

INTRODUCTION AND BACKGROUND

The following report is provided to document the completed project as per the scope of work and provide the supporting information outlining the design process. Upon approval from the Colorado Water Conservation Board the Fish Grant received by Colorado Springs Utilities on October 30, 2009 will be complete and can be closed out. Each task is outlined in the sections below with a brief description and the deliverables required per the scope of work are contained in the relevant sections.

There are over 20 diversion dams and other structures on Fountain Creek between Colorado Springs and the confluence with the Arkansas River in Pueblo. Studies conducted by the USACE, CDOW, and USGS have concluded that these dams are impeding fish movement on the Creek, resulting in reduced numbers of fish, including the Arkansas darter (state threatened) and the flathead chub (state species of concern). The water diversion dam located on the Clear Springs Ranch property that is owned by Colorado Springs Utilities was given a high priority by these agencies for a fish passage project due to the abundance of fish at this location and the drop structures height (approximately 6 feet).

The project provided the required planning, research, design and engineering for fish passage around the existing water diversion structure. The target species for the fish passage are the Arkansas darter and flathead chub, although it is expected that other fish with similar physical characteristics will use the fish passage. The project established swimming performance data for the target species and lead to a first of its kind guidelines for the design and implementation of fish passage for native plains fish species. This work will be applicable to all future plains fish passage projects.

OBJECTIVES

The project was able to successfully meet the objectives set forth by the scope of work.

1. Conduct swimming performance tests on the target species to determine species performance parameters. Swimming performance data will be utilized to design the Clear Springs Ranch Water Diversion fish passage as well as future fish passages where the fish species is the same or similar to the target species.
 - a. Colorado State University performed swimming performance test on the target species and worked with the stakeholders to determine the design criteria used in the design of the passage. The two reports completed by Colorado State University can be found in the Appendix - Task 4.

2. Design, engineer, and develop probable estimate of construction costs for a fish passage to circumvent existing conditions that prevent fish passage upstream of the Clear Springs Ranch Water Diversion Structure.
 - a. Colorado Springs Utilities, THK Associates and Matrix Design Group completed the design for the passage. The design drawings and engineering analysis can be found in the Appendix - Task 10.
 - b. At each of the design phases a cost estimate was completed and at the final design stage an opinion of probable construction cost was completed and can be found in the Appendix - Task 10.
3. Acquire the required easements or land for the access, construction, and management of the fish passage structure.
 - a. The proposed design as presented in Task 10 utilizes a structure that is constructed over the dam and does not require any additional easements or land for construction or monitoring.

TASKS

- Task 1. Pre-Project Team Meeting, Coordination and Site Visit

Prepare for, coordinate and attend a Project Team Meeting and Site Visit to identify and discuss project issues, goals, opportunities, constraints and potential solutions. Meet to discuss and refine the project process and schedule as required. Meeting to be attended by all project partners.

- Deliverables
 - Meeting minutes – Meeting minutes for the stakeholder meetings are provided in Appendix – Task 1

- Task 2. Site Survey and Base Map Development

Coordinate topographic survey of the project site.

- Deliverables
 - Site Survey and Base Map - An AutoCAD file and pdf base map of the existing site conditions is provided in the Appendix – Task 2

- Task 3. Geotechnical Soil Investigation and Analysis

Coordinate geotechnical investigation and analysis.

- Deliverables

- Geotechnical Soils Report – The proposed design utilizes the existing diversion dam basin and subgrade to support the structure so no additional geotechnical investigation was completed. The existing dam as-builts are provided in the Appendix – Task 3

- Task 4. Aquatic Research and Design Criteria

Colorado State University will collaborate with CDOW and the USGS to collect wild fish samples and conduct swimming performance research for the target fish species. The resulting research data will allow design engineers to calculate the performance limits of the species evaluated and apply them directly to the design process. Any information generated under this task will apply to the many future fish passage mitigation measures on Fountain Creek and the eastern plains of Colorado.

- Deliverables

- Use available, newly acquired, and published data for any other fishes on Fountain Creek to develop a set of velocity recommendations for the proposed fishway at the Clear Springs Ranch Water Diversion Structure - The swimming studies and design criteria are attached in the Appendix – Task 4

- Task 5. Pre-Planning, Identify Fish Passage Design Options and Preliminary Estimate of Probable Construction Costs

Based on information learned from aquatic research, fish sampling, soils investigation and existing site conditions such as creek hydrology, land ownership, vegetation, etc., the design team will identify potential alternatives to provide passage for the target fish species over or around the existing diversion structure. Based on what we know about the site at this time, at least two options are probable. One option would involve a fish passage around the east side of the diversion structure. A second option would incorporate the fish ladder as part of the existing diversion structure. Preliminary estimates of probable construction costs will be provided for each viable option.

- Deliverables

- Up to two design options with associated estimates of probable construction costs – The alternative analysis PowerPoint, Design

Alternatives Report and Concept Drawings evaluated during the design process are attached in the Appendix – Task 5

- Task 6. Land Acquisition/Easements

The options identified in Task 4 may require land acquisition in order to construct the fish passage or ladder or to gain access to the site for construction. The Project Team will meet with the existing landowner on the east side of Fountain Creek to discuss the possibility of acquiring land or easements to accommodate a fish passage or construction access onto private property.

- Deliverables

- Land acquisition surveying, legal description, agreement, etc. will be completed by Colorado Springs Utilities - The proposed design as presented in Task 10 utilizes a structure that is constructed over the dam and does not require any additional easements or land for construction or monitoring.

- Task 7. Identify Preferred Fish Ladder Options and 30% Design

Based on all of the results from Task 1 through 6, the Project Team with concurrence with the Client will identify the best option for a fish passage or ladder.

- Deliverables

- 30% design and engineering submittal of the preferred option and estimate of probable construction costs – During the design process it was determined that this design phase would be excluded and the plans would move directly to 60% Design.

- Task 8. 60% Design and Estimate of Probable Construction Costs

Complete approximately 60% complete design and engineering construction drawings, details, specifications and estimate of probable construction costs.

- Deliverables

- 60% design and engineering submittal of the preferred option and estimate of probable construction costs – The 60% design and cost estimate documents are attached in Appendix – Task 8

- Task 9. 90% Design and Estimate of Probable Construction Costs

Complete approximately 90% complete design and engineering construction drawings, details, specifications and estimate of probable construction costs.

- Deliverables
 - 90% design and engineering submittal of the preferred option and estimate of probable construction costs - The 90% design and cost estimate documents are attached in Appendix – Task 9
- Task 10. 100% Design and Estimate of Probable Construction Costs

Complete 100% complete design and engineering construction drawings, details, specifications and estimate of probable construction costs.

- Deliverables
 - 100% design and engineering submittal of the preferred option and estimate of probable construction costs - The 100% design and cost estimate documents are attached in Appendix – Task 10
- Task 11. Permitting

Prepare Nationwide 404 Permit.

- Deliverables – Nationwide 404 Permit.
- Task 12. Reporting and Final Deliverable

The applicant shall provide the CWCB a progress report every six months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the task identified in the scope of work including a description of any major issues that have occurred and any corrective action taken to address these issues.

- Deliverable
 - Final Report summarizing the project and documents how the project was completed – This report is provided to document the completed project as per the scope of work and provide the supporting information outlining the design process.