# Final Independent External Peer Review Report Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Coastal Storm Risk Management Planning Center of Expertise
Baltimore District

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505 King Avenue
Columbus, Ohio 43201

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## Executive Summary

### Project Background and Purpose

The Florida Keys are a 123-mile-long chain of islands extending into the Gulf of Mexico from the southern tip of Florida. The study area includes all of the Florida Keys, which are within Monroe County. A portion of Monroe County's land area is located on the mainland of Florida as well, but that area is largely Federal land within the Everglades National Park and therefore is not included in this Civil Works study.

Impacts from recent hurricanes have highlighted the need for a collaborative evaluation of coastal storm risk management for all of the Florida Keys. The average elevation of the islands ranges from 4 to 5 feet above mean sea level to 10 to 12 feet on some of the larger islands. All of the land surface area is vulnerable to the effects of coastal storms, and risk management measures are needed to protect critical infrastructure and evacuation routes and reduce structural damage from such storms. Specifically, U.S. Route 1 has been identified as an integral component of critical infrastructure in the study area, as it provides the primary ground transportation access and thus facilitates the evacuation of Florida Keys residents and tourists. Climate change effects in the Florida Keys include increasing sea levels and associated coastal flooding from regular, seasonal, or extreme tidal, wind, or storm events, which will continue to increase coastal storm risk within the study area.

The Florida Keys are an important asset to the economic development of the United States. The islands are a major tourism destination that also hold unique environmental resources, including the third largest coral reef in the world and 17 national and state parks. There is Federal interest in addressing the Keys' high levels of risk and vulnerability to coastal storms, which are expected to be compounded by the combined effects of sea level change and climate change. Analysis completed during the scoping phase identified a variety of structural and non-structural solutions that, if implemented, could have marked effects on resiliency and could be economically justified, environmentally acceptable, and consistent with U.S. Army Corps of Engineers (USACE) policy. This interest is also echoed across the region in the South Atlantic Coastal Study (SACS) and the 13 other coastal storm risk management studies that are currently being conducted within the state of Florida.

The study area will continue to be vulnerable to the effects of coastal storms in the future. In addition to damages to structures and critical infrastructure, there is a significant life safety component that should be considered due to the vulnerability of the population and the remoteness of the Keys, especially the lower islands. Study risks include the accurate projection of sea level rise (SLR) over the period of analysis, the extremely rich environmental resources that are present within and adjacent to the study area, and the potentially limited ability to use existing models to analyze conditions in the study area due to unique geologic and hydrodynamic conditions.

## Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. USACE is conducting an Independent External Peer Review (IEPR) of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida (hereinafter: Florida Keys CSRM IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, is free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2018). 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 (2018) 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 decision documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: economics/plan formulation, environmental law compliance, coastal/hydrology and hydraulic (H&H) engineering, and civil/geotechnical 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 all the final candidates to independently confirm that they had no COIs, and Battelle made the final selection of the four-person Panel from this list.

The Panel received electronic versions of the decision documents (901 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2018) 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.

IEPR panel members reviewed the decision documents individually and produced individual comments in response to the charge questions. 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, seven Final Panel Comments were identified and documented. Of these, one was identified as having medium/high significance, four have medium/low significance, and two have low significance.

Battelle received public comments from USACE on the Florida Keys CSRM (38 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 the Florida Keys CSRM review documents. After completing its review, the Panel confirmed that no new issues or concerns were identified other than those already covered 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, 2018) in the Florida Keys CSRM 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 report is well-written, is concise, and provides excellent supporting documentation on engineering, environmental, economic, and plan formulation issues. The Panel identified elements of the report that would benefit from being clarified or revised.

**Plan Formulation/Economics:** The Panel noted that the overall report was well-organized and provided consistent cross-referencing throughout the document. The Panel also commented that the planning and economic analyses were properly conducted and the analyses were adequately reported; therefore, no issues were noted for the economic analysis. However, the Panel is concerned that the Locally Preferred Plan (LPP) was not directly included as a planning alternative, despite potential cost advantages and reduced adverse environmental justice impacts when compared to the Tentatively Selected Plan (TSP). The Panel also understands that the LPP was not formally identified by the Non-Federal Sponsor prior to the publication of the DIFR/EIS and that a waiver to USACE policy is necessary for these benefits to be realized. If the waiver is granted, the Panel suggests that this alternative be fully evaluated and compared to the TSP to determine what benefits would be realized if implemented. The Panel also suggests that the alternatives analysis in the DIFR/EIS take into account the results of a thorough risk analysis and life safety analysis.

**Engineering:** The Panel commented that the alternatives screening process was detailed and considered future conditions such as SLR into the conceptual designs. However, the Panel noted that the engineering documents lacked detail regarding the design wave heights used by the Federal Emergency Management Agency (FEMA) in its wave analysis modeling. The Panel is concerned that the FEMA study may underpredict wave heights when compared to USACE Wave Information Study (WIS) stations. The Panel also recommends that the DIFR/EIS document how USACE determined the height limits for shoreline stabilization along U.S. Route 1. Adding this information will demonstrate the positive benefits and provide information on the minimization of scour and erosion of fine-grained material above riprap limits.

**Environmental:** The Panel observed that the environmental impacts and biological analyses are thoroughly assessed. One place where the DIFR/EIS could be strengthened is in the explanations for elevation limits for raising and/or flood-proofing structures. The limited information provided for this issue makes it hard to determine whether the protection extends to historic structures or considers environmental justice.

**Table ES-1. Overview of Seven Final Panel Comments Identified by the Florida Keys CSRM IEPR Panel**

| No. | Final Panel Comment |
|---|---|
| **Significance – Medium/High** | |
| 1 | The LPP was not directly included as a planning alternative, despite potential cost advantages and reduced adverse environmental justice impacts when compared to the TSP. |
| **Significance – Medium/Low** | |
| 2 | Details used to prepare the H&H/Coastal section of the Engineering Appendix, particularly with regard to the design wave heights, are not clearly documented. |
| 3 | The explanations for elevation limits for raising and/or flood-proofing structures are too limited to be able to determine whether the protection extends to historic structures or considers environmental justice. |
| 4 | The DIFR/EIS documents do not provide a complete evaluation of the alternatives because the results of a risk analysis and life safety analysis are not included. |
| 5 | The DIFR/EIS documents lack detail regarding the determination of height limits for shoreline stabilization along U.S. Route 1 that could provide a positive benefit and minimize the risks of scour and erosion. |
| **Significance – Low** | |
| 6 | The DIFR/EIS documents do not provide the source and quality of material for riprap, which affects the geotechnical assessment of abrasion resistance for the anticipated dynamic wave force. |
| 7 | Monitoring and adaptive management to address potential future consequences from SLR to shoreline stabilization revetments and mangrove habitat is not incorporated into the DIFR/EIS documents. |

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# LIST OF ACRONYMS

| | |
|---|---|
| **ADM** | Agency Decision Milestone |
| **BCR** | Benefit-to-Cost Ratio |
| **CMS** | Coastal Modeling System |
| **CSRM** | Coastal Storm Risk Management |
| **COI** | Conflict of Interest |
| **DIFR/EIS** | Draft Integrated Feasibility Report/Environmental Impact Statement |
| **DrChecks** | Design Review and Checking System |
| **EA** | Environmental Assessment |
| **EC** | Engineer Circular |
| **EIS** | Environmental Impact Statement |
| **EFH** | Essential Fish Habitat |
| **EPA** | Environmental Protection Agency |
| **ESA** | Endangered Species Act |
| **ER** | Engineer Regulation |
| **ERDC** | Engineer Research and Development Center |
| **FDOT** | Florida Department of Transportation |
| **FEMA** | Federal Emergency Management Agency |
| **G2CRM** | Generation 2 Coastal Risk Management (model) |
| **HEC** | Hydrologic Engineering Center |
| **HEP** | Habitat Evaluation Procedure |
| **H&H** | Hydrology and Hydraulic |
| **IEPR** | Independent External Peer Review |
| **LPP** | Locally Preferred Plan |
| **LPV** | Lake Pontchartrain and Vicinity |
| **MMPA** | Marine Mammal Protection Act |
| **NAVD88** | North American Vertical Datum of 1988 |
| **NED** | National Economic Development |
| **NEPA** | National Environmental Policy Act |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **O&M** | Operation and Maintenance |

| | |
|---|---|
| **OEO** | Outside Eligible Organization |
| **OMB** | Office of Management and Budget |
| **OPSEC** | Operations and Security |
| **PIANC** | World Association for Waterborne Transport Infrastructure |
| **PCX** | Planning Center of Expertise |
| **PDT** | Project Delivery Team |
| **SACS** | South Atlantic Coastal Study |
| **SAR** | Safety Assurance Review |
| **SLR** | Sea Level Rise |
| **TSP** | Tentatively Selected Plan |
| **USACE** | United States Army Corps of Engineers |
| **USFWS** | United States Fish and Wildlife Service |
| **WIS** | Wave Information Study (model) |

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# 1. INTRODUCTION

The Florida Keys are a 123-mile-long chain of islands extending into the Gulf of Mexico from the southern tip of Florida. The study area includes all of the Florida Keys, which are within Monroe County. A portion of Monroe County's land area is located on the mainland of Florida as well, but that area is largely Federal land within the Everglades National Park and therefore is not included in this Civil Works study.

Impacts from recent hurricanes have highlighted the need for a collaborative evaluation of coastal storm risk management for all of the Florida Keys. The average elevation of the islands ranges from 4 to 5 feet above mean sea level to 10 to 12 feet on some of the larger islands. All of the land surface area is vulnerable to the effects of coastal storms, and risk management measures are needed to protect critical infrastructure and evacuation routes and reduce structural damage from such storms. Specifically, U.S. Route 1 has been identified as an integral component of critical infrastructure in the study area, as it provides the primary ground transportation access and thus facilitates the evacuation of Florida Keys residents and tourists. Climate change effects in the Florida Keys include increasing sea levels and associated coastal flooding from regular, seasonal, or extreme tidal, wind, or storm events, which will continue to increase coastal storm risk within the study area.

The Florida Keys are an important asset to the economic development of the United States. The islands are a major tourism destination that also hold unique environmental resources, including the third largest coral reef in the world and 17 national and state parks. There is Federal interest in addressing the Keys' high levels of risk and vulnerability to coastal storms, which are expected to be compounded by the combined effects of sea level change and climate change. Analysis completed during the scoping phase identified a variety of structural and non-structural solutions that, if implemented, could have marked effects on resiliency and could be economically justified, environmentally acceptable, and consistent with U.S. Army Corps of Engineers (USACE) policy. This interest is also echoed across the region in the South Atlantic Coastal Study (SACS) and the 13 other coastal storm risk management studies that are currently being conducted within the state of Florida.

The study area will continue to be vulnerable to the effects of coastal storms in the future. In addition to damages to structures and critical infrastructure, there is a significant life safety component that should be considered due to the vulnerability of the population and the remoteness of the Keys, especially the lower islands. Study risks include the accurate projection of sea level rise over the period of analysis, the extremely rich environmental resources that are present within and adjacent to the study area, and the potentially limited ability to use existing models to analyze conditions in the study area due to unique geologic and hydrodynamic conditions.

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 Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida (hereinafter: Florida Keys CSRM IEPR) in accordance with procedures described in the Department of the Army, USACE, Engineer Circular (EC) *Review Policy for Civil Works* (EC 1165-2-217) (USACE, 2018) 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 Florida Keys CSRM IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted, including the 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 A-1. Appendix D presents the organizational COI form that Battelle completed and submitted to the Institute for Water Resources prior to the award of the Florida Keys CSRM 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, as described in USACE (2018).

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 Florida Keys CSRM DIFR/EIS was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-217). 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. The IEPR was completed in accordance with established due dates for milestones and deliverables as part of the final Work Plan; the due dates are based on the award/effective date and the receipt of review documents.

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: economics/plan formulation, environmental law compliance, coastal/hydrology and hydraulic (H&H) engineering, and civil/ geotechnical engineering. The Panel reviewed the Florida Keys CSRM documents and produced seven Final Panel Comments in response to 16 charge questions provided by USACE for the review. This charge also included two overview questions and one public comment question added by Battelle, for a total of 19 questions. 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 1165-2-217), 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, 2018) in the Florida Keys CSRM IEPR review documents. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, is concise, and provides excellent supporting documentation on engineering, environmental, economic, and plan formulation issues. The Panel identified elements of the report that would benefit from being clarified or revised.

**Plan Formulation/Economics:** The Panel noted that the overall report was well-organized and provided consistent cross-referencing throughout the document. The Panel also commented that the planning and economic analyses were properly conducted and the analyses were adequately reported; therefore, no issues were noted for the economic analysis. However, the Panel is concerned that the Locally Preferred Plan (LPP) was not directly included as a planning alternative, despite potential cost advantages and reduced adverse environmental justice impacts when compared to the Tentatively Selected Plan (TSP). The Panel also understands that the LPP was not formally identified by the Non-Federal Sponsor prior to the publication of the DIFR/EIS and that a waiver to USACE policy is necessary for these benefits to be realized. If the waiver is granted, the Panel suggests that this alternative be fully evaluated and compared to the TSP to determine what benefits would be realized if implemented. The Panel also suggests that the alternatives analysis in the DIFR/EIS take into account the results of a thorough risk analysis and life safety analysis.

**Engineering:** The Panel commented that the alternatives screening process was detailed and considered future conditions such as Sea Level Rise (SLR) into the conceptual designs. However, the Panel noted that the engineering documents lacked detail regarding the design wave heights used by the Federal Emergency Management Agency (FEMA) in its wave analysis modeling. The Panel is concerned that the FEMA study may underpredict wave heights when compared to USACE Wave Information Study (WIS) stations. The Panel also recommends that the DIFR/EIS document how USACE determined the height limits for shoreline stabilization along U.S. Route 1. Adding this information will demonstrate the positive benefits and provide information on the minimization of scour and erosion of fine-grained material above riprap limits.

**Environmental:** The Panel observed that the environmental impacts and biological analyses are thoroughly assessed. ne place where the DIFR/EIS could be strengthened is in the explanations for elevation limits for raising and/or flood-proofing structures. The limited information provided for this issue makes it difficult to determine whether the protection extends to historic structures or considers environmental justice.

## 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 LPP was not directly included as a planning alternative, despite potential cost advantages and reduced adverse environmental justice impacts when compared to the TSP.**

### Basis for Comment

Section 7.8 of the DIFR/EIS (main report) includes an evaluation of a possible LPP that appears to offer some advantages relative to the TSP. The evaluation indicates that the LPP would provide a higher benefit-to-cost ratio (BCR), a higher net annual benefit, and reduced adverse impacts with regard to environmental justice. Based on the mid-review teleconference call with USACE on July 10, 2020, the LPP has not been formally proposed and should not be considered as part of the analysis. Given the information in Section 7.8 of the DIFR/EIS, however, the primary difference between the TSP and the LPP is the extent of property acquisitions. Monroe County has proposed a waiver of USACE policy that requires mandatory use of acquisitions (Appendix H).

If this waiver is granted, the LPP could be considered an alternative that would be evaluated relative to the other alternatives described in Chapter 6 of the DIFR/EIS.

### Significance – Medium/High

The planning process and selection of the TSP would benefit from a complete array of alternatives.

### Recommendation for Resolution

1. Expand the array of alternatives considered in the planning and evaluation process to include the LPP as described in Section 7.8 of the DIFR/EIS.

## Final Panel Comment 2

**Details used to prepare the H&H/Coastal section of the Engineering Appendix, particularly with regard to the design wave heights, are not clearly documented.**

### Basis for Comment

The H&H/Coastal section of the Engineering Appendix (Chapter 4 of Sub-Appendix 1) relies heavily on a previous study from FEMA that addresses methods and models for calculating wave heights. While the H&H/Coastal section provides a minimal amount of data and a brief description of modeling (presumably from the FEMA study), details on the FEMA source material are not included, and the material was not provided. Without a more detailed discussion documenting FEMA's approach to wave analysis, it is difficult to fully understand how the design wave heights were determined without referring to the reference documents.

In addition, a quick review of USACE WIS stations indicates that the wave heights obtained from the FEMA study may be underpredicted. For example, WIS Station 63492, which is located offshore of West Summerland Key and Bahia Honda Key, has a 100-year wave height of 36.1 feet. Wave heights at the shoreline will therefore be depth-limited and highly dependent on the local water depths (including storm surge and SLR) at the base of the revetments. The expected 100-year water level including SLR was determined to be 10.41 feet NAVD88 (North American Vertical Datum of 1988) at Bahia Honda Key. Assuming the revetment toe is located at 0 feet NAVD88 (this information was not provided in the Engineering Appendix) and using linear wave theory, a wave height of 8.1 feet may impact the revetment at Bahia Honda Key (compared to the expect wave height of 4.34 feet provided in the Engineering Appendix).

### Significance – Medium/Low

A more detailed summary of the FEMA study would allow for a higher level of confidence in the determination of the design wave heights. An underprediction of wave heights will affect the stability of the revetment stone.

### Recommendations for Resolution

1. Revise the H&H section to include more details on the FEMA study, particularly on the design wave heights.
2. Using the USACE WIS Station wave results, perform a shoaling analysis and determine breaking wave heights at the base of the revetments, then compare to the FEMA wave results.
3. Revise the armor stone stability calculations if wave heights are revised.

## Final Panel Comment 3

**The explanations for elevation limits for raising and/or flood-proofing structures are too limited to be able to determine whether the protection extends to historic structures or considers environmental justice.**

### Basis for Comment

The DIFR/EIS cites a 12-foot limit for raising residential structures and a 3-foot limit for floodproofing commercial structures, but it does not provide documentation for those limits. Residential structures that would not be eligible to be raised would be acquired and demolished; many of these are National Register of Historic Places-eligible structures that occur within the Key West Historic District or are minority-owned or -occupied.

It is unclear from the discussion in the DIFR/EIS whether the stated elevation limits are based on a specific USACE policy or were calculated based on professional judgment. If professional judgment was used, then there may be an opportunity to exceed those limits under some circumstances. If so, potentially significant adverse environmental justice and/or historic resource impacts, as described in Table 9-1 (Environmental Compliance), could potentially be avoided.

### Significance – Medium/Low

The lack of documentation on how elevation limits were determined, particularly as they apply to potentially historic structures and/or minority-owned or -occupied structures, affects the clarity of the study documents.

### Recommendation for Resolution

1. Provide supporting documentation for the 12-foot limit for elevating residential structures, and the 3-foot limit for floodproofing commercial structures.

## Final Panel Comment 4

**The DIFR/EIS documents do not provide a complete evaluation of the alternatives because the results of a risk analysis and life safety analysis are not included.**

### Basis for Comment

The DIFR/EIS does not document the results of an explicit risk and uncertainty analysis associated with the proposed alternatives. Uncertainties about costs are discussed, but formal analysis is minimal. The most significant concern is that the damages avoided under the planning alternatives are presented as point estimates. No error bounds or confidence intervals are presented that would allow an assessment of the differences between alternatives and a determination as to whether these differences are meaningful.

Section 7.7 of the DIFR/EIS (main report) discusses the risk analysis but acknowledges that further analysis and information is necessary before the assessment is consistent with Engineer Regulation (ER) 1105-2-101, Risk Assessment for Flood Risk Management Studies (USACE, 2017). In addition, the DIFR/EIS states that the life risk analysis was not completed prior to its release and is still being evaluated using Hydrologic Engineering Center (HEC)-LifeSim 2.0. Therefore, it is not possible to fully assess whether the DIFR/EIS adequately addresses the stated need and intent.

### Significance – Medium/Low

The planning and evaluation process, and the peer review of this process, would benefit from a complete set of analyses as required by USACE planning guidance ER 1105-2-101.

### Recommendation for Resolution

1. Complete the required risk and life safety analyses and include this information in the evaluation of the alternatives to determine the TSP.

**Literature Cited:**

USACE (2017). Risk Assessment for Flood Risk Management Studies. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation (ER) 1105-2-101. July 17.

## Final Panel Comment 5

**The DIFR/EIS documents lack detail regarding the determination of height limits for shoreline stabilization along U.S. Route 1 that could provide a positive benefit and minimize the risks of scour and erosion.**

### Basis for Comment

The Executive Summary (p. iii) of the DIFR/EIS lists several measures to reduce coastal storm risk and damage throughout the Florida Keys. The first measure proposes the use of "shoreline stabilization in six different locations along U.S Route 1 (Overseas Highway) that were identified as having risk of damage due to erosion and/or wave energy during a storm event. These six rock revetment structures range in height from five to seven feet and were designed to reduce damage to a total of approximately 5,500 feet of roadway by stabilizing the shoreline and reducing the risk of washout."

The DIFR/EIS documents lack details regarding how the limits in the height of shoreline stabilization along U.S. Route 1 were determined. Given the vital role of U.S. Route 1 in evacuation during an emergency, addressing this concern will provide a positive benefit and minimize scour and erosion of fine-grained material above riprap limits.

### Significance – Medium/Low

The planning, design, and review process will be strengthened if all possible risks are assessed at the shoreline stabilization locations along U.S. Route 1. This is crucial given the vital role of the road during emergency evacuations.

### Recommendation for Resolution

1. Establish height limits of riprap at the six shoreline stabilization locations along U.S. Route 1 and provide supporting calculations of the wave force to determine the limits.

## Final Panel Comment 6

**The DIFR/EIS documents do not provide the source and quality of material for riprap, which affects the geotechnical assessment of abrasion resistance for the anticipated dynamic wave force.**

### Basis for Comment

The DIFR/EIS documents do not discuss the source and quality (pertinent engineering properties) of the materials to be used as riprap. The source of the materials contributes to the overall cost of the project. The quality or engineering properties of the materials (such as abrasive resistance) provide a guide to its sustainability to resist the dynamic impact of the design wave forces. Riprap material with low abrasive resistance will deteriorate more quickly, resulting in less protection of the shoreline and higher replacement costs.

### Significance – Low

Detailed information on the materials used as riprap would be beneficial to the planning and review process because the materials could impact the project cost and resilience and affect the design life of the project.

### Recommendation for Resolution

1. Provide specifications (engineering properties) for the material to be used as riprap and identify possible source(s).

## Final Panel Comment 7

**Monitoring and adaptive management to address potential future consequences from SLR to shoreline stabilization revetments and mangrove habitat is not incorporated into the DIFR/EIS documents.**

### Basis for Comment

The Engineering Appendix states that design considerations for the six shoreline stabilization revetments include the current road elevations and the presence of mangroves. Specifically, the crest elevation will be based on the road elevation of U.S. Route 1 rather than water levels, and a one-foot buffer allowance between mangrove root systems and the base of the revetments will be incorporated into the design.

Section 3.8 of the Engineering Appendix states that the project "…consists of components that are adaptable to future increases in sea level due to climate change" (p. 35). Consideration is given to increase the revetment crest elevations in the event the road elevation of U.S. Route 1 is increased in the future; however, no consideration is provided for the mangroves that provide soil stabilization at the base of the revetments.

SLR may cause reduced growth or die-off of existing mangroves (Krauss et al., 2008), while the presence of the proposed revetments will preclude up-slope recruitment of new mangroves. This could result in shoreline erosion at the base of the revetments, which in turn could affect the overall stability of the revetment stone. Additional stone placement may be required in the future to compensate for the absence of the mangroves.

### Significance – Low

Addressing the potential loss of mangrove habitat due to SLR and its effects on stability (and effectiveness) of the revetments would improve the description of the TSP.

### Recommendation for Resolution

1. Provide an overview of the monitoring and adaptive management plan for shoreline stabilization to compensate for loss of mangroves due to SLR.

**Literature Cited:**

Krauss, K.W., Lovelock, C.E., McKee, K.L., López-Hoffman, L., Ewe, Sharon M.L., and Sousa, W.P. (2008). Environmental drivers in mangrove establishment and early development. Aquatic Bot. 89:105-127.

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Krauss, K.W., Lovelock, C.E., McKee, K.L., López-Hoffman, L., Ewe, Sharon M.L., and Sousa, W.P. (2008). Environmental drivers in mangrove establishment and early development. Aquatic Bot. 89:105-127.

OMB (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.

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.

USACE (2018). Water Resources Policies and Authorities: Review Policy for Civil Works. Engineer Circular (EC) 1165-2-217. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. February 20.

USACE (2017). Risk Assessment for Flood Risk Management Studies. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation (ER) 1105-2-101. July 17.

# APPENDIX A

IEPR Process for the Florida Keys CSRM Project

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

Table A-1 presents the major milestones and deliverables of the Independent External Peer Review (IEPR) of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida (hereinafter: Florida Keys CSRM 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 June 19, 2020. 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 November 12, 2020. The actual date for contract end will depend on the date that all activities for this IEPR are conducted and subsequently completed.

**Table A-1. Major Milestones and Deliverables of the Florida Keys CSRM IEPR**

| Task | Action | Due Date |
|---|---|---|
| 1 | Award/Effective Date | 12/27/2019 |
| | Review documents available | 6/19/2020 |
| | Public comments available | 8/18/2020 |
| | Battelle submits draft Work Plan[a] | 1/8/2020 |
| | USACE provides comments on draft Work Plan | 1/14/2020 |
| | Battelle submits final Work Plan[a] | 1/17/2020 |
| 2 | Battelle submits list of selected panel members[a] | 1/15/2020 |
| | USACE confirms the panel members have no COI | 1/22/2020 |
| 3 | Battelle convenes kick-off meeting with USACE | 1/14/2020 |
| | Battelle convenes kick-off meeting with panel members | 5/18/2020 |
| | Battelle convenes kick-off meeting with USACE and panel members | 6/10/2020 |
| 4 | Panel members complete their individual reviews | 7/28/2020 |
| | Panel members provide draft Final Panel Comments to Battelle | 8/11/2020 |
| | Battelle sends public comments to panel members for review | 8/19/2020 |
| | Panel confirms no additional Final Panel Comment is necessary with regard to the public comments | 8/22/2020 |
| | Panel finalizes Final Panel Comments | 8/22/2020 |
| 5 | Battelle submits Final IEPR Report to USACE[a] | 9/2/2020 |
| 6[b] | Battelle convenes Comment Response Teleconference with panel members and USACE | 10/22/2020 |
| | Battelle submits pdf printout of DrChecks project file[a] | 11/5/2020 |
| | Agency Decision Milestone (ADM) meeting[c] | 10/26/2020 |
| | Contract End/Delivery Date | 1/19/2021 |

[a] *Deliverable.*
[b] *Task 6 occurs after the submission of this report.*
[c] *The ADM meeting was listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.*

At the beginning of the Period of Performance for the Florida Keys CSRM 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 16 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.

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

| Review Documents | No. of Review Pages |
|---|---|
| Main Report | 282 |
| Appendix A – Plan Formulation | 13 |
| Appendix B - Engineering | 99 |
| Appendix C - Economics | 53 |
| Appendix D – Environmental | 331 |
| Appendix E – Cultural | 73 |
| Appendix F – Real Estate | 24 |
| Appendix G – Non-Structural Implications | 20 |
| Appendix H – Correspondence with Non-Federal Sponsor | 6 |
| **Total Number of Review Pages** | **901** |
| **Public Comments** | **38** |

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

- Review Policy for Civil Works (EC 1165-2-217, February 20, 2018)
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review (December 16, 2004)
- Foundations of SMART Planning
- Feasibility Study Milestones (PB 2018-01, September 30, 2018 and PB 2018-01(S), June 20, 2019)
- SMART – Planning Overview
- Planning Modernization Fact Sheet
- USACE Climate Change Adaptation Plan (2015)
- Procedures to Evaluate SLR Change Impacts Responses Adaptation (ETL 1100-2-1 – June 30, 2014)
- Incorporating SLR Change in CW Programs (ER 1100-2-8162 – December 31, 2013).

About halfway through 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 13 panel member questions to USACE. USACE was able to provide responses to the mid-review questions during the teleconference and also provided written responses to all of the questions prior to the end of the review. As part of their response, USACE provided a more legible version of Appendix B: Engineering Appendix, Chapter 4, FEMA South Florida Storm Surge Study for the Panel to use.

## 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 Florida Keys CSRM 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 members 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 descriptions 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:** There is a fundamental issue within study documents or data that will influence the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
    2. **Medium/High:** There is a fundamental issue within study documents or data that has a strong probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
    3. **Medium:** There is a fundamental issue within study documents or data that has a low probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
    4. **Medium/Low:** There is missing, incomplete, or inconsistent technical or scientific information that affects the clarity, understanding, or completeness of the study documents, and there is uncertainty whether the missing information will affect the selection of, justification of, or ability to implement the recommended plan.

5. **Low:** There is a minor technical or scientific discrepancy or inconsistency that affects the clarity, understanding, or completeness of the study documents but does not influence the selection of, justification of, or ability to implement the recommended plan.

- 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, seven 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 38 pages of public comments on the Florida Keys CSRM in Excel, PDF, and Outlook Item formats. 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, Battelle determined and the Panel confirmed that no new issues or concerns were identified other than those already covered in the Final Panel Comments.

## 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. 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 seven Final Panel Comments developed by the Panel into USACE's 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 Florida Keys CSRM Project

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## B.1 Panel Identification

The candidates for the Independent External Peer Review (IEPR) of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida (hereinafter: Florida Keys CSRM IEPR) Panel were evaluated based on their technical expertise in the following key areas: economics/plan formulation, environmental law compliance, coastal/hydrology and hydraulic (H&H) engineering, and civil/ geotechnical engineering. These areas correspond to the technical content of the review documents and overall scope of the Florida Keys CSRM 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 four 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 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."

The term "firm" in a screening question referred to any joint venture in which a firm was involved. It applied to any firm that serves in a joint venture, either as a prime or as a subcontractor to a prime. Candidates were asked to clarify the relationship in the screening questions.

| Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida |
|---|
| 1. Previous and/or current involvement by you or your firm in the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida (hereinafter: Florida Keys, Monroe County) and related projects. |
| 2. Previous and/or current involvement by you or your firm in coastal storm risk management or similar studies in southern Florida and Florida Keys. |

| Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida |
|---|
| 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 Florida Keys, Monroe County 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 the Florida Keys, Monroe County, project. |
| 6. Previous and/or current employment or affiliation with the non-Federal sponsors or any of the following cooperating Federal, State, County, local and regional agencies, environmental organizations, and interested groups *(for pay or pro bono):*<br>• John Wood Group PLC consulting<br>• Environmental Protection Agency (EPA)<br>• Florida Department of Transportation (FDOT)<br>• NOAA Marine Sanctuary<br>• NOAA Protected Resources Division<br>• Federal Emergency Management Agency (FEMA) |
| 7. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to the Florida Keys |
| 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, Engineer Research and Development Center [ERDC], etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Jacksonville or Norfolk Districts. |
| 9. Previous or current involvement with the development or testing of models that were used for, or in support of, the Florida Keys, Monroe County, project. |
| 10. Current firm involvement with other USACE projects, specifically those projects/contracts that are with the Jacksonville or Norfolk Districts. 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 Jacksonville or Norfolk Districts. Please explain. |
| 11. Any previous employment by USACE as a direct employee, notably if employment was with the Jacksonville or Norfolk Districts. 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 Jacksonville or Norfolk Districts. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role. |

| Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida |
|---|
| 13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning coastal storm risk management studies, and include the client/agency and duration of review (approximate dates). |
| 14. Pending, current, or future financial interests in contracts/awards from USACE related to the Florida Keys, Monroe County, project. |
| 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 Monroe County contracts. |
| 17. Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Florida Keys, Monroe County, project |
| 18. Participation in relevant prior and/or current Federal studies related to the Florida Keys, Monroe County, project. |
| 19. Previous and/or current participation in prior non-Federal studies related to the Florida Keys, Monroe County, project. |
| 20. Has your research or analysis been evaluated as part of the Florida Keys, Monroe County, project? |
| 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. 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. Florida Keys CSRM IEPR Panel: Summary of Panel Members**

| Name | Affiliation | Location | Education | P.E. | Experience (years) |
|---|---|---|---|---|---|
| **Economist/Planning Formulator** | | | | | |
| Wally Milon | Independent consultant | Orlando, FL | Ph.D., Economics | No | 40 |
| **Environmental Law Compliance Specialist** | | | | | |
| Barry Vittor | Barry A. Vittor & Associates, Inc. | Mobile, AL | Ph.D., Ecology | No | 48+ |
| **Coastal/Hydrology and Hydraulic (H&H) Engineer** | | | | | |
| Michael Giovannozzi | AquaTerra Consulting International | West Palm Beach, FL | M.S., Civil Engineering (Coastal Engineering) | Yes | 20 |
| **Civil/Geotechnical Engineer** | | | | | |
| Kipkoech Chepkoit | Hanson Professional Services, Inc. | Maryland Heights, MO | Ph.D., Civil Engineering (Geotechnical) | Yes | 25 |

Table B-2 presents an overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information on the panel members and their areas of technical expertise is given in Section B.3.

**Table B-2. Florida Keys CSRM IEPR Panel: Technical Criteria and Areas of Expertise**

| Technical Criterion | Milon | Vittor | Giovannozzi | Chepkoit |
|---|---|---|---|---|
| **Economist/Planning Formulator** | | | | |
| At least 10 years of demonstrated experience in public works planning | X | | | |
| Minimum M.S. degree or higher in economics | X | | | |
| Two years of experience in reviewing federal water resource economic documents justifying construction efforts are required | X | | | |
| Experience related to regional economic development and capable of evaluating traditional National Economic Development (NED) plan benefits associated with hurricane and coastal storm risk management projects | X | | | |
| Some familiarity with Generation 2 Coastal Risk Model (G2CRM) and Hydrologic Engineering Center's (HEC's)-LifeSim modeling | X | | | |
| Demonstrated experience in public works planning with a minimum of 5 years of experience directly managing the U.S. Army Corps of Engineers (USACE) SMART Planning process and risk-informed planning as outlined in the Planning Manual Part II: Risk-Informed Planning and ER 1005-2-100, Planning Guidance Notebook | X | | | |

**Table B-2. Florida Keys CSRM IEPR Panel: Technical Criteria and Areas of Expertise (cont'd)**

| Technical Criterion | Milon | Vittor | Giovannozzi | Chepkoit |
|---|---|---|---|---|
| **Economist/Planning Formulator (cont'd)** | | | | |
| Familiarity with the USACE plan formulation process, procedures, and standards, as it relates to coastal storm risk management projects | X | | | |
| **Environmental Law Compliance Specialist** | | | | |
| A minimum 10 years of demonstrated experience in evaluating and conducting National Environmental Policy Act (NEPA) impact assessments, including cumulative effects analyses | | X | | |
| Experience in coastal storm risk management and coastal watersheds | | X | | |
| Experience with the Endangered Species Act (ESA), essential fish habitat, and the Marine Mammal Protection Act (MMPA) | | X | | |
| Knowledge of construction impacts on marine and coastal regions | | X | | |
| **Coastal/Hydrology and Hydraulic Engineer** | | | | |
| Registered professional engineer | | | X | |
| Minimum 10 years of experience in coastal and hydraulic engineering, or a professor from academia with extensive background in coastal processes and hydraulic theory and practice | | | X | |
| Minimum M.S. degree or higher in engineering | | | X | |
| Active participation in related professional societies | | | X | |
| Familiarity with USACE application of risk and uncertainty analysis in hurricane and coastal storm risk management projects | | | X | |
| Experience with USACE Safety Assurance Review (SAR) | | | X | |
| **Civil/Geotechnical Engineer** | | | | |
| Registered professional engineer | | | | X |
| A minimum of 15 years of experience in civil engineering and design | | | | X |
| Minimum B.S. or higher in engineering | | | | X |
| Senior-level civil engineer with expertise in roadway design and familiarity with the structural and non-structural measures used in a coastal storm risk management study | | | | X |
| Understanding of the behavior of soils, site characterization, material management, and slope stability | | | | X |
| Familiarity with the porous limestone geology found in the Florida Keys | | | | X |

## B.3 Panel Member Qualifications

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

| | |
|---|---|
| **Name** | J. Walter Milon, Ph.D. |
| **Role** | Economist / Planning Formulator |
| **Affiliation** | Independent Consultant |

Dr. Milon is the Provost's Distinguished Research Professor in the Department of Economics at the University of Central Florida's College of Business Administration and a founding faculty member of the National Center for Integrated Coastal Research at the University of Central Florida. He has taught graduate and undergraduate courses in benefit-cost and social impact analyses, economic theory, and natural resource and environmental economics. He earned his Ph.D. in economics from Florida State University in 1978 and has more than 40 years of experience in natural resource and environmental economics and water resource economic evaluation. He is a member of the Association of Environmental and Resource Economists and the American Economic Association.

Dr. Milon is familiar with USACE and SMART plan formulation processes, procedures, and standards as they relate to ecosystem restoration and flood risk management. He has more than 10 years of experience reviewing Federal water resource economic documents evaluating construction projects for coastal storm risk management, flood risk management, and ecosystem restoration. He has participated in planning and technical advisory support for the USACE Florida Everglades Restudy and was lead economist on eight USACE IEPRs: the Everglades C-111 construction project; the Louisiana Coastal Areas Restoration Project; the White Oak Bayou, Texas, flood control plan; the Walton County, Florida hurricane flood risk study; the Caño Martin Peña Ecosystem Restoration Project, San Juan, Puerto Rico; the Rio Grande de Arecibo flood risk management study; the Lake Okeechobee, Florida, Watershed Restoration Project; and the Savannah Harbor Expansion Project Fish Passage at New Savannah Bluff Lock and Dam Integrated Post-Authorization Analysis Report and Environmental Assessment. Dr. Milon is familiar with large, complex Civil Works projects with high public and interagency interests and has reviewed USACE projects utilizing probabilistic life cycle analysis models such as HEC-LifeSim, Beach-fx, and G2CRM.

In addition, Dr. Milon has more than 25 years of experience in research and economic analysis related to fisheries economics and recreational fishing. He supervised several fisheries research projects for the National Marine Fisheries Service and served as a technical expert for Federal fishery management councils and journals. He also conducted research on the initial development of the Florida Keys National Marine Sanctuary and was a co-principal investigator for the project "Human-Environment Linkages in the South Florida Coastal Ecosystem: Effects of Natural and Anthropogenic Stressors" funded by the Coastal Ocean Program, U.S. National Oceanic and Atmospheric Administration (NOAA).

Dr. Milon is the co-editor of the recent book, *Coastal Resource Economics and Ecosystem Valuation,* and more than 15 book chapters, 45 reports, and 40 journal articles. He has been involved in more than 25 university contracts and grants and serves as a private economic consultant to both government and private clients.

| | |
|---|---|
| **Name** | Barry Vittor, Ph.D. |
| **Role** | Environmental Law Compliance Specialist |
| **Affiliation** | Barry A. Vittor & Associates, Inc. |

Dr. Vittor is President and Senior Scientist at Vittor & Associates, with more than 48 years of experience in water resource planning, including port development, beach renourishment, and dune and barrier island reconstruction. He earned his Ph.D. in ecology from the University of Oregon. As a member of the Board of Directors of the Alabama Coastal Foundation and a member of the Mobile Bay National Estuary Program Management Committee, he has been very active in coastal resource management.

Dr. Vittor has conducted NEPA impact assessments for USACE, the U.S. EPA, and other public sector and private clients. He has prepared EISs and environmental assessments (EAs) and has conducted wetlands delineation; restoration and management studies; Essential Fish Habitat (EFH) assessments; benthic community impact assessments and baseline studies; and threatened/endangered species evaluations for numerous coastal area projects, including petroleum-related developments, shoreline protection and restoration, navigation-related projects, and beach renourishment projects. He has assisted in regulatory agency permitting of hundreds of public and private projects throughout the southeast, for port developments, shoreline protection/restoration, beach renourishment, utility installations and other infrastructure projects, aquatic weed control programs, and hurricane-related debris cleanup. Examples include the Gulf Liquefied Natural Gas regasification plant on Bayou Casotte (Mississippi), flood control and ecosystem restoration feasibility studies of the D'Olive Creek watershed in coastal Alabama, post-Hurricane Katrina debris removal in coastal Mississippi and Alabama, and the programmatic EIS for New York District navigation projects in the Port of New York/New Jersey.

Dr. Vittor is experienced in coastal storm risk management projects, particularly in urbanized coastal areas. He has been involved in EAs related to barrier island reconstruction after Hurricane Katrina; studies of port development impacts on wave run-up during major storm events; and USACE IEPRs for the Hereford Inlet to Cape May Inlet, New Jersey, Hurricane and Coastal Storm Damage Risk Reduction Project Draft Feasibility Report and Environmental Assessment, and the Surf City and North Topsail Beach Integrated Feasibility Report and Environmental Impact Statement.

Dr. Vittor is familiar with the habitat and the fish and wildlife species that may be affected by project alternatives in a study area. He has studied ecosystems along the entire U.S. Atlantic and Gulf coasts regarding fisheries, benthic and demersal fauna, avifauna, and other biological resources, along with assessments of beach renourishment/sand borrow projects and port and navigation development projects.

Dr. Vittor has extensive experience in most aspects of the Clean Water Act of 1972, including Section 404 wetlands and streams, National Pollutant Discharge Elimination System discharge permit monitoring, ocean disposal of dredged material, and Section 408 Federal projects coordination. He has handled hundreds of Section 404, Section 7, and Section 10 projects with the U.S. Fish and Wildlife Service (USFWS). He has also prepared Habitat Conservation Plans for a number of protected species.

Dr. Vittor is familiar with the USFWS Habitat Evaluation Procedure (HEP) and has applied HEP and several other habitat functional value indices (e.g., Cover Type, Hydrogeomorphic Approach, Wetlands Evaluation Technique, Wetlands Rapid Assessment Procedure) to field assessments of port development projects along the Gulf Coast, navigation channel maintenance dredging/disposal in riverine and

embayment projects in the New York District, and numerous private development projects. He has conducted numerous studies and surveys of plant and animal species listed under the ESA, for a wide variety of public and private client projects, in the Gulf of Mexico and along the Eastern Seaboard. He has prepared biological assessments for terrestrial and aquatic species in accordance with USFWS guidelines and has addressed protected species of plants and animals in reviews of coastal beach and dune reconstruction projects on the U.S. Atlantic Coast. He has assessed EFH impacts related to beach renourishment, sand borrow operations, petroleum development, and port/navigation projects along the U.S. Atlantic and Gulf Coasts, and has evaluated EFH impacts of storm debris removal operations in the northern Gulf of Mexico.

Dr. Vittor is familiar with the MMPA and has assessed potential impacts of offshore oil and gas developments on marine mammals in the Gulf of Mexico, including noise effects, ship collisions, and seismic surveys. He has also participated in peer reviews of impacts of coastal dune and beach reconstruction on marine mammals along the U.S. Atlantic Coast and has coordinated with the National Marine Fisheries Service regarding potential impacts of storm debris clean-up operations on marine mammals (especially bottlenose dolphin) in the northern Gulf.

Dr. Vittor has served on several USACE IEPR panels as a biology, ecology, and NEPA specialist for coastal storm damage reduction, flood risk management, deep draft navigation, and ecosystem restoration studies.

| | |
|---|---|
| **Name** | Michael Giovannozzi, P.E. |
| **Role** | Coastal/Hydrology and Hydraulic Engineer |
| **Affiliation** | AquaTerra Consulting International |

Mr. Giovannozzi is a coastal engineer and independent consultant with more than 20 years of engineering experience in both government and private sectors in the fields of coastal and hydraulic engineering, including deep-draft navigation projects, throughout the United States. He earned both a B.S. and an M.S. in civil engineering from the University of Delaware, with a coastal engineering concentration for his graduate degree. He is a registered professional engineer in Washington, Florida, Alabama, Connecticut, Georgia, South Carolina, Texas, North Carolina, New Jersey, and Delaware. He worked for three years with USACE Philadelphia District (2001-2004), two years with USACE Seattle District (2009-2011), and 15 years in private consulting.

Mr. Giovannozzi has extensive experience designing navigation improvement projects in tidally influenced systems, including channel deepening projects. In the area of coastal current studies, he has performed extensive hydrodynamic and sediment transport modeling, morphologic analysis, and engineering assessments for multiple projects to determine expected water levels, tidal exchange, wave conditions, and circulation patterns. While at USACE Philadelphia District, he was the hydraulic engineer for a coastal inlet hydrodynamics study that involved numerical modeling to predict sediment transport potential for several alternative sand borrow-area strategies for a Federal beach fill project near a coastal inlet in Ocean City, New Jersey. He also was the coastal engineer for a dredging/environmental restoration project for an island community located on the Intracoastal Waterway in Palm Beach County, Florida. The work included tidal hydraulic modeling, channel optimization, and dredging cost estimates for hydraulic and mechanic dredging to restore tidal connectivity.

Mr. Giovannozzi is familiar with the application of USACE risk and uncertainty analyses and coastal engineering requirements for feasibility studies (including channel design and effects of navigation channels on currents, sea level rise, sedimentation, and water quality). He has demonstrated experience in deep-draft navigation channel design. Notably, he was involved in the hydrodynamic modeling and navigation studies of the canals for the World Islands Mega Project in Dubai, United Arab Emirates. The project required a balanced design that allowed for safe navigation of pleasure craft and provided sufficient flow to minimize siltation and improve tidal flow, while also minimizing shoreline erosion. The study included hydrodynamic and sediment transport modeling and determination of safe navigational clearances for vessels. In addition, Mr. Giovannozzi was the lead project engineer for a Section 905(b) Reconnaissance Study that examined the potential need for navigation improvements for the Neah Bay Entrance Channel in Washington State to enable deeper-draft vessels to use the port for commerce and as a safe harbor of refuge.

Mr. Giovannozzi has specialized experience in subsurface investigations for channel design, dredged material management, and the design of dredged material placement areas (open water, ocean disposal, and beneficial use). He is familiar with both mechanical and hydraulic dredging technologies and has completed the USACE Dredging Fundamentals Course. While at USACE Seattle District, he was the project manager for the outer reach of the Grays Harbor Navigation Channel Maintenance Dredging project and worked with Miami Dade County on several channel and berth deepening projects at the Port of Miami. Mr. Giovannozzi recently developed a dredged material management plan for the Panama Canal Authority. The dredge disposal plan included best management strategies (including beneficial reuse) for six confined upland and nearshore disposal areas for marina and riverine dredging along the Pacific region of the Panama Canal. The work included a review of subsurface sediments for beneficial reuse, construction of internal dikes, and expansion of the perimeter dikes to optimize storage within the disposal areas.

In addition, Mr. Giovannozzi is familiar with standard USACE H&H computer models and has been working with numerical modeling applications for navigation projects for more than 18 years. For example, he used the USACE numerical wave and circulation models, Coastal Modeling System (CMS) Wave and CMS Flow, respectively, to assess channel realignment scenarios for the Quillayute Navigation Channel Improvement Study in Washington State. The computer models were used to optimize the channel modification scheme to improve hydraulic efficiency with an aim to reduce future maintenance dredging activities. Recommendations were provided to alter the channel cross section and to rehabilitate a nearby sea dike to optimize the channel flow. Mr. Giovannozzi has also performed wave and circulation modeling for a navigation study to assess the feasibility of deepening the Intracoastal Waterway to accommodate deep-draft megayachts at a yacht repair facility located near the Port of Palm Beach in Palm Beach County, Florida.

Mr. Giovannozzi is experienced in hurricane and flood damage risk analysis and is familiar with USACE risk registers and cost and schedule risk analysis. He has addressed Safety Assurance Review (SAR) aspects on several USACE projects, including the Neah Bay Entrance Channel Breakwater Repair (Seattle District).

Mr. Giovannozzi is an active member of the American Society of Civil Engineers; the Coasts, Oceans, Ports, and Rivers Institute; and the Association of Coastal Engineers. He regularly attends and presents at national and international conferences on flood damage reduction and shoreline protection. In addition, he served as the Secretary for the World Association for Waterbourne Transport Infrastructure (PIANC)

Recreational Committee Work Group on Marina Design and as PIANC YP-Com Vice-Chair of the Americas.

| | |
|---|---|
| **Name** | Kipkoech Chepkoit, Ph.D., P.E. |
| **Role** | Civil / Geotechnical Engineering |
| **Affiliation** | Hanson Professional Services, Inc. |

Dr. Chepkoit is the chief geotechnical engineer at Hanson Professional Services, Inc., and has 25 years of experience in geotechnical subsurface explorations and computation, analysis, and design of soil-structure interaction. He earned his Ph.D. in civil engineering (geotechnical) from the University of Maryland and is a registered professional engineer in Missouri, Louisiana, Illinois, Arkansas, Tennessee, Iowa, Michigan, Mississippi, Indiana, Florida, New York, Washington, Oklahoma, and Ohio. His specific geotechnical expertise is in deep and shallow foundations design; geotechnical seismic evaluation and design; retaining structures; settlement of structures and embankments; slope stability and stabilization; soil shrink/swell/collapse and remediation; shoring and retention systems; non-destructive testing of foundations; site grading and compaction; and soil improvements and stabilization using deep dynamic compaction and chemical stabilization.

Dr. Chepkoit has experience performing engineering during construction services during his work on the Devils Lake City Embankments for USACE St. Paul District. His responsibilities included designing a 6-foot raise to the existing embankment, designing a new pump station compatible with the raise, documenting the design analysis, preparing construction plans and specifications, preparing the construction cost estimate, and responding to questions and preparing amendments during the solicitation period.

Dr. Chepkoit has familiarity and experience with the structural and non-structural measures used in coastal storm risk management. He participated as a geotechnical engineer on the Hurricane and Storm Damage Risk Reduction System, USACE New Orleans District Lake Pontchartrain and Vicinity (LPV) floodwall and levee projects, providing engineering services for design and construction of the floodwalls and levees; participating in the design process; determining the geological/soil profiles and soil parameters; performing global stability analyses, settlement analyses, and pile capacity analyses; determining downdrag forces; evaluating cofferdam design and temporary shoring during construction sequencing; and preparing plans and specifications.

Dr. Chepkoit has familiarity and experience with the porous limestone geology of the Florida Keys and other challenging geological units nationwide. For the FDOT and City of Jacksonville, he reviewed plans for the bridge foundation of a highway interchange and modeled temporary shoring for stage construction and preparation of specifications and construction drawings. As the geotechnical engineer for the Monroe County Board of Aviation in Bloomington, Indiana, Dr. Chepkoit evaluated effective and long-lasting solutions to sinkholes along the west edge of Runway 17-35 at the airport, conducting the geotechnical exploration and preparing a geotechnical recommendation report and design and construction plans. For the Missouri Department of Transportation, for the Route 160 bridge over Interstate 1-44, Dr. Chepkoit was the geotechnical engineer responsible for deep foundation recommendations (per load and resistance factor design) for end-bearing piles on predrilled pinnacled bedrock; analysis and design of mechanically stabilized earth walls; stage construction; and preparation of specifications and construction drawings.

For a private venture that was constructing wind turbines in New York, Dr. Chepkoit was the geotechnical engineer responsible for gravity foundation recommendations on soil and karstic bedrock (soluble rock). He performed standard and cone penetration tests, conducted a geophysical analysis, and developed a report with recommendations.

Dr. Chepkoit was an IEPR reviewer of the geotechnical engineering for the New Orleans Hurricane and Storm Damage Risk Reduction System LPV 145, which involved review of analyses, design, and plans and specifications for hurricane protection system improvements, including pile-supported floodwalls. The project involved the construction of 5.75 miles of pile-supported T-wall to provide hurricane risk reduction for the 1% design storm event. For the USACE Chicago District, Chicago Underflow Plan (CUP) for McCook Reservoir, Dr. Chepkoit was the IEPR reviewer of the geotechnical engineering. He reviewed the design of the 22,000-acre-foot McCook Reservoir at four different stages of completion: a review of the 100% complete plans and specifications; a construction phase review at 50% complete; a construction phase review at 95% complete; and operation and maintenance, repair, replacement and rehabilitation documents and manuals.

Dr. Chepkoit is an active member of the American Society of Civil Engineers (St. Louis chapter), Society of American Military Engineers (St. Louis post), and the National Council of Examiners for Engineering and Surveying.

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# APPENDIX C

Final Charge for the Florida Keys CSRM IEPR

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# Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida

***This is the final Charge to the Panel for the Florida Keys CSRM IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on January 17, 2020. The dates and page counts in this document have not been updated to match actual changes made throughout the project.***

## BACKGROUND

The study area includes all of the Florida Keys, which are within Monroe County. The Florida Keys are a 123-mile-long chain of islands extending into the Gulf of Mexico from the southern tip of Florida. A portion of Monroe County's land area is located on the mainland of Florida as well, but is largely Federal land within the Everglades National Park and therefore will not be included in this Civil Works study.

Impacts from recent hurricanes have highlighted the need for a collaborative evaluation of coastal storm risk management for all of the Florida Keys. Average elevation of the islands ranges from four to five feet above mean sea level to 10 or 12 feet on some of the larger islands. For this reason, all of the land surface area is vulnerable to the effects of coastal storms, and there is a need for coastal storm risk management to address protection of critical infrastructure, reduction of structure damages, and evacuation route protection. Specifically, U.S. Route 1 has been identified as an integral component of critical infrastructure in the study area, as it provides the primary ground transportation access and thus facilitates the evacuation of Florida Keys residents and tourists. Climate change effects in the Florida Keys include increasing sea levels and associated coastal flooding from regular, seasonal, or extreme tidal, wind, or storm events which will continue to increase coastal storm risk within the study area.

The Florida Keys are an important asset to the economic development of the United States; the islands are a major tourism destination that also hold unique environmental resources, including the third largest coral reef in the world and 17 national and state parks. There is Federal interest in addressing the Keys' high levels of risk and vulnerability to coastal storms, which is expected to be compounded by the combined effects of sea level change and climate change. Analysis completed during the scoping phase indicates the potential for a variety of structural and non-structural solutions to have marked effects on resiliency and to be economically justified, environmentally acceptable, and consistent with United States Army Corps of Engineers (USACE) policy. This interest is also echoed across the region in the South Atlantic Coastal Study (SACS) and the 13 other coastal storm risk management studies that are currently being conducted within the state of Florida.

The study area will continue to be vulnerable to the effects of coastal storms in the future. In addition to damages to structures and critical infrastructure, there is a significant life safety component that should be considered due to the vulnerability of the population and the remoteness of the Keys, especially the lower islands. Study risks include the accurate projection of sea level rise over the period of analysis, the extremely rich environmental resources that are present within and adjacent to the study area, and the potentially limited ability to use existing models to analyze conditions in the study area due to unique geologic and hydrodynamic conditions.

## OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida (hereinafter: Florida Keys CSRM IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Review Policy for Civil Works* (Engineer Circular [EC] 1165-2-217, dated February 20, 2018), and the Office of Management and Budget's (OMB'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 and environmental assumptions and projections, project evaluation data, economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in evaluation of economic or environmental impacts, and any biological opinions" (EC 1165-2-217; p. 39) 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 1165-2-217 (p. 41), 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

| Review Documents | No. of Review Pages | Subject Matter Experts | | | |
|---|---|---|---|---|---|
| | | Economist/ Planning Formulator | Environmental Law Compliance Specialist | Coastal/ Hydrology and Hydraulic Engineer | Civil/ Geotechnical Engineer |
| Main Report | 500 | 500 | 500 | 500 | 500 |
| Appendix A – Plan Formulation | 100 | 100 | 100 | 100 | 100 |
| Appendix B - Engineering | 800 | | | 800 | 800 |
| Appendix C - Economics | 250 | 250 | | | |
| Appendix D – Environmental | 600 | | 600 | | |
| Appendix E – Real Estate Plan | 50 | | 50 | | |

| Review Documents | No. of Review Pages | Subject Matter Experts | | | |
|---|---|---|---|---|---|
| | | Economist/ Planning Formulator | Environmental Law Compliance Specialist | Coastal/ Hydrology and Hydraulic Engineer | Civil/ Geotechnical Engineer |
| Appendix F - Correspondence | 20 | 20 | 20 | | |
| Appendix G – Review Certifications | 10 | 10 | 10 | | |
| **Total Number of Review Pages** | **2,330** | **880** | **1,280** | **1,400** | **1,400** |
| **Public Comments[ab]** | **200** | **200** | **200** | **200** | **200** |

a. USACE will submit public comments to Battelle, which will in turn submit the comments to the IEPR Panel.
b. The Public Comment page count was not included in the overall review pages due to the hours being considered separately and Options 1 or 3 being implemented if the page count increases.

### Documents for Reference

- Review Policy for Civil Works (EC 1165-2-217, February 20, 2018)
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review (December 16, 2004)
- Foundations of SMART Planning
- Feasibility Study Milestones (PB 2018-01, September 30, 2018; PB 2018-01(S), June 20, 2019)
- SMART – Planning Overview
- Planning Modernization Fact Sheet
- USACE Climate Change Adaptation Plan (2015)
- 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 date of the final review documents and may be revised if review document availability changes. This schedule may also change due to circumstances out of Battelle's control such as changes to USACE's project schedule and unforeseen changes to panel member and USACE availability. As part of each task, the panel member will prepare deliverables by the dates indicated in the table (or as directed by Battelle). All deliverables will be submitted in an electronic format compatible with MS Word (Office 2003).

| Task | Action | Due Date |
|---|---|---|
| **Meetings** | Subcontractors complete mandatory Operations Security (OPSEC) training | 2/29/2020 |
| | Battelle sends review documents to panel members | 3/11/2020 |

| Task | Action | Due Date |
|---|---|---|
| | Battelle convenes kick-off meeting with panel members | 3/12/2020 |
| | Battelle convenes kick-off meeting with USACE and panel members | 3/13/2020 |
| | Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE | 3/24/2020 |
| **Review** | Panel members complete their individual reviews | 4/8/2020 |
| | Battelle provides talking points for Panel Review Teleconference to panel members | 4/10/2020 |
| | Battelle convenes Panel Review Teleconference | 4/13/2020 |
| | Battelle provides Final Panel Comment templates and instructions to panel members | 4/14/2020 |
| | Panel members provide draft Final Panel Comments to Battelle | 4/21/2020 |
| | Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments | 4/22/2020-4/28/2020 |
| | Panel finalizes Final Panel Comments | 4/29/2020 |
| **Public Comment Review** | Battelle receives public comments from USACE | 5/1/2020 |
| | Battelle sends public comments to Panel | 5/4/2020 |
| | Panel completes its review of public comments | 5/7/2020 |
| | Battelle and Panel review the Panel's responses to the charge question regarding the public comments | 5/8/2020 |
| | Panel drafts Final Panel Comment for public comments, if necessary | 5/12/2020 |
| | Panel finalizes Final Panel Comment regarding public comments, if necessary | 5/14/2020 |
| **Final Report** | Battelle provides Final IEPR Report to panel members for review | 5/18/2020 |
| | Panel members provide comments on Final IEPR Report | 5/20/2020 |
| | *Battelle submits Final IEPR Report to USACE | 5/22/2020 |
| | USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance | 6/1/2020 |
| **Comment Response Process** | Battelle inputs Final Panel Comments to Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE | 6/3/2020 |
| | Battelle convenes teleconference with Panel to review the Comment Response process | 6/3/2020 |
| | USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review | 6/24/2020 |
| | USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed | 6/30/2020 |

| Task | Action | Due Date |
|---|---|---|
| | USACE PCX provides draft PDT Evaluator Responses to Battelle | 7/1/2020 |
| | Battelle provides draft PDT Evaluator Responses to panel members | 7/6/2020 |
| | Panel members provide draft BackCheck Responses to Battelle | 7/9/2020 |
| | Battelle convenes teleconference with panel members to discuss draft BackCheck Responses | 7/10/2020 |
| | Battelle convenes Comment Response Teleconference with panel members and USACE | 7/13/2020 |
| | USACE inputs final PDT Evaluator Responses to DrChecks | 7/20/2020 |
| | Battelle provides final PDT Evaluator Responses to panel members | 7/21/2020 |
| | Panel members provide final BackCheck Responses to Battelle | 7/24/2020 |
| | Battelle inputs panel members' final BackCheck Responses to DrChecks | 7/27/2020 |
| | *Battelle submits pdf printout of DrChecks project file | 7/28/2020 |
| **ADM** | Agency Decision Milestone (ADM) Meeting | 9/10/2020 |
| | Contract End/Delivery Date | 1/19/2021 |

* Deliverables

** Battelle will provide public comments to panel members after they have completed their individual reviews of the project documents to ensure that the public comment review does not bias the Panel's review of the project documents.

## 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. Some sections have no questions associated with them; however, you may still 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 1165-2-217).

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, Patti Connaughton-Burns (burnsp@battelle.org), or Program Manager, Lynn McLeod (mcleod@battelle.org), for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Lynn McLeod (mcleod@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, no later than 10 pm ET by the date listed in the schedule above.

# Independent External Peer Review of the Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida

## Charge Questions and Relevant Sections as Supplied by USACE

The following Review Charge to Reviewers outlines the objectives of the Independent External Peer Review (IEPR) for the subject study and identifies specific items for consideration for the IEPR Review Panel.

The objective of the IEPR is to obtain an independent evaluation of whether the interpretations of analysis and conclusions based on analysis are reasonable for the subject study. The IEPR Review Panel is requested to offer a broad evaluation of the overall study decision document in addition to addressing the specific technical and scientific questions included in the Review Charge. The Review Panel has the flexibility to bring important issues to the attention of decision makers, including positive feedback or issues outside those specific areas outlined in the Review Charge. The Review Panel can use all available information to determine what scientific and technical issues related to the decision document may be important to raise to decision makers. This includes comments received from agencies and the public as part of the public review process.

The Panel review is to focus on scientific and technical matters, leaving policy determinations for USACE and the Army. The Panel should not make recommendations on whether a particular alternative should be implemented or present findings that become “directives” in that they call for modifications or additional studies or suggest new conclusions and recommendations. In such circumstances the Review Panel would have assumed the role of advisors as well as reviewers, thus introducing bias and potential conflict in their ability to provide objective review.

Panel review comments are to be structured to fully communicate the Panel’s intent by including the comment, why it is important, any potential consequences of failure to address, and suggestions on how to address the comment.

The Review Panel is asked to consider the following items as part of its review of the decision document and supporting materials.

1. Is the need for and intent of the decision document clearly stated?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical information?

Given the need for and intent of the decision document, assess the adequacy and acceptability of the following:

3. Project evaluation data used in the study analyses,
4. Economic, environmental, social, and engineering assumptions that underlie the study analyses,
5. Economic, environmental, social, and engineering methodologies, analyses, and projections,

6. Models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives,
7. Methods for integrating risk and uncertainty,
8. Formulation of alternative plans and the range of alternative plans considered,
9. Quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans, and
10. Overall assessment of significant environmental impacts, social justice, and any biological analyses.

Further,

11. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable, and
12. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.

For the tentatively selected plan, assess whether:

13. The models used to assess life safety hazards are appropriate,
14. The assumptions made for the life safety hazards are appropriate,
15. The quality and quantity of the surveys, investigations, and engineering are sufficient for a concept design considering the life safety hazards and to support the models and assumptions made for determining the hazards, and
16. The analyses adequately address the uncertainty and residual risk given the consequences associated with the potential for loss of life for this type of project.

## Battelle Summary Charge Questions to the Panel Members[1]

### Summary Questions

17. 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.
18. Please provide positive feedback on the project and/or review documents.

### Public Comment Questions

[1] Questions 17 through 19 are Battelle-supplied 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.

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

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# APPENDIX D

Conflict of Interest Form

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David Kaplan
USACE, Institute for Water Resources
December 19, 2019
C-2

# Conflicts of Interest Questionnaire

**Independent External Peer Review**

**Florida Keys, Coastal Storm Risk Management Study, Monroe County, Florida**

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 Corporate Operations**
REPRESENTATIVE'S NAME: **Courtney Brooks**
TELEPHONE: **614-424-5623**
ADDRESS: **505 King Avenue, Columbus, Ohio 43201**
EMAIL ADDRESS: **brooksc1@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 Brooks

December 19, 2019
Date

BATTELLE

It can be done