

CACHE LA POUFRE RIVER AT GREELEY, COLORADO

SUMMARY OF THE PROPOSED FEASIBILITY STUDY EFFORT AND EXPECTED PRODUCTS

1. GENERAL STUDY SCOPE

The study effort will build upon what was learned in the Reconnaissance Study (905(b) Report). The primary study objective is to determine the most beneficial plan to reduce the flood threat to Greeley and improve the riparian ecosystem of the Cache la Poudre River. Based upon the results of the Reconnaissance Study, it is anticipated that flood damages can be reduced by increasing stream channel conveyance, lowering flood peaks by storing part of the excess flow in designated areas of the flood plain and removing some property from the floodway. It is likely that the final flood damage reduction plan will include many or all of those methods. The purpose of the Feasibility Study will be to evaluate and then select the best combination of solutions to the problems.

Flood damage reduction solutions focus on finding economical ways to lower peak flood discharges and stages and reducing the amount of property subject to flood damage. Flood levels are reduced by increasing channel conveyance and storage in the river system.

Channel conveyance can be improved by buying and removing some property from critical reaches of the floodway and moving existing sand berms further from the center of the river. Widening the floodway will build upon the City's on-going effort to improve the channel capacity of bridge crossings in Greeley. Where the floodway can be widened, efforts will be made to improve both the environment in the reach and provide a public access corridor.

Gravel pits and old oxbows offer potential as storage areas for flood flows. In addition unoccupied flood plain property, such as the old sugar plant reservoir site east of 6th Avenue near the mouth of Eaton Draw, could also be used for flood storage. The flood storage areas will also be evaluated for their potential to improve riparian habitat along the Cache la Poudre River in Greeley, wetland habitat for migratory bird species and for public access via the regional trail system.

2. STUDY OBJECTIVES TO DECISION POINT 1

The initial focus of the Feasibility Study will be to identify flood reduction alternatives that are likely to have the highest favorable benefit / cost ratios. Additionally, ecosystem restoration efforts that are the most productive will be identified at the end of this phase of study. For both the flood damage reduction and ecosystem improvement efforts, typical tasks will include defining the problem and opportunities, forecasting the future conditions without a project and formulating alternative plans. This initial focus is referred to as "Decision Point 1" and an incremental cost estimate has been prepared for that part of the study.

Affordable flood damage reduction alternatives will be actively pursued during this phase. Particular focus will be producing a solution that will greatly reduce, or possibly eliminate the 100-year flood plain designation in urban areas of Greeley. Efforts will be made to determine whether storage, flood channel widening, land use changes, or some combination of those options will produce the greatest reduction in flood damages for the money spent. Hydrologic and hydraulic models will be prepared that will permit a detailed evaluation of the flood flows in the lower Cache la Poudre River around Greeley. This evaluation will include modeling of flood peaks and flood volumes to determine whether sufficient storage can be realized in detention basins and oxbow storage areas to produce significant flood stage reduction. Specific channel features and flood plain structures will be evaluated to determine where the majority of flood conveyance improvements or flood damage reduction should be focused.

Within the context of the channel and flood plain changes proposed for the Cache la Poudre River, opportunities for ecosystem restoration and enhancement will be examined. Widening the channel to permit overflows to course through old oxbows and flood plain storage areas provide opportunities to recreate riparian habitat similar to what once existed in the lower Cache la Poudre River, prior to channelization and the dissection of the flood plain with spoil-bank levees. The potential for new habitat will be evaluated in terms of state or regional ecological goals, and where possible, designed to support efforts to encourage the survival of threatened and endangered species.

Opportunities for greater river access and use by local citizens will be explored as flood reduction and ecosystem restoration features are examined. Alternatives evaluated during this effort will be examined for integration with the existing recreational system of parks and trails, with the goal to improve the river corridor as an asset to the well being of the citizens of Greeley.

3. PRODUCTS OF THE WORK EFFORT LEADING TO DECISION POINT 1

Specific tasks that will be addressed before reaching Decision Point 1 include defining of stage-frequency-damage curves along key river reaches, determining the shape of major historical flood hydrographs, trends in flooding with time and identifying specific channel reaches and storage areas for ecosystem restoration. An economic analysis will be conducted, including the existing conditions expected annual damages for floods of all frequencies. The existing ecosystem will be documented, and a dominant cover-type map developed for the project reach.

If desirable flood damage reduction and ecosystem restoration measures are identified for Decision Point 1, then the study will continue to its conclusion through the process of evaluating the alternatives against the “without project” alternative, comparing the alternatives and selecting a plan. When Decision Point 1 is reached, the scope of the study could be enlarged if desired, to include tributary flood issues, channel stability and other issues that surface during the first part of the feasibility study effort.

More details on the proposed study effort, and the specific tasks to be performed by each member of the team, are provided in the Project Management Plan Appendix A. The following is a summary of specific tasks by each study team member of work to be done to reach the first decision point. Results of the efforts noted below will be provided in an “In-Progress Report”.

A. Cultural Resources – Initial evaluation of key cultural sites via contacts with State Historical Preservation Office and the review of available publications on the topic. Document results in “In-Progress Report”.

B. Biology

1. Review of previous studies that focus on the reach of the Cache la Poudre and species of interest in eastern Colorado. Document results within “In-Progress Report.”
2. Define baseline ecosystem conditions & develop cover-type maps for specific reaches or areas.
3. Define baseline water quality and fishery conditions.
4. Formulate ecosystem restoration plans from among:
 - a) Restoration of river meanders, side channels and oxbows.
 - b) Improvement of riparian and flood plain wetland habitat.
 - c) Limiting impact of construction on fish and wildlife.

C. Socioeconomic Studies -

1. Compile cost information on damages from historical floods.
2. Compile land use & property value data within the 500-year flood plain.
3. Define stage-damage reaches in cooperation with Hydraulics, for use with HEC-FDA model.
4. Compute expected annual damages for alternatives developed in Phase I.

D. Real Estate –

1. Data collection & development of baseline maps.
2. Right of entry, report of title.

E. Hydrology –

1. Hydrologic data collection – Historical stream and canal discharge records & basin parameters.
2. Review & update flood frequency curves.
3. Evaluate trends in flow & their impact on future frequency curves.
4. Develop low flow volume probability relationships.

F. Flood Plain –

1. Configure existing land use data for nonstructural assessment.
2. Conduct nonstructural flood damage reduction assessment.
3. Configure existing water surface profiles for hazard areas.

G. Hydraulics –

1. Compile historic flood data including high water marks, gage information and levee & flood plain information.
2. Update bridge information for modeling.
3. Obtain baseline information on levees & spoil banks with Geotechnical Engineering, including whether the embankments were designed by an engineer.
4. Obtain most recent DTM or TIN files for channels.
5. Define stage-damage reaches in cooperation with Economics.
6. Convert HEC-2 model to HEC-RAS & calibrate for greater analysis accuracy.
7. Delineate flood boundaries using HEC GeoRAS & ArcView.
8. Evaluate impact of storage areas on flood stage reduction using HEC-RAS.

H. Geotechnical –

1. Evaluate the integrity of the existing levee system.
2. Define basic geological conditions (surface and subsurface).
3. Develop preliminary plans for alternative levee alternatives for cost analysis.

I. GIS -

1. Definition of best data sources.
2. Organization of data into logical theme groups.
3. Dissemination of data to team members for use.

J. Cost Engineering –

1. Prepare cost estimates of key features of flood damage reduction and ecosystem restoration alternatives.

K. Plan Formulation –

1. Coordinate team meetings.
2. Corps internal reporting & budget process.
3. Work with Greeley to develop an initial public involvement plan.
4. Lead the team in formulating alternative plans.
5. Coordinate Independent Technical Review process.

4. FINAL PRODUCT OF THE FEASIBILITY STUDY

The final product of the Feasibility Study will be a Recommended Plan for Flood Damage Reduction and Ecosystem Restoration.