



# INDEPENDENT EXTERNAL PEER REVIEW PANEL

## for the PAPILLION CREEK AND TRIBUTARIES LAKES, NEBRASKA, GENERAL REEVALUATION REPORT AND ENVIRONMENTAL ASSESSMENT

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).

<b>Entity Conducting the Review</b>	
Outside Eligible Organization:	Battelle 505 King Avenue Columbia, OH 43201
<b>Dates of Review</b>	
Review Initiation:	15 October 2019
Type I IEPR Final Report Submittal:	11 December 2019
<b>Reviewer Names and Qualifications</b>	
<b>David Luckie</b>	<b>Plan Formulation/Economics</b>
<p>Mr. Luckie is an independent consultant with 31 years of professional experience in water resource economics, planning, plan formulation, benefit-cost analysis, and risk-based analysis. His public works experience encompasses decades of work with Federal and non-Federal agencies, as well as local and state organizations. He earned his B.S. in economics and finance from the University of South Alabama in 1986. His professional experience includes working with multidisciplinary teams to provide or review complex planning studies for coastal storm risk management (CSRM), dam safety, flood risk management (FRM), ecosystem restoration, and water supply and water quality studies. He is intimately familiar with Engineer Regulation (ER) 1105-2-100 and the 6-Step Planning Process and has prepared, supervised, or reviewed numerous planning studies in his career.</p> <p>Mr. Luckie is familiar with the evaluation of alternative plans for both CSRM and FRM studies and has conducted, supervised, or reviewed several water resource studies featuring numerous alternative plans constructed from an array of different management measures. Over the last three decades, Mr. Luckie has been involved in numerous FRM studies. Two examples are the Hunting Bayou General Reevaluation Report for Houston, Texas, a multipurpose project that included structural, non-structural, and recreation outputs, and the Mississippi Coastal Improvements Program following Hurricanes Katrina and Rita. He has also served as a panel member on the IEPRs of the Leon Creek Watershed Feasibility Study in Tennessee and the Dallas Floodway Extension Feasibility Study in Texas. He applied his knowledge of ER-1105-2-100 and the 6-Step Planning Process in each of these high-profile efforts.</p> <p>Least cost analysis, also known as cost-effectiveness analysis, has been a very important aspect of Mr. Luckie's decades of work. He is familiar with the evaluation of alternative plans. As a Regional Economist with the U.S. Army Corps of Engineers (USACE) Mobile District (1988-2006), Mr. Luckie conducted, supervised, or reviewed benefit-cost analyses for a variety of single-purpose and multipurpose water resource projects covering the full range of USACE missions. Relevant studies include the Apalachicola-Chattahoochee-Flint River and the Alabama-Coosa-Tallapoosa</p>	

Comprehensive Studies; the draft Programmatic Environmental Impact Statements covering the states of Alabama, Florida, and Georgia; and the Hunting Bayou GRR in Houston, Texas. Mr. Luckie is very familiar with USACE standards and procedures. He has extensive experience in performing National Economic Development (NED) analyses, specifically as they relate to flood and coastal risk management. For more than 25 years, he has performed, supervised, or reviewed NED procedures for technical accuracy and for compliance with policy, guidance and accepted planning principles. Such studies as Panama City Beaches and Mississippi Coastal Improvements reflect this expertise.

Mr. Luckie has been using the Hydrologic Engineering Center Flood Damage Reduction Analysis (HECFDA) software since its inception in the 1990s. He has also performed, reviewed, or trouble-shot scores of HEC-FDA analyses for Federal, non-Federal, and private sector clients. In addition, he has mentored interns and junior economists in USACE methodologies for CSRM, requiring them to calculate without and with-project condition damages, either by hand or with a Microsoft Excel spreadsheet, before allowing them to use HEC-FDA. He is also very familiar with the USACE Regional Economic System (RECONS) model and the estimation of Regional Economic Development benefits and has used the model for both Federal and non-Federal project proponents since its inception.

#### **Dane Shuman**

#### **Environmental Law Compliance**

Mr. Shuman is an expert in fisheries and aquatic conservation and management, specifically threatened and endangered (T&E) species, with over 20 years of experience in the State of Nebraska and the upper Great Plains working in habitats ranging from small streams to the Missouri River. He received his M.S. in Natural Resource Sciences with specialization in Aquatic Ecology from the University of Nebraska-Lincoln in 2003. Mr. Shuman's extensive professional development training includes three stream restoration courses instructed by hydrologist/geomorphologist Dave Rosgen (River Assessment and Monitoring, River Morphology and Applications, and Applied Fluvial Geomorphology) and one provided through the U.S. Fish and Wildlife Service (USFWS) (Applied Fluvial Geomorphology).

Mr. Shuman has spent most of his career assessing fish and wildlife habitat in Nebraska and the upper Great Plains. He was on staff for the USFWS from 2004 to 2017, beginning as a Fisheries Biologist and rising to Fisheries Supervisor, where he oversaw the Federal management of fisheries programs in South Dakota, Nebraska, and Kansas. He is currently a Senior Aquatic Biologist for Trutta Environmental Solutions, LLC, where he is part of a team to develop and implement a High Definition Stream Survey (HDSS) platform. He is also researching and reviewing fundamental river and stream sampling methods, protocols, and stream habitat suitability models with a focus on T&E species habitat requirements and major aquatic parameters (e.g., depth substrate, bank condition, habitat type). Mr. Shuman was also the initial project coordinator for the comprehensive Nebraska Statewide Stream Fisheries Inventory Project initiated in 2004, which assessed distribution, abundance, and habitat for stream fishes throughout Nebraska.

Mr. Shuman has authored and co-authored 17 manuscripts, 32 reports, and 55 presentations on native fish and habitat to promote and support the effective management of fisheries resources throughout the Great Plains, including more than a dozen peer-reviewed publications focusing on fish and fish habitat in Nebraska. He has participated on 16 technical teams, work groups, or committees that helped direct the management and recovery actions for endangered species, conservation of native fish, and continuing education for natural resource management professionals primarily in Nebraska and the upper Great Plains.

As a Supervisory Fish Biologist with the USFWS Great Plains Fish and Wildlife Conservation Office in Pierre, South Dakota, Mr. Shuman oversaw technical assistance programs to State, Federal, and Tribal agencies in South Dakota, Nebraska, and Kansas and initiated programs such as the stocking requests and sampling permits for endangered fishes in South Dakota and Nebraska. Throughout his career, he collaborated on various projects with State, Federal, Tribal, and local partners, including USACE and the Nebraska Game and Park Commission, on river and stream fish and habitat issues. He also represented the USFWS on numerous workgroup committees and technical teams, including serving as the lead to develop decision criteria for the Missouri River Adaptive Management Plan on the endangered pallid sturgeon.

Mr. Shuman has demonstrated his expertise working under the National Environmental Policy Act (NEPA) by addressing species-specific criteria (i.e., pallid sturgeon) and broad, system-wide (Missouri River) planning efforts under the Missouri River Management Plan and the Missouri River Ecosystem Recovery Plan, respectively. In that capacity, Mr. Shuman drew on his expertise and existing scientific literature and research to identify and re-evaluate threats, current conditions, and potential changes to those conditions to examine and address alternative solutions. Additionally, Mr. Shuman has expertise working in conformance with the requirements of the Endangered Species Act, Sikes Act, and Fish and Wildlife Coordination Act, where he designed and performed assessments, developed management actions, and provided project alternatives.

**Michael Schwar**

**Hydrology and Hydraulic (H&H)  
Engineering**

Dr. Schwar, Principal Water Resources Engineer with Stony Point Hydrology LLC in Mukwonago, Wisconsin, has 30 years of professional and academic experience focusing on the hydrology and hydraulics of surface water systems, with special emphasis on the restoration of streams, rivers, lakes, and wetlands. He earned an M.S. in environmental engineering and sciences from the University of Washington in 1991 and a Ph.D. in civil and environmental engineering from the University of Wisconsin-Madison in 2002. He has worked on more than 150 surface water projects in 21 states, Canada, and Puerto Rico. He is a registered professional engineer (P.E.) in six states (Washington, Wisconsin, North Dakota, Iowa, Arizona, and Illinois) and is a Certified Floodplain Manager (CFM), and has been recognized as a Diplomate, Water Resources Engineer (D.WRE) by the American Academy of Water Resources Engineers.

While a hydraulic engineer with the USACE Rock Island District, Dr. Schwar worked on ecosystem restoration projects (specifically, riverine, backwater and floodplain wetland, fish passage enhancement, and stream restoration projects), both along the mainstem Mississippi and Illinois Rivers and within the tributary watersheds. He was one of the primary authors of the Illinois River Basin Restoration Comprehensive Plan, which received the Mississippi Valley Division's "Outstanding Planning Achievement Award" in 2007. Dr. Schwar's graduate work focused on the restoration of freshwater ecosystems, first in lakes and then in rivers and wetlands. His background provides him with the basis to analyze both the physical drivers (such as flows, water levels, substrate) and the water quality aspects (such as nutrients, dissolved oxygen) that are key to supporting healthy ecosystems. Throughout his career, he has conducted planning and implementation of restoration projects, working at scales ranging from site-specific practices to watershed plans encompassing thousands of square miles.

Dr. Schwar has demonstrated experience in aquatic ecosystem restoration, particularly techniques and practices used in wetland and riverine restoration. That experience has been applied specifically for the creation or restoration of freshwater estuarine wetlands (marshes, marsh atolls, riparian forests, beaches and dunes, reefs, and fish passage structures). Among his relevant design projects

are several backwater wetland restorations along the Illinois and Mississippi Rivers, island creation in Peoria Lake (Illinois River), Grand Isle dune rehabilitation (Louisiana), and restoration of the lower Kinnickinnic River/Milwaukee River Estuary. He has also designed channel creation, stabilization, and softening projects, as well as invasive species removal and dredging projects. He has designed restoration measures focusing on habitat enhancement, channel reconstruction, and restoration of sediment and geomorphic processes within 17 rivers and streams in five states (Wisconsin, Illinois, Iowa, Missouri, and Arizona).

Dr. Schwar has led the analysis of over 20 flood risk reduction projects, including detention facilities, levees/floodwalls, conveyance improvements and channel modification, located in Wisconsin, Washington, Missouri, Illinois, and Puerto Rico. He was the assistant project manager and led the engineering services during construction for the Milwaukee County Grounds floodwater facility and Phase 1 (levee and floodplain construction) of the Western Milwaukee project. He was also project manager and led the design for the Western Milwaukee Phase 2A project.

Dr. Schwar is trained in the advanced analysis and design of open-channel flood management systems. He has extensive experience with hydraulic models such as the Storm Water Management Model, HEC River Analysis System (HEC-RAS), and FLO-2D, and hydrologic models such as the Hydrological Simulation Program - FORTRAN (HSPF) and HEC Hydrologic Modeling System (HEC-HMS). He is also familiar with the use of more specialized models to evaluate specific problems. He has analyzed and designed channel modifications for flood risk reduction, stabilization, sediment transport, and ecosystem restoration. Projects include Boneyard Creek Restoration (Urbana, Illinois), Blue River Grade Control (USACE Kansas City), Menomonee River-Western Milwaukee (Milwaukee Metropolitan Sewerage District, Wisconsin), Tres Rios Phase 3A (USACE Los Angeles), and Ebner Coulee Creek (La Crosse, Wisconsin). He is specifically familiar with the hydraulics of water control structures, including ungated low-head dams, gated navigation dams, and high-head/hydroelectric dams. He has contributed to projects that analyzed fish-passage enhancement within various systems, including the Mississippi-Illinois River watershed, the Great Lakes, and the Pacific Northwest.

Dr. Schwar has contributed to the assessment of flood risk for 21 levee systems in six states (Wisconsin, Iowa, Illinois, Missouri, New Jersey, and Texas) and seven dams in three states (Wisconsin, Illinois, and Washington). He also led the floodplain permitting, including Federal Emergency Management Agency (FEMA) coordination where necessary, for eight other projects. He developed and currently teaches courses titled "Watercourse Design" and "GIS Applications for Water Resources Engineering" at the Milwaukee School of Engineering.

Dr. Schwar is a member of the American Society of Civil Engineers, the Environmental and Water Resources Institute River Restoration Task Committee (past chair), the Association of State Floodplain Managers, the Water Environment Federation and its Watershed Management Committee, and the Society of American Military Engineers.

<b>Chris Brown</b>	<b>Geotechnical/Soils Engineering</b>
--------------------	---------------------------------------

Dr. Brown is an associate professor at the University of North Florida (UNF), teaching courses in civil engineering, fluid mechanics, hydraulics, senior design, foundation engineering, and engineering geology. He earned his Ph.D. in civil engineering in 2005 from the University of Florida; an M.A. in civil engineering (geo-environmental concentration) in 1997 from Villanova University; and a B.S. in civil engineering from Temple University in 1991. Dr. Brown is a licensed, practicing P.E. in Florida and Pennsylvania focusing on water resources and geotechnical

engineering. He has 29 years of civil engineering experience, which includes planning, design, construction, inspection, and teaching. He has worked with and for USACE as a civilian geotechnical engineer (Philadelphia District, 1991-1999, and Jacksonville District, 1999-2006), as well as municipal governments and private engineering firms.

Dr. Brown has worked on a wide variety of large public works projects including dams, levees, shore protection, coastal structures, navigation (e.g., dredging and lock/dam projects), and environmental restoration (e.g., Everglades restoration work). Dr. Brown has worked on several large channel modification projects as both a design engineer and a peer reviewer. His work efforts have included the evaluation of surface soils and subsurface geology, bank and channel stability projects, and multiple modeling efforts. Past experience includes full preparation of designs, plans, drawing sets, and specifications. Dr. Brown started his computer-aided design and drafting (CADD) work using AutoCAD version 1.0, demonstrating his significant experience with both AutoCAD and Microstation. As for specific projects, for the Molly Ann's Brook project in Haledon/Patterson, New Jersey, he worked on excavation plans and retaining wall design, and helped with the underpinning of existing buildings near the modified channel. As a peer reviewer, he has reviewed channel modification projects in North Carolina, Arizona, Illinois, Washington, and Texas.

Dr. Brown has helped project economists derive traditional economic benefits from transportation savings, reduced emergency response costs, and reduced inundation costs. He has used all manner of site investigations on flood control, shore protection, and navigation projects, including standard penetration test (SPT) borings, cone penetration test (CPT) borings, downhole geophysical investigations, vibrocores, and test pits. Dr. Brown has used this information to determine channel modification depths, rock excavation requirements, and disposal estimates. For the Little Mill Creek project in Delaware, he determined the required depths of channel modification based upon the site investigation data. Dr. Brown was the primary design engineer for the modification of the Canaveral Harbor South Jetty, where he considered environmental impacts, natural geomorphology, and coastal processes to optimize the final modification design. He was the lead geotechnical engineer for the Barnegat Bay study in New Jersey, studying environmental restoration alternatives to restore natural areas in the study area as well as beneficial use of dredged sand. This study including the development of subsurface exploration plans for the entire large study area. Dr. Brown was also the lead geotechnical engineer evaluating both shore protection needs and dredging requirements in the Tampa Harbor complex. For this project, the project team investigated disposal of dredged material in open ocean environments, as beneficial beach fill material, and in upland confined disposal sites. A recent hydrologic study of the Fish Eating Creek basin included an evaluation of river flows, sediment, erosion, and nutrients. Dr. Brown prepared both a groundwater model using MODFLOW and a hydrology model using HEC-HMS.

Dr. Brown has also worked on traditional geotechnical designs of large buildings, structures, and coffer dams. Dr. Brown was the lead geotechnical engineer for the design of two massive liquefied natural gas storage tanks in Florida. The design included completion of SPT borings, downhole seismic investigations, and ground-penetrating radar studies. Dr. Brown used both GeoStudio Sigma/W and Plaxis to develop the final mat foundation design for each tank to minimize differential settlement and to ensure adequate bearing capacity. For the Dover Airforce Base PAX Terminal, Dr. Brown was the lead geotechnical engineer responsible for design of the large control tower. This design included evaluating drilled shafts and pile foundations as alternatives to support the control tower.

Dr. Brown has also worked as an expert witness, testifying in multiple trials involving differing site condition claims, foundation failures, and deficient designs. He has also testified in arbitration proceedings and in the International Court of Settlements. Dr. Brown has planning and design experience in Florida, Georgia, Delaware, Virginia, West Virginia, New Jersey, Delaware, Pennsylvania, and Puerto Rico. He teaches the water resources series of courses at UNF as well as the senior civil engineering capstone course. In the past, he has also taught engineering geology and foundation engineering. Dr. Brown has participated on several previous IEPR panels for multiple USACE districts.

Dr. Brown is also fully capable of addressing relevant safety assurance review (SAR) issues and has fulfilled this requirement for at least four other IEPR projects, including the Olmsted Locks and Dam 52 and 53 Replacement Project Post Authorization Change Report and the Dallas Floodway Feasibility Report and Environmental Impact Statement, Dallas, Texas.