



INDEPENDENT EXTERNAL PEER REVIEW PANEL

for the

UPPER BARATARIA, LOUISIANA, INTEGRATED FEASIBILITY STUDY

The U.S. Army Corps of Engineers submits the following information per requirements in the Water Resources Reform and Development Act of 2014, Section 1044(c)(4)(B).

Entity Conducting the Review	
Outside Eligible Organization:	Battelle 505 King Avenue Columbia, OH 43201
Dates of Review	
Review Initiation:	4 December 2019
Type I IEPR Final Report Submittal:	14 February 2020
Reviewer Names and Qualifications	
Marvin Feldman	Planning Formulator/Economist
<p>Dr. Feldman, an independent consultant and principal economist at Resource Decisions, has more than 39 years of experience in water resource and environmental economics. He earned his M.S. in water resource management in 1969 and a Ph.D. in natural resource economics in 1979 from the University of Wisconsin.</p> <p>Dr. Feldman is experienced in the evaluation and conduct of complex multi-objective public works projects with high public and interagency interests, including flood risk analysis. As a senior economist at Dames & Moore under contract to the U.S. Department of Energy, he worked on developing a multi- attributable site selection model for evaluating risks of alternative sites for the Preliminary Nevada High- level Nuclear Waste Siting Analysis. For the Smith Lake Improvement and Stakeholder Association (SLISA), Alabama, he provided economic evaluation of alternative costs and benefits of municipal and industrial, navigation, recreation, and hydroelectric water uses and non-power evaluations for recreation, property values flood control, navigation, and erosion control to support SLISA’s negotiations with the Federal Energy Regulatory Commission and Alabama Power. For the Alaska Department of Natural Resources, he applied risk/cost/benefit analysis to environmental protection methods for petroleum exploration in the Beaufort Sea. As a member of IEPR teams (under contract to Battelle), he reviewed flood Civil Works planning and economic issues related to the Ala Wai Canal in Hawaii, Mamaroneck River in Connecticut, and Moose Creek in Alaska. Dr. Feldman is familiar with the USACE plan formulation process, procedures, and standards as they relate to flood risk management and has more than 10 years of demonstrable experience dealing directly with the USACE six-step planning process, governed by Engineer Regulation (ER) 1105-2-100, Planning Guidance Notebook. Most notably, he applied the six-step process to his work on the USACE/Bureau of Reclamation Central Arizona Water Control Study.</p>	

Dr. Feldman has experience related to the economic evaluation of traditional National Economic Development (NED) plans, including his participation in a University of Wisconsin test team that helped develop the original U.S. Water Resources Council Principles and Guidelines. In conjunction with the USACE/Bureau of Reclamation Central Arizona Water Control Study, he designed a multi-attribute utility analysis framework for selecting preferred alternatives. This framework included flood risk management and National Ecosystem Restoration (NER) attributes and structured the tradeoffs among hundreds of alternative plans with regard to these and other attributes. The framework allowed the specification of minimum and maximum acceptable attribute values. Identification of attributes and the importance of weighting these attributes was a key aspect of the public involvement program. By focusing the public involvement on NER and flood control, as well as other key attributes, the plan selection process was more cooperative and less competitive. While working as a consultant to the USACE Sacramento District, he developed and applied a methodology for the cost-effectiveness and incremental analysis of alternative mitigation measures to enhance the habitat of the endangered winter-run salmon on the Sacramento River.

Dr. Feldman has a strong working knowledge of USACE economic benefit calculations. Throughout his career, he has conducted studies requiring economic benefit analysis for flood risk management. For example, he evaluated the state-of-the-art municipal and industrial water conservation benefit evaluation techniques for the California Urban Water Conservation Council (CUWCC) and identified promising methods for application by CUWCC member water agencies in evaluating their conservation options. His advanced expertise and extensive experience in flood damage analysis and risk and decision analysis is reflected in his work on such studies as the Smith Lake-Black Warrior River (Alabama) benefit-cost analysis of lake levels, the calculation of cost-benefit tradeoffs for the North Fork of the Feather River (Pacific Gas and Electric, California), and an economic analysis of agricultural diversion alternatives for the Glenn-Colusa Irrigation District (California).

Dr. Feldman is also familiar with methodologies for estimating damages, including the Hydrologic Engineering Center Flood Damage Analysis (HEC-FDA) software. His familiarity with HEC-FDA includes his knowledge of inputs, assumptions, calculations, and results attributed to the program. He has applied his knowledge of USACE flood risk management and damage calculations/analysis in his work as economist/planner on the USACE/Bureau of Reclamation Central Arizona Water Control Study. This study was a flood control and dam safety study involving the consideration of feasibility alternatives and the selection of preferred alternatives. Other studies requiring the assessment of risk and damage included the aforementioned Preliminary Nevada High-level Nuclear Waste Siting Analysis and the SLISA studies. Dr. Feldman has participated on a previous USACE IEPR panel as an economics expert for the Institute for Water Resources Planning Suite Model II certification review.

Kris Thoemke Environmental Law Compliance Specialist

Dr. Thoemke, currently an independent consultant, was most recently a Senior Scientist for Coastal Engineering Consultants, Inc. He received his Ph.D. in biology from the University of South Florida in 1979 and is a Certified Environmental Professional (CEP). He has 38 years of experience as a professional ecologist in South Florida and has been a researcher and land manager for the State of Florida, a private ecological consultant, an environmental and outdoor communicator, and an Everglades project manager for a non-profit organization. He also teaches undergraduate- and graduate-level environmental management, fisheries management, and fish and wildlife policy and management courses for the American Public University System.

For the past eight years as an environmental consultant, Dr. Thoemke has conducted marine and estuarine environmental assessments (EAs), environmental permitting, and listed species surveys along the Atlantic and Gulf coasts in Florida. His environmental consulting work has been related to water resource environmental permitting and National Environmental Policy Act (NEPA) compliance documentation. He has also taught a graduate course in environmental management, permitting, and NEPA compliance. His experience with wetlands and estuarine ecosystems derives from his Ph.D. work on estuarine invertebrates; 11 years as manager of Rookery Bay National Estuarine Research Reserve in Naples, Florida; four years as a wetlands ecologist conducting Everglades restoration work; and 14 years as a wetlands and estuarine consultant.

Dr. Thoemke is familiar with large, complex Civil Works projects with high public and interagency interests. His direct experience includes his work as a wetland scientist on the Florida Everglades restoration program; ongoing involvement as the environmental scientist for the Charlotte County, Florida, Erosion Control Project for Stump Pass; and participation on a team working on large Civil Works restoration projects for the State of Louisiana in the Mississippi Delta region.

Dr. Thoemke is familiar with all NEPA and environmental impact statement (EIS) requirements. He gained experience with environmental policies and processes by preparing reports and by serving on IEPR panels, including the Walton County, Florida, Hurricane and Storm Reduction Feasibility Report and Draft Environmental Assessment, and the Central Everglades Planning Project Draft Project Implementation Report and EIS.

Dr. Thoemke was a member of an integrated team of scientists and engineers that prepared the EIS for the Terrebonne Basin Barrier Island Shoreline Restoration Project, Louisiana, including Endangered Species Act (ESA), essential fish habitat (EFH), and NEPA requirements. He has also reviewed EISs and EAs for other coastal restoration projects in the Mississippi Delta. Dr. Thoemke was project manager on the Port Everglades Ocean Dredged Material Disposal Site Environmental Assessment, which included Marine Mammals Protection Act listed species. In addition, he has completed Section 7 assessments for listed species under National Marine Fisheries Service jurisdiction for projects in several south Florida locations, and coordinated with the U.S. Fish and Wildlife Service (USFWS) to prepare an updated Biological Opinion for swimming sea turtles and shorebirds on Marco Island, Florida. He has provided EFH consultation to several projects and continues to prepare EFH studies for marine and estuarine species as a part of his permitting work.

Dr. Thoemke is a member of the National Association of Environmental Professionals and a member and Chairman of the Certification Review Board of the Academy of Board-Certified Environmental Professionals.

Brian Bledsoe

H&H Engineer

Dr. Bledsoe is Georgia Athletic Association Distinguished Professor in the College of Engineering at the University of Georgia. He has 30 years of experience as a civil and environmental engineer, hydrologist, and environmental scientist in the private and public sectors. He holds degrees from Georgia Tech, North Carolina State University, and Colorado State University. Dr. Bledsoe is a registered Professional Civil Engineer in Colorado and North Carolina. Before moving to the University of Georgia, he was a tenured full professor at Colorado

State University (CSU), where he conducted research with computer simulation and physical modeling of large river systems in the CSU Hydraulics Laboratory from 1997-2015.

Before entering the professoriate, Dr. Bledsoe worked as a consulting engineer and surveyor for the State of North Carolina Division of Coastal Management as a watershed restoration specialist and non-point source program coordinator engineer. His on-going research is focused on the interface of engineering, hydrology, and ecology with an emphasis on river hydraulics, flood hazards, stormwater, infrastructure, water quality, and restoration of riverine, and wetland, and coastal ecosystems. He is experienced in all aspects of H&H engineering and has published numerous peer-reviewed papers on H&H modeling, sediment transport analysis, channel stability analysis, and statistical hydrology.

Dr. Bledsoe is well-versed in the application of many USACE H&H models, including: HEC-RAS (1-D, 2-D, and hydraulic design modules), HEC-GeoRAS, HEC-HMS, HEC-GeoHMS, HEC-FDA, and SAM. He is familiar with Coastal Storm Risk Management (CSRMS), coastal flood modeling with ADCIRC, floodplain mapping and flood management projects, and risk and uncertainty analysis. He has developed practical guidance for design hydrology at stream crossings and analytical channel design for stability under land use change methods for the National Cooperative Highway Research Program, as well as tools for predicting and mitigating channel instability resulting from hydromodification for several municipalities and the State of California Water Board.

Dr. Bledsoe has served as an expert peer reviewer for several flood mitigation and ecosystem restoration projects: Southwest Coastal Louisiana Feasibility Study; Orestimba Creek-West Stanislaus County, California, Feasibility Study; Louisiana Coastal Area Barataria Basin Barrier Shoreline Restoration Project; Biscayne Bay Coastal Wetlands Project; and Louisiana Coastal Area Amite River Diversion Canal Modification Project Feasibility Study and Supplemental Environmental Impact Statement (SEIS). He currently leads the urban flooding research group for the National Science Foundation's Urban Water Innovation Network (UWIN). The research he leads through UWIN is focused on compound flooding (pluvial, fluvial, and coastal) and probabilistic flood hazard mapping under changing land cover and climate. Dr. Bledsoe received a National Science Foundation CAREER Award in 2006, served as a Fulbright Scholar in Chile with a focus on hydraulic and river engineering research in 2008, is past president of the American Ecological Engineering Society, and was elected a Fellow of the American Society of Civil Engineers in 2017. Dr. Bledsoe is a registered Professional Civil Engineer in Colorado and North Carolina. He has authored more than 60 publications related to river mechanics, H&H, channel stability, stream and watershed restoration, and water quality.

Robert Fleming, Jr.

Civil/Geotechnical Engineer

Mr. Fleming is a geotechnical engineer specializing in project design and geotechnical and structural engineering for flood control projects. He earned his Master of Engineering (M.E.) in geotechnical engineering from Texas A&M University in 1971 and is a licensed professional engineer in Mississippi. He has more than 53 years of experience in geotechnical and structural engineering, including working for the USACE Vicksburg District for 35 years. In that capacity, he was actively involved in the design, construction, and evaluation of all types of hydraulic structures. At USACE, he served 10 years as the Chief of the Geotechnical Branch, 5 years as the Chief of the Design Branch, and 4 years as the Chief of Engineering. Mr. Fleming has had overall technical responsibility for all types of flood control, navigation, environmental restoration, and recreation projects, which have included locks and dams, pumping stations,

levees, levee tie-ins to natural features, flood management channels, drainage structures, floodwalls, earth dams, channels, channel stabilizations, and earth slide remediation.

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

Mr. Fleming was involved in numerous designs and construction of both semi-pervious and pervious seepage berms, relief wells, and slurry trench cut-offs on various projects, including the mainline Mississippi River Levees and high-hazard dams located within the Vicksburg District, USACE. He was also involved in numerous slope stability analyses of dams, levees, and excavation slopes, as well as the remediation of existing slope failures. One example was a study completed to determine the cause of, and make recommendations for repair of, a continuous problem with shallow slough slides that occurred on the riverside slopes of the mainline Mississippi River Levees. The riverside slopes consisted of highly plastic CH clays. Mr. Fleming has extensive expertise in the geotechnical evaluation of flood risk management structures, including static and dynamic slope stability evaluation. He has demonstrated experience related to USACE geotechnical practices associated with flood management channels, construction, and soil engineering, and he also has significant knowledge about dams and their stability. For example, from 1980 to 1993, he was involved in and responsible for the Sardis earthquake study and remediation of the large Sardis hydraulic fill dam in North Mississippi. Sardis Dam was founded on an alluvial foundation that contains recent-age liquefiable silt layers that were determined to be the primary risk for liquefaction in the dam foundation and cause for excessive deformation of the dam during the Design Earthquake.

Mr. Fleming was also responsible for numerous geotechnical designs of levees, floodwalls, and hydraulic structures, such as the Lake Chicot Pumping Plant, the first structure built in the Lower Mississippi River mainline levees, and locks and dams on the Red River.

As Chief of the Design Branch, he was involved in the mechanical stabilization of the historically significant bluffs overlooking the Mississippi River in Natchez, Mississippi. He is experienced in the evaluation of seepage through earth foundations of large urban levees, as evident in his work on numerous seepage studies evaluating alternatives such as seepage berms, relief wells, and slurry trench cutoffs to find the most cost-effective seepage control. Relevant studies involved the Ouachita River in Monroe, Louisiana, and the Red River in Alexandria, Louisiana. As Chief of Engineering, Mr. Fleming signed the Construction Plans & Specifications that were advertised for bids. He also signed the Official Cost Estimates for evaluating bids submitted. As Chief of the Design Branch, he signed individual drawings in the bid package. Both at USACE and as a geotechnical consultant, Mr. Fleming has worked on projects that have involved bridge design and construction, namely as part the appurtenant structures associated with the design and construction of Locks and Dams 3, 4, and 5 on the Red River Waterway. He has experience with the design and construction of detention/retention basins, utility relocations, positive closure requirements, and interior drainage requirements on the various recreation sites on the Red River Waterway and the seven high-hazard dams located within Vicksburg District. His design and

construction experience also includes the numerous floodwater-retarding and grade control structures that were part of the Demonstration Erosion Control Project located in the hills overlooking the Mississippi Delta in Mississippi. On several flood risk management projects in Vicksburg, he routinely applied and considered non-structural flood risk management measures as part of plan development.

Mr. Fleming has a working knowledge of the geomorphology of the primary rivers of the Vicksburg District. These alluvial rivers include the Mississippi River, the Red and Ouachita Rivers (in Louisiana), and the Yazoo and Tallahatchie Rivers (in Mississippi). A specific example of a levee project that included tie-ins to natural features is the Big Sand Creek, a tributary of the Yazoo River located in the Mississippi Delta. It included tie-ins to the hills and appurtenant structures such as grade controls in the channel and drainage structures through the levee.

Mr. Fleming has experience designing and implementing site investigation and laboratory testing plans; executing and interpreting data and risk analyses, including seepage, stability, and seismically induced liquefaction; and performing most of the individual analyses in GeoStudio software. Mr. Fleming also has experience in geotechnical risk and fragility analysis, as demonstrated by his work on the Sardis earthquake analysis and remediation project described above.

Mr. Fleming is knowledgeable in all phases of alternatives development and evaluation and was involved in numerous USACE planning studies investigating flood control alternatives. In addition, he has served on six IEPR panels: (1) as geotechnical, structural, and cost engineering reviewer for the Jordan Creek- Springfield, Greene County, Missouri, Feasibility Study Report and Environmental Assessment (2013); geotechnical reviewer for the Manhattan, Kansas, Section 216 Feasibility Study (2014); (2) geological/geotechnical reviewer for the Malibu Creek, California, Ecosystem Restoration Feasibility Study (2017); (4) geotechnical engineer reviewer for the Middle Rio Grande Flood Protection Project (2017); (5) structural/civil engineering reviewer for the Brazos River Floodgate and Colorado River Lock Feasibility Study (2018); and (6) geotechnical reviewer for the Port Fourchon Belle Pass Channel Deepening Project (2018). He can address the USACE Safety Assurance Review aspects of all projects due to his experience and background in the development and implementation of the Design Quality Management System and the Independent Technical Review Process for USACE, Vicksburg District. He also served as an independent consultant on the Interagency Performance and Evaluation Task Force for the Greater New Orleans Hurricane and Storm Damage Risk Reduction System.

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