WaterSMART: Water and Energy Efficiency Grants FY 2018

Burns Bench Irrigation Company

Burns Bench Diversion and Piping Project

Applicant

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Executive Summary

Date: May 10, 2018
Applicant Name: Burns Bench Irrigation Company
City: Jensen **County:** Uintah **State:** Utah
Contact: Christian Thomsen, P.E., CIVCO Engineering, Inc. christhomsen@civcoengineering.com

Burns Bench Irrigation Company is requesting funding under Funding Group I. The proposed project will pipe an irrigation pond, Install SCADA and improve existing diversion structure. The project will be designed and constructed over a two year period which includes; completing environmental compliance, survey, and design for the entire project; installing over 300 ft of pipe; installation of SCADA on diversion structure and improving existing diversion structure. The project will be completed by March 2020. Once completed, the project will realize the conservation of **3,599.6 acre-feet of water a year** and better management of all the water diverted by Burns Bench Irrigation Company. The proposed project is not located on a Federal facility.

Background Data

The Project is located approximately 5 miles Northwest of Jensen, Utah on the Brush Creek just off Brush Creek Rd. It is just over 4,800 feet in elevation. Please see Figure 1 for the Location Map.

Canal construction and home settlement started in the 1880's. The Red Fleet Reservoir was built in the early 1980's. The water from Red Fleet was used to supplement water rights to the Burns Bench Irrigation Company, Burton Ditch Irrigation Company and the Murray Ditch Pipeline Inc. (Companies). In 2000 the Companies got together and built a pipeline with Bureau of Reclamation funding. The Companies have agreed with the Bureau of Reclamation to flow 1,800 ac-ft of water through the pipeline and into Stewart Lake to be used for fish, wildlife and recreation. Combined the Companies have the right to divert 54.146 CFS of water and can irrigate 3235.32 acres. Water is diverted from April 1 to November 1.

The Companies have two parts to their water share. Primary shares are from their original water right with an 1890 priority. J share come from the supplement water received after Red Fleet Reservoir was built. The project water made it so all land owners could divert 3.8 ac-ft of water per acre.

Burns Bench Irrigation Company current system does not adequately remove sediment from the water before it enters the pressurized irrigation system. The sediment settles in the pipes and wheel lines, leading to high maintenance costs and an increase of water usage to flush the wheel lines.

The company has a diversion structure, inlet structure, settling basin 7 miles of pipeline and 500 ft of open ditch. The existing inlet structure plugs during high flows thus not allowing the company to divert the full flow needed. Also, the inlet structure was originally designed to divert Burns Bench Flow. Bureau

of Reclamation, Murray Ditch and Burton Ditch flows were added after the structure was completed. The existing structure cannot meet peak flow demands.

Burns Bench worked with the Bureau of Reclamation in 2001 to pipe their canals. Burns Bench's pipeline has cut conveyance losses to about 3%, which drastically increased the amount of water to irrigate crops. Shareholders are gradually adding more and more sprinklers to the system. Soon all acreage that is served will be converted from flood irrigation to sprinkler systems. Approximately 90% of the current acres are under sprinklers.

Below is a table of Water Rights owned by the Bureau of Reclamation and the Companies and important info associated with each water right:

	Right #	Flow	Volume	Acres	Date
Bureau of Reclamation	45-5691		1800		1996
Burns Bench Irrigation Company	45-54	31.120		1998.02	1890
Burton Ditch Irrigation Company	45-46	13.690		746.50	1890
Murray Ditch Pipeline Inc.	45-43	1.218		35.00	1890
Murray Ditch Pipeline Inc.	45-41	2.167		127.90	1890
Murray Ditch Pipeline Inc.	45-42	3.326		134.00	1890
Murray Ditch Pipeline Inc.	45-44	0.047		1.50	1890
Murray Ditch Pipeline Inc.	45-45	1.167		144.50	1890
Murray Ditch Pipeline Inc.	45-4761	1.411		47.90	1890

The soil in the area is well draining and is mostly gravely shale. The primary use of the water coming from the canal is for irrigation water to raise alfalfa, small grains, meadow hay and irrigate pastures. The Companies have worked with the Bureau of Reclamation successfully to pipe their main canals.

Technical Project Description

This project will include the design, construction and environmental compliance of a new pipeline, SCADA, diversion structure and inlet structure. Please see Figure 2 for the Project Map.

Pipeline- The proposed pipeline will place over 300 linear feet in pipe to replace an existing irrigation pond. The pipeline will be 54 inch DR 32.5 solid HDPE pipe. The pipe will be used to deliver open canal flow to the existing pipelines inlet structure. The proposed pipe will reduce the Companies maintenance costs and reduce water losses.

Diversion Structure- Very little sediment is removed from the water before it enters the pressurized irrigation system. The sediment in the water settles in the pipes and wheel line. Removing the sediment before it enters the system will reduce maintenance costs and prevent the proposed pipe from filling with sediment and increase water savings by reducing the amount of water needed to flush wheel lines. The sediment in the water also creates premature wear to sprinklers and plugs pivots and wheel lines.

The current structure does not allow sediment to bypass the system. The proposed diversion structure will allow sediment to settle upstream of the structure. Radial gate will be opened during high sediment loads to empty out the sediment.

The existing screen is in the middle of the creek. During high flows debris builds around the screen and prevent water from entering the system. The proposed structure will have the screen placed so that it can be maintained during high flows.

The existing structure was built for Burns Bench. When the Burns Bench decided to pipe most of the canal, Burton Ditch and Murray Ditch requested to divert their water at the Burns Bench Diversion. The existing structure was never upgraded to handle the additional capacity. During times of peak flow, the existing diversion cannot divert peak flow.

SCADA: The diversion will have automation that will open the gates to allow sediment heavy storm water to bypass the system during large storms. SCADA (Supervisory Control and Data Acquisition) system on the diversion structure will collect hourly and daily averages that will allow the River Commissioners the ability to make changes in their diversion amounts. There will be a level sensor placed on the structure to record amount of overflow. The SCADA will help eliminate the need of the pond by providing flow to the system as needed.

Inlet Structure- A screen and concrete inlet structure will be designed at the head of the pipeline**.** The screen will be designed to remove debris larger than one inch.

Below is a project timeline showing project milestones and activities to be accomplished as a result of this project:

Milestone/Task	May 1, 2018	June 1, 2018	July 1, 2018	August 1, 2018	September 1, 2018	October 1, 2018	November 1, 2018	December 1, 2018	January 1, 2019	February 1, 2019	March 1, 2019	April 1, 2019	May 1, 2019	June 1, 2019	July 1, 2019	August 1, 2019	September 1, 2019	October 1, 2019	November 1, 2019	December 1, 2019	January 1, 2020	February 1, 2020	March 1, 2020
Application to WaterSMART	X																						
Shareholder Vote on Resolution		X																					
Funding Application to Water Resources		X																					
Water Resource Committal of Funds					X																		
Response from WaterSMART					X																		
Sign WaterSMART Grant								X															
Project Design								X	X	X	X	X	X	X	X	X	X	X					
Environmental and Cultural Compliance								X	X	X	X	X	X	X	X	X	X	X					
Review and Define Easements									X	X	X	X	X	X	X	X	X	X					
Bid Project																			X				
Project Construction																				X	X	X	
Quantify Project Benefits																							X

Evaluation Criteria

E.1.1. Evaluation Criterion A: Quantifiable Water Savings

The proposed project with conserve water through Seepage and Evaporation loss eliminated by piping, reduce water used to flush sediment and conserve water by diversion improvements.

Seepage and Evaporation

The proposed project pipes an existing irrigation pond. The proposed SCADA and diversion improvements with eliminate the need for the pond. Water will be conserved by eliminating seepage and evaporation losses.

To calculate losses due to seepage eight 12 in X 21 in holes were dug in the pond and water was poured into the holes to calculate the seepage into the ground. Three (3) seepage tests were performed on each hole. Figure 3 shows the location of the holes. Hole 4 was thrown out because it did not fit close to the other test preformed. The average seepage rate was multiplied by the days and area of the pond to determine the yearly losses. At first the number seemed high. After talking to the companies, the pond never had a liner and was placed in very porosity soils. Every year when they remove water from the system the pond dries very fast. The calculated seepage loss is 3,175-acre feet per irrigation season.

Attached are the average evaporation maps from Utah State University. To calculate seasonal evaporation losses the seasonal evaporation rate was multiplied by the pond area. The calculated seasonal evaporation loss is 33.7 Acre feet per irrigation season.

Flushing Water Conserved

Additional water savings for this project will come by removing the sediment. The existing flushing structure does a good job of removing sediment but a lot of sediment still gets through. Farmers in the spring need to flush their pipes and wheel lines every day and, in the summer, need to flush it every three days averaging flushing every 2 days. It is estimated that there are over 125-wheel line and it takes 600 cubic feet of water for each flush. Once the system is completed it is estimated that they will only need to flush once a week. By reducing the amount of flushing it is estimate that the project will conserve 112.5-acre feet of water.

During large storm events, the existing sediment structure fills full of sediment. Using SCADA and level sensors, the diversion will open to allow large storms to bypass the system. To estimate water used to flush sediment after large storm events, we used the attached NOAA charts to determine number of large storms and then talked to operators to determine amount of water used to flush. The calculated water savings from not flushing sediment basin after storms is 28.33-acre feet a year.

The proposed diversion structure will have radial gates that can be opened. This will remove sediment by diverting the water away from the system. It is difficult to calculate water saving from continual flushing, so additional savings was not calculated.

Diversion Improvements

During high flows, debris around screen and water prevents the ditch rider to divert required water into the system. To calculate water loss, we spoke with water operators to estimate the number of days and amount of water they estimated is lost. It is estimated that 50-acre feet of water is lost due to structure plugging.

The existing structure cannot deliver peak flow to users. To calculate water not delivered during peak flow, we spoke with operators to determine how often and amount of water loss. It is estimated that 200-acre feet of water will be conserved a year.

To calculate diversion improvement, we planned to use diversion record and to look for patterns. The river commissioner's computer crashed and we were not able to recover data.

(1) **Canal Lining/Piping:** Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage.

(a) **How has the estimated average annual water savings that will result from the project been determined?** Ponding Method was used to calculate seepage losses. NOAA data was used to calculate evaporation losses. Diversion estimates where used to determine losses due to existing structure. Estimates where used to calculate losses due to sediment removal.

(b) **How sites have average annual canal seepage losses been determined?** Ponding Method was used to calculate seepage losses. NOAA data was used to calculate evaporation losses. Diversion estimates where used to determine losses due to existing structure. Estimates where used to calculate losses due to sediment removal.

(c) **What are the expected post-project seepage/leakage losses and how were these estimates determined?** Post project seepage/leakage is estimated as insignificant based upon previous leakage tests on solid wall HDPE pipe.

(d) **What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project?** NA. The proposed pipe replaces a pond not a canal.

(e) **How will actual canal loss seepage reductions be verified?** The performance of the proposed system will be calculated by the difference in losses from the pond to the pipeline. The Companies and their engineering firm will use the ponding method to verify the losses in the canal again this fall and next spring to verify the calculation done previously. Pressure test will be completed on the pipeline to verify that there are no losses from the pipeline installed. Once the structure has been updated, flows will be verified to ensure the new structure meets peak demands of the system. The company will verify that the new diversion design will prevent debris build up and overflow. After the project is completed the Companies will send out surveys to farms

to get estimates on how much water has been saved by reducing the need to flush the system. Reports will be prepared and sent to reclamation to verify water savings.

(f) Include a detailed description of the materials being used. The pipeline will be 54-inch solid wall HDPE DR 32.5. The diversion structure will be made of concrete with a radial gate and slide gate to control flow. The existing rotating screen on the diversion structure will be relocated for better maintenance and reliability.

E.1.2. Evaluation Criterion B—Water Supply Reliability

Please describe in detail where the conserved water will go and how the conserved water is expected to increase water sustainability.

(1) Does the project promote and encourage collaboration among parties in a way that helps increase the reliability of the water supply?

(a) Is there widespread support for the project?

Burns Bench met with the following people to determine best solution to resolve the issues and all are very supportive of the project:

Bureau of Reclamation Employees
Burns Bench, Burton Ditch and Murray Ditch Share Holders
Fish and Game Employee
Utah Water Resource Employees
NRCS Employees
Uintah Water Conservancy District Employees
Ditch Rider
River Commissioner
County Commissioners
Ute Tribe Employees
Local Soil Conservation District employees
Local appointees by the Governor of Utah

Attached are copies of letters from Uintah County Commissioners, Uintah Water Conservancy and NRCS.

(b) What is the significance of the collaboration/support?

Burns Bench feels that by discussing the issues with all the parties to help determine the best fix has brought groups together for the betterment of the community. The support through the design of this project will help it be successful.

(c) Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

The proposed project will enhance future NRCS on farm projects.

(2) Will the project make water available to address a specific water reliability concern? Please address:

(a) Explain and provide detail of the specific issue(s) in the area that is impacting water reliability, such as shortages due to drought, increased demand, or reduced deliveries. The existing structure was not built for all peak flows in the system. The structure was originally built just for Burns Bench. When Burton Ditch and Murray Ditch started diverting out of the structure the capacity of the structure was not increased. This project will be designed to provide peak flow to the users, helping water reliability. The existing screen is in the middle of the creek during high flow. The screen gets clogged and cannot be reached to be clean reducing the amount of flow that can be diverted. The proposed structure screen will be place in a location where it can be cleaned during high flows helping with water reliability and shortages.

(b) Describe where the conserved water will go/how it will be used. Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)? Will it be left in the river system? The Companies currently have a water right of 3.7 ac-ft of water per acre of land. The crops used by shareholders only require 3.3 ac-ft of water, so as the overall system becomes more efficient, additional instream flows will result from the project. Some water saved will be used to increase crop production

(c) Describe how the project will address the water reliability concern?

(d) Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?

(e) Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.

(f) Describe the roles of any partners in the process. Please attach any relevant supporting documents.

(g) Indicate the quantity of conserved water that will be used for the intended purpose.

(3) Will the project benefit Indian tribes?

Project is surrounded by Indian Land. The improved water quality will have the Indian water down stream and will help endangered species on Indian land and in Indian waters.

(4) Will the project benefit rural or economically disadvantaged communities?

Jensen town is a disadvantage community located near the project and is served by water from Burns Bench. Increase in crop production with help the farmers that live in town and surrounding areas. Construction of the proposed project with help the economy in the Jensen area.

(5) Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.

Water is diverted out of Brush Creek. Brush Creek provides critical spawning beds for the endangered Humpback Chub, Bonytail, Colorado Pikeminnow and Razorback Sucker. Providing more flow and better water quality will benefit 14 native species including the 4 endangered fish. This project will reduce salinity and selenium levels in the creek and reduce sediment during low flows.

(6) Will the project address water supply reliability in other ways not described above?
The proposed diversion structure will have radial gates that can open to remove sediment during by diverting the water away from the system. It is difficult to calculate water saving from continual flushing, so additional savings was not calculated

E.1.4. Evaluation Criterion D—Complementing On-Farm Irrigation Improvements

(1) Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.

(a) Provide a detailed description of the on-farm efficiency improvements.
Project would entice farmers that have not installed on farm systems to install them.

(b) Have the farmers requested technical or financial assistance from NRCS for the on-farm efficiency projects, or do they plan to in the future?
Over 90% of the land under the Burns Bench system has taken advantage of the EQUIP program and installed sprinklers. This project has helped others show interest in converting to sprinklers by increasing pressure and reducing sediment in the water.

(c) If available, provide documentation that the on-farm projects are eligible for NRCS assistance, that such assistance has or will be requested, and the number or percentage of farms that plan to participate in available NRCS programs.
Please see attached letter of recommendation from the local District Conservationist.

(d) Applicants should provide letters of intent from farmers/ ranchers in the affected project areas.
Please see attached letter of recommendation from the local District Conservationist.

(2) Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.

(a) Will the proposed WaterSMART project directly facilitate the on-farm improvement? If so, how? For example, installation of a pressurized pipe through WaterSMART can help support efficient on-farm irrigation practices, such as drip-irrigation.
Proposed project would provide better water quality for existing and future on farm systems by reducing sediment and debris in water. Project will also reduce pumping by extending the existing pipeline. Farmers are having problems with the sediment clogging the system and causing excessive wear on the system. Those that have not completed an on-farm system are hesitant because of the sediment problems.

(b) Will the proposed WaterSMART project complement the on-farm project by maximizing efficiency in the area? If so, how?

Project will encourage farmers to switch from flood irrigation to sprinklers.

(3) Describe the on-farm water conservation or water use efficiency benefits that would result from the on-farm component of this project.

(a) Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.

Potentially there are over 300 acres that will convert to sprinklers increasing the efficiency from 50% to 90%, conserving approximately 396-acre feet of water a year. Each acre uses about 3.3-acre feet a year. Calculations 300*3.3*.4=396-acre feet.

E.1.5. Evaluation Criterion E—Department of the Interior Priorities

(1) Creating a conservation stewardship legacy second only to Teddy Roosevelt

(a) Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment;

The proposed structures will use SCADA and designs that use the best management practices to manage water resources and the environment.

(b) Examine land use planning processes and land use designations that govern public use and access;

Burns Bench has used plans prepared by the BOR, NRCS and their engineer and will continue to use these resources in the design and construction of the proposed project.

(c) Revise and streamline the environmental and regulatory review process while maintaining environmental standards.

Burns Bench with utilize BOR employee, NRCS employees and their engineer to streamline and maintain standards in the environmental process.

(d) Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity;

Burns Bench with utilize BOR employee, NRCS employees and their engineer to resolve conflicts and expand capacity of DOI water storage, transportation and distribution systems.

(e) Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands;

Throughout the design and construction of this project Burns Bench has and will continue to foster and build relationships with Uintah Water Conservation District, NRCS, BOR, Ute Indian Tribe and other private entities.

(f) Identify and implement initiatives to expand access to DOI lands for hunting and fishing;

Proposed project will provide better water quality to Stewart Lake Waterfowl Management area reducing sediment from filling ponds and reducing access for hunting and fishing.

(g) Shift the balance towards providing greater public access to public lands over restrictions to access.

Proposed project will provide better water quality to Stewart Lake Waterfowl Management area reducing sediment from filling ponds and reducing access for hunting and fishing.

(2) Utilizing our natural resources

(a) Ensure American Energy is available to meet our security and economic needs;

Project will reduce pumping cost, thus ensuring American Energy is available to meet needs.

(b) Ensure access to mineral resources, especially the critical and rare earth minerals needed for scientific, technological, or military applications;

Project will increase crop production reduce grazing needs on private, Indian and federal land and reduce the impact to mineral land that has grazing.

(c) Refocus timber programs to embrace the entire 'healthy forests' lifecycle;

Project will increase crop production, reduce grazing need on private, Indian and federal land, and reduce impact to timber land that has grazing.

(d) Manage competition for grazing resources.

Project will increase crop production, reduce grazing need on private, Indian and federal land.

(3) Restoring trust with local communities

(a) Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;

Burns Bench has brought several entities together to find a solution and plans on continuing the dialogue through design construction and after the project is completed.

(b) Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.

Burns Bench met with the following people to determine best solution to resolve the issues and all are very supportive of the project:

Bureau of Reclamation Employees
Burns Bench, Burton Ditch and Murray Ditch Share Holders
Fish and Game Employee
Utah Water Resource Employees
NRCS Employees
Uintah Water Conservancy District Employees
Ditch Rider
River Commissioner
County Commissioners
Ute Tribe Employees
Local Soil Conservation District employees
Local appointees by the Governor of Utah

Burns Bench has opened a dialog with the agencies above and will continue to expand the lines of communication with them.

(4) Striking a regulatory balance

(a) Reduce the administrative and regulatory burden imposed on U.S. industry and the public;

SCADA will reduce the time and energy by the river commissioner to verify flow and diversion records. The diversion will help deliver flow to Stewart Lake reducing Fish and Game time to manage the refuge. SCADA equipment will help the manager of Red Fleet Reservoir better control outflow from the reservoir

(b) Ensure that Endangered Species Act decisions are based on strong science and thorough analysis.

The project will be completed using the best management practices to protect endangered species and the additional flow and water quality will help the endangered fish population downstream of the project and will enhance Stewart Lake. Stewart Lake is a gated wetland on the Green River near Jensen, Utah, managed by the Utah Division of Wildlife Resources, which plays a vital role in protecting Razorback Suckers and other native fish.

(5) Modernizing our infrastructure

(a) Support the White House Public/Private Partnership Initiative to modernize U.S. infrastructure;

The demand to increase efficiency, "do more with less" and prepare for a new wave of technology, with applications such SCADA is steadily increasing the pressure on automation and control system engineering. Modernizing and installing the SCADA control systems on the diversion will yield important improvements to help modernize the US infrastructure.

(b) Remove impediments to infrastructure development and facilitate private sector efforts to construct infrastructure projects serving American needs;

By increasing water supplied, improve water quality and sediment removal this project will help farmers produce more hay improving American needs.

(c) Prioritize DOI infrastructure needs to highlight:

a. **Construction of infrastructure;**

The construction of this project would install valuable infrastructure to help private, tribal and federal lands. Project would encourage the installation of on farm systems.

b. **Cyclical maintenance;**

By removing sediment out of the pipe, it will reduce the need to replace sprinkler heads, pipeline screens and wheel lines by reducing the wear from sediment in the water. Some farmers are replacing sprinkler heads every two years because of the sediment in the water.

c. **Deferred maintenance.**

If this project is not constructed the canal company will continue to remove the sediment from the pond and try to function how it has. In the past the pond has filled full of sediment after a couple of large storms. This project would eliminate the need to clean the pond. The improved structure and SCADA will eliminate the need for the pond.

Implementation and Results

E.1.6.1. Subcriterion F.1— Project Planning

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place?

(1) Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Drought Contingency Plan or other planning efforts done to determine the priority of this project in relation to other potential projects.

Project is located in the study area of the Colorado River Basin Water Supply and Demand Study and the Colorado River Basin Study . Attached is a copy of the Water Conservation Plan for Burns Bench Irrigation.

(2) Describe how the project conforms to and meets the goals of any applicable planning efforts and identify any aspect of the project that implements a feature of an existing water plan(s).

The proposed project is in line with the goals of the Burns Bench Water Conservation Plan on Page 3.

E.1.6.2. Subcriterion F.2— Performance Measures

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved). For more information calculating performance measure, see Appendix A: Benefit Quantification and Performance Measure Guidance.

The performance of the proposed system will be calculated by the difference in losses from the irrigation pond to the pipeline. The Companies and their engineering firm will use the ponding method to verify the losses in the canal again this fall and next spring to verify the calculation done previously. Pressure test will be completed on pipeline to verify that there are no losses from the pipeline installed. Once the structure has been updated, flows will be verified to ensure the new structure meets peak demands of the system. The company will verify that the new diversion design will prevent debris build up and overflow. After the project is completed the Companies will send out surveys to farms to get estimates on how much water has been saved by reducing the need to flush system. Reports will be prepared and sent to reclamation to verify water savings.

E.1.7. Evaluation Criterion G— Nexus to Reclamation Project Activities

(1) How is the proposed project connected to Reclamation project activities?

Upstream of this project is the Bureau of Reclamation Red Fleet Reservoir. All Reclamation water flows through the Companies system and into Stewart Lake for fish, wildlife and recreational uses. The proposed project also helps in the Bureau of Reclamations Colorado Salinity Reduction Project.

(a) Does the applicant receive Reclamation project water?

Yes. The Companies are allocated J shares, water from Red Fleet Reservoir, to bring the total shares to 3.7 ac-ft per acre of land.

(b) Is the project on Reclamation project lands or involving Reclamation facilities?

No.

(c) Is the project in the same basin as a Reclamation project or activity?

Project is located in the study area of the Colorado River Basin Water Supply and Demand Study and the Colorado River Basin Study . The project is located in the Colorado River Basin which has several Reclamation projects and activities.

(d) Will the proposed work contribute water to a basin where a Reclamation project is located?

The project will increase river flows and increase water quality in the Colorado River Basin and will contribute to several ongoing projects with Reclamation.

(2) Will the project benefit any tribe(s)?

The project is surrounded by the Ute Reservation and will help Reclamation meet trust responsibilities with the Ute Tribe.

Environmental and Cultural Resources Compliance

Below are questions and responses to the questions that focus on the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements of the WaterSMART Grant.

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)?

Similar projects in the past have had minimal impacts. Disturbance of soils should be kept to a minimum, during the construction of the pipeline and other structures. The Project will reduce salinity in the Colorado River thus improving water quality. There are potential impacts to animal habitat within the project area, but the impact should be very minimal, if any. The Companies will take steps necessary to reduce or minimize the impacts.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

There is potential impact to wildlife, but impact should very minimal. The Companies will take steps necessary to reduce or minimize the impact to wildlife.

Potential impacts to USFWS-designated wildlife species, including the Greater Sage-Grouse(GRSG) (Centrocercus urophasianus) and the four federally endangered fish species of the Upper Colorado River System: Bony Tail [Gila elegans], Colorado Pikeminnow [Ptychocheilus lucius], Humpback Chub [Gila cypha], and Razorback Sucker [Xyrauchen texanus], and their respective habitats within and downstream of the Project Area; and potential impacts to USFWS non-designated wildlife species, including Pronghorn Antelope (Antilocapra americana) and obligate species associated with White-tailed Prairie Dog (WTPD)(Cynomys leucurus) colonies, and their habitats within the Project Area.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under Clean Water Act (CWA) jurisdiction as "Waters of the United States"?

The Companies are not aware of any issues concerning wetland or other surface waters that fall under CWA in the project area.

When was the water delivery system constructed?

The water delivery system was started in the early 1890's.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., head gates, canals, or flumes)?

The proposed project will be placed within the current ditch and canal alignments and will impact existing structures. Structures impacted are not older than 50 years.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?

No buildings, structures, or irrigation features listed on the national register of historic places are impacted by this project.

Are there any known archeological sites in the proposed project area?

There are not any known archeological sites in the proposed project area.

Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?

There will be no adverse effect on low income or minority populations.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

The project will have no impact to tribal land or sacred sites.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

The project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species. Project plans include removal of several Russian Olive trees.

Letters of Project Support

Attached are letters of support from Uintah County Commissioners, NRCS and from Uintah Water Conservation District.

Required Permits or Approvals

The entire project falls on private property in the existing canal right-of-way. The environmental study has not yet been completed but will be completed shortly after funding is obtained. Burns Bench will need to acquire a Stream Alteration from the State of Utah. The stream alteration permit will cover the 404-permit required by the Army Corps of Engineers

Official Resolution

The Official Resolution is included in the appendix.

Project Budget

Funding Plan and Letters of Commitment

The Companies have obtained a commitment of $504,900 no interest loan from Utah Water Resources Revolving Fund and Uintah Water Conservancy District has committed $65,000.00 Grant. Burns Bench secured the loan hoping to do the project with the loan money from Water Resources. The Burns Bench Shareholders were not comfortable doing the project at 100% loan and agreed that grant funding needed to be secured to make the project feasible. If Burns Bench is awarded WaterSMART funding they will reduce the loan amount from Water Resources. Burns Bench has completed all requirements to receive funds from Water Resources and Uintah Water Conservancy District. Funds are available now. Attached is a letter of commitment from Water Resources and Uintah Water Conservancy District.

Burns Bench portion of project will be made in the form of monetary. No cost will be included in project costs that were incurred before project start date. No other funds will be used from Federal partners. Burns Bench has requested $100,000 from Utah Department of Agriculture and Food (UDAF). If it is approved, the loan portion from Water Resources will be reduced. Burns Bench applied for UDAF funds last year and was not approved.

Below is a table showing the summary of Non-Federal and Federal Funding Sources:

Funding Sources	Funding Amount
Non Federal Entities	
1. Applicant Burns Bench Irrigation Company	$ 20,000.00
2. State of Utah Division of Water Resources	$ 215,000.00
4. Uintah Water Conservation District	$ 65,000.00
Requested Reclamation Funding:	$ 300,000.00
Total Funding:	$ 600,000.00

Budget Proposal

Burns Bench Irrigation Company

Preliminary Estimate of Probable Cost

Budget Item Description	Unit	Unit Cost	Quantity	Recipient Funding	Water Resources	Reclamation Funding	Total Cost
DESIGN ENGINEERING							
Project Manager	HR	$150.00	21	$ 94.50	$ 1,480.50	$ 1,575.00	$3,150.00
Project Engineer	HR	$115.00	54	$ 186.30	$ 2,918.70	$ 3,105.00	$6,210.00
GIS Specialist	HR	$95.00	34	$ 96.90	$ 1,518.10	$ 1,615.00	$3,230.00
CADD Technician	HR	$90.00	102	$ 275.40	$ 4,314.60	$ 4,590.00	$9,180.00
Licensed Surveyor	HR	$130.00	24	$ 93.60	$ 1,466.40	$ 1,560.00	$3,120.00
Surveyor	HR	$90.00	35	$ 94.50	$ 1,480.50	$ 1,575.00	$3,150.00
Clerical	HR	$56.00	57	$ 95.76	$ 1,500.24	$ 1,596.00	$3,192.00
CONSTRUCTION ENGINEERING							
Project Manager	HR	$150.00	21	$ 94.50	$ 1,480.50	$ 1,575.00	$3,150.00
Project Engineer	HR	$115.00	27	$ 93.15	$ 1,459.35	$ 1,552.50	$3,105.00
Senior Inspector	HR	$110.00	85	$ 280.50	$ 4,394.50	$ 4,675.00	$9,350.00
Inspector	HR	$83.00	113	$ 281.37	$ 4,408.13	$ 4,689.50	$9,379.00
CADD Technician	HR	$90.00	35	$ 94.50	$ 1,480.50	$ 1,575.00	$3,150.00
Licensed Surveyor	HR	$130.00	11	$ 42.90	$ 672.10	$ 715.00	$1,430.00
Surveyor	HR	$90.00	17	$ 45.90	$ 719.10	$ 765.00	$1,530.00
LEGAL							
Attorney	HR	$300.00	5	$ 45.00	$ 705.00	$ 750.00	$1,500.00
Paralegal	HR	$130.00	28	$ 109.20	$ 1,710.80	$ 1,820.00	$3,640.00

Budget Item Description	Unit	Unit Cost	Quantity	Recipient Funding	Board of Water Resources	Reclamation Funding	Total Cost
MOBILIZATION							
Materials							
Bond	EA	8988.53	1	$ 2,269.66	$ 2,224.61	$ 4,494.27	$8,988.53
Labor							
General Contractor	HR	$53.96	25	$ 40.47	$ 634.03	$ 674.50	$1,349.00
Senior Project Manager	HR	$53.96	25	$ 40.47	$ 634.03	$ 674.50	$1,349.00
Truck Driver	HR	$22.31	25	$ 16.73	$ 262.14	$ 278.88	$557.75
Equipment Operator	HR	$41.39	25	$ 31.04	$ 486.33	$ 517.38	$1,034.75
Equipment Delivery Truck	HR	$49.35	25	$ 37.01	$ 579.86	$ 616.88	$1,233.75
Delivery Truck Fuel	GAL	$3.80	370	$ 42.18	$ 660.82	$ 703.00	$1,406.00
54" HDPE PIPE-DR 32.5							
Materials							
54" HDPE Pipe-DR 32.5	FT	$120.56	300	$ 1,085.00	$ 16,998.40	$ 18,083.40	$36,166.80
Air Valve	EA	$6,000.00	4	$ 720.00	$ 11,280.00	$ 12,000.00	$24,000.00
Imported Pipe Bedding	CY	$10.00	435	$ 130.50	$ 2,044.50	$ 2,175.00	$4,350.00
Seed	MSF	$22.00	2	$ 1.32	$ 20.68	$ 22.00	$44.00
Labor							
Senior Project Manager	HR	$53.96	12	$ 19.43	$ 304.33	$ 323.76	$647.52
Skilled Labor	HR	$22.31	12	$ 8.03	$ 125.83	$ 133.86	$267.72
General Labor	HR	$11.68	12	$ 4.20	$ 65.88	$ 70.08	$140.16
Excavator Operator	HR	$41.39	12	$ 14.90	$ 233.44	$ 248.34	$496.68
Loader Operator	HR	$41.39	12	$ 14.90	$ 233.44	$ 248.34	$496.68
Equipment							
Excavator	HR	$63.00	7	$ 13.23	$ 207.27	$ 220.50	$441.00
Front End Loader	HR	$63.00	11	$ 20.79	$ 325.71	$ 346.50	$693.00
Backhoe	HR	$42.00	6	$ 7.56	$ 118.44	$ 126.00	$252.00
Pick-up Truck	HR	$12.60	13	$ 4.91	$ 76.99	$ 81.90	$163.80
Generator	HR	$5.71	14	$ 2.40	$ 37.57	$ 39.97	$79.94
Fusion Machine	HR	$55.97	14	$ 23.51	$ 368.28	$ 391.79	$783.58
Compactor	HR	$7.48	6	$ 1.35	$ 21.09	$ 22.44	$44.88
Seed Spreader	HR	$23.44	1	$ 0.70	$ 11.02	$ 11.72	$23.44
Other							
Excavator Fuel	GAL	$3.80	80	$ 9.12	$ 142.88	$ 152.00	$304.00
Front End Loader	GAL	$3.80	15	$ 1.71	$ 26.79	$ 28.50	$57.00
Backhoe Fuel	GAL	$3.80	70	$ 7.98	$ 125.02	$ 133.00	$266.00
Pick-up Fuel	GAL	$3.80	19	$ 2.17	$ 33.93	$ 36.10	$72.20
Generator Fuel	GAL	$3.80	14	$ 1.60	$ 25.00	$ 26.60	$53.20
Compactor Fuel	GAL	$3.80	3	$ 0.34	$ 5.36	$ 5.70	$11.40
Seed Spreader Fuel	GAL	$3.80	1	$ 0.11	$ 1.79	$ 1.90	$3.80

Budget Item Description	Unit	Unit Cost	Quantity	Recipient Funding	Board of Water Resources	Reclamation Funding	Total Cost
INLET STRUCTURE AND SCREEN							
Materials							
Concrete	CY	$130.00	48	$ 187.20	$ 2,932.80	$ 3,120.00	$6,240.00
Reinforcing Steel	LB	$1.20	4500	$ 162.00	$ 2,538.00	$ 2,700.00	$5,400.00
Steel	LB	$1.75	9300	$ 488.25	$ 7,649.25	$ 8,137.50	$16,275.00
Water Stop	FT	$3.70	270	$ 29.97	$ 469.53	$ 499.50	$999.00
Form Materials	SF	$2.50	950	$ 71.25	$ 1,116.25	$ 1,187.50	$2,375.00
Foundation Material	TON	$7.50	24	$ 5.40	$ 84.60	$ 90.00	$180.00
Rip Rap	SY	$50.00	57	$ 85.50	$ 1,339.50	$ 1,425.00	$2,850.00
Imported Pipe Bedding	CY	$10.00	215	$ 64.50	$ 1,010.50	$ 1,075.00	$2,150.00
Labor							
Senior Project Manager	HR	$53.96	276	$ 446.79	$ 6,999.69	$ 7,446.48	$14,892.96
Excavator Operator	HR	$41.39	276	$ 342.71	$ 5,369.11	$ 5,711.82	$11,423.64
Skilled Labor	HR	$22.31	276	$ 184.73	$ 2,894.05	$ 3,078.78	$6,157.56
General Labor	HR	$11.68	276	$ 96.71	$ 1,515.13	$ 1,611.84	$3,223.68
Equipment							
Excavator	HR	$63.00	276	$ 521.64	$ 8,172.36	$ 8,694.00	$17,388.00
Pick-up Truck	HR	$12.60	276	$ 104.33	$ 1,634.47	$ 1,738.80	$3,477.60
Other							
Excavator Fuel	GAL	$3.80	2648	$ 301.87	$ 4,729.33	$ 5,031.20	$10,062.40
Pick-up Truck	GAL	$3.80	480	$ 54.72	$ 857.28	$ 912.00	$1,824.00
Diversion STRUCTURE							
Materials							
Concrete	CY	$130.00	510	$ 1,989.00	$ 31,161.00	$ 33,150.00	$66,300.00
Reinforcing Steel	LB	$1.20	67000	$ 2,412.00	$ 37,788.00	$ 40,200.00	$80,400.00
Water Stop	SF	$3.70	251	$ 27.86	$ 436.49	$ 464.35	$928.70
Form Materials	SF	$2.50	564	$ 42.30	$ 662.70	$ 705.00	$1,410.00
Foundation Material	Ton	$7.50	40	$ 9.00	$ 141.00	$ 150.00	$300.00
Rip Rap	SY	$50.00	140	$ 210.00	$ 3,290.00	$ 3,500.00	$7,000.00
Imported Pipe Bedding	CY	$10.00	325	$ 97.50	$ 1,527.50	$ 1,625.00	$3,250.00
Labor							
Senior Project Manager	HR	$53.96	880	$ 1,424.54	$ 22,317.86	$ 23,742.40	$47,484.80
Excavator Operator	HR	$41.39	880	$ 1,092.70	$ 17,118.90	$ 18,211.60	$36,423.20
Skilled Labor	HR	$22.31	880	$ 588.98	$ 9,227.42	$ 9,816.40	$19,632.80
General Labor	HR	$11.68	880	$ 308.35	$ 4,830.85	$ 5,139.20	$10,278.40
Equipment							
Excavator	HR	$63.00	715	$ 1,351.35	$ 21,171.15	$ 22,522.50	$45,045.00
Pick-up Truck	HR	$12.60	715	$ 270.27	$ 4,234.23	$ 4,504.50	$9,009.00
Other							
Excavator Fuel	GAL	$3.80	640	$ 72.96	$ 1,143.04	$ 1,216.00	$2,432.00
Pick-up Truck	GAL	$3.80	365	$ 41.61	$ 651.89	$ 693.50	$1,387.00
CULTURAL AND ENVIRONMENTAL COMPLIANCE							
Project Manager	HR	$159.82	9	$ 43.15	$ 676.04	$ 719.19	$1,438.38
Environmental Scientist	HR	$98.94	49	$ 145.44	$ 2,278.59	$ 2,424.03	$4,848.06
GIS Specialist	HR	$63.46	32	$ 60.92	$ 954.44	$ 1,015.36	$2,030.72
Project Engineer	HR	$139.97	16	$ 67.19	$ 1,052.57	$ 1,119.76	$2,239.52
	Total Direct Cost Project Cost			$20,000.00	$280,000.00	$300,000.00	$600,000.00
	Total Indirect Cost			$ -	$ -	$ -	$ -
	Total Project Cost			$20,000.00	$280,000.00	$300,000.00	$600,000.00

Budget Narrative

Salaries and Wages

All Salaries and Wages will be listed within the Contractual area of the narrative

Fringe Benefits

All Fringe benefits are fixed provisional rates for billing.

Travel

No travel will be required.

Equipment

Equipment will be part of the contracted portion of the project.

Material and Supplies

Material and Supplies will be part of the contracted portion of the project and will be documented as required.

Contractual

CIVCO Engineering, Inc. has been the consultant on this project and has written the grant. CIVCO will prepare the design, bid packets, and conduct construction management for all areas of the project. A breakdown of CIVCO's potential project cost is below. The following staff will participate in the design construction observation of the proposed WaterSMART project for Burns Bench Irrigation Company.

	Project Manager	Project Engineer	GIS Specialist	CADD Technician	Senior Inspector	Inspector	Licensed Surveyor	Surveyor	Clerical
Hourly Bill Rate	$ 150.00	$ 115.00	$ 95.00	$ 90.00	$ 110.00	$ 83.00	$ 130.00	$ 90.00	$ 56.00
Composite Direct Labor Rate	$ 45.00	$ 34.50	$ 28.50	$ 27.00	$ 33.00	$ 24.90	$ 39.00	$ 27.00	$ 16.80
Overhead	$ 24.00	$ 18.40	$ 15.20	$ 14.40	$ 17.60	$ 13.28	$ 20.80	$ 14.40	$ 8.96
Fringe Benefits	$ 28.50	$ 21.85	$ 18.05	$ 17.10	$ 20.90	$ 15.77	$ 24.70	$ 17.10	$ 10.64
Indirect Labor	$ 37.50	$ 28.75	$ 23.75	$ 22.50	$ 27.50	$ 20.75	$ 32.50	$ 22.50	$ 14.00

A contract will be awarded to a construction company to perform the construction of this project. The contractual costs shown are estimates for each of the components to furnish and install all of the supplies and equipment. Contractors will be prequalified and the company will most like go with low bidder.

Environmental and Regulatory Compliance Cost

The amount for the environmental and regulatory compliance cost represents just under 2% of the project construction cost and is $10,556.68.

Reporting

All reports will be done by an engineering company or the irrigation company.

Other

Bonding and legal costs will include a review of all contracts and other documents, as well as preparation of all required documents for bonding for the loan from Division of Water Resources.

Indirect Cost

The Companies do not have a federally approved indirect cost; therefore, no indirect cost will be taken.

Contingency Costs

Contingency has been assigned to individual items.

Total Cost

Total Funded by the Companies	$ 20,000.00
Total from Division of Water Resources	$ 65,000.00
Total from Division of Water Resources	$215,000.00
Total Requested Funds from the Bureau of Reclamation	$300,000.00
Total Project Cost	$600,000.00

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Water Resources
ERIC L. MILLIS
Division Director

June 27, 2017

Boyd Snow, President
Burns Bench Irrigation Company
PO Box 72
Jensen, UT 84035

RE: Authorization of Funds, Proj. No. E395 - Burns Bench Irrigation Company

Boyd Snow:

In its June 22, 2017 meeting, the Board of Water Resources authorized your project to install gates and pipe to keep sediment out of system. The board will advance 85% of the project cost up to $504,900, which the company will return to the state at 0% interest over 20 years, with annual payments of approximately $25,300. The Board's action is contingent upon the availability of funds at the time the project is ready for construction.

Attached is a list of requirements that need to be accomplished before a funding agreement can be executed. Also attached are forms that will help accomplish requirement #3. Please fill-out the form applicable to your bylaws, etc.

Please contact Jaqueline Pacheco at 801-538-7286 if you have any questions.

Thank you,

Todd Stonely

Todd Stonely, P.E.
Project Funding Manager

TES:JP:db

Enclosures
1. List of Requirements
2. Certification and Acknowledgment Forms (2)

cc: Randy Crozier - Board of Water Resources (via email)
Chris Thomsen - Civco Eng (via email)
Monty Pratt - Burns Bench (via email)

1594 West North Temple, Suite 310, PO Box 146201, Salt Lake City, UT 84114-6201
telephone (801) 538-7230 • facsimile (801) 538-7279 • TTY (801) 538-7458 • *www.water.utah.gov*

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
815 South 400 West
Roosevelt, Utah 84066

May 7, 2018

Boyd Snow
President Burns Bench Irrigation Company
P.O. 72
Jensen, Utah 84035

Re: Letter of Recommendation for Project

To WaterSMART Program,

I have been to the project site and visited with farmers in the area about the Burns Bench Diversion and Pipeline Project. A majority of farms in this area have used EQIP funding to complete on farm projects and this project has the potential to help over 300 acres of future NRCS EQIP projects.

NRCS helped design and install the diversion and settling basin for Burns Bench. The addition of the Murray Ditch and Burton Ditch has caused the structures to not work as designed. The extra sediment in the system wears out nozzles, filters and pipes. During peak flows, the diversion cannot meet the peak, on farm demands to the system, hindering the farmers to get the best crop production. The proposed pipeline will increase the pressure, thus reducing pumping cost to existing and future on farm systems.

Roosevelt NRCS office supports this project because of the several benefits and potential benefits to future on farm projects. Please let me know if you have any questions or comments.

Sincerely,

Jeremy Maycock
District Conservationist
Roosevelt NRCS Office

Uintah Water Conservancy District
78 West 3325 North
Vernal, Utah 84078

May 8, 2018

Boyd Snow
President Burns Bench Irrigation Company
P.O. 72
Jensen, Utah 84035

Re: Burns Bench Diversion and Piping Project

To Whom It May Concern,

It is Uintah Water Conservancy District's policy to develop and conserve water supplies for the benefit of the inhabitants of Uintah County through the most cost effective and environmentally prudent methods. The Burns Bench Diversion and Piping Project has been explained to the District and we are pleased to inform you that we are very supportive of this project. The water saving from this project is in line with the mission and objectives of the District to acquire, develop, conserve and where necessary preserve water resources and to preserve, where necessary, stream and/or watershed ecosystems to maintain water quality standards and aquatic ecosystem balances.

We feel that this project is so important that we have agreed to contribute $65,000.00 to the design of this project.

We know that once this project is funded, that the Burns Bench Irrigation Company y will proceed in a diligent and timely manner to complete the project according to the Bureau of Reclamation requirements.

Sincerely,

Gawain Snow
General Manager
Uintah Water Conservancy District

OFFICIAL RESOLUTION

Burns Bench Irrigation Company Resolution No. 2017-01

WHEREAS, The Burns Bench Irrigation Company must maintain, provide for, and service the Water System,

WHEREAS, The Company desires to conserve water and manage its water supply more efficiently and is in need of canal piping,

WHEREAS, The Company desires to obtain grant funding from the Bureau of Reclamation through WaterSMART: Water and Energy Efficiency Grant for FY 2017

NOW THEREFORE, BE IT RESOLVED that the Board of Directors, agrees and authorizes that:

1. The WaterSMART: Water and Energy Efficiency Grant Application prepared by CIVCO Engineers, Inc. has been reviewed by the BOARD of Directors and supports the contents therein;
2. The Pioneer Canal Company is capable of providing the amount of funding specified in the funding plan; and
3. If selected for WaterSMART: Water and Energy Efficiency grant, the Company will work with the Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement.

Dated: 2-7-17

Boyd R Snow

Boyd Snow, President

ATTEST:

Carrie Goodrich

January 1979

Tabulation and Application of Pan Evaporation Data for Utah Through 1976

Kenneth G. Hubbard

MONTHLY EVAPORATION

VERNAL Lat: 40° 27' Long: 109° 31' Elev: 5280 ft.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1948				4.68	8.09	6.85	7.95	7.14	6.01			
1949							7.22	6.84	5.36	2.95		
1950				6.22	6.38	8.62	6.88	6.40	4.60	3.75		
1951							7.32	4.99	4.08			
1952						7.33	7.34	5.97	5.10			
1953				4.84	6.30	7.49	6.88	5.94	5.09			
1954					7.91	7.90						
No. of Yrs.				3	4	5	6	6	6	2		
Average				5.25	7.17	7.64	7.27	6.21	5.04	3.35		
Std. Dev.				.847	.962	.665	.394	.764	.658	.566		
Maximum				6.22	8.09	8.62	7.95	7.14	6.01	3.75		
Minimum				4.68	6.30	6.85	6.88	4.99	4.08	2.95		

MONTHLY WIND MOVEMENT

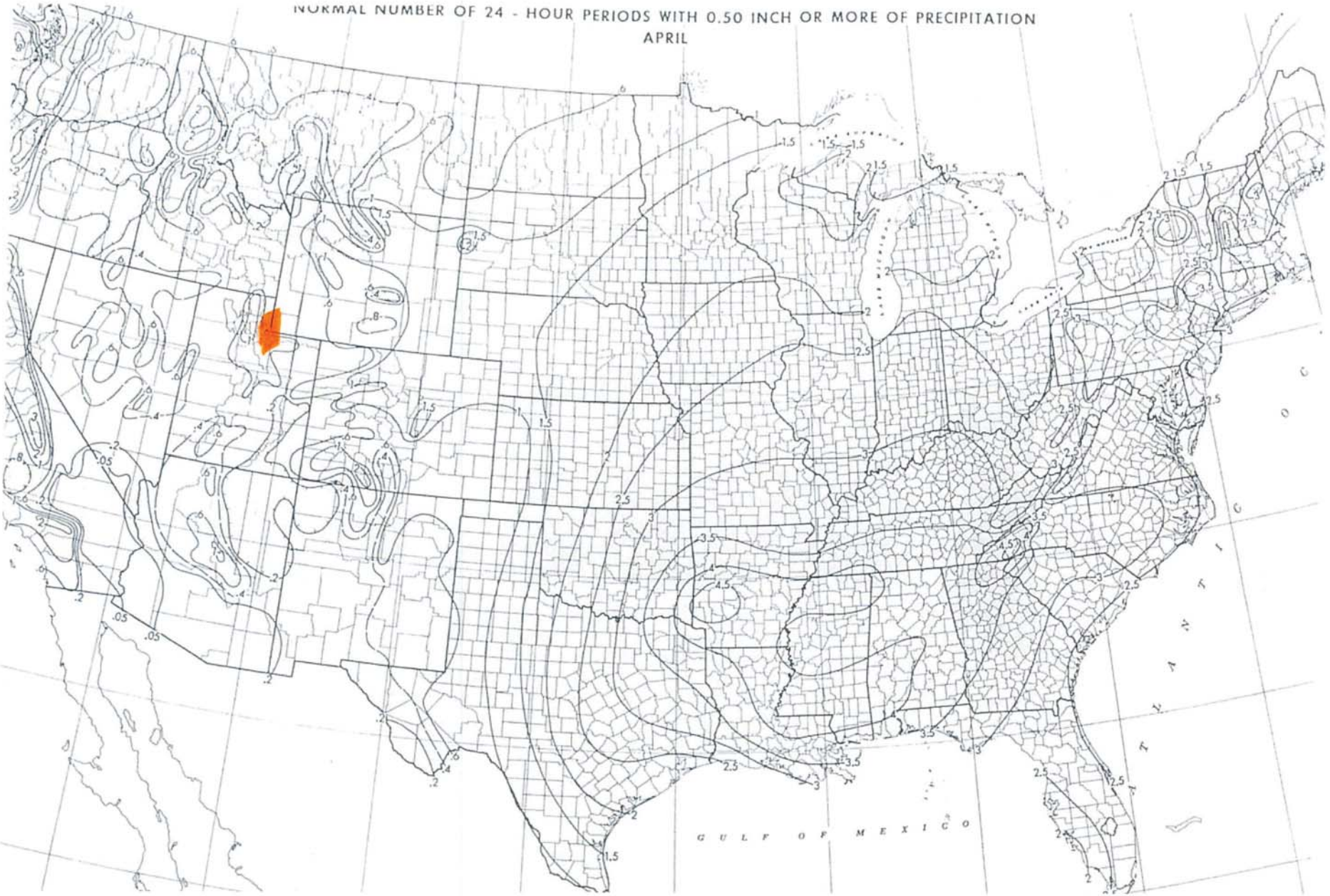
VERNAL

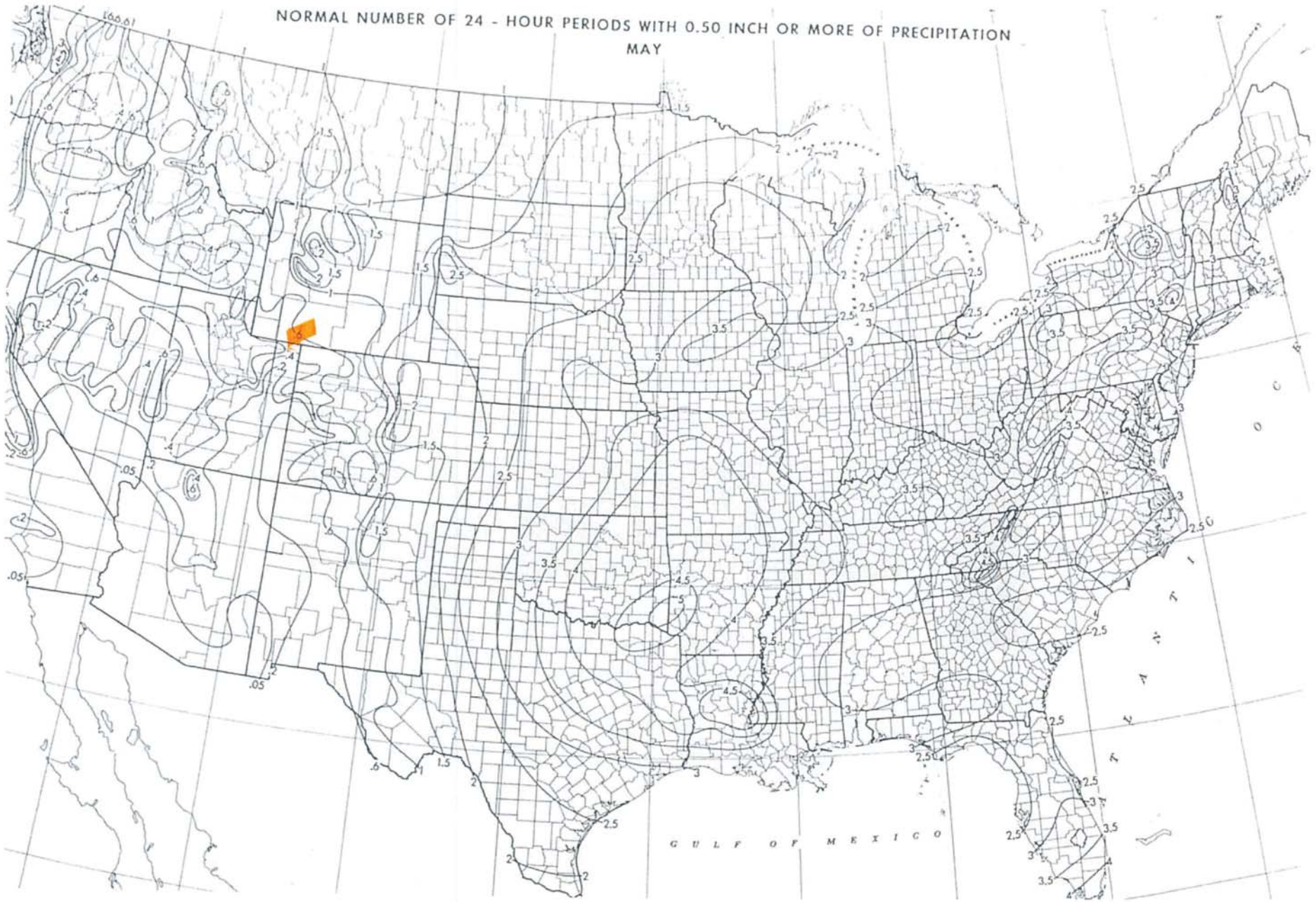
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1948				2380	2220	1020	790	570	780	800		
1949							838	706	864	485	720	
1950				2361	1967	1753	647	444	225	379	867	657
1951	1021	934		2112	2133		1114	751	674			
1952						1192	479	673	592			
1953				2264	2446	1141	391	607	517			
1954					1779	1523						
No. of Yrs.	1	1		4	5	5	6	6	6	3	2	1
Average				2279	2109	1326	710	625	609	555	794	
Std. Dev.				123	253	303	263	110	226	219	104	
Maximum				2380	2446	1753	1114	751	864	800	867	
Minimum				2112	1779	1020	391	444	225	379	720	

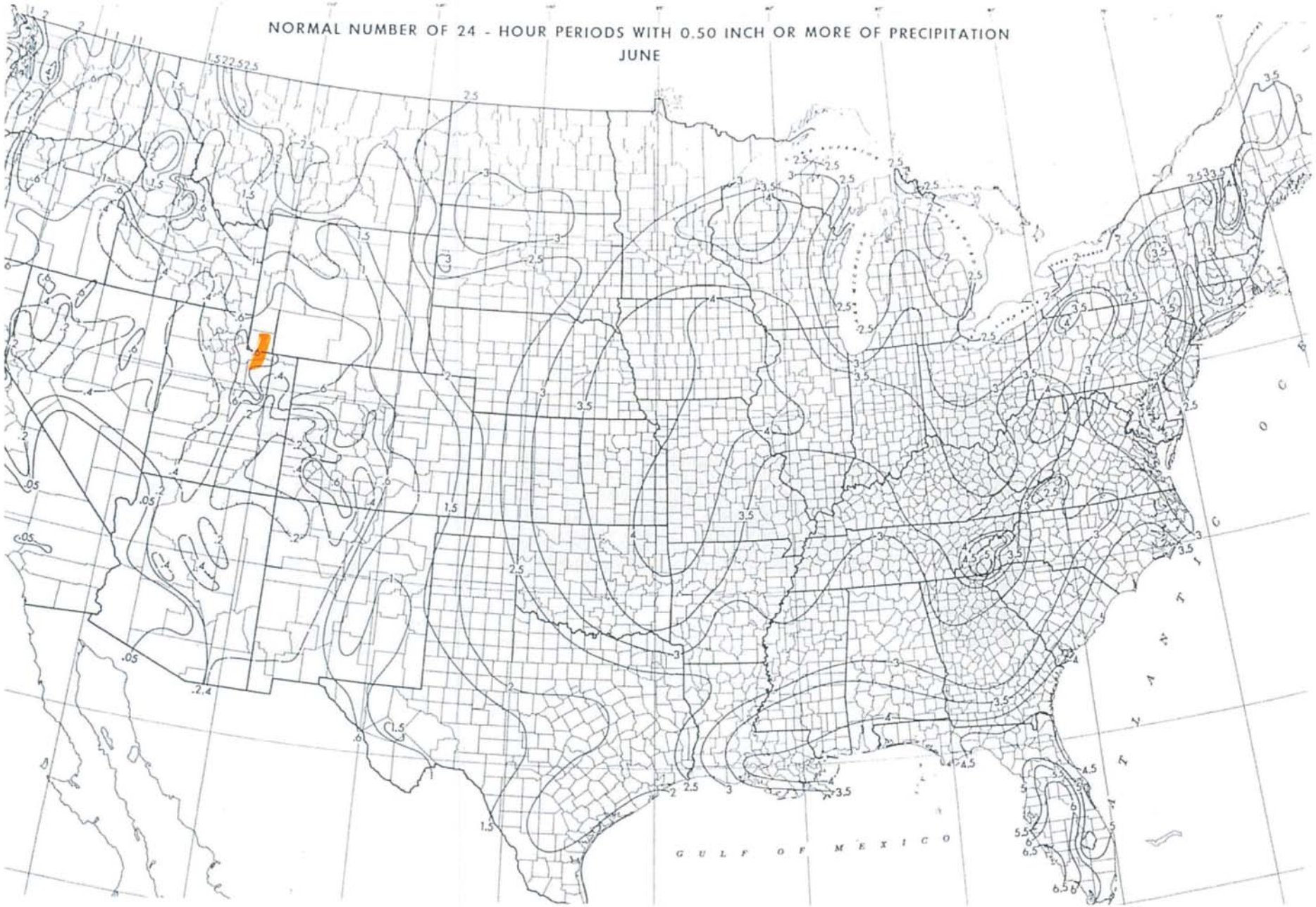
MONTHLY EVAPORATION

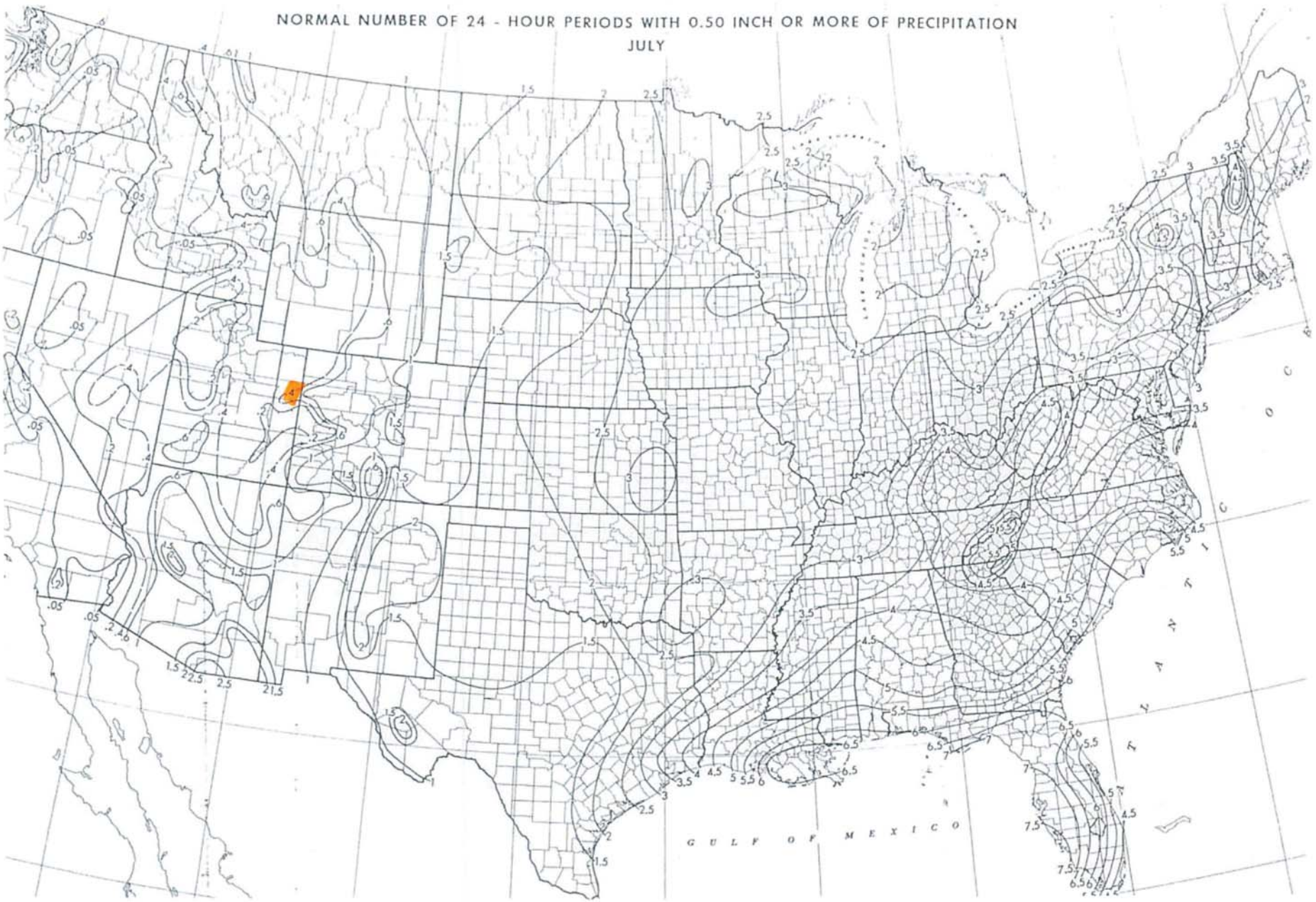
WANSHIP DAM Lat: 40° 48' Long: 111° 24' Elev: 5950 ft.

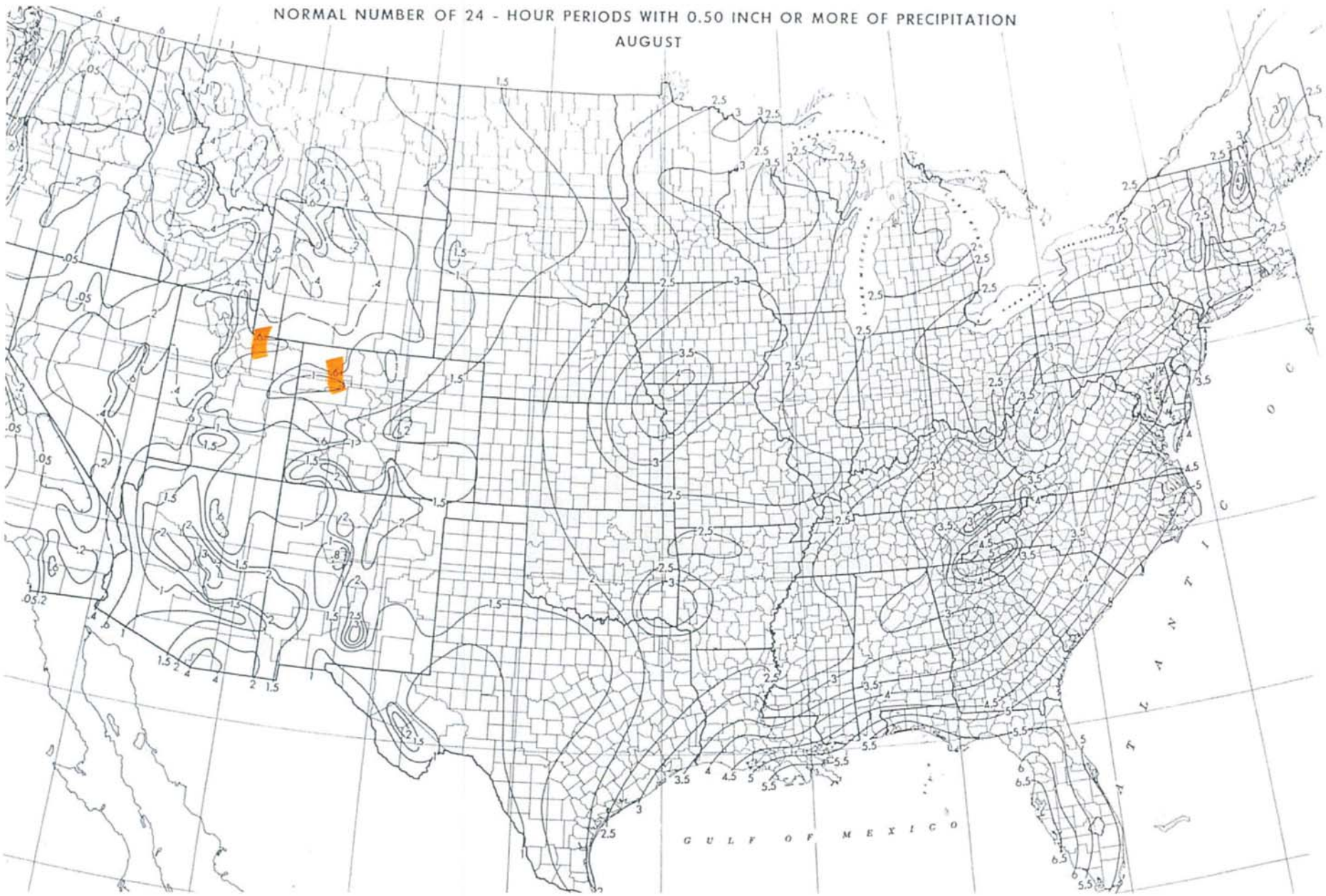
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1955								5.81	5.93	4.13		
1956					6.52	8.31	7.16	6.69	6.29	3.66		
1957					5.20	6.25	7.17	7.14	4.86	2.81		
1958					7.87	8.36	8.94	7.77	5.69			
1959						7.65	8.06	6.70	4.34			
1960						7.18	5.96	6.27	3.98			
1961						7.30	6.74	5.60	3.96			
1962						7.45	6.81	6.94	5.47			
1963						5.95	7.07	4.16	3.04	2.50		
1964							5.38	8.86	8.12	6.54		
1965						6.19	7.09	5.92	4.77			
1966						8.33	9.04	7.78	4.63			
1967						5.53	7.11	5.36	3.61			
1968						7.05	7.21	4.84	3.74			
1969					8.68	5.33	7.24	7.33	5.47			
1970					6.80	6.67	7.43	7.92	5.73	3.12E		
1971					5.25	7.03	8.15	6.55	5.37	3.29		
1972					7.06E	6.60	8.23	7.06	4.87			
1973						6.80	7.80	8.25	4.85E	4.12E		
No. of Yrs.					7	17	18	19	19	8		
Average					6.77	6.94	7.37	6.68	4.99	3.77		
Std. Dev.					1.277	.922	.917	1.206	1.155	1.261		
Maximum					8.68	8.36	9.04	8.86	8.12	6.54		
Minimum					5.20	5.33	5.38	4.16	3.04	2.50		

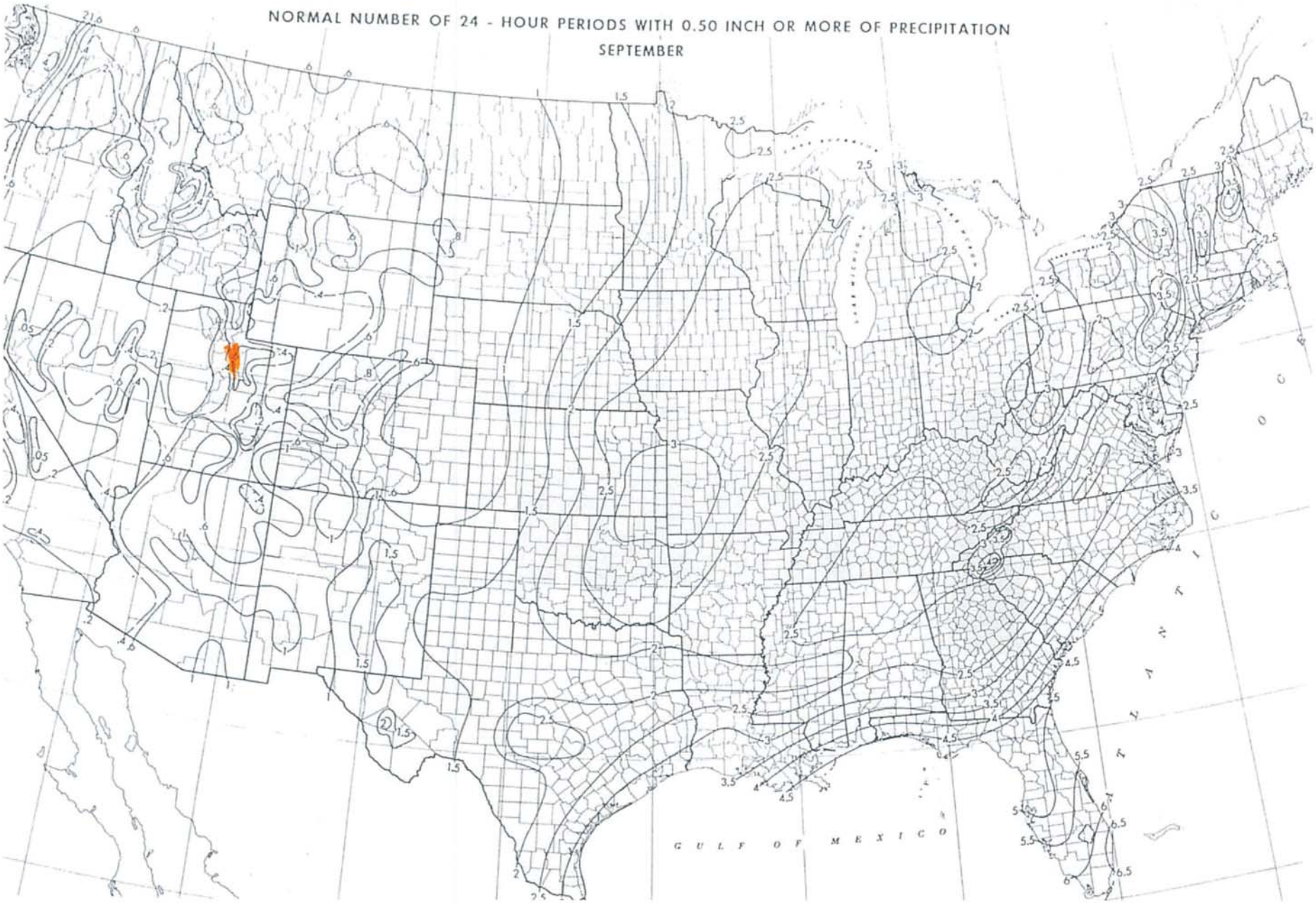

NORMAL NUMBER OF 24 - HOUR PERIODS WITH 0.50 INCH OR MORE OF PRECIPITATION
APRIL
GULF OF MEXICO


NORMAL NUMBER OF 24 - HOUR PERIODS WITH 0.50 INCH OR MORE OF PRECIPITATION
MAY
GULF OF MEXICO


NORMAL NUMBER OF 24 - HOUR PERIODS WITH 0.50 INCH OR MORE OF PRECIPITATION
JUNE
GULF OF MEXICO


NORMAL NUMBER OF 24 - HOUR PERIODS WITH 0.50 INCH OR MORE OF PRECIPITATION
JULY
GULF OF MEXICO


NORMAL NUMBER OF 24 - HOUR PERIODS WITH 0.50 INCH OR MORE OF PRECIPITATION
AUGUST
GULF OF MEXICO


NORMAL NUMBER OF 24 - HOUR PERIODS WITH 0.50 INCH OR MORE OF PRECIPITATION
SEPTEMBER
GULF OF MEXICO

Water Saving Calculations

Pond Seepage Calculations losses

Pond Area = 1.4 acres

Hole 1

	Time (min)	Water lvl Drop (inches)
Test 1	40	6
Test 2	20	2.5
Test 3	20	2.5
Average	26.66667	3.66667
Loss ft/day	16.5	

Hole 2

	Time (min)	Water lvl Drop (inches)
Test 1	40	2
Test 2	20	0.5
Test 3	20	1
Average	26.667	1.166667
Loss ft/day	5.25	

Hole 3

	Time (min)	Water lvl Drop (inches)
Test 1	20	0.5
Test 2	20	0.5
Average	20	0.5
Loss ft/day	3	

Hole 4

	Time (min)	Water lvl Drop (inches)
Test 1	10	8.5
Test 2	10	6
Test 3	10	5
Test 4	10	5
Test 5	10	4.5
Average	10	5.8
Loss ft/day	69.6	

Hole 5

	Time (min)	Water lvl Drop (inches)
Test 1	20	2
Test 2	20	1
Test 3	20	1
Average	20	1.333333
Loss ft/day	8	

Hole 6

	Time (min)	Water lvl Drop (inches)
Test 1	20	3
Test 2	20	3
Test 3	20	2.5
Average	20	2.83333
Loss ft/day	17	

Hole 7

	Time (min)	Water lvl Drop (inches)
Test 1	20	2
Test 2	20	1
Test 3	20	1
Average	20	1.33333
Loss ft/day	8	

Hole 8

	Time (min)	Water lvl Drop (inches)
Test 1	20	5.5
Test 2	20	5
Test 3	20	4
Average	20	4.833333
Loss ft/day	29	

Threw out Hole 4

Average Holes 1,2,3,5,7 and 8

12.39	ft/day

Used April 1st through October 1

Days	183

Season Loss = days*loss/day*area

Season Loss=	3175.05	acft/yr

Evaporation losses

Monthly Average evaportion per month (inches)

May	June	July	Aug	Sep
5.25	7.17	7.64	7.27	6.21

From study completed by Utah State University for Vernal Area

Seasonal Evaporation

33.54 in

Seasonal Evaporation = Seasonal Evaporation * Area

Evaporation Losses=	33.7	acre ft

Flushing Settling Basin After Storm Losses

Normal Number of 24 periods with .5 inch or more of precipitation

April	May	June	July	Aug	Sept
0.6	0.6	0.6	0.4	0.6	0.6

Data from NOAA website

Average number of large storms per season

3.4	Storms

Time required to flush settling basin after storm

4	hr

Average flow for flush

25	cfs

Water required per flush

8.333333	acft

Water wasted per season on flushing after storm

28.33	acre feet

Flushing Wheel Lines

Flush wheel lines now

every 2 days

Estimated Flushing After Project

once a week

Estimated water needed to flush

600	Cubic Feet

Pre project flush per season

91.5	times /season

Post project flush per season

26.14	times /season

Estimated number of wheel lines

125.00	count

Season water savings from removing flushing

112.5295	acre feet

Diversion Deficency losses

Clogged Inlet

Averages 2.5 times a year

Estimated average loss

10	CFS

Estimated time of clogs

1	day

Inlet Capacity Losses

Days Can't Meet Demand

20	Days a year

Estimated average loss

5	cfs

Seasonal water saving from improving structure

250	acre feet

3599.57

Burns Bench Irrigation Company

Water Management and Conservation Plan

Prepared By

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Background Information

Burns Bench Irrigation Company was registered with the State of Utah in 1936, and provides irrigation water for agricultural use from Brush Creek to farmlands near Jensen, Utah. There are currently 306 shares distributed among 25 shareholders.

Canal construction and settlement started in the 1880's. Red Fleet Reservoir was built in the early 1980's. The water from Red Fleet was used to supplement water rights to the Burns Bench Irrigation Company, Burton Ditch Irrigation Company and the Murray Ditch Pipeline, Inc. (Companies). In 2000 the Companies got together and built a pipeline with Bureau of Reclamation funding. The Companies have agreed with the Bureau of Reclamation to flow 1,800 ac ft of water through the pipeline and into Stewart Lake to be used for fish, wildlife and recreation. Combined the Companies have the right to divert 54.146 CFS of water and can irrigate 3,235.32 acres. Water is diverted from April 1 to November 1.

The Companies have two parts to their water shares. Primary shares are from their original water right with an 1890 priority. J share come from the supplemental water received after Red Fleet Reservoir was built. The project water made it so all land owners could divert 3.8 ac-ft of water per acre.

Below is a table of Water Rights owned by the Bureau of Reclamation and the Companies and important information associated with each water right:

	Right #	Flow	Volume	Acres	Date
Bureau of Reclamation	45-5691		1800		10/9/1996
Burns Bench Irrigation Company	45-54	31.12		1998.02	1890
Burton Ditch Irrigation Company	45-46	13.69		746.5	1890
Murray Ditch Pipeline Inc.	45-43	1.218		35	1890
Murray Ditch Pipeline Inc.	45-41	2.167		127.9	1890
Murray Ditch Pipeline Inc.	45-42	3.326		134	1890
Murray Ditch Pipeline Inc.	45-44	0.047		1.5	1890
Murray Ditch Pipeline Inc.	45-45	1.167		144.5	1890
Murray Ditch Pipeline Inc.	45-4761	1.411		47.9	1890

The soil in the area is well draining and is mostly gravely shale. The primary use of the water coming from the canal is for irrigation water to raise alfalfa, small grains, meadow hay and irrigate pastures.

Existing Resources:

Burns Bench Irrigation Company owns water rights in Brush Creek and owns shares in Red Fleet Reservoir. The company has a diversion structure, inlet structure, settling basin 7 miles of pipeline and 500 ft of open ditch.

Current Water Use and Determination of Future Requirements – Water Management Issues and Goals:

Burns Bench Irrigation Company's current system does not adequately remove sediment from the water before it enters the pressurized irrigation system. The sediment settles in the pipes and wheel lines, leading to high maintenance costs and an increase of water usage to flush the wheel lines.

The existing inlet structure plugs during high flows thus not allowing the company to divert the full flow needed. Also, the inlet structure was originally designed to divert Burns Bench Flow. Bureau of Reclamation, Murray Ditch and Burton Ditch flows were added after the structure was completed. The existing structure cannot meet peak flow demands.

Burns Bench has been approved for funding from the Utah Division of Water Resources in order to implement upgrades to the system. The proposed project would fix the problems in the diversion structure and remove more sediment from the system. The diversion will have automation that will open the gates to allow sediment heavy storm water to bypass the system during large storms.

Burns Bench's pipeline has cut conveyance losses to about 3%, which drastically increased the amount of water to irrigate crops. Shareholders are gradually adding more and more sprinklers to the system. Soon, all acreage served will be converted from flood irrigation to sprinkler systems. Approximately 90% of the current acres are under sprinklers.

Brush Creek has a SCADA (Supervisory Control and Data Acquisition) system. This system monitors water usage and will collect hourly and daily averages. This allows the River Commissioners the ability to make changes in their diversion amounts. There are no housing or development pressure in the service area. The company does not anticipate any significant changes in the amount of water they deliver or land that they serve in the future.

Identification of Alternative to Meet Future Water Needs:

Burns Bench currently does not see any change in their future water needs. Burns Bench will monitor needs and look for a solution to those needs as they arise.

Evaluation and Selection of Alternatives:

Burns Bench believes it is currently implementing all available and practical water conservation measures. It is the goal of Burns Bench to make every reasonable effort to continue to discover and implement additional conservation and water management measures.

Periodic Evaluation:

This water management and conservation plan will be reviewed and updated periodically.

Associated Plans – Emergency Response plans:

Emergency problems likely to affect the company could include drought, flooding, malfunctions of the pressure reducing system or a break in the pipeline. In the event of a break, the water most likely will run across hayfields and back into the river. The pipeline can also be shut down at one of several isolation valves. All shareholders have been notified of the potential emergencies and know that the president, directors and ditch rider should be called immediately in the event of an emergency.