Final Independent External Peer Review Report Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California

Prepared by
Battelle Memorial Institute

Prepared for
U.S. Army Corps of Engineers
Ecosystem Restoration Planning Center of Expertise
Mississippi Valley Division

Contract No. W912HQ-15-D-0001
Task Order: 0017

May 5, 2017

BATTELLE
It can be done

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Executive Summary

PROJECT BACKGROUND AND PURPOSE

The Malibu Creek is located approximately 30 miles west of downtown Los Angeles, California. Approximately two-thirds of the watershed is located in northwestern Los Angeles County and the remaining one-third is in southeastern Ventura County. The drainage area covers approximately 110 square miles of the Santa Monica Mountains and Simi Hills. Elevations in the watershed range from over 3,100 feet at Sandstone Peak in Ventura County to sea level at Santa Monica Bay.

Malibu Creek is an important regional corridor that links Santa Monica Bay, a National Estuary, Malibu Lagoon, one of the last two remaining estuaries in Los Angeles County, and riparian systems from the immediate coastal plain with interior plains and valleys of both the Department of Parks and Recreation (DPR) and the Santa Monica Mountains National Recreation Area (SMMNRA), administered by the National Park Service (NPS). As such, the watershed represents a unique opportunity for systemic and sustainable ecosystem restoration in highly urbanized southern California. The Malibu Creek watershed drains the Santa Monica Mountains in northern Los Angeles and southern Ventura Counties. A coastal watershed, it is the largest watershed in the Santa Monica Mountains, and encompasses some of the largest areas of protected open space left in southern California.

The watershed provides for a wealth of biological resources. The Santa Monica Mountains support a remarkably abundant wildlife community: over 450 vertebrate species, including 50 mammals, 384 species of birds, and 36 reptiles and amphibians. Additionally, Malibu Creek is critical habitat for the endangered steelhead trout (steelhead).

Malibu Creek is currently interrupted by Rindge Dam. This concrete dam has been filled with sediment since the 1950s, and effectively prevents the free movement of steelhead and other aquatic species from travelling up and down the stream. The dam has interrupted the natural sediment transport of Malibu Creek, and has altered the natural geomorphic, riparian, and aesthetic character of Malibu Creek. Approximately 780,000 cubic yards of sediment have accumulated behind the dam. Pools, riffles, and runs that historically supported steelhead and other fish still exist above the dam. Downstream reaches to the ocean have been starved of sediment and sands as a result of the dam. Thus, there is a need to reconnect the segmented aquatic and riparian corridor and to restore the natural hydrology and geomorphology of Malibu Creek.

The purpose of the project is removal of Rindge Dam and other upstream barriers as well as the accumulated sediment, beneficial reuse of suitable substrate for beach replenishment, and upland disposal of remaining debris.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California (hereinafter: Malibu Creek IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate this IEPR. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the Malibu Creek Ecosystem Restoration Study Draft Integrated Feasibility Report (IFR) with Environmental Impact Statement/Environmental Impact Report (EIS/EIR) Los Angeles and Ventura Counties, California and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: Civil Works planning/economics, environmental biology, civil/structural engineering, geology/geotechnical engineering, hydrology and hydraulic engineering, and coastal engineering. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. USACE was given the list of final candidates to confirm that they had no COIs, but Battelle made the final selection of the six-person Panel.

The Panel received electronic versions of the Malibu Creek decision documents (2,106 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2012) and OMB (2004), USACE prepared the charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference at the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the decision documents individually. The panel members then met via teleconference with Battelle to review key technical comments and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, nine Final Panel Comments were identified and documented. Of these, one was identified as having high significance, three were identified as having medium/high significance, three had medium significance, one had medium/low significance, and one had low significance.

Battelle received public comments from USACE on the Malibu Creek IFR (approximately 139 letters from the public, and 16 Agency letters, totaling more than 175 pages of comments) and provided them to the IEPR panel members. The panel members were charged with determining if any information or concerns

presented in the public comments raised any additional discipline-specific technical concerns with regard to Malibu Creek review documents. After completing its review, the Panel confirmed that no new issues or concerns were necessary to address in the Final Panel Comments.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Malibu Creek review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the IFR is thorough and well-organized in presenting the engineering, environmental, economic, and plan formulation issues. The IFR provides a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the project where additional analysis are warranted and sections of the IFR where clarification of project findings, assumptions, and objectives need to be documented or revised.

Civil Works Planning and Economics: From the Civil Works planning and economics perspective, the IFR is well-assembled and informative. The economic analysis is consistent with accepted USACE methodologies and the plan formulation process is presented well and follows prescribed USACE ecosystem restoration procedures, including a complete and thorough analysis of all reasonable alternatives. One particular concern, however, is that not all the land required for disposal of excavated material from the project site has been considered land, easements, rights-of-way, relocation, and disposal areas (LERRD) and assigned the responsibility of the Non-Federal Sponsor. Although it will not affect the total cost of the project, classifying Calabasas landfill as LERRD will significantly increase the non-Federal LERRD requirement and cost share credit. Of lesser concern, the Panel believes the project cost estimate does not clearly outline the infrastructure impacts on public roads from project truck traffic. The Panel suggests that a more comprehensive accounting of road repair be included in the final IFR.

Engineering: The engineering panel members commented that the IFR is very thorough and well-researched. The Panel was impressed with the effort that was made to determine the classification and quantity of sediment to be removed. Of primary concern from a civil and structural engineering standpoint is that the project assumptions have not factored constraints imposed by noise mitigation into the project cost estimate and schedule. Sediment removal is the likely project schedule critical path that leads to a project duration of 6 to 7 years. To meet noise mitigation requirements, the on-site restriction from using up to 16 trucks at one time to no more than two trucks at one time represents an approximately 80% decrease in truck availability allowed on site with an associated loss in productivity. Additionally, the Panel found three cases of cost estimate uncertainty in the IFR that may lead to uncertainty in project decisions: treatment of contingency, quantity take-off, and cost estimate precision. These undefined variations in project contingencies create uncertainty in the project cost estimates and project decisions. It is unclear whether the existing Appendix F allowance and contingencies include costs to meet these requirements. The Panel suggests that further analysis and rationale be added to the IFR to clarify these driving risk factors.

From a coastal engineering standpoint, the Panel does not understand whether sea level rise has been incorporated into the modeling used to create the 50-year forecasts of flood inundation. Without including the potential sea level rise, the flood inundation maps may under-predict the effects of a low annual

chance exceedance (ACE) event (0.5%, 0.2% ACE) under future conditions. The project would benefit from a rerun of the models used to create the 50-year flood inundation forecasting, applying USACE guidance of High, Intermediate, and Low Sea Level Rise Values.

Of lesser concern, the Panel noted that the decision to use a diamond wire saw for the majority of the dam demolition may prematurely restrict the consideration of other demolition methodologies. The assumptions cited in the IFR, Appendices C and F, indicate that a demolition methodology has been chosen and documented in the decision document. The Panel notes that the use of alternate demolition methodologies should not be limited during the feasibility phase of evaluation and could create a constraint on future design and construction phases of the project.

Environmental: Overall, the environmental analysis provides good background information, which is very useful in understanding the project area associated with Malibu Creek. However, the Monitoring and Adaptive Management program provides only minimal monitoring of the complex range of ecological changes that can be expected as the project progresses. The project would benefit from monitoring at a level detailed enough to assess progress in changing habitat conditions as outlined in the habitat evaluation section. The monitoring results could then be fed back into the habitat model for use in adaptive management. Additionally, the current monitoring plan may be insufficient and may not have enough funding to assess project performance in meeting objectives.

A second environmental concern noted by the Panel is the IFR does not describe in detail the limiting factors of the steelhead trout population. Passage is a major factor in the distribution of steelhead. However, it is unclear how viable the habitat in Malibu Creek is for steelhead in the longer term under the alternatives with current conditions and under climate change scenarios. If temperature, water quality, non-native species, or a combination of these factors limit steelhead abundance and distribution, the removal of the dam and measured habitat improvements may not necessarily result in major benefits for this sensitive population. The Panel suggests that a more detailed analysis of water quality and water temperature data in relation to steelhead, under existing conditions and under climate change scenarios, be conducted. Similarly, the Panel was concerned that the risks imposed by required mitigation for nesting birds have not been sufficiently addressed. Project delays due to bird nesting do not appear to have been factored into the project cost and schedule. The Panel suggests that further review and evaluation of the restrictions and mitigation requirements associated with bird nesting be conducted to determine if any deviation from current requirements might be allowable.

Table ES-1. Overview of Nine Final Panel Comments Identified by the Malibu Creek IEPR Panel

No.	Final Panel Comment
Significance – High	
1	The project assumptions in the IFR have not factored constraints imposed by noise mitigation into the project cost estimate and schedule.
Significance – Medium/High	
2	Without details associated with different ecological functional responses, it is unclear how the Monitoring and Adaptive Management Program will be able to function as the project progresses.
3	The project cost estimate and schedule do not sufficiently address the risks imposed by required mitigation for nesting birds.
4	The limiting factors of the steelhead trout population are not clearly outlined in the IFR to support the benefits of dam removal and habitat improvements.
Significance – Medium	
5	The treatment of contingency, quantity take-off, and cost estimate precision in the project cost estimates may lead to uncertainty in project decisions.
6	The land required for disposal of excavated material from the project site is considered LERRD and the responsibility of the Non-Federal Sponsor.
7	It is not clear whether sea level rise has been incorporated into the modeling used to create the 50-year forecasts of flood inundation.
Significance – Medium/Low	
8	The infrastructure impacts on public roads from project truck traffic are not clearly outlined in the IFR and project cost estimate.
Significance – Low	
9	The decision to use a diamond wire saw for the majority of the dam demolition may prematurely restrict the consideration of other demolition methodologies.

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LIST OF ACRONYMS

ACE	Annual Chance Exceedance
ADM	Agency Decision Milestone
ATR	Agency Technical Review
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
COI	Conflict of Interest
CWRB	Civil Works Review Board
DPR	Department of Parks and Recreation
DrChecks	Design Review and Checking System
EC	Engineer Circular
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
HEC-HMS	Hydraulic Engineering Center's Hydraulic Modeling System
HEC-RAS	Hydraulic Engineering Center's River Analysis System
HSDRRS	Hurricane and Storm Damage Risk Reduction System
IEPR	Independent External Peer Review
IFR	Integrated Feasibility Report
IWR	Institute for Water Resources
LERRD	Land, easements, rights-of-way, relocation, and disposal areas
LPP	Locally Preferred Plan
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
NPS	National Park Service
OEO	Outside Eligible Organization
O&M	Operations and Maintenance
OMB	Office of Management and Budget
PCX	Planning Center of Expertise
PDT	Project Delivery Team
PED	Preconstruction, Engineering, and Design
SAR	Safety Assurance Review
SLC	Sea Level Change
SMMNRA	Santa Monica Mountains National Recreation Area
SWPPP	Storm Water Pollution Prevention Plans
TAC	Technical Advisory Committee
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
wPHQ	Weighted Pool Habitat Quality

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1. INTRODUCTION

The Malibu Creek is located approximately 30 miles west of downtown Los Angeles, California. Approximately two-thirds of the watershed is located in northwestern Los Angeles County and the remaining one-third is in southeastern Ventura County. The drainage area covers approximately 110 square miles of the Santa Monica Mountains and Simi Hills. Elevations in the watershed range from over 3,100 feet at Sandstone Peak in Ventura County to sea level at Santa Monica Bay.

Malibu Creek is an important regional corridor that links Santa Monica Bay, a National Estuary, Malibu Lagoon, one of the last two remaining estuaries in Los Angeles County, and riparian systems from the immediate coastal plain with interior plains and valleys of both the Department of Parks and Recreation(DPR) and the Santa Monica Mountains National Recreation Area (SMMNRA), administered by the National Park Service (NPS). As such, the watershed represents a unique opportunity for systemic and sustainable ecosystem restoration in highly urbanized southern California.

The Malibu Creek watershed drains the Santa Monica Mountains in northern Los Angeles and southern Ventura Counties. A coastal watershed, it is the largest watershed in the Santa Monica Mountains, and encompasses some of the largest areas of protected open space left in southern California.

Over two-thirds of the watershed is currently undeveloped and the remaining one third, over 30 square miles, is protected as open space by state, Federal, and other agencies. It is projected to remain undeveloped through the life of the project. Another 40 square miles is projected to be developed with no more than one dwelling per 20 acres, with other areas unlikely to change, based on a combination of steep slopes, ridgelines, and coastal restrictions on development.

The watershed provides for a wealth of biological resources. The Santa Monica Mountains support a remarkably abundant wildlife community: over 450 vertebrate species, including 50 mammals, 384 species of birds, and 36 reptiles and amphibians. Additionally, Malibu Creek is critical habitat for the endangered steelhead trout (steelhead).

Malibu Creek is currently interrupted by Rindge Dam. This concrete dam has been filled with sediment since the 1950s, and effectively prevents the free movement of steelhead and other aquatic species from travelling up and down the stream. The dam has interrupted the natural sediment transport of Malibu Creek, and has altered the natural geomorphic, riparian, and aesthetic character of Malibu Creek. Approximately 780,000 cubic yards of sediment have accumulated behind the dam. Pools, riffles, and runs that historically supported steelhead and other fish still exist above the dam. Downstream reaches to the ocean have be starved of sediment and sands as a result of the dam. Thus, there is a need to reconnect the segmented aquatic and riparian corridor and to restore the natural hydrology and geomorphology of Malibu Creek.

The purpose of the project is removal of Rindge Dam and other upstream barriers as well as the accumulated sediment, beneficial reuse of suitable substrate for beach replenishment, and upland disposal of remaining debris.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California (hereinafter: Malibu Creek IEPR) in accordance with procedures described in the Department

of the Army, U.S. Army Corps of Engineers (USACE), Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the Malibu Creek Ecosystem Restoration Study Draft Integrated Feasibility Report (IFR) with Environmental Impact Statement/Environmental Impact Report (EIS/EIR) Los Angeles and Ventura Counties, California (Section 4). Appendix A describes in detail how the IEPR was planned and conducted, including the complete schedule followed in executing the IEPR. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to USACE in the final Work Plan according to the schedule listed in Table 1. Appendix D presents the organizational conflict of interest form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the Malibu Creek IEPR.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the Malibu Creek was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. Table 1 presents the major milestones and deliverables of the Malibu Creek IEPR. Due dates for milestones and deliverables are based on the award/effective date listed in Table 1. Note that the actions listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on July 7, 2017. The actual date for contract end will depend on the date that all activities for this IEPR, including Civil Works Review Board (CWRB) preparation and participation, are conducted and subsequently completed.

Table 1. Major Milestones and Deliverables of the Malibu Creek IEPR

Task	Action	Due Date
1	Award/Effective Date	3/3/2017
	Review documents available	3/6/2017
	Public comments available	4/19/2017
2	Battelle submits list of selected panel members	3/14/2017
	USACE confirms the panel members have no COI	3/16/2017
3	Battelle convenes kick-off meeting with USACE	3/9/2017
	Battelle convenes kick-off meeting with USACE and panel members	3/27/2017
4	Panel members complete their individual reviews	4/17/2017
	Battelle sends public comments to panel members for review	4/20/2017
	Panel confirms no additional Final Panel Comment is necessary with regard to the public comments	4/25/2017
	Panel members provide draft Final Panel Comments to Battelle	4/26/2017
5	Battelle submits Final IEPR Report to USACE	5/5/2017
6[a]	Battelle convenes Comment Response Teleconference with panel members and USACE	6/21/2017
	Battelle submits pdf printout of DrChecks project file to USACE	7/7/2017
	Agency Decision Milestone (ADM) meeting[b]	TBD
	CWRB Meeting (estimated date)[b]	TBD
	Contract End/Delivery Date	6/30/2018

[a] *Task 6 occurs after the submission of this report.*

[b] *The ADM and CWRB meetings were listed in the Performance Work Statement under Task 3 but were relocated in this schedule to reflect the chronological order of activities.*

Battelle identified, screened, and selected six panel members to participate in the IEPR based on their expertise in the following disciplines: Civil Works planning/economics, environmental biology, civil/structural engineering, geology/geotechnical engineering, hydrology and hydraulic engineering, coastal engineering. The Panel reviewed the Malibu Creek documents and produced nine Final Panel Comments in response to 38 charge questions provided by USACE for the review. This charge included two overview questions and one public comment question added by Battelle. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)

4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-214, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Malibu Creek review documents. The following summarizes the Panel's findings.

Based on the Panel's review, the Integrated Feasibility Report (IFR) is thorough and well-organized in presenting the engineering, environmental, economic, and plan formulation issues. The IFR provides a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the project where additional analysis are warranted and sections of the IFR where clarification of project findings, assumptions, and objectives need to be documented or revised.

Civil Works Planning and Economics: From the Civil Works planning and economics perspective, the IFR is well-assembled and informative. The economic analysis is consistent with accepted USACE methodologies and the plan formulation process is presented well and follows prescribed USACE ecosystem restoration procedures, including a complete and thorough analysis of all reasonable alternatives. One particular concern, however, is that not all the land required for disposal of excavated material from the project site has been considered land, easements, rights-of-way, relocation, and disposal areas (LERRD) and assigned the responsibility of the Non-Federal Sponsor. Although it will not affect the total cost of the project, classifying Calabasas landfill as LERRD will significantly increase the non-Federal LERRD requirement and cost share credit. Of lesser concern, the Panel believes the project cost estimate does not clearly outline the infrastructure impacts on public roads from project truck traffic. The Panel suggests that a more comprehensive road repair program be included in the final IFR.

Engineering: The engineering panel members commented that the IFR is very thorough and well-researched. The Panel was impressed with the effort that was made to determine the classification and quantity of sediment to be removed. Of primary concern from a civil and structural engineering standpoint is that the project assumptions have not factored constraints imposed by noise mitigation into the project cost estimate and schedule. Sediment removal is the likely project schedule critical path that leads to a project duration of 6 to 7 years. To meet noise mitigation requirements, the on-site restriction from using up to 16 trucks at one time to no more than two trucks at one time represents an approximately 80% decrease in truck availability allowed on site with an associated loss in productivity. Additionally, the Panel found three cases of cost estimate uncertainty in the IFR that may lead to uncertainty in project

decisions: treatment of contingency, quantity take-off, and cost estimate precision. These undefined variations in project contingencies create uncertainty in the project cost estimates and project decisions. It is unclear whether the existing Appendix F allowance and contingencies include costs to meet these requirements. The Panel suggests that further analysis and rationale be added to the IFR to clarify these driving risk factors.

From a coastal engineering standpoint, the Panel does not understand whether sea level rise has been incorporated into the modeling used to create the 50-year forecasts of flood inundation. Without including the potential sea level rise, the flood inundation maps may under-predict the effects of a low annual chance exceedance (ACE) event (0.5%, 0.2% ACE) under future conditions. The project would benefit from a rerun of the models used to create the 50-year flood inundation forecasting, applying USACE guidance of High, Intermediate, and Low Sea Level Rise Values.

Of lesser concern, the Panel noted that the decision to use a diamond wire saw for the majority of the dam demolition may prematurely restrict the consideration of other demolition methodologies. The assumptions cited in the IFR, Appendices C and F, indicate that a demolition methodology has been chosen and documented in the decision document. The Panel notes that the use of alternate demolition methodologies should not be limited during the feasibility phase of evaluation and could create a constraint on future design and construction phases of the project.

Environmental: Overall, the environmental analysis provides good background information, which is very useful in understanding the project area associated with Malibu Creek. However, the Monitoring and Adaptive Management program provides only minimal monitoring of the complex range of ecological changes that can be expected as the project progresses. The project would benefit from monitoring at a level detailed enough to assess progress in changing habitat conditions as outlined in the habitat evaluation section. The monitoring results could then be fed back into the habitat model for use in adaptive management. Additionally, the current monitoring plan may be insufficient and may not have enough funding to assess project performance in meeting objectives.

A second environmental concern noted by the Panel is the IFR does not describe in detail the limiting factors of the steelhead trout population. Passage is a major factor in the distribution of steelhead. However, it is unclear how viable the habitat in Malibu Creek is for steelhead in the longer term under the alternatives with current conditions and under climate change scenarios. If temperature, water quality, non-native species, or a combination of these factors limit steelhead abundance and distribution, the removal of the dam and measured habitat improvements may not necessarily result in major benefits for this sensitive population. The Panel suggests that a more detailed analysis of water quality and water temperature data in relation to steelhead, under existing conditions and under climate change scenarios, be conducted. Similarly, the Panel was concerned that the risks imposed by required mitigation for nesting birds have not been sufficiently addressed. Project delays due to bird nesting do not appear to have been factored into the project cost and schedule. The Panel suggests that further review and evaluation of the restrictions and mitigation requirements associated with bird nesting be conducted to determine if any deviation from current requirements might be allowable.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

The project assumptions in the IFR have not factored constraints imposed by noise mitigation into the project cost estimate and schedule.

Basis for Comment

It is not apparent from the IFR or Appendix F that a constraint on productivity due to noise mitigation or the risk to productivity has been factored into the project cost and schedule. IFR, Section 4.4.2 (p. 224) and Appendix C, Section 4.1, Figure 4.1.3 (p. c-20) cite truck traffic of up to 16 trucks/hour leaving the project site.

Sediment removal is the likely project schedule critical path that leads to a project duration of 6 to 7 years. This critical path assumption is based on local ordinances limiting truck haul hours, steep haul roads, and a truck loading cycle time of 15 minutes, as noted in IFR, Section 4.4.2, and appendices.

IFR, Section 5.11.3 (p. 423), notes that mitigation measure titled 'Noise-2:-Heavy Equipment Operation' places a limit …"that no more than two haul trucks are at the site at one time and for the sediment hauling option, trucks would be scheduled so that one truck is entering the site immediately after another truck has just left. Bulldozer work would be scheduled so that no more than two bull dozers are operating at a time."

To meet noise mitigation requirements, the on-site restriction from using up to 16 trucks at one time to no more than two trucks at one time represents an approximately 80% decrease in truck availability allowed on site with an associated loss in productivity. Non-truck construction equipment such as cranes, loaders, breakers, and excavators is apparently considered 'bull dozers' in the citation above. Therefore the aggregate of all non-truck equipment would be limited to two pieces of equipment in operation at one time. Since hauling material will be concurrent with dam demolition, and since only four pieces of equipment (two trucks plus two bull dozers) are able to run at one time due to noise mitigation, the total reduction in overall single shift productivity will be larger than that for truck traffic alone.

Finally, the IFR does not address noise from diesel-powered project trucks using 'engine brakes,' also commonly referred to as 'jake brakes.' Unmuffled engine brake noise, especially on the 15% downgrade into the project, will likely have very serious noise impacts.

Significance – High

The project cost estimate and schedule may be understated because noise mitigation constraints have not been included.

Recommendation for Resolution

1. Review and evaluate noise mitigation requirements to determine if any deviation might be allowable from current requirements.
   a. If deviation is allowable, modify text in the IFR regarding noise mitigation and modify cost estimates in accordance with revised noise mitigation requirements.
   b. If no deviation is allowable, leave text in the IFR regarding noise mitigation unmodified and modify cost estimates in accordance with original noise mitigation requirements.
2. Review and evaluate the project alternative decision process to determine if the revised cost and schedule information affects the selection of the tentatively selected plan (TSP) and the locally preferred plan (LPP).

3. Review and revise as necessary the cost and study Risk Registers to reflect the risk introduced by noise mitigation requirements.
4. Update the IFR to include a prohibition on the use of unmuffled engine brakes both on and off road.

Final Panel Comment 2

Without details associated with different ecological functional responses, it is unclear how the Monitoring and Adaptive Management Program will be able to function as the project progresses.

Basis for Comment

The Monitoring and Adaptive Management program provides only minimal monitoring of the complex range of ecological changes that can be expected as the project progresses. A wide range of responses can be expected for native fish (including steelhead), non-native fish, aquatic invertebrates, riparian species composition, and nearshore species such as benthic fauna and surfgrass. However, the monitoring described in the Integrated Feasibility Report (IFR) will not be able to detect anticipated changes in the diverse biota. IFR, Section 3.4.3 (p. I-9), for example, does not include anything on sampling fish and invertebrate biota, and provides no details of sampling or interpreting changes in benthic fauna or surfgrass associated with sedimentation, or any indication if they are to be monitored.

The proposed habitat sampling is not likely to be a clear indicator of change in the aquatic community compared to direct sampling of fish and other aquatic life. For example, the assumption is that monitoring changes in Malibu Creek habitat of steelhead, a listed species, will directly result in more steelhead and an expansion of their range. Such an anticipated direct benefit to steelhead may occur if other potential factors, such as temperature, water quality, or non-native species, do not impede it.

Steelhead population expansion and ecological changes, including shifts in species composition, would be more effectively monitored with actual fish sampling via electrofishing or trapping of resident and migratory species, and through sampling of stream invertebrate biota. Nothing is known of how steelhead use estuary and nearshore habitats beyond Malibu Creek, or how those habitats may limit recovery. The coarse-grained monitoring method proposed indirectly captures the ecological/habitat requirements of steelhead, and will not be adequate in detail or approach for assessing benefits to and response of steelhead. The cost estimate for monitoring this complex, and in some ways, unique, project does not seem adequate for effective monitoring of the listed species.

The ability to use adaptive management productively would also be greatly enhanced with a more rigorous monitoring program. If the seasonal monitoring of temperature includes daily thermographs before and after, as the project proceeds, it may provide some indications of changes in thermal suitability for steelhead. A more rigorous and focused aquatic monitoring program would be much more useful for adaptive management in future years under projected climate change scenarios.

At a minimum, the project would benefit from monitoring at a level detailed enough to assess progress in changing habitat conditions as outlined in the habitat evaluation section Appendix I, Section 3.3, (p. j-19). The monitoring results could then be fed back into the habitat model for use in adaptive management. For example, the aquatic portion:

Aquatic Habitat Value Score = (A+B+C+D)/4

where: A = Habitat value
B = Steelhead use
C = Steelhead connectivity
D = Aquatic connectivity

considers not only habitat, but also actual steelhead use and connectivity. This approach implies that in assessing progress, actual use, as well as documented connectivity by season and year, should be

evaluated explicitly. Based on the available monitoring and adaptive management document (Appendix I), it does not appear that this sort of sampling is proposed. These two sections of the plan (Appendices I and J) need to be more directly and explicitly linked as part of the adaptive management approach.

The proposed monitoring plans lack critical study design and timeframe details associated with different ecological functional responses. Table 3.6-1 (p. I-11) outlines the general types of monitoring activities to be undertaken over a five-year period. Some indicators of ecological function may be useful and detectable in one year, some after 3 or 5 years, and some others, not to be included in this monitoring program, probably not for 10 to 20 years or longer. A five-year plan, however, should be adequate to assess progress. The monitoring outlined, however, is not adequate to capture the variable timeframes associated with different ecological functional responses. It would be useful for the proposed monitoring activities and the methods to accomplish them (beyond just “qualitative” and “quantitative”) to be more thoroughly broken out into reasonable timeframes for expected responses.

Significance – Medium/High

The Monitoring and Adaptive Management Program in the IFR lacks a robust monitoring plan and may not be funded sufficiently to assess project performance in meeting objectives and addressing important uncertainties.

Recommendation for Resolution

1. Develop a monitoring program at a level sufficient to assess progress in detecting changing habitat conditions over a five-year period as they relate to key species occupying riverine, riparian, and estuarine habitats. Quantitative metrics are preferred.
2. For steelhead, a listed species, develop a monitoring program that considers ecological requirements of steelhead and quantitatively monitors the species and habitat conditions before and after dam removal.
3. Develop a monitoring program for surf grass and nearshore benthic fauna to assess impacts of sediment; use adaptive management as the program proceeds.
4. Use changing habitat metrics to assess progress in an adaptive management approach.

Final Panel Comment 3

The project cost estimate and schedule do not sufficiently address the risks imposed by required mitigation for nesting birds.

Basis for Comment

The construction season is April to October, as identified in IFR Section 4.4.2, Appendix F Section 2.7, and other locations in the review documents. The bird nesting season is February 1 to August 15. IFR Section 5.4.4, Mitigation labeled BIO-5, limits vegetation removal to outside the nesting season or to August 15 to October 31.

Alternatively, BIO-5 provides for clearing vegetation during the nesting season, but only if an appropriate buffer is provided to avoid impacts on nesting birds. Appendix P, Coordination Act Report (p. 39) defines this appropriate buffer as a 300-foot zone to protect any identified nest. The species of bird to be protected is not specified. As written, the 300-foot diameter buffer applies to any bird nest.

The review documents do not address whether the buffer requirement also applies to bird nests outside of, but within 300 feet of, the vegetation clearance zone. For example, a bird nest 50 feet from the edge of the cleared zone might require a 250-foot enclave into the proposed cleared zone to protect the nest.

With a construction zone/clearing zone of 250 feet by 2500 feet (nominal dimensions taken from Appendix C, Table 3.5-1, p. C-13), a single nest could require dedicating more than 45% of the construction zone to an uncleared buffer until August 15. Depending on the amount of overwinter re-vegetation and habitat of ground nesting birds, this restriction could exist each season.

Appendix F, Risk Register item PS-12, acknowledges the possibility of contractor delay due to bird nesting, but describes the risk as marginal. However, it is not clear whether this constraint on productivity, or risk to productivity, has been factored into the project cost and schedule in either the IFR or Appendix F.

Significance – Medium/High

Project delays due to bird nesting do not appear to have been factored into the project cost and schedule.

Recommendation for Resolution

1. Clarify the requirement in Appendix P, Coordination Act Report, which bird species must have a 300-foot buffer.
2. Review and evaluate restrictions and mitigation requirements associated with bird nesting to determine if any deviation from current requirements might be allowable.
   a. If deviation is allowable, modify text regarding bird nesting mitigation in the IFR Appendix P and modify cost estimate risk evaluations in accordance with revised impact mitigation requirements.
   b. If no deviation is allowable; leave text regarding bird nesting mitigation unmodified in the IFR Appendix P and modify cost estimate risk evaluations in accordance with the original bird nest buffer mitigation requirements.
3. Review and evaluate the project alternative decision process to determine if the revised cost and schedule information affects the TSP and LPP decisions.
4. Review and update Risk Registers for the risk introduced by bird nesting mitigation requirements.

5. Clarify construction impacts and buffer regarding bird nests near the cleared zone but not in the cleared zone.
6. Clarify the definition of impacts, including if equipment proximity, vibration, lighting, and noise are considered impacts to nesting birds.

Final Panel Comment 4

The limiting factors of the steelhead trout population are not clearly outlined in the IFR to support the benefits of dam removal and habitat improvements.

Basis for Comment

Passage is a major factor in the distribution of steelhead. However, it is unclear how viable the habitat in Malibu Creek is for steelhead in the longer term under the alternatives with current conditions and under climate change scenarios. It is also unclear from the data presented in the IFR whether this southerly steelhead stock is strongly temperature-limited in some or all years, or not limited in that way.

The aquatic habitat model quasi-quantifies changes in habitat quality, and thereby ecological benefits, primarily to steelhead, by reach, under the alternatives. Although the model is used appropriately, capturing possible or probable ecological changes, it is unclear whether it captures the expected benefits to steelhead.

For example, the aquatic habitat was evaluated based on the best professional judgment of project staff and Technical Advisory Committee (TAC) members and considerable data points previously collected, i.e., weighted Pool Habitat Quality (wPHQ) ratings from Abramson and Grimmer (2005) as provided in Appendix J4. There do not seem to be any recent detailed field evaluations of steelhead in Malibu Creek, especially on the primary factors limiting the species annually. A wide array of factors could be implicated: inadequate passage, competition from other native and non-native species, physical habitat conditions such as water quality, water quantity, water temperature, and survival in the estuary and nearshore areas. This lack of detail on the limiting factors is compounded by the even weighting of the Habitat Value.

In the Habitat Value A, the list of factors leading to a quasi-quantified metric does not explicitly give temperature as a factor. The steelhead may benefit from the proximity of the stream to cooler coastal waters and from the steep topography through which it flows. Shapovalov and Taft (1954), for example, provided temperature data which showed that temperature was not a serious limiting issue for steelhead in Waddell Creek, California at the time of their study. However, many salmonid models use thermal variables as potential limiting factors, so more detailed data and interpretation would be beneficial. Barnhart (1986) profiled steelhead life history and concluded that “a productive steelhead stream should have summer temperatures in the range of 10 to 15° and an upper limit of 20° C.” Bell (1973) estimated the upper lethal limit as 23.9°C. Warmer conditions can lead to stress and exacerbate negative interactions with other native and non-native species better adapted to warmer waters. IFR Table 3.3-3 (p. 89), Average Monthly Water Temperature for Project Vicinity (°F), provides means, but not a clear indication of how warm the systems become each year, or how many days above 20°C occur by site and year. These factors can greatly influence suitability of habitat for steelhead. Current conditions, those after a few years, and those projected under future climate change and riparian changes should all be considered. It is possible that even if other aspects of habitat are adequate as estimated by the model, thermal issues may limit habitat suitability by season and area. The TAC members may have a clear understanding of whether temperature is a factor; however, it was not clear to the Panel.

Similarly, water quality concerns identified in the IFR may preclude meeting objectives for steelhead in Malibu Creek. Water quality information is not linked to requirements for steelhead, and it is unclear if water quality is a limiting factor for steelhead anywhere in the system.

Significance – Medium/High

If temperature, water quality, non-native species, or a combination of these factors limit steelhead abundance and distribution, the removal of the dam and measured habitat improvements may not necessarily result in major benefits for this sensitive population.

Recommendation for Resolution

1. Collect water quality and water temperature data in relation to steelhead, under existing conditions and under climate change scenarios, and summarize findings in either a table or short narrative in the IFR.
2. Conduct further field analysis of non-native species and their role in limiting steelhead recovery.

Literature Cited:

Barnhart, R.A. (1986). Steelhead. Species Profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest). U. S. Fish and Wildlife Service, Biological Report 82(11.60). Washington, D. C.

Bell, M.C. (1973). Fisheries Handbook of Engineering Requirements and Biological Criteria. U. S. Army Corps of Engineers, Contract DACW 57-68-C-0086. Portland, Oregon

Shapovalov, L., and Taft, A.C. (1954). The Life Histories of the Steelhead Rainbow Trout (*Salmo gairdneri gairdneri*) and Silver Salmon (*Oncorhynchus kisutch*) with Special Reference to Waddell Creek, California and Recommendations Regarding Their Management. California Department of Fish and Game. Fish Bulletin 98. Sacramento. May 1. Available online at: http://escholarship.org/uc/item/2v45f61k.

Final Panel Comment 5

The treatment of contingency, quantity take-off, and cost estimate precision in the project cost estimates may lead to uncertainty in project decisions.

Basis for Comment

The Panel found three cases of cost estimate uncertainty in the review documents that may lead to uncertainty in project decisions:

- Appendix F Cost Engineering uses a different contingency percentage for the same item of work in the different project alternatives. It is not apparent which risk factors distinguish the different levels of contingency for the same work line items among the alternatives. This treatment of contingency leads to increased uncertainty in the project decision. For example:
  - Rindge Dam - Arc Demolition
    - Variations on alternative #2 lists a contingency of 24%.
    - Variations on alternative #3 with same approximate cost lists a contingency of 45%
    - Variations on alternative #4 with same approximate cost lists a contingency of 41%
  - Malibu Canyon Road Repair
    - Variations on alternative #2 lists a contingency of 24%.
    - Variations on alternative #3 with same approximate cost lists a contingency of 45%
    - Variations on alternative #4 with same approximate cost lists a contingency of 41%
- Several locations in Appendix F Risk Registers including Risk Elements numbered PS-5, PS-6, PS-7, AS-5, CE-5, T-1, T-2, T-3, T-4, EST-1, EST-2, EST-3, EST-4 and others (no page numbers on these appendix sheets) state that the quantities estimated were 'conservative' without defining in what manner they were conservative. Normal and ordinary quantity take off's during the project feasibility phase can be captured in either a conservative quantity estimate or in contingency. If the quantity take off is captured as both a conservative quantity estimate and in the line-item contingency, there is concern that the quantity estimate could have been unwittingly double counted. This treatment of contingency may lead to increased uncertainty in the project decision.
- The numeric values in Appendix F do not appear to follow convention for calculation using significant figures associated with underlying estimated values. As a result, the project cost estimates imply a greater precision than can demonstrated. When adjusted for a consistent level of precision and significant figures, the difference among alternatives may have to be reconsidered.

Based on the Panel's review of the Public Comments, several public agencies are requesting additional analyses and field investigations. It is unclear whether the existing Appendix F allowance and contingencies include costs to meet these requirements.

Significance – Medium

Undefined variations in project contingencies create uncertainty in the project cost estimates and project decisions.

Recommendation for Resolution

1. Appendix F should distinguish the driving risk factors and provide a brief rationale in the establishment of contingency percentages when line item contingencies are different among different project alternatives for line items where the line item work is essentially the same. Upon clarification, adjust line item contingency and overall contingency for each project alternative as appropriate.
2. Clarify the simultaneous use of conservative quantity take-off and contingency in cost estimates.
    a. Indicate the qualitative and quantitative impact of including a conservative estimate vs. an unbiased estimate.
    b. Indicate how conservative estimates were treated in the calculation of contingency as compared to normal or unconservative estimates.
    c. Indicate if and how conservative estimates might have impacted the decision process.
    d. Indicate if and how conservative estimates might have impacted the cost estimate.
    e. Upon clarification, adjust the report text or line item contingency to clarify the manner in which uncertainty was included in the project.
3. Add discussion to the IFR and Appendix F to explain how calculations reflect the underlying detailed estimate (or lack of detailed estimate). Indicate where professional judgment was used to adjust calculated values to better approximate results had significant figures been used in the calculations. Upon clarification, adjust the IFR as appropriate.
4. Clarify the status of the analyses and field investigations being requested/required by public agencies (through public comments), and, as appropriate, adjust the allowance and contingencies provided in Appendix F.

Final Panel Comment 6

The land required for disposal of excavated material from the project site is considered LERRD and the responsibility of the Non-Federal Sponsor.

Basis for Comment

The IFR Appendix G (p. G-12) designates all disposal areas except Calabasas landfill as land, easements, rights-of-way, relocation, and disposal areas (LERRD). From its description in the IFR, the Calabasas landfill is being used as LERRD. As a result, this will make Calabasas the responsibility of the Non-Federal Sponsor.

According to Engineer Regulation 1105-2-100 (USACE 2000, p. E-150), the Non-Federal Sponsor shall provide 100 percent of LERRD. The value of LERRD shall be included in the Non-Federal Sponsor's 35 percent share. Where the LERRD exceeds the Non-Federal Sponsor's 35 percent share, the sponsor will be reimbursed for the value of LERRD that exceeds their 35 percent share.

Based on the costs presented in Appendix F, Section 2.5, disposal fees account for 70% of the total cost of sediment removal. With the suggested designation of Calabasas as LERRD, some of these costs will shift to the Non-Federal Sponsor.

Significance – Medium

Although it will not affect the cost of the project, classifying Calabasas landfill as LERRD will significantly increase the non-Federal LERRD requirement and cost share credit.

Recommendation for Resolution

1. Modify the IFR and appendices to identity all disposal sites, including Calabasas, as LERRD.
2. Modify cost sharing portions of the IFR to reflect any changes to the cost share accounting.

Literature Cited:

USACE (2000). Planning: Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100). Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22, 2000.

Final Panel Comment 7

It is not clear whether sea level rise has been incorporated into the modeling used to create the 50-year forecasts of flood inundation.

Basis for Comment

IFR Appendix B presents flood inundation maps for 50 years into the future for with- and without-project conditions (see Plates 16.2-5, 16.3-2, etc.). It is unclear whether the effects of sea level rise have been included in the models used to produce these maps. Engineer Regulation 1100-2-8162 (USACE 2013) provides guidance for incorporating sea level change in USACE coastal projects, noting on page 1 that "Potential relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence." Section 6c of ER 1100-2-8162 (p. 2) states that "Alternatives should be evaluated using "low," "intermediate," and "high" rates of future SLC [sea level change] for both "with" and "without" project conditions."

Without including the potential sea level rise, the flood inundation maps may under-predict the effects of a low annual chance exceedance (ACE) event (0.5%, 0.2% ACE) under future conditions. As these models are used to evaluate the increased flooding risk and were the basis for the inclusion of floodwalls into Alternative 3, the models should also include sea level rise effects when doing 50-year forecasts.

Significance – Medium

Without including the effects of sea level rise, flood extents may be under-predicted and flood risks understated in the 50-year forecasts.

Recommendation for Resolution

1. Rerun the models used to create the 50-year flood inundation forecasting with the USACE High, Intermediate, and Low Sea Level Rise Values included and discuss the results.

Literature Cited:

USACE (2013). Incorporating Sea Level Change in Civil Works Programs. Engineer Regulation (ER) 1100-2-8162. Department of the Army. U.S. Army Corps of Engineers, Washington, DC. December 31.

Final Panel Comment 8

The infrastructure impacts on public roads from project truck traffic are not clearly outlined in the IFR and project cost estimate.

Basis for Comment

IFR Appendix F, Section 2.4.10 (p. F-14), addresses repair to public roads from wear and tear caused by project truck traffic, indicating full road replacement for 0.5 miles at the intersection of the public roads with project haul roads at the end of construction. The project cost estimate appears to be based on this 0.5 mile road replacement.

However, other locations in the report make qualitative statements regarding a post-construction repair of greater extent:

- Appendix C, Section 6.4 (p. C-49), states that “even though the proposed routes are over roads designed for regular truck traffic, some road repair would be necessary when the project is complete due to the large amount of truck traffic wear generated by the project.”
- Appendix F, Section 2.4.6 (p. F-13) states “The contractor will be required to make appropriate repairs to the Malibu Canyon Road to allow for normal use after construction.”
- Appendix F, Risk Register item PS-12 (no page number in document), acknowledges the possibility of requiring additional road repair throughout the project duration including possible interim repairs of pot holes and damages, but describes the risk as ‘marginal.’

The IFR and appendices seem to recognize a greater project impact than is shown in the project cost estimate. In addition, the project cost estimate assumptions do not include:

- Repair of the portion of Malibu Canyon Road the rest of the way to the landfill beyond the 0.5 miles included in the estimate
- Repairs to the haul route to Ventura Harbor under the locally preferred plan (LPP)
- Repair of the Malibu Harbor parking lot
- Both the National Ecosystem Restoration (NER) and LPP roads will endure 7 to 8 construction seasons of project use with a winter wet season between each construction season. The wet season will very likely exacerbate road potholes and other road failure conditions. Actual road repair might require 6 to 7 intermediate repairs (after each season) with one final repair.

The Panel notes that local governments often seek to have the project pay to restore public roads to their pre-project condition when the project subjects the road to frequent heavy loads. Even when the road does not appear to be damaged, local governments very often claim reduced life cycle for the roads. The Los Angeles Department of Public Works submitted a public comment on the IFR requesting a road repair mitigation plan. This supports the Panel’s observation that a road repair program more comprehensive than presented in the review document may be required.

Significance – Medium/Low

The impact on and repair of public roads is understated in the IFR and project cost estimate.

Recommendation for Resolution

1. Add a more comprehensive and coordinated description in the IFR and Appendix F of projected damages to public roads and anticipated seasonal end-of-project repairs.
2. Review post-construction reports or lessons learned on road repair from completed USACE projects where public roads received significant project traffic.
3. Review and revise as necessary the Appendix F Risk Register to reflect the risk (currently rated as marginal) associated with the outcome of the comprehensive description of projected damages above.
4. Review and revise as necessary the Appendix F cost estimates to reflect the cost associated with Recommendation 1.

Final Panel Comment 9

The decision to use a diamond wire saw for the majority of the dam demolition may prematurely restrict the consideration of other demolition methodologies.

Basis for Comment

The use of a diamond wire saw for demolition of the dam arch is widely described in IFR Appendices C and F. While this analysis considers in some detail the use of diamond wire saw methodology, other key constraints do not appear to have been considered:

- Each arc demolition season calls for the mobilization of a crane with a 20-ton capacity at the radius of the required lift to the site. Each mobilization would include transport down 15% grades and transportation of weights for use in a test lift. This mobilization cost may not be captured in typical mobilization cost profiles and is not mentioned in the review documents.
- Each block will require lifting points for the crane to lift the block off the structure and onto the truck. Slings would be an easy solution, except to safely get a sling under the block would be a significant problem. The contractor will likely have to provide calculated lifting points anchored into the block to both lift and balance the load. This cost and schedule risk is not identified in the review documents.
- Unloading the block at the landfill is left unresolved in the IFR. Depending on the type of truck, unloading the block might require another crane or large forklift. This cost and schedule risk is not mentioned in the review documents. (Note that the review documents do include the cost for the block to be broken up and separating out the steel.)
- Saw cutting may include more, not less, water quality issues than currently noted. For example, the cutting slurry must be contained, controlled, and treated through Storm Water Pollution Prevention Plans (SWPPP). The capture of this slurry down the face of the dam to the stream bed below and transport back to the contractor's SWPPP facility may prove especially challenging. This cost and the schedule risk is not addressed in the review documents.

The assumptions cited in the IFR, Appendices C and F, indicate that a demolition methodology has been chosen and documented in the decision document. While the review documents do propose the use of other demolition methodologies along with the diamond wire saw, the decision to predominately use the wire saw limits further evaluation during the design phase that should consider the most efficient and effective demolition methodologies and their respective constraints. The use of alternate demolition methodologies should not be limited during the feasibility phase of evaluation.

The project cost and schedule will best benefit when, to the extent practicable, the means and methods of construction are left to the contractor and the competitive bidding process.

Significance – Low

This issue may be a pre-decisional constraint on future design and construction phases of the project.

Recommendation for Resolution

1. Add a short narrative in the IFR, Appendices C and F, that indicates the use of diamond wire saw for demolition of the dam arch is provided to demonstrate technical feasibility and for costing

purposes, but whose use will be further refined during Preconstruction Engineering and Design (PED).

2. Verify that the diamond wire saw cost analysis includes allowances for crane mobilization, calculation of lifting points, and water quality control measures.

5. REFERENCES

Barnhart, R. A. (1986). Steelhead. Species Profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest). U. S. Fish and Wildlife Service, Biological Report 82(11.60). Washington, D. C.

Bell, M. C. 1973. Fisheries handbook of engineering requirements and biological criteria. U. S. Army Corps of Engineers, Contract DACW 57-68-C-0086. Portland, Oregon

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

Shapovalov, L. and A. C. Taft (1954). The life histories of the steelhead rainbow trout (Salmo gairdneri gairdneri) and silver salmon (Oncorhynchus kisutch) with special reference to Waddell Creek, California and recommendations regarding their management, California Department of Fish and Game fish Bulletin 98. SacramentoOMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

USACE (2013). Incorporating Sea Level Change in Civil Works Programs. Engineer Regulation (ER) 1100-2-8162. Department of the Army. U.S. Army Corps of Engineers, Washington, DC. December 31.

USACE (2012). Water Resources Policies and Authorities: Civil Works Review. Engineer Circular (EC) 1165-2-214. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. December 15.

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22, 2000.

APPENDIX A

IEPR Process for the Malibu Creek Project

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the schedule followed in executing the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California (hereinafter: Malibu Creek IEPR). Due dates for milestones and deliverables are based on the award/effective date listed in Table A-1. The review documents were provided by U.S. Army Corps of Engineers (USACE) on March 6, 2017. Note that the actions listed under Task 6 occur after the submission of this report and are described in more detail at the end of this Appendix.

Table A-1. Malibu Creek Complete IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date	3/3/2017
	Review documents available	3/6/2017
	Public comments available	4/19/2017
	Battelle submits draft Work Plan[a]	3/10/2017
	USACE provides comments on draft Work Plan	3/28/2017
	Battelle submits final Work Plan[a]	3/31/2017
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	3/8/2017
	USACE provides comments on COI questionnaire	3/9/2017
	Battelle submits list of selected panel members[a]	3/14/2017
	USACE confirms the panel members have no COI	3/16/2017
	Battelle completes subcontracts for panel members	3/20/2017
3	Battelle convenes kick-off meeting with USACE	3/9/2017
	Battelle sends review documents to panel members	3/21/2017
	Battelle convenes kick-off meeting with panel members	3/22/2017
	Battelle convenes kick-off meeting with USACE and panel members	3/27/2017
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	4/10/2017
4	Panel members complete their individual reviews	4/17/2017
	Battelle provides talking points for Panel Review Teleconference to panel members	4/18/2017
	Battelle convenes Panel Review Teleconference	4/19/2017
	Battelle provides Final Panel Comment templates and instructions to panel members; Battelle sends public comments to panel members for review	4/20/2017
	Panel confirms no additional Final Panel Comment is necessary with regard to the public comments	4/25/2017

Table A-1. Malibu Creek Complete IEPR Schedule (continued)

4	Panel members provide draft Final Panel Comments to Battelle	4/26/2017
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	4/27/2017 - 5/2/2017
	Panel finalizes Final Panel Comments	5/3/2017
5	Battelle provides Final IEPR Report to panel members for review	5/4/2017
	Panel members provide comments on Final IEPR Report	5/5/2017
	Battelle submits Final IEPR Report to USACE[a]	5/8/2017
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	5/15/2017
6[b]	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	5/17/2017
	Battelle convenes teleconference with USACE to review the Comment Response process	5/17/2017
	Battelle convenes teleconference with Panel to review the Comment Response process	5/17/2017
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	6/5/2017
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	6/9/2017
	USACE PCX provides draft PDT Evaluator Responses to Battelle	6/12/2017
	Panel members provide draft BackCheck Responses to Battelle	6/14/2017
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	6/19/2017
	Battelle convenes Comment Response Teleconference with panel members and USACE	6/20/2017
	USACE inputs final PDT Evaluator Responses to DrChecks	6/21/2017
	Battelle provides final PDT Evaluator Responses to panel members	6/28/2017
	Panel members provide final BackCheck Responses to Battelle	6/30/2017
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	7/6/2017
	Battelle submits pdf printout of DrChecks project file[a]	7/7/2017
	Agency Decision Milestone (ADM) meeting[c]	TBD
	CWRB meeting (estimated date)[c]	TBD
	Contract End/Delivery Date	6/30/2018

[a] *Deliverable.*

[b] *Task 6 occurs after the submission of this report.*

[c] *The ADM and CWRB meetings were listed in the Performance Work Statement under Task 3 but were relocated in this schedule to reflect the chronological order of activities.*

At the beginning of the Period of Performance for the Malibu Creek IEPR, Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., terminology to use, access to DrChecks, etc.). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 38 charge questions provided by USACE, two overview questions and one public comment question added by Battelle (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and after their subcontracts were finalized, all the members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the review documents and reference/supplemental materials listed in Table A-2 below.

Table A-2. Documents to Be Reviewed and Provided as Reference/Supplemental Information

Review Documents	No. of Pages
Malibu Creek Ecosystem Restoration Draft Feasibility Study and EIS	570
Appendix A: Agency Coordination and Public Involvement	122
Appendix B: Hydrology and Hydraulics	166
Appendix C: Civil and Structural	128
Appendix D: Geotechnical Engineering	146
Appendix E: Economic	34
Appendix F: Cost Engineering	76
Appendix G: Real Estate	52
Appendix H: 404(b)(1) Evaluation	36
Appendix I: Monitoring and Adaptive Management	20
Appendix J: Habitat Evaluation	160
Appendix K: Cultural Resources *(Confidential, available upon request)*	4
Appendix L: Air Quality Analysis	278
Appendix M: Noise Analysis	18
Appendix N: Traffic Analysis	206
Appendix O: Coastal Engineering	34
Appendix P: Coordination Act Report	50
Appendix Q: Distribution List	6
Report total number of pages to be reviewed	**2,106**

Review Documents	No. of Pages
Public Comments[a]	*50*
Risk Register[b]	*5*

[a] *USACE will submit public comments to Battelle upon their availability according to the schedule in Table A-1, who will in turn submit the comments to the IEPR Panel for review. A separate Addendum to the Final Report will be submitted if additional Final Panel Comments are necessary.*
[b] *Supporting documentation only.*

In addition to the materials provided in Table A-2, the panel members were provided the following USACE guidance documents.

- USACE guidance, *Civil Works Review* (EC 1165-2-214), December 15, 2012
- Office of Management and Budget, *Final Information Quality Bulletin for Peer Review,* December 16, 2004.

Near the end of the review, a teleconference was held with USACE, Battelle, and the Panel so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted 11 panel member questions to USACE. USACE was able to provide responses to most of the questions during the teleconference, and followed up with an email providing a written responses to the remaining questions prior to the end of the review.

In addition, USACE provided the following documents in response to the mid-review teleconference questions and discussion. These documents were provided to Battelle and then sent to the Panel as additional information only and were not part of the official review:

- Figure 2 Barrier Locations in the Malibu Creek Watershed
- Figure 1.10-2 Malibu Shoreline Habitat Characterization
- Malibu-Los Angeles County Coastline Reconnaissance Report
- Relative Sea Level Change Projections: Santa Monica, CA graph.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response form provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments into a preliminary list of overall comments and discussion points. Each panel member's individual comments were shared with the full Panel.

A.3 IEPR Panel Teleconference

Battelle facilitated a teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member should serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative

comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle distributed a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the Malibu Creek IEPR:

- Lead Responsibility: For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed a summary email detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.

- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel member as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:

    1. Comment Statement (succinct summary statement of concern)
    2. Basis for Comment (details regarding the concern)
    3. Significance (high, medium/high, medium, medium/low, and low; see description below)
    4. Recommendation(s) for Resolution (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:

    1. **High:** Describes a fundamental issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a “showstopper” issue.

    2. **Medium/High:** Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the SMART Planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models, and/or analyses available at this stage in the SMART Planning process and has determined that if the issue is not addressed, it could lead to a “showstopper” issue.

3. **Medium:** Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the SMART Planning process. Comments rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue is not appropriately addressed.

4. **Medium/Low:** Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses.

5. **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. Comments rated as low indicate that the Panel identified information that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented.

- Guidelines for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. At the end of this process, nine Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The full text of the Final Panel Comments is presented in Section 4.2 of the main report.

A.5 Conduct of the Public Comment Review

Following the schedule in Table A-1, Battelle received 158 PDF file of public comments on the Malibu Creek (approximately 139 letters from the public, and 16 Agency letters, totaling more than 175 pages of comments) from USACE. Battelle then sent the public comments to the panel members in addition to the following charge question:

1. **Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?**

The Panel produced individual comments in response to the charge question. Each panel member's individual comments for the public comment review were shared with the full Panel. Battelle reviewed the comments to identify any new technical concerns that had not been previously identified during the initial IEPR. Upon review, the Panel determined and Battelle confirmed that no new issues or concerns were identified that needed to be addressed in the Final Panel Comments. However, the Panel noted that some of the issues raised in the public comments were similar to concerns raised in the IEPR Final Panel Comments, particularly a request for a road repair mitigation plan and additional analyses and field investigations related to the treatment of contingency, quantity take-off, and cost estimate.

A.6 Final IEPR Report

After concluding the review and preparation of the Final Panel Comments, Battelle prepared a final IEPR report (this document) on the overall IEPR process and the IEPR panel members' findings (this document). Each panel member and Battelle technical and editorial reviewers reviewed the IEPR report prior to submission to USACE for acceptance.

A.7 Comment Response Process

As part of Task 6, Battelle will enter the nine Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

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APPENDIX B

Identification and Selection of IEPR Panel Members for the Malibu Creek Project

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B.1 Panel Identification

The candidates for the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California (hereinafter: Malibu Creek IEPR) Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning/economics, environmental biology, civil/structural engineering, geology/geotechnical engineering, hydrology and hydraulic engineering, coastal engineering. These areas correspond to the technical content of the review documents and overall scope of the Malibu Creek project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected six experts for the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

Candidates were screened for the following potential exclusion criteria or conflicts of interest (COIs). These COI questions were intended to serve as a means of disclosure in order to better characterize a candidate's employment history and background. Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. Guidance in OMB (2004, p. 18) states,

> "…when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Malibu Creek	
1. Previous and/or current involvement by you or your firm on the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California and related projects.	
2. Previous and/or current involvement by you or your firm in Ecosystem Restoration projects in southern California, specifically in Los Angeles or Ventura Counties.	
3. Previous and/or current involvement by you or your firm in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects in the Malibu Creek Ecosystem Restoration Study area or related projects.	

4. Current employment by the U.S. Army Corps of Engineers (USACE).	
5. Previous and/or current involvement with paid or unpaid expert testimony related to Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California.	
6. Previous and/or current employment or affiliation with members of the non-Federal sponsor or any of the following cooperating Federal, State, County, local and regional agencies, environmental organizations, and interested groups *(for pay or pro bono):* California Department of Parks and Recreation, Angeles District.	
7. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to southern California, specifically in Los Angeles or Ventura Counties.	
8. Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Los Angeles District.	
9. Previous or current involvement with the development or testing of models (HEC-RAS, HEC-HMS, Flow 2D, CE/ICA) that will be used for, or in support of the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California.	
10. Current firm involvement with other USACE projects, specifically those projects/contracts that are with the Los Angeles District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Los Angeles District. Please explain.	
11. Any previous employment by USACE as a direct employee, notably if employment was with the Los Angeles District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.	
12. Any previous employment by USACE as a contractor (either as an individual or through your firm) within the last 10 years, notably if those projects/contracts are with the Los Angeles District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.	
13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning related studies (i.e. ecosystem restoration review, dam removal), and include the client/agency and duration of review (approximate dates).	
14. Pending, current, or future financial interests in Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California related contracts/awards from USACE.	

15. Significant portion of your personal or office's revenues within the last three years came from USACE contracts.	
16. Significant portion of your personal or office's revenues within the last three years came from California Department of Parks and Recreation contracts.	
17. Any publicly documented statement (including, for example, advocating for or discouraging against) related to Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California.	
18. Participation in relevant prior and/or current Federal studies relevant to this study and/or Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California.	
19. Previous and/or current participation in prior non-Federal studies relevant to this study and/or Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California.	
20. Has your research or analysis been evaluated as part of the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California?	
21. Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.	

Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Table B-1 provides information on each panel member's affiliation, location, education, and overall years of experience. One panel member held a dual role serving as both the economics and Civil Works planning expert. Two of the six final reviewers are affiliated with a consulting company; the other four are independent consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

Table B-1. Malibu Creek IEPR Panel: Summary of Panel Members

Name	Affiliation	Location	Education	P.E.	Exp. (yrs)
Civil Works Planning / Economics					
David Bastian	Independent consultant	Annapolis, MD	M.S., River Engineering	Yes	36
Environmental Biology					
Dennis Scarnecchia	Independent consultant	Moscow, ID	Ph.D., Fisheries	No	34
Civil / Structural Engineering					
Phillip Brozek	Brozek & Associates	Eugene, OR	B.S., Civil Engineering	Yes	35
Geology / Geotechnical Engineering					
Robert Fleming Jr.	Independent consultant	Vicksburg, MS	M.E., Geotechnical Engineering	Yes	48
Hydrology and Hydraulic Engineering					
Clifford Pugh	Independent consultant	Littleton, CO	B.S., Civil Engineering	Yes	44
Coastal Engineering					
Christopher Hall	Dynamic Solutions, LLC	Knoxville, TN	Ph.D., Civil and Environmental Engineering	Yes	10

Table B-2 presents an overview of the credentials of the final six members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information regarding each panel member and his area of technical expertise is given in Section B.3.

Table B-2. Malibu Creek IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Bastian	Scarnecchia	Brozek	Fleming	Pugh	Hall
Civil Works Planning / Economics						
Minimum of 10 years of demonstrated experience in public works planning	X					
Familiar with the USACE plan formulation process, procedures, and standards	X					
Familiar with evaluation of alternative plans for ecosystem restoration	X					
Experience related to evaluating traditional National Ecosystem Restoration (NER) plan benefits associated with ecosystem projects, to include experience in USACE methodologies for performing cost effectiveness/incremental cost analysis (CE/ICA), and experience in determining the cost effectiveness of fish passage	X					

Technical Criterion	Bastian	Scarnecchia	Brozek	Fleming	Pugh	Hall
Minimum of 15 years of demonstrated experience or combined equivalent of education and experience	X					
M.S. degree or higher in economics	W[1]					
Recognized in applied economics related to water resource economic evaluation (ecosystem restoration and flood risk management analyses) or review	X					
Experience working with risk informed approaches to decision making, risk models, and evaluation scenarios with regard to economic impact	X					
At least two years of experience reviewing Federal water resources economics documents justifying construction efforts	X					
Able to evaluate the appropriateness of CE/ICA, as applied to dollar costs and ecosystem restoration benefits, and preferably be familiar with the USACE tool for CE/ICA called the Institute for Water Resources (IWR) Planning Suite	X					
Familiarity with "At-Risk" software, and evaluate an erosion model based on its methodology	X					
At least five years of experience directly working for or with USACE	X					
Environmental Biology						
Minimum M.S. degree or higher in a related field		X				
At least 10 years of experience directly related to environmental evaluation or review		X				
Extensive knowledge of the following: estuarine ecology, salmonid biology (spawning, rearing, freshwater migration), wetlands, riparian habitats, riverine systems, and process-based restoration		X				
Demonstrated experience working with National Environmental Policy Act (NEPA) impact assessments, including cumulative effects analyses, for complex ecosystem projects with competing trade-offs		X				
Knowledge of steelhead and steelhead habitat		X				
Civil/Structural Engineering						
Registered professional engineer			X			

[1] Educational waiver - Mr. Bastian has an M.S. in river engineering and is recognized as an expert in applied economics related to water resource economic evaluation (ecosystem restoration and flood risk management analyses) and review for more than 30 years.

Technical Criterion	Bastian	Scarnecchia	Brozek	Fleming	Pugh	Hall
Minimum of 15 years of experience in structural engineering with an emphasis on dam removal and dam safety			X			
Geology/Geotechnical Engineering						
Registered professional engineer				X		
Minimum of 15 years of experience in geotechnical engineering with a minimum M.S. degree or higher in engineering						
Demonstrated experience in performing geotechnical evaluation and geo-civil design for all phases of flood risk management projects				X		
Experience in levees, culverts, channel stability, design, and construction, bridge design and construction, as well as design and construction for detention/ retention basins, utility relocations, positive closure requirements, interior drainage requirements, and application of non-structural flood risk management measures				X		
Knowledge in dam stability				X		
Familiar with and have demonstrated experience related to USACE geotechnical practices associated with flood management channels, construction, and soil engineering				X		
Experience in geotechnical risk and fragility analysis				X		
Capable of addressing the USACE Safety Assurance Review (SAR) aspects of all projects				X		
Hydrology and Hydraulic Engineering						
Registered professional engineer with a minimum of 15 years of experience in hydrologic and hydraulic engineering					X	
Experience with all aspects of hydrology and hydraulic engineering including: northwest hydrology, urban hydrology and hydraulics, open channel systems, effects of management practices and low impact development on hydrology, design of earthen dams and detention ponds, use of nonstructural systems as they apply to flood proofing, warning systems, and evacuation					X	
Familiarity with Hydraulic Engineering Center (HEC) modeling computer software including HEC River Analysis System (RAS) and HEC Hydrologic Modeling System (HMS), and Flow 2D					X	
Specialized experience in river engineering, sediment transport, and familiarity with rivers with water control structures and dredging projects					X	

Technical Criterion	Bastian	Scarnecchia	Brozek	Fleming	Pugh	Hall
Coastal Engineering						
Expert in coastal engineering with a strong background in river hydrology and hydraulics						X
Registered professional engineer						X
Minimum of 10 years of experience in coastal engineering or extensive background in coastal theory and practice						X
Minimum M.S. degree in engineering						X
Extensive knowledge of the coastal and hydraulic evaluation of nearshore restoration actions						X

B.3 Panel Member Qualifications

Detailed biographical information on each panel members' credentials and qualifications and areas of technical expertise are summarized in the following paragraphs.

Name	***Role***	***Affiliation***
David Bastian, P.E.	Civil Works Planning/Economics	Independent consultant

Mr. Bastian is an independent consultant and P.E. for David Bastian Consulting in Annapolis, Maryland, specializing in USACE feasibility studies and their technical and policy compliance, adherence to plan formulation, and review of feasibility studies incorporating incremental cost analysis, ecosystem restoration, flood risk reduction, and hydraulic and river engineering. He earned his B.S. in civil engineering from the Georgia Institute of Technology and an M.S. in river engineering from Delft University, Holland.

Mr. Bastian has 36 years of experience with USACE and as contractor/consultant on USACE projects involving feasibility studies and public works planning, all based on the USACE six-step planning process. As a reviewer at USACE Headquarters, he became familiar with and has direct experience with Engineer Regulation (ER) 1105-2-100 and other USACE engineering regulations, manuals, and pamphlets, and continues to use and stay familiar with the "planning community toolbox." He co-authored the USACE Planner's Workshop Manual. His project history has resulted in his review of and collaboration on more than 100 USACE reports evaluating and comparing alternative plans.

Mr. Bastian has extensive experience with the IWR-Planning Suite model and the strategy and principles in developing cost effectiveness and incremental cost analysis (CE/ICA). He has evaluated the appropriateness of CE/ICA as applied to dollar costs and ecosystem restoration benefits on such studies

as Picayune Strand and Puget Sound described below. He also has experience in determining cost effectiveness of the restoration or creation of riverine and estuarine wetlands and oyster reefs, and the use of fish passage structures.

Mr. Bastian has 20 years of experience in coastal and riverine economics evaluation and ecosystem restoration, all of which include an incorporation of risk analysis often part of USACE-certified planning models and risk registers. He has direct experience in identifying and evaluating alternative plans for coastal and riverine systems, including nine years involved in coastal economic evaluation for coastal Louisiana restoration, the greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS), and four other study areas along the Louisiana and Texas coasts. He is familiar with large, complex Civil Works projects with high public and interagency interests through his extensive involvement with the Louisiana Coastal Study area pre- and post-Hurricane Katrina. Additionally, he has spent four years working for the greater New Orleans HSDRRS, planning and constructing the 133-mile levee, floodwall, and massive pumping system and the extensive, diverse, and complex ecosystem restoration associated with it.

Mr. Bastian has experience related to evaluating traditional National Ecosystem Restoration (NER) plan benefits associated with ecosystem projects, which includes experience or familiarity with USACE methodologies for performing CE/ICA analysis in the following studies: (1) the Puget Sound Nearshore Ecosystem Restoration Feasibility Study/Environmental Impact Statement 2014, where he served on an IEPR panel to assess the NED/NER benefits and application of CE/ICA analysis to restore environmental degradation on numerous mini projects around Puget Sound; (2) the Picayune Strand project, where he was selected to participate in the IEPR to review the plan formulation and economics aspects of the Picayune Strand portion of the Everglades restoration project; and (3) the Boardman River, Michigan Ecosystem Restoration Study-2011, which involved fish passage optimization, where he provided the Project Delivery Team with quality control and report writing services to ensure that the study results were economically and environmentally compliant with USACE policy requirements.

Mr. Bastian is familiar with USACE coastal storm damage reduction projects and has evaluated and conducted NER analysis procedures, particularly as they relate to hurricane and coastal storm damage risk reduction, through his participation on the following related projects: (1) he managed the hydrologic and hydraulic studies and contributed to the draft Donaldsonville to the Gulf hurricane risk reduction feasibility study report and the draft Larose to Golden Meadow hurricane risk reduction feasibility study report; (2) he reviewed the Morganza to the Gulf hurricane risk reduction feasibility study report; and (3) he prepared and collaborated on many of the project description documents.

Mr. Bastian is familiar with “At-Risk” software and its potential use in associated USACE-certified planning models such as the Hydrologic Engineering Center (HEC) and Institute for Water Resources (IWR) risk-based models to incorporate uncertainty into models that predict stage, velocity, accretion and erosion and other water resource parameters for evaluating alternatives in ecosystem restoration projects. He is adept at evaluating the risk parameters and their inputs and outputs.

While employed at USACE, Mr. Bastian held positions as Deputy Chief of Staff for Support, Office Chief of Engineers; Assistant Director of Civil Works, Office Chief of Engineers; technical and policy compliance review expert, Washington Level Review Center; and navigation research, USACE Institute for Water Resources. He has served as a USACE Washington-level technical and policy compliance review expert and managed interdisciplinary reviews of more than 70 feasibility reports. Mr. Bastian is a member of the

American Society of Civil Engineers, the American Association of Port Authorities, the Permanent International Association of Navigation Congresses, and the Western Dredging Association.

Name	Role	Affiliation
Dennis Scarnecchia, Ph.D.	Environmental Biology	Independent consultant

Dr. Scarnecchia is a Professor of Fisheries in the Department of Fish and Wildlife Sciences at the University of Idaho in Moscow, Idaho. He earned his Ph.D. in fisheries from Colorado State University. For the past 34 years, his research has focused on fish ecology, fish stock assessment, fish population dynamics, and large river fisheries including Pacific and Atlantic salmon, steelhead, several trout species, paddlefish, and sturgeon. He has also done considerable habitat-related work on these species.

Dr. Scarnecchia has experience with the environmental evaluation and review of estuarine ecology, salmonid biology (spawning, rearing, freshwater migration), wetlands, riparian habitats, riverine systems, and process-based restoration. For the past 10 years, as an environmental consultant, he has evaluated proposals and project designs related to fisheries and stream and river fish and aquatic habitat projects (including river and estuary projects). He has provided these technical reviews primarily for the Northwest Power and Conservation Council's Independent Scientific Advisory Board (ISAB) and Independent Scientific Review Panel (ISRP) as part of ongoing research, operations, and restoration projects and activities for the Columbia River. Dr. Scarnecchia's experience includes identifying and assessing the impacts of hydrosystem operations and accompanying habitat changes on fish and other aquatic life.

His knowledge of steelhead and steelhead habitat has been applied to research on steelhead, redband trout, resident rainbow trout, and Atlantic salmon; the last three species all share many life history traits with steelhead. He has published more than 40 papers related to salmon, trout, and steelhead and their habitats. For example, in his paper entitled "Summer distribution and habitat use by chinook salmon and steelhead within a major basin of the South Umpqua River, Oregon" (in Transactions of the American Fisheries Society), he investigated habitat use in a river where steelhead habitat has been affected by land use practices.

Dr. Scarnecchia is familiar with all National Environmental Policy Act (NEPA) impact assessments, including cumulative effects analyses, for complex ecosystem projects with competing trade-offs. He gained experience with environmental policies and processes by preparing reports and by serving on the ISAB and ISRP. He is a member of the American Fisheries Society and the American Institute of Fishery Research Biologists.

Name	Role	Affiliation
Phillip Brozek, P.E.	Civil/Structural Engineering	Brozek & Associates

Mr. Brozek, a principal with Brozek & Associates, has 35 years of experience as a practicing engineer. He earned his B.S. in civil engineering in 1979 from California State University, Sacramento, and is a registered professional engineer in California and Oregon. Mr. Brozek holds a Certificate in Hazardous Material Management from the University of California Extension, Davis, an Associates Certificate in

Project Management from George Washington University, and was a founding member of the Practitioner Advisory Committee at the California State University Sacramento, Department of Civil Engineering.

Mr. Brozek is familiar with large, complex Civil Works projects with high public and interagency interests. He served as a Civil Works Senior Project Manager for 11 years with the USACE Sacramento District, overseeing large multi-objective projects on the San Lorenzo River, South Sacramento Streams Group, Yuba River, and Sacramento River Gradient Structure (RM 207). He was project and program manager for the interagency restoration of the Lake Tahoe watershed, which included multi-objective planning and implementation to address the watershed's nine Environmental Threshold Carrying Capacity targets and a Total Maximum Daily Load (TMDL) water quality plan as part of long-term $3.5B watershed restoration plan. For more than seven years he served as a consultant on large Civil Works projects such as Phases 4 and 5 of the Folsom Dam Joint Federal Project, Folsom Dam Raise, and Folsom Water Control Manual. All these projects enjoyed significant scrutiny from political leadership, Federal, state, and local agencies, tribes, non-governmental organizations (NGOs), and engaged and vocal stakeholders.

Mr. Brozek's civil and structural engineering experience spans 35 years and includes projects with emphasis on dam removal and dam safety. In this capacity, he has performed simplified feasibility analysis for removal of a small dam on property managed by the U.S. Department of Agriculture Forest Service in an extraordinarily sensitive watershed with regard to sediment load and release, and performed review and planning associated with major dam safety modification projects such as Martis Creek (DSAC 1 rating) with early options for removal or modification) and Folsom Dam Auxiliary Dam and Spillway (including phased approach to construction and removal of temporary structures for construction). He has presented original material on elements of dam safety and dam failure to a meeting of the Society of American Military Engineers; reviewed new construction and demolition of concrete flood walls, flood gates, and other appurtenances; reviewed slope stabilization during demolition of existing concrete and stone structures construction of replacement structures; reviewed plans for temporary stream routing and sediment management during stream relocation/restoration and bridge removal/replacement and in an extraordinarily sensitive watershed; and participated in a Value Planning Study on Folsom Dam balancing robust design, added dam safety risk, and constructability. Mr. Brozek has experience in the planning, design, and review of material management plans for projects that involve the removal, separation, storage, and disposal of large amounts of excess material, including concrete and soil, on stream and wetland restoration projects in the Lake Tahoe basin and runway replacement projects.

As Sacramento District USACE Civil Works senior project manager, Mr. Brozek was responsible for large multi-objective projects that used off-stream detention basins and on-stream overbank storage with earthen embankments and control features to maximize storage while attenuating and reducing peak discharge. Vegetated basins also provided incremental water quality improvements, aquatic ecosystem improvements, and recreation opportunities when not inundated. Detention basins on these projects used existing parkways and other undeveloped space. Typical projects were the South Sacramento Streams Group and multiple stream restoration projects (e.g., Mill Creek, Blackwood Creek, Upper Truckee River) in the Lake Tahoe watershed.

In the area of reinforced concrete design/construction/evaluation of flood risk management structures, Mr. Brozek has extensive experience on projects that included reinforced concrete channels and floodwalls on top of embankments, box culverts, bridge appurtenances, pump stations, control structures, buildings, and transposition infrastructure. Project examples are South Sacramento Streams Group, San Lorenzo River, Magpie Creek, Incline Creek, Mill Creek, and Folsom Dam Joint Federal Project. He also has

experience in levee embankment design/construction/evaluation of flood risk management structures through projects that included levee embankment, stability berms, water control berms for wetland creation, and detention basins. Project examples are South Sacramento Streams Group, San Lorenzo River, Yuba River, Magpie Creek, Sacramento River (RM 207), and Folsom Dam Joint Federal Project.

Mr. Brozek is familiar with and experienced in geotechnical evaluations and geo-civil design for flood risk management projects, having been involved in required foundation exploration plans, evaluation of foundation conditions, and design or other mitigation of unsuitable foundation conditions. Project examples are South Sacramento Streams Group, San Lorenzo River, Yuba River, Magpie Creek, Sacramento River (RM 207), Folsom Dam Joint Federal Project, and many smaller vertical construction and hazardous, toxic, and radioactive waste (HTRW) investigations.

In addition, Mr. Brozek is capable of addressing a USACE Safety Assurance Review (SAR) as applied to Type I IEPR. He has planned and facilitated the Folsom Dam Joint Federal Project Phase IV Type II IEPR (SAR), including design in accordance with ER 1110-2-1150, Engineering and Design for Civil Works Projects, with due consideration for the sufficiency of surveys, investigations, and engineering, appropriateness of assumptions and models, and analysis of risk. He also prepared a modification of the Folsom Dam Water Control Manual Review Plan to better integrate elements of both Type I and Type II IEPRs into a hybrid IEPR process for a unique project. Mr. Brozek served as panel member for Type I IEPRs on other USACE projects where those projects would pose a significant threat to human life and public safety and the review charge included elements of SAR review.

Name	***Role***	***Affiliation***
Robert Fleming Jr., P.E.	Geology/Geotechnical Engineering	Independent consultant

Mr. Fleming is a geotechnical engineer specializing in project design and geotechnical and structural engineering for flood control projects. He earned his Master of Engineering (M.E.) in geotechnical engineering from Texas A&M University in 1971 and is a licensed professional engineer in Mississippi. He has more than 48 years of experience in geotechnical and structural engineering, including working for USACE, Vicksburg District for 35 years where he was actively involved in the design, construction, and evaluation of all types of hydraulic structures. At USACE, he served 10 years as the Chief of the Geotechnical Branch, five years as the Chief of the Design Branch, and four years as the Chief of Engineering. Mr. Fleming has had overall technical responsibility for all types of flood control, navigation, environmental restoration, and recreation projects, which have included locks and dams, pumping stations, levees, flood management channels, drainage structures, flood walls, earth dams, channels, channel stabilizations, and earth slide remediation.

Major accomplishments while serving as the Chief of Engineering include the responsibility for the overall design, plans, and specifications and construction consultation of the Mississippi River Enlargement Program in Mississippi, Louisiana, and Arkansas; enlargements included more than 40 miles of levee raises up to 8 feet on existing levees 25 to 35 feet in height. As the Dam Safety Officer for seven large high hazard dams, he was responsible for ensuring the safe operation and maintenance of these structures, as well as the design and construction of numerous floodwater retarding structures, riser pipes, low drop grade control, and high drop grade control structures as part of the “Demonstration Erosion Control Program” in North Mississippi.

Mr. Fleming has extensive expertise in the geotechnical evaluation of flood risk management structures, including static and dynamic slope stability evaluation. He has demonstrated experience related to USACE geotechnical practices associated with flood management channels, construction, and soil engineering, and he also has significant knowledge about dams and their stability. For example, his engineering efforts associated with the Sardis Earthquake Study led to a major remediation to the Sardis Dam. He was also responsible for numerous geotechnical designs of levees, floodwalls, and hydraulic structures, such as the Lake Chicot Pumping Plant, the first structure built in the Lower Mississippi River Mainline levees, and Locks & Dams on the Red River. As Chief of the Design Branch, he was involved in the mechanical stabilization of the historically significant bluffs overlooking the Mississippi River in Natchez, Mississippi. In addition, from 1980 to 1993, he was involved in and responsible for the Sardis Earthquake Study and Remediation of the large hydraulic fill dam in North Mississippi. He is experienced in the evaluation of seepage through earth foundations of large urban levees as evident in his work on numerous seepage studies evaluating alternatives such as seepage berms, relief wells, and slurry trench cutoffs to find the most cost-effective seepage control. Relevant studies involved the Ouchita River in Monroe, Louisiana, and the Red River in Alexandria, Louisiana.

Both at USACE and as a geotechnical consultant, Mr. Fleming has worked on projects that have involved bridge design and construction, namely as part the appurtenant structures associated with the design and construction of Locks and Dams 3, 4, and 5 on the Red River Waterway. He has experience with design and construction for detention/retention basins, utility relocations, positive closure requirements, and interior drainage requirements on the various recreation sites on the Red River Waterway and the seven high hazard dams located within Vicksburg District, as well as the numerous floodwater retarding and grade control structures that were part of the Demonstration Erosion Control (DEC) Project located in the hills overlooking the Mississippi Delta in Mississippi. On several flood risk management projects in Vicksburg, he routinely applied and considered non-structural flood risk management measures as part of plan development.

Mr. Fleming also has experience in geotechnical risk and fragility analysis. This can be demonstrated by his work on the Sardis Earthquake Analysis and Remediation. Sardis is a hydraulic fill dam founded on an alluvial foundation that contains recent age liquefiable silt layers that were determined to be the primary risk for liquefaction in the dam foundation and cause for excessive deformation of the dam during the Design Earthquake.

Mr. Fleming is knowledgeable in all phases of alternatives development and evaluation and was involved in numerous USACE planning studies investigating flood control alternatives. In addition, he has served on two IEPR panels: (1) as the geotechnical, structural, and cost engineering reviewer for the Jordan Creek-Springfield, Greene County, Missouri Feasibility Study Report and Environmental Assessment (2013), and (2) as the geotechnical reviewer for the Manhattan Kansas Section 216, Feasibility Study (2014). He can address the USACE SAR aspects of all projects due to his experience and background in the development and implementation of the Design Quality Management System and the Independent Technical Review Process for USACE, Vicksburg District. He also served as an independent consultant on the Interagency Performance and Evaluation Task Force for the New Orleans Hurricane Protection System.

Mr. Fleming actively participates in professional engineering and scientific societies and is a fellow of the American Society of Civil Engineers, and a member of the U.S. Society on Dams and the Society of American Military Engineers.

Name	*Role*	*Affiliation*
Clifford Pugh, P.E., D.WRE, M. ASCE	Hydrology and Hydraulic Engineering	Independent consultant

Mr. Pugh is an independent consultant with 44 years of experience in hydraulic engineering and hydrologic studies on large public works projects. He earned his B.S. in civil engineering from Colorado State University (CSU) in 1973. He is a registered professional engineer in Oregon and pursued graduate studies in hydraulics at CSU and water resources engineering at Mississippi State University.

Mr. Pugh has extensive experience with all aspects of hydraulic engineering and hydrology: northwest hydrology, urban hydrology and hydraulics, open channel systems, and effects of management practices. He served as a hydraulic engineer for USACE from 1973 to 1977, and worked in the hydraulics laboratory as a hydraulic engineer for the U.S. Bureau of Reclamation for 32 years in a variety of positions, including laboratory group manager, senior technical specialist/research team leader, and head of the laboratory. His work at the laboratory involved conducting studies and advising in dam design, dam safety, hydraulic system testing and evaluation, environmental hydraulics, and water conservation. In addition, he directed and conducted dozens of physical model studies and computational fluid dynamics investigations using the FLOW-3D numerical code, including physical and numerical studies of Folsom, Friant, Glen Canyon, Shasta, and Carter Lake Dams. Mr. Pugh participated in safety evaluations to develop improved safety practices and measures to protect Folsom Dam and the downstream floodplain. This led to a major dam model study to develop design features for an auxiliary spillway at Folsom Dam that will significantly improve the safety of the Sacramento, California, area.

Additionally, Mr. Pugh has experience in river engineering and sediment transport, and is familiar with rivers with water control structures and dredging projects. This can be demonstrated by his model studies and development of guidelines for “Sediment Transport Scaling for Physical Models, ASCE’s Manual 54, Sedimentation Engineering.” He has given numerous technical presentations, including “Methods for Better Operation and Control of Water Delivery Systems,” presented to the Western States Water Council.

He has experience with the design of earthen dams and detention ponds, use of nonstructural systems as they apply to flood proofing, warning systems, and evacuation. He is familiar with the dam removals at Glines and Elwah Dams in Washington State and is currently a reviewer on the “Dam Removal Guidelines for Sediment, Volume 3.” Mr. Pugh has extensive experience in the design and evaluation of outlet works and spillways for embankment dams and concrete dams, including Glen Canyon Dam, McPhee Dam, and Blue Mesa Dam. He also developed the generally accepted design guidelines for fuse plug embankments, which are used for extra spillway capacity needed for very large floods. Mr. Pugh is familiar with USACE application of risk and uncertainty analysis in flood damage reduction studies. He reviewed the USACE risk analysis as the hydraulic engineering expert on the New Orleans Katrina External Review Panel for the American Society of Civil Engineers.

Mr. Pugh is familiar with the Hydraulic Engineering Center (HEC) modeling computer software, including HEC-River Analysis System (RAS) and HEC-Hydrologic Modeling System (HMS), and Flow 2D. Mr. Pugh is also familiar with HEC-1, STORM, and STWAVE. He is a member of the American Society of Civil Engineers, the International Association for Hydraulic Engineering and Research, and the U.S.

Committee on Irrigation and Drainage. He is a diplomate of the American Association of Water Resources Engineers.

Name	*Role*	*Affiliation*
Christopher Hall, Ph.D., P.E.	Coastal Engineering	Independent consultant

Dr. Hall is a water resources and environmental engineer with 10 years of experience specializing in hydrodynamic and hydraulic modeling, two- and three-dimensional surface water modeling, sediment transport and fluid mud modeling, and resource conservation. He earned his Ph.D. in civil and environmental engineering from Mississippi State University and is a registered professional engineer in Tennessee. He has a strong background in coastal engineering, river hydrology, and hydraulics. Dr. Hall's education and experience in biological engineering, environmental engineering, and civil engineering have provided him with an understanding of the biological processes that occur in the environment and unique insight into the biological effects and hydrodynamics within coastal and riverine environments.

Dr. Hall's coastal expertise includes extensive hydrodynamic modeling in and around the coastal areas of Atchafalaya Bay, Cole's Bayou/Vermillion Bay, and Breton Sound in Louisiana as well as coastal estuaries in Florida and California. Dr. Hall has extensive knowledge of the coastal and hydraulic evaluation of nearshore restoration actions in these areas. The Cole's Bayou Coastal Marsh Restoration modeling work was completed in support of restoring more than 350 acres of coastal marsh and supplying sediment and nutrients to the marsh under various restoration scenarios; the Breton Sound work was conducted to evaluate the impacts of various Mississippi River Diversion scenarios on salinity in the system. His riverine experience includes scour analysis and supercritical flow from his work with USACE Jacksonville District on the S65-E structure on the Kissimmee River, sediment transport modeling experience on the Fox and Kalamazoo Rivers, and two-dimensional (2-D) hydrodynamic modeling of 70 miles of the Sacramento River. He has modeling experience with Adaptive Hydraulics (ADH), Environmental Fluid Dynamics Code (EFDC), HEC-RAS, and HEC-Reservoir System Simulation (ResSim).

Dr. Hall developed a 2-D ADH model of the Kissimmee River near the S-65E structure, which is the downstream-most flow control structure on the Kissimmee River, eight miles upstream of Lake Okeechobee. The model was used to test the location and orientation of additional spillway bays needed to handle flood flows through the system, including supercritical flows. Resulting flow patterns were mapped and impacts on the existing structure, riverbanks, and downstream weir were evaluated.

Dr. Hall assisted in the development of a 2-D ADH model of the Sacramento-San Joaquin River Delta to be used to evaluate the local and system-wide effects of levee breaches. This model of the complex system of Delta channels was calibrated to one year of hydrodynamic data and used to simulate a levee breach on Sherman Island. Detailed models of four additional vulnerable areas were constructed and levee breach scenarios were performed. The flood timing and inundation areas were evaluated from an emergency management perspective. The system-wide salinity and hydrodynamic changes were evaluated to realize water supply and environmental impacts. The model framework developed will be used by USACE to evaluate the impacts of levee breaches for any island within the system. In addition, he assisted in the development and calibration of a 2-D ADH model for more than 70 miles of the

Sacramento River, from Freeport to Wilkins Slough. Hydrographs from several time periods were used to calibrate the model, ensuring its fidelity to a range of low to moderate flow conditions. The hydrodynamics from the ADH model will drive the Eulerian-Langrangian-agent model (ELAM), which uses bioenergetic data and movement algorithms to provide travel time estimates of anadromous fish in the system. This unique synthesis of hydraulic and ecological models allows for the integration of environmental function into bank stabilization designs. He also assisted in the development and testing of a 3-D EFDC hydrodynamic model of the larger San Francisco Bay-Delta domain that was used for sea-level rise analyses and assessments for salinity intrusion and inundation of shoreline areas.

Dr. Hall assisted in model development of the Cole's Bayou Marsh Restoration Area ADH hydrodynamic model. The specific goals of the project are to restore 365 acres of brackish marsh and supply nutrients and additional freshwater to 53 acres of existing marsh by increasing freshwater flows and sediment supplies to the interior of the marsh by enhancing the hydraulic connections. The purpose of this modeling work was to evaluate changes to the flow patterns through the Cole's Bayou Marsh under various scenarios and the effects on the hydrology, including inundation times and frequency. The model would also be used to ascertain any salinity and sediment movement changes in the system. This work involved calibration to existing conditions and modeling of various culverts and flap gates within the system, as well as bathymetric modification for marsh creation areas to evaluate project alternatives.

Dr. Hall's firm was tasked with a review of the Environmental Impact Statement and modeling support to evaluate the appropriateness and validity of the approach and models used by USACE in developing the water control plan for the Alabama-Coosa-Tallapoosa River Basin. During this analysis, Dr. Hall assisted with the HEC-ResSim model evaluation and the water quality analysis. Additionally, Dr. Hall led the modification of the HEC-ResSim model to evaluate effects from model changes on the water quality results downstream.

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APPENDIX C

Final Charge for the Malibu Creek IEPR

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Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California

This is the final Charge to the Panel for the Malibu Creek IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on March 31, 2017.

BACKGROUND

The Malibu Creek is located approximately 30 miles (mi) west of downtown Los Angeles, California. Approximately two-thirds of the watershed is located in northwestern Los Angeles County and the remaining one-third is in southeastern Ventura County. The drainage area covers approximately 110 square miles (mi^2) of the Santa Monica Mountains and Simi Hills. Elevations in the watershed range from over 3,100 feet (ft) at Sandstone Peak in Ventura County to sea level at Santa Monica Bay.

Malibu Creek is an important regional corridor that links Santa Monica Bay, a National Estuary, Malibu Lagoon, one of the last two remaining estuaries in Los Angeles County, and riparian systems from the immediate coastal plain with interior plains and valleys of both DPR and the Santa Monica Mountains National Recreation Area (SMMNRA), administered by the National Park Service (NPS). As such, the watershed represents a unique opportunity for systemic and sustainable ecosystem restoration in highly urbanized southern California.

The Malibu Creek watershed drains the Santa Monica Mountains in northern Los Angeles and southern Ventura Counties. A coastal watershed, it is the largest watershed in the Santa Monica Mountains, and encompasses some of the largest areas of protected open space left in southern California.

Over two-thirds of the watershed is currently undeveloped and the remaining one third, over 30 mi^2, is protected as open space by State, Federal, and other agencies. It is projected to remain undeveloped through the life of the project. Another 40 mi^2 is projected to be developed with no more than one dwelling per 20 acres, with other areas unlikely to change based on a combination of steep slopes, ridgelines, and coastal restrictions on development.

The watershed provides for a wealth of biological resources. The Santa Monica Mountains support a remarkably abundant wildlife community. The Santa Monica Mountains are reported to support over 450 vertebrate species, including 50 mammals, 384 species of birds, and 36 reptiles and amphibians. Additionally, Malibu Creek is critical habitat for the endangered steelhead trout (steelhead).

Malibu Creek is currently interrupted by Rindge Dam. This concrete dam has been filled with sediment since the 1950s, and effectively prevents the free movement of steelhead and other aquatic species from travelling up and down the stream. The dam has interrupted the natural sediment transport of Malibu Creek, and has altered the natural geomorphic, riparian, and aesthetic character of Malibu Creek. Approximately 780,000 cubic yards of sediment have accumulated behind the dam. Pools, riffles, and runs that historically supported steelhead and other fish still exist above the dam. Downstream reaches to the ocean have be starved of sediment and sands as a result of the dam. Thus, there is a need to reconnect the segmented aquatic and riparian corridor and to restore the natural hydrology and geomorphology of Malibu Creek.

The purpose of the project is removal of Rindge Dam and other upstream barriers as well as the accumulated sediment, beneficial reuse of suitable substrate for beach replenishment, and upland disposal of remaining debris.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Malibu Creek Ecosystem Restoration Feasibility Study, Los Angeles and Ventura Counties, California (hereinafter: Malibu Creek IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Civil Works Review* (Engineer Circular [EC] 1165-2-214, dated December 15, 2012), and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004). Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-214; p. D-4) for the decision documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) who meet the technical criteria and areas of expertise required for and relevant to the project.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-214, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review - The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Review Documents	No. of Review Pages	Subject Experts: Civil Works Planner/ Economics	Enviro. Biologist	Civil/ Structural Engineer	Geologist/ Geotechnical Engineer	H&H Engineer	Coastal Engineer
Malibu Creek Ecosystem Restoration Draft Feasibility Study and Environmental Impact Statement	570	570	570	570	570	570	570
Appendix A: Agency Coordination and Public Involvement	122	122	122				
Appendix B: Hydrology and Hydraulics	166					166	
Appendix C: Civil and Structural	128			128			
Appendix D: Geotechnical Engineering	146				146		
Appendix E: Economic	34	34					
Appendix F: Cost Engineering	76	76		76	76	76	76
Appendix G: Real Estate	52	52	52				52
Appendix H: 404(b)(1) Evaluation	36		36		36		
Appendix I: Monitoring and Adaptive Management	20		20		20		20
Appendix J: Habitat Evaluation	160		160				
Appendix K: Cultural Resources *(Confidential, available upon request)*	4		4				
Appendix L: Air Quality Analysis	278		278				
Appendix M: Noise Analysis	18		18				
Appendix N: Traffic Analysis	206		206	206			
Appendix O: Coastal Engineering	34						34
Appendix P: Coordination Act Report	50		50				
Appendix Q: Distribution List	6	6	6	6	6	6	6
Report total number of pages to be reviewed	**2,106**	**860**	**1,522**	**986**	**854**	**818**	**758**
*Public Comments**	*50*	*50*	*50*	*50*	*50*	*50*	*50*
*Risk Register***	*5*	*5*	*5*	*5*	*5*	*5*	*5*

* Page count for public comments is approximate. USACE will submit public comments to Battelle, who will in turn submit the comments to the IEPR Panel.
** Supporting documentation only.

Documents for Reference

- USACE guidance *Civil Works Review,* (EC 1165-2-214, December 15, 2012)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004)
- Foundations of SMART Planning
- SMART Planning Bulletin (PB 2013-03)
- SMART – Planning Overview
- Planning Modernization Fact Sheet.
- USACE Climate Change Adaptation Plan (June 2014)
- ETL 1100-2-1 – Procedures to Evaluate SLR Change Impacts Responses Adaptation
- ER 1100-2-8162 – Incorporating SLR Change in CW Programs

SCHEDULE

This schedule is based on the receipt of the final review documents. Note that dates presented in the schedule below also could change due to panel member and USACE availability.

Task	Action	Due Date
Attend Meetings and Begin Peer Review	Subcontractors complete mandatory Operations Security (OPSEC) training	4/19/2017
	Battelle convenes kick-off meeting with USACE	3/9/2017
	Battelle sends review documents to panel members	3/21/2017
	Battelle convenes kick-off meeting with panel members	3/22/2017
	Battelle convenes kick-off meeting with USACE and panel members	3/27/2017
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	4/5/2017
Prepare Final Panel Comments	Panel members complete their individual reviews	4/17/2017
	Battelle provides talking points for Panel Review Teleconference to panel members	4/18/2017
	Battelle convenes Panel Review Teleconference	4/19/2017
	Battelle provides Final Panel Comment templates and instructions to panel members	4/20/2017
	Panel members provide draft Final Panel Comments to Battelle	4/26/2017
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	4/27/2017-5/02/2017
	Panel finalizes Final Panel Comments	5/3/2017

Task	Action	Due Date
Review Public Comments	Battelle receives public comments from USACE	4/3/2017
	Battelle sends public comments to Panel	4/18/2017
	Panel completes its review of public comments	4/21/2017
	Battelle and Panel review Panel's responses to public comments	4/24/2017
	Panel drafts Final Panel Comment for public comments, if necessary	4/28/2017
	Panel finalizes Final Panel Comment regarding public comments, if necessary	5/2/2017
Review Final IEPR Report	Battelle provides Final IEPR Report to panel members for review	5/4/2017
	Panel members provide comments on Final IEPR Report	5/5/2017
	***Battelle submits Final IEPR Report to USACE**	**5/8/2017**
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	5/15/2017
Comment/ Response Process	Battelle inputs Final Panel Comments to Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE	5/17/2017
	Battelle convenes teleconference with USACE to review the Comment Response process	5/17/2017
	Battelle convenes teleconference with Panel to review the Comment Response process	5/17/2017
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	6/5/2017
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	6/9/2017
	USACE PCX provides draft PDT Evaluator Responses to Battelle	6/12/2017
	Battelle provides draft PDT Evaluator Responses to panel members	6/14/2017
	Panel members provide draft BackCheck Responses to Battelle	6/19/2017
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	6/20/2017
	Battelle convenes Comment Response Teleconference with panel members and USACE	6/21/2017
	USACE inputs final PDT Evaluator Responses to DrChecks	6/28/2017
	Battelle provides final PDT Evaluator Responses to panel members	6/30/2017
	Panel members provide final BackCheck Responses to Battelle	7/6/2017

Task	Action	Due Date
Comment/ Response Process	Battelle inputs panel members' final BackCheck Responses to DrChecks	7/6/2017
	*Battelle submits pdf printout of DrChecks project file	7/7/2017
ADM	Agency Decision Milestone Meeting	TBD
CWRB	Panel prepares for (reviews slides and script) and participates in CWRB	TBD
	Civil Works Review Board Meeting	3/30/2018
	Contract End/Delivery Date	6/30/2018

* Deliverables

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the decision documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and properly documented; satisfies established quality requirements; and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the decision documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.

5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review (ATR).
2. Please contact the Battelle Project Manager (Jessica Tenzar; tenzarj@battelle.org) or Program Manager (Rachel Sell; sellr@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Rachel Sell (sellr@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to the Project Manager, tenzarj@battelle.org, no later than 10 pm ET by the date listed in the schedule above.

Charge Questions and Relevant Sections as Supplied by USACE

General Questions

1. Were all models used in the analyses used in an appropriate manner?
2. Are the models used sufficiently discriminatory to support the conclusions drawn from them (i.e., identify meaningful differences between alternatives)?
3. Were risk and uncertainty sufficiently considered?
4. Are potential life safety issues accurately and adequately described under existing, future without-project, and future with-project conditions?
5. In your opinion, are there sufficient analyses upon which to base the recommendation?

Problem, Needs, Constraints, and Opportunities

6. Are the problems, needs, constraints, and opportunities adequately and correctly defined?
7. Do the identified problems, needs, constraints, and opportunities reflect a systems, watershed, and/or ecosystem approach, addressing a geographic area large enough to ensure that plans address the cause-and-effect relationships among affected resources and activities that are pertinent to achieving the study objectives (i.e., evaluate the resources and related demands as a system)?
8. Did the study address those resources identified during the scoping process as important in making decisions relating to the study?

Existing and Future Without-Project Resources:

9. Has the character and scope of the study area been adequately described and is the identified study area appropriate in terms of undertaking a systems/watershed/ecosystem based investigation?
10. Do you agree with the general analyses of the existing social, financial, and natural resources within the study area?
11. Given your area of expertise, does this section appropriately address the existing conditions of all resources pertinent to the study?
12. Were the surveys conducted to evaluate the existing social, financial, and natural resources adequate? If not, what types of surveys should have been conducted?
13. Were socioeconomic conditions adequately addressed? Were specific socioeconomic issues not addressed?
14. Were the hydrologic, hydraulic and sediment (HHS) transport discussions sufficient to characterize current baseline conditions and to evaluate how forecasted conditions (with and

without proposed actions) are likely to affect HHS conditions? Please comment on the completeness of the hydrodynamics of the project area.

15. For your particular area of expertise, provide an in-depth review of whether the analyses of the existing social, financial, and natural resources within the project area are sufficient to support the estimation of impacts of the array of alternatives.

16. Was the discussion of natural resources sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without proposed actions)?

17. Were the assumptions used as the basis for developing the most probable future without-project conditions reasonable? Were adequate scenarios effectively considered (applied during analyses where relevant and/or reasonably investigated)? Were the potential effects of climate change addressed?

18. Are the future conditions expected to exist in the absence of a Federal project logical and adequately described and documented?

19. Please comment on the conclusion of the most probable future without-project condition. Do you envision other potential probable outcomes?

Plan Formulation/Evaluation

20. Was a reasonably complete array of possible measures considered in the development of alternatives?

21. Did the formulation process follow the requirement to avoid, minimize, and then mitigate adverse impacts on resources?

22. Does each alternative meet the formulation criteria of being effective, efficient, complete, and acceptable?

23. Were the assumptions made for use in developing the future with-project conditions for each alternative reasonable? Were adequate scenarios considered? Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified where different?

24. Are the changes between the without- and with-project conditions adequately described for each alternative?

25. Please comment on the screening of the proposed alternatives. Are the screening criteria appropriate? In your professional opinion are the results of the screening acceptable? Were any measures or alternatives screened out too early?

    a. Is the initial screening of the array of alternatives used to identify the focused array appropriate?

    b. Are trade-offs between mechanical transport and natural transport of Rindge Dam impounded sediment appropriately addressed?

c. Is the change in downstream flood risk associated with Rindge Dam removal (i.e., after completion of construction) adequately addressed?

d. Is downstream flood risk during construction associated with the Rindge Dam removal process/interim conditions adequately addressed?

e. Is downstream debris-flow risk during construction associated with intended mobilization of impounded sediments/interim conditions adequately addressed for natural sediment transport alternatives?

f. Is downstream risk during construction associated with structural reliability of the dam/interim conditions adequately addressed?

g. Is the change in landslide risk in the canyon associated with removal of the dam and impounded sediments adequately addressed?

h. Did the array of alternatives considered adequately include "life safety" concerns in the plan formulation?

26. Are the uncertainties inherent in our evaluation of benefits, costs, and impacts, and any risk associated with those uncertainties, adequately addressed and described for each alternative?

27. Are future Operation, Maintenance, Repair, Replacement, and Rehabilitation efforts adequately described and is the estimated cost of these efforts reasonable for each alternative?

28. Were the engineering, economic, and environmental analyses used for this study consistent with generally accepted methodologies? Why or why not?

29. Does any alternative include identified separable elements (i.e., a portion of a project that is physically separable, and produces hydrologic effects or physical or economic benefits that are separately identifiable from those produced by other portions of the project)? If so, is each identified separable element independently justified and are the benefits, costs, and effects of the separable elements correctly divided?

Tentatively Selected Plan (TSP)

30. Comment on whether you agree or disagree with how the TSP alternative was formulated and selected. Comment on the plan formulation. Does it meet the study objectives and avoid violating the study constraints?

31. Are there any unmitigated environmental impacts not identified in the TSP and if so could they impact plan selection?

32. Please comment on the likelihood that the TSP achieves the expected outputs.

33. Please comment on the completeness of the TSP (i.e. will any additional efforts, measures, or projects be needed to realize the expected benefits)?

34. Please comment on the appropriateness of location, sizing, and design of plan features.

Specific Charge Questions

Ecosystem Restoration

35. Are the expected changes in the quality and abundance of desired ecological resources clearly and precisely specified in justifying the ecosystem restoration and protection investment?
    a. Is the significance of the sought ecological resources clearly determined by institutionalized national goals (e.g., the ESA national goal to sustain native fish and wildlife, the NEPA goal to preserve natural heritage)?
    b. Is the scarcity of the sought ecological resources characterized in terms of national abundance and significance (e.g., with indicators of low to high potential for sustainability)?
    c. Is the distinctiveness of the sought ecological resources quality indicated (are there closely related resources that substitute in most respects)?
    d. Are forecast changes in sought ecological resource quality quantified so as to indicate achievement of national goals?
36. Is it clear that restoration of the desired ecological resource quality is a function of improvements in habitat quality or quantity?
    a. Do planning models and procedures clearly link habitat improvement to the needs of the targeted ecological resources?
    b. Do planning models and procedures adequately consider and provide for limiting factors beyond quality and quantity of habitat?
37. Is it clear that the restored ecological resource quality will be sustainable over the long run?
        a. Are the risks facing successful restoration of sustainable ecological resource quality clearly shown to be managed and any residual risks identified in terms of :
            i. Sufficient geophysical support (hydrology and geomorphology)?
            ii. Sufficient environmental chemistry?
            iii. Sufficient biological support (e.g., food, habitat and systems-stabilizing species)?
            iv. Changes in climate and in the influential ecoregion (e.g., major land use changes)?
38. Are the required long-term commitments (both Federal and non-Federal) to sustaining the restored ecological resource quality adequately described and adequately demonstrated?

Battelle Summary Charge Questions to the Panel Members[2]

Summary Questions

1. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.

2. Please provide positive feedback on the project and/or review documents.

Public Comment Questions

3. Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?

[2] Battelle supplied the following 3 questions and should not be construed or considered part of the list of USACE-supplied questions. These questions were delineated in a separate appendix in the final Work Plan submitted to USACE.

APPENDIX D

Conflict of Interest Form

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Conflicts of Interest Questionnaire

Independent External Peer Review

Malibu Creek Ecosystem Restoration Project Feasibility Study, Ventura County, CA

The purpose of this document is to help the U.S. Army Corps of Engineers identify potential organizational conflicts of interest on a task order basis as early in the acquisition process as possible. Complete the questionnaire with background information and fully disclose relevant potential conflicts of interest. Substantial details are not necessary; USACE will examine additional information if appropriate. Affirmative answers will not disqualify your firm from this or future procurements.

NAME OF FIRM: **Battelle Memorial Institute**
REPRESENTATIVE'S NAME: **Courtney M. Brooks**
TELEPHONE: **614-424-5623**
ADDRESS: **505 King Avenue, Columbus, OH 43201**
EMAIL ADDRESS: **brookscl@battelle.org**

I. INDEPENDENCE FROM WORK PRODUCT. Has your firm been involved in any aspect of the preparation of the subject study report and associated analyses (field studies, report writing, supporting research etc.) **No** Yes (if yes, briefly describe):

II. INTEREST IN STUDY AREA OR OUTCOME. Does your firm have any interests or holdings in the study area, or any stake in the outcome or recommendations of the study, or any affiliation with the local sponsor? **No** Yes (if yes, briefly describe):

III. REVIEWERS. Do you anticipate that all expert reviewers on this task order will be selected from outside your firm? No **Yes** (if no, briefly describe the difficulty in identifying outside reviewers):

IV. AFFILIATION WITH PARTIES THAT MAY BE INVOLVED WITH PROJECT IMPLEMENTATION. Do you anticipate that your firm will have any association with parties that may be involved with or benefit from future activities associated with this study, such as project construction? **No** Yes (if yes, briefly describe):

V. ADDITIONAL INFORMATION. Report relevant aspects of your firm's background or present circumstances not addressed above that might reasonably be construed by others as affecting your firm's judgment. Please include any information that may reasonably: impair your firm's objectivity; skew the competition in favor of your firm; or allow your firm unequal access to nonpublic information.
No additional information to report.

Courtney M. Brooks

Courtney M. Brooks — February 27, 2017

BATTELLE

It can be done