



Rio Grande Floodway Project  
General Reevaluation Report and  
Supplemental Environmental Impact Statement  
Independent External Peer Review (IEPR), Phase 2

Final IEPR Panel Comments, USACE Responses,  
and IEPR Panel Backcheck Comments

13 September 2012

## **Rio Grande IEPR Comments**

Each Comment is formatted into four parts that include the following: (1) a clear statement of the concern (the Comment), (2) the basis for the concern (Basis for Comment), (3) the significance of the concern (the importance of the concern with regard to project implementability) (Significance), and (4) the recommended actions necessary to resolve the concern to include a description of any additional research that would appreciably influence the conclusions (Recommendation for Resolution). Comments are rated as “high,” “medium,” or “low” to indicate the general significance the Comment has to the sufficiency of the General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS). The significance ratings are applied using the following criteria:

- High = Comment describes a fundamental problem with the project that could affect the recommendation or justification of the project
- Medium = Comment affects the completeness or understanding of the recommendation or justification of the project
- Low = Comment affects the technical quality of the reports but will not affect the recommendation or justification of the project

After the IEPR review period ended and comments were developed, Noblis consolidated and collated the final panel comments. The comments are arranged in order of significance. Of the final 17 comments, 7 were identified as having high significance, 7 were identified as having medium significance, and 3 were identified as having a low level of significance.

Minor editorial comments were provided to USACE under a separate cover letter.

**Comment #1:**

The economic analysis in Appendix F-10 suggests that the tentatively selected plan (TSP) is economical. Although most issues raised by the panel were addressed in the revised documents, the panel is still not fully convinced that the TSP is economical, for three reasons 1) the cost of a drainage facility that would provide the same benefits as the 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. USACE concurred with the original Comment #25 and stated that costs were recomputed to include O&M costs as recurring annual costs. Please indicate where these changes are reflected.

The USACE may be well within their authorities regarding 1) and 2). OMRR&R costs should be added.

**Basis for Comment:**

The estimated annualized benefit of the TSP is \$17.995 million (GRR page 4-31). Annualized construction costs are \$11.077 million, so the B/C ratio is 1.62.

1) Regarding the LFCC:

The analysis assumes that the LFCC, if destroyed by a flood, would be replaced. However, there does not appear to be any analysis of the economic merits of replacement. Are the following benefits (page 48) worth \$125 million?

The LFCC has and continues to serve multiple water resource related purposes that include providing effective valley drainage; being a wasteway for irrigation return flows; serving as a water source for four pumping locations to deliver water back to the river for Endangered Species flow needs; and providing irrigation diversion for the Middle Rio Grande Conservancy's Socorro Division, Bosque Del Apache National Wildlife Refuge, and the Armendaris (Turner) Ranch.

Also, the same benefits might be achieved for a much lower cost.

Reclamation states (page 50)

If the LFCC had been constructed for drainage purposes only, it would have been smaller and would have had much less riprap lining. Obviously, it would have been less expensive to construct. Operational costs are lower now than when the LFCC was in full.

The USACE might base the replacement cost of LFCC on a facility that serves current needs, rather than the authorized facility. Given current maintenance costs of \$150,000 to \$700,000 per year, could a piped facility be more economical? A piped facility might sustain far less damages from a flood.

However, it is understandable if the LFCC replacement cost must be based on the cost of the authorized facility. That is, the analysis might not be faulted for using the LFCC replacement cost even though, on a conceptual basis, a more suitable facility design should be entertained.

2) Regarding HEC-FDA

The Panel has had extensive discussion with the USACE regarding potential reasons for differences in EAD between estimates based on event damages, and estimates obtained

directly from HEC-FDA. In both the original and revised Appendix F-10 and GRR, the estimate based on event damages has been much lower than that based on HEC-FDA. The USACE has provided potential explanations, but some of the explanations were themselves in error.

In the current Appendix F-10, average annual damages under the future condition, Table F6-B are shown as \$18.285 million. Table F5-A can be used to estimate average annual damages based on event damages as shown below.



The estimated annual average damages estimated using event damages is \$7.925 million which is considerably less than claimed benefits of \$17.995 million, and is less than annualized costs of \$11.077 million.

The Panel believes that the difference between the \$7.925 million, and the \$17.995 million must be caused primarily by probability distributions used in HEC-FDA to account for uncertainty. Whether the difference between \$7.925 and \$17.995 is justified by this application remains unclear.

From Section F-04, page 16

Principal sources of error affecting the stage-damage relationship were examined in a risk and uncertainty framework. Those sources of error are 1) errors associated with the damageable property elevation, 2) errors associated with the values of structures in the floodplain inventory, 3) errors associated with values of structure contents in the floodplain inventory, 4) errors associated with the damage functions used against the floodplain inventory.

Section F-04 goes on to explain how variance was added to the analysis to account for the “sources of error.” Clearly, the amount of variance to add for each “source of error” is somewhat subjective. This subjectivity leads the panel to be uncertain about the increment of damages between \$7.925 million and \$17.995 million.

3) Regarding OMRR&R Costs

This is unfinished business.

Regarding comment #25, the USACE responded

Concur – Adopt: Project costs were recomputed using O&M costs.

However, there are still no O&M costs

From Appendix F-10 page 117

Table F-18 shows, for each alternative and the aggraded channel future situation considered, construction cost, interest during construction, total investment cost, interest and amortization costs, OMRR&R costs, and total average annual costs.

However, there are no OMRR&R costs in Table F-18

From GRR p 5-18

In general, OMRR&R will consist of maintaining the vegetation management zone free of woody vegetation larger than 0.5-inch-diameter stems or trunks. The sponsor will be responsible for maintaining levee integrity by repairing runoff erosion, eliminating rodent burrows in the levee, replacing rip rap lost in flow events, and inspecting and cleaning seepage infrastructure regularly. The sponsor will also be available to perform annual inspections of the levee system with Corps personnel.

Therefore, there will be OMRR&R costs. These costs should be estimated and included in the project costs.

**Significance: HIGH**

The economic justification for this project does not appear to be highly reliable.

**Recommendation for Resolution:**

1) The text on page 10 of Appendix F-10 reads:

“For each category. . . . Tables F-5A and F-5B display the single occurrence damages by category for the floodplain evaluated. Tables F-6A to F-6C present the average annual damages computation from the HEC-FDA analysis. . . .”

A paragraph or more should be added after this paragraph 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. Maybe include this text:

HEC-FDA does not generate point estimates of flows, stages, or damages for a specific event. The software, essentially, performs a statistical analysis of hydrology, hydraulic, and economic information using concepts of risk and uncertainty, meaning that a specific event frequency can have a range of flows, stages, and damages as a result of all the variables entered into the study.

- 2) Provide a rationale for requiring the LFCC to be replaced in its current form instead of rebuilding a smaller facility or no facility
- 3) If 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 Evaluator Response (#1):**

1) **Concur, Adopt:** USACE and the IEPR panel have discussed the difference between single event information presented in the report and EAD extensively during Phase I and Phase II of this IEPR. During those conversations it’s clear that there simply isn’t enough information in tables F-5A and F-5B to replicate EAD as presented in HEC-FDA. Factors such as number of events modeled, the risk assumptions that are entered into the HEC-FDA model, and even how the start of damages condition is entered all have significant bearing on the EAD calculation. Tables F-5A and F-5B are required by Appendix E of ER 1105-2-100, which requires studies describe the 0.2 percent, 1 percent and other key events to better describe the nature of the flood situation. This report describes the impact of key flood events in Tables F-5A and F-5B but does not advocate “back of the envelope” calculation of EAD outside of the certified model. There are too many other factors going into HEC-FDA that make this “back of the envelope” calculation unusable, such as hydrologic years of record, errors associated with hydraulic stages for specific events, errors associated with structure elevation, errors associated with structure and content value, errors associated with the depth-% damage relationships used, etc...

Recommended text added to Para. F-06 of Appendix F-10.

2) **Non-Concur, Non-adopt:** USACE does not have the legal authority to plan, design or build water supply infrastructure in the study area. Para. F-17 of Appendix F-10 of the GRR contains the results of a USACE solicitation of Bureau of Reclamation personnel about the nature of the Low Flow Conveyance Channel (LFCC). Question 16 of that solicitation asks “What would Reclamation’s response be should the LFCC be damaged or destroyed?” The

response was, “Reclamation would most likely seek to reconstruct the LFCC facility where the damage occurs.” Other questions in the solicitation (questions 4, 7, 9) indicate the Bureau of Reclamation maintains the channel’s original design, will continue to do so for the foreseeable future. That assumption is also codified in a Record of Decision for the Upper Rio Grande Basin Water Operations Review Final EIS (Page 1-21). USACE believes it has more than sufficiently documented the present and future without-project and with-project conditions regarding the Low Flow Conveyance Channel.

3) **Concur, Adopt:** OMRR&R costs (approximately \$618,000/year) have been added to Table F-56 for the Tentatively Selected Plan (Alternative A, at the Base +4’ height) only. OMRR&R costs were not expected to significantly alter plan selection among the alternatives when the screening took place in August, 2010.

**IEPR Panel Backcheck Comment (#1):**

**1. Concur.** However, the Panel asserts that, because the event damages and their probabilities do not by themselves support economic justification, the USACE should explain and quantify, if possible, why the “other factors” provide economic justification for the selected alternative.

**2. Concur.** Although the above references indirectly discuss the issue, it is important to simply state in the GRR/SEIS that the Bureau of Reclamation does not have authority to rebuild any other facility.

**3. Concur.**

**Comment #2:**

**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.**

**Basis for Comment:**

The existing conditions text provides an excellent summary overview of existing habitat conditions for silvery minnow but a more detailed assessment of the 40+-mile-long study area would appear warranted given that the project could directly impact this species. USACE should consider collaborating with USFWS to perform censusing of minnow populations by river reach to ascertain the most sensitive areas to be avoided and to determine precise impacts and mitigation measures necessary to offset them. If this information is already available, USACE should consider appending it to the SEIS.

Subsection 3.3.4.1 provides a sufficiently detailed summary of No-Action conditions pertaining to the silvery minnow from the perspective of factors adversely impacting this species versus management initiatives designed to sustain its populations. While predicting the future is difficult, the document should reach some conclusion regarding the most likely scenario for the future regarding this species. (For example, under existing conditions, it sounds as if a certain amount of the population may wash downstream every year into Elephant Butte Reservoir and die). The text should address the question head on: Are populations likely to continue to decline if current trends continue, without the project? Or at a minimum, are they likely to continue to decline without significant Government intervention and expenditure of public funds? NEPA does not require certainty, and Federal management decisions are made routinely on the basis of incomplete information. As such, the value of the current text is limited by not weighing the evidence to reach some conclusion. In addition, while it is appreciated that the Future No Action section attempts to address issues associated with climate change, an attempt should be made to connect future trends with silvery minnow habitat and population changes. If snowmelt is earlier in the year than previously, 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.

While it is recognized that Phase 2 of the IEPR review will likely deal with mitigation issues once it is determined whether the proposed project should proceed, evaluating ecological impacts is difficult without a detailed mitigation plan in place. For example, in Subsection 6.5.1. the text notes "*Maintenance of suitable silvery minnow critical habitat remains dependent on routing flow within the existing floodway to maximize fluvial processes during flood events.*" It would be helpful to follow this paragraph with a quick bulleted summary of how that flow routing will be maintained. In addition, a detailed mitigation plan with alternatives considered should be developed that would ensure project impacts do not adversely affect that species.

**Significance: HIGH**

Understanding the spatial extent and quality of minnow habitat is critical to evaluating impacts to this endangered species. Data and information have been provided but the GRR/SEIS needs to

take a stance and indicate what impacts would occur relative to Future No-Action conditions. It cannot be determined whether impacts on this species would be effectively mitigated.

**Recommendation for Resolution:**

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

Provide the suggested conclusion in the text.

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. This evaluation should also include 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 Evaluator Response (#2):**

1) **Concur, Adopt:** The available silvery minnow habitat and population monitoring literature has been condensed to the issues relevant to the project. USACE participates in the Middle Rio Grande Endangered Species Collaborative Program (CP) along with the U.S. Fish and Wildlife Service. The CP funds and supports minnow population monitoring and habitat management. The proposed levee alignment by default avoids sensitive minnow habitat. The direct effects of the soil cement wall on minnows and their habitat that has been fully evaluated in consultation with the Service. The relevant silvery minnow literature is analyzed and cited in the Biological Assessment and forthcoming Biological Opinion. The inclusion of these two documents in the report appendix will satisfy the comment.

2) **Concur, Adopt:** The CP monitoring reports indicate the silvery minnow population has resilience to highly variable flow volumes during the current drought. The CP sponsored population viability analysis (PVA) model is nearing completion. Continued government involvement will likely contribute toward maintaining a viable silvery minnow population during the drought. The population will likely continue to vary over several orders of magnitude with a low risk of extinction.

The range of conclusions based on limited analysis precludes making statements about the species future. There is a significant gap between climate models and species/habitat models. The appropriate venue for data analysis and synthesis for projecting into the future is through the CP, and not this document. The minimal effects of this project on silvery minnows are unlikely to change the viability of the population.

Substantial revisions to Chapter 6 have been made to provide improved biological information.

3) **Concur, Adopt:** The Tiffany Sediment Basin measure was removed from consideration because of unacceptable (unmitigable) impacts to both endangered species and surface water losses. The desired flow routing for dynamic habitat creation is achieved by levees designed to handle the 1%-chance flood event. The paragraph discusses the basic concepts for flood processes to maintain suitable minnow habitat. There is minimal loss of minnow habitat resulting from levee construction. The effects of the project are analyzed in the Biological Assessment in consultation with the Service. The relevant silvery minnow literature is analyzed and cited in the Biological Assessment and forthcoming Biological Opinion. The inclusion of these two documents as well as the inclusion of the mitigation plan in the report appendix will satisfy the

comment.
<b>IEPR Panel Backcheck Comment (#2):</b>
<b>Concur.</b>

**Comment #3:**

**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.**

**Basis for Comment:**

Section 4.1.1 Ecological Resources does not provide sufficient background on methodology, rationale, or analysis to provide the technical support necessary to justify the selection of the proposed alternative from the perspective of impacts. At a minimum, the supporting documentation should be cited and appended to the GRR/SEIS. As such, the conclusion cannot be verified.

Under Section 6, while extensive text has been written on potential endangered species impacts, there is little follow-up discussion on all the other wildlife discussed under existing conditions. Which species would benefit or be adversely impacted by the project? Would fish habitat (in general) be impacted? What other aquatic resources other than silvery minnows would potentially be affected? Was a rapid bioassessment or other evaluation of stream habitat conducted for comparison of alternatives? Were prior valuation studies performed for the 1992 GRR/SEIS incorporated into the analysis of impacts or selection of alternatives?

In addition, the text should note the relationship between water levels, changes in phreatophytic water use (with both salt cedar eradication under No-Action, and with vegetative removal for levee construction and with woody vegetation exclusion on the new levees), and their impact on fish and wildlife habitat within the area affected by the proposed levee so that project impacts can be more readily evaluated.

Section 3.3.1 on p. 3-8 lacks sufficient detail in support of the broad statements *“In the future without-project scenario, the current status of the riparian ecosystem would continue to degrade, including continued fragmentation of remaining habitat, lack of overbank flooding necessary for regeneration of native vegetation, and nonnative vegetation replacing native vegetation.”*

Specifically, the document would benefit from discussion of: What are the specific sources of continued fragmentation of habitat (development into smaller parcel sizes? If so, how is this occurring if demography is flat over the next decade? How far out is USACE projecting, 50 years?), and, What specific factors would encourage non-native vegetation to continue replacing native vegetation? If, for example, cottonwood trees will continue to mature, that would benefit some wildlife (and presumably plant) species at the expense of others. Also, the document could address to what extent the spread of non-native vegetation be offset by existing management programs. Are these programs currently working to keep the spread in check throughout the entire study area reach or are they a “drop in the bucket” focused on specific areas such as the Bosque del Apache refuge?

Section 3.3.2 on p. 3-8 could also benefit from more detail in support of the conclusions

regarding trends, and sounds a bit generic as written: “*In the future without-project scenario, the current status of the aquatic ecosystem would continue to degrade, including continued fragmentation of remaining habitat, aggradation of the floodplain coupled with increasing depths to groundwater, and narrowing of river channel from the effects of water regulation and restriction of historical river avulsion patterns due to constraints on the channel, resulting in the loss of warmwater aquatic habitat and wetlands.*” Specifically, the document should address whether sedimentation in the river would be greater in the future under No-Action conditions, simply as a result of the more extreme storm events referenced in the climatic change section that would increase the steepness of the hydrograph and cause greater erosion. This, in turn, would be expected to increase the amount of sediment plug events. The text should then address the specific impacts—Southwestern willow flycatchers seem to benefit because they can colonize the young willow growth that may generate in these areas before they are cleaned out. Silvery minnows, in contrast, would not benefit from those trends without considerable intervention and maintenance at Government expense. Also, the effect of climatic change would tend to exacerbate channel desiccation mentioned under Subsection 3.3.4.1. While this would probably be detrimental to silvery minnows, the discussion should be broadened to the aquatic community as a whole.

Table 4.11 summarizes project impacts to the Southwest willow flycatcher as “*minor impacts resulting from removal of riparian vegetation in the southern two-thirds of the project.*” The southern two-thirds would consist of a 28-mile-long area; depending on the width and extent of cutting, the impacts could be significant. Moreover, impacts from the authorized project are described as “unknown.” More clarification and elaboration is needed; at a minimum, an explanatory footnote is warranted.

Section 6.6.5 concludes that there would likely be impacts to flycatcher habitat. However it stops short at that point of addressing whether the impacts would be adequately mitigated. While mitigation has been proposed for vegetation, the text should address proposed mitigation measures for endangered species habitat, or at least the process that will be followed to achieve interagency concurrence regarding mitigation requirements.

Further, Section 6.4.2 addresses mitigation proposed for disturbance to riparian vegetation from construction of the proposed project. The text states, “*For the construction of the proposed, A +4 ft alternative, a total of 36.2 acres of riparian vegetation within the floodway would be removed to accommodate the levee structure and Vegetation-free Zone (Table 6.4). Considering the net increase of about 74 acres in the floodway after construction of the proposed levee, approximately 35.2 acres of that area would be suitable for planting, or otherwise establishing, riparian vegetation. All of this plantable area would occur between the upstream end of the levee alignment and BDANWR. Following construction, the Corps would reestablish 36.2 acres of woody riparian vegetation within the floodway, or on lands managed by BDANWR.*” It is not clear how the mitigation requirements (apparently 1:1 replacement of vegetation) were arrived at and if the habitat quality data collected during the 1992 GRR/SEIS were incorporated into the proposed mitigation plan. While it is understood that the majority of vegetation impacts are to invasive salt cedar, the fact that mature woody vegetation will take some time to become reestablished suggests that greater than 1:1 replacement may be warranted. Further, the vegetative impacts summarized in Table 6.4 are not sufficiently detailed (e.g., native versus non-native) for the reader to come away with a clear picture of impacts. Are the non-native impacts to

mature cottonwood trees or to young coyote willow? The difference has a bearing on re-establishment time, habitat quality for different species, and ultimate mitigation requirements. The bottom line is that the text should address how these measures will offset the potential impacts to the Southwest willow flycatcher as well as other species using the riparian zone and why that plan is the best way to mitigate for the impact.

For example, the text on p. 2-24 states “*The largest breeding population of flycatchers along the Rio Grande in New Mexico occurs in the upper reaches of Elephant Butte Reservoir, approximately 5 miles downstream from the San Marcial Railroad Bridge. Receding lake levels allowed the establishment of riparian shrub species that were quickly colonized by the flycatcher.*” If true, this suggests a potential mitigation measure for any impacts to willow flycatchers should USACE, USFWS, U.S. Bureau of Reclamation (USBR), and the local water conservancy be able to come to agreement on management of water levels in the reservoir to encourage habitat establishment along the lake margins.

**Significance: HIGH**

More detail is required to evaluate the conclusions of the GRR/SEIS. More detail is necessary to enable an informed comparison of project impacts with Future No-Action conditions. More detail is required to determine whether impacts would be significant.

**Recommendation for Resolution:**

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.

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

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

**USACE Evaluator Response (#3):**

1) **Concur, Adopt:** The text will be revised to state that impacts were based on the results of many studies of middle Rio Grande valley riparian habitat types conducted over the past 30 years which has consistently related floristic and physiognomic characteristics with wildlife use. The relative value of various riparian communities has been well documented for birds, herptiles, and small mammals. The revised GRR/SEIS quantitatively evaluates the 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.

Several recent studies along the Rio Grande in New Mexico have estimated evapo-transpiration rates for various riparian vegetation types. These facilitate the quantitative estimation of differential water use among types. Whether vegetation management and habitat restoration activities actually result in salvageable water is still debated. The Corps will confer with resource managers in the project area to determine if the differential evapo-transpiration losses are, in fact, a concern based on the size of the affected area, and will evaluate that effect amongst the alternatives in the GRR/SEIS accordingly.

2) **Concur, Adopt:** Section 3.3.1: You make several good points about improving this text to benefit the reader. We will revise the text to clarify the general statements, and will attempt to quantify some potential effects (while avoiding extrapolation where sufficient information is lacking).

3) **Concur, Adopt:** The final report will contain a detailed mitigation plan quantitatively evaluating affected habitats and the expected value of mitigative plantings. Effects to endangered species habitat has been detailed in the Biological Assessment (pursuant to the ESA) and included as an appendix to the GRR/SEIS. The mitigation plan in the reviewed version of the GRR/SEIS was preliminary. Consultation with the USFWS is ongoing, as is coordination with two National Wildlife Refuges (where the majority of habitat effects occur). The mitigation plan will be finalized before submitting the final GRR/SEIS for approval.

We hesitate to make quantitative estimates of the effects of the authorized plan because of the sparse information on resource conditions in 1948.

USACE and the project sponsors lack all authority regarding the operation of Elephant Butte Reservoir. The Bureau of Reclamation is in the process of consulting with the USFWS on its future operation.

**IEPR Panel Backcheck Comment (#3):**

**Concur.** The response addresses the stated concern.

<b>Comment #4:</b>
<b>There are several issues identified concerning the hydrologic, hydraulic, and sediment transport analyses that can easily be resolved with the inclusion of more detail.</b>
<b>Basis for Comment:</b>
<ul style="list-style-type: none"> <li>• Telephone conversations with USACE personnel indicated that some of the information related to long-term sediment transport is included in other documents, not provided. Moreover, USACE personnel noted that approximately 87 historical sections, equally spaced, were used in determining the long-term transport. None of the analysis data is presented in the documents. USACE staff has noted that this data will be reviewed during design phase.</li> <li>• It is difficult to understand how flooding depths, velocities, and sediment erosion/deposition were analyzed with the various tools—FLO-2D, HEC-RAS, comparison of river cross-sections, sediment Transport equations, etc. For example, in Appendix F4 it is stated that infiltration losses are included in FLO-2D modeling, but no description is included as to how infiltration rates were determined and/or calibrated. There are similar parameter discussions absent from the present text for both modeling and analysis procedures and parameters.</li> </ul>
<b>Significance: HIGH</b>
<p>Modeling and analysis results are strongly dependent on parameters and methods. While it is expected that procedures used in the present study followed USACE requirements and guidelines, these procedures are never stated, and, at present, unclear.</p> <p>Significant improvements in the readability and organization of the modeling and hydro/hydraulic analysis data have achieved during the review period. The continued absence of detailed modeling and analysis documentation is confounding, however. Typical EIS/EIR documents will include a detailed technical appendix that will later form the basis for the design documentation. This is not the case here, where detailed documentation is to be provided following the environmental review during design.</p>
<b>Recommendation for Resolution:</b>
<p>The GRR/SEIS should be updated to include an appendix containing:</p> <ol style="list-style-type: none"> <li>1. The description of the methodology for the analysis of long-term sediment transport should be made clearer. Figures and tables showing reach locations and sedimentation changes should be included where appropriate.</li> <li>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.</li> <li>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.</li> <li>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</li> </ol>

included. Explain why FLO-2D modeling did not account for sediment movement, if that is the case.

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?
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.
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.
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 Evaluator Response (#4):**

1 and 2. **Concur, Adopt:** More information regarding the long-term sedimentation will be included in section 5 of the H&H Appendix.

3. **Concur, Adopt:** A clearer summary of how the various modeling tools were applied will be included in the H&H Appendix.

4. **Concur, Adopt:** A large-scale map showing the area covered by both FLO-2D grid cells and HEC-RAS river stations will be included 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. (The FLO-2D/sediment issue will be address as per above.)

5. **Concur, Adopt:** Will be addressed as discussed in 1, above.

6. **Non-concur, Non-adopt:** Alternatives were considered through a number of processes. The removal of non-levee alternatives from consideration was based on formulation and screening in prior EIS's. New or updated, non-levee alternatives are evaluated through the planning criteria discussed in Section 4.5. Only levee alternatives are carried forward for analysis using the combination of H&H and economic modeling expressed as benefits. Those discussions are contained in Sections 4.6.5.1 and further in 4.7.3.

7: **Non-concur, Non-adopt:** Section 5 of the H&H Appendix currently 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 5.2.3 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 is not anticipated to vary significantly in the with and without project condition, and attendant cost/benefits associated with them have been captured by the economic evaluation, within the appropriate sections of the report and appendices.

**8. Concur, Adopt:** A short segment will be added to section 5.4 of the H&H appendix denoting that the Yang and Brownlie functions were selected for the continuity analysis performed to assess the replacement RR bridge-span alternatives 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 existing discussion within this section describes how the ordinal ranking of the number-of-spans was not sensitive to the two transport functions used, as well as makes clear that this was a screening level evaluation used for early bridge alternative formulation and was not calibrated to any measured data. The basis of the selection was relative transport continuity near the bridge.

**IEPR Panel Backcheck Comment (#4):**

**1–5 and 8. Concur.**

**6. Non-concur.** In the April 2012 version of the GRR/SEIS provided to the Panel for review, it remains unclear from the text how alternatives were removed from consideration. If outside texts were used, then these texts should be referenced directly. Section 4.5 only describes the alternatives, not how they were removed from consideration. Table 4.1, for example, only includes very brief descriptions for removing alternatives, but no analytical or supporting information is provided.

**7. Non-concur.** The methods employed to conduct the analysis remain unclear in the April 2012 GRR/SEIS. No equations are presented, no references are cited, and no data is given. With the H&H appendix as written, it is not possible to conclude that the analysis methods for long-term bed change are sound. The Panel maintains that if only reach-averaged bed elevation changes were considered, localized constrictions and expansions should be discussed in more detail to ensure that the ground profile used in the HEC-RAS models is representative of future conditions.

<b>Comment #5:</b>
<b>The GRR/SEIS discussion on flow and sediment transport analyses for all bridges, must be more detailed.</b>
<b>Basis for Comment:</b>
<p>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).</p> <p>Additionally, including the discussion of a new Railroad (RR) bridge at this location in the GRR/SEIS is confusing. Clarification is needed.</p>
<b>Significance: HIGH</b>
It is not clear as to what impacts the existing bridges will have on levee performance, back-water effects and sediment transport. O&M requirements must be considered to determine viability of any alternative.
<b>Recommendation for Resolution:</b>
<p>Identify these locations 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, including existing and expected channel meandering, sediment deposition or erosion, and maintenance requirements for a sustainable river system.</p> <p>It should be explicitly stated that a new RR bridge 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.</p>
<b>USACE Evaluator Response (#5):</b>
<p>1. <b>Non-concur, Non-Adopt.</b> The differential impacts to the bridges by the proposed project are expected to be negligible, since the project is essentially replacing the existing spoil bank along its current alignment with a more robust engineered levee. Functionally, over the majority of the time, the two perform in the same way restricting flows to the floodway east of the alignment. The existing and expected impacts of the bridges on the proposed levee alternatives were captured primarily through modeling, including quantification of the uncertainty associated with the projected water surface elevations, and were discussed within the H&amp;H Appendix Hydraulic Modeling and Risk and Uncertainty sections. Channel meandering, per se, was not modeled in any way given the one-dimensional hydraulic modeling channel algorithms of both models. However, 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 1-D modeling. For those potential locations where existing bankline stabilization (i.e., Kellner Jacks) is not present, slope protection measures were</p>

developed and included in the alternative cost estimates. Thus, the impact of these variables on the selected alternative have been accounted for.

**2. Concur, Adopt:** Regarding the BNSF RR Bridge, the recommendation to clarify that the existing bridge will not be replaced under the recommended plan will be adopted within the report. The future disposition of the bridge is discussed in Section 3.5.4.2 Transportation Facilities

“The primary transportation facility within the area is the BNSF railroad. The BNSF bridge at San Marcial is currently in the floodplain of the Rio Grande and is at risk of being damaged or destroyed from moderate or large flood events. The BNSF has no plans to replace this structure in the near future. They do recognize the flood risk but currently consider it to be acceptable. It is Reclamation’s intention to maintain the channel such that the current capacity of the bridge is not further reduced. Their maintenance program will continue into the future until the structural integrity of the bridge deteriorates to the point it must be replaced. However, this is not expected to occur within the next 50 years, which is the period of analysis covered by this report. It can be concluded, that without a Federal project, the railroad bridge would continue to function as it does under current conditions or until a large event destroys the bridge and it is replaced with a bridge elevated above the floodplain.”

The assumption for future conditions was that the existing bridge would be replaced by others by the end of the period of evaluation, most likely by a structure that would not inhibit conveyance capacity to anything close to the degree that the current bridge does. Review of Table 5 of the appendix should make the logic for this assumption clear, but the application of this regarding the modeling of the bridge under future conditions will be clarified in the H&H Appendix.

**IEPR Panel Backcheck Comment (#5):**

**1. Non-concur.** The added protection and increased upstream capacity resulting from the new levee could have negative impacts (e.g., at constrictions and from lateral migration) beyond what would occur under existing or no-action conditions. These impacts should be considered.

**2. Concur.**

<b>Comment #6:</b>
<b>The floodwall at San Acacia Dam may be impacted by dam improvements planned by others.</b>
<b>Basis for Comment:</b>
The flood wall on the west side of San Acacia Dam may be impacted by proposed improvements to the stilling basin downstream from the dam. A proposed river crossing through this basin may also be problem if the approach road crosses the wall. Additional scour protection and /or extension of the wall may be necessary.
<b>Significance: HIGH</b>
New dam improvements may destabilize the flood wall; so, additional protection of the flood wall will be required.
<b>Recommendation for Resolution:</b>
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.
<b>USACE Evaluator Response (#6):</b>
<b>Concur. Non-adopt:</b> The USACE has been tracking with a potential project at the SADD to provide a fish ladder through the dam. The fish ladder project is only in a preliminary stage. Preliminary proposals for the ladder occur on the east side of the dam. The slope protection along the west bank will not be effected based on preliminary fish ladder plan. The bank lowering/excavation would occur farther downstream therefore no impact is anticipated from or to the USACE recommended plan.
<b>IEPR Panel Backcheck Comment (#6):</b>
<b>Concur.</b> Nonetheless, before construction plans are prepared, the USACE should coordinate more closely with the designers of the USBR fish passage and erosion control at the toe of the dam.

**Comment #7:**

**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.**

**Basis for Comment:**

1) From ER-1105-100

For all project purposes except ecosystem restoration, the alternative plan that reasonably maximizes net economic benefits consistent with protecting the Nation's environment, the NED plan, shall be selected. The Assistant Secretary of the Army for Civil Works (ASA (CW)) may grant an exception when there are overriding reasons for selecting another plan based upon other Federal, State, local and international concerns.

From Page 4-32, the GRR rationale for picking Alternative A over K based on NED is very weak. The estimated annualized benefit of the TSP is \$17.995 million (GRR page 4-31). Annualized construction costs are \$11.077 million. For alternative K, these values are \$17.990 and \$11.085.

These differences are so small that they may not justify selection of Alternative A over K based on NED alone.

From Tables F-18 and F-43, the Alternatives A and K benefits category for "Tiffany basin (RR and reroutes)" is \$379.35 and \$374.74, respectively, and the "Levee" benefit is the same. Alternative K should not have less benefits than Alternative A when it just extends the levee downstream.

Appendix F-10, page 104 to 105 suggests that other factors plaid into selection of Alternative A over K. These factors should be summarized in the GRR.

**Reclamations opinions:**

Reclamation also recommends that the Corps extend their Flood Control Levee down to the San Marcial Railroad Bridge Crossing. Reclamation considers this area at risk due to the presence of the BN&SF railroad line. In the event of a catastrophic flood, Reclamation believes there is the potential for public health and safety risks to the railroad workers and operators in the event a train is derailed due to failure of their embankment.

Alternative K should include additional benefits, but it does not. The USACE does not include economic benefits of saving lives in their benefit-cost analysis. However, there might be significant and unusual transportation and emergency costs associated with loss of the railroad line.

From page 20

It should be noted that many intangible damages (such as loss of life, disruption to community services, and increased health risks) that could occur because of flooding are not represented in these damage values.

From page 54 and 55 and Table 4-12 it appears that potential health and safety benefits of alternative K have not been included. Potential loss of life could be an "overriding reason" to

select Alternative K.

2) From Page 4-25

As shown in this table, the analysis indicates that the levee that maximizes benefits is the Base Levee + 4 ft plan.

Table 4.7 suggests that perhaps the Base plus 4.5 foot would be a better alternative. However, no inference should be made because a large share of the benefits are not being counted in this table.

The text states

Remaining benefits are from the severe and rare events, which are only captured through levee height increases. However, the remaining benefits are not enough to offset increases in cost.

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. Therefore, remaining benefits are NOT obtained 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.” Was the Base Levee + 5 ft option even evaluated?

From Page 4-25

Since transporting soil is a costly process, any levee plan that minimizes spoil of borrow is efficient.

This sentence should probably be removed since it is not true.

Does the base plus 4 feet precisely use all of the spoil and requires no borrow?

**Significance HIGH**

Selection of the tentatively selected plan may be affected

**Recommendation for Resolution:**

Regarding 1), explain why Alternative K has less economic benefits than Alternative A. If Alternative K actually has less benefits, Expand the GRR discussion 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.

The last cell of Table 4.12 on Page 4-35 appears to be in error. Alternative K would provide a significant public health and safety effect that is NOT provided by Alternative A.

Regarding 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 Evaluator Response (#7):

1) **Concur, Non-adopt:** Alternative K had a slightly higher residual risk than Alternative A. In the future condition, the flood risk showed a slightly longer duration against the railroad tracks (the only damageable property protected by Alternative K), and against any proposed levee in the 50% and 10% chance events. The difference in benefits to the area is due to the duration that railroad traffic is rerouted, because of flood waters up against the railroad tracks. The threat to health and safety in the Tiffany area is captured by the marginal cost per ton-mile that railroad traffic is rerouted away from the affected area. It is such a remote factor that the benefits for A and K could be statistically identical. Any levee at the extreme southern edge of the study area will have a seriously limited service life, as sediment studies indicate the area will receive over 10' of sediment accumulation in the future without and the future, with-project conditions. Extending the levee past the Tiffany area was remarkably ineffective at controlling flood flows as the Rio Grande continues to aggrade into the future.

Adjusting the benefits such that A and K have identical benefits does not alter plan selection, nor is there a case to be made that K provides significantly more benefits than A in protecting one or two extra miles of railroad track. The panel is correct in pointing out that the NED plan is the "...alternative plan that reasonably maximizes net economic benefits consistent with protecting the Nation's environment." (Italics added) Para. 6.8.2 of the main report (page 6-35) restates statements made in the Economics appendix (pages 104-105). Namely, it is not desirable to cut the Tiffany Basin off from the Rio Grande floodway without substantial (and uncaptured) mitigation costs incurred by cutting off over 2000 acres of privately held property from the Rio Grande floodway. Those costs alone (real estate acquisition, plantings, other features) would drive up the cost of Alternative K relative to Alternative A, and result in fewer net benefits, such that Alternative A is the plan which maximizes net NED benefits.

2) **Concur, Non-adopt:** Referring back to the Principles and Guidelines, the NED plan is the "...alternative plan that reasonably maximizes net economic benefits." (Italics added) Para. F-16 of Appendix F-10 states: "It's unlikely that a larger levee would generate even more net for several reasons. First, levee costs for most levees use the existing spoilbank levee along the west bank of the Rio Grande as source material for new levee construction. Above the Base levee + 4' levee height, the project incurs substantial (and presently uncaptured) borrow costs for material, real estate costs to accommodate the wider footprint, and potentially higher mitigation costs. Second, the levee captures over 97% of EAD, and additional costs are expected to substantially offset, and even overshadow, the benefits remaining. Remaining benefits are from the severe and rare events, which would be capturable only through levee height increases, which would increase construction costs at increasing rates as the required volume of materials necessary to support a trapezoidal levee of specific side slopes increases."

Evaluating a levee 6" smaller didn't seem reasonable during the alternative screening in August, 2010. The study team felt that the project costs differences between Base + 3' and Base + 4' was \$2 million in a project cost estimate over \$220 million (or less than 1% apart) were too small to further optimize. It would be difficult, time consuming and expensive to chase down the peak of the optimization curve IF the peak existed at a levee height lower than Base + 4'. The project design would have more waste material generated such that project costs for a Base + 3.5' levee may not be an interpolation between Base + 3' and Base + 4'. The project benefits between a

Base + 3' levee and a Base +4' levee are roughly \$500k apart in a total benefit base of \$18 million (or less than 3% apart).

The review team has identified an issue regarding residual risk in the main report, which is more fully explored in Appendix F-10, Para. F-19 “Project Performance” and in Table F-61. It describes project performance against specific recurrence interval events in the future, without and future, with-project condition. The important thing to note is that the residual risk for each study damage center is different. Thus, the text in Para. F-19 describes two scenarios where residual risk can be evaluated for the proposed project. The “vulnerable location” examines project performance at one damage center. The “worst case scenario” describes project performance at the most vulnerable location (Defined as the location where the annual chance exceedance of exceeding a specified levee height is the greatest among damage centers protected by the proposed project.). The present, with-project condition shows remarkable performance against the array of possible floods and as protection against specific floods modeled, but the PDT felt that was not a complete assessment of the residual risk once the proposed project is implemented. The Rio Grande is in an aggrading state in the southern extents of the proposed project. The river is expected to rise 10' in within the expected life of the project within the most southern extents of the project, which does not have much damageable property affected. Upstream aggradation is substantially less, but there is more property afforded protection by the proposed project. Future decreased performance is modeled and then discounted within HEC-FDA to compute Equivalent Annual Damages and benefits.

**IEPR Panel Backcheck Comment (#7):**

- 1. Concur.** The Panel’s intent is not to suggest preference for a particular alternative, but that GRR/SEIS Section 4.7.4.3 would greatly benefit from the discussion provided in USACE Evaluator Response above to support the analysis for selection of TSP.
- 2. Concur.**

**Comment #8:**

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.
- 2) It does not include LFCC maintenance cost savings

**Basis for Comment:**

- 1. It appears that sediment damages on agricultural lands and refuge lands following a flood are not included or discussed in appropriate detail.

More discussion of sediment damages and clean-up costs is justified given the history of extreme sediment deposits from past floods. The analysis includes sediment costs as part of emergency costs, but this amount of sediment costs is believed to be inadequate.

The USFWS opined that “the refuge would receive substantial benefits if a large magnitude flood is contained by the proposed project.” A large share of these perceived benefits may be related to sediments.

Regarding the LFCC, from page 40

Cost engineering has indicated that channel REPLACEMENT involves additional activities, such as clearing sediment from damaged portions as needed, which would drive this cost up.

- 2. From Page 42

Reclamation will save LFCC OMRR&R costs (estimated in the without project condition at \$150,000-\$700,000), but was unable to provide a figure for the with-project condition.

LFCC maintenance costs of \$150,000 to \$700,000 annually would be reduced by the levee. The reduced maintenance cost with the new levee should be a relatively easy benefit to document.

**Significance: MEDIUM**

Clean-up costs associated with sediment could be significant for agricultural and refuge lands. However, it seems unlikely that additional sediment costs could have much effect on the economic justification.

Maintenance cost savings might also be a small fraction of EAD of around \$18 million annually.

**Recommendation for Resolution:**

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 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 LFCC maintenance costs will be reduced and provide a range of cost saving estimates.

**USACE Evaluator Response (#8):**

1) **Concur, Non-adopt.** There is no current approved methodology to identify and capture sediment cleanup costs. The study team agrees that sediment cleanup can be significant but did not see where sediment cleanup would alter plan selection, or alter the height which reasonably maximizes net benefits. Providing estimates of acreage flooded by event and land use type are additional data produced which has no bearing on NED plan identification. As a result of an earlier IEPR comment, the study team did note that “Emergency Costs” include sediment cleanup costs, as best as the team could determine at the time. It’s important to note that the study area is over 44 river miles in length. Up north, the channel is expected to remain stable or even degrade, as sediment is washed downstream. The middle third of the study area is expected to be relatively stable in the future, with regard to sedimentation. It’s the lower third of the study area which faces significant threat of sedimentation following a flood.

2) **Non-Concur, Non-adopt:** The Bureau of Reclamation was asked to identify any maintenance savings that may occur do to implementation of the proposed project, and could not. Within Para. F-11 of Appendix F-10, the study team asked the Bureau directly, “Should the proposed levee be constructed, do you foresee any changes to these activities, such as reduced spending in one activity or another?” To which the Bureau responded, “No.” The study team has no information upon which to base an estimate of maintenance savings.

**IEPR Panel Backcheck Comment (#8):**

**Concur.**

<b>Comment #9:</b>
<b>Subsection 4.7.6.3 provides inadequate detail in support of the findings presented.</b>
<b>Basis for Comment:</b>
Subsection 4.7.6.3 entitled Ecological Contributions states “ <i>Ecological improvements that would be generated by the proposed alternatives include additional floodplain habitat within the floodway. Since the footprint of the proposed levee feature has a smaller total footprint than the existing spoil bank, additional floodplain may be provided from implementation of a Federal project.</i> ” Note that “floodplain” is not an ecological term and does not in itself speak to the habitat that would be created. Without an assessment of the frequency or depth of inundation, it is difficult to envision whether this habitat would succeed into riparian conditions or remain upland habitat degraded by occasional rapid erosive forces from severe flood events. More detailed clarification is necessary if the reader is to be convinced that this is an ecological contribution.
<b>Significance: MEDIUM</b>
The project benefits and impacts cannot be fully understood without further clarification.
<b>Recommendation for Resolution:</b>
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.
<b>USACE Evaluator Response (#9):</b>
<b>Concur, Adopt:</b> A brief description of the gained acres, vegetation type, and water regime (or a reference here to the section in Chapter 6 describing the same) will be added to the final GRR/SEIS.
<b>IEPR Panel Backcheck Comment (#9):</b>
<b>Concur.</b>

**Comment #10:**

**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.**

**Basis for Comment:**

Section 5.1.2. The text on p. 5-3 describes stabilization measures as follows: *“A soil cement veneer applied to the existing embankment would prevent scour of the river bank and seepage. Mixing cement with the existing soil forms a stronger, less permeable matrix. The soil cement would be used to accommodate the space limitations because it can be applied to the 1-foot vertical to 1-foot horizontal slope of the existing embankment. Soil cement armoring would begin at the SADD and continue along the west bank of the river for approximately 4,000 feet, where it would transition to the typical earthen levee section used for the remainder of the levee alignment. Self-launching riprap would be placed along the toe of the soil cement armoring and for approximately 600 feet of the earthen levee. The riprap would launch or fall into scour holes as they might develop from channel scouring or incision.”* In addition to the alternatives analysis used to determine the appropriate means to address the project purpose, once a preferred alternative is tentatively selected, an analysis of construction alternatives should also be undertaken (and described in the GRR/SEIS). While the proposed design may well turn out to be the best way to achieve the project purpose, the analysis should describe what other designs or methods might be used that are equally valid, superior or inferior, that were rejected. For example, in the example above, rip-rap and soil cement armoring are proposed. Federal planning criteria cited on p. 5-4 include the following *“Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.”* It is not clear from the text whether “greener” slope stabilization measures (i.e., bioengineering) were considered such as the use of articulated concrete blocks to allow vegetation to be incorporated above the water, which would provide habitat for wildlife.

There is no discussion in the text regarding whether rip-rap and cement are essential within this reach or if alternative measures could be employed to manage erosion and sedimentation more effectively while preserving habitat. Granted, using vegetation may increase the Manning’s roughness coefficient and potentially influence water elevations, but there is no convincing analysis presented as to why it would be infeasible as an alternative.

Later in the document it is stated *“The Corps’ Engineer Technical Letter 1110-2-571 (10 April 2009) requires that no ‘woody’ vegetation be allowed to grow on the levee or within 15 feet of the riverward and landside toes of the levee. In this case, ‘woody’ vegetation is considered tree or shrub plants with trunk diameter greater than 1/2 inch. During construction, existing vegetation would be removed adjacent to the riverward and landside toes by root plowing or clearing and grubbing to create a vegetation management zone.”* The question raised is whether the text complies with NEPA. Granted, the Engineering Technical letter may reflect USACE policy; from a technical perspective the reason why vegetation is not allowed to grow at the base of the levee is not fully explained or justified on the basis of past studies/results. Are there “greener” approaches that could potentially be safely accommodated into the design but were apparently not discussed? For example, could concrete blocks be used that allow some

vegetation to grow between them and, therefore, address both stabilization and habitat issues? While the IEPR panel is not focused on policy, the concern here is that the text is both NEPA-compliant and represents a scientifically valid and supportable look at all alternatives.

The USACE memorandum in GRR/SEIS indicates that vegetation policy on levees should also consider other environmental factors and statutes, such as the Endangered Species Act, in choosing a final design ([http://www.water.ca.gov/floodsafe/leveeveg/levee\\_documents/2011-129\\_Memo\\_USACE-SWIF.pdf](http://www.water.ca.gov/floodsafe/leveeveg/levee_documents/2011-129_Memo_USACE-SWIF.pdf)). Reference specifically para. 3b, and item 10, which refer collectively to the District's ability to obtain a vegetation variance in order to comply with the Endangered Species Act, for example.

It is not clear from the text whether alternative approaches were considered, and if so, why they were rejected. The USACE has a vegetation variance policy (that is currently being updated) that might allow vegetation to be incorporated into sections of the levee design to help minimize loss of habitat and mitigate for potential impacts to Southwest willow flycatchers and other riparian species.

**Significance: MEDIUM**

Additional detail is required to determine if the document is NEPA-compliant and addresses impacts to the degree practicable.

**Recommendation for Resolution:**

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 Evaluator Response (#10):**

**Concur, Adopt later:** Regarding soil cement erosion protection Section 5.1.2: The design for this feature has changed slightly to include soil cement throughout its vertical extent (installed in an ascending series of 1-foot lifts. This embankment is located on the outside bank of a large bend of the channel. The text will be revised to explain that the high velocities expected during the design flood — 17- 20 feet per second — preclude the use of vegetation for bank stabilization in this area.

Rip rap is proposed to be used to protect the levee slope and toe in selected downstream areas. The use of alternative materials (including articulated block) is being evaluated pursuant to the recommendations of a Value Engineering study.

Regarding vegetation along the levee slope and toes: The text will be revised to explain that the penetration of large (> 0.5") roots into the levee can facilitate increased seepage and saturation of the structure during floods. The current policy is based on nationwide experience, and local and regional studies of specific problems are ongoing. These results, and other pertinent information, will be considered during the phased design and construction of the project over the next 20 years.

**IEPR Panel Backcheck Comment (#10):**

**Concur.** The response addresses the stated concern.

<b>Comment #11:</b>
<b>The GRR/SEIS does not show the top of the levee and bosque access roads or ramps.</b>
<b>Basis for Comment:</b>
The reference to stations in Notes 6 and 7 on Sheet C-106, in App. F-1, is the only mention of how high the levees should be raised, and even that is qualitative. a graphical representation of the existing and the recommended plan on a longitudinal profile view of the levee would help illustrate how much higher or lower the before and after water surface and top of spoil bank and levee elevations would be. This may also address some of the public comments on the project.
<b>Significance: MEDIUM</b>
A clear understanding of how much the levee height is changing is needed. For example, with the addition of 4 feet above the design flood water surface, the top of levee is still close to the top of spoil bank. This needs to be verified.
<b>Recommendation for Resolution:</b>
The profile view, to be included in App. F-2/F-3, would graphically 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.
<b>USACE Evaluator Response (#11):</b>
<b>Concur, Adopt:</b> The engineering appendix will be revised to provide a profile which will include the existing spoil bank, and proposed levee for the entire project reach. Annotation in the plates to reconcile tables 10 though 16 in the H&H appendix will not be included. 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. These floods' water surface elevations are characterized through the use of statistical deviation parameters, as discussed in the H&H Appendices, to account for uncertainties identified. As such, they are not effectively represented as a "design flood water surface" profile line. Although it would be possible to plot a specific index flood mean water surface profile, this poses prospective problems in terms of risk communication.
<b>IEPR Panel Backcheck Comment (#11):</b>
<b>Concur.</b>

**Comment #12:**

**The various sections of the report are not consistent with respect to assumptions regarding the size of events in which damages begin.**

**Basis for Comment:**

GRR Page 4-29.

For the without-project conditions, it was assumed that all existing spoil banks did not contain flood flows. Therefore, the spoil bank breach option was not used in the FLO-2D model. Rather, spoil banks were completely removed from the without-project model.

From Appendix F-10 Page 24

For purposes of determining damages and benefits for this appendix, the existing spoilbank levee provides no protection from any of the flood events evaluated.

Compare these quotes to the following quote from Appendix F-10, Section F-05 Page 19,

Therefore, a beginning damage depth was applied in HEC-FDA corresponding to the present condition, 10%- chance water surface elevation. This ensures that events more frequent than the 10%-chance event doesn't damage the floodplain inventory, as the flows are expected to be contained within the banks of the Rio Grande. to be

contained within the banks of the Rio Grande. The PDT feels this assumption is conservative, as it assumes the existing spoil bank levees provide some degree of protection.

This assumption is equivalent to assuming that the existing spoilbank levee provides protection for all events more frequent than the 10%-chance event. If so, then the GRR Page 4-29, Appendix F-10 Section F-05, and other text should be modified to reflect what was actually done for the analysis.

From Appendix F-10 Section F-11 page 35

As a means to test whether modeling existing levee performance would have an impact on LFCC damages and benefits, two scenarios were developed to model in HEC-FDA. A beginning damage depth was applied in HEC-FDA corresponding to the present condition, 20%-chance water surface elevation. This ensures that events more frequent than the 20%-chance event doesn't damage the floodplain inventory, as the flows are expected to be contained within the banks of the Rio Grande. A second beginning damage depth was applied to the LFCC corresponding to the present condition, 10%-chance water surface elevation, to evaluate the impact of the start of damages condition on LFCC damages and benefits.

Which of these options for the LFCC was ultimately used? From Page 36, the second part of Table 4-11 shows LFCC EAD 5-year start of damages from the RGMCC curve, 1990 FIRM rate review of \$6366.73. This is identical to the LFCC EAD in Table F-6C Page 148. So, the 5-year start of damages was used for the LFCC?

<b>Significance: MEDIUM</b>
Inconsistent statements regarding the size of events in which damages begin should be reconciled.
<b>Recommendation for Resolution:</b>
Review the documents for related text and modify as appropriate.
<b>USACE Evaluator Response (#12):</b>
<p><b>Concur, Adopt.</b> Although the economic appendix is very specific in the start of damages the GRR will be revised to make the start of damages consistent or provide qualifying statements where a qualitative discussion provided a frequency event of failure of the spoil bank of foundation. In this way the failure point, and start of damages may be more clear.</p> <p>The study team perceives the existence/non-existence of the spoil banks differently than the “start of damages” issues presented in the comment. The “start of damages” condition is described in Appendix F-10, Para F-04 “HEC-FDA Use.” This section describes the use of the “beginning damage depth” corresponding to the mean, 10% chance water surface elevation was used to de-emphasize damages associated with frequent, though relatively not severe events to structures and contents in the floodplain adjacent to the perched Rio Grande. This beginning depth is a) conservative and b) arbitrary, but provided reasonable damages and benefits data consistent with prior evaluations, and was adopted for this evaluation. The existing spoilbank levees’ performance is described in Appendix F-5 “Geotechnical Engineering” and Para. F-08 of Appendix F-10 “Analysis of Existing Levees.” Here, the existing spoilbank structure is evaluated per current USACE guidance on existing levee performance, buttressed by anecdotal and prior performance information from the Bureau of Reclamation.</p> <p>It’s very important to note that the start of damages condition being modeled in HEC-FDA is a depth, rather than an event probability. In the software, various factors that go into the risk and uncertainty analysis could create, say, a 50% chance occurrence event with a fairly deep stage, that HEC-FDA would incorporate into the analysis, or even a 4% chance occurrence event with a low depth that the model would ignore. The “start of damages” condition for HEC-FDA corresponds to a depth, rather than an event.</p> <p>The Low Flow Conveyance Channel (LFCC) was evaluated in 30 different scenarios to determine the sensitivity of key assumptions on damage and benefit calculations. This was done as a result of comments generated in prior reviews by technical and policy compliance reviewers, who identified the LFCC was a significant source of benefits, all of which is attributable to a Federal property. That evaluation is in Appendix F-10, Para. F-11 “Evaluation of the Bureau of Reclamation’s Low Flow Conveyance Channel (LFCC).” It’s important to note that in this evaluation, the Bureau of Reclamation indicated that seepage underneath the existing spoilbank levee, located between the LFCC and the Rio Grande caused ANNUAL damages to the LFCC, which was not an issue in the floodplain of structures and other damageable property. The LFCC is closer to the Rio Grande than the inventory of damageable property. The sensitivity analysis did evaluate the impact of altering the start of damages on LFCC benefits (such as altering the start of damages from the 20% to the 10% chance occurrence lowered benefits 1-2%).</p> <p>At the conclusion of the sensitivity analysis, there were no scenarios identified as “more likely”</p>

than others, so a reasonableness test was adopted. For cost, the study team picked a reasonable middle value developed within USACE rather than the extreme range of values provided by the Bureau of Reclamation. For the “start of damages event” the team picked the 20% chance occurrence rather than the 10% chance occurrence event, to be slightly more consistent with the historical pattern of damages and repairs. For depth-% damage curve selection, the team selected out concrete lined channels, as the LFCC is earthen and rock lined. The result was to pick “Likely cost, the RGMCC curve, and the 20% chance occurrence start of damages condition.”

**IEPR Panel Backcheck Comment (#12):**

**Concur.**

<b>Comment #13:</b>
<b>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.</b>
<b>Basis for Comment:</b>
Attention should be paid to producing a clean, more complete, stand-alone document that provides appropriate weight to the important economic, hydrologic/hydraulic, and geotechnical analysis.  Figure F-1 is missing  Table F-14, page 56 to 57, is missing.
<b>Significance: MEDIUM</b>
Economic justification may be in doubt if the documentation is not of sufficient quality to support it.
<b>Recommendation for Resolution:</b>
Appendix F-10 should be modified to address the issues identified above and in other IEPR Comments so that the economic analysis is readable.
<b>USACE Evaluator Response (#13):</b>
<b>Concur, Adopt:</b> Tables added per comment. The economic analysis has been written and reviewed extensively through multiple project team reviews, and other reviews consistent with EC 1165-2-209. The report has developed consistent with comments generated with those reviews. Beyond the missing tables, the study team feels this is an editorial comment.
<b>IEPR Panel Backcheck Comment (#13):</b>
<b>Concur.</b>

<b>Comment #14:</b>
<b>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 example needed, incorrect internal references</b>
<b>Basis for Comment:</b>
Lack of data, incorrect statements, and other errors mean that the selection of alternatives cannot be fully and fairly evaluated.
Page 2-30 Wrong data in table  <p style="padding-left: 40px;">Table 2.4 shows the total value of damageable property by category within the various flood event floodplains. In total, the study area has about \$98 million (August 2010 price level) worth of estimated damageable property within the 1-percent chance event.</p> <p>But Table 2.4 is labeled “Table 2.4 Single Occurrence Damages – Without-Project Conditions” not the value of damageable property. Table 2.4 reproduces Table F-5A, so it is event damages, not value of damageable property.</p>
Page 2-33, Outdated text  <p>The text on this page does not appear to be consistent with the current, actual operations of the LFCC.</p> <p>On page 2-33:</p> <p style="padding-left: 40px;">The diversion of river flows (up to 2,000 cfs) into the LFCC assists in conserving water and making water deliveries required by the Rio Grande Compact and the 1906 Treaty with Mexico, which requires annual delivery of 60,000 acre-feet.</p> <p>One of the questions for Reclamation (Appendix F-10, page 48 states:</p> <p style="padding-left: 40px;">Surface water diversions into the LFCC are no longer occurring.</p> <p>It appears that the GRR text involving the LFCC should be revised to reflect actual, current conditions. At a minimum, “In the past, diversion of river flows. . . . assisted in conserving....”</p>
Page 4-4, Section 4.3.1.1. Update for 2007 WRDA or at least mention  <p>This section should probably reference the 2007 WRDA and address comments from WildEarth Guardians that “The Water Resources Development Act of 2007 promotes a new federal policy for water projects.”</p>
Page 4-6 Unclear meaning of “planning constraints”  <p>It might be useful to reference the source or reason for these “planning constraints.”</p>
Page 4-6 Unclear meaning of “complete protection”  <p style="padding-left: 40px;">The alternatives eliminated from further consideration have in common the fact that individually and collectively they do not provide complete protection for agricultural land, BDANWR and the LFCC.</p> <p>I do not understand why alternatives should be eliminated because they do not provide “complete</p>

protection” “Complete protection” was not mentioned as a planning objective or constraint. Indeed, the phrase does not appear elsewhere in the document. Perhaps this paragraph needs to be reworded? Is this the same as “completeness” on page 4-37?

Page 4-9. Costs should be updated

The costs of the Rio Puerco and Rio Salado dams might be updated to 2010 levels to make the point that the costs of these dams are now much more than the recommended plan.

Page 4-25 Better example needed; text not justified by table.

As shown in this table, the analysis indicates that the levee that maximizes benefits is the Base Levee + 4 ft plan.

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.

Page 4-26 states

Remaining benefits are from the severe and rare events, which are only captured through levee height increases. However, the remaining benefits are not enough to offset increases in cost.

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. Therefore, remaining benefits are NOT obtained 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.” Apparently, the Base Levee + 5 ft option was not actually evaluated.

Page 4-31 Incorrect references

Table 4.9 shows net benefits and the benefit-to-cost ratio for each alternative.

Table 4.9 does not include the benefit-to-cost ratio.

Table 4.10 is not introduced or discussed.

Table 4.10 bottom row should probably be labeled “Annualized Costs” not “Average Annual Costs”

This page should be re-written so that the sources of benefit and cost information are summarized

Page 4-32 to 4-33 Content should be changed

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”?

<b>Significance: MEDIUM</b>
Errors and omissions make the documents hard to evaluate
<b>Recommendation for Resolution:</b>
Address comments regarding incorrect, misleading, misplaced and missing information.
<b>USACE Evaluator Response (#14):</b>
<p>This comment cannot be answered by a single response as it is 9 unrelated comments with 9 separate and distinct subjects and therefore resolutions. The District has annotated the comment with letters A-I to distinguish the comments and responses.</p> <p>A) <b>Concur Adopt</b> - Data in the table is correct. The text that refers to the table is changed 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.”</p> <p>B) <b>Concur Adopt</b> – The subsection (Water Conservation and Delivery) from which the quote was taken describes the LFCC among other infrastructure in the study area. The section is organized chronologically Within 3 paragraphs of the subject quote is 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 stating its current disposition. The initial discussion of the purpose and function of the LFCC prior to the 2007 ROD will be changed to reflect a past tense.</p> <p>C) <b>Non concur, Not adopt</b> - 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. Further, Implementation guidance is contingent on an update to the Principles and Guidelines which has not occurred.</p> <p>D) <b>Non Concur Not Adopt</b> –Section 4.1 bullet 1 states “Planning goals are set, objectives are established, and constraints are identified” The constraints are identified as part of the study as were the problems and objectives.</p> <p>E) <b>Concur Adopt</b>- The criteria for elimination for some alternatives such as flood proofing is changed to Effectiveness instead of Completeness. An abbreviated discussion of planning criteria including definitions presented in Section 4.7.6 is added to this section 4.3.1. to read:</p> <p>“As suggested by the USWRC, the alternative plans are also compared using the following criteria: completeness, effectiveness, efficiency, and acceptability. Completeness is the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure realization of the planned objectives. Effectiveness is the extent to which an alternative resolves the identified problems and achieves the specified objectives. Efficiency is the extent to which an alternative is the most cost-effective means of addressing the identified problems while realizing the specified objectives consistent with protecting the Nation’s environment. Acceptability is the workability and viability of an alternative to other Federal agencies, affected State, tribal, and local agencies; and public entities, given existing laws, regulations, and public policies. Additional detail for these criteria is provided in Section 4.7.6”</p> <p>Further the paragraph containing the subject quote in Section 4.5 is changed to read:</p>

“The alternatives eliminated from further consideration have in common the fact that individually and collectively they are unreasonable since they do not meet planning objectives and therefore do not fulfill the purpose and need of the project. Many of the alternatives are eliminated because they are incomplete, ineffective or not acceptable per those planning criteria presented in Section 4.3.1 Alternatives put forth in previous EIS or SEIS’s were found to not be effective or acceptable. Many alternatives are incomplete since they do not reduce flood damage to protection for agricultural land, the BDANWR and the LFCC. A breach of the spoil bank could damage or destroy these features. Only the alternatives carried forward for additional analysis described in Chapter 5 provide protection to these features throughout the study area.”

F) **Non concur Not Adopt** – 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 Section 4.5.2.

G) **Concur Adopt** – Table 4.7 and supporting text is revised to show information contained in table F-18 of the economic appendix.

Levee Height	Expected Annual Benefit and NED Cost (x \$1,000, Aug 2010 Price Level)		
	Benefits	Cost	Net Benefits
No Action	0	0	0
Base Levee	12,160	10,167	1,993
Base Levee + 1 ft	15,023	10,481	4,452
Base Levee + 2 ft	16,500	10,810	5,690
Base Levee + 3 ft	17,370	10,962	6,408
Base Levee + 4 ft	17,995	11,077	6,918

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 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. This table does not present a comparison of performance during the period of analysis as the commenter suggests.

H) **Concur, Adopt:** The typos mentioned have been corrected.

I) **Concur, Adopt:** Additional Text will be added to Section 4.7.5.3 to describe the regional benefits to the area from a large Federal project. The following text is also added to Section on 4.7.5.4 other social effects.

“The Bosque Del Apache National Wildlife Refuge represents a significant recreation opportunity in the study area that is important to both the region and the Nation. Providing flood protection to the Refuge (in the form of levees) preserves this recreation opportunity for

continued enjoyment by visitors. Alternatives that excluded the levees provided no means to preserve this recreation opportunity.

The floodplain is roughly 1.5 to 2 miles wide, and sits below the perched Rio Grande. In the event of a flood, warning times may prevent evacuation, but flood velocities are not expected to be sufficient to dislodge vehicles using local roads, however, the field inventory did not identify any high water marks as the floodplain is generally flat, and does not include low water crossings, although there may be unexpected areas with more flood depth due to local topography. Most flood fatalities occur in vehicles moving through the floodplain ([http://www.nws.noaa.gov/oh/hic/flood\\_stats/recent\\_individual\\_deaths.shtml](http://www.nws.noaa.gov/oh/hic/flood_stats/recent_individual_deaths.shtml), accessed 4/5/12).

The flood hydrograph described in the H&H appendix outlines two flood scenarios. Floods generated by local thunderstorms have short warning, rapid onset, relatively short duration (3-4 days) with the flood peak passing within hours. Floods generated by snowmelt in uncontrolled drainages downstream of Cochiti dam have considerably more warning time, but the volume and duration suggests a 90-100 day inundation duration. Only a small portion of the urbanized areas of the Town of Socorro will be impacted, as most of the Town sits above the floodplain. Public services are not expected to be disrupted outside of the floodplain. The flood impacts will fall mostly upon the rural areas outside of the Town. Evacuations will be necessary, and reoccupation and cleanup time and costs from New Orleans and Mississippi River floods (longer duration, though much deeper than projected for this study) suggest that the emergency costs used in this report (from Carlsbad, NM) are fairly”

**IEPR Panel Backcheck Comment (#14):**

- A. Concur.**
- B. Concur.**
- C. Concur.**
- D. Concur.**
- E. Concur.**
- F. Concur.**
- G. Concur.**
- H. Concur.**
- I. Concur.**

<b>Comment #15:</b>
<b>GRR/SEIS Section 6.8 (Socioeconomics) should address potential regional economic impacts generated by the project to the community.</b>
<b>Basis for Comment:</b>
It seems unusual that, outside of Table 4.12, the GRR/SEIS does not mention potential jobs growth (at least in short-term construction jobs) and other local economic impacts that would result from such a large project. Constructing 43 miles of levee over a 10–14-year period would almost certainly provide economic spillovers to the local economy, which in addition to jobs could include local services such as hotels/housing, restaurants, mechanized equipment rental, landscaping, and other goods and services.
<b>Significance: LOW</b>
USACE is missing an opportunity to demonstrate positive project impacts. The RED section in Appendix F-10 might also include more discussion of economic impacts during construction.
<b>Recommendation for Resolution:</b>
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 positive local effects that do not appear to be addressed in Section 6.8.
The District should review the <i>Proposed National Objectives, Principles and Standards for Water and Related Resources Implementation Studies</i> document dated December 3, 2009, which describes how economic impacts to the regional economy should be addressed: “ <i>b. Regional Economic Subcategory. This subcategory includes the changes in the distribution of regional monetary effects that result from each alternative shall be displayed when they are significant to local, state, and regional decision making, or needed to address other concerns of the public. A region may be defined as needed to address these concerns. Regional effects include the National effects that accrue within the region, plus transfers of income into or out of the region relative to the rest of the Nation. The monetary effects of an alternative not occurring within the defined region shall be displayed in a “Rest of Nation” category. Regional changes include National effects, income transfers, and employment effects.</i> ”
<b>USACE Evaluator Response (#15):</b>
<b>Concur, Adopt:</b> The GRR discussion of the Four Accounts (NED, NER, OSE, RED)” is revised to include a qualitative discussion that a ~\$3million project over 20 years will contribute to the NED through jobs, 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 will be reiterated in chapter 6 regarding the socioeconomics sections.
<b>IEPR Panel Backcheck Comment (#15):</b>
<b>Concur.</b> The response addresses the stated concern.

<b>Comment #16:</b>
<b>Assertions regarding water quality from flood events on p. 6-11 require further support or modification.</b>
<b>Basis for Comment:</b>
P. 6-11 states “Although periodic floodplain inundation outside of the existing spoil bank alignment has the potential for providing allochthonous material to the Rio Grande, historic and existing land uses west of the spoil bank also present potential threats to water quality. Following a spoil bank breach, floodwaters would likely be of low quality and would result in the introduction of potential contaminants (sewage, petroleum products) to the river, and, therefore, would not be considered beneficial to aquatic habitat and organisms.” Without measuring the actual contribution of contaminants or allochthonous material, the overall conclusion of low-quality contributions is unsupported.
<b>Significance: LOW</b>
Additional detail is warranted or the paragraph should be deleted.
<b>Recommendation for Resolution:</b>
Consider modifying the text to reflect the issue raised in the Comment.
<b>USACE Evaluator Response (#16):</b>
<b>Concur, Adopt:</b> This statement 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.  National Academy of Engineering. 2006. The Bridge: Linking Engineering and Society. Vol. 36.  Suedel, B.C., Steevens, J.A., Kennedy, A.J., Brasfield, S.M., Ray, G.L. 2007. Environmental consequences of water pumped from greater New Orleans flowing hurricane Katrina: Chemical, toxicological, and infaunal analysis. Environmental Science and Technology. Vol. 41, No. 7.
<b>IEPR Panel Backcheck Comment (#16):</b>
<b>Concur.</b>

**Comment #17:**

**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.**

**Basis for Comment:**

In general, the existing conditions section is well-written and provides a sufficiently comprehensive basis for comparison with project alternatives. However, certain sections of the existing conditions and impacts sections would benefit from the inclusion of figures indicating the location of features referenced in the text.

- A. This applies to Section 3 on HTRW, Section 2.4.1 on Riparian Plant Communities (a table is provided), Subsection 2.4.4.1 critical habitat for the silvery minnow, Subsection 2.4.4.2 critical habitat for the Southwestern willow flycatcher.
- B. The text on p. 2-24 states *“In 2010, 27 of the flycatcher territories in this reach were located on the west bank of the river, adjacent to the alignment of the current spoil bank and proposed engineered levee.”* A figure would be very helpful here or in the impacts section showing the location of the area (not specific nests) to the proposed levee construction.
- C. Section 3.5.4 Land Use and Classification (under Future No-Action conditions). This section would benefit from a zoning map if one exists of the area, to support the conclusion of no anticipated land use changes.

Many of these figures would be easy and cost-effective to produce and would greatly aid in understanding the potential project impacts (or lack thereof). These can easily be 8.5-in x 11-in figures and incorporated into the body of the text.

The aesthetics section as written sounds contradictory: *“As discussed in the 1992 SEIS, the evaluation of visual qualities is a value judgment and is subjective, differing according to the perception of each individual. The general visual setting of the proposed project area is thought to be of high aesthetic quality, with the exception of the sporadic litter and domestic garbage.”* It might be easier to avoid the value judgments entirely and include photographs of the project site under existing conditions from different views. For the impacts section, it would be useful to have photomontage views (to scale) of what the newly-constructed berm would look like from major vantage points such as along I-25, from Socorro, or from the Bosque del Apache NWR.

**Significance: LOW**

The clarity of the GRR/SEIS would be much greater with figures and enable the reader to verify the conclusions and other statements made within the text. This is important to do if the document is going out to public comment. Aesthetics is often not a major issue, but with a 43-mile-long levee, a more effective and objective analysis is warranted.

**Recommendation for Resolution:**

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

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 Evaluator Response (#17):**

1) With a primary affected area that is 1 to 2 miles wide and 43 miles long, depicting resources throughout the study usually entail 4 or more 11x17” sheets. Where possible, links or references to existing supporting information will be provided to reduce the size of the existing document per NEPA.

A. **Concur, Non-adopt:** HTRW concerns have been described in the text using landmarks depicted on project maps. Additional maps would not provide significant additional information.

Detailed Vegetation mapping would require 7 or 8 plates for proper resolution. The mapping system is esoteric to the public (but is intimately known and accessible by local biologists).

Critical habitat for both species encompasses nearly the entire floodway for 50 miles with only minor exceptions (e.g., NWRs). The discussion of minnow habitat will be revised to concisely describe this, and provide a USFWS internet source for flycatcher critical habitat. No additional maps will be added for the reasons stated above.

B. **Concur, Adopt:** A graphic to display the distribution of breeding flycatchers over the past 2-3 seasons will be provided in section 2.4.4.2. The maps also will depict designated critical habitat for the flycatcher.

C. **Concur, Non-adopt.** The proposed structures occupy fee land or easements that are dedicated to its use for flood control purposes and would replace the existing inferior structure that is used for the same purpose. The affected area lies within Federal or local governments lands and is not zoned for municipal purposes

2) **Concur, Adopt:** The reference to value judgments in Section 2.8 is removed so that the discussion reflects those in Chapters 3 and 6. Much of the area is distant from traffic and the general public; therefore, we will likely adopt the view of an adjacent landowner or as the levee would be seen from highways crossings. We will include photographs of 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 four years ago.

**IEPR Panel Backcheck Comment (#17):**

**Concur.**