21st Century Act –

http://cwcb.state.co.us/IWMD/statutes.htm

House Bill 06-1400 – Adopted the Interbasin Compact Committee Charter –

http://cwcb.state.co.us/IWMD/statutes.htm

Senate Bill 06-179 – Created the Water Supply Reserve Account –

http://cwcb.state.co.us/IWMD/statutes.htm

Statewide Water Supply Initiative

General Information - http://cwcb.state.co.us/IWMD/

Phase 1 Report - http://cwcb.state.co.us/IWMD/PhaseIReport.htm

Attachment A

Please provide a brief narrative of any related or relevant previous studies. Attach additional sheets as needed.

The project as proposed involves raising the lake level three feet above the CWCB natural lake level of 8,995 feet.

In a feasibility study conducted in 2003, three critical issues were successfully addressed for the proposed three-foot increase of lake level. These were (1) dam classification, (2) assessment of public support, price per acre-foot, and (3) environmental issues (see table). The dam classification and public support were considered fatal flaw issues. The table sets forth the decision variables as assessed at the project's conception.

The question of dam classification was resolved with the state engineer, and the outlet structure was classified as a Class III dam. As reported below, citizens gave qualified support for the project. The conceptual engineering provided a rough estimate of cost for the project as $2,000per acre-foot. The study identified environmental issues as a major concern with the inundation of wetlands at the upper end of the lake resulting from an increased lake level.

Lake San Cristobal Project

	Decision Variables	% Contribution
1	Environmental ?	10
2	Community ?	15
3	Design/Engineering	5
4	Dam Classification	20
5	Lake vs Reservoir	5
6	Price per AF	10
7	Supply & Demand	10
8	Water Rights CWCB	10
9	Partnerships	5
10	Financing	10
		Certainty → 100%

	Decision Variables	% Contribution
4	Dam Classification	20
2	Community	15
5	Lake vs Reservoir	5
6	Price per AF	10
		50%
	Funded / Unfunded	
7	Supply & Demand	10
8	Water Rights CWCB	10
		70%
	1, 3, 9, &10	30
		100%

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It was apparent that while the increase in lake level could be pursued, it would be cost prohibitive, primarily due to inundation of the wetlands. Consequently, the CWCB natural lake level water right was examined. It was determined that CWCB used inaccurate methods to determine a historical natural lake level when it obtained its water right. The inaccuracy of such methods provides the basis for modification of the CWCB natural lake level water right under Rule 9c (1) of the Rules Concerning the Colorado Instream Flow and Natural Lake Level Program.

Beginning in the 1950's, Hinsdale County Road and Bridge Department crews constructed a rock and timber dam at the outlet of Lake San Cristobal that raised the water level in the lake above its natural level. The 2003 feasibility study established that the natural lake level is, in fact, approximately 8,990 feet and the dam raised the level to approximately 8,992.5 feet. Thus, storage has been historically occurring above the natural lake level, and the improved structure can impound the proposed 960 acre-feet without inundation of additional wetlands.

After consultation with the UGRWCD legal counsel and Hinsdale County, it was determined that before modification of the CWCB natural lake level water right was sought, an assessment of the firm yield and marketability should be conducted. If the project appeared to be financially viable, then the sponsors will proceed with addressing modification of the CWCB water right.

Water Supply Reserve Account – Grant Application Form

Form Revised October 2006

Gunnison Basin Roundtable
Lake San Cristobal Project

Appendix B

KEITH & McKUHN, LLC

15 February 2007

Ms. Laurie Vierheller, County Administrator
P. O. Box 277
Lake City, CO 81235

Re: Lake San Cristobal, Firm Yield and Market Analysis

Dear Ms. Vierheller:

In response to your request to provide project management and other services for the County's continuing effort to assess the feasibility of constructing a control outlet for Lake San Cristobal, I am providing this proposal.

The proposed investigation will consist of two studies. The first is to determine the firm yield of the proposed 960 acre-feet of water storage and develop an engineering report to support the water right application in Case No. 03CW108. The second will analyze the current and future market for water impounded by the structure. I have contacted Mr. Jim Slattery, Slattery Aqua Engineering, regarding this work. Please see his attached proposal. Mr. Slattery has worked on a number of projects for the Upper Gunnison River Water Conservancy District (UGRWCD).

I will assist Mr. Slattery in securing data for Lake San Cristobal, identify and, and with him, contact potential water purchasers, and prepare reports and presentations. My project management services will include, but are not limited to:

- Review draft reports
- Present study results to Hinsdale County and the UGRWCD
- Participate in meetings with Mr. Slattery with Hinsdale County, the UGRWCD, and the CWCB
- Budget and invoice functions
- Liaison with the Gunnison Basin Roundtable (GBRT) Project Screening Committee, the GBRT and the CWCB regarding funding and other related matters
- Preparation of final report for the GBRT

The project will require approximately five months from CWCB funding approval. I will submit monthly invoices at the end of the month concurrently with Mr. Slattery's. My rate is $110per hour. Personal vehicle mileage for travel will be billed at 48.5¢ per mile or current IRS rate. All other expenses will be at actual cost. Total compensation to complete the project shall not exceed $10,000.

Sincerely,

Ralph W Grover

Ralph W. Grover
Managing Director

P.O. Box 113 · Lake City, Colorado 81235-0113 USA · Telephone 970.944.5666 · email: rgrover@kmck.net

Slattery Aqua Engineering LLC

8357 Windhaven Drive, Parker, CO 80134 Office: (720) 851-1619 Fax: (303) 840-2575 email: SlatteryAquaEngineering@comcast.net

February 12, 2007

Ralph Grover
P.O. Box 3953
Grand Junction, CO 81502-3953

Subject: Potential Lake San Cristobal Enlargement

This letter outlines a proposal to perform an engineering investigation of the re-configuration of the Lake San Cristobal outlet works which could result in approximately 1,000 ac-ft of storage. The investigation will consist of two phases that will be performed simultaneously. The first phase is to estimate the firm yield of the 1,000 ac-ft of storage space and develop a defensible engineering report that can be used to support the water right application in Case No. 03CW108. The second phase will be a marketable yield analysis. There is a cost savings for performing the two phases simultaneously because the field visits and meetings can be scheduled at the same time.

Firm Yield Analysis

For the purpose of this analysis, the firm yield is the amount of water that can be released every year including extremely dry years like those that occurred in 2002 and 2003. The following tasks will be performed to estimate the firm yield associated with the 1,000 ac-ft of potential new regulated storage in Lake San Cristobal.

1. Prepare location map showing major hydrologic features including stream gages, ditches, and the Colorado Water Conservation Board ("CWCB") instream flow reaches. Also prepare regional scale map for use in final report.
2. Identify stream gages to use in area-precipitation weighted method for estimating physical streamflow at Lake San Cristobal.
3. Travel to the Lake City area and meet with the local Water Commissioner and local officials to identify water right issues that could affect the yield of a new water right for Lake San Cristobal. During the same trip, meet with Ralph Grover, Project Manager for the Lake San Cristobal Project, John McClow, General Counsel for the Upper Gunnison River Water Conservancy District ("UGRWCD") and Frank Kugel, General Manager of the UGRWCD to discuss engineering analysis.
4. Estimate evaporation losses on the reservoir surface area.
5. Estimate any transit loss that might be charged on reservoir release between Lake San Cristobal and Blue Mesa Reservoir.

9. Incorporate comments on draft report and prepare final report.
10. Travel to Lake City to discuss final results of analysis with Hinsdale County representatives. Coordinate this meeting so that it will be on the same day as a UGRWCD Board meeting so that the results can be presented and discussed with the UGRWCD.
11. At the request of the Gunnison Basin Round Table, meet with the Round Table to discuss the results of the report.

Cost Estimate

The cost to perform the Firm Yield Analysis is estimated to be $15,000. The cost to do the Marketable Yield Analysis is estimate to be $10,000. The cost for both phases is $25,000. The cost estimate for the marketable yield analysis assumes that the meetings in the Gunnison area will be coordinated to occur at the same time as when I am in the Gunnison area for meetings on the firm yield analysis. This work will be performed under my direction. I plan to sub-contract with Randy Hendrix of Helton & Williamsen, P.C. to assist in this analysis.

I will submit monthly invoices at the end of the month describing the work performed. Jim Slattery's billing rate is $127/hour and Randy Hendrix's billing rate is $103/hr. Personal vehicle mileage for travel will be billed at the Internal Revenue Service specified business rate (currently 48.5¢ per mile) and all other expenses at actual cost. Total compensation to complete the project shall not exceed $25,000.

Once I have received written notice to proceed, I estimate this project will take approximately 5 months to complete. If you have any questions, please let me know.

Slattery Aqua Engineering, LLC

James E. Slattery

James E. Slattery

Slattery Aqua Engineering LLC

8357 Windhaven Drive, Parker, CO 80134 Office: (720) 851-1619 Fax: (303) 840-2575 email: SlatteryAquaEngineering@comcast.net

James E. Slattery

EDUCATION:
Colorado State University - B. S. Civil Engineering, 1984
Colorado State University - M.S. in Civil Engineering - Ground Water Modeling, 1986

SOCIETIES: American Society of Civil Engineers

REGISTRATION: Registered Professional Engineer in Colorado

EXPERIENCE:

2007- **Slattery Aqua Engineering LLC, Parker, Colorado**
Represent a range of clients throughout Colorado in water resource matters including the Upper Gunnison River Water Conservancy District, the City of Westminster, the State of Colorado, the Rio Grande Water Users Association, and the Republican River Water Conservancy District. Provides expertise in analysis of water rights transfers, expert witness court testimony, development of surface water and groundwater models, and a variety of water resource problems.

1995-2006 **Helton & Williamsen, P.C., Englewood, Colorado**
Vice President – Responsible for projects involving water supply, water requirements, water rights, reservoir operation, and basin-wide planning. Experienced in the analysis of databases and in developing computer models to solve water resource problems.

Performed consumptive use studies to determine water use patterns for both surface and ground water supplies. Representative assignments include the development of a spreadsheet model of the Bear Creek basin, engineering analyses and expert testimony in the second phase of Kansas v. Colorado in the U.S. Supreme Court, development of a daily basin planning model for the Clear Creek basin, and development of a monthly spreadsheet model of the Upper Gunnison basin. Testified as an expert witness in Case No. 2004CW24 concerning rules and regulations for new wells in the confined aquifer in the San Luis Valley.

Performed a needs and storage assessment for the Upper Gunnison River Water Conservancy District. Modified and enhanced the HI model of the lower Arkansas River Basin as part of the Kansas v. Colorado U.S. Supreme Court case on the Arkansas River. Appointed to the 3 member team to represent Colorado in the Kansas v. Nebraska v. Colorado U.S. Supreme Court Case concerning litigation in the Republican River basin. Involved in numerous Colorado water court cases concerning the change and transfer of use water from agricultural to municipal purposes.

Developed or reviewed various MODFLOW groundwater models in Colorado including a groundwater model for the sandstone and granite aquifers in the vicinity of Woodland Park. Member of the peer review committee for the MODFLOW model developed by the Colorado Department of Water Resources for the San Luis Valley. Testified as an expert witness in Case No. 2004CW24 regarding the inflow and outflow components for the MODFLOW groundwater model of the San Luis Valley.

Developed augmentation plans to cover various water uses throughout the state of Colorado including the augmentation plan for the Lower Arkansas Water Management Association to augment well depletions from approximately 700 wells in Case No. 02CW181.

1986-1995 **Boyle Engineering Corporation, Lakewood, CO.**

(1992-1995) Project Manager. Managed a wide range of water resource and computer modeling projects, including the development of PACSM a comprehensive computer model representing the operation of Denver's extensive water supply system. This model simultaneously represents the operation of Denver's facilities in both the South Platte and the Colorado River basins using a daily time step and a 45-year study period. Another model was developed to evaluate the monthly operation of the water supply system for the City of San Diego during a 103-year planning period. Served as technical reviewer for numerous other computer modeling projects and water resource studies including ground water models in North Carolina, Florida, Colorado, and California. Conducted a gain-loss study for the Greeley-Loveland Canal System in northern Colorado. Analyzed and reviewed numerous ground water pumping tests throughout the United States for unconfined, confined, and leaky-confined aquifers.

(1986-91) Water Resources Engineer. Responsible or assisted in the development of water supply, water rights, surface water, and ground water studies, and for surface water and ground water modeling projects. Specific tasks included numerous applications of the USGS three-dimensional MODFLOW model to ground water basins throughout the United States. Also, applied a three-dimensional finite element model to evaluate surface water-ground water conditions and interactions in the Central Valley of California. Served as an expert for the State of Colorado in Kansas v. Colorado in the U.S. Supreme Court. Responsible in this case for developing the ground water pumping estimates used to assess the impacts of ground water pumping on historical streamflows and testified at trial concerning these estimates.

PUBLICATIONS

1) Slattery, James E., Master Thesis, Finite Strip Method in Groundwater Hydrology, Colorado State University, 1986.

2) Hahn, W., Slattery J. and Little, O. "Evaluation of Ground Water for Municipal Supplies Using a PC-Based Spreadsheet Analysis", published in the proceedings of the 1990 Groundwater Engineering and Management Conference.

Randy L. Hendrix

EDUCATION:

Colorado State University - B. S. Environmental Engineering, 1996

SOCIETIES:

American Water Resource Association, Member
Tau Beta Pi, Member

REGISTRATION:

Registered Professional Engineer in Colorado

EXPERIENCE:

1996 - Present **Helton & Williamsen, P.C., Englewood, Colorado**
Water Resources Engineer. Specializes in database programming to develop user friendly databases to store and retrieve information on water rights, well permits, and historical water use. Developed graphical user interfaces that are user friendly to display requested information or transfer selected information from user input to a computer model. Implemented and maintains a Geographical Information System program to be used in conjunction with water supply analyses. Typical projects involve water rights, water supply, hydrology, compiling data into computer spreadsheets, executing computer models, generate geospatial data, measuring well discharge, measuring power consumption, estimating power coefficients, preparing well permit applications, and database programming. Water supply analyses include stream depletion calculations using the Glover method, MODFLOW, other computer models, and the SB5 computer model to determine the amount of water available within certain aquifers to project the amount of water available for use; the amount of water consumed in irrigation practices via the modified Blaney-Criddle, Hargreaves, and Penman - Monteith formulas and consumed by households; and the amount of return flow to the drainage basin or river. Analyses of water right projects encompass the compilation of data on current and past water right amounts and evaluating the amount of water diverted for these rights to develop a historic water use in the implementation of water augmentation plans. Develop augmentation plans to replace out of priority pumping by wells. Administration of implemented substitute water supply and augmentation plans. Hydrologic analyses include acquiring stream flow data and climate data used in developing and executing current models on surface flow on drainage basins, lake or reservoir evaporation, and water balances. Measuring well discharge entails the use of different techniques, such as current meters, flow meters, and weirs.

COLORADO WATER CONSERVATION BOARD

Conserve, Develop, Protect an
Manage Colorado's Water for Present ar
Generations

CWCB Lake Cases

Physical Information Summary:

Case Number: **4-W-3366-77**

Lake Name: **San Cristobal Lake** CDOW #: **92130**

Water Division: **4**		Water District: **62**	
Watershed:	**Upper Gunnison**		
Location:	**S22 T43N R4W NMPM**		
Surface Acres:	**346**	Lake Capacity:	**13545**
Elevation (ft):	**8995**	Appropriation Date:	**5/12/1976**
County:	**Hinsdale**	USGS Map Name:	**Lake San Cristobal**

Additional Information: