



UPPER GUNNISON RIVER WATER CONSERVANCY DISTRICT 2020 GRANT APPLICATION

Date Received (for UGRWCD use only): _____

Project Title: *Pete's Lake Multipurpose Enhancement Project*

Applicant: Lake Fork Valley Conservancy

Contact Information:

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Estimated Start Date: 5/1/2020

Estimated Completion Date: 10/31/2021

Amount of Funding Request: \$36,960

Cash Match Amount (all other sources): \$34,848

Total Project Value: \$71,808

Project Summary

The Lake Fork Valley Conservancy (LFVC) seeks support to complete a multi-purpose enhancement project at Pete's Lake, a public wetland area located at the north end of Lake City, CO. The project will provide water storage, improved wetland habitat, enhanced recreational activities, and a long-term site for the local community garden, run by the LFVC.

Project activities include: 1) dredging of parts of the pond to enhance fishing opportunities and to create islands in the center to promote bird breeding habitat; 2) construction of a weir dam at the outlet of the lake to raise the elevation of the water level 1.5 feet; 3) construction of a seepage cutoff to reduce groundwater flooding in nearby homes; 4) revegetation of wetland sites around and within the pond; and, 5) install new community garden infrastructure near the outlet of the lake.

The project aligns well with the UGRWCD mission and grant eligibility requirements for demonstration projects. The project meets multiple objectives and was identified during the assessment phase of the Upper Gunnison Basin watershed planning process. The UGRWCD has already invested over \$16,000 to complete the initial feasibility study.

1) Project Description

1.1 Background

The 10.2-acre Pete's Lake parcel is located on the northwest side of Lake City, Colorado, and is owned by the Town of Lake City government. The area is public and under a permanent deed restriction to maintain as open space.

The property is dominated by the shallow Pete's Lake, and is mainly covered with wetland vegetation. The lake receives natural inflow from two tributaries to the Lake Fork Gunnison River: Slaughter House Gulch and Rigney Creek (formerly known as Goner Creek). A drainage feature at the southeast end of the lake conveys water from the lake to the Lake Fork of the Gunnison River, which is located a short distance to the east.

There are smaller areas of higher ground associated with various berms that were part of historical dike and impoundment features as well as fill areas in the southeast corner of the property. Steeper terrain surrounds the property to the east, west and north, including a larger rocky cliff and outcrop area. The area includes more developed as well as primitive walking trails with access from the end of neighborhood streets at the north end of Lake City. The area has been subject to various anthropogenic impacts including multiple abandoned dike features, a stream diversion, raising and lowering of lake levels over the years, and fill areas in the southern portion of the property.

Pete's Lake was initially developed to support historic mining operations. The reservoir was larger in size, with a dam approximately eight to ten feet high. The reservoir had a 42-acre-foot (AF) storage right decreed with a 1915 appropriation date and a 1960 adjudication date and decreed to fill with surface water from Slaughter House Gulch, Goner Creek (through the Goner Ditch), and Crystal Creek (through the Crystal Ditch). The Goner Ditch structure diverts from Goner Creek, which are now referred to as the Rigney Ditch and Rigney Creek, respectively. The 42 AF reservoir water right was abandoned by the court in 1992 when the dam was mostly removed, leaving a small berm (1 to 2 feet high) which retained a smaller amount of the lake volume. In 2002, the Division of Water Resources (DWR) District Water Engineer ordered the outlet and ditch to be lowered to release water to the Lake Fork during drought. The Water Commissioner then removed the portion of the berm that blocked the outlet ditch, which lowered the water level to what is thought to have existed before any lake improvements were made. Consequently, the wetland area lost water, which led to a steady decline in the quality of habitat for birds and other wetland species and an increase in weeds. Pete's Lake currently retains natural ponding of water and extensive wetlands, but has no active storage. The existing capacity of Pete's Lake has not been surveyed and is unknown.

Emergent wetlands are widespread, primarily due to the lowered water elevation in the lake. Over time, wetland vegetation has become established in the old lakebed. Vegetation is strongly dominated by beaked sedge (*Carex utriculata*), Baltic rush (*Juncus balticus*) and creeping wild rye (*Elymus trachycaulus*). Wetland areas on the north side of

the lake support mature and immature narrowleaf cottonwood (*Populus angustifolia*) with willows (*Salix monticola* and *Salix drummondiana*) making up the understory. A few clumps of mature willow occur along the eastern shore. The noxious weed Canada thistle (*Cirsium arvense*) is becoming established in wetland and nearby upland areas.

1.2 Project Goals

The primary goals of this project are to protect and enhance Pete's Lake wetlands in the Town of Lake City to provide improved habitat for birds and other wetland species, while simultaneously increasing water storage and creating additional recreational opportunities such as increased hiking/biking trails and fishing access, and a permanent location for the Hearts and Spades Community Garden.

1.3 Feasibility Study and Design

A feasibility study and conceptual design was conducted by SGM Consultants and Bio-Environs, to determine extent and topography of the wetland area, research water rights, and provide conceptual designs for outlet structure and drainage berm to control water leaving the area, and proposed biological and recreational improvements.

Figure 1 shows the extent of wetlands on the property. There are approximately 5.44 acres of jurisdictional wetlands, 2.75 acres of open waters, and 1.93 acres of upland areas on the 10.12-acre property (Figure 1). The majority of the area is determined to be wetland, excluding the area adjacent to the ditch where excess material was pulled out of the ditch and outlet in 2002. This area will be leveled and become the new site for the Hearts and Spades Community Garden (Figure 2).

SGM engineers determined that a one-foot rise in water level would bring the lake to 6 inches elevation below the lowest point of the existing trail. Figure 3 shows the inundated area of 5.1 acres with the island covering 1.1 acres with a 1.5 ft rise. An outlet structure has been designed to control this level of storage. In addition, to address the issue of groundwater seepage to nearby homes, SGM has proposed an underground berm to control groundwater seepage and prevent flooding of homes adjacent to the southern boundary of the property (see Conceptual design drawings for both the weir and seepage berm in Figures 4-9).

2) Project Activities

The following activities are proposed as part of this funding request, to be completed by fall of 2021. UGRWCD funds are specifically requested for the weir dam construction.

2.1 Weir Dam Construction

SGM developed a preliminary design for a weir dam located just upstream of the existing wooden pedestrian bridge, in the existing lake outlet to increase the water depth at the

Lake (by approximately 1.5 feet) and ultimately improve wildlife habitats and visitor experiences. This dam would be approximately 20-feet long, and 1-foot wide, and approximately 5.5 feet tall; however, only about 2 feet of the dam would be visible above the finished grade. Conceptual plans are found in Figures 4-9 and detailed actions are outlined in the budget in Section 6.

The proposed weir dam will result in an increased water depth and improve habitat conditions. Deeper water habitats would help retain fish populations over the winter, improve habitats for overwintering northern leopard frogs (*Lithobates pipiens*), and more foraging habitats for diving ducks, Canada geese (*Branta canadensis*), and potentially other species (such as osprey [*Pandion haliaetus*]).

2.2 Construction of a Seepage Cutoff Structure

SGM developed a preliminary design for a seepage cutoff located on the south boundary of the property, north of the central pedestrian bridge. This structure is designed to hold water back in the lake, which currently seeps toward neighboring houses via an old ditch, causing periodic crawlspace flooding. Along with construction of this structure, the ditch will be filled all the way to the adjacent alley. Conceptual plans are found in Figures 4-9 and detailed actions are outlined in the budget in Section 6.

2.3 Dredging Portions of the Lake

Pete's Lake will still be relatively shallow due to a lack of lake bed topography even with the weir dam improvements. Increasing the depths of some areas would likely increase the diversity of aquatic habitats and improve fishery habitat. The center of the lake has a network of elevated grounds that used to be isolated islands that provided good bird habitat when lake levels were higher. Additional dredging around these elevated areas will be done to once again create islands.

Total dredged material is estimated to be approximately 900 cubic yards and covers about 1300 sq ft of pond area. Dredging will be permitted through the U.S. Army Corps of Engineers. LFVC is currently working on permitting with Corps staff to cover this and all other activities.

2.4 Wetland Revegetation

Containerized stock (1-gallon sized) of willows (mountain willow [*Salix monticola*], Drummond's willow [*S. drummondiana*], or Bebb's willow [*S. bebbii*]) will be planted around the edges of the lake, and on the islands if possible. These willows will add visual screening, habitat diversity, nesting habitat, and foraging habitat for several wildlife species. In addition to willows, emergent wetland plants such as sedges will be planted where construction work damaged vegetation. These activities will be coordinated through a technical grant from the USFW Partners Program (in progress).

2.5 Relocation of the Hearts and Spades Community Garden

LFVC has contracted with the Town of Lake City to lease a 0.2 acre area at the southeast corner of the Pete's Lake area adjacent to the outlet ditch (Figure 2). This area will be leveled (including filling in the slough off of the ditch). The small area of wetland to be filled in will be covered under the USACE permit. Once leveled, LFVC staff and garden volunteers will be constructing raised beds, storage shed, and perimeter fence.

2.6 Water Storage Rights and Augmentation

Pete's Lake currently does not have a water right to store water, meaning that it can only store water during "free river" conditions (i.e. when there is no downstream call on the river). SGM conducted an analysis of water rights (with legal review) and recommended first completing the outlet, underground berm, and other improvements, then apply for an absolute water storage right. The Town could apply for a conditional water storage right for Pete's Lake now but it SGM's recommendation to wait and apply for an absolute water storage right once the pond expansion is complete for a more streamlined process. Once the pond is constructed, a survey can determine the finished volume and surface area, which will be needed for the absolute water rights application.

When Pete's Lake is expanded, the increased surface area will increase evaporation, causing out-of-priority depletions even when the lake is not actively storing water. Whether or not LFVC applies for a water right for Pete's Lake, out-of-priority evaporation from Pete's Lake must be covered (augmented or released from the reservoir), during *any* downstream call. There are two options to address evaporative losses – either release equivalent amounts from the outlet, or acquire augmentation rights from the Lake San Cristobal Water Activity Enterprise so that the lake can remain full. LFVC and the Town will work with the Lake San Cristobal Water Activity Enterprise regarding augmentation rights for Pete's Lake. Evaporation rates and costs for augmentation were provided as part of the SGM analysis (Appendix A).

3) Additional Project Activities (beyond scope of this funding request)

3.1 Trail Construction

Part of the conceptual plan SGM completed includes a trail design (Figure 10) that will follow the edge of the wetlands on Town land, avoiding the trail that people currently use through private land on the north side of the lake. Extension of the existing pedestrian trail will be done around the east side of the lake and out to a small fishing pier, with a post and pier design to protect the underlying wetland edge and provide fishing access to deeper portions of the lake on the north side. Given the increased lake height, portions of this trail may need to be elevated, similar to the existing bridges. Depending on topography, a short trail access easement may be required from adjacent neighbors, which they verbally have agreed to grant.

The existing trail could also be extended to the north, to a natural break in the trees around the western side of the lake. SGM recommends not completely circling Pete’s Lake with a trail, in order to provide wildlife species areas of refugia where nesting, foraging and resting could occur without disruption from visitors. This would allow more wildlife species to persist at the lake and would therefore allow more viewing opportunities for visitors.

3.2 Create a Put and Take Fishery

There is strong community support to create a kid’s fishing pond at Pete’s Lake. The area would become more suitable for a put-and-take fishery with increased lake depths through installation of the weir dam and dredging activities. Annual stocking would be necessary due to the fact that the lake would not provide suitable habitat for natural preproduction of fish (spawning areas). The lake will, however, provide better over-wintering persistence for fish. Stocking can be done from Colorado Parks and Wildlife’s nearby hatcheries (Roaring Judy or Pitkin Hatcheries). A group of local residents have pledge financial support to develop this recreational amenity.

4) Project Timeline

The project will successfully achieve the following milestones by the end of October 2021.

Task	Deadline	Responsible Party
Obtain USACE and County permits	April 2020	LFVC, Milski Construction
Regrade garden lease area and install garden infrastructure	May-June 2020	LFVC
Dredge portions of lake	September 2020	WEBCO, Milski Construction
Construct weir	October 2020	Contractor
Construct seepage control structure	April-May 2021	Contractor
Revegetation work	May-June 2021	LFVC
Final reporting	October 2021	LFVC

5) Project Participants and Beneficiaries

Organization	Roles/Benefits
Lake Fork Valley Conservancy (LFVC)	LFVC serves as the fiscal agent and coordinating entity for the project to ensure timely completion of project tasks. This project achieves a major milestone in their 2020-2024 strategic plan.
Town of Lake City (TLC)	TLC serves as main project partner and land owner. Recreation and habitat improvements increase Town standing with local recreationists, which attracts more visitors to the area and improves the local economy. They will also be able to partially regain their lost water storage right.
Town and County residents and visitors	Locals and visitors alike will enjoy a more aesthetically pleasing recreational area and community garden, a trail system that offers environmental education as well as exercise, and better fishing and birding experiences.
Adjacent land owners	Private land owners to the south of Pete’s Lake will have less issues with groundwater flooding. They will also have a more aesthetically pleasing recreational area next to them.
UGRWCD	UGRWCD has invested over \$16,000 in this project to date. They benefit from seeing the project through to completion.
Lake City Community School	The LFVC has been engaged with the school for environmental education since 2008. The school will benefit by having a living outdoor laboratory for their students to learn about wetland ecology and gardening.
Hinsdale County Trails Commission	The Trails Commission will assist LFVC with trail construction and long-term maintenance.

6) Budget

Total project cost is estimated to be \$71,808. LFVC requests \$36,960 from the UGRWCD to primarily cover the cost of the weir construction. Total match is \$34,848.

Budget Item	Unit	# units	\$/unit	Total Cost	UGRWCD	LFVC	In-kind (Webco and Milski Construction)
Dredging of north side of pond approximately 9,000 sq ft of pond area and 500 CY)	CY	500	\$10	\$5,000	\$0	\$1,000	\$4,000
Dredging of mid berm to hydrologically connect north and south ponds (approximately 6000 sq ft of pond area and 400 CY)	CY	400	\$10	\$4,000	\$0	\$1,000	\$3,000
Final design and construction of weir (see attached detailed budget)	LS	-	-	\$35,160	\$35,160	\$0	\$0
Final design and construction of seepage cutoff (see attached detailed budget)*	LS	-	-	\$11,548	\$0	\$11,548	\$0
Wetland and shrub revegetation (disturbed construction sites and middle island habitat enhancement)	LS	-	-	\$2,500	\$0	\$2,500	\$0
Garden site reshaping and grading	LS	-	-	\$500	\$0	\$0	\$500
Garden infrastructure (fence, beds, shed) materials	LS	-	-	\$9,500	\$0	\$9,500	\$0
Project coordination and administration	HR	45	\$80	\$3,600	\$1,800	\$1,800	\$0
Total Grant Request				\$71,808	\$36,960	\$27,348	\$7,500
*In process of writing grant applications for this structure							

Pete's Lake - Outlet Weir
Feasibility Level EOPC



Jun-2019

Description of Task	Unit	Unit Cost (\$)	Quantity	Extension
Construction				
Clear and Grub Site	AC	\$ 25,000.00	0.02	\$ 500.00
Cut Excavation	CY	\$ 10.00	100	\$ 1,000.00
Fill (import and reprocessed site mat'l.)	CY	\$ 15.00	90	\$ 1,350.00
Class VI Aggregate	Ton	\$ 55.00	35	\$ 1,925.00
Waste Excavation	CY	\$ 10.00	10	\$ 100.00
Class D Concrete w\ Rebar	CY	\$ 600.00	10	\$ 6,000.00
D50=6" Riprap 1.5' thick	SY	\$ 60.00	25	\$ 1,500.00
Reveg	AC	\$ 5,000.00	0.03	\$ 150.00
Stormwater Management Controls SWMP	Allow.	\$ 2,500.00	1	\$ 2,500.00
Construction Subtotal				\$ 15,025.00
Bonds (2%)	LS	\$ 300.50	1	\$ 300.50
Contingency (30%)	LS	\$ 4,507.50	1	\$ 4,507.50
Mobilization (20%)	LS	\$ 3,005.00	1	\$ 3,005.00
Construction Total				\$ 22,838.00
Design Services				
Local Permitting	Allow.	\$ 500.00	1	\$ 500.00
Design Management	Allow.	\$ 916.50	1	\$ 916.50
Construction Plans	Allow.	\$ 5,000.00	1	\$ 5,000.00
Technical Specifications	Allow.	\$ 500.00	1	\$ 500.00
Cost Estimate	Allow.	\$ 500.00	1	\$ 500.00
DWR NJ NTC	Allow.	\$ 110.00	1	\$ 110.00
Design Services Total				\$ 7,526.50
Construction Services				
Engineering Management & Oversight (6%)		\$ 1,370.28	1	\$ 1,370.28
Construction Materials Testing		\$ 1,712.85	1	\$ 1,712.85
Construction Surveying		\$ 1,712.85	1	\$ 1,712.85
Construction Services Total				\$ 4,795.98
Project Total:				\$ 35,160.48



Pete's Lake - Seepage Cutoff

Design Level EOPC



Sep-2019

Description of Task	Unit	Unit Cost (\$)	Quantity	Extension
Construction				
Clear and Grub Site	AC	\$ 25,000.00	0.01	\$ 250.00
Waste Excavation	CY	\$ 20.00	12.5	\$ 250.00
Import Select Fill Material w\ Bentonite Chips	CY	\$ 50.00	20	\$ 1,000.00
HDPE 60-mil Liner material	SF	\$ 5.00	225	\$ 1,125.00
Reveg	AC	\$ 5,000.00	0.02	\$ 100.00
Stormwater Management Controls SWMP	Allow.	\$ 1,500.00	1	\$ 1,500.00
Construction Subtotal				\$ 4,225.00
Bonds (2%)	LS	\$ 84.50	1	\$ 84.50
Contingency (30%)	LS	\$ 1,267.50	1	\$ 1,267.50
Mobilization (20%)	LS	\$ 845.00	1	\$ 845.00
Construction Total				\$ 6,422.00
Design Services				
Local Permitting	Allow.	\$ 500.00	1	\$ 500.00
Design Management	Allow.	\$ 427.50	1	\$ 427.50
Construction Plans	Allow.	\$ 2,500.00	1	\$ 2,500.00
Technical Specifications	Allow.	\$ 100.00	1	\$ 100.00
Cost Estimate	Allow.	\$ 250.00	1	\$ 250.00
Design Services Total				\$ 3,777.50
Construction Services				
Engineering Management & Oversight (6%)		\$ 385.32	1	\$ 385.32
Construction Materials Testing		\$ 481.65	1	\$ 481.65
Construction Surveying		\$ 481.65	1	\$ 481.65
Construction Services Total				\$ 1,348.62
Project Total:				\$ 11,548.12





Figure 1. Wetland delineation for Pete's Lake.



Figure 2. Future Site of the Hearts and Spades Community Garden.

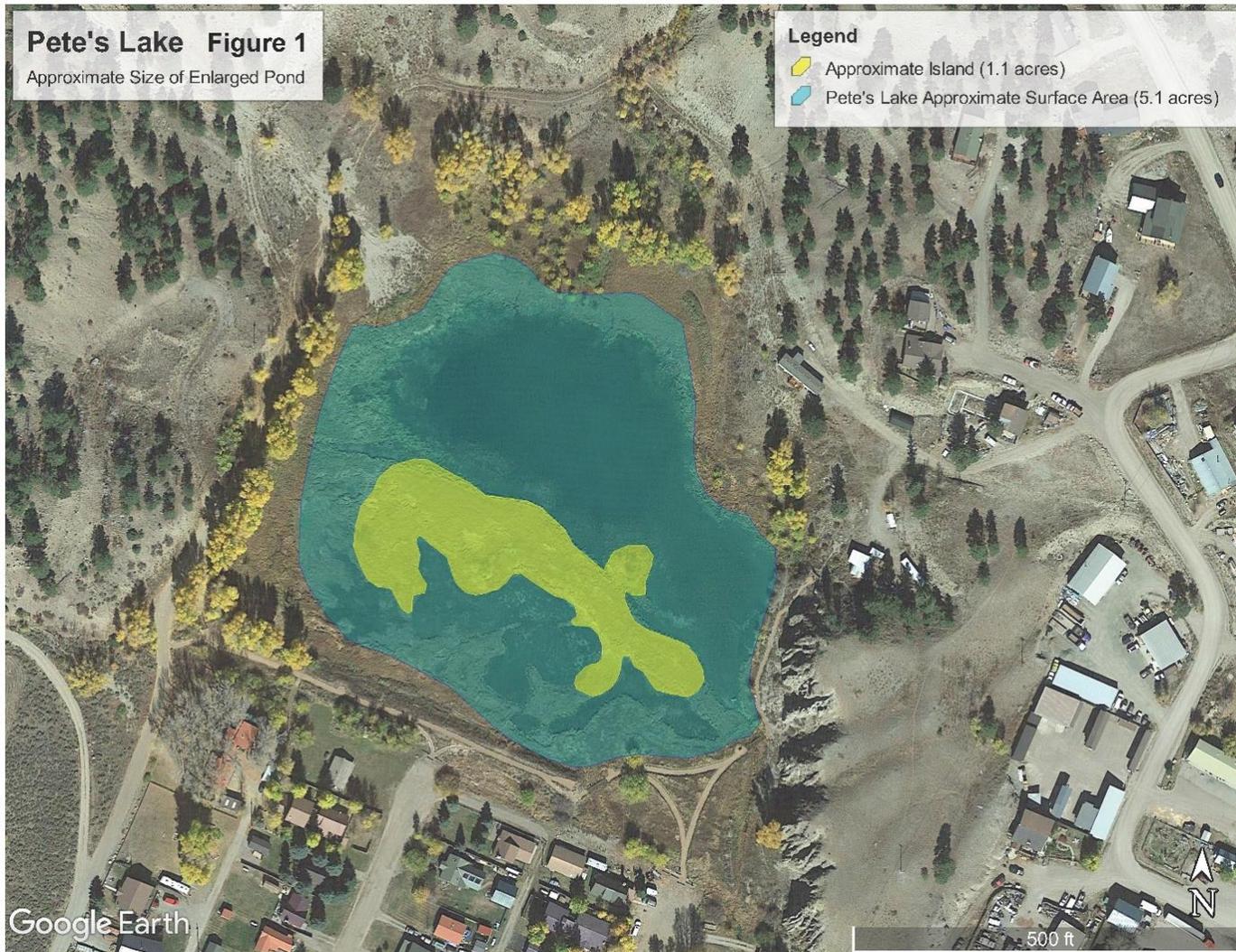
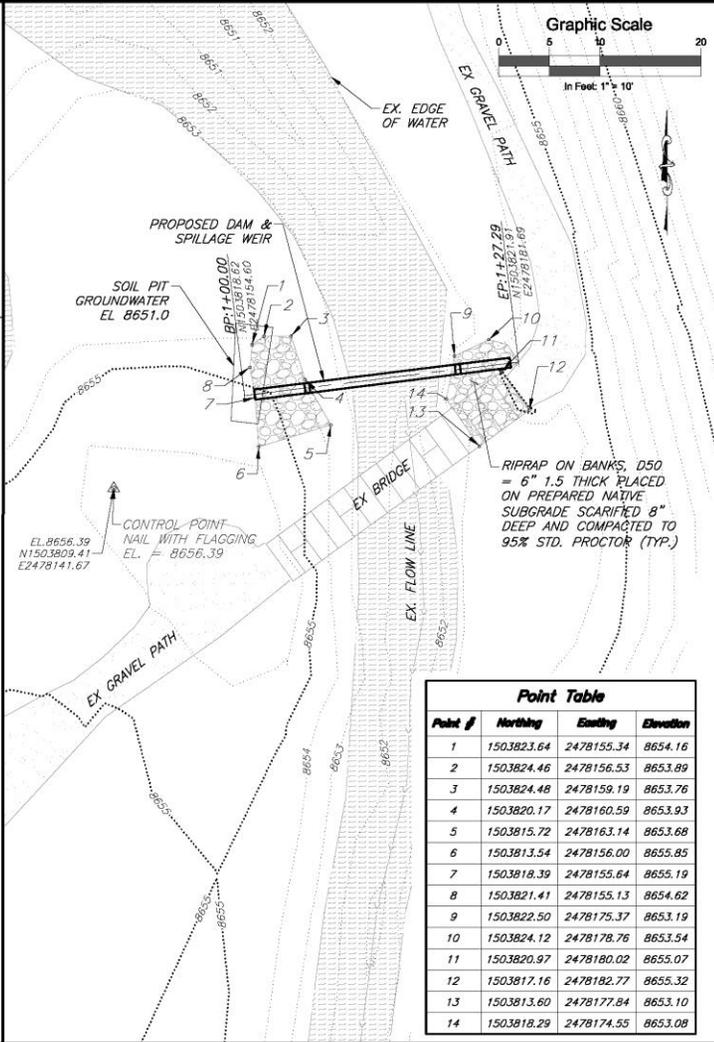
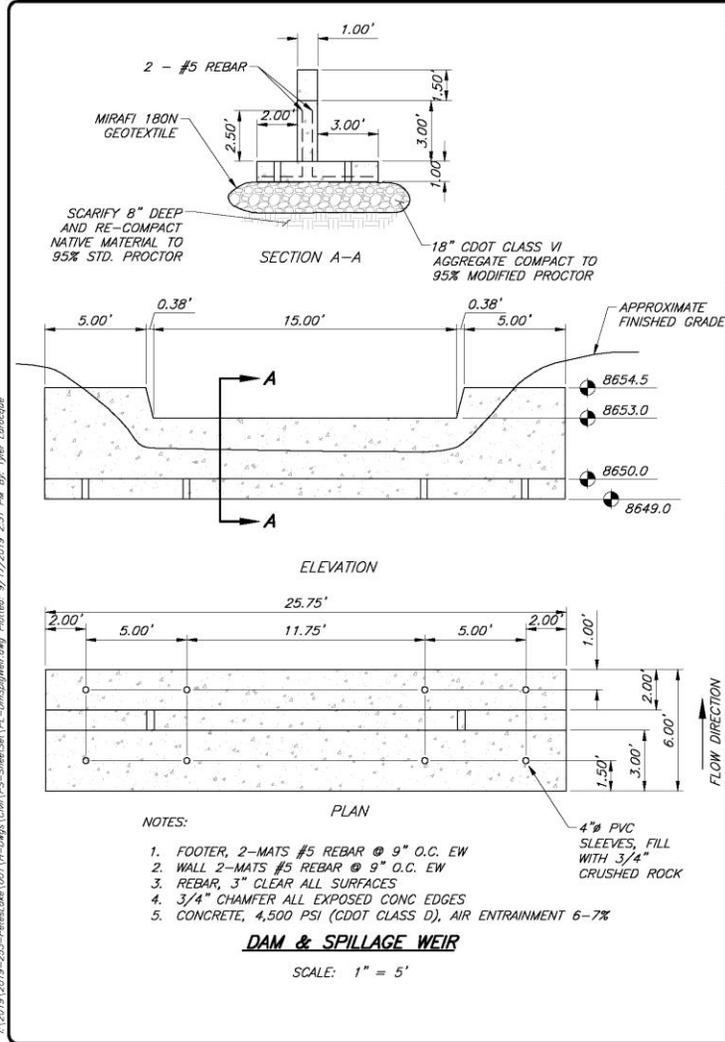


Figure 3. Approximate size of enlarged pond.



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Lake Fork Valley Conservancy
Pete's Lake Improvements

CONSTRUCTION SET

Job No. 2019-263.001
Drawn by: TL
Date: 6.26.19
QC: BLL | PE: ELK
File: PL-DamSpillage

Dam & Spillage Weir Design

Dwg No. **5**
Of: 6

A:\2019\2019-263-Pete's Lake Improvements\PL-DamSpillage.dwg Plotfile: 8/17/2019 2:31 PM Bjr Tyler Larocque

Figure 1. Conceptual Build Out for Trails



Figure 10. Conceptual Layout of Proposed Trails at Pete's Lake.



DRAFT MEMORANDUM

TO: Camille Richard – Lake Fork Valley Conservancy

FROM: Bailey Leppek, PE and Brendon Langenhuizen, PE – SGM Inc.

DATE: 7/12/2019

RE: Pete’s Lake Water Storage and Habitat Improvement Project –
Water Rights Evaluation

Pete’s Lake is located on the northwest side of Lake City, Colorado. The lake can receive natural inflow from two tributaries to the Lake Fork Gunnison River: Slaughter House Gulch and a tributary which is called Rigney Creek (formerly known as Goner Creek). There is currently no water right for the Lake. Lake Fork Valley Conservancy (LFVC) wants to build up the berm to raise the water level in Pete’s Lake by one to two feet for better wildlife habitat and to serve as a town park amenity.

The purpose of this memo is to provide background on the past water rights for Pete’s Lake, provide water rights recommendations, and provide options for covering out-of-priority evaporation caused by expanding the storage capacity of the lake.

History and Background

Pete’s Lake was previously a larger mining reservoir with a dam approximately eight to ten feet high. The reservoir had a 42 acre-foot (AF) storage right decreed in Case No. CA6981 with a 1915 appropriation date and a 1960 adjudication date. The reservoir was decreed to fill with surface water from Slaughter House Gulch, Goner Creek (through the Goner Ditch), and Crystal Creek (through the Crystal Ditch). The Goner Ditch structure diverts from Goner Creek, which are now referred to as the Rigney Ditch and Rigney Creek, respectively. The 42 AF reservoir water right was abandoned by the court in 1992. At that time the dam was mostly removed, leaving a small berm (1 to 2 feet high) which retained a smaller amount of storage. Recently, within the last few years, the Water Commissioner removed the part of the berm that blocked the outlet ditch, which lowered the water level to what is thought to have existed before any lake improvements were made. Pete’s Lake currently retains some natural ponding of water and wetlands, but currently has no active storage. The existing capacity of Pete’s Lake has not been surveyed and is unknown.

Water Rights Summary

Pete's Lake currently does not have a water right to store water, meaning that it can only store water during "free river" conditions (i.e. when there is no downstream call on the river). If LFVC files for a new junior water right for storage in Pete's Lake, the reservoir will be able to store water as long as the downstream call is junior to its water right (i.e. the water right will protect the reservoir's ability to fill from any water rights filed after its own water right is filed).

When Pete's Lake is expanded, the increased surface area will increase evaporation, causing out-of-priority depletions even when the lake is not actively storing water. Whether or not LFVC applies for a water right for Pete's Lake, out-of-priority evaporation from Pete's Lake must be covered (augmented or released from the reservoir). Without a water right, evaporation must be covered during *any* downstream call. If a new junior water right is filed, evaporation will need to be covered during times of a *senior* downstream call.

Downstream Water Rights and Instream Flows

The Gunnison River typically has a call placed every year that places Lake Fork and Rigney Creek under administration during the summer and late irrigation season. The closest downstream call risk on the Lake Fork Gunnison River is an instream flow (ISF) right decreed Case No. 80CW119. While the ISF right has never placed a call on the Lake Fork Gunnison River, it could place a call in the future.

The only foreseen risk, albeit a low risk, is for a water right to be filed on the Rigney Creek tributary downstream of Pete's Lake for 1,000 feet to the confluence with Lake Fork Gunnison River. There are no pending water rights, including ISF rights, on this stretch, and as it is a short and steep stretch, it doesn't appear that it would be a high priority candidate for a future junior water right filing.

Recommendations for Applying for a Water Right

LFVC could apply for a conditional water storage right for Pete's Lake now but it our recommendation to wait and apply for an absolute water storage right once the pond expansion is complete for a more streamlined process.

Once the pond is constructed, a survey can determine the finished volume and surface area, which will be needed for the absolute water rights application. Applying for an absolute water right will save the time of diligence filing that a conditional water right would require. Waiting up to a few years to apply for the right will cause Pete's Lake to have a slightly more junior priority date. As there is no pending instream flow water right between Pete's Lake and the confluence with the Lake Fork Gunnison River, it is likely that the difference in priority date of the water right will not make a significant difference.

Reservoir Evaporation

Table 1 presents the monthly evaporation rates for Pete’s Lake. The exact surface area for the reservoir as expanded is currently unknown, as it is based on many factors yet to be determined (the dam height, how much area is dredged, whether the dredged material is added to the interior island, the size of the interior island, etc.). As such, the evaporation volume for an expected mid-range surface area of 5.1 acres is presented in the table. **Figure 1**, attached, is a map showing a possible approximate surface area of the pond as expanded (5.1 acres) and a possible approximate location and size of the interior island.

Table 1: Monthly Evaporation Rate and Volume for Pete’s Lake at Surface Area of 5.1 acres

Monthly Distribution	Net Evaporation for Pete’s Lake		
	Evaporation Rate ¹ for On Channel Lake Elevation 8,600 to 8,799 ft		Evaporation Volume ² for Surface Area of 5.1 acres (AF)
	(inches)	(AF/acre)	
Jan	0.25	0.02	0.11
Feb	0.75	0.06	0.32
Mar	1.49	0.12	0.63
Apr	2.24	0.19	0.95
May	3.11	0.26	1.32
Jun	3.85	0.32	1.64
Jul (Peak)	3.97	0.33	1.69
Aug	3.23	0.27	1.37
Sep	2.73	0.23	1.16
Oct	1.86	0.16	0.79
Nov	0.99	0.08	0.42
Dec	0.37	0.03	0.16
Annual Total	24.84	2.07	10.56

Notes:

1. Water Replacement Requirement for Pond Evaporation Rates for On Channel Lakes, tables of annual evaporation replacement requirement from UGRWCD agreement for augmentation from Lake San Cristobal. Monthly distribution for elevations above 6,500 ft applied from Division of Water Resources, April 1, 2011, "General Guidelines for Substitute Water Supply Plans for Sand and Gravel Pits".
2. Monthly volume of net evaporation based on an approximated surface area of 5.1 acres.

Options for Covering Evaporation

LFVC has two main options for augmenting out-of-priority evaporation, as described below.

Option 1: Release water from the reservoir

LFVC could have an outlet structure constructed on Pete’s Lake that would allow LFVC to incrementally lower the water level each month equal to the estimated volume of evaporation that occurred that month. The approximate depth and volume that would have to be released for an estimated reservoir size of 5.1 acres are described in **Table 1**. This option would require that LFVC coordinate with the Division of Water Resources on the frequency (monthly or bi-monthly

releases) of lowering pond levels and have someone available to make the required adjustments. This option also requires that the proposed low-head dam include the operational ability to lower the water surface level utilizing an Agridrain water level control structure or similar device.

Option 2: Augment water lost to evaporation using a contract with Upper Gunnison Water Conservancy District for releases from Lake San Cristobal

The alternative option for augmenting evaporation depletions is to get a contract with the Upper Gunnison Water Conservancy District (UGWCD) for augmentation releases from Lake San Cristobal which will allow Pete's Lake to stay full year-round. UGWCD does not need Pete's Lake to have a water right in order to provide augmentation water from Lake San Cristobal to cover evaporative losses, so this option will work in the interim before a water right is obtained for Pete's Lake. Lake San Cristobal is upstream of Pete's Lake on the Lake Fork Gunnison River, so this augmentation will cover requirements from a call from the instream flow on the Lake Fork Gunnison River.

UGWCD charges for augmentation water out of Lake San Cristobal based on the surface area (and therefore based on the evaporation they will need to cover), elevation of the reservoir, and whether the reservoir is on-channel or off-channel. UGWCD charges a onetime purchase price for the augmentation units (based on the number of units purchased), plus an annual fee (also based on the number of units purchased).

As the exact surface area of the expanded reservoir is not yet known, **Table 2** presents a range of likely surface areas and the resulting number of augmentation units that would need to be purchased from Lake San Cristobal, and the resulting purchase price and annual fee.

Table 2: Summary of Possible Augmentation Costs for Pete's Lake

Surface Area (acres)	Number of Augmentation Units Required	Approximate Purchase Price (One Time Fee)	Annual Fee	Notes
6.5	269.1	\$ 14,800	\$ 1,230	High end of likely surface area.
5.5	227.7	\$ 12,500	\$ 1,040	
5.1	211.1	\$ 11,600	\$ 970	Likely mid-range surface area shown on Figure 1 .
4.5	186.3	\$ 10,300	\$ 860	
3.5	144.9	\$ 8,000	\$ 670	Current surface area, minimum cost.