RIO GRANDE FLOODWAY
SAN ACACIA TO BOSQUE DEL APACHE UNIT
SOCORRO COUNTY, NEW MEXICO
GENERAL REEVALUATION REPORT AND
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT II

FINAL
U.S. Army Corps of Engineers Response to
Independent External Peer Review
May 2014

An Independent External Peer Review (IEPR) was conducted for subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (2004).

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide the most scientifically sound and sustainable water resource solutions for the nation. USACE review processes are essential to ensuring project safety and quality of the products USACE provides to the American people.

Noblis Inc., a non-profit science and technology organization was engaged to conduct the IEPR for the Rio Grande Floodway, San Acacia to Bosque del Apache Unit, draft General Reevaluation Report and Supplemental Environmental Impact Statement II (GRR/SEIS II) as well as supporting documentation.

This effort was performed in two phases. Phase 1, which began in October 2011, focused on the GRR/SEIS II Alternative Formulation Briefing (AFB) read-ahead material and appendices. USACE took into consideration the Phase 1 comments when developing the Draft GRR and SEIS for public review. After receiving public comments on the Draft GRR/SEIS II, the Phase 2 IEPR activities began, where the panel, building upon the comments and feedback from Phase 1, conducted a review of the USACE's Draft GRR/SEIS II and public comments to that document. The phase 2 results were completed in a report dated 10 August, 2012. Phase 1 resulted in 58 comments which were resolved or carried forward so that seventeen comments were identified for phase 2. Of these, seven were identified as having high significance, seven comments had medium significance, and three had low significance.

Each Comment is rated as "high," "medium," or "low" to indicate the general significance the comment has to the sufficiency of the GRR/SEIS II. The significance ratings are applied using the following criteria:

- High = Describes a fundamental problem with the project that could affect the recommendation or justification of the project
- Medium = Affects the completeness or understanding of the recommendation or justification of the project

- Low = Affects the technical quality of the reports but will not affect the recommendation or justification of the project.

Phase 2 comments were developed from review of the Draft GRR/SEIS II as well as comments recieved from the public during public review of that document. The following discussions present the USACE Final Response to the 17 Phase 2 Comments.

1. IEPR Comment - *High Significance:* The panel is not fully convinced that the tentatively selected plan is economical, for three reasons 1) the cost of a drainage facility to provide the same benefits as the Bureau of Reclamations Low Flow Conveyance Channel (LFCC) might be much less than the replacement cost of the LFCC, 2) the favorable benefit-cost ratio of the project is apparently assured by somewhat subjective distributions introduced by HEC-FDA, and 3) there appear to be no operations, maintenance, repair or replacement costs (OMRR&R) included. OMRR&R costs should be added.

This comment includes three recommendations for resolution which have been adopted,

Recommendation 1: A paragraph or more should be added to Appendix F-10 to explain why the average annual damages estimates in Tables F-6A and F-6B do NOT follow from Tables F-5A and F-5B.

USACE Response: Adopted.

Action Taken: Recommended text has been added to paragraph F-06 of Appendix F-10, Economics, to the GRR/SEIS II. The average annual damages estimates in Tables F-6A and F-6B do not follow from Tables F-5A and F-5B because there are many variable factors used in the HEC-FDA model that cannot readily be replicated in a table format. These include hydrologic years of record, errors associated with hydraulic stages for specific events, errors associated with structure elevation, errors associated with structure and content value, and errors associated with the depth – percent damage relationships used.

Recommendation 2: Provide a rationale for requiring the LFCC to be replaced in its current form instead of rebuilding a smaller facility or no facility

USACE Response: Adopted.

Action Taken: In 2007, the Record of Decision (ROD) for the Upper Rio Grande Basin Water Operations Review Final EIS (USBR, 2007c) established that the Bureau of Reclamation (the Bureau) will continue operating the LFCC as a passive drain with zero diversion from the Rio Grande. Additional text is added to emphasize this fact in Sections 1.8.1, 2.6.1, 6.7.1 and Table 1.5. USACE has documented present and future without-project and with-project conditions for the LFCC, to include replacement costs if destroyed by a flood. This ROD states that the BOR will maintain the channels original design for the foreseeable future. USACE has re-solicited the BOR regarding this assumption, and verified that the LFCC would be repaired to its current condition if damaged by floods.

Recommendation 3: If operations, maintenance, repair or replacement costs (OMRR&R) costs are included, show where they can be found, particularly in the computation of the Benefit Cost ratio for Alternative "A." If they are not included, OMRR&R costs must be added, or justify why they are not included.

USACE Response: Adopted.

Action Taken: OMRR&R costs (approximately $618,000/year) have been added to Table F-56 of Appendix F-1, Economics, for the Tentatively Selected Plan (Alternative A, at the Base +4' height) only. When screening was conducted in August, 2010, OMRR&R costs were not expected to significantly alter plan selection among the alternatives. Upon re-inspection of these calculations and their basis, that remains the case.

2. IEPR Comment – *High Significance*: Additional detail on silvery minnow populations and distribution within the study area should be provided as a basis for ascertaining potential impacts. Provide weight of the evidence conclusion regarding projected silvery minnow populations in the future without the project. The project requires a detailed mitigation plan for the silvery minnow impacts.

This comment includes three recommendations for resolution, all of which have been adopted as discussed below.

Recommendation 1: Provide additional detail on silvery minnow populations and distribution in the study area as a basis for determining potential impacts, and addressing future without project conditions.

USACE Response: Adopted.

Action Taken: Additional detail on silvery minnow populations and distribution in the study area has been provided in Sections 6.4 and 6.5.1 of the GRR/SEIS II to provide direct effects of alternatives on minnows and their habitat as determined in consultation with the U.S. Fish and Wildlife Service (the Service). The relevant silvery minnow literature has also been analyzed and cited in the Biological Assessment and Biological Opinion included in Appendix C, Biological Assessment, to the GRR/SEIS II.

Recommendation 2: Provide the suggested conclusion in the text regarding the most likely scenario for the future regarding the Rio Grande silvery minnow.

USACE Response: Adopted.

Action Taken: USACE has substantially revised Chapter 6 of the GRR/SEIS II to add improved biological information; however, available analyses preclude precise assessment of the species' future.

There is a significant gap between existing climate models and species/habitat models, especially in view of continuing climate change. Monitoring reports from the Middle Rio

Grande Endangered Species Collaborative Program (CP) indicate that the silvery minnow population has resilience to highly variable flow volumes during the current drought. Analysis of the recommended plan has shown that potential project impacts on the viability of the population are minimal.

Recommendation 3: Developing a mitigation plan that evaluates potential alternatives for mitigating project impacts can be accomplished in parallel with ongoing final project design studies. This evaluation should include further consideration of measures that might be undertaken to prevent or offset silvery minnow mortality if the Tiffany Basin portion of the project is implemented.

USACE Response: Adopted.

Action Taken: A mitigation plan has been developed and is provided in Appendix C, Biological Assessment. The Biological Assessment and the Biological Opinion developed during consultation with U.S. Fish and Wildlife Service (USFWS), citing the analysis of the relevant silvery minnow literature, has also been added in Appendix C, Biological Assessment, to the GRR/SEIS II. The Tiffany Basin measure was removed from consideration because of unacceptable (unmitigatable) impacts to both endangered species and surface water losses. There is minimal potential for loss of silvery minnow habitat resulting from levee construction.

3. IEPR Comment – *High Significance*: There is insufficient documentation on ecological resources (outside of endangered species) to reach a conclusion regarding whether the proposed alternative should be chosen, and also regarding impacts of the proposed plan on wildlife and aquatic resources. Provide additional detail to substantiate Future No-Action projections in Section 3.3.1 and 3.3.2. The text would benefit from a more complete and cogent discussion of the overall potential project impacts to the Southwest willow flycatcher (and other riparian species) in terms of population impacts, habitat impacts, and potential mitigation measures.

This comment includes three recommendations for resolution, all of which have been adopted as discussed below.

Recommendation 1: Provide more detail on studies undertaken to date, and project impacts on the basis of existing conditions data already reported. Discuss any changes in water salvage to increase or decrease river flows and water table elevations.

USACE Response: Adopted.

Action Taken: USACE revised the text in Section 6.4, in particular Section 6.4.2, in Chapter 6 of the GRR/SEIS II to state that project impacts were evaluated on the basis of existing conditions data from many studies of middle Rio Grande valley riparian habitat types. These studies, conducted over the past 30 years, have consistently related riparian plant community species and structure with wildlife use, and these relationships form the basis for determining the relative impacts of project alternatives on wildlife.

Vegetation management and habitat restoration activities may or may not result in salvageable water. Coordination with resource managers in the project area has determined that differential evapo-transpiration losses are not a concern based on the inconclusive data and the small size of the affected area.

Recommendation 2: Add the additional detail to the text as a basis to allow detailed comparison with the Future No-Action alternative.

USACE Response: Adopted.

Action Taken: Section 3.3.1 in Chapter 3 of the GRR/SEIS II has been revised to clarify the general statements about future habitat conditions and trends in habitat value. Additional discussions have been added to provide more detail and quantify potential effects from climate change and invasive species; while avoiding extrapolation where sufficient information is lacking. In Chapter 6, Section 6.4.1.1 has been revised to discuss the with and without project conditions related to inundation and affects to ecological resources within the current floodway and throughout the floodplain west of the spoil bank. Additional detail comparing floodway area, habitat and vegetation effects in with and without project conditions has been added to Section 6.4.2. Subsection 6.4.2.4 summarizes mitigative activities for vegetation and endangered species described in detail in Appendix F-4, Preliminary Mitigation Plan.

Recommendation 3: Revise the text to clarify how proposed mitigation measures will offset the referenced potential project impacts to the Southwest willow flycatcher.

USACE Response: Adopted.

Action Taken: A detailed mitigation plan has been included in Chapter 6, Section 6.4.2.4, that presents a quantitative evaluation of potential project impacts to the Southwest willow flycatcher and other species habitats, and provides the expected value of proposed mitigation measures. A combination of shrub and tree plantings are planned for 50.4 acres of habit mitigation determined to be necessary to offset negative impacts per the Biological Opinion issued by the USFWS, and the detailed effects to endangered species habitat described in the Biological Assessment. The Biological Assessment and Biological Opinion are included in Appendix C, Biological Assessment, to the GRR/SEIS II.

4. IEPR Comment – *High Significance*: There are several issues identified concerning the hydrologic, hydraulic, and sediment transport analyses that can easily be resolved with the inclusion of more detail.

This comment includes eight recommendations for resolution, all of which have been adopted, as discussed below.

Recommendation 1: The description of the methodology for the analysis of long-term sediment transport should be clarified. Figures and tables showing reach locations and sedimentation changes should be included where appropriate.

Recommendation 2: The clarification and description of sediment transport sections and analysis should be included with respect to the long-term sediment transport analysis and procedures.

USACE Response 1 and 2: Adopted.

Action Taken: Additional information on the analysis of long-term sediment transport and historic aggradational trends has been added in section 5.3 of Technical Appendix F-2, Hydrology and Hydraulics (H&H). The methodology for assessing aggradation over the period of analysis is explained, and additional discussion of long-term sediment transport analysis has been provided.

Recommendation 3: Higher level discussion of modeling and analysis procedures should be included in the appendix. A summary discussion of how the various tools were used, the assumptions behind them, and the limits or risks from using these results should be included in the text. This discussion should include approaches and parameters for modeling, statistical and other analysis tools.

USACE Response: Adopted.

Action Taken: Section 5.2.3 and 5.3.1 of the Technical Appendix F-2, H&H, have been revised to provide a clearer summary of how the various modeling tools were applied. These revised discussions add detail to the methodology and assumptions used relative to channel aggradation. The aggrading active channel within the floodway will follow its natural processes depositing sediment in the channel and immediately adjacent overbank until the channel avulses and begins the process again. Over time the avulsions and channel meander will deposit sediment across the entire floodway cross section. Within HEC-RAS and the FLO-2D models, the entire floodway is raised by an amount corresponding to the amount of aggradation occurring in each reach.

Recommendation 4: Maps showing where the various models were applied, comparisons between the model results, how well the existing and proposed conditions compared, etc., should be included. Explain why FLO-2D modeling did not account for sediment movement, if that is the case.

USACE Response: Adopted.

Action Taken: A large-scale map showing the area covered by both the FLO-2D and HEC-RAS models has been added in Technical Appendix F-2, H&H, to visually illustrate the coverage of the two models. Table 4 of the H&H Appendix lists the bounding FLO-2D grid cells and range lines used to identify HEC-RAS river stations that correspond with the economic performance locations. To account for sediment movement FLO-2D grid cells

were manipulated so that the entire floodway was raised by an amount corresponding to the amount of aggradation occurring in each reach.

Recommendation 5: A brief discussion of how erosional/depositional processes across the floodplain were analyzed. It appears that volumetric comparison of range lines was the main method. Or, were FLO-2D results also used, and how?

USACE Response: Adopted.

Action Taken: A discussion of how erosional/depositional processes across the floodplain were analyzed has been included in Sections 5.2.3 and 5.3.1 of Technical Appendix F-2, H&H. Over time the avulsions and channel meanders will deposit sediment across the entire floodway cross section. Forecast conditions and rates of channel aggradation were based on historic trends. Within HEC-RAS and the FLO-2D models, the entire floodway was raised by an amount corresponding to the amount of aggradation occurring in each reach. Model parameters were not changed to account for degradational trends in the northern two-thirds of the project reach, thereby providing a conservative estimation of channel capacity.

Recommendation 6: A more detailed discussion detailing how alternatives were removed from consideration using modeling and analytical approaches should be included for each alternative. Discuss any alternatives that looked at other than levees for the reach above Tiffany Junction.

USACE Response Adopted.

Action Taken: Section 4.5 in Chapter 4 of the GRR/SIES II was reorganized to make clear what alternatives were eliminated based on analysis performed in previous Environmental Impact Statement documents; those measures re-evaluated in the current study; and which alternatives were carried forward for detailed economic and environmental effects analysis. Table 4.1 was added to summarize this discussion. New or updated, non-levee alternatives were evaluated using the planning criteria discussed in Section 4.5, including effectiveness, completeness, and acceptability. Flood risk measures were also eliminated based on unacceptable impacts on the environment. Non- structural measures that were found effective were later eliminated on an economic basis. Only levee alternatives were carried forward for detailed analysis using integrated results of hydraulic and hydrologic analysis and economic modeling expressed as benefits in Section 4.6 and 4.7.

Recommendation 7: A brief discussion of how the project may continue to develop a perched channel bottom, and the possible environmental consequences, should be included. Include the O&M responsibilities to the local sponsors, and the attendant cost/benefits.

USACE Response: Adopted.

Action Taken: Section 5 of Technical Appendix F-2, H&H, describes the aggradational reach of the study area identified (range lines 1412 through 1781), its consistency with historic trends, and use of the regression relationship developed to project this trend to a future state within the models. The discussion in section Section 5.2.3 of the GRR/SEIS II

includes development of a perched channel condition. Since the without project condition consists of river confinement by a spoil bank and repair and replacement of the spoil bank in the event of a failure; ecological and river maintenance and attendant cost/benefits are not anticipated to vary significantly in the with and without project condition. River maintenance is an ongoing effort regardless of the implementation of the proposed project and therefore it was determined that this cost should not be included in specific operation and maintenance (O&M) responsibilities to the local sponsor.

Recommendation 8: A discussion of how Yang's equation was selected for sediment transport analysis and a summary of any sensitivity analysis for equation selection should be included.

USACE Response: Adopted.

Action Taken: A discussion has been added to Section 5.4 of Technical Appendix F-2, H&H, regarding the sediment transport (continuity) analysis that was performed to assess the replacement railroad bridge-span alternatives. Section 5.4 notes that the Yang and Brownlie functions were selected for the continuity analysis because they were judged applicable to the range of hydraulic (e.g., depth, velocity, etc.) and sediment particle size (predominantly sand) conditions within the bridge subreach. The discussion describes how the ordinal ranking of the number-of-spans was not sensitive to the two transport functions used, and makes clear that this was a screening level evaluation used for early railroad bridge alternative formulation and was not calibrated to any measured data. The basis of alternative plan selection was relative transport continuity near the bridge.

5. IEPR Comment – *High Significance*: The GRR/SEIS discussion on flow and sediment transport analyses for all bridges must be more detailed. The hydraulic and sediment transport impacts at all existing bridges, constrictions, tributary inflows, etc. must be discussed. If there are existing problems at these locations, the GRR/SEIS is not clear on how these problems will be alleviated, and the nature of maintenance issues that may be required of local sponsors in the future. It also not clear if the planned approach is compliant with the IWRM objective (public concern). Additionally, including the discussion of a new Railroad (RR) bridge at this location in the GRR/SEIS is confusing. Clarification is needed.

This comment includes two recommendations for resolution, one of which has been adopted, and one which has not been adopted, as discussed below.

Recommendation 1: Identify these locations (existing bridges, constrictions, tributary inflows, etc.) in the GRR/SEIS with a summary table of existing and expected impacts. Provide a detailed discussion of the issues at each location in App. F-2/F-3 (Technical Appendix F-2, H&H), including existing and expected channel meandering, sediment deposition or erosion, and maintenance requirements for a sustainable river system.

USACE Response: Not Adopted.

Action Taken: The potential impacts of the variables such as existing bridges, constrictions, and tributary inflows on the design of the selected alternative have been accounted for. The differential impacts of the proposed project to the various bridge crossings within the study area are expected to be negligible, and do not impact alternative selection because the project is essentially replacing the existing spoil bank along its current alignment with a more robust engineered levee. The existing and expected impacts of the bridges on the proposed levee alternatives including scour, erosion and inundation, were captured primarily through modeling, including quantification of the uncertainty associated with the projected water surface elevations as discussed in Section 5.3 of technical appendix F-2, H&H, Hydraulic Modeling, and Risk and Uncertainty, sections. Potential lateral migration and impingement locations that could affect the proposed levee were identified, primarily through interpretation of historic planform imagery combined with hydraulic parameters from the one-dimensional modeling. For those potential locations where existing bankline stabilization (i.e., Kellner Jacks) is not present, slope protection measures were developed and included in the alternative cost estimates.

Recommendation 2: It should be explicitly stated that a new RR bridge [at San Marcial] is not considered in the SEIS. However, studies with a new bridge were investigated and those results should be documented in an attachment to the Appendix. Furthermore, the disposition of the existing bridge under future conditions should be discussed – will the bridge remain in place, will it be destroyed by floods, and how much sedimentation or erosion may be expected under either scenario?

USACE Response: Adopted.

Action Taken: Additional discussion is included in Chapter 4 of the GRR/SEIS II, Section 4.5, Alternatives Eliminated From Further Consideration, specifically, Section 4.5.5.3, part 6 on Flood Proofing; to clarify that replacement of the existing BNSF railroad bridge is not part of the recommended plan. The future damage and destruction events and their probabilities relative to the bridge have been added to the discussion in Chapter 3, Section 3.5.4.2 on Transportation Facilities. Additional detail on future disposition of the bridge, including its potential replacement by the BNSF, can be found in Section F-12 of the Appendix F-10, Economics.

6. IEPR Comment – *High Significance*: The floodwall at the San Acacia Diversion Dam (SADD) may be impacted by dam improvements planned by others. Additional scour protection and /or extension of the wall may be necessary.

Recommendation: Acquire details of the proposed changes below the dam, and how those changes will interface with the wall. Conduct the appropriate analysis if necessary; or, reconsider the wall – perhaps a rip-rap lined slope tied to the stilling basin with a paved roadway over it should be considered.

USACE Response: Adopted.

Action Taken: USACE is aware of a potential project at the SADD to provide a fish ladder through the dam. The fish ladder project is in a preliminary stage, proposing the ladder be sited on the east side of the dam. Slope protection along the west bank will not be effected based on the preliminary fish ladder plan. Because the proposed bank lowering/excavation would occur farther downstream, no impact to potential plans for a fish ladder is anticipated from or to the USACE recommended plan. USACE will continue to coordinate with other agencies regarding the fish ladder in detailed design and construction phases.

7. IEPR Comment – *High Significance*: The rationale for selection of the TSP is weak. Alternatives that might be preferred to the current TSP are 1) Alternative K, and 2) Alternative A or K, but with a slightly lower or higher levee.

This comment includes two recommendations for resolution, one of which has been adopted, and the other not adopted, as discussed below.

Recommendation 1: Explain why Alternative K has less economic benefits than Alternative A. If Alternative K actually has fewer benefits, expand the GRR discussion at page 4-31 and 4-42 using text from Appendix F-10, page 104 to 105 to explain why Alternative A should be preferred to K.

USACE Response: Adopted.

Action Taken: Chapter 6, Section 6.8.2 of the GRR/SEIS II has been revised to provide additional rationale for selection of Alternative A over Alternative K. Although net benefits are very close, Alternative K had a slightly higher residual risk than Alternative A due to the additional confinement of the floodway for a longer extent. Isolating Tiffany Basin from the Rio Grande perpetually would require extensive mitigation of over 2,000 acres of land that once received river flows (albeit sporadically). Those costs alone (real estate acquisition, plantings, and other features) would drive up the cost of Alternative K relative to Alternative A, and result in fewer net benefits.

Recommendation 2: Table 4.7 is flawed. A better analysis is needed to support the contention that the Base plus 4 foot levee is the best. The Panel suggests trying analysis at Base plus 3.5' and Base plus 4.5', with ALL benefits included, to ensure that neither of those heights is more economical.

USACE Response: Not Adopted. The levee height evaluation using increments of one foot are reasonable and provide discernible differences in cost and benefits. Evaluating a levee that is six inches lower was not considered reasonable since the project cost differences would be so small. The cost difference between Base + 3' and Base + 4' was $2 million, or less than one percent of a project cost estimate of over $220 million. The disparity in project benefits between a Base plus 3-foot levee and a Base plus 4-foot levee is roughly $500,000, or less than three percent of a total benefit base of $18 million.

As discussed in Chapter 4, Section 4.6.5.2, it is unlikely that a larger levee would generate more net benefits since the project incurs substantial (and uncaptured) borrow costs for material, real estate costs to accommodate the wider footprint, and potentially higher mitigation costs. The recommended plan also captures over 97 percent of estimated annual damages so that the additional cost of a larger levee would not be offset by additional benefits.Remaining benefits are derived from the severe and rare events, which would be captured only through levee height increases.

8. IEPR Comment – *Medium Significance*: The economic analysis may be unnecessarily conservative for two reasons: 1) It does not appear to include appropriate consideration of sediment damages or an appropriate amount of sediment clean-up costs, and, 2) it does not include LFCC maintenance cost savings.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Provide estimates of urban, refuge, and agricultural acreage flooded. Discuss the history of sediment damages from floods in this region, how flood events would deposit sediments, how the methodology realistically captures sediment clean-up and land re-grading costs, or not. If possible, include explicit accounting for sediment clean-up costs. At a minimum, note that some benefits may be conservative because of this exclusion. Provide a paragraph that explains why the LFCC maintenance costs will be reduced and provide a range of cost saving estimates.

USACE Response: Adopted.

Action Taken: USACE solicited the BOR regarding maintenance savings that may occur due to implementation of the proposed project. The BOR was unable to provide information of that type, Consideration of sediment cleanup costs in this case would not alter plan selection, or alter the levee height which reasonably maximizes net benefits because those costs would reasonably occur proportionately for each alternative. Estimates of acreage flooded by event and land use type would have no bearing on NED plan identification for the same reason. . Additional text is added to 4.7.5.4 of the GRR/SEIS II and in Section F-06 and F-18 of the Economic Appendix, F-10 to include emergency cost figures based on flooding in Carlsbad, NM. These costs total $158,000 for Alternative A at Base +4' included evacuation, reoccupation, disaster relief, cleanup and debris removal, and other similar expenses and are stated as being conservative. Sediment clean up costs could not be separated from the reports and clean up costs from similar flood events in SE NM could not be found.

9. IEPR Comment – *Medium Significance*: Subsection 4.7.6.3 provides inadequate detail in support of the findings presented.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Subsection 4.7.6.3 should be revised to describe the specific habitat to be created by the proposed project design so that the conclusion that it will have an ecological contribution can be verified.

USACE Response: Adopted.

Action Taken: Descriptions of the specific habitat to be created by the proposed project design in terms of the gained acres, vegetation type, and water regime have been added to Chapter 6 of the GRR/SEIS II. Particular discussion of habitat effects has been added in Section 6.4.2.2. The mitigative plantings and soil moisture within the gained area are described in Section 6.4.2.4a, Measures S and B. The increased wildlife value (bird abundance) of mitigative plantings for these measures is discussed in Appendix F-4, Preliminary Mitigation Plan, Section 4.3.3 and Table 2.

10. IEPR Comment – *Medium Significance*: The GRR/SEIS document should make it clear the extent to which alternative bank and channel stabilization designs that incorporate vegetation were considered, or could be considered under NEPA.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Further discussion seems warranted within the USACE regarding the extent to which vegetation can be incorporated further in the design in order to increase habitat quantity and quality along the 43-mile proposed levee.

USACE Response: Adopted.

Action Taken: The text has been revised in Chapter 5, Section 5.1.2, of the GRR/SEIS II to explain that the high velocities preclude the use of vegetation for bank stabilization downstream of the SADD. A proposed soil cement veneer will be applied to the existing embankment on the outside bank of a large bend in the channel in this area, to prevent scour of the river bank and seepage from the expected 17- 20 foot-per-second design flows.

Section 6.4.2.2, Changes due to the Vegetation-free zone, has been added to explain that the penetration of large (greater than 0.5 inch) roots into the levee can facilitate increased seepage and saturation of the structure during floods. The current policy is based on nationwide experience; local and regional studies of specific problems related to this policy are ongoing. Results of further studies and other pertinent information will be considered during the phased design and construction of the project over the next 20 years.

11. IEPR Comment – *Medium Significance*: The GRR/SEIS does not show the top of the levee and bosque access roads or ramps.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: A graphical representation of the existing and the recommended plan on a longitudinal profile view would show select data presented in Tables 10 through 16. This

graphic would show design water surface elevations; and the increase in levee height as a result of the risk analysis would then be evident for any location along the project reach. A short paragraph referring to this graphic in the Appendix could be added to the SEIS.

USACE Response: Adopted.

Action Taken: Technical Appendix F-1, Civil Engineering, has been revised to provide a profile which includes the existing spoil bank and proposed levee for the entire project reach. Tables 10 though 16 in Technical Appendix F-2, H&H, were not revised because a profile would not effectively represent the "design flood water surface." Under current Corps guidance, a full range of floods are used to evaluate the performance of alternatives evaluated, including those that would exceed the top of the proposed levee. The water surface elevations resulting from these floods are characterized through the use of statistical deviation parameters, as discussed in the H&H Appendix, to account for uncertainties identified. Plotting a specific index flood mean water surface profile can also pose prospective problems regarding risk communication.

12. IEPR Comment – *Medium Significance*: The various sections of the report are not consistent with respect to assumptions regarding the size of events in which damages begin.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Review the documents for related text and modify as appropriate.

USACE Response: Adopted.

Action Taken: The GRR/SEIS II has been revised to differentiate the start of damages and to reflect the FLO-2D assumption regarding spoil bank performance. Technical Appendix F-10, Economics, is specific in identifying the start of damages condition as it relates to flood damages. For the "start of damages event" the USACE picked the 20 percent chance occurrence rather than the 10 percent chance occurrence event, to be more consistent with the historical pattern of damages and repairs as described in Appendix F-10, paragraph F-04 "HEC-FDA Use." It is important to note that the start of damages condition being modeled in HEC-FDA is a depth, rather than an event probability.

13. IEPR Comment – *Medium Significance*: Appendix F-10 (the economics appendix) is not especially well organized or written. Some tables and data are absent. This inhibits the ability of the expert panel to evaluate the economic analysis and creates uncertainty about the economic analysis.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Appendix F-10 should be modified to address the issues identified above and in other IEPR Comments (to be a more complete, stand-alone document that provides appropriate weight to the important economic, hydrologic/hydraulic, and geotechnical analysis) so that the economic analysis is readable.

USACE Response: Adopted.

Action Taken: Technical Appendix F-10, Economics, has been revised to demonstrate a clearer connection between hydrologic/hydraulic and geotechnical analyses, and assumptions used. Sensitivity analysis has also been incorporated relative to the value and damages associated with the LFCC, and all missing exhibits and text have been added.

14. IEPR Comment – *Medium Significance*: The GRR/SEIS is difficult to evaluate because of numerous errors and omissions; wrong data provided in tables, outdated text, updates needed, unclear definitions, better examples needed, incorrect internal references.

This comment includes one recommendation comprised of five sub-recommendations for resolution, three of which have been adopted, and two which have not been adopted, as discussed below.

Recommendation: Address comments regarding incorrect, misleading, misplaced and missing information.

Sub-Recommendation 1: Lack of data, incorrect statements, and other errors mean that the selection of alternatives cannot be fully and fairly evaluated. [examples provided in comment]

USACE Response: Adopted.

Action Taken: The data provided in Table 2.4 is correct. The text that refers to Table 2.4, in Chapter 2 has been changed for clarity to read "Table 2.4 shows the single occurrence damages of property by category within the various flood event floodplains. In total, the study area has about $98 million (August 2010 price level) worth of damages incurred by the 1-percent chance event."

A detailed discussion of the evaluation of the LFCC conducted in the late 1990's, as well as the conclusion of the study published in 2007 that states its current disposition, is provided in Subsection 2.7.4.1 Water Management Facilities, item c, Water Conservation and Delivery.

The criteria for elimination of some alternatives, such as flood proofing, was changed from Completeness to Effectiveness. An abbreviated discussion of planning criteria, including definitions presented in Section 4.7.6, has been added to Section 4.3.1. Section 4.5 has been changed to clarify the rationale for Alternatives eliminated from further consideration.

Table 4.7 and its supporting text have been revised to show information contained in table F-18 of Technical Appendix F-10, Economics. The intent of Table 4.6 is to describe the risk remaining, even with a Federal project.

Typographical errors have been corrected and missing or incorrect references and information on page 4-31, in Table 4.9, and Table 4.10 have been provided or changed.

Additional text has been added to Section 4.7.5.3 to describe the regional benefits in terms of regional income and regional employment to the area from a large Federal project.

Additional text has been added to Section 4.7.5.4 on other social effects to describe the type of flood risk and examples of impacts from river flooding and flash flooding.

The rationale for elimination of the retention dams was not only monetary, but due to "conflicts over land use, and constraints on the USFWS that prohibited inundation of about 300 acres of land on the Sevilleta National Wildlife Refuge" as provided in Chapter 4, Section 4.5.2 of the GRR/SEIS II.

Sub-Recommendation 2: This section should probably reference the 2007 WRDA and address comments from Wild Earth Guardians that "The Water Resources Development Act of 2007 promotes a new federal policy for water projects."

USACE Response: Not Adopted. WRDA 2007 does not apply to the San Acacia to Bosque del Apache GRR/SEIS II as defined in the section on applicability contained in the act. Furthermore, implementation guidance is contingent on an update to the Principles and Guidelines, which has not occurred.

Sub-Recommendation 3: It might be useful to reference the source or reason for "planning constraints."

USACE Response: Not Adopted. Section 4.1 bullet one states: "Planning goals are set, objectives are established, and constraints are identified." The constraints were identified as part of the study, as were the problems and objectives.

Sub-Recommendation 4: Table 4.7 is a poor example. It suggests that the net economic benefit of any alternative is less than zero. Some benefits have not been included. It suggests that perhaps the Base plus 5 feet or maybe Base plus 4.1 foot would be a better alternative.

From Table 4.6, there appears to be a 32 percent chance that this levee will fail in a 1 in 10 year event and a 44 percent chance that it will fail in a 1 in 50 year event. Remaining benefits are NOT obtained, therefore, only from severe and rare events. Information is not provided that could be used to confirm that "the remaining benefits are not enough to offset increases in cost."

USACE Response: Adopted.

Action Taken: Table 4.7 and supporting text have been revised to show information contained in Table F-18 of Technical Appendix F-10, Economics. The intent of Table 4.6. is to describe the risk remaining even with a Federal project. The table presents the probability of passing a certain event through the entire levee system including the most vulnerable location at the end of the period of analysis, as stated in the supporting text. A more pointed example is made by presenting figures from the end of the period of analysis once channel capacity has decreased from aggradation in the southern third of the project. This table does

not present a comparison of performance during the period of analysis, as the panel comment suggests.

Sub-Recommendation 5: Sections 4.5.7.2, 4.5.7.3 and 4.5.7.4 should be populated with a summary of effects information from the tables that follow. Table 4.12 does not include a section for the "Other Social Effects" accounts. It appears there should be one; isn't "Public Health and Safety" under "Other Social Effects"?

USACE Response: Adopted.

Action Taken: Additional text has been added to Chapter 4, Section 4.7.5.3 to describe the regional benefits to the area in terms of regional income and regional employment from approximately $3 million each year for 20 years. Additional text has been added to Section 4.7.5.4 on Other Social Effects to describe the type of flood risk, and provide examples of the impacts from river flooding and flash flooding that would be reduced.

15. IEPR Comment – *Low Significance*: GRR/SEIS II Section 6.8 (Socioeconomics) should address potential regional economic impacts generated by the project to the community. GRR/SEIS II Section 6.8 (Socioeconomics) should address potential regional economic impacts generated by the project to the community.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: The District should review the *Proposed National Objectives, Principles and Standards for Water and Related Resources Implementation Studies* document dated December 3, 2009, which describes how economic impacts to the regional economy should be addressed

USACE Response: Adopted.

Action Taken: The GRR/SEIS II discussion of the Four Accounts (NED, EQ, OSE, RED) in Section 4.7.5.4 has been revised to include a qualitative discussion that a ~$3 million project over 20 years will supplement the NED benefits through jobs, and resources purchases such as fuel and incidental commerce from a workforce present in the area. OSE will also be improved through a reduction of life safety risk. These statements are reiterated in the socioeconomics Section 6.8 in Chapter 6.

16. IEPR Comment – *Low Significance*: Assertions regarding water quality from flood events on p. 6-11 require further support or modification. Without measuring the actual contribution of contaminants or allochthonous material, the overall conclusion of low-quality contributions [during flood events] is unsupported.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Consider modifying the text to reflect the issue raised in the Comment.

USACE Response: Adopted.

Action Taken: The assertion regarding water quality from flood events on page 6-11 has been removed. With the exception of bacterial contamination, previous flooding has found the level of both organic and inorganic contaminants to be relatively low.

17. IEPR Comment – *Low Significance*: The GRR/SEIS should contain more figures to support statements and conclusions made in the text. The aesthetics sections (existing conditions and future action) would greatly benefit from photographs or photomontages to provide an objective analysis of project impacts.

This comment includes two recommendations for resolution which have been adopted as discussed below.

Recommendation 1: It is recommended that the District add the suggested figures to allow the reader to corroborate findings of the GRR/SEIS.

USACE Response: Adopted.

Action Taken: Where possible, links or references to existing supporting graphical information have been added to convey this information while limiting the size of the existing document per NEPA and CEQ guidance. The Phase 1 Site assessment and the included maps dated September 1, 2005 has been added to appendix F-6, Hazardous, Toxic and Radioactive Waste. Although the mapping system may seem esoteric to the general public, it is intimately known and accessible by local biologists, who are most likely to scrutinize said maps. The discussion of minnow habitat in Section 6.5 has been revised to describe this more precisely, and to provide a USFWS internet source for flycatcher critical habitat maps. A graphic displaying the distribution of breeding willow flycatchers over the past 2-3 seasons has been added in section 2.4.4.2. The maps also depict designated critical habitat for the flycatcher.

In Section 3.5.4, Land Use and Classification, the proposed structures occupy land owned in fee, or held in easements dedicated for flood control purposes. Added land use maps would not be informative, since the recommended levee would replace the existing inferior structures used for the same purpose.

Recommendation 2: Consider preparing photomontages of the study area under existing and future conditions to show the public views of the levee to scale. This can be done economically by many commercially available services and would make an understanding of the project much more accessible to the public.

USACE Response: Adopted.

Action Taken: The discussion in Section 2.8 has been revised to ensure that the discussion reflects those in Chapters 3 and 6. Photographs have been added to Section 6.9 to show the existing spoilbank (as seen from a highway crossing) along with a photo of a levee (similar in design to that proposed) constructed near Albuquerque to demonstrate the minor changes in aesthetics.

PHASE 1 COMMENTS and USACE AGENCY RESPONSE

Phase 1, which began in October 2011, focused on the GRR/SEIS II Alternative Formulation Briefing (AFB) read-ahead material and appendices. The following discussions present the USACE Final Response to the Phase 1 Comments.

1. IEPR Comment - *High Significance:* The economic analysis in Appendix F-10 suggests that the tentatively selected plan (TSP) is economical. The panel is not entirely convinced that this is true. Taken together, a large number of problems with the economic analysis could, if corrected, result in a non-economical project.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Rewrite Appendix F-10 to include recalculated [Equivalent Annual Damages] EAD and issues identified to improve the quality of the document and ensure the economic justifications are reliable.

USACE Response: Adopted.

Action Taken:
Inconsistencies present in the economic analysis have been corrected throughout the Economics Appendix, F-10. Likewise, omissions of operation, maintenance repair replacement and relocation (OMRR&R) and mitigation costs have been added to Table F-56 in the appendix and GRR/SEIS II in Tables 7.2 and 8.1. Avoided water loss is no longer quantified or claimed as a benefit category since it does not affect the selection of one alternative over another. Equivalent Annual Damages (EAD) have been recomputed for the structures and contents category including commercial structures to be consistent with other benefit categories. EAD is also recomputed for the Low Flow Conveyance Channel (LFCC) with a sensitivity analysis to verify that changes in assumptions do not change alternative selection. These changes have made in the to benefit calculations in the Economics appendix F-10 and Tables 7.2 and 8.1 of the GRR/SEIS II. The selected plan remains economical and remains the plan that maximizes net economic benefits. The revised analysis also includes additional details provided by the Bureau of Reclamation outlining the existing spoil bank performance. This information confirms assumptions relative to damages occurring for high-frequency, small events.

2. IEPR Comment - *High Significance:* The panel is not able to verify that the economic analysis was done correctly. The approximate single occurrence damages in Tables F-5A and F-5B do not appear to be consistent with the EADs presented in Tables F-6A and F-6B of Appendix F-10. Possibly, the probabilities used to estimate benefits for structures and contents are different from those used to estimate other benefits.

This comment includes two recommendations for resolution, both of which have been adopted.

Recommendation 1: Include a discussion following presentation of Tables F-5A and F-5B [of Appendix F-10, Economics] to explain how results in Tables F-6A and F-6B follow, or not. Recalculate EAD if necessary.

USACE Response: Adopted.

Action Taken: Revised text has been added to Section F-06 of Appendix F-10 to explain how results in Tables F-6A and F-6B relate to previous tables. Section F-03 describes how event-damage relationships presented in Tables F-5A and F-5B were computed for structures, contents, vehicles, streets, utilities, agriculture, irrigation ditches. Section F-06 describes the process by which tables F-6A and F-6B are created using HEC-FDA (for structures and their contents) or using the event-damage relationships created for other property types.

Recommendation 2: Explain why contents and structures can be about 20% of without-project event damages but more than half of EAD. Or if there is an error, re-calculate EAD.

USACE Response: Adopted.

Action Taken: Equivalent Annual Damages (EAD) have been recomputed for the structures and contents category including commercial structures to be consistent with other benefit categories. EAD is also recomputed for the Low Flow Conveyance Channel (LFCC) with a sensitivity analysis to verify that changes in assumptions do not change alternative selection. The revised analysis also includes additional details outlining the existing spoil bank performance. This Information provided by the Bureau of Reclamation relative to existing spoil bank performance confirms assumptions of damages occurring for high-frequency, small events. The selected plan remains economical and remains the plan that maximizes net economic benefits.

3. IEPR Comment - *High Significance:* Appendix F-10 (the economics appendix) is not especially well organized or written. This inhibits the ability of the expert panel to evaluate the economic analysis.

This comment includes two general recommendations for resolution which have been adopted. Eight editorial recommendations are provided within the context of the general comments. All editorial comments were considered.

Recommendation 1: Excessive documentation of alternatives not ultimately selected for non-economic reasons is probably not required. Consider putting such material in an appendix to the economic study

USACE Response: Adopted.

Action Taken: A substantial revision to the Economic appendix was performed to improve organization, update H&H data and update the damages and benefits attributable to the

LFCC. References have been provided to information in other appendices that supports the Economic analysis

.

Recommendation 2: Make sure references in text to results are updated; for example, the text on p. 100 says the benefit/cost (B/C) ratio for the plan that maximizes net benefits, being the 100-year levee plus four feet, is 4.6. However, Table F-15, p. 41 shows a B/C ratio of 3.81 for the 100-year levee plus four feet.

USACE Response: Adopted

Action Taken: The references in text to results have been updated and revised to be current and consistent with those in tables throughout the Economic Appendix as well as in tables 4.8, 7.2, and 8.1 where economic results are presented in the GR/SEIS II.

4. IEPR Comment - *High Significance:* Construction cost estimates are only summarized for the Tentatively Selected Plan (TSP).

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to include an overview of the cost estimates for the TSP consisting of major items: their units, quantities, unit prices, and costs. In addition to the basic cut and fill items, include foundation preparation, slurry wall, rip-rap, and cy-mile overhaul of spoil.

USACE Response: Adopted.

Action Taken: The appendix F-7, Cost Estimates, has been updated to contain the standard summary report for the certified TSP estimate at a Civil Works Breakdown Structure account level along with the other supporting documentation. This level of detailed cost estimate is not provided in the main body GRR/SEIS II.

5. IEPR Comment - *High Significance:* The GRR/SEIS needs to elaborate further on foundation preparation for the levee construction. Under earthquake loading this is a very important issue.

This comment includes one recommendation for resolution which has not been adopted.

Recommendation: It is suggested that thought be given to doing some moderately deep compaction from the surface, after stripping and before the excavation for the keyway.

USACE Response: Not Adopted. The USACE follows the process for the National Flood Insurance Program Levee System Evaluation to evaluate if additional analysis is required. According to the USGS probabilistic hazard curves, 2002 data, ground motion for the 100 year return period relative to this project is well below the threshold requiring additional analysis.

6. IEPR Comment - *High Significance:* There is no discussion of the seismicity of the region

This comment includes one recommendation for resolution which has not been adopted.

Recommendation: USACE should demonstrate that the probability of a strong earthquake on the causative fault—during flood—is sufficiently remote and that the risk will be assumed and the levee damage repaired if the event occurs. This should be stated and supported in the GRR/SEIS.

USACE Response: Not Adopted. The probability of both a flood event and earthquake sufficient to cause liquefaction are considered remote, therefore, moderately deep compaction was determined not necessary. No additional evaluation is required per ground motion for the 100 year return period criteria contained in EC 1110-2-6067, the USACE Process for the NFIP Levee System Evaluation.

7. IEPR Comment - *High Significance*: GRR/SEIS makes the assumption [in Section 4.7.3.2 first bullet] that the existing spoil banks did not contain flood flows.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to include a definition of "flood flows" to help in determining whether existing spoil banks do or do not contain flood flows.

USACE Response: Adopted.

Action Taken: Text has been added to the subject bullet to state that non containment of flood flows should not be confused with "start of damages" conditions used for the Economics models. A reference to the Economic Appendix F-10, Para F-04 "HEC-FDA Use." is provided.

8. IEPR Comment - *High Significance:* The levee details do not correspond to the GRR/SEIS.

This comment includes four recommendations for resolution which have been adopted.

Recommendation: Add detail drawings to the report or appendix.

A. aShow all three types of levee construction, and how the <5-ft height levees would be constructed, including foundation and compaction;

B. Clarify what the other two cross-sections represent height-wise, and check against the verbal descriptions to match the graphical representation;

C. Show preliminary layouts for levee openings, tie backs, sediment basins, and other significant cost facilities. Include O&M requirements, as appropriate; and

D. Show alignment and profile for the new Railroad Bridge, and graphically show how the bridge hydraulics and sediment transport issues are addressed. There is a verbal description, but it is difficult to visualize the facility and its location. Also discuss and show what will happen to the existing structure, and any cultural values.

USACE Response: Adopted.

Action Taken: Levee superiority analysis performed subsequent to this comment has redefined the levee's vertical alignment. Text and typical sections shown in Section 5.1.3 have been revised to show that the levee is greater than 5' for the entire levee alignment. Additional plates and drawings are provided in Appendix F-1 Civil Engineering to show ancillary structures and station reaches. The railroad bridge replacement measure was screened out early in alternative selection, therefore additional graphics of this measure are not warranted.

9. IEPR Comment - *High Significance:* The GRR/SEIS does not show the top of the levee and bosque access roads or ramps.

This comment includes three recommendations for resolution which have been adopted.

Recommendation: In the GRR/SEIS add the following:

A. Details as to where and how these appendages will be constructed, while maintaining levee integrity and protecting the levee side slopes from erosion and degradation by unauthorized all-terrain vehicles or four-wheel-drive activity.

B. A discussion of earth volumes, with remediation, that will be required for construction of these ramps.

C. A discussion, with graphics, of what, if any, improvements are required for the Escondida Bridge and roadway embankment. If the levee height is raised at the roadway crossing, this will require adjustments to the vertical roadway profile for a significant distance away from the levee and across the floodplain. This will require widening the embankment base to maintain roadway widths, plus addition of wider shoulders per current roadway design criteria, all of which will require more earthen materials, with remediation, and additional construction costs.

USACE Response: Adopted.

Action Taken: Additional plan, profile and typical drawings are provided in Appendix F-1 Civil Engineering to show levee heights and ancillary structures. Access ramps will be reconstructed at existing locations unless relocated through coordination with local stakeholders and the sponsors. Detailed quantities and design will be developed in plans and specifications.

10. IEPR Comment - *High Significance:* There are several issues identified concerning the hydrologic, hydraulic, and sediment transport analyses.

This comment includes three recommendations for resolution which have been adopted.

Recommendation: The GRR/SEIS should be updated to include an appendix containing:

A. A description of the methodology for the analysis of long-term sediment transport. Additional sediment transport sections and analysis should be made of long-term sediment transport to ensure that sampling bias is not present in the results. It is presently recommended that the total number of sediment transport analysis sections totals 35.

B. A summary discussion of how the various tools were used, the assumptions behind them, and the limits or risks from using these results.

C. A map showing where the various models were applied, comparisons between the model results, how well the existing and proposed railroad crossings were modeled, etc., with graphics.

USACE Response: Adopted.

Action Taken: Additional plan, profile and typical drawings are provided in Appendix F-1 Civil Engineering to show levee heights and ancillary structures. Access ramps will be reconstructed at existing locations unless relocated through coordination with local stakeholders and the sponsors. Detailed quantities and design will be developed in plans and specifications.

11. IEPR Comment - *High Significance:* Additional detail on silvery minnow populations and distribution within the study area should be provided as a basis for ascertaining potential impacts.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Provide the requested information or indicate why it is infeasible in the text of the document.

USACE Response: Adopted.

Action Taken: The section presenting the available silvery minnow habitat and population monitoring literature has been condensed to focus on issues relevant to the project. Additional detail and discussion has been added to Sections 6.4 and 6.5.1of the GRR/SEIS II to provide direct effects of alternatives on minnows and their habitat as determined in consultation with the Service. The relevant silvery minnow literature is also analyzed and cited in the Biological Assessment and Biological Opinion, both of which are included in Appendix C, Endangered Species Act Consultation.

12. IEPR Comment - *High Significance:* There is insufficient documentation on ecological resources (outside of endangered species) to reach a conclusion regarding whether the proposed alternative should be chosen and also regarding impacts of the proposed plan on wildlife and aquatic resources.

This comment includes one recommendation for resolution which has been adopted.

Recommendation : Provide more detail on studies undertaken to date and project impacts on the basis of existing conditions data already reported. Discuss any changes in water salvage to increase or decrease river flows and water table elevations.

USACE Response: Adopted.

Action Taken: The text in Section 6.4 and in particular 6.4.2 has been revised to show that impact evaluation was based on results of many studies of middle Rio Grande valley riparian habitat types conducted over the past 30 years. Section 6.4.2 of the GRR/SEIS II has been revised to quantitatively evaluate impacts to riparian vegetation and the value of mitigative plantings based on breeding bird densities from censuses in similar habitat types along the Rio Grande. Coordination with resource managers in the project area has determined that differential evapo-transpiration losses are not a concern based on the inconclusive data and small size of the affected area.

13. IEPR Comment - *High Significance:* The text would benefit from a more complete and cogent discussion of the overall potential project impacts to the Southwest willow flycatcher (and other riparian species) in terms of population impacts, habitat impacts, and potential mitigation measures.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Revise the text to clarify how proposed mitigation measures will offset the referenced potential project impacts to the Southwest willow flycatcher

USACE Response: Adopted.

Action Taken: A detailed mitigation plan has been added in Section 6.4.2.4 that presents a quantitative evaluation of affected habitats, and provides the expected value of mitigative plantings determined to be necessary to offset negative impacts per the Programmatic Biological Opinion. Detailed effects to endangered species habitat have been described in the Biological Assessment and Biological Opinion, both of which are included in Appendix C, Endangered Species Act Consultation.

14. IEPR Comment - *High Significance:* The project requires a detailed mitigation plan for the silvery minnow impacts.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Developing a mitigation plan that evaluates potential alternatives for mitigating project impacts can be done in parallel with ongoing design studies for finalizing the project, regardless of whether the proposed project proceeds exactly as planned. Included within this evaluation could be further consideration of measures that might be undertaken to prevent or offset minnow mortality should the Tiffany Basin portion of the project be implemented.

USACE Response: Adopted.

Action Taken: A detailed mitigation plan has been added in Section 6.4.2.4 that presents a quantitative evaluation of affected habitats and mitigative plantings determined. Detailed effects to endangered species habitat have been described in the Biological Assessment and Biological Opinion, both of which are included in Appendix C, Endangered Species Act Consultation.

15. IEPR Comment - *Medium Significance:* It is important for the GRR/SEIS to be a stand-alone document. There are numerous instances where the panel was unable to corroborate GRR/SEIS findings because the data were not provided or analysis methodology was not described in a readily understandable form. Considering that several supporting analyses for this GRR/SEIS are based on existing documents that go back to 1948, the GRR/SEIS should provide appropriate page and paragraph references to pertinent existing documents through the use of summaries, footnotes, etc. in the GRR/SEIS. Where noted elsewhere in the Comments, appendices should be revised for clarity in support of conclusions of the SEIS so that findings may be corroborated.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to include references to the materials (as summary text or footnotes) in previous work that are relevant to this GRR/SEIS.

USACE Response: Adopted.

Action Taken: References to technical appendices have been added in parentheses to discussions in the GRR/SEIS II in Sections 1.7, 2.2.5, 5.1.4 and others. Other references such as excerpts from a report of investigation have been added to section 1.4.1 Flood History to better describe what is considered a "failure" of the spoil bank.

16. IEPR Comment - *Medium Significance:* The various sections of the report do not consistently support the assumption that flood damages start in the 1-in-5-year event. The level of damages assumed for a 1-in-5-year event should be displayed in the document. Additionally, if damages were included for flood events larger than the 1-in-500-year flood, these should also be displayed. At least, additional support for the current assumption and a review of text for consistency is suggested.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Explain what single-occurrence damage levels were used to calculate damages in the range of the 1-in-5 flood to the 1-in-10 flood, and for events larger than the 1-in-500 flood, if applicable. This might include a discussion of how the Hydrologic Engineering Center's Flood Damage Analysis (HEC-FDA) calculated EAD based on data inputs.

Include avoided flood fighting costs as economic benefits. However, if the data soundly support failure of the existing system in a 1-in-5-year event, provide documentation and resolve the

inconsistencies in the various sections within the report regarding the reliability of the existing levee and storage system

USACE Response: Adopted.

Action Taken: Revised text has been added to Sections F-03 and F-06 of the Economic Appendix, F-10 describing the process by which HEC-FDA outputs are developed using the event-damage relationships. The Bureau was unable to provide information regarding avoided flood fighting costs in a solicitation found in Section F-11 of Appendix F-10.

Additional language has been added describing what is considered a "failure" of the spoil bank (seep, boil, piping, sloughing) to the GRR/SEIS II in Sections 1.4.1 Flood History, 3.1.2 Geology and Soils and 3.5.2 Flood Hazard. The Discussion includes examples of failures that have occurred in years preceding the investigation. This supports the conclusion that start of damages occur at the 14-20% exceedance event in the lower reach.

17. IEPR Comment - *Medium Significance*: Low Flow Conveyance Channel (LFCC) damage estimates are planned for revision. Without revised estimates, the panel cannot tell how the economic analysis may be affected. The revision should include more detailed documentation of LFCC damages.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Use revised estimates. Provide a citation for LFCC damages and provide appropriate discussion of methods and results.

USACE Response: Adopted.

Action Taken: EAD is and benefits have been recomputed for the Low Flow Conveyance Channel (LFCC) with a sensitivity analysis to verify that changes in assumptions do not change alternative selection. These changes have made in the benefit calculations in the Economics appendix F-10 and Tables 7.2 and 8.1 of the GRR/SEIS II.

18. IEPR Comment - *Medium Significance:* Provide more discussion of commercial contents in Appendix F-10.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Explain what commercial properties are responsible for the current commercial contents EAD estimate, and what the commercial contents are. Ensure no double-counting is occurring.

USACE Response: Adopted.

Action Taken: The USACE reexamined the economic inventory to ensure that a particular line of inventory coding was not used more than once to ensure no double counting. Revised

text has been added to Section F-04 of the Economic Appendix, F-10 describing the valuation and analysis of commercial properties and contents.

19. IEPR Comment - *Medium Significance:* Discuss the schedule for levee construction for various stages of the Rio Grande, and include the maximum length of the existing levee that the specifications will allow to be opened at one time.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: The Government should perform an analysis to determine the reasonable length of the levee that can be breached at any one time, and how construction impacts to [threatened and endangered] T&E species will be mitigated.

USACE Response: Adopted.

Action Taken: A detailed mitigation plan has been added in Section 6.4.2.4 that discusses construction impacts to T&E species. Cost presented in Table 7.2 for the recommended plan, include evaluation of a 20 year construction schedule. Detailed analysis of contraction methods such as maximum length of the existing spoil bank that will be opened at one time and mitigation of flooding during construction has been conducted for plans and specifications, however is not provided in the GRR/SEIS II or appendices.

20. IEPR Comment - *Medium Significance:* The GRR/SEIS, does not provide the approximate station limits for levee height >5 ft (Reference: p. 4-18, para. 1 and Appendix F-7).

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Revise the GRR/SEIS to give the station limits where the levee height is >5 ft, briefly describe the proposed construction where H is >5 ft and where H is <5 ft, and include an overview of the cost estimates that includes the cost of the slurry wall. **USACE Response: Adopted.**

Action Taken: Text and typical sections shown in Section 5.1.3 and engineering drawings in Appendix F-1 Civil Engineering have been revised to show that the levee is greater than 5' for the entire levee alignment due to levee superiority analysis. The appendix F-7, Cost Estimates, has been updated to contain the standard summary report for the certified TSP estimate that specifies costs for the slurry wall.

21. IEPR Comment - *Medium Significance:* Minimizing the amount of spoil hauled to Tiffany Basin by disposing of it onsite could result in significant cost savings.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to include an explanation justifying why USACE is hauling spoil to Tiffany Basin rather than onsite, which could result in significant savings. Place

as much spoil material, as it is safe to do so, as compacted fill against the outer slope of the design section near where cut is in excess of fill.

USACE Response: Adopted.

Action Taken: Some excess material will placed as compacted fill against the land side slope of the proposed levee in the northern reach to the extent that the larger levee footprint does not result in impacts to fish and wildlife resources resulting in additional mitigation. The cost estimate in Appendix F-7 includes cost risk analysis performed for the TSP that included the potential savings if the government or contractor is able to locate spoil area(s) closer to the work during construction. These savings are captured in the contingency rate calculated by the risk analysis and applied to the project cost.

22. IEPR Comment - *Medium Significance:* From the discussions in the GRR/SEIS, it appears as if groundwater recharge is considered a water loss. [Reference Section 2.2.3.2]

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Saving water constitutes a significant benefit and USACE should consider editing the benefits listed in the GRR/SEIS to reflect this.

USACE Response: Adopted.

Action Taken: Text has been added to the end of Section 2.7.4.3 (c), Water Conservation and Delivery, to emphasize that infiltration of surface water is an unquantified benefit to the local groundwater recharge.

23. IEPR Comment - *Medium Significance:* The GRR/SEIS discussion on the Railroad Bridge is not consistently described.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS (e.g., Chapter 4) to include a single paragraph on the Railroad Bridge that provides the reader with a clear understanding of the complete history of the Railroad Bridge.

USACE Response: Adopted.

Action Taken: Sections 3.5.4.2 was revised to compliment section 2.7.5 regarding continued function of the bridge. Sections 4.5.1 and 4.5.5.6 are revised to provide a more concise description of alternative measure eliminated from consideration including relocation of the railroad bridge.

24. IEPR Comment - *Medium Significance:* The GRR/SEIS discussion on flow and sediment transport analyses for all bridges, and especially the Railroad Bridge, must be more detailed.

This comment includes one recommendation for resolution which has not been adopted.

Recommendation: Add a discussion, with appropriate graphics and value functions, as to existing levee performance (hydraulic impacts, flood plain issues, and sediment transport) with the existing bridges; as well as proposed levee performance with existing and proposed bridges.

USACE Response: Not Adopted. The differential impacts by the proposed project to the various bridge crossings within the study area are expected to be negligible, and do not affect alternative selection because the project is essentially replacing the existing spoil bank along its current alignment with a more robust engineered levee. The discussed in the Appendix F-2 , F-3 Sections 4.3 With Project Hydraulic Analysis and Section 7, Risk and Uncertainty, address existing and expected impacts of the bridges on the proposed levee alternatives. The impacts of hydraulicss, flood plain issues, and sediment transport on the design of the selected alternative have been accounted for.

25. IEPR Comment - *Medium Significance:* In the GRR/SEIS, p. 6-28, Table 6.7, Comparison of Costs and Equivalent Annual Benefits for Alternative Levee Heights, O&M costs are not included as an annual recurring cost.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: USACE should consider including the O&M costs in Table 6.7 for consistency.

USACE Response: Adopted.

Action Taken: OMRR&R costs have been added to Table F-56 of the Appendix F-10, Economics and tables 7.2 and 8.1 of the GRR/SEIS II for the recommended plan only. OMRR&R costs were not expected to significantly alter plan selection among the alternatives evaluated. Upon re-inspection of these calculations and their basis, that remains the case.

26. IEPR Comment - *Medium Significance:* In the GRR/SEIS, the timeframe for the construction period is inconsistent.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to reflect the correct number of years for the construction period and revise any sections that would be affected by the change.

USACE Response: Adopted.

Action Taken: References to the construction period have been revised for consistency in Sections 4.7.4, 6.2.2, and 7.1.10.

27. IEPR Comment - *Medium Significance:* The GRR/SEIS should include a discussion of alternatives considered for the reach north of Tiffany Junction.

Three recommendations were provided with this comment; two of which were adopted on one that was not adopted.

Recommendation 1: Modify the GRR/SEIS to include a discussion of specific locations of proposed improvements that turned out to be less effective,

USACE Response: Adopted.

Action Taken: Chapter 4 was reorganized to present the various alternatives or measures that were considered but eliminated from detailed evaluation. Table 4.1 was added to present a concise picture of alternative and rational for screening.

Recommendation 2: Modify the GRR/SEIS to include a discussion of why the LFCC needs to be protected, and any function or utilization beyond acting as a levee toe drain.

USACE Response: Adopted.

Action Taken: In 2007, the Record of Decision (ROD) for the Upper Rio Grande Basin Water Operations Review Final EIS (USBR, 2007c) established that the Bureau will continue operating the LFCC as a passive drain with zero diversion from the Rio Grande. Additional text is added to emphasize this fact in Sections 1.8.1, 2.6.1, 6.7.1 and Table 1.5.

Recommendation 3: Modify the GRR/SEIS to include a discussion of how the LFCC will benefit drainage of the levee foundation.

USACE Response: Not Adopted. The discussion in Section 5.1.3 describes the seepage control features to prevent damage to the bank of the LFCC. These features contribute additional cost to the recommended plan rather than a benefit to its function.

28. IEPR Comment - *Medium Significance:* Probability Analysis must be clarified in the GRR/SEIS.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to provide a discussion of why the equations were deemed appropriate, or if it is standard practice to follow the guidance document equations. Address how reliably the composite value represents the individual risk factors and their range and show how the selected value, for economic reasons, was greater than the computed values.

USACE Response: Adopted.

Action Taken: Additional text is added to Section 4.6.5.1 to discuss derivation of project performance. EM 1110-2-1619 prescribes a framework for incorporation of quantitative Risk and Uncertainty into the analysis of flood damage reduction studies, which was followed for this study. Equation 5-6 of the EM presents a method of combining differing categories of uncertainty to arrive a composite standard deviation, which was used in this study for its intended purpose. The Attachment to Appendix F-3 (Hydrology) describes in more detail the basis for the primary descriptor of hydrologic uncertainty adopted for the study.

29. IEPR Comment - *Medium Significance:* The GRR/SEIS document should make it clear the extent to which alternative bank and channel stabilization designs that incorporate vegetation were considered, or could be considered under NEPA.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Further discussion seems warranted within the USACE regarding the extent to which vegetation can be incorporated further in the design in order to increase habitat quantity and quality along the 43-mile proposed levee.

USACE Response: Adopted.

Action Taken: The text has been revised in Chapter 5, Section 5.1.2, of the GRR/SEIS II to explain that the high velocities preclude the use of vegetation for bank stabilization downstream of the SADD. A proposed soil cement veneer will be applied to the existing embankment on the outside bank of a large bend in the channel in this area, to prevent scour of the river bank and seepage from the expected 17- 20 foot-per-second design flows.

Section 6.4.2.2, Changes due to the Vegetation-free zone, has been added to explain that the penetration of large (greater than 0.5 inch) roots into the levee can facilitate increased seepage and saturation of the structure during floods. The current policy is based on nationwide experience; local and regional studies of specific problems related to this policy are ongoing. Results of further studies and other pertinent information will be considered during the phased design and construction of the project over the next 20 years.

30. IEPR Comment - *Medium Significance:* GRR/SEIS Section 6.8 (Socioeconomics) should address potential economic benefits generated by the project to the community.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: The decision regarding whether to proceed with the proposed project is dependent on whether the project is deemed in the public interest. The economic feasibility of the project itself has been focused on in detail. However, the project has the potential to create local economic benefits that do not appear to be addressed in Section 6.8.
The District should review the Proposed National Objectives, Principles and Standards for Water and Related Resources Implementation Studies document dated December 3, 2009, which describes how economic impacts to the regional economy should be addressed:

USACE Response: Adopted.

Action Taken: The discussion of the Four Accounts (NED, EQ, OSE, RED) in Section 4.7.5.4 of the GRR/SEIS II has been revised to include a qualitative discussion that a ~$3million project over 20 years will supplement the NED benefits through jobs, and resources purchases such as fuel and incidental commerce from a workforce present in the area. Also the OSE will be improved through a lower life safety risk. The statements are reiterated in the socioeconomics Section 6.8.

31. IEPR Comment - *Medium Significance:* Potential contaminant issues associated with the proposed project have not been adequately addressed in the GRR/SEIS.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Provide a description of potential testing protocols and assurance that the material will not leach contaminants when mobilized

USACE Response: Adopted.

Action Taken: The Phase 1 Site assessment dated September 1, 2005 has been added to appendix F-6, Hazardous, Toxic and Radioactive Waste. As stated in Sections 23, 3.2 and 6.3 database searches and site surveys did not identify any known or suspected HTRW concerns in the footprint of the proposed project. USACE regulation requires additional phase 1 site assessments be conducted within 6 months prior to new construction. Therefore timely phase I assessments will be conducted on a site specific basis for each phased construction effort during the projected 20-year construction period.

32. IEPR Comment - *Medium Significance:* The GRR/SEIS should contain more figures to support statements and conclusions made in the text.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: The GRR/SEIS should contain more figures to support statements and conclusions made in the text.

USACE Response: Adopted.

Action Taken: Where possible, links or references to existing supporting graphical information have been added to convey this information while limiting the size of the existing document per NEPA and CEQ guidance. The Phase 1 Site assessment and the included maps dated September 1, 2005 has been added to appendix F-6, Hazardous, Toxic and Radioactive Waste. Although the mapping system may seem esoteric to the general public, it is intimately known and accessible by local biologists, who are most likely to scrutinize said maps. The discussion of minnow habitat has been revised to describe this

more precisely, and to provide a USFWS internet source for flycatcher critical habitat maps. A graphic displaying the distribution of breeding willow flycatchers over the past 2-3 seasons has been added in section 2.4.4.2. The maps also depict designated critical habitat for the flycatcher.

33. IEPR Comment - *Medium Significance:* Identify the methodology used to identify wetlands in the study area.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Include a description of the methodology used to conclude there are no jurisdictional wetlands affected by the project.

USACE Response: Adopted.

Action Taken: USACE has completed an updated Section 404(b)(1) Guidelines Evaluation and State Water Quality Certification (Feb. 2013) and added this as Appendix B of the GRR/SEIS-II. A description of the methodology used to identify wetlands is presented in the evaluation. Section 5.1.16.1 is also revised to state that the recommended plan entails fill within wetlands and that an exemption through Section 404(r) is being sought.

34. IEPR Comment - *Medium Significance:* Provide additional detail on Environmental Justice concerns pertinent to the No-Action condition.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Suggest providing similar detailed analysis to the Comments above if available as part of the justification for the project.

USACE Response: Adopted.

Action Taken: Environmental Justice Sections 2.7.6 and 6.8.6 have been revised to provide additional information of the demographics and income of the affected population in Socorro County, NM. Effects of the recommended plan and no action alternative are presented in Section 6.8.6.

35. IEPR Comment - *Medium Significance:* Provide additional detail to substantiate Future No-Action projections in Section 3.3.1 and 3.3.2.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Add the additional detail to the text as a basis to allow detailed comparison with the Future Action alternative.

USACE Response: Adopted.

Action Taken: Section 3.3.1 has been revised to clarify the general statements about future habitat conditions and trends in habitat value. Additional discussions have been added to quantify potential effects from climate change and invasive species; all while avoiding extrapolation where sufficient information is lacking. Section 6.4.1.1 has been revised to discuss the with and without project conditions related to inundation and affects to ecological resources within the current floodway and throughout the floodplain west of the spoil bank. Additional detail comparing floodway area, habitat and vegetation effects in with and without project conditions is added to Section 6.4.2. Subsection 6.4.2.4 summarizes mitigative activities for vegetation and endangered species described in detail in Appendix F-4 Mitigation Plan.

36. IEPR Comment - *Medium Significance:* Provide weight of the evidence conclusion regarding projected silvery minnow populations in the future without the project.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: While predicting the future is difficult, the document should reach some conclusion regarding the most likely scenario for the future regarding this species [Silvery Minnow]. The document should attempt to address the implications on water levels in the Rio Grande and supporting tributaries, particularly in relation to late summer months, impacts on juvenile recruitment, and movement downstream.

USACE Response: Adopted.

Action Taken: Substantial revisions to Chapter 6 have been made to add improved biological information; however, available analyses preclude precise assessment of the species' future. There is a significant gap between existing climate models and species/habitat models, especially in view of continuing climate change. Because of the minimal effects of any alternative on silvery minnows, however, potential impacts are not selective and the recommended plan would not change.

37. IEPR Comment - *Medium Significance:* Ecosystem restoration goals are introduced generically up front but not addressed in the text of the impacts section. There is no discussion of how impacts to habitat quality will be addressed by the proposed project.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Address whether ecosystem restoration should be included in project objectives, or delete the reference. In either case, mitigation plans/alternatives should be discussed in greater detail in the document.

USACE Response: Adopted.

Action Taken: The planning objective with reference to ecosystem restoration has been removed. Subsection 6.4.2.4 has been revised to summarize mitigative activities for vegetation and endangered species. A detailed mitigation plan has been added as appendix F-4.

38. IEPR Comment - *Medium Significance:* Subsection 4.7.6.3 provides inadequate detail in support of the findings presented

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Subsection 4.7.6.3 should be revised to describe the specific habitat to be created by the proposed project design so that the conclusion that it will have an ecological contribution can be verified.

USACE Response: Adopted.

Action Taken: Additional detail comparing floodway area, habitat and vegetation effects in with and without project conditions is added to Section 6.4.2. Subsection 6.4.2.4 summarizes mitigative activities for vegetation and endangered species described in detail in Appendix F-4 Mitigation Plan.

39. IEPR Comment - *Low Significance:* A variety of potential damage costs have been excluded from Appendix F-10, which suggests the economic analysis may be conservative. Critical related information about the nature of flood events has also not been provided.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Discuss what a flood would be like including water velocity, notification issues, ability to remove agricultural equipment and animals, and people. Consider working with the USBR to identify a share of the $2 million LFCC annual O&M and flood-fighting costs that would be avoided with the new levee. Use the current Federal discount rate.

USACE Response: Adopted.

Action Taken: USACE solicited the Bureau of Reclamation (the Bureau) for the nature of their flood fighting efforts and any savings that could be realized with the construction of the proposed levee. The Bureau could not provide that information. The solicitation is added to Section F-11 of the Economics appendix. The current Section F-18 describes "Other Social Effects" and suggests that thunderstorm-based events would have no warning time. Velocities are not expected to dislodge vehicles, and livestock wasn't encountered in the floodplain during the economic inventory.

40. IEPR Comment - *Low Significance:* The analysis regarding the probability of failure for the proposed levee is not well-supported.

This comment includes one recommendation for resolution which has not been adopted.

Recommendation: Summarize hydrologic, hydraulic, and geotechnical analyses within Appendix F-10; provide a discussion of failure probabilities for the with-project levee alternatives in the text.

USACE Response: Not Adopted.

Section F-19 of the Economics Appendix describes the project performance analysis in terms of the array of storms or a specific recurrence interval flood event producing a flood stage greater than the top of the proposed levee. The primary assumption for the economic model is that the failure mode for the proposed levee is that it is overtopped.

41. IEPR Comment - *Low Significance:* The panel is unable to determine if the economic analysis includes an appropriate amount of sediment clean-up costs.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Provide estimates of urban, refuge, and agricultural acreage flooded. Discuss the history of sediment damages from floods in this region. Discuss how flood events would deposit sediments. Discuss how the methodology captures sediment clean-up and land re-grading costs, or not. If possible, include explicit accounting for sediment clean-up costs. At a minimum, note that some benefits may be conservative because of this exclusion.

USACE Response: Adopted.

Action Taken: Additional text is added to 4.7.5.4 of the GRR/SEIS II and in Section F-06 and F-18 of the Economic Appendix, F-10 to include emergency cost figures based on flooding in Carlsbad, NM. These costs are stated as being conservative and included evacuation, reoccupation, disaster relief, cleanup and debris removal, and other similar expenses. Sediment clean up costs could not be separated from the reports and clean up costs from similar flood events in SE NM could not be found.

42. IEPR Comment - *Low Significance:* Provide more discussion in Appendix F-10 on how Cochiti can be operated during a flood.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Explain how modeled operations at Cochiti influence the economic analysis.

USACE Response: Adopted.

Action Taken: Additional text has been added to the Economics Appendix, F-10 in Section F-11 3.D. to discuss how operations at upstream reservoirs influence flooding in the study area.

43. IEPR Comment - *Low Significance:* As presently written, the GRR/SEIS does not provide a clear explanation of Alternatives B–J and the rationale for their elimination from further consideration.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Revise the GRR/SEIS, Section 4.5, and Table 4.1 to include a description of eliminated Alternatives B–J.

USACE Response: Adopted.

Action Taken: Chapter 4 of the GRR/SEIS II has been reorganized to clarify the screening and formulation of alternatives. The individual measures have been described, and rationale for elimination from consideration provided, in Section 4.5. Table 4.1 was added to preview this discussion. The discussion of recombined FRM measures resulting in alternatives B-J, as described in the Economics Appendix, F-10, was removed.

44. IEPR Comment - *Low Significance:* In the GRR/SEIS, p. 4-28, para. 4.7.3.1, Base Year and Economic Period of Analysis, the determination of when the base year conditions begin is not clear.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to provide for a consistent definition of when the base year condition begins.

USACE Response: Adopted

Action Taken: Text has been added to Section 4.7.3.1 to define the Base year and references made consistent throughout the GRR/SEIS II. Based upon the 20-year construction period for the proposed levee, the base year was moved to the end of that construction period. Benefits and costs during construction were computed, and presented in Section F-17 of the Economics Appendix.

45. IEPR Comment - *Low Significance:* There are some discrepancies between the content of Table 4.9 and its footnotes.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Modify the GRR/SEIS to reflect the accurate interest rate and update Note 2 to identify whether or not the costs are included in Total First Costs.

USACE Response: Adopted.

Action Taken: Revisions to Section 4.7.4.2, and subject table now Table 4-10 and footnotes of the GRR /SEIS II reflect the accurate interest rate and construction period. Revised costs

include contingency, construction management/SA, and land, easements, rights-of-way, relocation, and disposal areas (LERRDs) so that this foot note was removed.

46. IEPR Comment - *Low Significance:* On p. 5-16, para. 5.1.14, Line 1, an incorrect reference is given. Also, at Line 6, indicate that July–April are the months of the year when the low flows can be expected.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Update the GRR/SEIS to reflect the correct reference and identify the months of the year when the low flows can be expected.

USACE Response: Adopted.

Action Taken: The reference to the months of the year when the low flows can be expected was removed from this Section. Additional detail regarding construction and avoidance of resources has been added in the Mitigation plan in Appendix F-4 as well as the Biological Opinion added in Appendix C.

47. IEPR Comment - *Low Significance:* P. 4-34, Authorized Project/Employment. Once the project is constructed, the GRR/SEIS should show a decrease in employment for O&M of the levee.

This comment includes one recommendation for resolution which has not been adopted.

Recommendation: Make appropriate changes to the GRR/SEIS.

USACE Response: Not Adopted.

Solicitation of this information from the Bureau of Reclamation did not provide quantifiable benefits through OMRR&R changes relative to the existing levee. A discussion of the Bureau of Reclamation's activities pre-and post-project is contained within Section F-11 of the Economics Appendix.

48. IEPR Comment - *Low Significance:* Nowhere in the documentation provided is the process of the hydraulic numerical modeling described. This material should be included in the report

This comment includes one recommendation for resolution which has been adopted.

Recommendation: An appendix should be included that describes in detail the methodology of the numerical modeling effort.

USACE Response: Adopted

Action Taken: Section 5.2.3 and 5.3.1 of the H&H Appendix H-2 have been revised to provide a clearer summary of how the various modeling tools were applied and add detail to the methodology and assumptions used.

49. IEPR Comment - *Low Significance:* The analysis period should be identified up-front in the document. The document should indicate up-front the proposed project life and the duration upon which the analysis of Future No Action and Action conditions is based to ensure that this period is the same for all project impacts considered. The same is true for the construction period of the project so that short-term impacts versus long-term impacts can be distinguished.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Mention and justify the analysis period up-front and ensure all sections are consistent.

USACE Response: Adopted

Action Taken Revised text has been added to the of the GRR/SEIS II in the Executive Summary, at the end of the second paragraph in Chapter 2, Future Without Project Conditions, and in instances where the period of analysis is discussed in alternative evaluation of the GRR/SEIS II. Related text was also added to Bullets 2 and 3 under Section 4.1 Plan Formulation Process.

50. IEPR Comment - *Low Significance:* GRR/SEIS text should indicate whether tribes were consulted (if applicable). Report the information if available.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Report the information if available.

USACE Response: Adopted

Action Taken: The GRR/SEIS II has been revised to include the responses from tribal consultation as well as the State Historic Preservation Officer in Section 6.6 to reflect the status of consultation and response letters provided in Appendix F-8. The sentence "No traditional cultural properties are known to occur within or adjacent to the project area." was deleted from Section 2.6.

51. IEPR Comment - *Low Significance:* Text on p. 2-4 of the GRR/SEIS [regarding soils and construction of engineered levees] appears out of place.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Suggest moving the text to the Future Action condition description.

USACE Response: Adopted

Action Taken: The text has been removed from the GRR/SEIS II.

52. IEPR Comment - *Low Significance:* The aesthetics sections (existing conditions and future action) would greatly benefit from photographs or photomontages to provide an objective analysis of project impacts.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Consider preparing photomontages of the study area under existing and future conditions to show the public views of the levee to scale. This can be done economically by many commercially available services and would make an understanding of the project much more accessible to the public.

USACE Response: Adopted

Action Taken: Discussion in Section 6.9 has been revised to reflect differences in with and without project view sheds. Photos of the existing spoil bank and an engineered levee similar to the proposed have been added provided for comparison.

53. IEPR Comment - *Low Significance:* Section 4.2 mentions study area problems that are historical and will not be addressed by the proposed plan.

This comment includes one recommendation for resolution which has not been adopted.

Recommendation: Address the disparity in the text.

USACE Response: Not Adopted

Action Taken: The subject discussion provides a range of problems identified in the study area, inclusive of some beyond this project authority. The subsection following the problem statements lists the objectives of the study which were the focus of formulation of measures and alternatives then used as criteria for selection of the recommended plan.

54. IEPR Comment - *Low Significance:* Cultural resources text on p. 3-10 in the GRR/SEIS should be clarified.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Clarify the point being made [in Section 3.4, p. 3-10].

USACE Response: Adopted

Action Taken: The subject sentence was deleted to remove confusion. Additional information has been added to state that archaeological could be impacted in the event of a major flood, such as those that occurred in 1929 and 1937.

55. IEPR Comment - *Low Significance:* GRR/SEIS text should be consistent in the treatment of wildlife habitat impacts based on comparisons with historical and current conditions.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Consider revising the text accordingly to be consistent with Section 4.2 treatment of the issue.

USACE Response: Adopted

Action Taken: Section 3.5.4.3 has been revised to clarify that periodic inundation may be beneficial to natural and managed habitats within the refuge, but uncontrolled flooding would incur damages to infrastructure and temporarily limit recreational opportunities.

56. IEPR Comment - *Low Significance:* Subsection 4.7.6.3 should indicate whether Tiffany Sediment Basin is included in the proposed plan.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Consider revising this section for clarity.

USACE Response: Adopted

Action Taken: Chapter 4 has been reorganized to clarify the screening and formulation of alternatives. The individual measures have been described and rationale for removal from consideration revised in Section 4.5. Table 4.1 was added to preview this discussion. The Tiffany Basin feature is presented as a passive and active method in sections 4.5.9 and 4.5.10 in the revised documents.

57. IEPR Comment - *Low Significance:* In the GRR/SEIS, p. 6-8 could benefit from clarification. …a more site-specific discussion is warranted to focus specifically on the acreage of wetlands to be encountered and why the proposed project will not impact them. Earlier in the text it states that no wetlands will be impacted by the proposed alternative; this should be reiterated here…

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Consider making the suggested text change.

USACE Response: Adopted

Action Taken: USACE has completed an updated Section 404(b)(1) Guidelines Evaluation and State Water Quality Certification (Feb. 2013) and added this as Appendix B of the GRR/SEIS-II. Section 5.1.16.1 is also revised to state that the recommended plan entails fill within wetlands and that an exemption through Section 404(r) is being sought.

58. IEPR Comment - *Low Significance:* Assertions regarding water quality from flood events on p. 6-11 require further support or modification.

This comment includes one recommendation for resolution which has been adopted.

Recommendation: Consider modifying the text to reflect the issue raised in the Comment.

USACE Response: Adopted

Action Taken: The discussion in the referenced Section regarding the potential for floodwaters to introduce contaminants to the Rio Grande has been removed.