



TO: Governance Committee (GC)
FROM: Executive Director's Office (EDO)
SUBJECT: Review of Elm Creek Reservoir
DATE: November 25, 2015

I. Introduction

The Elm Creek Reregulating Reservoir was initially proposed in the mid-2000s for the purpose of flood control. The Central Platte Natural Resources District (CPNRD), acting on behalf of local landowners, commissioned a preliminary feasibility study that was completed in May 2006 and determined that flood control benefits were not adequate to justify the construction costs. In 2009, the proposed reservoir was added to the PRRIP's Water Action Plan (WAP) Update as a means of retiming Platte River flows to potentially reduce shortages to target flows and to augment Short Duration High Flow (SDHF) releases. A feasibility study conducted by Olsson Associates was completed in January 2011, and the findings were presented to the Water Advisory Committee (WAC) in April 2011 and to the Governance Committee (GC) in June 2011. Based on extensive concerns with the Elm Creek Reregulating Reservoir that were identified by members of the WAC and the GC, the GC declined to move forward with further analysis of the project. The J-2 Regulating Reservoirs project was selected as the preferred reservoir alternative to move forward into feasibility and implementation.

Analyses presented by consultant RJH indicate that costs for the proposed J-2 Regulating Reservoirs have increased significantly from previous estimates as a result of design refinements and materials costs. Based on these developments, members of the WAC requested that the Elm Creek Reregulating Reservoir be revisited by the Executive Director's Office (EDO) as a matter of due diligence to confirm the rationale for the decision to not move forward with the project in 2011. This memorandum summarizes a preliminary review of past documentation regarding the Elm Creek Reregulating Reservoir, including the following resources:

- EDO and WAC. 2010. Platte River Recovery Implementation Program 2009 Water Action Plan Update. Final. February 23.
- Olsson Associates. 2011. DRAFT Feasibility Study—Elm Creek Regulatory Reservoir, Elm Creek Watershed—Dawson and Buffalo Counties NE. January 10.
- EDO. 2011. Elm Creek Reservoir Feasibility Study Status Update. January 13.
- EDO. 2011. Water Advisory Committee Meeting Minutes, April 26, 2011. Final.
- EDO. 2011. Governance Committee Meeting Minutes, June 14-15, 2011.
- EDO. 2015. 2014 Water Action Plan Project Update: Active, Future, and Inactive WAP Projects. Final, May 22.

The following sections summarize potential issues with the Elm Creek Reregulating Reservoir that were identified in 2011 as affecting the viability of the project to meet PRRIP objectives. Also, it should be noted that recent discussions with representatives of CPNRD indicate that interest in the Elm Creek Reregulating Reservoir for either flood control or Program purposes is not as strong as in the past.



A. Potential Issues with the Elm Creek Reregulating Reservoir

The Elm Creek feasibility study completed by Olsson Associates in January 2011 evaluated 33 different alternative configurations for the project. The most feasible alternative was determined to be a reservoir with 12,000 AF or 19,850 AF storage capacity, improvements to Dawson County Canal to deliver 125 cfs during the non-winter operations, and a well field adjacent to the canal to pump and deliver 60-70 cfs during the winter months. Olsson Associates identified nothing that they considered to be a fatal flaw with the project alternative. However, there are a number of significant environmental and other impacts that were identified in the feasibility study:

- With a 100-year flood storage pool and 19,850 AF of beneficial storage for the PRRIP, the dam and reservoir would impact 1,930 acres of land. This includes 29 parcels of land and 24 landowners.
- 7.25 miles of county roads and various utilities would be within the reservoir and would need to be closed or relocated.
- 13 registered wells would need to be retired.
- Given the cost of channel improvements, releases from the Elm Creek Reregulating Reservoir would be limited to 1,000 cfs, and optimally in the range of 700 cfs to 800 cfs. While this would provide benefit for the reduction of shortages to target flows, it limits the usefulness of the reservoir for supplementing SDHF releases. These release rates also do not account for any transit losses from about four miles of the Elm Creek channel during delivery operations to the Platte River. The J-2 Regulating Reservoirs have an outlet capacity of 2,000 cfs directly to the river.
- Seepage from the reservoir would create a groundwater mound that would raise the water table at least one foot over a radius of three miles. Water table increases in the vicinity of the Village of Elm Creek would be in the 2- to 4-foot range, which would require mitigation in the form of five additional pumping wells. Lining the reservoir to prevent this seepage would result in cost considerations consistent with recent developments regarding the J-2 Regulating Reservoirs.
- The Corps of Engineers identified the Dawson County Canal as waters of the United States due to its downgradient connection to Elm Creek. As a result, a Section 404 Individual Permit would be required, along with National Environmental Policy Act (NEPA) compliance. Given past and recent experience in Nebraska and Colorado, this process could be far more expensive and time-consuming than anticipated during the feasibility study.

The results of the feasibility study were presented to the WAC by representatives of the EDO, CPNRD, and Olsson Associates in April 2011. The meeting minutes indicate a list of concerns expressed by WAC members, including the following:

- Project yields reported in the feasibility study represent releases at the reservoir outlet during times of shortage, but do not account for conveyance losses from Elm Creek during delivery or in the Platte River during routing to Grand Island.
- Project yields do not reflect the necessary score adjustment of more than 11 percent due to the Elm Creek site being about eight miles downstream of the Overton Gage and therefore not providing benefit to the entire habitat reach.



- Elm Creek channel improvements are cost-prohibitive above 1,400 cfs, preventing the reservoir from being able to achieve the 2,000 cfs SDHF release goal. As a result, the reservoir benefit would be primarily for the reduction of shortages to target flows.
- Costs are not presented clearly in the report; if miles of canal improvements are required in addition to other cost factors already considered, this may be a fatal flaw.
- Potential impacts to groundwater were a concern. WAC members were uncertain as to how the proposed wells along Dawson County Canal would be permitted, whether pumping seepage water is appropriate, and how to ensure there are no depletions associated with the pumping. If it is determined that there would be depletions, it is unclear if the Program or another entity would be responsible for the required mitigation.
- A representative from the U.S. Fish and Wildlife Service stated that the USFWS supported the J-2 Regulating Reservoirs project, but was “not excited about the Elm Creek Regulating project.”

Following the WAC discussion, the Elm Creek Reregulating Reservoir feasibility study was presented to the GC in June 2011. Notes from the meeting indicate the following issues were discussed:

- Supply issues – limited ability to wheel water into the reservoir
- Impacting several landowners, depending on the size of the reservoir
- Lower yields, but with similar costs to J-2
- On the mainstem of Elm Creek, so the Corps permitting process would be difficult
- Concern about how deeply we are dipping into the excess flow pool

With regard to the April 2011 WAC meeting, the GC meeting notes state that “the WAC inclination was not favorable toward this reservoir.” Furthermore, as a result of the combination of issues identified above, Executive Director Kenny “said these items mean the Program is backing off on this [Elm Creek] project, and the window of opportunity may be closing as a result.”

B. Elm Creek and J-2 Cost Comparison

As indicated above, despite Olsson Associates identifying no fatal flaws with the Elm Creek Reregulating Reservoir, review of the feasibility study by the EDO, WAC, and GC raised many concerns about the viability of the project. Contemporaneous meeting minutes suggest that costs barely factored into the discussions. Nonetheless, it is worth taking a closer look at estimated costs of the project in comparison to the J-2 Regulating Reservoirs.

Capital costs for the most feasible Elm Creek alternative were estimated to be approximately \$35.5M to \$40.8M, including construction, engineering, permitting, and land acquisition. For comparison, the initial capital cost estimate for the J-2 Regulating Reservoirs, as presented in the 2009 WAP Update, was about \$40.039M. This cost estimate was developed by Olsson Associates as part of a 2009 feasibility study of potential regulating reservoirs that could be located within the Central Nebraska Public Power and Irrigation District (CNPPID) system. The costs are identified as including base reservoir cost, plus inlet, outlet, and conveyance cost.



On the surface, it appears that the initial estimates of the costs to build these reservoirs were similar. Both estimates were developed by the same consultant and used similar assumptions in 2009 and 2011. The EDO developed the following comparative table in early 2011, and made adjustments to estimated lifecycle costs based on anticipated total project score (i.e., reductions to target flow shortages routed to Grand Island rather than the yields at the point of release from storage as presented in the feasibility reports).

Component	J-2 Reregulating Reservoir	Elm Creek Reregulating Reservoir (19,850 AF storage)	Elm Creek Reregulating Reservoir (12,000 AF storage)
SDHF Augmentation Release Potential ¹	2,000 cfs	1,000 cfs	1,000 cfs
50-Year Life Cycle Cost from Report Tables ²	\$19	\$37	\$37
Estimated Target Flow Score ³	40,000 AFY	30,000 AFY	25,000 AFY
Adjusted 50-Yr Life Cycle Cost for Score ⁴	\$28	\$47	\$49
Total Cost (Construction & 50-Yr Capital Costs) ⁵	\$56,103,000	\$69,763,000	\$61,330,000

1,2,3,4,5. Notes included in the spreadsheet "Comparison table of J2, Elm Creek 01.18.11.xlsx"

The Elm Creek feasibility study identified project yield ranging from 33,000 AFY to 38,000 AFY. However, these values were based on releases from the reservoir outlet and, as indicated previously, did not take into account conveyance losses from the Elm Creek channel while delivering to the Platte River or the pro-rata reduction as a result of the reservoir's distance downstream from the Overton gage at the upper end of the associated habitat reach. The 25,000 AFY to 30,000 AFY score values are based on the EDO's preliminary routing analysis to Grand Island. Thus, although the initial project costs appear to be similar, life cycle costs per AF of scored yield were about 1.7 times higher for Elm Creek than J-2. Moreover, the 40,000 AF total score for the J-2 Regulating Reservoirs is based on a storage capacity of 13,959 AF; with a potential score of 30,000 AF from the 19,850 AF reservoir, Elm Creek produces less Program benefit from a larger storage volume.

Costs for Elm Creek have not been updated since 2011, whereas costs for J-2 were updated as the project progressed. As of the completion of the 2014 WAP Update, costs for construction, engineering, and permitting of the J-2 Regulating Reservoirs had increased to \$58M; this does not include land acquisition or O&M costs. It is anticipated that costs to build the Elm Creek Reregulating Reservoir would be subject to the same cost escalation factors.

C. Further Considerations for Elm Creek

The EDO's review of Elm Creek Reregulating Reservoir documentation indicated that Program stakeholders identified many potential issues with the project. A number of the points made by WAC and GC members raise other questions that would also need to be considered, such as the following:

- As stated previously, there is the potential for pumping associated with the Elm Creek project to create depletions that the Program may be required to mitigate. If this were to happen, there would necessarily be further downward adjustments to the potential project score.



- 141 • The “most feasible” Elm Creek alternative identified by Olsson Associates included wells for
142 pumping water into the Dawson County Canal during the winter months for delivery to the
143 reservoir. Applegate Group prepared a Canal Winter Operations Feasibility Study for the Nebraska
144 Public Power District (NPPD) that investigated the Dawson County Canal and others. The report
145 identified several concerns regarding potential winter canal operation, including the need to
146 replace numerous check structures, potential replacement of siphons, necessary enlargement of the
147 lower extent of the main canal, and winter removal of trashracks to prevent icing problems. If these
148 issues were to preclude the winter pumping into Dawson County Canal, the water supply to the
149 Elm Creek Reregulating Reservoir would be reduced, which may in turn translate to a lesser ability
150 to reduce shortages to target flows, and thus, a further reduced project score.
- 151 • The score reduction of approximately 11 percent due to Elm Creek being eight miles below the
152 Overton Gage physically corresponds to the upper portion of the habitat reach deriving no benefit
153 from the project.
- 154 • If CPNRD declines to participate in the project for the flood control benefit, it is unclear what
155 entity would be responsible for the actual operation of the reservoir. Without a project sponsor, it
156 is uncertain what would happen to the reservoir if the Program were to end. In contrast, CNPPID
157 has a vested interest in the J-2 Regulating Reservoirs because of the benefit from the mitigation of
158 hydrocycling effects.
- 159 • The number of potentially affected landowners at the Elm Creek site (24) is many more than at the
160 J-2 site.
- 161 • Lifecycle costs per AF for Elm Creek were higher than J-2 when evaluated in 2011. Accounting
162 for cost escalation factors in combination with the identified factors that contribute to downward
163 adjustment of the potential project score for Elm Creek would result in even higher lifecycle costs
164 for Elm Creek.

165 Further updates of Elm Creek costs could be completed if requested by the WAC or the GC, however, the
166 many other issues with the reservoir site and operations that were identified in 2011 are still valid concerns
167 in 2015. There is no basis to think that Elm Creek Reservoir has become a more feasible option for the
168 PRRIP, regardless of cost.