

SCOPE OF SERVICES
RIO GRANDE – CABALLO DAM TO AMERICAN DAM
NEW MEXICO AND TEXAS

1. GENERAL. The Albuquerque District of the U.S. Army Corps of Engineers (Corps) will conduct the Caballo Dam to American Dam Study under authority given in the Economy in Government Act (31 USC 1535). The U. S. International Boundary and Water Commission (USIBWC) will use the information to support the management of the Rio Grande Canalization Project.

2. WORK TO BE PERFORMED.

a. Hydrology and Hydraulics.

(1) Data Collection, Research, and Qualitative Analysis

(a) Meet with various branches of the Corps, USIBWC, Elephant Butte Irrigation District (EBID), Environmental Defense (ED), World Wildlife Fund (WWF) and other agencies as appropriate to obtain existing studies, hydraulic models (HEC-RAS and FLO-2D), and FEMA flood studies (HEC-2) for the Rio Grande reach from Caballo Dam to American Dam.

(b) Conduct Data Compilation of the Rio Grande Geomorphology to include applicable studies and reports investigating the Rio Grande and its tributaries within the project reach.

(c) Conduct site visit and meet with EBID, USIBWC, WWF, and ED staff to gain familiarity with the site, the Rio Grande above and below the site, and become familiar with the various dam and diversion operations through the reach.

(d) Review available GIS data bases and mapping to identify survey information and mapping available to support hydraulic modeling and analyses and recommend additional survey/mapping requirements, as necessary.

(e) Obtain from the Corps and USIBWC river profile, cross section, flow, sediment data, and aerial photographs to update this reach of the Rio Grande as a basis for more detailed hydraulic analyses.

(f) Update existing HEC-RAS model through the project reach as necessary to support river restoration alternatives. This model would be used for detailed site-specific analysis within the project reach to address questions related to overbank flows, bank stability and levee stability. This model would provide an additional tool to respond to site-specific requests for hydraulic analysis by sponsors and PDT members as the project investigation phase proceeds.

(2) Initial Modeling and Assessment of Baseline Conditions

(a) Evaluate the hydraulic, sediment transport, and geomorphic impacts and trends to define baseline conditions for the project reach. Of particular importance will be potential impacts on hydraulic structures and bridges throughout the study reach and the impact of any proposed Rio Grande gradient control or other proposed features on the 100- year water surface elevation, and other events as appropriate. The following efforts will be included in this evaluation:

- Identification of sub reaches based on geomorphology, hydraulic and biologic considerations (referencing Hope for a Living River) including substrate, channel width/depth ratio, bankfull discharge, vegetation community and other channel morphology parameters. This requires some additional field time to review substrate conditions at various arroyo confluences.

- Conduct Data Compilation of the Rio Grande Geomorphology affecting this reach. Develop existing conditions description including aggradation/degradation trends, sediment size distribution and composition.

(b) Update the 2-dimensional hydraulic model using the existing URGWOM FLO-2D model for the Rio Grande from the Caballo Dam to the American Dam to include the overbank/bosque from levee to levee.

(c) Model existing conditions flows to establish baseline conditions. Assess potential existing areas of overbank flow and sediment effects. A frequency analysis should be performed based on the Caballo Dam, the Leasburg gage, the Mesilla gage, and the Courchesne Gage. Determine hydrograph shape and timing for the FLO-2D model inputs. From this analysis select the following target flows to be included in the modeling effort:

- Average annual spring hydrograph (+/- 2350 cfs upper reach, 1400 cfs lower reach)

- Average annual irrigation flows (2,500 cfs)
- Bankfull discharge (2,500 to 3000 cfs)
- 10 year storm event
- 100 year storm event

(d) Existing Conditions Baseline Report (including existing conditions description, summary explanation of model development, hydrologic and hydraulic assumptions, and sediment analysis with short term trends).

(3) Initial Screening of Restoration Potential with FLO-2D and Sediment Analysis

(a) Coordinate development of river restoration alternatives with the EBID, USIBWC, ED, and WWF. Incorporate alternatives for channel protection in the reach and at any USIBWC river maintenance sites identified.

(b) Model target restoration flows between 1500 to 5000 cfs, in 500 cfs increments, to assess potential existing areas of overbank flow and sediment effects. Using the frequency analysis performed in Task 2 evaluate the various flows to determine a target restoration flow hydrograph defining both the peak and duration which will provide the greatest benefit for each reach being evaluated and relate that target flow to expected hydrographs occurring within each project reach being assessed such as:

- Average annual spring hydrograph (+/- 2350 cfs upper reach, 1400 cfs lower reach)
- Average annual irrigation hydrograph (2,500 cfs)
- Bankfull discharge hydrograph (2,500 cfs to 3,000 cfs)

(c) Map areas of inundation with land ownership, habitat and vegetative mapping based on target restoration flows.

(d) Conduct analysis of restoration potential by subreach based on target restoration flows. Graph area of inundation versus discharge.

(e) Identify potential areas and techniques for restoration. Identify the advantages and disadvantages as they relate to other river operation and maintenance objectives including sediment transport, channel maintenance, flood control, irrigation deliveries, and water budget.

(f) Sediment inflows and sediment transport and deposition shall be evaluated through the main stem Rio Grande for the flow conditions previously investigated. Quantify impacts to the channel configuration (e.g., aggregation and/or degradation, changes to bed material make-up, velocities, flow depths) associated with the proposed hydraulic conditions. This evaluation should consider:

- Identification and implementation of methods for modeling sediment dynamics.
- Additional sediment samples to be taken as needed to supplement existing data collected to help in calibrating sediment transport models.
- The geomorphic investigations will be used to determine sustainability of alternatives as well as sustainability of existing structures throughout the project reach.
- The geomorphic investigations will be used to help provide a scientific basis for making operational decisions in the future regarding such items as: operation of water delivery systems and maintenance operations including dredging.

(g) Present results of sediment analysis and restoration potential by subreach for Stakeholder Workshop.

(4) 2-Dimensional Modeling and Final Alternative Analysis

(a) Select target restoration flow(s)

(b) Evaluate the benefits and hydraulic impacts of preferred alternative techniques on the overbank /bosque area for both sides of the river including surface water and channel/overbank interactions. Of particular importance will be the rejuvenation of old oxbow areas, potential areas of overbank inundation (to support revegetation formulation), and the hydraulic impacts of clearing and revegetating specific areas of the overbank.

(c) The sites to be evaluated will include any restoration sites identified in the Canalization EIS inundated under the restoration flow(s) and any additional sites where inundation is occurring or could easily be made to occur. On-site evaluation will be conducted to verify model results.

(d) Analyze selected restoration locations and techniques. Provide hydraulic data to support evaluation of various restoration alternatives.

(e) Prioritize restoration areas and techniques.

(f) Evaluate cumulative impacts from target restoration flow(s) and floodplain inundation in terms of water storage, loss of surface flow, irrigation deliveries and water management, flood routing and hazards, channel morphology, channel conveyance capacity, and treaty and compact obligations.

(g) Evaluate 10-year and 100-year flow impacts on restoration sites identified.

(h) Final Alternative Analysis Report to include conclusions and recommendations. The report should address sediment transport and long term geomorphology to provide an indication of sustainability for the alternatives recommended.

(5) Meetings, Permitting, Coordination

(a) 8 person-trips have been estimated for meetings, site visits, and coordination.

(b) Telephone conference calls, video conferencing, and e-mail will be used for coordination between meetings

(c) Support the other Project Team Members in coordination activities.

(6) Supervision, Contract Administration

(a) As a project delivery team member attend meetings, site visits, and provide coordination.

(b) Perform contract scoping, negotiation, and administration

(c) Supervision and administrative overhead.

b. Environmental Analysis.

(1) Data Collection, Research, and Qualitative Analysis

(a) Meet with various branches of the Corps, USIBWC, EBID, ED, WWF and other agencies as appropriate to obtain existing studies, vegetation mapping, and restoration objectives for the Rio Grande reach from Caballo Dam to American Dam.

(b) Conduct site visits and meet with EBID, USIBWC and WWF staff to gain familiarity with the reach, the Rio Grande above and below the site, and become familiar with the operations and habitats through this reach.

(c) Review available GIS and mapping to identify pertinent information available to support analyses and recommend additional mapping requirements, as necessary.

(2) Evaluate Restoration Potential Throughout Study Reach

(a) Determine existing vegetation and hydrologic regime at all potential restoration areas indicated in the EIS.

(b) Determine existing and potential vegetation, and future hydrologic regime, at all areas with overbanking flow at the modeled discharges.

(c) Outline potential restoration techniques (referring to SOB and DEIS for restoration opportunities).

(d) Preliminary evaluation of ecological benefits and hydraulic impacts at each site.

(e) Develop criteria to prioritize locations and techniques for restoration application (referencing SOB analysis) through study team and shareholder input.

(f) Select restoration areas and techniques (more than one method or technique may be applicable).

(3) Restoration Plans for Selected Sites

(a) Describe restoration features, benefits, and impacts at selected sites (including ecological, hydraulic, ownership, and logistic consideration).

(b) Estimate implementation costs.

(c) Calculate cost efficiencies over the array of selected sites and techniques.

(d) Recommend a reach-wide restoration plan.

(4) Meetings, Permitting, Coordination

(a) 8 person-trips have been estimated for meetings, site visits, and coordination.

(b) Telephone conference calls, video conferencing, and e-mail will be used for coordination between meetings

(c) Support the other Project Team Members in coordination activities.

(5) Supervision, Contract Administration

(a) As a project delivery team member attend meetings, site visits, and provide coordination.

(b) Perform contract scoping, negotiation, and administration

(c) Supervision and administrative overhead.

c. Plan Formulation. The Corps will be responsible for the overall formulation of study objectives and alternatives, and day-to-day organization and management of the study. The planner will work with the other team members to establish schedules for production and delivery of the various elements of the study. The planner, working with the project manager and the other team members (which includes the USIBWC) will first establish the without-project or “baseline” condition of the study area. Next, preliminary objectives will be identified, to include opportunities and constraints, which will be defined for ecosystem restoration. The array of potential actions will be evaluated without respect to organizational (Corps) constraints, and will be presented in the findings of the study based on biologic benefit, technical feasibility, and economic feasibility. The planner will be responsible for compilation, quality control, and review of the report, as well as incorporation of review comments, reproduction, and distribution.

d. Workshops/Informational Meetings. The Corps will conduct 3 workshops/informational meetings with the USIBWC and stakeholders to discuss potential restoration projects/locations along the Rio Grande from Caballo Dam to Mesilla, New Mexico. The purpose of the stakeholder meetings is to seek input from stakeholders on the scope of work and restoration objectives, and involve stakeholders in the analysis and selection of a target restoration flow, restoration sites and techniques, and development of a conceptual restoration plan. The location for the meetings shall be Las Cruces, New Mexico. A professional facilitator/mediator shall be used to run the meetings. The mediator will provide impartial and neutral services in an effort to assist the parties to reach agreement on restoration locations and water use requirements that is risk appropriate for all concerned. The mediator shall employ an approach that permits the parties to negotiate freely and in a self-directed manner. The mediator will control the procedural issues but the ultimate goal of the process is for the parties to reach agreement on their own.

e. Report Preparation. Documentation of study findings and results will be continuous by each organization as work proceeds. The work associated with this task will consist of preparing and reproducing preliminary drafts, a final draft, and the final report on the study. The final report will include a main report with appendices. Organization of the final report will be structured to reflect the study area and the overall planning process. The Corps and the USIBWC will discuss and agree on the specific outline and content of the final report. Preliminary in-progress review reports will be prepared for two checkpoint meetings with the USIBWC.

f. Technical Review. All planning documents will be reviewed prior to being finalized. The quality control process will include technical team meetings, meetings with the USIBWC and stakeholders, and Corps in-house technical review. The quality control process will be on-going throughout the study (seamless peer review), but at particular milestones, specific efforts will be made to assess the quality and progress of the study (independent technical/policy review). Corps of Engineers and USIBWC guidelines will be followed, including development of a Quality Control Plan. Review

teams will be established at the beginning of the study. Completion of specific documents will be identified by specific milestone dates. The Review Team will perform their review at the specific milestones and document each review. A USIBWC representative will participate in the initial Review Strategy meeting as part of quality assurance partnership with the Corps.

g. Project/Study Management.

(1) This work item will include all scheduling and organizing of the study; regular periodic meetings with technical elements to review progress; preparing budget documentation; monitoring and managing all funds being obligated and expended; preparing project-related correspondence; coordinating with Federal, State, and local agencies; and providing guidance and support as required to ensure that they have answered all questions and they have solved all study-related problems. The Corps will perform this task for the duration of the study.

(2) The Corps will manage the tasks associated with overall coordination of the various study work items including funds management and work item scheduling. The overall purpose of this work item is to ensure that the study will accomplish the goals established, maintain schedule and cost estimates, and address all items in the Scope of Study.

3. DELIVERY AND SCHEDULE.

a. Draft Document. The Corps will provide a draft copy of the report to the USIBWC. The report will include discussion concerning methodology, data sources, findings, and other appropriate data for review and approval. It will be single-spaced, comb-bound, with all pages consecutively numbered. The report will identify all data sources and references. A compact disc containing an electronic version of the draft report will also be provided.

b. Final Document. Upon the USIBWC's approval and return of the edited draft to the Corps, the Corps will prepare the document in single-spaced format, with corrections made as noted on the first draft. The Corps will furnish the final original document to the USIBWC, comb-bound, with all pages consecutively numbered. A compact disc containing an electronic version of the final report will also be provided.

c. Meetings and Conferences. The Corps and the USIBWC will hold monthly meetings. Meetings will be face-to-face, telephone conference calls, or video teleconferences. The Corps or the USIBWC will request other meetings as needed for discussion of questions and problems relating to work.

d. Schedule. The Corps will submit the above items according to the following schedule. Additional interim products may be produced to assist with development of alternatives and for use in workshops on an as-needed basis. Period of performance for overall project completion will be 490 calendar days following the date of the signed agreement and receipt of USIBWC funds.

SUBMITTAL SCHEDULE

Delivery Requirement	Delivery Schedule	Electronic Copies EBID, ED, USIBWC, WWF	Hard Copies EBID, ED, USIBWC, WWF
Kick-Off Meeting (El Paso, TX)	10 calendar days after the date of the signed agreement and receipt of USIBWC funds.	NA	NA
Stakeholder Meeting 1 (Las Cruces, NM)	42 calendar days after Kick-Off Meeting (data collection phase).	NA	NA
Stakeholder Meeting 2 (Las Cruces, NM)	28 calendar days after completion of baseline conditions work.	NA	NA
Internal Plan Formulation Meeting (El Paso, TX)	28 calendar days after Stakeholder Meeting 2.	NA	NA
Stakeholder Meeting 3 (Las Cruces, NM)	42 calendar days after Internal Plan Formulation Meeting.	NA	NA
Draft Document	28 calendar days after Stakeholder Meeting 3.	1 each	1 each
Sponsor Review	28 calendar days after submittal of the draft document.	NA	NA
Final Document	28 calendar days after receipt of comments on the draft document.	1 each	1 each
Final Project Wrap-up Meeting (El Paso, TX)	10 calendar days after submittal of the final document.	NA	NA