



INDEPENDENT EXTERNAL PEER REVIEW PANEL

for the

Savannah Harbor Expansion Project, Georgia and South Carolina Fish Passage at New Savannah Bluff Lock and Dam Integrated Post-Authorization Analysis 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).

Entity Conducting the Review	
Outside Eligible Organization:	Battelle 505 King Avenue Columbia, OH 43201
Dates of Review	
Review Initiation:	5 February 2019
Type I IEPR Final Report Submittal:	23 April 2019
Reviewer Names and Qualifications	
J. Walter Milon	Plan Formulation/Economics
<p>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, where he has taught graduate-level 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 38 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 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 justifying construction efforts. He has participated in planning and technical advisory support for the USACE Florida Everglades Restudy (1995-1999) and was lead economist on five USACE IEPRs: the Everglades C-111 construction project (2009); the Louisiana Coastal Areas Restoration Project (2009-2011); the White Oak Bayou, Texas, flood control plan (2011); the Caño Martin Peña Ecosystem Restoration Project, San Juan, Puerto Rico (2013); and the Lower Yellowstone Intake Diversion Dam Fish Passage Project, Montana, Draft Environmental Impact Statement. Dr. Milon is familiar with large, complex Civil Works projects with high public and interagency interests, having served as a consultant for planning and technical advisory support on the USACE Florida Everglades Restudy (1995-1999). In addition, he has more than 20 years of experience in research and economic analysis related to fisheries economics and recreational fishing; supervised several fisheries research projects for the National Marine Fisheries Service, and served as technical expert for Federal fishery management councils and journals; as such he has significant experience working with the USACE six-step planning formulation process. Dr. Milon has written an economics book 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.</p>	

Boyd Kynard	Environmental Law Compliance
<p>Dr. Kynard is a fish behaviorist with almost 40 years of experience working in academia, government agencies, and, most recently, his own private consulting firm, BK-Riverfish. He holds a Ph.D. in fisheries biology from the University of Washington and a B.S. in biology from the University of Massachusetts. Dr. Kynard studies the behavior of migratory fish during life history to conserve them and to design fish passage for them at dams. His expertise is in migratory fish life history behavior (timing and ecology of up- and downstream migrations and evolution of migration styles); research, development, and design of up- and downstream passage for migrant fish at dams in North America, China, and Brazil; designing streams; and conservation of migratory fish in large north temperate and neo-tropical rivers with hydroelectric dams. Prior to moving to Massachusetts, he was a tenured professor of fisheries at the University of Arizona, where he started the undergraduate fisheries major and studied endangered desert fishes. He has 39 years of experience studying the behavior, ecology, and fish passage of Atlantic coast diadromous fishes. Research has involved eastern fish: American shad, river herring, Atlantic salmon, striped bass, anadromous sea lamprey, shortnose and Atlantic sturgeons; and western fish species: pallid, shovelnose, green and white sturgeons and American paddlefish. He has led or co-led field and laboratory research projects on migrations, habitats, and fish passage for migratory fishes in the United States (Connecticut, Merrimack, Kootenai, and Potomac rivers), Brazil (San Francisco and Grande rivers and the Madeira River, a headwater tributary of the Amazon River), Romania (Danube River), and China (Yangtze River). As a Federal employee of the U.S. Fish and Wildlife Service and U.S. Geological Survey, he developed four state-of-the-art research programs: (1) field and lab research on migrations and habitats of shortnose and white sturgeons, (2) a lab research program on the ontogenetic behavior, habitat selection, and dispersal of sturgeons from North America, Asia, and Europe, and (3) flume research on American shad, sturgeons, and riverine fishes to develop up- and downstream passage systems, and (4) evaluation of river regulation on migratory fish life history behavior. Since retiring from the U.S. Department of Interior in 2007, he established a private consulting business, BK-Riverfish, LLC, and for 10 years has continued to conduct research on fish behavior in his lab, do research to develop a new type of fish ladder for fish with moderate swimming ability, and consult on migratory fish conservation and protection in the U.S., China, and Brazil. Dr. Kynard has 30 years of experience with the Endangered Species Act (ESA). He holds a National Marine Fisheries Service (NMFS) scientific collection permit for endangered shortnose sturgeon for 27 years and is a member of the NMFS Recovery Team for shortnose sturgeon for 11 years, preparing the first draft Recovery Plan for the species. He has participated in multiple activities related to lawsuits involving the ESA, NEPA, or both. In 2016, for The Sierra Club, he evaluated NMFS listing of critical habitat, coast-wide, for Atlantic sturgeon (Fed. Reg., Vol. 81, No.197, 3 June 2016). In 2017-18, for the Southern Environmental Law Center he evaluated (a) impacts of a power-generating station on James River Atlantic sturgeon, and (b) the NMFS 5-year Review of the Status of Chesapeake Bay Atlantic sturgeon DPS. In 2018 he reviewed, for Duke Law Center and the Chesapeake Bay Office of NPS, the impact of a power line structure/installation on James River Atlantic sturgeon and shortnose sturgeon. In 2016, he helped develop the Environmental Impact Statement and reviewed the fish passage design for migratory fish, particularly pallid sturgeon, by USACE for the Lower Yellowstone Intake Diversion Dam Fish Passage Project (NEPA compliance). He received the Dwight Webster Award of Merit from the NE Division, American Fisheries Society, in 2008 and the Distinguished Lifetime Service Award from the National Conference on Engineering for Fish Passage in 2012.</p>	

Stephen Olausen	Cultural Resources Specialist
<p>Mr. Olausen has 31 years of experience as an architectural historian, including 21 years working for Public Archaeology Laboratory (PAL) in Rhode Island. He received an M.A. in applied history and historic preservation in 1988 from the University of South Carolina. As a PAL Senior Architectural Historian and Project Manager, Mr. Olausen conducts cultural resource management projects that require the identification, evaluation, and registration of historic architectural and landscape properties. He fully meets the Secretary of Interior's Professional Qualification Standards for conducting historic architectural projects (36 CFR Part 61 Appendix A). Mr. Olausen is an expert at coordinating projects that are conducted under Federal historic preservation laws: the National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA), and Section 4(f) of the Department of Transportation Act (DOTA), as well as the various state historic preservation laws of the New England and Mid-Atlantic regions. He has completed hundreds of cultural resources identification and evaluation surveys conducted for projects that require compliance under Section 106 of the NHPA and NEPA. Nearly all these projects have involved the assessment of project impacts on historic properties pursuant to Section 106 regulations. Mr. Olausen has overseen the completion of more than 150 successful National Register of Historic Places nominations that involve the evaluation of historic properties in accordance with the National Register Criteria. He is also expert at assisting clients in conducting consultation under Section 106 and drafting agreement documents that specify actions required to avoid, minimize, or mitigate project impacts on historic properties. Mr. Olausen has managed numerous projects that require the production of mitigation documentation, such as Historic American Buildings Surveys and Historic American Engineering Record (HABS/HAER) documentation, interpretive materials, and displays. Other areas of expertise include the preparation of cultural resource management plans, Section 106 reports and agreement documents, Section 4(f) statements, architectural design guidelines, and historic preservation tax incentive certifications. Mr. Olausen has conducted projects for a wide variety of Federal clients, including the U.S. Army Corps of Engineers, National Park Service, U.S. Coast Guard, U.S. Department of Agriculture, Federal Emergency Management Agency, Federal Railroad Administration, National Railroad Passenger Corporation (Amtrak), General Services Administration, U.S. Army, and U.S. Navy. He has also managed aboveground historic property work for PAL projects conducted for the departments of transportation in Connecticut, Rhode Island, Massachusetts, and Maine. Mr. Olausen's experience directly related to the SHEP NSBLD IPA/EA includes serving as the lead architectural historian and project manager for evaluation and treatment of historic industrial and transportation resources. He has extensive knowledge of historic industrial property types, ranging from Colonial period grist mills to mid-twentieth century manufacturing plants. His work has included managing cultural resources investigations for a large number of dam removal projects that have involved the evaluation of significance and the assessment of project effects for historic dams, reservoirs, and associated factory complexes. Since 1998, Mr. Olausen has served as the lead cultural resource management consultant for an extensive system of historic hydroelectric developments on the Deerfield and Connecticut River Hydroelectric Projects in Vermont, New Hampshire, and Massachusetts. He has assessed the effects of improvement projects, including the installation of fish passage facilities, consulted with the Federal Energy Regulatory Commission and State Historic Preservation Officers, and authored and implemented historic properties management plans. The following are examples of some of the major projects on which Mr. Olausen has served as project manager and senior architectural historian: Amtrak's Northeast Corridor-New Haven to Boston Electrification; New Bedford/Fall River Rail Restoration (Massachusetts); Stetson Wind Project, Maine; I-95 Ramp Improvements (Providence, Rhode Island); and Manchester Airport Expansion (Manchester, New Hampshire). His work for the National Park Service has included the preparation of National Register of Historic Places documentation for some of the nation's most significant historic properties, including the</p>	

Statue of Liberty National Monument, Minuteman National Historical Park, Saratoga National Historical Park, and Appomattox Court House National Historical Park.

Michael Schwar

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

Dr. Schwar, Principal Water Resources Engineer with Stony Point Hydrology LLC in Mukwonago, Wisconsin, has more than 25 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 P.E. in six states (Washington, Wisconsin, North Dakota, Iowa, Arizona, and Illinois) and 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, he 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, specifically, 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 is trained in the advanced analysis and design of open-channel systems. 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 [MSD], 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.

He 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 FEMA coordination where necessary, for seven other projects. He developed and currently teaches a course titled "Watercourse Design" 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.

Jesse Waldrip

General Engineering

Mr. Waldrip is the Fish Passage Discipline Leader at Kleinschmidt Associates. He has a background in civil engineering and structural design and 15 of a total 17 years of experience in the planning and design of fish passage facilities across North America. He has a B.S in civil engineering from Auburn University in Alabama and is a licensed professional engineer in Maine, Wisconsin, Michigan, Utah, and Alabama. At Kleinschmidt Associates he is responsible for technical leadership of large fish passage projects, advisory oversight, and quality control for fish passage projects being led by other team members, and mentoring and development of technical staff. He has experience working with engineers, biologists, and regulators on all phases of fish passage projects from feasibility studies and alternatives analysis, through conceptual and final design, into bidding and construction support, and finally monitoring and effectiveness testing. Mr. Waldrip has been involved in a wide array of fish passage projects, including steep-pass fishways, Denil ladder fishways, pool and weir fishways, vertical slot fishways, fish elevators, nature-like fishways, eel ladders, and downstream fish passage facilities. He routinely manages and participates in engineering design projects, site inspections, and feasibility studies. His engineering experience covers design, inspection, evaluation, and rehabilitation of steel, concrete, and wood structures at dams and hydroelectric facilities using guidelines and design criteria from USACE Engineering Manuals, AISC Steel Construction Manual, ACI Building Code Requirements for Structural Concrete, and National Design Specification for Wood Construction. He has managed and performed engineering design for a variety of projects, including fish passage facilities, dams, powerhouses, intakes, trash racks and rakes, gates, penstocks, retaining walls, flashboards, and inflatable rubber dams. Mr. Waldrip's East Coast fish passage experience includes substantial engineering and construction projects in large rivers such as the Great Pee Dee River and the Roanoke River (North Carolina), the Susquehanna River (Pennsylvania), the Connecticut River (Massachusetts), the Saco, Kennebec, and Penobscot Rivers (Maine), and the St. John River (New Brunswick). Mr. Waldrip routinely leads the design and construction support for complex fish passage projects such as fish elevators, which require the coordination of multiple engineering disciplines such as civil, structural, geotechnical, hydraulic/hydrologic, mechanical, and electrical. Examples of recent fish passage projects that Mr. Waldrip has worked on as a senior fish passage engineer are the Nature-like Fishway Design at the York Haven Hydroelectric Project (Pennsylvania), Nature-like Fishway Design at the Island Farm Weir on the Raritan River (New Jersey), Fish Lift and Downstream Fish Passage Design at the Blewett Falls Hydroelectric Project (North Carolina), Value Engineering Study for the Downstream Fish Passage Facility at Cougar Dam (Oregon, with USACE), and Design of Fish Ladder Modifications to Improve Monitoring at the Lower Granite Lock and Dam (with USACE). Regionally, Mr. Waldrip has also consulted on the feasibility and conceptual design of fish passages at the King Mill Project (Augusta, Georgia), and six hydroelectric projects on the Coosa River (Alabama). He also performed condition assessments at the Columbia Hydroelectric Project, the Lockhart Hydroelectric Project, and the Riverdale Hydroelectric Project (South Carolina), and the Weiss Hydroelectric Development (Alabama).