



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS  
441 G STREET, NW  
WASHINGTON, DC 20314-1000

REPLY TO  
ATTENTION OF

CECW

MAY 29 2014

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: Berryessa Creek Element, Coyote and Berryessa Creeks Project, Santa Clara County, California – Final USACE Response to Independent External Peer Review

1. Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).
2. The IEPR was conducted by Battelle Memorial Institute. The IEPR panel consisted of four members with technical expertise in Civil Works planning/economics, biology/ecology, cost engineering, and hydrologic and hydraulic engineering.
3. The final written responses to the IEPR are hereby approved. The enclosed document contains the final written responses of the Director of Civil Works to the issues raised and the recommendations contained in the IEPR report. The IEPR Report and the USACE responses have been coordinated with the vertical team and will be posted on the Internet, as required in EC 1165-2-214.
4. If you have any questions on this matter, please contact me or have a member of your staff contact Mr. Bradd Schwichtenberg, Deputy Chief, South Pacific Division Regional Integration Team, at (202) 761-1367.

Encl

STEVEN L. STOCKTON, P.E.  
Director of Civil Works

**Berryessa Creek General Reevaluation Report (GRR) and  
Environmental Impact Statement (EIS)**

**U.S. Army Corps of Engineers Response to  
Independent External Peer Review  
March 2014**

Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review (2004)*. The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide the most scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of products USACE provides to the American people.

Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR for the Berryessa Creek GRR and Environmental Impact Statement. The Battelle IEPR panel reviewed the Draft GRR and the Draft EIS, as well as the supporting documentation. The Final IEPR Battelle Report was issued on 6 March 2013.

Overall, fifteen comments were identified and documented. Of the fifteen comments, three were identified as Economics; one as Economics and Plan Formulation; one as Plan Formulation related; four were Hydrology-or Hydraulic-related; one was Cost Engineering related; and five were related to Environmental issues. Six comments were identified as having high significance, eight comments had medium significance, and one comment had low significance.

- 'High': Describes a fundamental problem with the project that could affect the recommendation, success, or justification of the project.
- 'Medium': Affects the completeness of the report in describing the project, but will not affect the recommendation or justification of the project.
- 'Low': Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project.

The following discussions present the USACE Final Response to the Comments.

1. **Final Panel Comment 1 (Hydraulics) – *High Significance* – The impact of sedimentation is not included in the hydraulic modeling aspect of channel design.**

There are two recommendations as part of this comment, all of which were adopted, as discussed below.

Recommendation #1: Investigate post-sedimentation within the channels using post-sedimentation cross-sections from the sediment transport model.

**USACE Response: Adopted.**

**Action to be Taken:** USACE will investigate Post-sedimentation after the project is constructed as part of project monitoring, and cross-sections will be obtained. The Operations, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) Manual will contain sediment clean-out requirements. USACE will conduct inspections to ensure OMRR&R requirements are being met.

Recommendation #2: Adjust design discharges to accommodate bulking of the flows due to sediment load.

**USACE Response: Adopted.**

**Action to be Taken:** During design, USACE will evaluate discharges that accommodate bulking due to sediment loading. Since bulking flows would impact all scenarios in a similar fashion, this would not have affected plan selection. However, since the drainage has more sediment than other projects, more information on bulking will be beneficial.

2. **Final Panel Comment 2 (Hydraulics) – *High Significance* – The operations and maintenance plan does not present sufficient details related to sediment removal and maintenance of clear channel conditions.**

There are three recommendations as part of this comment, all of which were adopted, as described below.

Recommendation #1: Develop a detailed O&M plan to ensure that the design assumptions of channels clear of sediment are valid.

**USACE Response: Adopted.**

**Action to be Taken/Action Taken:** USACE will develop a detailed Operations, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) Manual (O&M plan) during the preconstruction engineering and design phase. To clarify, current design assumptions do not assume complete sediment removal—sediment deposition is

accounted for in the uncertainty parameters. Additional OMRR&R details were provided in Section 7.4 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #2: Describe how the sediment maintenance will be conducted and identify all the locations where sediment removal will be performed. Details on maintenance frequency should be included as part of the O&M plan.

**USACE Response: Adopted.**

**Action to be Taken/Action Taken:** USACE will describe sediment maintenance in the Operations, Maintenance, Repair, /Rehabilitation, and Replacement (OMRR&R) Manual. According to the sponsor (who conducts the maintenance), sediment is typically removed from the adjacent maintenance roads and/or bridge crossings using cranes. Appendix B, Part III: Geomorphic and Sediment Transport, Section 2.2.2 discusses how the project reach (below Interstate 680) typically requires less sediment removal than upstream. Additional OMRR&R details were provided in Section 7.4 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #3: Describe impacts and mitigation needed to reduce sediment carried to downstream reaches outside the project study area.

**USACE Response: Adopted.**

**Action Taken:** A discussion on how sedimentation in the downstream reaches is expected to be reduced was added to the alternative evaluation/effects analysis in Section 4.4.2.6 of the General Reevaluation Report/Environmental Impact Statement. With the project providing a wider channel, sediment currently contributed from bank erosion in the project reach will be greatly minimized post-project. If timely sediment removal activities are performed in the project area (as will be prescribed in the Operations, Maintenance, Repair, Rehabilitation, and Replacement Manual), there should be minimal impact to the sediment transporting from the project to the downstream area.

- 3. Final Panel Comment 3 (Economics) – *High Significance* – The National Economic Development benefits cannot be validated due to inconsistencies and incomplete data associated with the calculation of the Annual Equivalent Damages.**

There are six recommendations as part of this comment, all of which were adopted, as described below.

Recommendation #1: Ensure consistency in reported damages in Tables 6.1 and 6.2 (Appendix C).

**USACE Response: Adopted.**

**Action Taken:** Tables 6.1 and 6.2 were modified for consistency. Additional explanation and clarification was provided in Appendix C: Economics regarding the apparent contradiction between exceedance probability event damages as reported in Table 6.1 and expected annual damages as reported in Table 6.2. This explanation refers the reader to Tables 4.5 and 4.6, which display the single-event damages for impact areas E and F, respectively. Verbiage describing Table 6.1 has also been revised to clarify that the exceedance probability-damage curves include uncertainty in the hydrology, hydraulics, and economics. Language has been updated to point out that the exceedance probability-damage curve for impact area E is in fact “above” that of impact area F’s curve and that expected damages for all categories except the industrial category are greater in impact area E than in impact area F. There is considerable uncertainty in the damages associated with several industrial structures, which is being reflected in the expected annual damages for this category, and hence the higher expected annual damages for impact area F as compared to impact area E.

Recommendation #2: Explain the significant increases in structure and content damages resulting from slight increases in stage.

**USACE Response: Adopted.**

**Action Taken:** Additional information was added to Appendix C: Economics describing the technique used to compute stage-damage curves within the HEC-FDA software. These include using the hydraulic design software FLO-2D’s output to link depth of flooding to individual structures for a range of frequency events and using exterior (in-channel) stages from rating curves to link exterior stages to interior (floodplain) damages

Also, additional information was added to Appendix C: Economics focusing on explaining the association of in-channel stages to floodplain damages. FLO-2D was used to generate floodplains -- water surface elevations by grid cells and frequency events. Structures were then tied to individual grid cells (water surface elevations), and this inventory was imported into HEC-FDA. In order to compute/scale stage-damage curves in HEC-FDA, exterior (in-channel) stages (from the rating curve) were linked to interior (floodplain) water surface elevations by event. This grid cell approach in FLO-2D is not proportional.

Recommendation #3: Describe the method used to calculate the advance bridge replacement benefits.

**USACE Response: Adopted.**

**Action Taken:** Additional information about advance bridge replacement benefits was provided in Appendix C: Economics (Economics Memorandum for File, 7 June 2013, Section 4). The memorandum describes how the data was used and shows the steps taken

to calculate advanced bridge replacement benefits. Data was included for all bridges, and a step-by-step example featuring the Old Piedmont Bridge was presented.

Recommendation #4: Present damages in Table 6.1 (Appendix C) by exceedance probability events that are consistent with the remainder of the report.

**USACE Response: Adopted.**

**Action Taken:** The damages presented in Table 6.1 of Appendix C were modified to be consistent with the remainder of the report. The exceedance probability-damage curves displayed in Table 6.1 differed from the rest of the report because they are output results from the HEC-FDA models; they are not user-provided data points.

Recommendation #5: Revise Tables 4.1 - 4.6 (Appendix C) to include damages for the events between the non-damaging and the 0.040 exceedance probability events.

**USACE Response: Adopted.**

**Action Taken:** Tables 4.1 to 4.6 of the General Reevaluation Report/Environmental Impact Statement were revised to include damages for the events between the non-damaging exceedance probability event and the 0.04 exceedance probability event.

Recommendation #6: Provide the supporting data used to develop the with-project equivalent annual damages in Table 7.1 (Appendix C).

**USACE Response: Adopted.**

**Action Taken:** Additional explanation has been included in Appendix C: Economics explaining where the equivalent annual damages in Table 7.1 came from. In Table 7.1, equivalent annual damages for the areas upstream of I-680 (areas A, B, C, and D) were taken from Table 6.2 (total expected annual damages) and summed; areas A, B, C, and D did not include any future development, so expected annual damages are equal to equivalent annual damages. Also in Table 7.1, equivalent annual damages for the areas downstream of I-680 (areas E and F) were taken from Table 6.2 (total expected damages for area F) and Table 6.3 (total equivalent annual damages for area E) and summed; area F did not include any future development, so expected annual damages are equal to equivalent annual damages; area E did include future development (midtown Milpitas), so an equivalent annual damage analysis was performed.

4. **Final Panel Comment 4 (Economics) – *High Significance* – The National Economic Development benefits cannot be validated due to inconsistencies and incomplete data in the economic risk and uncertainty analysis.**

There are five recommendations as part of this comment, all of which were adopted, as described below.

Recommendation #1: Report the risk associated with implementing Alternatives 2B/d and 4/d to ensure compliance with EM 1110-2-1619 and resolve conflicting statements in the GRR.

**USACE Response: Adopted.**

**Action Taken:** The following clarifying statements regarding risk and uncertainty were added to Appendix C: Economics: The FLO-2D computer modeling indicates that there are no residual floodplains with these alternatives in place. Therefore, no economic modeling of these alternatives was performed; In the case of Berryessa, it is important to note that while the modeling indicates absolutely no residual risk for Alternatives 2B and 4, the reality is that no matter how “big” or “strong” a flood risk management project is thought to be, there is always the chance for residual flooding; In terms of analyzing the final array of alternatives and identifying the National Economic Development plan, assuming zero residual risk for Alternatives 2B and 4 is a conservative approach to show that neither alternative provides the most net benefits to the Nation, even under the best of circumstances.

Recommendation #2: Verify the significant increase in mean benefit without and with incorporating risk and uncertainty, and explain how the mean benefits increased significantly due to incorporation of risk and uncertainty.

**USACE Response: Adopted.**

**Action Taken:** The HEC-FDA models were re-run to verify without-project damages and with-project damages reduced (benefits). Without-project damages and with-project damages reduced were re-computed under both a “without risk” scenario and a “with risk” scenario. The results indicate that there is a large increase in damages/damages reduced when computed with risk. This increase can be attributed to the relatively high uncertainty in the hydrology (35 year equivalent record length) and the in-channel stages for specific exceedance probability events (between 0.5 feet and 0.9 feet), which is being reflected in the large range in benefits for alternative 2A and 5 as shown in Table 7. 3 of Appendix C: Economics.

Additionally, the large spreads in damages can be attributable to several factors, including (1) shallow flood levels (2) several large value industrial buildings (3) FLO-2D water surface elevation (WSE) transition from no flood depth to flooding within HEC-FDA. In other words, many structures (some of significant value) that are on the verge of being flooded under the no uncertainty scenario, become flooded when risk and uncertainty is incorporated.

Recommendation #3: Verify the reported single expected value and probabilistic net benefits for Alternatives 5 and 2A, or explain how the mean benefits can be greater than 75% of the values in the probability distribution.

**USACE Response: Adopted.**

**Action Taken:** The expected damages reduced (benefits) were verified in the HEC-FDA models. There is relatively high uncertainty associated with the hydrology and hydraulics as modeled in HEC-FDA. The large range in benefits and the non-alignment of expected benefits with median benefits (50% probability benefits) reflect this uncertainty. A more detailed explanation of the expected benefit results and the role uncertainty plays in the results has been added to Appendix C: Economics.

Additionally, the tables in Chapter 8 of Appendix C: Economics showing the net benefit and benefit-to-cost analyses of Alternative 2A (the plan identified as the NED) have been expanded to include an analysis using the 75% probability benefits. This is intended to provide more information regarding the economic feasibility of Alternative 2A using a more conservative estimate of benefits.

A sensitivity analysis was performed with the industrial structures and is described in the, in Appendix C: Economics (Economics Memorandum for File 7 June 2013, Section 4). In this sensitivity analysis, the industrial structures were removed from the net benefit and benefit-to-cost analyses in order to show the effects on net benefits and the BCR. This is an extreme (or worst case) scenario, and assumes that the industrial structures will never be flooded.

Recommendation #4: Incorporate risk and uncertainty into the development of future conditions.

**USACE Response: Adopted.**

**Action Taken:** Additional text was added to Appendix C: Economics to clarify that risk and uncertainty was incorporated into the future conditions. An analysis was performed using the HEC-FDA software to compute equivalent annual damages and benefits related to the future development in the Milpitas Midtown area. It is important to note that future development was analyzed in accordance with Sec 308 of WRDA 1990 (33 USC 2318) as damages or benefits were NOT claimed from flooding to these structures from an event 100-year and smaller. Future development would comply with FEMA regulations to build the first floors above the 100-year base flood elevation. Only damages or benefits from the incremental water surface elevation increase for events greater than 100-year were accounted for in this economic analysis. The damages or benefits associated with future development comprise only a very small portion (~1%) of total

benefits. Recommendation #5: Present the results of the risk-based analysis in accordance with ER 1105-2-101.

**USACE Response: Adopted.**

**Action Taken:** The tables in Chapter 8 of Appendix C: Economics were adjusted to better display the net benefit and benefit-to-cost risk-based analyses of the alternatives. Engineer Regulation (ER) 1105-2-101 was used as a guide to better explain the risk analysis results. Part of the explanation included displaying floodplains for a range of exceedance probability events in Appendix B, Part I: Hydraulic Analysis of Alternatives.

**5. Final Panel Comment 5 (Economics) – *High Significance* – The National Economic Development benefits cannot be validated because detailed documentation associated with the development of the structure inventory, content value surveys, and structure valuation is not provided.**

There are fourteen recommendations as part of this comment, all of which were adopted, as discussed below

Recommendation #1: Provide the rationale for excluding a portion of the study area from an Economic Impact Area and indicate if structure and content values in that area are included in the analysis.

**USACE Response: Adopted.**

**Action Taken:** The rationale was added to Appendix C: Economics. The area is not part of the 500-year floodplain. No structures within the 500-year floodplain were excluded in the economic inventory.

Recommendation #2: Provide the date that the “previously completed” structure inventory was performed. If the inventory is dated, describe any verification undertaken during this analysis to update the inventory.

**USACE Response: Adopted.**

**Action Taken:** A comprehensive inventory was developed in 2000. Updates/verifications were completed in 2004 and 2008. Since 2008, only limited updating (price level) of the inventory has been performed. The area is considered built-out (except for the additional multifamily units in the Midtown Milpitas area). These dates and actions were added to the Economics Appendix.

Recommendation #3: Provide date of on-site inspection of structures.

**USACE Response: Adopted.**

**Action Taken:** The on-site inspection dates were added to Appendix C: Economics. On-site inspections were last completed in 2004. Limited updates have been completed since then.

Recommendation #4: Describe how the structure inventory was developed in accordance with Section 308, and how structures built after July 1, 1991 were identified.

**USACE Response: Adopted.**

**Action Taken:** A description of structure inventory methods and how structures built after July 1, 1991 were assessed was added to Section 2.2 of Appendix C: Economics. Data was collected mainly from assessor's parcel data, which includes the year the structure was built. Structures built after July 1991 were identified via the assessor's parcel data.

Recommendation #5: Indicate the portion of the structure inventory constructed after July 1, 1991.

**USACE Response: Adopted.**

**Action Taken:** The structure inventory excludes structures built after July 1991, except for those related to future development in the Midtown Milpitas area. No damages or benefits were claimed from flood events at or below a 100-year for those structures slated for future development. No damages/benefits were claimed at all for any existing structures built after July 1991. This explanation was added to Section 2.2 of Appendix C: Economics.

USACE recognizes that benefits of each alternative could actually be greater than currently being reported if those structures built after 1991 were included in the inventory. The amount of damages (and damages reduced with a project in place) tied to these structures would most likely be minimal, because we assume that they have been built in accordance with FEMA regulations requiring development above the 100-year base flood elevation. These structures would only sustain damages from less frequent events (lower than 0.01 exceedance probability). The only damages accounted for in the economic analysis are those attributed to the incremental delta increase above the 100-year flood plain water surface elevation. Recommendation #6: Provide the date and source of the structure data used to develop the Marshall & Swift Valuation Service structure valuations.

**USACE Response: Adopted.**

**Action Taken:** The date and source for the structure data used to develop the Marshall & Swift Valuation Service structure valuations were added to Appendix C: Economics.

Assessor's parcel data was used to develop the structure inventory. A comprehensive inventory was initially completed in 2004.

Recommendation #7: Indicate the method used to value structures built since the conduct of the "previously completed" structure inventory.

**USACE Response: Adopted.**

**Action Taken:** The method used to value structures built since the previous structure inventory was added to Appendix C: Economics. Future development in the Midtown Milpitas area includes multi-family residential (MFR) units. Each of these units/structures was valued at \$200,000. This value was carried forward from the 2006 General Reevaluation Report and used in this analysis.

It is important to note that for those structures planned for future development, no damages/benefits were claimed due to flooding from events at or below the 100- year in accordance with Section 308 of WRDA 1990 (33 USC 2318). Only damages or benefits from the incremental water surface elevation increase for events greater than 100-year were accounted for in the economic analysis. Any damages attributed to the 100-year event water surface elevation were not counted. Also, benefits tied to future development comprise a relatively insignificant amount (about 1%) of total benefits (Alternative 2A).

Recommendation #8: Provide the basis for estimating the effective age of structures.

**USACE Response: Adopted.**

**Action Taken:** An explanation for the basis for estimating the effective age of structures was added to the Appendix C: Economics. During the initial inventory development and through a combination of field work and assessor's parcel data, a qualitative estimation of condition (very good, good, poor, etc.) was made, which was then used to determine a depreciation percentage/remaining value percentage. These percentages were then used in the estimation of depreciated replacement values.

Recommendation #9: Indicate the impact, if any, of the 2008-2009 U.S. economic recession on housing values, and labor and construction costs in the area.

**USACE Response: Adopted.**

**Action Taken:** Impacts from the 2008-2009 recession were added to the Economic Appendix and to section 4.1.2.2 of the General Reevaluation Report/Environmental Impact Statement. Any impact the 2008-2009 recession may have had on depreciated replacement values/construction costs in the area would be reflected in the Marshall & Swift factors used to update the structure values.

(During the 2008-2009 economic downturn, housing values in the San Francisco Bay Area did not see a precipitous decline as compared to other areas in California, especially in such Central Valley cities like Sacramento. Housing prices in the Bay Area have since stabilized and are now increasing.)

Recommendation #10: Provide the rationale for not confirming content percentages or adjusting content values developed for the 1992 GDM for use in this analysis.

**USACE Response: Adopted.**

**Action Taken:** The rationale for not confirming content percentages or adjusting content values used from the 1992 General Design Memorandum was added. It is believed that the content-to-structure value ratios for non-residential categories taken from the 1992 GDM is the best available at this time. USACE verified this using other studies in the area (e.g., Upper Penitencia Creek, Upper Guadalupe) with similar type structures.

In addition, it is recognized that there is a significant amount of uncertainty associated with the flooding and subsequent damages/benefits to the high-value industrial structures in the study area. A sensitivity analysis was performed on the industrial structures to see the impact removing them from the analysis has on net benefits and benefit-to-cost ratios. Even if no benefits were failed from the structures (a conservative estimate), Alternative 2A remains the National Economic Development Plan, and all alternatives remain economically justified. This is detailed in Appendix C: Economics (Economics Memorandum for File, 7 June 2013, Section 1).

Recommendation #11: Provide the rationale for not independently verifying the best-guess estimates from survey content data and estimated loss for various flood events for non-residential content value.

**USACE Response: Adopted.**

**Action Taken:** It is believed that the survey data collected for the 1992 General Design Memorandum is the best available at this time. This was verified using other studies in the area (e.g., Upper Penitencia Creek, Upper Guadalupe) with similar type structures. This is detailed in Appendix C: Economics (Economics Memorandum for File, 7 June 2013, Section 1).

Recommendation #12: Indicate the portion of the increase in total value of structures within the floodplain since the 1987 Feasibility study that is attributable to each factor.

**USACE Response: Adopted.**

**Action Taken:** The statements in Appendix C: Economics, describing the value of damageable property being eight times the value reported in the 1987 Feasibility Study may be based on incorrect information reported in the 1987 report. The increase in value may be closer to 2.5 times. USACE verified this and elaborated on how much of the increase in total value of structures is attributed to each factor. An additional table was added to Appendix C: Economics comparing the structure counts, structure types, and value of damageable property between the 1987 Feasibility Study and this current analysis.

Recommendation #13: Provide the date and methods used during field visits to establish first floor structure elevations.

**USACE Response: Adopted.**

**Action Taken:** The dates and methods used during field visits to establish first floor structure elevations were added to Appendix C: Economics. Field work was completed during the 2004 update. Foundation heights were estimated for each structure using 0.5 foot increments during the field visits; “window” surveys were used to estimate foundation heights. Using Geographic Information Systems (GIS), ground elevations were assigned to each structure. Both ground elevations and foundation heights were imported into the HEC-FDA computer models; through its computation processes, HEC-FDA calculates first-floor elevations (ground elevation plus foundation height) for each structure.

Recommendation #14: Provide data on the current survey responses that were used to modify the industrial content depth damage curves used in the original USACE study and how the depth damage curves were modified.

**USACE Response: Adopted.**

**Action Taken:** The industrial content depth-percent damage curves used in the original USACE study were modified during past efforts (not this current effort) using content survey responses; this survey was also completed during past efforts and not during this current analysis. While this survey data is not readily available, USACE has reviewed the depth- percent damage curves for reasonableness by comparing them to those used in other studies in the area that also have similar high-tech occupancy types.

In addition, it is recognized that there is a significant amount of uncertainty associated with the flooding and subsequent damages/benefits to the high-value industrial structures in the study area. A sensitivity analysis was performed on the industrial structures to see the impact removing them from the analysis has on net benefits and benefit-to-cost ratios. Even if no benefits were derived from the structures (a conservative estimate), Alternative 2A remains the National Economic Development Plan, and all alternatives

remain economically justified. This is detailed in the Appendix C: Economics (Economics Memorandum for File, 7 June 2013, Section 1).

6. **Final Panel Comment 6 (Hydraulics) – *High Significance* – The FLO-2D boundaries as modeled include artificial barriers that confine water flow within the study area, which could affect the National Economic Development benefit calculations.**

Recommendation #1: Eliminate artificial barriers along Capitol Avenue within the FLO-2D model and rerun the model; revise the economic analysis accordingly.

**USACE Response: Adopted.**

**Action Taken:** A sensitivity analysis in which outflow grids were placed along this artificial barrier (thus simulating the expansion of the grid and subsequent loss of flow “through” the barrier) was performed. Results of this analysis show that floodplains area likely to change for the 2 through 0.02 percent chance exceedance events, which will necessitate modification of the FLO-2D model and thus revised floodplains and economic analyses. The revisions, however, would affect the plans equally and will not significantly change the benefits, so they will not affect plan selection. The results of this sensitivity analysis are captured in the Appendix C: Economics (Economics Memorandum for File, 7 June 2013, Section 3).

7. **Final Panel Comment 7 (Hydrology) – *Medium Significance* – The use of the current NOAA Atlas 14 Volume 6 precipitation-frequency data could alter hydrological model design discharges and affect the channel design parameters.**

There was one recommendation as part of this comment, which has been adopted, as described below.

Recommendation #1: Evaluate the impact on channel design of the latest precipitation-frequency estimates presented in NOAA Atlas 14.

**USACE Response: Adopted.**

**Action to be Taken:** The use of a design storm that incorporates the National Oceanographic and Atmospheric Administration’s (NOAA) Atlas 14 will be studied in the PED phase. The current hydrology should be adequate to support the conclusions reached in the feasibility phase.

8. **Final Panel Comment 8 (Plan Formulation) – *Medium Significance* – A clear justification for the elimination of levees from the final array of alternative plans has not been provided.**

There was one recommendations as part of this comment, which has been adopted, as described below.

Recommendation #1: Present a clear rationale for selecting floodwalls as opposed to levees for the final project alternatives.

**USACE Response: Adopted.**

**Action Taken:** The phrase “due to real estate constraints” was added after “Free-standing concrete floodwalls would be constructed...” in the second sentence of the Alternative 2A/d description in the General Reevaluation Report/Environmental Impact Statement Sections 3.7.5.4 and 7.1.1.

**9. Final Panel Comment 9 (Environmental) – *Medium Significance* – The impact on wetlands and riparian habitat is not described in adequate detail to demonstrate that no net loss would occur.**

There are three recommendations as part of this comment, all of which were adopted, as discussed below.

Recommendation #1: Describe in the Impact and Mitigation Section (Section 5.5.3) how wetland and riparian habitat would be affected by the project, including which activities would result in loss, under what conditions it would be feasible to avoid the impact, and whether the impact would be considered a one-time loss of habitat or would be the result of repeated maintenance and operation activities.

**USACE Response: Adopted.**

**Action Taken:** USACE clarified habitat types within the project area, added that effects would be a onetime impact, and discussed maintenance activities in Section 4.5.2.1 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #2: Develop a mitigation measure in the GRR EIS/EIR (Section 5.5.3.6) to demonstrate how a no-net-loss standard would be achieved and what actions would be implemented if the expected natural revegetation of wetland and riparian habitat is not met.

**USACE Response: Adopted.**

**Action Taken:** USACE added explanation for a no net loss determination and added success criteria to vegetation plantings in Sections 5.4.3.6 and 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #3: Elaborate on the statement “... the Corps would replant cattails and/or other wetland vegetation upon completion of the project...” to include details of which species would be planted, how many acres would be restored, and what monitoring would occur.

**USACE Response: Adopted.**

**Action Taken:** USACE added some additional information on species planted and success criteria to Sections 5.4.3.6 and 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement.

10. **Final Panel Comment 10 (Environmental) – *Medium Significance* – The mitigation measures are not linked to the impact analysis and it is not clear if the mitigation avoids, minimizes, or compensates for the impacts on biological resources.**

There are three recommendations as part of this comment, all of which have been adopted as discussed below.

Recommendation #1: Provide explanation for the HEP analysis and details of which species models were used in the impact analysis section. Describe how the HEP model was used to determine the biological impacts (GRR EIS/EIR, Section 5.5.1, p. 5-21).

**USACE Response: Adopted.**

**Action Taken:** Additional information of HEP analysis was added to Section 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement, and the Habitat Evaluation Procedure analysis was included in Appendix A: Environmental.

Recommendation #2: Re-examine the impact analysis section to determine if additional impacts on biological resources need description.

**USACE Response: Adopted.**

**Action Taken:** Additional information was added to the impact analysis on biological resources. Information and species identification was included in Section 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #3: Revise the mitigation measures in Section 5.5.3.6 to clearly demonstrate how the measures would avoid, minimize, or compensate for the impacts described in Section 5.5.3.

**USACE Response: Adopted.**

**Action Taken:** Performance criteria and the responsible party for mitigation were added to Section 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement.

11. **Final Panel Comment 11 (Environmental) – *Medium Significance* – The potential for California red-legged frogs to move accidentally into the project area or be washed downstream from areas of suitable habitat is not evaluated.**

There are four recommendations as part of this comment, all of which were adopted, as discussed below.

Recommendation #1: Describe in detail in the environmental setting section the surveys that have been conducted for California red-legged frog. In addition, describe known occurrences of California red-legged frogs in the region, potential for California red-legged frogs to move from these areas into the project area, and identify if federally designated critical habitat for California red-legged frog is in the project area.

**USACE Response: Adopted.**

**Action Taken:** Additional information was added to Section 4.5.2.2 of the General Reevaluation Report/Environmental Impact Statement about California Red Legged Frog (CRLF) surveys completed for the project area and the area upstream of the project area, location of critical habitat, and barriers within the project area. The survey report was added to Appendix A: Environmental. The survey report determined CRLFs do not inhabit the main channel of Berryessa Creek, and CRLFs are unable to colonize the stream course; therefore, the proposed project in upper Berryessa Creek will not have any adverse effects on the species.

Recommendation #2: Include additional descriptions to support that project activities are not likely to adversely affect California red-legged frog.

**USACE Response: Adopted.**

**Action Taken:** USACE added additional information was included to support that project activities are not likely to adversely affect the California Red Legged Frog (CRLF) in Section 4.5.2.2 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #3: Analyze the impact of the California red-legged frog potentially moving through the project area temporarily or accidentally being washed down from upstream areas.

**USACE Response: Adopted.**

**Action Taken:** Additional information has been added to Section 4.5.2.2 about potential for California Red Legged Frog (CRLF) to move through the creek. Even if CRLF are present and washed downstream, they'll likely be eaten by predators or die due to lack of habitat.

Recommendation #4: Include mitigation measures to avoid or minimize the impacts if the California red-legged frog could be adversely affected (include examples of avoidance and minimization measures for California red-legged frog as found in the Santa Clara Valley Habitat Plan (ICF, 2012b)).

**USACE Response: Adopted.**

**Action Taken:** USACE will employ such avoidance measures as constructing the project in the dry season. Preconstruction surveys will be completed prior to work for listed species. These measures are described in the Section 5.13.2.4 of the report.

**12. Final Panel Comment 12 (Environmental) – *Medium Significance* – Several special-status species that have a potential to occur in the study area are not included in the description of threatened and endangered species.**

There are three recommendations as part of this comment, all of which were adopted, as discussed below.

Recommendation #1: Expand the list of special-status species evaluated beyond the CNDDDB and USFWS species list references and provide detailed methodology for how the list of special-status species was generated in Section 4.5.2 and Table 4-14.

**USACE Response: Adopted.**

**Action Taken:** The list of special-status species evaluated beyond the CNDDDB and USFWS species list references was expanded. Descriptions of suggested species were included in Section 4.5.2 and Table 4-14 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #2: Re-examine potential impacts from the project on each of these species. Consider if other special-status species would be adversely affected by project alternatives and include a description of how the project would affect these species.

**USACE Response: Adopted.**

**Action Taken:** Clarification of habitat within the project area and likelihood to be affected by the project was added to Section 5.5.3 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #3: Develop mitigation measures to reduce the severity, intensity, or duration of the impact to demonstrate how the impact would be avoided, minimized, or compensated in Section 5.5.3.6. Additional detail should be provided that clearly explains how the measures would mitigate for a specific impact.

**USACE Response: Adopted.**

**Action Taken:** Mitigation measures to survey and monitor for listed species were added to Section 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement.

13. **Final Panel Comment 13 (Environmental) – *Medium Significance* – The impact analysis does not identify the potential for invasive species to be introduced, spread, or perpetuated by the project as directed by Executive Order 11312: Invasive Species.**

There are three recommendations as part of this comment, all of which were adopted, as discussed below.

Recommendation #1: Describe any invasive species with potential to occur in the project area.

**USACE Response: Adopted.**

**Action Taken:** The report was revised to add invasive species with potential to occur in the project area as listed in the description of the project’s habitat reaches under the Vegetation and Wildlife subheading in Section 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #2: Describe the potential for the project to introduce invasive species into the project area.

**USACE Response: Adopted.**

**Action Taken:** Language on potential ways invasive species could be introduced to the site during construction in the analysis of each alternative was added to Section 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement.

Recommendation #3: Identify minimization measures or best management practices to prevent weed introduction and spread if the project has the potential to introduce, spread, or perpetuate invasive weeds.

**USACE Response: Adopted.**

**Action Taken:** The following mitigation measure was added to Section 5.5.3.6 of the General Reevaluation Report/Environmental Impact Statement. “All revegetated or disturbed areas would be monitored annually by the Corps for invasive, non-native plant species for five years following completion of construction, with the assistance of a qualified botanist. If invasive species are becoming established on areas disturbed by project activities during the five-year period, invasive species would be removed at times that preclude the plants from setting new seed.” **Final Panel Comment 14 (Cost Engineering) – *Medium Significance* – The basis for estimating lands, easements, rights-of-way, relocations, and disposal areas (LERRD) costs and annual operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs are not provided.**

There are five recommendations as part of this comment, all of which were adopted, as discussed below.

Recommendation #1: Provide the basis for developing the annual OMRR&R costs for each alternative.

**USACE Response: Adopted.**

**Action Taken:** OMRR&R costs were provided/developed by the sponsor; and have been verified by the USACE. Further explanation on O&M work beyond sediment removal was added to Appendix B, Part IV: Design and Cost Appendix.

Recommendation #2: Provide the basis for developing costs of anticipated maintenance after significant events (such as sediment removal) that is needed to maintain channel conveyance per design assumptions.

**USACE Response: Adopted.**

**Action Taken:** The local sponsor is responsible for maintenance. They provided costs based on actual, post-storm expenditures. Such costs range from \$5,000 for tree/debris removal to \$50,000 for erosion repairs. These were added to Appendix B, Part IV: Design and Cost Appendix.

Recommendation #3: Provide the basis for LERRD acquisition and administrative costs for each alternative.

**USACE Response: Adopted.**

**Action Taken:** The real estate acquisition costs were based on the number of parcels required for each alternative and appraised values. The administration costs are similarly based on the number of parcels for each alternative and a standard cost per parcel. The costs were revised in the report and Appendix E: Real Estate.

Recommendation #4: Ensure consistency between total annual economic cost for Alternative 2A/d in Tables 6-6, 6-8, and 6-9.

**USACE Response: Adopted.**

**Action Taken:** A consistency review was conducted between total annual economic cost for Alternative 2A/d in Table 6-6, 6-8, and 6-9. The equivalent tables were revised to be consistent with the revised Appendix C: Economics and Appendix B, Part IV: Design and Cost Appendix.

Recommendation #5: Ensure consistency between total costs for each alternative in Tables 8.1 and 8.3.

**USACE Response: Adopted.**

**Action Taken:** A consistency review was conducted between total costs for each alternative in Table 8-1 and 8-3. Tables 8-1 and 8-3 in the Appendix C: Economics were revised for consistency.

14. **Final Panel Comment 15 (Economics, Plan Formulation) – *Low Significance* – Certain socioeconomic data are inconsistent, dated, or not provided in the documents, which could lead to misinterpretation of study area conditions.**

There were six recommendations as part of this comment, all of which have been adopted, as described below.

Recommendation #1: Verify housing counts and occupancy rate for the six census tracts in the study area.

**USACE Response: Adopted.**

**Action Taken:** The housing occupancy rate for the six census tracts in the study area were verified for the final report.

Recommendation #2: Eliminate inconsistencies/conflicts between employment data sources and use most recent data available.

**USACE Response: Adopted.**

**Action Taken:** A single/consistent unemployment rate was used throughout the final report.

Recommendation #3: Revise column heading in Table 4-4 of GRR to eliminate confusion in the unemployment rate.

**USACE Response: Adopted.**

**Action Taken:** Table 4-4 of the General Reevaluation Report/Environmental Impact Statement column heading was revised for the final report to eliminate confusion in the unemployment rate.

Recommendation #4: Update socioeconomic data to the most recent data sources available.

**USACE Response: Adopted.**

**Action Taken:** Socioeconomic data was updated as needed for the final report.

Recommendation #5: Identify the population in the study area, in the various floodplains, and the population at risk in each reach under with- and without-project conditions.

**USACE Response: Adopted.**

**Action Taken:** Floodplain populations and population at risk in each reach under the with- and without-project conditions were updated as needed for the final report. These values will also be updated in the mandatory economic updates in the future.

Recommendation #6: Describe the impact of the 2008-2009 U.S. economic recession on the local and state economies, and its impact on the socioeconomic resources.

**USACE Response: Adopted.**

**Action Taken:** The impacts of the 2008-2009 U.S. economic recession on the local and state economies, and its impact on the socioeconomic resources, including employment, labor, and construction costs and housing values in the study were updated for the final report. The Silicon Valley has largely recovered from the recession.