

This is a digital document from the collections of the *Wyoming Water Resources Data System (WRDS) Library*.

For additional information about this document and the document conversion process, please contact WRDS at wrrds@uwyo.edu and include the phrase “**Digital Documents**” in your subject heading.

To view other documents please visit the WRDS Library online at:
<http://library.wrrds.uwyo.edu>

Mailing Address:

Water Resources Data System
University of Wyoming, Dept 3943
1000 E University Avenue
Laramie, WY 82071

Physical Address:

Wyoming Hall, Room 249
University of Wyoming
Laramie, WY 82071

Phone: (307) 766-6651

Fax: (307) 766-3785

Funding for WRDS and the creation of this electronic document was provided by the Wyoming Water Development Commission
(<http://wwdc.state.wy.us>)



GEOTECHNICAL AND
WATER RESOURCES ENGINEERING



PERMITTING REPORT EXECUTIVE SUMMARY

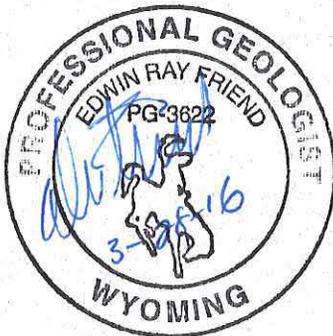
SUBLETTE CREEK RESERVOIR MAU/COVEY CANAL REHABILITATION LEVEL II, PHASE II(a) PROJECT LINCOLN COUNTY, WYOMING

Submitted to
Wyoming Water Development Commission
6920 Yellowtail Road
Cheyenne, Wyoming 82002

Submitted by
RJH Consultants, Inc.
9800 Mt. Pyramid Court, Suite 330
Englewood, Colorado 80112
303-225-4611
www.rjh-consultants.com

in association with
Wenck and Associates, Inc.
Western Ecosystems Technology
Miller Ecological Consultants, Inc.

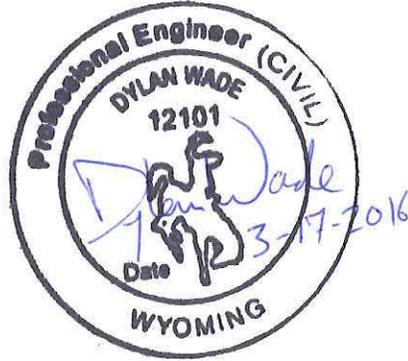
March 2016
Project 09114



Edwin R. Friend, P.E., P.G. PMP
Project Engineer/Geological Engineer
RJH Consultants, Inc.



Robert J. Huzjak, P.E.
Project Manager
RJH Consultants, Inc.



Dylan Wade, P.E.
Hydraulic Engineer
Wenck Associates, Inc.

TABLE OF CONTENTS

TABLE OF CONTENTS	I
SUBLETTE CREEK EXECUTIVE SUMMARY	1
CONCLUSIONS	2
RECOMMENDATIONS	6



SUBLETTE CREEK EXECUTIVE SUMMARY

The purposes of this report are to present data collected from our investigations; results from our evaluations; and input collected from permitting agencies. The Project site is located about 3 miles south of Cokeville, Wyoming on Sublette Creek. The primary objectives of this Level II, Phase II(a) study were to:

- Further evaluate permitting issues.
- Evaluate potential alternative reservoir storage sizes and locations.
- Evaluate probable environmental mitigation requirements and identify potential mitigation concepts.
- Update water supply evaluations.

The general scope of services performed and described in this report includes:

- Evaluated the potential to store water in Woodruff Narrows.
- Collected water and air temperature data for the Smiths Fork.
- Performed water temperature modeling of the Smiths Fork.
- Evaluated potential fisheries impacts and identified mitigation concepts.
- Collected stream and flow data on Smiths Fork, Sublette Creek, and Bear River.
- Updated and refined the existing STATEMOD model and reservoir operations.
- Refined the Purpose and Need Statement.
- Identified potential impacts to big game and identified potential mitigation concepts.
- Identified general requirements for acquiring state and federal lands.
- Identified potential partnering funding sources.
- Evaluated possible wetland mitigation concepts.
- Identified quantity of Animal Unit Months (AUMs) that would be lost due to inundation by the reservoir and identified potential mitigation options.
- Performed a high-level fatal flaw evaluation for a potential reservoir on Dry Fork.
- Updated the opinion of probable construction cost.

During the course of the above evaluations, some tasks that were included in the initial scope were removed by the Wyoming Water Development Commission (WWDC). The following items were not completed during the course of the Project:

- Updating the outlet works and reservoir temperature model because draining the reservoir annually was requested by the Wyoming Game and Fish Department (WGFD) and Sublette Creek would not be enhanced for fisheries.
- Evaluating impacts to reptile and amphibian habitat resulting from temporary inundation of the wetlands.

Conclusions

Based on the work completed in this Level II, Phase II(a) Study, RJH offers the following conclusions:

- The reservoir storage volume for a reservoir on Sublette Creek would be about 4,200 ac-ft.
- The 8- out of 10-year yield for a reservoir on Sublette Creek would be between 2,000 and 2,400 ac-ft.
- Five out of 10 years there is up to 3,100 ac-ft of water that could be exchanged through July at the Covey Canal or on the Lower Smiths Fork while maintaining the recommended minimum stream flows.
- Three out of 10 years there is up to 1,100 ac-ft of water that could be exchanged in September into the Covey Canal or on the Lower Smiths Fork while maintaining the recommended minimum stream flows.
- There are about 2,400 ac-ft of annual shortages that could be served directly by the reservoir and an additional 5,500 ac-ft that could be served through exchanges at the Covey Canal or on the Smiths Fork below the Covey Canal. This likely will not meet the entire need because the reservoir 8 out of 10-year yield is between 2,000 and 2,400 ac-ft.
- The WGFD recommends that the reservoir be drained every year or at least once every 3 years, and a fish screen will be included on the outlet to reduce the potential for establishment of undesirable nonnative fish species downstream of the reservoir.
- The modeling performed to estimate stream temperatures on Smiths Fork is a reasonable prediction based on water temperature data collected in 2015.

- The natural flows in Sublette Creek have been modeled to pass through the reservoir up to the minimum recommended flows shown in Table 3.1.
- Sublette Creek is not a likely location for fisheries mitigation because of the following:
 - The required buffer along the creek would severely limit the adjacent owners use of the land.
 - A portion of the creek is within a NRCS easement and modification may not be possible.
 - A fish bypass structure between Sublette Creek and Bear River may not be technically feasible to maintain the owner’s historical operation of the creek and land.
- Fisheries impacts on Sublette Creek caused by the creation of a reservoir could possibly be mitigated on Smiths Fork, the Bear River, or tributaries of the Smiths Fork. Mitigation and enhancement alternatives could include some combination of the below identified options:
 - Installation of a fish screen on the Covey Canal diversion structure.
 - Installation of a fish screen on the Tri-diversion structure.
 - Construction of a fish bypass structure around the Covey Canal diversion structure.
 - Enhancement of riparian habitat on Smiths Fork or tributaries of the Smiths Fork including bank stabilization, construction of engineered structures in the stream, or willow and cottonwood plantings.
 - Construction of a fish bypass structure around Pixley Dam and BQ diversion, and other fish passage barriers on the Bear River.
- With the recommended minimum stream flows, the Project would result in relatively minor impacts on native Bonneville cutthroat trout and appears to offer relatively minor potential fishery benefits.
- About 26 AUMs could be adversely impacted by the reservoir:
 - 11 AUMs would be adversely impacted on state or federal lands. These could be mitigated by treating existing rangeland with herbicide or controlled burns to increase forage.

- 15 AUMs would be adversely impacted on private land. Although direct mitigation of AUM's on private land may not be required because the purchase of the land would mitigate the lost AUMs, little to no impact to the local community is expected because of an increase of storage from the additional irrigation water and by treating existing rangeland with herbicide or controlled burns to stimulate forage production.
- The reservoir would likely lengthen and increase the stress on the mule deer migration.
- Mitigation and enhancement alternatives for big game could include some combination of:
 - Purchasing conservation easements at the reservoir and at other key locations.
 - Installing wildlife friendly fencing.
 - Improving habitat for elk and mule deer.
 - Purchase existing Federal AUMs and implement a rotation system to reduce grazing and improve habitat.
 - Perform aspen treatments at other locations in the Wyoming Range.
- About 10.5 acres of wetlands would be impacted by the reservoir, of these 3.7 acres would only be impacted temporarily (less than 2 feet of inundation for 2 months during the growing season); therefore, about 6.8 acres would be adversely affected.
- The preferred concept for wetland mitigation would be to construct wetlands up gradient from the reservoir and adjacent to existing wetlands.
- The habitat inundated by the reservoir in Sublette Creek would likely need to be mitigated. The current concept would be to improve stream and riparian habitat along Smiths Fork. Mitigation concepts on Smiths Fork need to be identified, quantified, and confirmed. Wetlands may be incidentally created with this mitigation and could be included in wetland mitigation.
- A dam and reservoir on Sublette Creek would require the following minimum land acquisition, right-of-way agreement, or special use permit:
 - 1 acre of state land.
 - 113 acres of federal land.
 - 185 acres of private land.

- These quantities do not include a buffer or easement around the property that would likely be required for operations. An additional 8 acres of state land, 26 acres of federal land, and 106 acres of private land would be required if a 200 foot buffer is included.
- Storage at Woodruff Narrows is not a viable alternative to storage in a reservoir at Sublette Creek.
- A reservoir on Dry Fork appears technically feasible, but the following items need further consideration and evaluation:
 - Site geology is likely not a fatal flaw, but will impact the Project configuration and increase Project costs.
 - There appears to be sufficient water in the basin; however, a supply canal with a capacity of 500 cfs would be required to obtain an 8- out of 10-year yield of 3,500 ac-ft for a 5,000 ac-ft reservoir.
 - Adverse impacts to other fisheries species, connectivity, flow regime, and habitat could increase Project costs.
 - There is a potential benefit to Smiths Fork fisheries from late season releases.
 - Clean Water Act permitting is likely not a fatal flaw, but will likely increase Project costs and mitigation requirements.
 - Sage grouse is not likely a fatal flaw.
 - Big game is not likely a fatal flaw but will require coordination with WGFD and could increase Project costs.
 - BLM grazing allotments will need to be addressed, which could impact Project costs.
 - There is a potential benefit for a nearby bald eagle nest with the open water created by the reservoir.
 - Threatened and endangered species could exist at the Project site and the site is adjacent to crucial habitat for the Canada lynx, which could increase permitting complexity and increase Project costs.
 - WGFD, BLM, and USFS have concerns with the Project and site.
 - The presence of the leatherside chub could be a fatal flaw to a dam and reservoir on Dry Fork.

- The new Gateway West transmission line will not cross the Sublette Creek Reservoir.
- A dam and reservoir is technically feasible on Sublette Creek (RJH, 2013).
- A dam and reservoir on Sublette Creek is likely permissible.
- The OPPC ranges from about \$24.5 million to \$26.7 million in 2015 dollars. The reliability of this cost estimate is about minus 15 to 30 percent, to plus 20 to 50 percent.

Recommendations

In our opinion, there appears to be a project that is technically feasible and likely permissible for a dam and reservoir on Sublette Creek. Prior to advancement of the Project, the following items should be considered by the WWDC:

- The CDC may require a grant larger than 95 percent for the Project to be economically feasible.
- Confirm beneficiaries and interested parties and identify if they would be directly served by the reservoir or would require exchanges at the Covey Canal.
- Evaluate approaches other than maintaining a large monthly minimum stream flow to reduce the potential for critically high water temperatures in Smiths Fork that could increase historic fish stress levels. The WGFD should be included in this evaluation. One possible approach would be to monitor water temperature, air temperature, and flow and adjust operations on specific days to manage water temperature in Smiths Fork.

If the Project is advanced to the Level III phase, the following items should be addressed in addition to requirements of the NEPA process. Some of these began during the Level II, Phase I Study (RJH, 2010) and Level II Phase II study (RJH, 2013), but were not advanced during this study because of budget constraints:

- CDC needs to establish a legal entity.
- Identify if mitigation for stream habitat inundated by the reservoir could occur on Smiths Fork instead of Sublette Creek.
- Obtain site-specific topographic information for the reservoir, wetlands, surrounding areas, and along Sublette Creek to confirm mitigation concepts are feasible.

- Perform a Class III cultural resource inventory to evaluate cultural resources that could be impacted by the Project.
- Update evaluations to confirm conformance with current sage-grouse executive order.
- A benefit cost ratio analysis was performed in 2010 (RJH, 2010). There have been changes to both the benefits and costs since this was developed. It appears that the benefit cost ratio may decrease, but the analyses needs to be re-evaluated with current information.
- New wetland delineation.
- Evaluation of impacts to amphibian and reptile species from temporary inundation of wetlands.
- Evaluate if irrigation practices could reduce shortages.
- Confirm required AUMs for mitigation and associated easements.
- Identify required easements for mitigation sites.