

REMAINING ITEMS

Investigations

Construction

Operation and Maintenance

Harbor Maintenance Trust Fund

Mississippi River and Tributaries

REMAINING ITEMS
(Ordered by Appropriation)

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APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Agencies

Access to Water Data, Engineer Research and Development Center 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$750,000	\$750,000	\$360,000	\$360,000 3/ 4/	\$360,000

1/ This activity is funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$10,721. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 2017 of Water Resources Development Act 2007 (33 USC 2342), as amended

DESCRIPTION; Annual funding provided under this program is used to develop standard business processes, procedures and database models to manage water quality and quantity data generated by the full range of Corps water resources activities in conjunction with the Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS) and the National Oceanic and Atmospheric Administration (NOAA) Water Control and Water Quality Programs. This may include water quality/quantity information associated with stream gages, water quality gages and other monitoring devices and water resources model and analytical tool output. These data include variables such as precipitation, water chemistry, temperature, evaporation, sedimentation, biological and habitat data, riverine discharges and stages, reservoir storage, inflows and outflow. This will include developing quality assurance/quality control processes and criteria for collected data. Water quantity and water quality data will be made available to the public through a standard web interface in a downloadable format as soon as quality assurance/quality control has been conducted by the USACE. The Corps routinely coordinates with other Federal agencies to solicit feedback on management and implementation of this program.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data

Automated Information Systems Support Tri-CADD, Engineer Research and Development Center 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$251,000	\$251,000	\$251,000	\$250,000 3/ 4/	\$250,000

1/ This activity is funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$80,830. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

DESCRIPTION: All Corps districts use Computer Automated Design (CAD) and Geospatial Information Systems (GIS) computer systems for Civil Works engineering, design, mapping, planning, and facility management. Many now use Building Information Modeling (BIM) and Civil Information Modeling (CIM) as an engineering and O&M tool. All engineering drafting tables have been replaced with CAD platforms or computer mapping systems and most Corps environmental and natural resource analysis are being performed on GIS platforms. Standards and productivity enhancement tools are used for both in-house and contractor produced drawings, maps and analyses, which assure that all Corps offices have the ability to exchange their work among themselves and with others, including the private sector. The deployment of these automated systems at field offices achieve maximum productivity when users leverage the economies of scale offered by sharing the development and use of common data standards, procedures, and applications. This sharing is accelerated through a concerted effort by the Center, working with various field-working groups, to draw from field expertise and dissemination of this knowledge in the form of lessons learned and standards to benefit all Corps users. Comprehensive data standards supported by the Center permit government and industry users to produce equivalent designs, maps, and analysis on a variety of computer systems using commercial off-the-shelf BIM, CIM, CAD, and GIS software.

Annual funding is used to ensure that the Corps obtains the maximum return on its investment in automated systems such as BIM, CIM, CAD, and GIS by coordinating development efforts and distributing products to Corps offices and to support over 3,000 users of BIM/CIM/CAD/GIS and facility management technologies for Civil Works projects. All work accomplished using these funds is limited to support for automated information system improvements.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Flood and Coastal Storm Damage Reduction

Coastal Field Data Collection, Engineer Research and Development Center 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$2,000,000	\$1,000,000	\$1,000,000	\$1,000,000 2/ 3/	\$1,000,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$492. There was an additional \$21,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

DESCRIPTION: The Coastal Field Data Collection program systematically measures, analyzes, and assembles long-term coastal data that field offices use to accomplish the Corps mission in coastal navigation and storm damage reduction. These are critical, high quality data sets, nationwide or regional in scope, which support multiple projects, but which no single project would have the mandate or funding to collect.

Inaccurate and insufficient observation data results in project design errors for coastal navigation and storm damage reduction. For example, wave data with a 20% error that are used to design a coastal rock structure will yield a 70% error rate in the stone size used to build the structure. Oversized stone makes initial construction costs much higher and undersized stone results in early failure and higher than necessary life cycle repair costs. Similarly, a 5 to 10 degree error in wave direction can result in an error, or even reversal, in predicted sediment transport, compromising the success of a regional sediment management strategy. Cost effective mission accomplishment in the coastal zone requires accurate and complete data. Long-term data are required to determine climatic changes that may impact Corps projects. Lack of available high quality observation data was highlighted as a critical issue by the Coastal Working Group of the Hydraulics, Hydrology and Coastal community of Practice in a Corps-wide survey on data requirements in 2009 and reinforced in 2012.

Critical to measuring, analyzing and providing useful coastal data products for Corps districts is the collection of long-term, high-resolution data for improving project design and performance. The Field Research Facility (FRF) in Duck, North Carolina (<http://frf.usace.army.mil>), is a real-world coastal facility that collects a comprehensive suite of wave, current, meteorological, bathymetric, and topographic data, typically required, but often unavailable at a Corps project site. The facility is used to: evaluate oceanographic measurement techniques and equipment, collect high-resolution data during storms, and collect spatially and temporally-intensive long-term measurements required to better understand complex coastal processes and coastal climate. Collected data are made available online in real time to engineers and scientists in the Corps, other agencies (NOAA, NSF, Navy, USCG, USGS, etc.), universities, and the private sector. They are used for coastal research and for developing coastal engineering tools that predict wave environments and sediment movement affecting coastal projects, navigation safety, and dredging quantities. In addition, the facility serves as a testbed for evaluating and developing coastal numerical models (many models exist, but few have been rigorously evaluated). As a unique coastal observatory, the FRF is a significant Corps contribution to the Integrated Ocean Observing System (IOOS)

Engineer Research and Development Center

Coastal Field Data Collection

as authorized in the Integrated Coastal and Ocean Observation System Act of 2009 (PL No. 111-11).

Recent activities at the FRF include the development and deployment of state-of-the-art lidar and radar systems for monitoring beach and nearshore changes in real-time including during storms; allowing highly accurate, temporally detailed observations. CLARIS, the Coastal Lidar and Radar Imaging System, is a mobile system for rapidly mapping the beach, both alongshore and offshore. RIOS, the Radar Inlet Observation System, is a radar-based system for remotely mapping evolving inlet shoals in real-time for navigation safety and dredging activities. A permanently mounted Terrestrial Lidar system, which continuously maps the beach and breaking waves, captured the first ever hour by hour record of wave run-up and beach changes during Hurricane Irene as it passed Duck, NC in 2011.

Annual funding is being used to:

- Continue the long-term coastal ocean data collection program and support the data requirements of the real-time model test bed. These wave observation systems provide data to advance coastal wave modeling technology and coastal inundation predictions.
- Continue the long-term coastal morphology survey program. These observations provide insight to erosion, inundation, and dune resilience, and inform development of sediment transport, shoreline change, and beach morphology models.
- Continue the collection of estuarine data (waves, water levels, winds, etc.) that is critical to understanding sediment transport processes in estuarine environments and applies to research on Corps activities including: re-suspension due to dredging, dredge material placement, and ecosystem restoration

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Agencies – Navigation

Committee on the Marine Transportation System 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018	Budgeted Amount in FY 2019
\$140,000	\$125,000	\$90,000	\$50,000 2/ 3/	\$50,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$0. There was an additional \$0 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

The Committee on the Marine Transportation System (CMTS) was established as directed by the President in the *Ocean Action Plan – The Administration's Response to the U.S. Commission on Ocean Policy* – 17 December 2004. The CMTS held its first meeting in July 2005 and continues to meet three to four times per year. The Assistant Secretary of the Army for Civil Works has been named as the Department of Defense (DOD) representative to the CMTS. The Chief of Engineers was selected to be the initial chair of the CMTS Coordinating Board, which advises and implements directives of the CMTS. An interagency Executive Secretariat supports the day-to-day activities of the CMTS on behalf of the Coordinating Board. The Corps provides a full-time GS-15 liaison to the CMTS Executive Secretariat. This position reports to the Chief of Operations, HQUSACE, and HQ Operations has had the lead in CMTS coordination.

As in prior years, FY2019 funding will be used to coordinate with other Departments and agencies participating in CMTS; provide support for studies and initiatives requested by the CMTS; and support the DOD share of other initiatives requested by the Committee such as the Marine Transportation System (MTS) Data and Information Portal, MTS Research & Development Needs, as well as other Integrated Action Teams.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Water Resource Agencies, Other Coordination Programs

Coordination with Other Water Resource Agencies 1/ 2/

	Allocation in FY 2015 3/	Allocation in FY 2016 3/	Allocation in FY 2017 4/ 5/	Presumed Allocation for FY 2018 \$400,000 6/ 7/	Budgeted Amount for FY 2019 \$400,000
Total	\$1,100,000	\$1,139,000	\$ 504,900		
CALFED	\$ 100,000	\$ 81,000	\$ 21,000		
Chesapeake Bay	\$ 290,000	\$ 350,000	\$ 105,200		
Gulf of Mexico	\$ 100,000	\$ 250,000	\$ 84,000		
Lake Tahoe	\$ 100,000	\$ 50,000	\$ 30,000		
Pacific Northwest Forest Case	\$ 10,000	\$ 10,000	\$ 0		
Other Programs	\$ 500,000	\$ 398,000	\$ 264,700		

1/ These activities are funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ Chesapeake Bay line item includes an additional \$40,000 reprogrammed in FY 2015 and \$275,000 reprogrammed in FY 2016; CALFED line item reflects \$19,000 reprogrammed away from the line item in FY 2016.

4/ \$49,900 reprogrammed to this line item in FY 2017.

5/ In FY 2017, this remaining item consolidated six separate line items included in prior Budgets, which will enable improved execution of coordination funds by increasing the Corps' flexibility to administer these funds as needed and improve visibility of the suite of interagency coordination activities. Those programs are CALFED, Chesapeake Bay, Gulf of Mexico, Lake Tahoe, and Pacific Northwest Forest Case.

6/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

7/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$72,264. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Fish and Wildlife Coordination Act of 1946 (16 USC 661 et seq.); Section 5 of the Watershed Protection and Flood Prevention Act of 1954, as amended (16 U.S.C 1005); Section 1 of the Flood Control Act of 1944 (33 U.S.C. 701-1; Section 7 of the Small Reclamation Projects Act of 1956 (43 U.S.C. 422a); Section 320 of the Water Quality act of 1987 (and Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended (43 U.S.C. 4332); Clean Water Act of 1972, as amended (33 U.S.C. 1251 et seq.)

DESCRIPTION: Funds provided under this program are used to enable efficient and effective coordination with other water resources agencies, which often support multi-agency, national initiatives and strategies such as a) reviewing the environmental impacts that would result from installation of Department of Agriculture project features; b) preparing estimates of flood control requirements, and benefits, and reservoir operating criteria for storage reservoirs to be constructed with Federal funds for Department of Interior (Bureau of Reclamation) projects; c) supporting actions related to the North American Waterfowl Management Plan, most recently revised in 2012; d) cooperate with Federal, state, and local agencies such as River Basin Compact Commissions; Interstate River Basin Compacts; and Regional Planning Commissions as well as for participation in Regional Planning Bodies of the National Ocean Council, as needed; and technical advisory committees of the National Estuary Program; and e) participating in specific regional initiatives, such as: i. Federal Leadership Committee for the Chesapeake Bay; ii. RESTORE, NFWF, and/or NRDA responses to Deep Water Horizon long term recovery; iii. Lake Tahoe Federal Interagency Partnership to restore ecosystems at Lake Tahoe while maintaining a viable economic climate; iv. ecosystem management of the public lands in the Pacific Northwest within the range of the Northern Spotted Owl; and v. the Southern Nevada Public Lands Management Act Program.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Other, Miscellaneous – Navigation

Disposition of Completed Projects, Multiple Districts 1/

	Total Estimated Federal Cost	Allocation in FY 2016 2/	Allocation in FY 2017	Presumed Allocation in FY 2018 3/ 4/	Budgeted Amount for FY 2019	Balance to Complete After FY 2020
Programmatic Management	\$80,000	\$50,000	\$30,000	\$0	\$0	\$0
West Pearl River Navigation Project, MS & LA	\$727,000	\$350,000	\$83,000	\$0	\$0	\$0
Kentucky River Locks and Dams, 1-4, KY	\$400,000	\$116,000	\$284,000	\$0	\$0	\$0
Willamette Falls Locks, OR	\$500,000	\$ 60,000	\$420,000	\$0	\$0	\$0
Allegheny River Locks 5-9, PA	\$450,000	\$100,000	\$350,000	\$0	\$0	\$0
Upper Monongahela River, PA	\$450,000	\$100,000	\$350,000	\$0	\$0	\$0
St. Anthony Falls, Mississippi River, MN	\$1,250,000	\$0	\$75,000	\$350,000	\$350,000	\$550,000
Salinas Reservoir (Santa Margarita Lake), CA	\$1,250,000	\$0	\$50,000	\$350,000	\$350,000	\$550,000
Cape Fear Locks and Dams 1-3, NC	\$1,250,000	\$0	\$0	\$300,000	\$300,000	\$950,000
Unallocated funds		\$1,284,000	\$642,000			

1/ These studies are conducted at 100 percent Federal expense.

2/ This effort was initiated in FY16. There were no allocations prior to FY 2016.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$986,000. There was an additional \$250 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$540,000.

AUTHORIZATION: Flood Control Act of 1970, Section 216 – Review of Completed Projects.

DESCRIPTION: The Corps uses an asset-based and risk-informed investment strategy for the lifecycle management of civil works assets. Asset management includes developing consistent, transparent, and repeatable tools and processes to inform strategic maintenance; performing condition and risk assessments and identifying associated consequences; and using that information to prioritize investments. Cost savings from

asset management can be derived from reductions of project operation and maintenance or divestiture of assets that are no longer providing benefits that warrant continued Federal investment.

Program execution is currently aligned with the scope and schedule of the Interim Guidance issued on August 22, 2016. The timing of guidance late in the fiscal year resulted in less work being accomplished in FY 2016 than was originally planned. However, after development of program guidance, program execution accelerated. It is anticipated that program execution will continue to accelerate in FY 2018 and no obstacles to continued progress have been identified.

Annual funding will be used to undertake disposition studies needed to identify necessary actions to safely dispose of infrastructure; ensure compliance with laws and regulations, including the National Environmental Policy Act; and verify interest in future ownership of the properties. Deauthorization and disposal of the facilities will eliminate future Federal operation and maintenance funding requirements after the facilities have been turned over to a non-Federal entity or removed. Prior to disposing of the facilities, the purpose of the infrastructure would be deauthorized. In some cases, ecosystem restoration may be a viable path toward disposal of the projects and that will be considered in the disposition study.

The study of each disposition will follow the current planning process. Disposition studies will be selected from facilities for which the Corps has ongoing maintenance responsibilities. Disposition studies will be focused on facilities that are expected to result in a net cost savings to the Federal government. In some cases, facilities have been identified as candidates for disposition, but a non-Federal interest has not expressed interest in assuming responsibility for the facility. While it is preferred to have an identified end user, a disposition study may continue without a committed end user.

The West Pearl Disposition Study was terminated when Congress deauthorized and directed conveyance of the West Pearl River Navigation Project, MS & LA in Section 1321 of the Water Resources Development Act of 2016. The Kentucky River Locks and Dams 1-4, KY and Willamette Falls Locks, OR disposition studies are being finalized using previously appropriated funds. The Allegheny Locks 5-9 and Upper Monongahela River, PA disposition studies are in the latter stages of completion with no anticipated recommendation given public input and lack of a path forward to disposition.

Fiscal Year 2018 and Fiscal Year 2019 funds are being used to initiate or continue disposition studies on St. Anthony Falls, Mississippi River, MN; Cape Fear Locks and Dams 1-3, NC; and Salinas Reservoir (Santa Margarita Lake), CA.

St. Anthony Falls is located at Mississippi River 853.3 in Minnesota. The Corps' original involvement at St. Anthony Falls followed the Eastman Tunnel collapse when the Corps built dams, a dike and apron to prevent the destruction of St. Anthony Falls. Subsequently, the Corps constructed the Upper Harbor Project consisting of horseshoe and chord dams and the Upper and Lower Locks. In June 2015, the St. Anthony Upper Lock was closed per WRRDA 2014, in an effort to prohibit Asian carp's upstream migration. The Lower St. Anthony Falls Lock continues to be operated on a limited basis.

Salinas Dam impounds the Salinas Reservoir (Santa Margarita Lake). Salinas Dam was originally constructed by the War Department in 1941 to

create a water supply for Camp San Luis Obispo. Salinas Reservoir was transferred to the Corps in 1947. Salinas Reservoir is currently operated by San Luis Obispo County Flood Control and Water Conservation District under a COE lease and is water supply storage for the city of San Luis Obispo.

Cape Fear Locks and Dams 1-3, located on the Cape Fear River, were originally constructed in support of commercial navigation. After construction these were authorized for recreation. Commercial navigation traffic has ceased. The facilities now provide recreational opportunities, and a minimal level of service to ensure safety.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Aquatic Ecosystem Restoration

Environmental Data Studies 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$90,000	\$98,000	\$1	\$80,000 2/ 3/	\$80,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this budget justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$7,534. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 2036, Water Resources Development Act (WRDA) 2007 (P.L. 110-114)

DESCRIPTION: The Environmental Data Studies program includes general national or regional environmental data collection and support of field offices in the use of innovative information system technology, including geographic information systems to demonstrate the relationship between project-funded environmental activities with national or regional environmental issues. Environmental data includes biological, physical, and/or cultural resource components. The access to data systems that house information is both intra agency and interagency, involving all concerned Federal agencies, notably the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, U.S. Geological Survey, U.S. Forest Service, Natural Resources Conservation Service, Environmental Protection Agency, as well as State fish and wildlife and natural resource agencies, and non-governmental organizations like NatureServe. The program supports the development of the Civil Works Mitigation and Endangered Species Act Compliance Database and the Ecosystem Restoration Business Line Database, which summarizes important information on projects and informs decision-making. The aim is to reduce costs, avoid duplication, improve procedures for complying with environmental statutes, and aid in addressing environmental issues of national and/or regional significance.

Annual funding is used to:

- Maintain and support upgrades to the Holistic Ecosystem Restoration Online Network (HERON), the Civil Works Mitigation and ESA Compliance Database and Ecosystem Restoration Business Line Database
- improve the efficiency with which District staff assemble and analyze environmental information for Civil Works projects;
- develop new or updated linkages to ensure access to current data sources; and
- maintain and support the access and sharing of environmental information for national and regional inventories and assessments and train field personnel in its access and use through the USACE environmental databases.

Examples of prior year accomplishments include; training and support to Districts on environmental data; NatureServe data subscription; and support upgrades to the Holistic Ecosystem Restoration Online Network (HERON).

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Agencies, Other Coordination Programs

FERC Licensing 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$200,000	\$200,000	\$100,000	\$100,000 3/ 4/	\$100,000

1/ This activity is funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ The actual unobligated carry-in from FY 2017 to FY 2018 was \$40,978. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Federal Power Act

DESCRIPTION: The funds provided under this line item enable the U.S. Army Corps of Engineers to conduct reviews of pre-applications for Federal Energy Regulatory Commission (FERC) preliminary permit and license applications for development of hydroelectric power at Corps and/or non-Corps projects to ascertain potential impacts to the Corps of Engineers' responsibilities and mission in operating projects for authorized purposes. Also, the Corps reviews applications for surrender or termination of licenses to ascertain impacts to Corps' responsibilities and mission. This work was funded under a different budget line item until 2012.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Flood and Coastal Storm Damage Reduction

Flood Damage Data 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$335,000	\$300,000	\$220,000	\$230,000 2/ 3/	\$230,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$23,704. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 904, Water Resources Development Act (WRDA) 1986 (P.L. 99-662); Section 308, WRDA 1990 (P.L. 101-640)

DESCRIPTION: The Flood Damage Data Program is required to facilitate the collection and maintenance of basic flood damage data to support Corps field offices in accomplishment of flood damage reduction studies. The major purpose of the program is to improve the technical quality and accuracy of flood damage data, to improve the understanding of the interrelationships of the characteristics of flooding on property damage, and to improve the formulation of flood damage reduction projects. Planning and evaluation of flood damage reduction projects requires knowledge of actual damages caused to various types of properties. The relationships between flood depth, flood duration and velocity, value and type of property, and the amount of damage are essential to making accurate and supportable estimates of the value of projects. The distributions of damages resulting from the various factors involved are needed for the risk analysis framework adopted for water resource studies. Damage data are obtained in rare instances when a damaging event occurs and funded studies are underway. However, in most instances when flooding occurs there are no current studies in the area or other funding mechanism to collect the requisite data to be used in future analysis or to report and accurately record the damages incurred and account for the effect of the factors that caused the damages. Previously no centralized flood damage data source existed which retrieved basic data for research efforts and for specific project studies.

The activities of the program are to:

- (1) Conduct actual flood damage surveys following flood events for riverine and coastal events;
- (2) Develop, maintain, and improve the economic database for flood damage reduction projects;
- (3) Calculate flood depth-damage functions for riverine and coastal flooding based on actual damage data;
- (4) Collect data and derive damage relationships for roads, public building and facilities, and other public costs of flooding;
- (5) Develop and maintain a floodplain inventory application that would be used to apply flood damage estimation models to feasibility, reconnaissance, and continuing authority studies; and
- (6) Provide information to communities for hazard mitigation plans and grant applications.

Annual funding is used to update and maintain data collection survey forms and data collection techniques, to collect post-flood damage data, to employ the flood

Institute for Water Resources

Flood Damage Data

damage database to estimate National models where regional or local flood characteristics can be specified to estimate flood damage relationships, to update and maintain a geospatial computer application for floodplain inventory data, and to certify a model for estimating residential and nonresidential structure values. Funds would also be used to facilitate collaboration in collecting and sharing of flood damage data within the Corps and between other agencies and to refine functions for estimating cleanup and relocation costs associated with flooding. Finally, funds are used to develop and refine depth-damage curves for coastal areas, for which the Corps has limited information, and for which effects (wave attack, erosion, storm surge, saline water) are markedly different from riverine flooding.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Flood and Coastal Storm Damage Reduction

Flood Plain Management Services 1/	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation for FY 2018	Budgeted Amount For FY2019
Total	\$10,500,000	\$15,000,000	\$15,300,000	\$15,000,000 2/3/	\$15,000,000
Non-Structural Alternatives	\$1,500,000	\$4,000,000	\$7,000,000	\$7,000,000	\$6,500,000
SAGE	\$1,000,000	\$2,000,000	\$1,000,000	\$ 400,000	\$ 500,000
National Hurricane Program	\$ 500,000	\$ 500,000	\$ 800,000	\$ 800,000	\$ 500,000
Nonstructural Flood Prfng Cmte.	\$ 420,000	\$ 420,000	\$ 500,000	\$ 500,000	\$ 500,000
Other Activities	\$4,580,000	\$6,080,000	\$6,000,000	\$6,300,000	\$7,000,000
Silver Jackets 4/	\$2,500,000	\$2,000,000	\$ 0	\$ 0	\$ 0

1/ These activities are funded at 100 percent Federal expense.

2/There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$5,760,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$1,342,000.

4/ The Silver Jackets Program for interagency coordination is being funded in the National Flood Risk Management Remaining Item beginning in FY 2017.

AUTHORIZATION: Section 206 of the 1960 Flood Control Act (P.L. 86 645), as amended.

DESCRIPTION: Annual funding for non-structural alternatives enables the Corps to provide technical support (assistance, information, and guidance) to states and local communities in their application of flood plain management measures, optimizing use of our and our interagency partners’ resources. This technical assistance, information, and guidance supports planning and implementing actions at the State and local levels. Non-structural alternatives focus on protecting life safety, reducing or stemming increases in loss of property and repetitive losses due to flooding, and enhancing resiliency to flood events. Non-structural assistance may include work on flood risk assessments, emergency planning, education, the development of state or local risk communications tools, floodplain management planning, flood inundation mapping, and/or improvements to state or local flood risk modeling and forecasting tools.

Systems Approach to Geomorphic Engineers (SAGE) investigates hybrid engineering solutions that integrate ecosystem-based approaches and engineered infrastructure to achieve coastal resiliency on a landscape scale.

The National Nonstructural Flood Proofing Committee provides technical expertise on all aspects of nonstructural flood risk reduction adaptive measures, focusing on reducing the consequences of flooding.

The National Hurricane Program funds real time support by Corps staff in hurricane situations, working with FEMA, to provide early input to state and local emergency management officials, and thereby enhance their preparedness.

The other activities funded through this program support the work of the Corps district offices in response to inquiries by state and local officials or the public for basic information or data concerning their flood risk, outside the scope of a specific Corps project.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Flood and Coastal Storm Damage Reduction

Hydrologic Studies 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$743,000	\$1,743,000	\$500,000	\$500,000 2/ 3/	\$500,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ The actual unobligated carry-in from FY 2017 to FY 2018 was \$21,138. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 7 of the 1944 Flood Control Act

DESCRIPTION: Major activities to be undertaken in the program generally include the collection of basic hydrologic data and the studies of these data for major storm events or certain special hydrologic processes. The information to be derived from this program will improve hydrologic engineering techniques for the planning, design, construction, and operation of water resources projects. The program consists of four sub items:

- 1) Storm Studies: Funds are used to gather comprehensive rainfall data used to refine the regional hydro-meteorological information throughout the nation. The up-to-date hydro-meteorological information is essential for design of new projects as well as for safety assessment of existing projects. Hydrologic data is used to inform water resources studies. These data are required in the evaluation of flood producing potentials of river basins, and constitute the major portion of the basic data used in probable maximum precipitation determinations.
- 2) General Hydrologic Studies: Funds are used to analyze rainfall runoff relationships, flood frequency, snowmelt studies, hydrograph development and routing at selected watersheds, model calibrations in urban areas, analyses of past floods, methods for the hydraulic analysis of non-gauged streams, and other studies of related hydrologic nature. Also included are planned upgrades to the internal Corps system of accounting for gages used largely both of control of water resources projects and also for studies of major hydrologic events.
- 3) Sedimentation Studies: These funds are used for conducting non-project sedimentation studies, and for the Corps share of the cooperative Interagency Sedimentation Project at the Hydraulics Laboratory, Waterways Experiment Station. The sedimentation studies include: promoting and supporting the standardization and development of equipment, criteria and methodology for the collection, analysis of suspended and bed load sediment characteristics of natural streams; and laboratory studies.
- 4) Stream Flow and Rainfall Data Analysis: Funds are used for installation and operation of hydrometeorology gages of non-project nature that are needed by the Corps in addition to the stations in the cooperative programs conducted by the U.S. Geological Survey and the National Weather Service for the Corps.

HQUSACE

Hydrologic Studies

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Agencies, Other Coordination Programs

Interagency and International Support 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Amount in FY 2018	Budgeted Amount in FY 2019
\$350,000	\$400,000	\$300,000	\$400,000 3/ 4/	\$400,000

1/ This activity is funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$621,515. There was an additional \$59,025 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 234 of the Water Resources Development Act of 1996 (33 U.S.C. 2323a), as amended.

DESCRIPTION: Annual funding allows the Secretary of the Army, using the expertise of the Corps of Engineers, and after consulting with the Department of State (DOS) on activities supportive to international organizations or foreign governments, to support other Federal departments and agencies, non-governmental and international organizations, and foreign governments, in addressing domestic and international problems related to water resources, infrastructure development, and environmental protection and restoration. Funding is also used to support DOS, the U.S. Agency for International Development (USAID), international organizations such as the World Bank and the United Nations and its technical agencies such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization, along with international partners and governments, requests for Corps involvement in task forces, working groups, technical exchanges, training courses and workshops, and other capacity building collaborative activities to provide technical and managerial (water resources management) assistance. Annual funding is based on emerging needs, subject to alignment with the National Security Strategy and consultation with DOS.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies With Other Agencies, Other Coordination Programs

Interagency Water Resources Development 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$955,000	\$721,000	\$176,900 3/	\$100,000 4/ 5/	\$100,000

1/ This activity is funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ \$1,900 reprogramming to this program during FY 2017.

4/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

5/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$96,422. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

Annual funding is used to cover activities including meeting with City, County and State officials to:

- a) help them solve water resources problems when they have sought advice;
- b) determine whether Corps programs are available and may be used to address the problems; and
- c) ensure they understand study cost-sharing and obtain an indication of their interest in participating in a future study.

Efforts are often part of or complementary to regional and local plans that address water resource problems.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Flood and Coastal Storm Damage Reduction

International Water Studies, Multiple Districts 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$150,000	\$150,000	\$125,000	\$125,000 2/ 3/	\$125,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-In: The actual unobligated carry-in from FY 2017 to FY 2018 was \$13,503. There was an additional \$94 of unobligated funds that were committed within the Corps for scheduled ongoing requirements in FY2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

Annual funding is used to fund U.S. Army Corps of Engineers participation in and support of boundary water treaties and other international agreements between the United States and Canada. These Boards and Committees hold joint meetings, review report drafts and correspondence, make field inspections, obtain, collect, and analyze hydrologic and hydraulic data, and report their findings to the establishing parties. The degree of study activity varies depending upon the requirements of the Commission or Treaty under which they were established. These efforts assure better control, use, and orderly development of the jointly controlled water resources, and are of importance in attempting to meet water demands resulting from an expanding economy along the United States and Canadian border.

Under the Boundary Waters Treaty of 1909, the International Joint Commission (IJC) was established and empowered to establish local boards, which conduct investigations and assure adherence to orders of approval pertaining to use of boundary waters issued by the Commission. U.S. Corps of Engineers representatives serve on and chair the U.S. Sections of the following IJC Boards: Saint Croix River, Champlain Richelieu, Lake Champlain, St. Lawrence River, Niagara, Lake Superior, Lake of the Woods, Rainy Lake, Souris Red Rivers Engineering, Souris River Control, Kootenay Lake, and Osoyoos Lake. In support of the Saint Croix River Board of Control, the Corps retrieves and analyzes water data to assure compliance with IJC rules and annual inspection of dams and fish passage facilities. The Corps supports the IJC as it executes the reference from the report entitled "The IJC and the 21st Century" regarding investigating the feasibility of establishing a demonstration watershed board and its implementation of the reference on diversion, consumption and transfer of international waters.

The Niagara Treaty of 1950 governs the split of Niagara River Waters between the United States and Canada, and between the uses of the waters. Corps representatives serve on and chair the United States' Sections of the International Niagara Committee and the International Lake Memphremagog Board. The Corps provides flow data and updates the rating curve used to verify compliance with Niagara Treaty requirements.

Together with Bonneville Power Administration and British Columbia Hydropower, and under the Columbia River Treaty of 1961, the Corps annually develops the Assured Operating Plan and the Detailed Operating Plan for the Columbia River Treaty storage projects. The Corps also supports the work of the Columbia River Treaty Permanent Engineering Board, including publication of its annual report to the Governments, the Columbia River Treaty Entities, and the Columbia River Treaty Operating Committee. The Corps undertakes special studies related to international impacts of evaluation of endangered species compliance related to Columbia River Treaty projects and coordinates operations of Libby Dam under the 2001 Libby Coordination Agreement.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Agencies, Other Coordination Programs– Flood and Coastal Storm Damage Reduction

Inventory of Dams 1/

Allocation in FY2015	Allocation in FY2016	Allocation in FY2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$400,000	\$400,000	\$400,000	\$400,000 2/ 3/	\$400,000

1/ All activities are funded at 100 percent Federal expense.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$8,652. There was an additional \$78,548 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 215 of the Water Resources Development Act of 1996 (P.L. 104-303), as amended by Section 3001 of the Water Resources and Reform Development Act of 2014 (P.L. 113-121).

DESCRIPTION: The National Inventory of Dams (NID) was initially compiled in 1975 and is periodically updated to reflect construction of new dams, changes in ownership, major modifications to existing dams, decommissioning and removal of dams, and improvements in data accuracy and completeness. The current database includes 90,580 dams, most of which are privately owned. The NID uses the internet to provide ease of use, accuracy, and accessibility for the data. Annual funding is used to update dam data, improve information flow, and perform data quality control processes. The database provides a central nationwide source of information that can be used to track and manage dam safety efforts. The Secretary of Homeland Security and the National Dam Safety Review Board are required to use the dam inventory to allocate dam safety program assistance funds to the states in proportion to the number of regulated dams in each state. USACE provides summaries and analysis of the dam inventory data to the Federal Emergency Management Agency (FEMA) for their preparation of the Biennial Report to Congress on the National Dam Safety Program and implementation of the Federal Guidelines for Dam Safety. The ongoing maintenance and publication of the NID is a coordinated effort involving data from the federal and non-federal dam safety community in cooperation with the FEMA, Interagency Committee on Dam Safety, and the Association of State Dam Safety Officials.

Since 2016, the dam inventory is updated every year and includes inspection completion dates and condition assessment data provided by state and federal agencies. As a result of this data collection, almost 80 percent of the dams in the Nation that are known to have a high hazard potential contain an assessment in the NID of the dam's condition based on the last inspection (compared to only 40 percent in 2009). Continuing efforts include routine maintenance on the inventory data and ensuring the internet based, searchable inventory remains available to all federal, state, and local government agencies and the public. In calendar year 2017, more than 23,000 users accessed the NID website. Based on their login selection, 20 percent of them were from academia, 17 percent were from engineering/construction businesses, 16 percent were from federal government, 11 percent were from the general public, and 5 percent were from the media.

Annual funds are used to continue maintenance and publication of the NID, including coordination with state and federal dam safety agencies to provide their entire dam inventory using the web-based application, upgrade the Geographic Information System interface and increase integration with other dam and levee safety resources. Modifications to the web-based data submittal tool continue to improve ease of access and information updates by federal and non-federal dam safety agencies.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Other, Miscellaneous – Flood and Coastal Storm Damage Reduction

National Flood Risk Management Program 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$5,000,000	\$6,000,000	\$5,175,000	\$5,000,000 2/ 3/	\$5,000,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$525,321. There was an additional \$25,618 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

DESCRIPTION: Annual funding is used to support the interagency coordination work of the Corps on flood risk management at the national and state levels. It funds the work of the Corps with other Federal agencies on programmatic issues of flood risk management, e.g., to coordinate the existing Federal programs that affect flood risk; share data, knowledge, and lessons learned; eliminate duplicative or conflicting activities or policies; and ensure that federally funded flood mitigation activities are coordinated with and complement state and local programs and policies that affect flood risk. This program funds the participation of the Corps in partnerships at the Federal, regional, and state levels through which regular and sustained coordination of flood risk management efforts occur. It also is used to fund the participation of the Corps in these partnership efforts to reach local communities nationwide. Specifically, the range of continuing activities involved in this effort includes:

- At the national level, sustaining the work of the Federal Interagency Floodplain Management Task Force (FIFM-TF). The FIFM-TF, co-chaired by USACE and FEMA, is a national level task force of agency representatives from Federal agencies with major water resources programs. The task force is responsible for updating and maintaining a Unified National Program for Floodplain Management; coordinating Federal agency policies for flood risk management; and identifying, developing, and recommending actions and policies by the Federal government necessary to reduce losses due to flooding and protect the safety of flood plain residents. Quarterly meetings of the FIFM-TF provide an opportunity for USACE, FEMA, and other Federal agency leadership to coordinate flood risk management programs, policies and activities to improve federal program implementation. In between the quarterly meetings, the FIFM-TF Working Group, composed of senior staff from the member agencies, implements the FIFM-TF Work Plan activities.
- At the regional level, supporting intergovernmental partnerships during recovery from major flood/disaster events. USACE-led Regional Flood Risk Management teams provide a venue for interagency and intergovernmental coordination at the regional level to manage flood risks by integrating pre-flood mitigation with a long-term strategy to plan and implement pre- and post-flood emergency actions, while developing promising nonstructural alternatives and other flood risk mitigation actions.
- At the state level, providing direction and oversight to the Silver Jackets program to support existing and establish new intergovernmental teams in each state in order to leverage and coordinate federal and state programs to address state flood risk management and hazard mitigation

priorities. Silver Jackets teams bring together Federal agency representatives at the state level to develop and implement solutions to state flood risk management priorities by assisting state agencies and local communities in leveraging information and resources, improving public risk communication, and creating a mechanism to collaboratively solve flood risk management issues and implement initiatives at the State and local levels.

- Developing and initiating a management framework to improve internal communication between USACE's Headquarters (HQ) and Districts and FEMA's HQ and Regions on flood risk management policy, practices and guidance.
- Developing tools and methods for communicating flood risk and encouraging public involvement in flood risk management planning.
- Using previously developed synthesis of existing federal agency and illustrative non-federal flood risk characterization analyses, combined with a comprehensive description of federal agency flood risk management programs, develop flood risk management recommendations that will enhance USACE capability to both 1) manage flood risk within its own programs and 2) be an effective partner with other federal agencies, non-federal governments, and communities who manage flood risks. Recommendations would be developed in close coordination with internal and external stakeholders to ensure they are relevant and implementable.

Priorities across the multiple activities included in this scope will be set by the USACE Senior Executive National Flood Risk Management Program Steering Committee with input from FEMA and other federal partners. Input from key groups such as the Association of State Floodplain Managers, the National Association of Flood and Storm Water Management Agencies, and the Association of State Dam Safety Officials will also be taken into consideration when setting these priorities.

ACCOMPLISHMENTS IN PRIOR YEARS:

- Cooperating with FEMA, other Federal agencies, and states to support interagency teams including representatives of multiple Federal and State agencies, the Silver Jackets program has created the opportunity to improve the delivery of Federal flood plain management and mitigation services through leveraging information and resources, resulting in increased and improved public risk communication, and combined efforts to address flood risk management challenges in States and communities. Specific interagency examples include: data sharing across agencies to support mapping studies; emergency response and evacuation planning assistance; combined and coordinated use of models, gage data and multiple agencies' databases to create a flood inundation model allowing for more effective flood response and mitigation; synthesis of existing studies and knowledge from different agencies to develop a comprehensive flood risk mitigation plan for a community without requiring any new study effort; supporting community recovery through short and long term mitigation strategies focused on nonstructural approaches and planning assistance; development of flood warning systems; integrating post-wildfire impacts into flood risk management approaches; evaluating buildings in flood hazard areas for nonstructural mitigation measures; and assistance in risk-informed decision-making.
- Established a permanent, standing Upper Mississippi Regional Flood Risk Management Team to facilitate interagency coordination at the regional level to integrate long-term flood risk mitigation planning with pre- and post-flood emergency actions. The team has focused, in particular, on identifying nonstructural alternatives to reduce flood risk within the region. Examples of team successes include elevating or removing USACE lease cabins incurring repetitive losses and claims on the National Flood Insurance Program and developing a non-structural alternative to a proposed structural repair by combining the use of different agency programs.
- Established the Mississippi River and Missouri River Interagency Flood Recovery Task Forces to facilitate interagency coordination in the watersheds of the Mississippi River and the Missouri River to assist in the recovery and repair of flood damage reduction systems resulting from the FY 2011 historic flooding in those watersheds.
- Co-led (along with FEMA) the Federal Interagency Floodplain Management Task Force (FIFM-TF), which provides an interagency forum of the federal agencies involved in flood risk management for discussion of their policies and programs. The task force assists these agencies to develop a consistent approach towards implementing their water resources authorities, programs, and strategies across the federal government.

- Through FIFM-TF efforts, developed new, technical assistance products for coastal flood risk managers that will be made available by National Oceanic and Atmospheric Administration through their Digital Coast website. This effort also improved understanding of remaining gaps and needs in available coastal technical assistance.
- Improved coordination between the USACE and FEMA on the USACE levee inspection program, USACE emergency response policies, and USACE levee certification policies (with respect to FEMA's levee accreditation policies and FEMA's nationwide RiskMAP program implementation).
- Convened discussion forums involving experts in flood risk management from the private sector as well as Federal and non-Federal agencies leading to the development of new policy and guidance to promote more effective flood risk management.
- Worked with communities to identify options to remediate deficient levees or otherwise mitigate safety hazards in a comprehensive flood risk management planning context.
- Developed a tool for characterizing flood risk on a national and regional basis for use in identifying flood risk throughout the nation and inform the flood risk management budget needs and future evaluation of proposed flood risk management policy changes; in use internally, this prototype tool has been tested and refined within USACE and other interested federal agencies.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Other, Miscellaneous – Flood and Coastal Storm Damage Reduction

National Shoreline Management Study 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$950,000	\$400,000	\$1,400,000	\$400,000 2/ 3/	\$400,000

1/ This study effort is funded at 100 percent Federal expense.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$353,258. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 215 of Water Resources Development Act of 1999.

DESCRIPTION: The study is an interagency effort, including collaboration with NOAA, USGS, and the Coastal States Organization, to describe the extent and cause of shoreline erosion and accretion on all the coasts of the United States and describe the economic and environmental impacts of that erosion and accretion and to improve our understanding of long-term regional trends. The study was initiated with FY 2002 funding.

Prior year funding was used to:

1. Complete an overview assessment of eight coastal regions in FY 2012, including a set of tentative conclusions about the future of shore protection and sediment management. This information was used as a starting point for engaging the states and other Federal agencies in a new dialogue about coastal flood risks, resiliency, and systems approaches.
2. Update the report "Technical Review of Corps Coastal Projects (Flood and Coastal Storm Damage Reduction, Navigation, and Ecosystem Restoration)" in 2017.
3. Link the Coastal Systems Portfolio Initiative (CSPI) database with the database systems for integrated Budget Evaluation Tool (iBET), Corps Map, and Coastal Asset Management enabling the Corps to incorporate Regional Sediment Management principles into coastal analyses.
4. Collaborate with Virginia, Hawaii, and California, and the Great Lakes States to develop regional strategies for adaptation, given the realistic prospects for coastal change.

Fiscal Year 2018 and Fiscal Year 2019 funding will be used to maintain the Coastal Systems Portfolio Initiative database nationally and build regional functionality in Mid Atlantic and California; update elements of the report "Technical Review of Corps Coastal Projects (Flood and Coastal Storm Damage Reduction, Navigation, and Ecosystem Restoration)"; and continue other work on the National Shoreline Management Study.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Agencies – Flood and Coastal Storm Damage Reduction

Planning Assistance to States 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budget Amount for FY 2019
\$5,000,000	\$6,000,000	\$6,750,000	\$5,000,000 2/ 3/	\$5,000,000

1/ With limited exceptions, non-Federal sponsors are responsible for 50 percent of the cost of efforts undertaken with these funds.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$3,856,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$1,500,000.

AUTHORIZATION: Section 22 of the Water Resources Development Act of 1974, as amended.

DESCRIPTION: The Planning Assistance to States program has continued to evolve into a highly effective tool for providing technical and planning assistance to states, local governments, and Indian tribes; annual funding is used to enable the Corps to provide planning and technical assistance to assist in a wide variety of water resource efforts. States, local governments, and Indian tribes recognize the need to develop locally directed solutions to their water resources problems, and this program provides a means of working with partners on broad water resources matters of interest to them and outside planning and authorization for site-specific studies and projects.

Annual funding is used to provide planning and technical assistance to States, such as development and updates to hazard mitigation plans and floodplain management plans. Funds could also be used to support the efforts of entities such as the Susquehanna River Basin Commission, Delaware River Basin Commission, and the Interstate Commission on the Potomac River Basin.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Other, Miscellaneous

Planning Support Program 1/ 2/

Allocation in FY 2014	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$4,900,000	\$5,210,000	\$3,100,000	\$3,150,000	\$3,500,000 3/ 4/	\$3,500,000

1/ The activities supported by this remaining item are funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$497,336. There was an additional \$296,948 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 936, WRDA 1986; Section 216, WRDA 2000; Section 2033(e), WRDA 2007

DESCRIPTION: The Planning Support Program provides technical and managerial assistance for project planning, development, and implementation; peer reviews of new major methods, models, or analyses used in feasibility studies; and support independent peer review panels as well as maintaining core planning competency within the workforce. The key components of this program are as follows:

1. Planner Capability and Training. The Planning Community of Practice is comprised of Corps employees who share best planning practices, test innovative solutions, and coach and mentor each other. The Planning Associates Program is an advanced training program for journeyman level water resource planners in the Corps. The program includes 20 instructional units held at various locations and extends over 1-3 week increments for 11 months. The goals of the program are to broaden the planners' competencies in solving complex water resources problems; to strengthen their leadership skills; and to retain critical planner capability as they progress toward expert planner. Since 2003, 149 planners have completed this training.
2. Planning Centers of Expertise: Six national Planning Centers of Expertise for inland navigation, deep draft navigation, ecosystem restoration, coastal and storm damage reduction, flood damage reduction, and water management and reallocation have key roles in maintaining and strengthening the competency of the Planning Community of Practice by providing technical assistance, conducting or managing peer review, and transferring the latest technology or methodologies and sharing lessons learned and best practices throughout the planning community.
3. Planning Modernization: The current planning process - Specific, Measurable, Attainable, Risk Informed, Timely (SMART) Planning - for feasibility studies is risk-informed and decision focused and utilizes the 6-step planning process (identify problems and opportunities, inventory and forecast conditions, formulate alternatives, evaluate alternatives, compare alternatives, select the recommended plan) while deliberately scoping analyses to what is necessary for decisions. SMART planning provides a framework to allow for the identification of a recommended plan through more direct collaboration between the District, Division, Headquarters and the non-Federal sponsor, and eliminates extraneous analysis while improving the quality of the decision.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Flood and Coastal Storm Damage Reduction

Precipitation Studies 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$225,000	\$225,000	\$200,000	\$200,000 2/ 3/	\$200,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ The actual unobligated carry-in from FY 2017 to FY 2018 was \$1,981. There was an additional \$13,607 of unobligated funds that were committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

The funds provided under this program are used to fund the Corps of Engineers hydrometeorological studies program. The Corps performs analyses of storm rainfall and other meteorological data required to develop hydrologic criteria for use in planning, design and water control management of flood control and water resources development projects, and in floodplain management studies.

The funds provided under this program are used to:

- (1) compile and review the meteorological aspects of storm data;
- (2) conduct precipitation analyses including depth-duration-frequency estimation for regions and the nation;
- (3) estimate probable maximum precipitation (PMP);
- (4) develop meteorological parameters pertaining to hurricanes, northeasters and other wind phenomena; and
- (5) conduct other hydro-meteorological studies as necessary to accomplish the Corps mission.

Other examples of accomplishments under this program include updates to precipitation frequency estimates, maintaining the Precipitation Frequency Data Server (PFDS) web portal, and preparing and delivering the annual report on nationwide flooding and associated assessment of damages.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data

Remote Sensing/Geographic Information System Support, Engineer Research and Development Center 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$425,000	\$350,000	\$75,000	\$75,000 3/ 4/	\$75,000

1/ This activity is funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$3,955. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Various authorities including Public Law 110-114.

DESCRIPTION: The Remote Sensing/GIS Center (Center) is the USACE Center of Expertise for Civil Works Remote Sensing and GIS technologies. Continuing interaction with other researchers and practitioners throughout the Corps, government, the private sector, and academia assures that knowledge of evolving trends that are relevant to Corps activities are available, and that duplication of effort is avoided.

The Center promotes sensors, data collection, analysis, and storage systems, building on commercial software, and integrating these with operational technologies that are then delivered to the USACE divisions, districts, and other agencies' activities. The Center develops approaches for the integration of data from disparate sources to inform comprehensive and collaborative land and water resources management and ensures that the necessary support can be rapidly directed toward solving operational problems that require specialized expertise. The Center provides guidance and technical support throughout the Corps and supports the transfer of technical knowledge to those who are, or soon will be, using these technologies via training conducted in the field through workshops, conferences, and distance learning. The Center also develops white papers; publications, including Engineering Letters, Circulars, and Manuals; etc. to transfer procedures and lessons learned to end users.

Annual funding is used to provide technical support and expertise throughout the Corps of Engineers for Civil Works remote sensing and GIS and continue to expand GIS and remote sensing capabilities to maintain technical leadership for USACE programs.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

PROJECT NAME: Research and Development 1/ 2/

Allocation in FY 2013	Allocation in FY 2014	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$26,760,000	\$24,183,000	\$22,489,000	\$27,711,000	\$22,150,000 3/	\$16,145,000 4/ 5/	\$16,258,500

1/ The activities under this line item are funded at 100 percent Federal expense.

2/ The costs of this activity are shared between the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines coincident with the Environmental, Flood and Coastal Systems, and Navigation subtotals detailed herein.

3/ \$150,000 was reprogrammed to this program during FY 2017.

4/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

5/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$59,000. There was an additional \$1,248,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: 10 U.S.C. 2358 ("The Secretary of Defense or the Secretary of a military department may engage in basic research, applied research, advanced research, and development projects that are necessary to the responsibilities of such Secretary's department in the field of research and development.")

DESCRIPTION: Annual funding enables the Corps to take advantage of rapidly developing technologies and techniques that will promote monetary savings and greater reliability, safety, enhanced efficiency, and environmental sustainability in planning, design, construction, operations and maintenance of civil works activities. Annual funding is categorized and managed as follows: Navigation, Flood and Coastal Systems (including Flood and Coastal Storm Damage Reduction, Emergency Management, Water Supply, and Recreation), and Environmental (including Aquatic Ecosystem Restoration, Regulatory, and Environmental Stewardship).

Results of the Corps' R&D are directly incorporated into practice within the Civil Works Program through revisions or additions to Engineer Regulations, Engineer Manuals, Technical Guidance Manuals, Engineer Technical Letters, or Guide Specifications. Numerous other means of technology transfer are also used such as training courses, workshops, demonstrations, technology availability in commercial tools and services, and other professional contacts.

The Corps conducts Civil Works R&D through the U.S. Army Engineer Research and Development Center (ERDC) and the Institute for Water Resources (IWR). The ERDC consists of seven research laboratories:

Coastal and Hydraulics Laboratory, Vicksburg, MS
Cold Regions Research and Engineering Laboratory, Hanover, NH
Construction Engineering Research Laboratory, Champaign, IL
Environmental Laboratory, Vicksburg, MS

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Geospatial Research Laboratory, Alexandria, VA
 Geotechnical & Structures Laboratory, Vicksburg, MS
 Information Technology Laboratory, Vicksburg, MS

The IWR is located in Alexandria, VA, and its Hydrologic Engineering Center (HEC) in Davis, CA. Policy guidance and executive oversight are provided by the Civil Works R&D Steering Committee co-chaired by the Director of Research and Development and the Deputy Director of Civil Works and comprised of CW division chiefs. The Director of Research and Development is responsible for developing the annual program. The Directors of ERDC and IWR are responsible for execution of the CW R&D program.

In order to most effectively use the available R&D resources and to avoid unnecessary duplication of research effort, the Civil Works R&D program maintains external technical exchange and technology transfer efforts with other Federal and major water resource agencies including the TVA, Bonneville Power Administration, Western Area Power Administration, EPA, NSF, Department of Agriculture (NRCS), Park Service, NOAA, DOI (USBR, Forest Service, FWS, USGS, DHS (USCG, FEMA, US Border Patrol), DOT (FHWA, FAA, MARAD), NASA, International Boundary Water Commission, International Joint Commission, DOE (NRC, FERC), the Navy, and state and local governments.

Corps researchers also maintain contact with the research activities of universities and industry through regular membership in such organizations as the American Society of Civil Engineers, the Civil Engineering Research Foundation, the American Concrete Institute, the American Society of Testing and Materials, the International Conference on Coastal Engineering, the American Association of Port Authorities, the American Society for Photogrammetry and Remote Sensing, Society of Environmental Toxicology and Chemistry, the Coastal Society, the Offshore Technology Conference, International Society of Soil Mechanics and Foundation Engineering, U.S. Society of Dams, and International Committees on Large Dams, the International Association for Hydraulic Research, the Association of American Geographers, Western Dredging Association and the International Navigation Association. The Corps also participates extensively with the Transportation Research Board, the Water Science and Technology Board, and the National Research Council in coordinating and leveraging research activities.

a. Navigation

Allocation in FY 2013	Allocation in FY 2014	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in In FY 2018	Budgeted Amount for FY 2019
\$12,426,000	\$12,586,000	\$10,708,000	\$12,511,000	\$8,936,648	\$6,330,000 2/	\$6,373,500

Navigation research delivers products that improve efficiency and reliability of the waterborne transportation network. The research framework integrates infrastructure engineering, physics, economics, innovative construction, coastal and riverine hydrodynamics and processes, monitoring and sensing technologies, operations research, environmental solutions, and emerging technologies to create effective solutions in concert with the multiple demands, requirements, and constraints of real world commodity transport and power production problems. Research efforts target navigation channels, locks, jetties, breakwaters, harbors, and dams to optimize among life-cycle and reliability trade-offs, assure defensible economic assessment, and provide better investment decision tools for predicting performance and deterioration with time, and for scheduling and prioritizing maintenance and repairs balanced with the consequences of delays. Essential to this effort is the development of tools for determining the condition of infrastructure components and for enabling risk-based prioritization of operation and maintenance needs. R&D efforts for development of condition index products include: Developing a standardized method and associated computer program for life-cycle engineering analysis of coastal rubble mound breakwaters, Improved Condition Indexing for Coastal Structures, Monitoring of Concrete Navigation Structures,

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Inspection and Condition Assessment of Steel Hydraulic Structures, and Condition Monitoring and Predictive Maintenance for Infrastructure. Funding is used to develop improved navigation economic technologies that can be used to support better-informed decision analyses and management of the deep-draft coastal ports and of the inland waterways.

This R&D area provides advanced and innovative tools and technology for the Corps to improve navigation functional performance, reduces unit costs, and improves safety. On the inland waterways, for example, R&D efforts are used to reduce the costs associated with delays due to closures for both scheduled and unscheduled repairs, as well as reduce the risk of catastrophic failure of a major infrastructure component. Through the R&D program, the Corps is better able to apply robust, reliable, and comprehensive capabilities to assess all impacts of alternative plans for projects and to select the most balanced and sustainable solutions. R&D delivers efficient and effective capabilities to plan, design, construct, operate, maintain, and upgrade transportation projects in inland and coastal locations and in all climates, from warm to ice-affected. Capabilities to improve system reliability are used in an asset management framework to extend project life and reduce life cycle costs. Engineering and environmental aspects are integrated in the development of processes and design models, decision support software, infrastructure condition assessment techniques, risk frameworks, infrastructure and design guidance, and innovative monitoring, operation and maintenance technologies.

b. Flood and Coastal Systems

Allocation in FY2013	Allocation in FY 2014	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$9,034,000	\$6,815,000	\$6,712,000	\$9,800,000	\$7,376,820	\$5,508,000 2/	\$5,548,000

Corps projects across the Nation reduce the risk of flooding and storm damage. In the daily and seasonal operation of hundreds of Corps projects, national requirements for water supply and opportunities for recreation and environmental stewardship are also balanced. The Nation expects the Corps to guarantee that its existing projects maximize efficiency and effectiveness, and that new projects incorporate the most advanced knowledge and capabilities in planning, design, construction, operation, and maintenance. Through R&D, the Corps develops technology that optimizes daily operations of water resources projects to meet multiple objectives, including water supply and environmental stewardship. The Corps' R&D creates new solutions to challenging infrastructure engineering problems in building, maintaining, upgrading, and operating the Nation's water resources infrastructure such as dams, locks, spillways, channels and levees. Through R&D, the Corps provides guidance and tools to understand the natural setting of water resource projects, to incorporate environmental & economic objectives, to manage flood risk, to assess alternative solutions, and to make optimal decisions. The technological requirements of emergency management are addressed to make possible the most rigorous planning and preparedness and the most efficient and effective response and recovery.

The Corps manages many of its existing water resources projects around the country to reduce the risk of flood damage, but also seeks to balance this objective in many cases with other authorized project purposes. As enabling technologies are developed, the Corps may use that information to upgrade and improve existing water resource projects; assess the risk of alternative operational scenarios; and assess the economic and environmental effects of alternative plans for new projects to inform selection of the most balanced and sustainable solutions. R&D delivers efficient and effective capabilities to plan, design, construct, operate, maintain, evaluate, and improve water resource projects in all climates and settings, from warm to ice-affected, and from inland to coastal.

Capabilities that prevent loss of life, minimize property damage, and reduce the life-cycle costs of projects include: advanced processes and design models,

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economic models and decision support software, infrastructure condition and risk assessment tools, infrastructure design guidance, innovative operation and maintenance technologies, flood-alert instrumentation and expedient emergency response capabilities, and new real-time data sources (e.g. precipitation radar) to accurately forecast real-time flow and stages.

This R&D component provides advancements in hydrologic and hydraulic simulation, water resources project optimization, tools for effective alternative analyses for solutions, infrastructure safety, structural design and performance, assessment of the risk and uncertainty associated with project designs, and assessment of non-structural, natural, and nature-based features to reduce flood risk. This R&D component also improves the technology available to emergency managers for emergency planning, preparedness, response, recovery, and assessment.

c. Environmental

Allocation in FY 2013	Allocation in FY 2014	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$5,300,000	\$4,782,000	\$5,069,000	\$5,400,000	\$5,940,000	\$4,307,000 2/	\$4,338,000

The Corps has ecosystem restoration and environmental stewardship and management responsibilities on more than 11 million acres of land and water resources. Due to the enormous scope of this mission, it is imperative that Corps field personnel can apply the latest technologies for ecosystem restoration and natural resource inventory. The scale of these activities ranges from large projects such as the Florida Everglades down to much smaller, local wetlands/stream restoration projects. The broad scope of these environmental activities (as well as the frequent changes to the legislative mandates that govern them) demands sound research and development to address these critical needs. The goal of this R&D is to provide cost-effective/innovative technologies for project planning, design, engineering/construction, and operation & maintenance. Products include concise, how-to guidance documents that provide rapid/low-cost technologies and methods for high priority field needs as well as sophisticated ecological process assessment models that are critical to the success of the Corps' Ecosystem Restoration business line.

Wide-ranging environmental compliance, management, and restoration efforts have become crucial parts of the Corps water resource management mission. The Corps must consider environmental issues related to the operation and maintenance of its existing water resources projects as well as the restoration of degraded ecosystems. This research area addresses the Corps' highest priority environmental issues through the development and application of cost-effective, time-saving technologies. There is a growing emphasis on "integrated" ecological restoration and management, that couples the requirements for ecological restoration and stewardship with other attainable services that ecosystems can provide. For example, ecological restoration efforts that achieve not only environmental benefit, but provide flood risk reduction, and reservoir management protocols that achieve not only a reliable water supply, but necessary environmental flows and water quality objectives. The current research portfolio can be categorized into seven (7) broad categories that generally capture the breadth and focus of the current environmental research program:

- 1) Maximizing value of ecosystem restoration projects;
- 2) Restoring ecological integrity and sustainability;
- 3) Management of inland aquatic and interdependent terrestrial resources;
- 4) Ensuring resilience, function and value of coastal ecosystems;

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- 5) Management of Threatened and Endangered and Invasive Species in Ecosystem Restoration projects;
- 6) Providing modeling tools and decision frameworks for evaluation and comparison of ecological restoration alternatives; and
- 7) Ecological Infrastructure - assessing the ecological role, function and design of natural and nature-based features in "integrated" multi-objective (ENV, NAV, FRM) projects.

User-oriented products will provide scientifically defensible and field validated solutions to the Corps' highest priority environmental problems.

Quantifying the environmental benefits and ecological outputs of proposed Corps ecosystem restoration projects is essential for decision makers to be able to select those projects that will yield the highest social, economic, and environmental services. The scientific community has criticized the underlying model assumptions, oversimplified relations, excessive data requirements, complexities in integrating impacts, and the lack of meaningful metrics to permit biologically-effective decisions. Moreover, current assessments are static and frequently insensitive to important system dynamics, not applicable across multiple scales, and incapable of predicting future conditions. Corps decision makers need robust assessment tools that: incorporate modern ecosystem principles that are easy to apply, offer significant user flexibility to meet individual project requirements, and that provide quantifiable output relevant to the Corps' performance measures. These tools are provided in brief user-focused technical guidance documents, web-based decision support systems, webinars (interactive web presentations between R&D Scientists and Engineers and Corps Practitioners), classroom and internet based training, and product technical support, as required.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data

Scientific and Technical Information Centers, Engineer Research and Development Center 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$47,000	\$47,000	\$47,000	\$50,000 3/ 4/	\$50,000

1/ This activity is funded at 100 percent Federal expense

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$1,822. There was an additional \$1,677 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Public Law 99-802, Federal Technology Transfer Act of 1986, requires technology transfer from Federal agencies to the private sector.

DESCRIPTION: The function of the five information analysis centers (coastal engineering, cold regions engineering, concrete technology, hydraulic engineering, and soil mechanics) located at the U.S. Army Engineer Research and Development Center (ERDC) is to acquire, examine, evaluate, summarize, and disseminate newly published scientific and technical information generated within the Corps of Engineers and other activities. These centers are a major technology transfer resource between the Corps of Engineers and the public and private sectors, including the scientific and engineering community and academia, for results of over 75 years of research results conducted by the ERDC laboratories in the fields of soil mechanics and foundation engineering, cold regions engineering, concrete technology, hydraulic engineering, and coastal engineering.

Each center, supported by their host laboratories, critically evaluate and summarize the technical validity and merits of published and unpublished research and technical publications on design, construction, or other technology utilization. User communities have been well established and distribution lists for technology transfer are continuously updated. Each center is supported by multi-disciplinary technical staff and has a comprehensive library of published materials. In a typical year, each Center responds to hundreds of information requests on subjects within its purview. These services are free to the users. In addition, services such as literature research, information synthesis, publication location, research reviews, and methodology comparisons on subjects of mutual interest to ERDC laboratories and other interested parties are available on a cost-reimbursable basis.

Annual funding is used to provide technical expertise in the form of copies of reports, arranging to speak with an expert, furnishing generalized technical advice, or giving updates on technical developments; digitize older ERDC research reports of significant technical value and place them on the internet for ready access by the public; and distribute reports, technical notes, computer programs, geographic information systems (GIS) data, abstracts, information bulletins, and other scientific and technical information to the Defense Technical Information Center (DTIC), Corps libraries, depository libraries, and identified user communities to ensure wide circulation and availability. The effectiveness of activities and services is evaluated on a continuing basis, and technology transfer products and methodology are revised when appropriate.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Coordination Studies with Other Agencies, Other Coordination Programs

Special Investigations 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$2,310,000 3/	\$1,326,000 4/	\$1,300,000	\$1,000,000 5/ 6/	\$1,000,000

1/ This activity is funded at 100 percent Federal expense.

2/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration, Flood and Coastal Storm Damage Reduction, and Navigation business lines.

3/ \$40,000 reprogrammed away from this activity in FY 2015.

4/ \$24,000 reprogrammed away from this activity in FY 2016.

5/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

6/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$445,108. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

DESCRIPTION: The funds provided under this program are used to respond to various special requests by local interests to conduct limited scope investigations of flooding and potential ecosystem restoration at multiple locations where a previously studied and/or authorized project does not exist as well as attendance at meetings with local interests and other agencies during the preliminary stages of project investigations.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Flood and Coastal Storm Damage Reduction

Stream Gaging, Institute for Water Resources 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$550,000	\$1,097,000	\$750,000	\$550,000 2/ 3/	\$550,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ The actual unobligated carry-in from FY 2017 to FY 2018 was \$10,235. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

The Corps makes extensive use of streamflow records in the planning, design, construction, and operation of water resources projects. For the optimum development and management of water resources, it is essential that continuous records of streamflow be maintained at specific sites over a long period of time to provide a reliable measure of water resources available for various uses. The basic network of stream gaging stations operated by the U.S. Geological Survey (USGS) under its normal functions is inadequate to meet all the special needs of the Corps water resources responsibilities. The Corps started working on this cooperative program in March 1928, so that streamflow data would be available to meet special needs concerning the Corps water resources responsibilities. The data collected at these gages is also used by the National Weather Service as the basis for its public flood forecasts. In addition, the data are published on the Internet by the Corps and/or in a regular series of reports by the USGS and provide valuable information for many Federal and state agencies and the public.

Annual funding is used to operate and maintain stations of special interest to the Corps that are not directly attributed to a specific Corps project. Funding for stations that are directly associated with a Corps project are budgeted within the cost of the authorized projects and/or studies.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Collection and Study of Basic Data – Navigation

Transportation Systems 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018	Budgeted Amount in FY 2019
\$1,559,000	\$1,593,000	\$3,430,000	\$1,000,000 2/ 3/	\$1,000,000

1/ This activity is funded at 100 percent Federal expense.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$310,731. There was an additional \$17,182 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: Section 904, Water Resources Development Act (WRDA) 1986 (P.L.99-662); Section 334, WRDA 1992 (P.L.102-580); and Section 230, WRDA 1996 (P.L. 104-303).

DESCRIPTION: The process of planning improvements for waterway and harbor navigation projects necessitates consideration of needs, opportunities, benefits, and economic costs of project improvements in the context of the project-specific areas as well as the overall national transportation system. The Transportation Systems remaining item is used to fund information and technical services and support for navigation projects including viable and practical analytical techniques, sources of information, tools and methods including the development of deep draft and shallow draft vessel operating cost data; provision of timely information regarding the global deep draft vessel fleet; preparation of commodity and cargo flow forecasts; and the publication of reports documenting the results of research and program-wide investigations associated with the Transportation System Analysis Program. The goals for the use of these funds include: (1) improve the technical quality, accuracy and consistency of navigation planning studies and procedures; (2) improve the strategic planning and management of navigation improvements; and (3) reduce the costs of individual navigation studies through shared data, methodologies, and analytical applications.

Fiscal Year 2018 funds will be used to update shallow and deep-draft vessel operating costs; continue certifying several navigation models; complete a draft national inland waterway traffic forecast, and purchase trade and shipping subscriptions used for navigation feasibility studies. In addition, funds will be used to update and improve the data and methods used to estimate shipper response to cost changes on the inland waterways as well as to update computer models and analyses related to the impacts of the Panama Canal's expansion and other world events, and to continue to make improvements to the Regional Economic System (RECONS) model.

Fiscal Year 2019 funds will be used to update shallow and deep-draft vessel operating costs; to finalize and certify navigation models; and to acquire trade and shipping subscriptions used for navigation feasibility studies. In addition, funds will be used to update and improve the data and methods used to estimate shipper response to cost changes on the inland waterways as well as to update computer models and analyses related to the impacts of the recent Panama Canal's expansion and other world events.

APPROPRIATION TITLE: Investigations, Fiscal Year 2019

Other, Miscellaneous

Tribal Partnership Program 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$2,500,000	\$1,432,925 3/	\$1,750,000	\$500,000 4/ 5/	\$500,000

1/ The non-Federal sponsor is generally responsible for 50 percent of the costs of all feasibility studies and 25 percent of the costs of all watershed studies funded out of this remaining item with the exception of a \$455,000 waiver for Federally-recognized Tribes that is subject to inflation.

2/ The costs of this remaining item are accounted for in the Aquatic Ecosystem Restoration and Flood and Coastal Storm Damage Reduction business lines.

3/ \$67,075 was reprogrammed away from this line item in FY 2016.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$2,788,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$1,139,000.

5/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

AUTHORIZATION: Sec. 203 of Water Resources Development Act (WRDA) of 2000, as amended by Section 2011 of WRDA 2007; Section 1156 of the Water Resources Development Act of 1986 as amended by Section 1119 of the Water Infrastructure and Investment Act of 2016; Section 1002 and 1031 of the Water Resources and Reform Development Act of 2014.

DESCRIPTION: Funds provided under this program may be used, in cooperation with Indian Tribes (as defined by 25 U.S.C 450b) and heads of other Federal agencies, to carry out water-related planning activities and study and determine the feasibility of carrying out water resources development projects that will substantially benefit Indian tribes and are located primarily within Indian country or in proximity to Alaska Native villages. A study under this authority "may address (A) projects for flood damage reduction, environmental restoration and protection, and preservation of cultural and natural resources; (B) watershed assessments and planning activities; and (C) such other projects as the Secretary, in cooperation with Indian Tribes and the heads of other Federal agencies, determines to be appropriate." Various activities may be considered pursuant to this broad authority such as floodplain mapping, water control management, self-reliance and economic capacity building, technical capacity building, erosion control, cultural resources, comprehensive planning, emergency management, water quality, water supply, community infrastructure, and hazardous and toxic waste assessments. Prior to FY 2008, these activities were funded in the Construction account.

Reconnaissance studies have previously been completed under this program: Land Augustine Watershed Study, Coachella (CA), Lapwai Creek Reconnaissance Study (ID), the Kickapoo Tribe (KS), Menemsha Pond Restoration (MA), Indian Island Feasibility Study (ME), Nottawaseppi Band of Huron Potawatomi Indians (MI), Forest Potawatomi Watershed Study (MI), and Stockbridge Munsee Indian Community (WI).

Feasibility Studies focus on a specific problem area (e.g. Flood and Coastal Storm Damage Reduction) within a limited geographic area and result in a specifically recommended project. Watershed Studies examine a broad array of watershed challenges, identify an array of potential corrective

actions, and result in a Watershed Management Plan as the final product. Watershed Management Plans do not result in specifically recommended projects. Studies follow the standard Civil Works planning process. Separate authorization and appropriations are required from Congress to proceed to preconstruction engineering and design for recommended projects whose Federal share is greater than \$10,000,000. No feasibility studies or watershed assessments have yet been completed under this program. However, two watershed assessments, Santa Clara Pueblo, NM, and Acoma Pueblo, NM, Watershed Assessment are currently anticipated to be completed in FY 2018.

There are currently five on-going feasibility studies and eight on-going watershed assessments with cost-sharing agreements signed between the Department of the Army and the non-Federal sponsor.

Annual funding and prior year appropriations will be used to continue and complete work on feasibility studies and watershed assessments with signed cost-sharing agreements, including termination of negative activities where appropriate; to develop, negotiate and execute cost-sharing agreements for new feasibility studies and/or watershed assessments; and for program coordination. The majority of the Tribal Nations are not located near Corps District Offices and require greater levels of coordination due to the remote geographic location of the Tribes.

Annual funding and prior year appropriations will be used to continue and complete work on feasibility studies and watershed assessments with signed cost-sharing agreements, including termination of negative activities where appropriate; to develop, negotiate and execute cost sharing agreements for new feasibility studies and/or watershed assessments; and for program coordination. The majority of the Tribal Nations are not located near Corps District Offices and require greater levels of coordination due to the remote geographic location of the Tribes.

On-going watershed assessments are as follows:

State	Study Title	Local Sponsor	Funding through FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019	Date of Cost-Sharing Agreement
AZ	Bird Springs Watershed Assessment	Navajo Nation at Bird Springs	\$109,225	\$38,300	\$0	\$12,000	\$28,000	October 2017
ME	Meduxnekeag Watershed Assessment Management Plan	Houlton Band of Maliseets	\$215,000	\$20,000	\$105,000	\$25,000	\$25,000	April 2017
NM	Santa Clara Pueblo, NM, Watershed Assessment	Pueblo of Santa Clara	\$1,046,018	\$50,171	\$183,000	\$40,000	\$0	Sept 2011
NM	Pueblo of San Felipe, NM Watershed Assessment	Pueblo of San Felipe	\$480,407	(-\$127,293)	\$116,000	\$40,000	\$25,000	March 2013

NM	Acoma Pueblo, NM, Watershed Assessment	Pueblo of Acoma	\$750,344	\$244,582	\$85,000	\$35,000	\$0	March 2013
NM	Pueblo of Santo Domingo, NM, Watershed Assessment	Pueblo of Santa Domingo	\$241,738	\$266,652	\$100,000	\$35,000	\$30,000	June 2014
NM	Pueblo of Santa Ana, NM Watershed Assessment	Pueblo of Santa Ana	\$551,106	\$235,927	\$60,000	\$35,000	\$30,000	June 2013
NM	Pueblo of Zia, NM, Watershed Assessment	Pueblo of Zia	\$50,000	\$117,206	\$200,000	\$30,000	\$30,000	March 2017

On-going feasibility studies are as follows:

State	Study Title	Local Sponsor	Funding through FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019	Date of Cost-Sharing Agreement
AK	Elim Subsistence Harbor	Kwethluk Native Village of Elim	\$0	\$0	\$0	\$27,000	\$27,000	June 2017
ID	Fort Hall Bottoms Resource Inventory & Management Plan	Shoshone-Bannock Tribe	\$0	\$0	\$0	\$10,000	\$30,000	December 2017
KS	Soldier Creek Watershed	Prairie Band Pottawatomie	\$0	\$0	\$0	\$20,000	\$20,000	April 2017
ME	Shoreline Erosion Study	Passamaquoddy Tribe, Pleasant Point Reservation	\$50,000	\$50,000	\$0	\$25,000	\$20,000	May 2016
SD	Lower Brule Sioux Study	Lower Brule Sioux	\$0	\$0	\$0	\$41,000	\$40,000	October 2017

The following watershed assessment is anticipated to commence with a signed cost-sharing agreement in FY 2018:

State	Study Title	Local Sponsor	Funding through FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
AZ	Middle Gila and Lower Santa Cruz River, AZ Watershed Study	Gila River Indian Community	\$105,000	\$0	\$0	\$25,000	\$20,000

The following feasibility studies are expected to commence with signed cost-sharing agreements in FY 2018 or FY 2019:

State	Study Title	Local Sponsor	Funding through FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019	Anticipated Date of Cost-Sharing Agreement
AZ	Tohono O'odham Flood Risk Management Study	Tohono O'odham Nation	\$160,000	\$333	\$0	\$15,000	\$20,000	FY 2018
AZ	Polacca Wash Feasibility Study	Hopi Tribe	\$143,400	(-\$65,475)	\$0	\$0	\$15,000	FY 2018
CA	Torres-Martinez Ecosystem Restoration Study	Torres-Martinez Desert Cahuilla Indians	\$150,000	\$867	\$0	\$15,000	\$20,000	FY 2018
CA/ NV	Washoe Tribal Lands along the Carson River, NV	Washoe Tribe of NV and CA	\$0	\$0	\$0	\$30,000	\$25,000	FY 2018
MN	Little Minnesota Fish Passage Investigation	Sisseton Wahpeton Oyate of the Lake Traverse Reservation	\$0	\$0	\$0	\$20,000	\$25,000	FY 2018

MN	Prairie Island Sturgeon Lake Habitat Restoration	Prairie Island Indian Community	\$0	\$0	\$0	\$20,000	\$25,000	FY 2018
NM	Pueblo of Isleta Feasibility Study	Pueblo of Isleta	\$0	\$0	\$0	\$0	\$25,000	FY 2018
NM	Pueblo of Zia Feasibility Study	Pueblo of Zia	\$0	\$0	\$0	\$0	\$20,000	FY 2018
WA	Hoh Tribal Partnership Project	Hoh Tribe	\$100,000	\$0	\$0	\$0	\$0	FY 2019

The following studies are inactive or terminated:

State	Study Title	Local Sponsor	Net allotment through FY 2017
AK	Villages Erosion Studies		>\$707,882
AK	Kuskokwim-Middle River Watershed Study	Kuskokwim Corporation	\$95,319
AZ & NM	Navajo Nation – Little Colorado (Upper Puerco), NM & AZ, Watershed Assessment	Navajo Nation, Little Colorado (Upper Puerco)	\$79,038
AZ, NM, & UT	Navajo Nation – San Juan (Chinle), NM, AZ & UT, Watershed Assessment	Navajo Nation, San Juan (Chinle)	\$57,832
CT	Mohegan Tribe, CT	Mohegan Tribe	\$85,500
MA	Santuit Pond Restoration Shoreline Erosion Study 5/	Mashpee Wampanoag Tribe (MA)	\$105,000
NM	Navajo Nation – Rio Puerco (Arroyo Chico), Ojo Encino Chapter, NM, Watershed Assessment	Navajo Nation, Rio Puerco (Arroyo Chico)	\$61,966
NM	Pueblo of Laguna Watershed Assessment	Pueblo of Laguna	\$29,924

NM	Pueblo of Picuris, NM, Watershed Assessment	Picuris Nation	\$56,099
NY	St Lawrence River, Akwesasne, St Regis Mohawk Tribe	St. Regis Mohawk Tribe	\$100,000
WA	Makah Tribal Partnership Study	Makah Tribe	\$2,070
WA	Lower Elwha Klallam Tribal Partnership Project	Lower Elwha Tribe	\$1,638
WA	Jamestown S'Klallam Watershed Study Project	Jamestown S'Klallam Tribe	\$99,989
WA	Quileute Tribal Watershed Study	Quileute Nation (WA)	\$277,455
WA	Sauk-Suiattle Tribal Partnership	Sauk-Suiattle Tribal Partnership	\$24,842
WA	White Swan Tribal Partnership Study	Yakama Nation	\$92,227
OR	Willamette Basin Pacific Lamprey Study	Grand Ronde Tribe	\$14,618

APPROPRIATION TITLE: Construction and Harbor Maintenance Trust Fund, Fiscal Year 2019

Continuing Authorities Projects Not Requiring Specific Legislation (Continuing Authorities Program (CAP))

Aquatic Ecosystem Restoration (CAP Section 206) – Construction, Aquatic Ecosystem Restoration

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 206 1/		\$8,000,000	\$8,000,000	\$ 8,000,000	\$ 6,500,000	\$1,500,000

Description: Annual funding is used to investigate, design, and construct aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest and are cost-effective. Not more than \$10,000,000 in Federal funds may be allocated to a project at a single locality. Up to \$50,000,000 may be appropriated annually to the Section 206 program.

Authority: Section 206 of the Water Resources Development Act of 1996 (PL 104-303), as amended.

1/ Non-Federal interests are required to share in a minimum of 35 percent of the implementation cost of construction including provision of all lands, easements, rights-of-way, and necessary relocations. Non-Federal interests pay 100 percent of the cost of operation, maintenance, replacement and rehabilitation.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY 2018. 3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 \$5,569,000. There was an additional \$7,373 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is less than \$200,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

Beneficial Uses of Dredged Material (CAP Section 204) – Harbor Maintenance Trust Fund, Navigation

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 204 1/		\$3,500,000	\$ 500,000	\$ 1,000,000	\$ 500,000	\$ 500,000

Description: Annual funding is used to investigate, design, and construct projects for the protection, restoration and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of an authorized navigation project. Not more than \$10,000,000 in Federal funds may be may be allocated to a single modification or measure. Up to \$50,000,000 may be appropriated annually to the Section 204 program.

Authority: Section 204 of the Water Resources Development Act (WRDA) of 1992 (PL 102-580), as amended.

1/ Non-Federal interests are required to share in a minimum of 35 percent of the implementation cost of each project.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY

2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 into FY 2018 was \$2,245,000. There was an additional \$12,340 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is less than \$1,000,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

Flood Control (CAP Section 205) – Construction, Flood and Coastal Storm Damage Reduction

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 205 1/		\$10,000,000	\$ 8,000,000	\$ 8,000,000	\$ 1,000,000	\$ 500,000

Description: Annual funding is used to investigate, design, and construct flood and coastal storm damage reduction projects, including structural and/or nonstructural measures that are designed to provide the same complete project and same degree of protection provided under regular authorization procedures. Each project selected must be economically justified and complete within itself. Federal cost participation is limited to \$10,000,000 per project at a single locality. Up to \$55,000,000 may be appropriated annually to the Section 205 program.

Authority: Section 205 of the Flood Control Act of 1948 (PL 80-858), as amended.

1/ Non-Federal interests are required to share in a minimum of 35 percent of the implementation cost of each project.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 into FY 2018 was \$16,171,000. There was an additional \$50,564 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$9,000,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

Project Modifications for Improvement of the Environment (CAP Section 1135) – Construction, Aquatic Ecosystem Restoration

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 1135 1/		\$6,600,000	\$ 3,000,000	\$ 3,000,000	\$ 1,000,000	\$ 1,000,000

Description: Annual funding is used to review Corps water resources projects to determine the need for structural or operational modifications for the purpose of improving the quality of the environment in the public interest; to determine if the operation of such projects has contributed to the degradation of the quality of the environment; and to carry out a program of such modifications that are feasible and consistent with authorized project purposes. Not more than \$10,000,000 in Federal funds may be expended on any single modification or measure pursuant to Section 1135. Up to \$40,000,000 may be

appropriated annually to the Section 1135 program.

Authority: Section 1135 of the Water Resources Development Act of 1986 (PL 99-662), as amended.

1/ Non-Federal interests are required to share in a minimum of 25 percent of the implementation cost of each project.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$5,866,000. There was an additional \$1,318 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is less than \$200,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

APPROPRIATION TITLE: Construction, Fiscal Year 2019

Dam Safety and Seepage/Stability Correction Program 1/ 2/

FY 2015 Allocation	FY 2016 Allocation	FY 2017 Allocation	Presumed FY 2018 Allocation	FY 2019 Budget Amount
\$34,000,000	\$31,200,000	\$ 21,000,000	\$ 34,300,000 3/ 4/	\$ 88,655,000

AUTHORIZATION: Section 2 of National Dam Inspection Act of 1972, P.L. 92-367 (authorized the Secretary of the Army to inspect dams across the country, to create the National Inventory of Dams and to provide recommendations for a national program for the inspection and regulation for the safety of dams), Section 215 of the Water Resources Development Act of 1996, P.L. 104-303 (establishing National Dam Safety Program, directing implementation of Federal programs to enhance dam safety); Section 1 of Dam Safety Act of 2006, P.L. 109-460 (directing Secretary of the Army to maintain national inventory of dams including requiring inclusion of condition assessments performed by agency); Section 3001 of Water Resources Reform and Development Act of 2014, PL 113-121 (reauthorizing National Dam Safety Program).

DESCRIPTION: The Dam Safety and Seepage/Stability Correction Program provides for the evaluation and study of options to address dam safety assurance, seepage control, and static instability concerns at completed dams that the Corps owns and operates. The studies are located in various states. There are 715 such dams and appurtenant structures that the Corps owns and operates at 555 projects. Many of these dams have the potential, either now or in the future, to pose life safety, economic, and environmental risk to the downstream population centers and floodplains. The Corps has implemented a risk informed approach for dam safety management to reduce the risk to life, property, and the environment, with the goal of ensuring that all dams are designed, constructed, regulated, operated, and maintained as safely and effectively as practicable. Central to this approach is a process for prioritizing investments to maximize the reduction of risk across the entire portfolio of these dams. The Dam Safety and Seepage/Stability Correction Program provides the funding necessary to perform all non-routine dam safety evaluations and studies to support the risk informed management of the portfolio and ensure that USACE dams and appurtenant structures are in compliance with “ FEMA 93 - Federal Guidelines for Dam Safety”. Each dam has a Dam Safety Action Classification (DSAC) based on a risk assessment. The Dam Safety Seepage/Stability Correction Program supports engineering analysis required to ensure the structures are in compliance with updated engineering criteria and essential engineering guidelines, perform Issue Evaluation Studies (IES), ongoing Dam Safety Modification Studies (DSMS), and Pre-construction Engineering and Design for the highest risk dams in the USACE national portfolio. NEPA documentation will be or has been included in the various DSMR’s. All new Dam Safety Modification Studies beginning in FY 2019 will be funded individually from the Investigations account.

JUSTIFICATION: The Federal Guidelines for Dam Safety (FEMA 93), which FEMA issued pursuant to a presidential memorandum from President Carter dated April 23, 1977, require each Federal agency with responsibility for the operations and maintenance of dams to have a dam safety program to include dam safety modification. Dam safety ensures the integrity and viability of dams such that they do not present unacceptable risks to the public, property, and the environment. It requires the collective application of engineering principles and experience, and a philosophy of risk management that recognizes that a dam is a structure whose safe functioning is not explicitly determined by its original design and construction. While no Corps dam is in imminent danger of failure at this time, some dams have been identified as having a higher risk of a dam safety incident than originally anticipated based on new data, inherent flaws and defects that manifest over time, or the potential adverse effects that could occur from extreme flood or seismic loads.

The Dam Safety and Seepage/Stability Correction Program provides for evaluation of completed Corps of Engineers dams with emphasis on those with a rating of extremely high risk or very high risk (DSAC 1 and DSAC 2) and also those with a rating of moderate to high risk (DSAC 3). Dam Safety Issue Evaluation Studies (IES) are conducted to further evaluate high-risk dams identified from the Portfolio Risk Analysis program, and make risk-informed decisions on the need for their modification or reclassification, and to evaluate the risks of dam safety incidents that manifest over time or exhibit unsatisfactory performance during high pools or seismic events. Dam Safety Modification Studies (DSMS) are conducted to investigate dam safety deficiencies that could result in loss of life, formulate one or more alternatives that reduce the risks to tolerable levels, and recommend, in a Dam Safety Modification Report, an appropriate solution. Pre-construction Engineering & Design (PED) activities are performed to advance final design work prior to construction. Construction of dam safety modifications are funded by project specific line items in the Construction account in accordance with the existing project authorizations.

FISCAL YEAR 2017: The allocation of \$21,000,000 plus the unobligated carry-in funding of \$6,300,000 was applied as follows:

Dam Safety Modification Studies	\$ 5,990,750
Pre-Construction Engineering & Design	\$ 4,400,000
Issue Evaluation Activities	\$ 16,909,250
Total	\$ 27,300,000

FISCAL YEAR 2018: The presumed allocation of \$34,300,000 plus the carry-in funds of \$1,108,000 are anticipated to be applied as follows:

Dam Safety Modification Studies	\$ 8,000,000
Pre-Construction Engineering & Design	\$ 4,000,000
Issue Evaluation Activities	\$ 23,408,000
Total	\$ 35,408,000

Description of Work: Multi-year dam safety studies will continue in FY 2018 on the projects listed below as part of the Dam Safety Seepage/Stability Correction Program. Ongoing IES and DSMS studies will be completed, and new IES studies will be initiated. The funding is also used for the preparatory work that provides the technical basis for the dam safety studies, DSAC characterization, and risk informed portfolio management. It is anticipated that three DSMS projects (Moose Creek, Whittier Narrows and General Edgar Jadwin) will be approved for PED activities in FY 2018. In that case, FY 2018 funds would be used for PED work on those projects. It is anticipated that two IES will be approved to move to DSMS in FY 2018 (Pipestem and Keystone).

FISCAL YEAR 2019: The budget amount of \$88,655,000 plus the carry-in funds of \$800,000 are anticipated to be applied as follows:

Continuing Dam Safety Modification Studies	\$ 3,000,000
Pre-Construction Engineering & Design	\$ 4,000,000
Issue Evaluation Activities	\$ 16,050,000
Other Dam Safety Projects	\$ 66,405,000
Total	\$ 89,455,000

Description of Work: Multi-year dam safety studies will continue in FY 2019 on the projects listed below as part of the Dam Safety and Seepage/Stability Correction Program. Ongoing IES and DSMS studies will be completed, new IES studies will be initiated, and the funds will also be used for the preparatory work that provides the technical basis for the dam safety studies, DSAC characterization, and risk informed portfolio management. It is anticipated that the PED work on three projects will continue in FY 2019 (Moose Creek, Whittier Narrows and General Edgar Jadwin), and that DSMS studies will continue on two projects (Pipestem and Keystone).

The Corps Screening Portfolio Risk Analysis has identified up to 326 Corps dams for potential study and evaluation, based on the currently available information about the risk that they may pose. A tentative list of identified Dam Safety projects that would receive this funding in FY 2019 is provided below:

Dam Safety Projects (PED, DSMS and IES Summary)

<i>Project</i>	<i>DSAC</i>	<i>Activity Description</i>	<i>Funding Allocated Through FY 2017 for All prior studies (DSMS and IES)</i>	<i>FY 2018 Funding Allocation</i>	<i>FY 2019 Funding Allocation 4/</i>	<i>Balance to Complete (BTC) 5/</i>
Issue Evaluation Studies 6/	DSAC 2 & 3 Dams	Risk Assessment and hazards analysis (Hydrologic, Seismic, Inundation Mapping, Consequence analysis) on over 200 DSAC 2 & 3 Dams.	\$164,000,000	\$23,408,000	\$16,050,000	N/A
Moose Creek Dam, Chena River, AK	3	DSMS in FY18/PED in FY19	\$9,700,000	\$1,200,000 (7/)	\$0	\$4,000,000 (8/)
Whittier Narrows Dam, CA	1	DSMS in FY18/PED in FY19	\$14,300,000	\$2,000,000 (7/)	\$2,000,000 (8/)	\$2,000,000 (8/)
Cherry Creek Dam, CO	2	DSMS in FY18	\$11,100,000	\$200,000 (7/)	\$0	\$0
Pipestem Dam, ND	2	DSMS in FY18-FY19	\$1,600,000	\$1,500,000 (7/)	\$1,500,000 (7/)	\$1,500,000 (7/)

Keystone Dam, OK	2	DSMS in FY18- FY19	\$8,000,000	\$1,500,000 (7/)	\$1,500,000 (7/)	\$1,500,000 (7/)
General Edgar Jadwin, PA	2	DSMS in FY18/PED in FY19	\$2,700,000	\$1,600,000 (7/)	\$2,000,000 (8/)	\$2,000,000 (8/)
Lewisville Dam, TX	2	PED in FY18	\$16,500,000	\$4,000,000 (8/)	\$0	\$0
Other Dam Safety Projects					\$66,405,000 (9/)	
TOTAL:			\$227,900,000	\$35,408,000	\$89,455,000	\$11,000,000

1/ Dam Safety Studies are funded at 100 percent Federal expense. The non-Federal cost for Pre-construction Engineering and Design activities varies and is identified and calculated in the decision documents prepared during the Dam Safety Modification Study in accordance with either the Water Resources Development Act of 1986 as amended, or the Reclamation Safety of Dams Act (P.L. 98-404) as amended.

2/ All costs associated with this remaining item are attributed to the Flood and Coastal Storm Damage Reduction business line.

3/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$1,108,000. There was an additional \$5,100,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018 to include ongoing dam safety study projects. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$800,000.

5/ Funds estimated as balance to complete on Moose Creek, Whittier Narrows, and General Edgar Jadwin are for PED activities. Funds estimated for Pipestem and Keystone are for DSMS and do not include PED estimates.

6/ Allocations for IES Studies since the implementation of the EC 1156 draft guidance in FY 2008.

7/ DSMS estimated funding requirement.

8/ PED estimated funding requirement.

9/ The FY 2019 request for the Dam Safety and Seepage/Stability Correction Program includes \$66,405,000 to accelerate the rehabilitation of the Herbert Hoover Dike in FY 2019 provided the State of Florida has contributed \$100 million or more by September 30, 2019, of its total commitment to provide \$200 million for such work.

APPROPRIATION TITLE: Construction – Fiscal Year 2019

PROJECT NAME: Employees Compensation (Payments to the Department of Labor) 1/

DESCRIPTION: The Employees Compensation program (Payments to the Department of Labor) provides that each agency shall include in its annual budget estimates, a request for an appropriation equal to costs previously paid from the Employees Compensation Fund on account of injury or death of employees or persons under the agency's jurisdiction. The budget request for Fiscal Year 2019 represents the total estimated cost of benefits and other payments made from the Employees Compensation Fund during the period July 1, 2016, through June 30, 2017, due to injury or death of persons under the jurisdiction of the Corps of Engineers civil works functions and also includes \$1,100,000 for the investigation of fraudulent claims for workers' compensation benefits.

AUTHORIZATION: This program is conducted under the general authority of Public Law 94-273, approved April 21, 1976, 5 USC 8147b.

SUMMARIZED FINANCIAL DATA:

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
19,000,000	17,530,000	19,000,000	17,000,000 2/ 3/	17,000,000

1/ There are no non-Federal costs.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$2,441,000. There was an additional \$0 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

HQUSACE

Employees Compensation

APPROPRIATION TITLE: Construction, Fiscal Year 2019

Inland Waterways Users Board, Institute for Water Resources 1/

	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018	Budgeted Amount in FY 2019
Total	\$860,000	\$325,000	\$325,000	\$335,000	\$335,000
Board Expense	\$60,000	\$50,000	\$50,000	\$60,000 2/ 3/	\$60,000
Corps Expense	\$800,000	\$275,000	\$275,000	\$275,000 2/ 4/	\$275,000

1/ This activity is funded at 100 percent Federal expense. All costs associated with this remaining item are attributed to the Navigation business line.

2/ There was no Conference Amount available at the time this J-sheet was prepared. The amount shown is the President's budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$73,548. There was an additional \$6,649 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

4/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$137,596. There was an additional \$85,558 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

AUTHORIZATION: The Board was established by Section 302 of the Water Resources Development Act of 1986, (PL 99-662) and pursuant to the Board's charter, originally approved by the Secretary of the Army on March 3, 1987. The Board is an advisory committee subject to the requirements of the Federal Advisory Committee Act (PL 92-463 as amended).

DESCRIPTION: The Inland Waterways Users Board (Board) is an advisory committee representing the interests of the commercial navigation users of the inland and intracoastal waterways of the United States. Its purpose is to make recommendations to the Secretary of the Army and Congress, reflecting its independent judgment, regarding construction and rehabilitation priorities and spending levels on commercial navigation features of these waterways. Generally, issues regarding the Inland Waterways Trust Fund fall within the scope of the advisory role of the Board. The Deputy Commanding General for Civil and Emergency Operations has been designated Executive Director to the Board, and he has designated staff members to provide continuing Board support.

Annual funding for the Corps expense are used for personnel costs for administrative Board meeting support, including coordinating meetings, staff travel, clerical, and related administrative needs, travel to Board meetings, and to provide objective analyses related to potential investments in the inland waterways and the financial outlook for the Inland Waterways Trust Fund. These funds are not used for any personnel or travel expenses incurred by Expenses account funded staff or the Office of the Assistant Secretary of the Army.

Annual funding for the Board expense are used for the 11-member Board's travel, meetings and other needs to meet the requirements of the charter. The Board has requested they meet four times annually.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Inspection of Completed Environmental Projects 1/

STATE	FY 2015 Allocations	FY2016 Allocations	FY 2017 Allocations	Presumed FY 2018 Allocations 2/ 3/	FY 2019 Budgeted Amounts
California	\$21,000	-	\$6,000	\$0	\$10,000
Colorado	\$10,000	-	-	\$0	\$17,000
Connecticut	\$15,000	\$9,900	-	\$10,000	-
Georgia	\$10,000	\$11,880	-	\$15,000	-
Iowa	-	-	\$21,000	\$6,000	\$6,000
Illinois	\$50,000	\$49,500	-	\$55,000	\$50,000
Kansas		-	\$4,000	\$11,000	\$4,000
Massachusetts	\$15,000	\$19,800	-	\$20,000	-
Maine	\$15,000	\$4,950	-	\$5,000	-
Missouri	-	-	\$2,000	\$2,000	\$2,000
Nebraska	-	-	\$33,000	\$3,000	\$3,000
New Jersey	\$5,000	-	\$15,000	\$15,000	\$45,000
New Mexico	\$30,000	\$19,800	-	-	\$27,000
New York	\$5,000	-	-	-	-
Oregon	-	\$19,800	\$15,000	\$60,000	\$60,000
Pennsylvania	\$5,000	-	\$10,000	\$10,000	\$60,000
Rhode Island	\$15,000	\$24,750	-	\$25,000	-
Virginia	\$15,000	-	-	-	-
Washington	\$106,000	\$69,300	\$1,000	\$70,000	\$70,000
Wyoming	\$10,000	\$11,880	-	\$10,000	\$15,000
TOTAL PROGRAM	\$327,000	\$241,560	\$107,000	\$317,000	\$369,000

AUTHORIZATION: Section 221 of the Flood Control Act of 1970, as amended (84 Stat. 1831, 42 U.S.C. 1962d-5b), requires that a written agreement be executed between the Secretary of the Army and the non-Federal sponsor to identify the "items of local cooperation" for Corps projects, including operation and maintenance (O&M) requirements. It also authorizes the Corps to "undertake performance of those items of cooperation necessary to the functioning of the project for its purposes, if the Corps has first notified the non-Federal interest of its failure to perform the terms of its agreement and has given such interest a reasonable time after such notification to so perform." The Corps undertakes inspections of completed environmental projects to determine whether the non-Federal sponsor is performing as agreed.

Division: Multiple

District: Multiple

Inspection of Completed Environmental Projects

DESCRIPTION: This funding supports inspection of completed federally authorized ecosystem restoration projects which are operated and maintained by the project sponsor. These inspections determine if the project is performing as expected and whether the project is being operated in accordance with requirements in the Project Partnership Agreements and project O&M manuals. Inspections also identify changed conditions within the project, undocumented project deficiencies, and project areas or features that require future additional inspection or monitoring. While the focus of Federally-constructed ecosystem restoration projects is restoration to a more functional and less degraded natural habitat, most projects have features which require O&M. However, for almost all ecosystem restoration projects, the O&M of completed environmental projects is the non-federal sponsor's responsibility. Annual funding is used to conduct pre-inspection preparation, post-inspection reporting, transmit notification requirements to the sponsor, and add completed inspection reports to the National Ecosystem Restoration Project Database. The program covers all 50 states and territories of the U.S.

1/ The costs of this activity are accounted for in the Aquatic Ecosystem Restoration business line.

2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$251,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

Division: Multiple

District: Multiple

Inspection of Completed Environmental Projects

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Inspection of Completed Works – Flood and Coastal Storm Damage Reduction

STATE	FY2016 Allocations	FY 2017 Allocations	Presumed FY 2018 Allocations 1/ 2/	FY 2019 Budgeted Amounts
Alaska	\$178,000	\$223,000	\$200,000	\$200,000
Alabama	\$64,000	\$208,000	\$210,000	\$198,000
Arkansas	\$533,000	\$485,000	\$458,000	\$646,000
Arizona	\$70,000	\$95,000	\$85,000	\$534,000
California	\$3,726,000	\$3,552,000	\$3,962,000	\$3,450,000
Colorado	\$360,000	\$372,000	\$352,000	\$347,000
Connecticut	\$332,000	\$342,000	\$461,000	\$474,000
District of Columbia	\$159,000	\$71,000	\$76,000	\$80,000
Delaware	\$40,000	\$57,000	\$65,000	\$70,000
Florida	\$1,435,000	\$1,259,000	\$958,000	\$814,000
Georgia	\$188,000	\$225,000	\$277,000	\$196,000
Hawaii	\$718,000	\$594,000	\$698,000	\$278,000
Iowa	\$754,000	\$1,433,000	\$868,000	\$1,282,000
Idaho	\$373,000	\$357,000	\$337,000	\$377,000
Illinois	\$2,354,000	\$2,534,000	\$1,654,000	\$1,973,000
Indiana	\$1,113,000	\$1,303,000	\$1,187,000	\$1,051,000
Kansas	\$935,000	\$1,194,000	\$1,218,000	\$1,250,000
Kentucky	\$965,000	\$1,338,000	\$1,271,000	\$1,015,000
Louisiana	\$1,025,000	\$1,028,000	\$866,000	\$1,069,000
Massachusetts	\$478,000	\$325,000	\$307,000	\$348,000
Maryland	\$174,000	\$118,000	\$196,000	\$126,000
Maine	\$60,000	\$103,000	\$95,000	\$100,000
Michigan	\$208,000	\$173,000	\$222,000	\$260,000
Minnesota	\$329,000	\$404,000	\$401,000	\$240,000
Missouri	\$1,402,000	\$1,590,000	\$1,305,000	\$1,512,000
Mississippi	\$91,000	\$109,000	\$86,000	\$116,000
Montana	\$204,000	\$271,000	\$232,000	\$154,000
North Carolina	\$257,000	\$198,000	\$205,000	\$190,000
North Dakota	\$329,000	\$331,000	\$374,000	\$530,000
Nebraska	\$500,000	\$1,201,000	\$932,000	\$466,000
New Hampshire	\$55,000	\$70,000	\$60,000	\$90,000
New Jersey	\$203,000	\$336,000	\$427,000	\$487,000

Division: National

District: National

Inspection of Completed Works

New Mexico	\$643,000	\$644,000	\$652,000	\$561,000
Nevada	\$74,000	\$76,000	\$68,000	\$77,000
New York	\$1,170,000	\$951,000	\$1,351,000	\$1,391,000
Ohio	\$690,000	\$828,000	\$874,000	\$737,000
Oklahoma	\$140,000	\$219,000	\$239,000	\$650,000
Oregon	\$1,030,000	\$1,036,000	\$1,082,000	\$628,000
Pennsylvania	\$1,167,000	\$883,000	\$1,117,000	\$1,110,000
Puerto Rico	-	\$278,000	\$228,000	\$134,000
Rhode Island	\$43,000	\$51,000	\$45,000	\$134,000
South Carolina	\$64,000	\$64,000	\$65,000	\$75,000
South Dakota	\$167,000	\$322,000	\$279,000	\$356,000
Tennessee	\$180,000	\$301,000	\$334,000	\$328,000
Texas	\$1,918,000	\$1,684,000	\$1,587,000	\$1,657,000
Utah	\$40,000	\$40,000	\$24,000	\$24,000
Virginia	\$310,000	\$368,000	\$364,000	\$432,000
Virgin Islands	-	\$168,000	\$24,000	\$49,000
Vermont	\$46,000	\$87,000	\$172,000	\$174,000
Washington	\$1,076,000	\$1,139,000	\$1,057,000	\$922,000
Wisconsin	\$51,000	\$53,000	\$55,000	\$41,000
West Virginia	\$420,000	\$461,000	\$463,000	\$474,000
Wyoming	\$73,000	\$80,000	\$80,000	\$123,000
TOTAL PROGRAM	\$28,914,000	\$31,632,000	\$30,205,000	\$30,000,000

AUTHORIZATION: Section 221 of the Flood Control Act of 1970, as amended (84 Stat. 1831, 42 U.S.C. 1962d-5b)

DESCRIPTION: Annual funding is used to inspect Federally constructed and locally maintained flood risk management projects with an emphasis on approximately 11,750 of Federally authorized and locally maintained levee systems. For each of these projects, the Department of the Army and the non-Federal sponsor have executed an agreement to identify the "items of local cooperation" for Corps projects, including operation and maintenance requirements necessary to ensure the project will function as intended, as well as preserve the value of the Federal investment. The inspections are used to identify deficiencies or areas which need monitoring or immediate repair; to identify any changes over time; and to collect information in order to be able to make informed decisions about future actions. Funds are also used to review updates to project operation and maintenance manuals.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$4,898,000. There was an additional \$2,000 of unobligated funds that are committed within in the Corps for scheduled ongoing requirements in FY2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

Division: National

District: National

Inspection of Completed Works

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Scheduling Reservoir Operations 1/

STATE	FY 2016 Allocation Amounts	FY 2017 Allocation Amounts	Presumed FY 2018 Allocation Amount 2/ 3/	FY 2019 Budgeted Amount
Alabama	-	\$99,000	\$83,000	\$85,000
Arizona	\$132,000	\$101,000	\$102,000	\$107,000
California	\$1,297,000	\$1,186,000	\$1,391,000	\$1,344,000
Colorado	\$374,000	\$570,000	\$646,000	\$560,000
Florida	\$33,000	\$33,000	\$99,000	\$132,000
Idaho	\$617,000	\$634,000	\$627,000	\$716,000
Kansas	\$287,000	\$365,000	\$369,000	\$472,000
Maryland	\$60,000	\$77,000	\$78,000	\$173,000
Montana	\$124,000	\$116,000	\$121,000	\$125,000
Missouri	\$89,000	\$167,000	\$169,000	\$172,000
North Dakota	\$126,000	\$116,000	\$121,000	\$123,000
New Mexico	\$327,000	\$211,000	\$383,000	\$199,000
Oklahoma	\$1,188,000	\$1,188,000	\$1,200,000	\$1,360,000
Oregon	\$85,000	\$97,000	\$98,000	\$99,000
Pennsylvania	\$44,000	\$35,000	\$37,000	\$76,000
South Dakota	\$142,000	\$128,000	\$102,000	\$144,000
Texas	\$268,000	\$278,000	\$332,000	\$295,000
Utah	\$468,000	\$501,000	\$554,000	\$477,000
Washington	\$419,000	\$419,000	\$425,000	\$463,000
Wyoming	\$231,000	\$106,000	\$80,000	\$107,000
TOTAL PROGRAM	\$6,311,000	\$6,427,000	\$7,017,000	\$7,229,000

AUTHORIZATION: Flood Control Act of 1944

DESCRIPTION: This nationwide program is to facilitate and coordinate the operations of Federal and non-Federal dams that have a Federal interest and investment in providing dedicated flood space. Annual funding is used to manage and operate stream gages, rain gages, and reservoir level gages for flood forecasting and reservoir regulating; for data collection to support operational decisions, environmental monitoring, and drought contingency actions; and for additional activities such as dam operator and flood training exercises. This program does not include funding for water control manual updates or other work that is specific to an individual project. Those activities are funded directly out of the project.

Division: National

District: National

Scheduling of Reservoir Operations

- 1/ The costs of this activity are accounted for in the Flood and Coastal Storm Damage Reduction business line.
- 2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$199,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.
- 3/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget Amount for FY 2018.

APPROPRIATION TITLE: Operation & Maintenance, Fiscal Year 2019

PROJECT NAME: Aquatic Nuisance Control Research – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$675,000	\$668,250	\$668,000	\$675,000 2/	\$675,000

AUTHORIZATION: The Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990 (Public Law 101-646), as amended by the National Invasive Species Act of 1996 (Public Law 104-332)

JUSTIFICATION: Annual funding is used to address invasive aquatic species that impact the Nation's waterways infrastructure and associated resources including development of control strategies for: navigation structures, hydropower and other utilities, vessels and dredges, and water treatment, irrigation, and other water control structures. Funding provides Corps managers and operational personnel with innovative technologies regarding risk assessment, prevention strategies, species life history/ecological data, and cost-effective, environmentally-sound options for managing aquatic nuisance species (ANS).

Program research focuses on:

- 1) The evaluation of potential control/barrier methods to prevent the transfer of Asian carps and other ANS (e.g. sea lamprey) between the Mississippi River and Great Lakes Basins;
- 2) New techniques for control of zebra and quagga mussels moving westward past the 100th meridian;
- 3) Improved detection and control methods for harmful algal blooms;
- 4) Corps personnel training in recognition and control methods of ANS on Corps lands/waters;
- 5) Web-based regional lists of aquatic invasive species on Corps projects;
- 6) Methods that reduce invasive species impacts to threatened and endangered species and provide restoration of natural habitats; and
- 7) Complete annual reporting requirements to the National Invasive Species Council on USACE Invasive Species expenditures.

ACCOMPLISHMENTS IN FY 2017:

- Completed laboratory evaluations to assess the effects of submersed metals on the swimming performance of sea lamprey. Results of these studies are being used to enhance efficacy of existing barriers and traps that suppress lamprey populations in the Great Lakes.
- Completed a review and assessment of sea lamprey barrier designs under consideration by the Detroit District and the Great Lakes and Ohio River Division.
- Completed field monitoring and laboratory studies to determine salinity responses to bighead and silver carp. Data was used to establish persistence and growth of Asian carp in brackish ecosystems following USACE operations of water diversion studies as well as indicated the ability of Asian carp species to use estuarine systems as trans-coastal conduits for dispersal.

- Provided technology transfer (website updates, technical publications, webinars, u-tube videos, Discover ERDC wiki pages, facility tours) to USACE personnel and the public on new technologies for preventing and managing aquatic invasive species.

DESCRIPTION OF WORK FOR FY 2018:

- Complete field studies to monitor and determine longevity and fecundity estimates for Asian carp populations. Data will be used to re-parameterize and improve existing population models for assessing Asian carp impacts to aquatic ecosystems.
- Complete field studies to evaluate the performance of deployed traps and barriers retrofitted with submersed metals to prevent passage of sea lamprey.
- Initiate the development and evaluation of new, non-toxic antifouling technologies for protection of Corps hydraulic structures to reduce the corrosion risk and maintenance costs associated with invasive mussels (zebra and quagga mussels) and other aquatic invasive macro-fouling organisms.

DESCRIPTION OF WORK FOR FY 2019:

- Utilize new Asian carp datasets on maximum burst speeds, jumping characteristics, salinity responses, and longevity, to re-parameterize and update population viability models on range-wide trajectories of Asian carp population distribution and responses to management actions. Results will improve predictions of movement and spread and assist with prioritizing future management actions.
- Evaluate new antifouling coatings/paints to determine impact on mussel fouling performance metrics and environmental toxicology.
- Develop a risk assessment framework to determine priority species impacting USACE projects to assist and prioritizing decision making of operational funds for ANS management activities.
- Investigate the use and feasibility of gene drive technologies to suppress establishment of zebra and quagga mussels.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$3,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Asset Management/Facilities and Equipment Maintenance 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$10,055,794 2/	\$7,142,000	\$3,218,000	\$3,650,000 3/ 4/	\$3,650,000 5/

DESCRIPTION: The Corps of Engineers is responsible for managing thousands of water resources infrastructure projects. This infrastructure provides critical services supporting the Nation, primarily in terms of commercial navigation, flood and storm damage reduction, and aquatic ecosystem restoration. Effective asset management informs planning, design, construction, operations, maintenance, recapitalization and disposition decision-making.

The Corps' asset management program includes Maintenance Management Improvement Plans (MMIPs) that are used to inventory existing assets, Project Maintenance Management Plans (PMMPs) that provide a detailed plan for maintenance of a specific project, and tools such as Operational Condition Assessments (OCA), Operational Risk Assessments (ORA), and the Corps Value Model, which help define risk. Its goal is the development of a strategy to create, sustain, or increase the delivery of benefits from Civil Works water resources by using risk as a common measure to inform investment decisions during the entire life cycle of Civil Works projects, including inception, significant decision points, and ultimately disposition.

In addition to the specific examples provided below, annual funding is used to:

- maintain a current asset inventory;
- assess benefits, risks, and consequences of failure among similar projects and similar assets through risk-based assessments;
- develop tools and processes to reduce risk and improve performance;
- develop and utilize quantitative information to prioritize the use of available Federal resources;
- formalize business processes that standardize best practices, promote accountability, and predict work requirements; and
- train Corps staff on how to implement pertinent methodologies.

ACCOMPLISHMENTS IN FY 2017:

1. Revised OCA policy guidance to provide greater consistency in condition ratings across the Civil Works program.
2. Substantially completed a draft of the Corps Value Model.
3. Developed an ORA tool that is applicable to all flood and coastal storm damage reduction projects, and refined the existing ORA tool for navigation projects (locks and dams).
4. Completed eight PMMPs.
5. Refined probabilities of failure for major hydropower components.
6. Continued implementation and refinement of MMIPs, including developing better reports and metrics for measuring progress.

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Asset Management/Facilities and Equip Maint

7. Continued Maintenance Management workshops to educate Civil Works workforce regarding the value of MMIP tools and processes to their projects and business processes.

DESCRIPTION OF WORK FOR FY 2018:

1. Implement ORA and refinements for flood and coastal storm damage reduction and navigation projects, respectively.
2. Coordinate draft outputs from the Corps Value Model effort.
3. Develop improved reporting for two of the eight PMMPs, including automation of data between the Facilities and Equipment Maintenance system (FEM) and the Enterprise Data Warehouse (EDW).
4. Conduct system modeling on Missouri River hydropower system.
5. Complete the OCA tool, training, and guidance for recreation assets.
6. Continue development of baseline OCA and ORA for navigation channels and environmental stewardship assets.
7. Continued implementation and refinement of MMIPs, including developing better reports and metrics for measuring progress.

DESCRIPTION OF WORK FOR FY 2019:

1. Complete guidance to formalize implementation of asset management throughout the Civil Works program.
2. Review and implement the draft Corps Value Model.
3. Review results of PMMP efforts on the Illinois Waterway, the Ohio River mainstem, and the McKlellan-Kerr- Arkansas River Navigation Systems, including automation of data between the Facilities and Equipment Maintenance system and the Enterprise Data Warehouse.
4. Continue to conduct system modeling on Missouri River hydropower system.
5. Continue to complete automated hydrographic survey condition automation via eHydro, and linking to Shoaling Assessment Tools and Channel Prioritization Tool to assist in developing risk information for coastal and inland Navigation Channels.
6. Continue development of baseline OCA and ORA for environmental stewardship assets.
7. Continue implementation and refinement of MMIP, including developing better reports and metrics for measuring progress.

1/ The costs of this activity are accounted for and evenly divided between the Navigation, Flood and Coastal Storm Damage Reduction, and Hydropower business lines.

2/ Prior to FY 2016, this remaining item was used to source the Civil Works Water Management System, which is now funded as a separate line item.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$586,000. There was an additional \$812,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$100,000.

4/ There was no conference amount at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

5/ The Critical Infrastructure Cyber Security Center of Expertise (CICSCX) and cybersecurity activities were funded through this Remaining Item through FY 2018. In FY 2019 a separate Remaining Item was established to fund the CICSCX and its activities.

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Asset Management/Facilities and Equip Maint

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Civil Works Water Management System (CWMS) – Flood and Coastal Storm Damage Reduction 1/

Total Estimated Federal Cost	Allocations Prior to FY 2016	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019	Balance to Complete after FY 2019
\$128,000,000	\$35,950,562 2/	\$14,850,000	\$9,652,000	\$10,000,000 3/	\$10,000,000	\$47,547,438

AUTHORIZATION: Various authorities including River and Harbors Act & Flood Control Act of 1948, Section 102 of the Rivers and Harbors Act of 1962, Section 216 of the River and Harbor and Flood Control Act of 1970, Section 731 of the Water Resources Development Act of 1986, Section 729 of the Water Resources Development Act of 1986, specific project and purpose authorizations, Executive Order 13653, and Executive Order 13514.

DESCRIPTION: CWMS models will be used by Corps water managers to achieve the authorized purposes on all Corps projects, which include flood control, hydropower, navigation, recreation, irrigation, water quality, water supply, and environmental restoration and stewardship. CWMS suite of models were used to produce inundation maps as well as provide consequence data (structures impacted, potential loss of life, damage values) for the December 2015/January 2016 flood for districts along the Mississippi River. Districts will continue to use CWMS models during future flood events should CWMS models exist in the basin experiencing flooding. The CWMS models will continue to be utilized in FY 2019 and beyond to support multiple Corps programs including Dam Safety, Levee Safety, Planning, USACE Operations Center/Flood Risk Management, and Critical Infrastructure Protection and Resilience program.

Incorporation of lessons learned and new information is crucial for an engineering organization that provides services whose performance can be tested by extreme events, such as floods, droughts, and coastal storms. The program objective is to improve the public safety and performance of USACE’s built infrastructure based on gaps, weaknesses and lessons learned from events including Hurricane Sandy, the 2012-13 drought, the greater Mississippi River Basin flood of 2011, the Nashville flood of 2010, and other extreme events dating back to Hurricane Katrina and its lessons learned efforts (the Interagency Performance Evaluation Taskforce – IPET, and the Hurricane Protection Decision Chronology- HPDC). An integrated, comprehensive, sustainable, and systems-based approach that places the highest priority on protection of public health and safety is the most effective way for USACE to provide safe, reliable projects with increased economic and environmental benefits. Updating and improving methods to estimate, assess, manage, and communicate risk are critical to planning, design, operation, and management of water resources infrastructure to meet the Nation’s evolving needs. Recent extreme events have highlighted the need to implement state-of-the-art systems-based watershed modeling consistently across the nation, to optimize operation of our reservoirs to maximize benefits, including flood risk management and public safety, water supply, navigation, recreation, irrigation, hydropower, ecosystem restoration and water quality. These extreme events also highlighted the need for enhanced interagency collaboration efforts such as those initiated under the Integrated Water Resources Science and Services (IWRSS) business model to improve real-time data sharing and development consistent national modeling and mapping capabilities such as those found in CWMS. Some of these capabilities included the importing of USGS ratings and time series directly into CWMS, many upgrades to the software that creates flood inundation maps, improvements to the precipitation visualization, estimation and forecasting tool HEC-MetVue or Meteorological Visualization, and improvements to report generation tools like REGI (Report Generation).

These tools will improve how the Corps performs its water management mission and assist in sharing data, models, and computational results across agencies. Perhaps more importantly, this effort will support the Corps Civil Works Transformation by moving from an individual project and business line investment plan to a systems-oriented approach with collaboration of multiple USACE programs. This effort benefits planning HQUSACE
Civil Works Water Management System

modernization, methods of delivery, budget development and infrastructure strategy. The CWMS models developed since 2013 continue to support multiple Corps programs including Dam Safety, Levee Safety, Planning, USACE Operations Center/Flood Risk Management, and Critical Infrastructure Protection and Resilience. The planning community has utilized CWMS models for several feasibility study efforts and expects to continue doing so. Districts have used the suite of CWMS models during flood events and the Dam and Levee Safety community has used CWMS models for numerous dam break models, multiple Semi-Quantitative Risk Assessments, and a number of Issue Evaluation Studies.

ACCOMPLISHMENTS IN FY 2017: CWMS suites of models were completed for 21 basins in FY 2017 where the Corps has water management responsibilities. An additional 22 basins were started in FY 2017; due to size and complexity, all of these basins will be completed in FY 2018. At the end of FY 2017, 92 of the 201 basins will have been implemented. 173 USACE personnel from 31 of the 36 USACE offices have been trained and are assisting with the CWMS national implementation. CWMS models were used by Corps water managers achieve authorized purposes on Corps projects, which include flood control, hydropower, navigation, recreation, irrigation, water quality, water supply, and environmental restoration and stewardship. Ten different CWMS suite of models were used to help produce inundation maps for the August 2017 Hurricane Harvey event and the September 2017 Hurricanes Irma and Maria events. This work also included providing consequence data (structures impacted, potential loss of life, and damage values) for the flooded areas. With all basins completed through FY 2017, 59% of the total USACE land area has been modeled, 73% of the USACE river miles have been modeled, and 73% of the USACE reservoirs modeled.

DESCRIPTIONS OF WORK FOR FY 2018: Funds are being used to continue to the nationwide CWMS modeling effort to enhance the operational decision making for floods, droughts, operations planning and real-time operations. This will include developing the hydrologic and hydraulic models required for a watershed approach to effectively meet authorized purposes. Data collection, data dissemination, and modeling and analysis capabilities will be addressed on a national level. Funds from this account will be used to complete the 22 basins started in FY 2017 as well as 5 new start basins in FY 2018. An additional 18 basins will be started in FY 2018; due to size and complexity, all of these basins will be completed in FY 2019. At the end of FY 2018, 118 of the 201 basins will be implemented. In addition, the funding will be used to help establish continuity of operations capabilities that fully support the water management mission and complies with U.S. Army Corps of Engineers and Department of Defense Corporate Information Assurance and Security requirements. With the basins scheduled for completion through FY 2018, 74% of the total USACE land area will be modeled, 84% of the USACE river miles will be modeled, and 80% of the USACE reservoirs will be modeled.

DESCRIPTIONS OF WORK FOR FY 2019: Funds will be used to carry out a concentrated program to enhance the operational decision making for floods, droughts, operations planning and real-time operations. This will advance the implementation of CWMS nationwide, including developing the hydrologic and hydraulic models required for a watershed approach to effectively meet authorized purposes. Data collection, data dissemination, and modeling and analysis capabilities will be addressed on a national level. Funds from this account will be targeted for the most critical watersheds that have not yet moved into the CWMS environment. Funds from this account will be used to complete the 18 basins started in FY 2018 and carried into FY 2019. An additional 17 basins will be started in FY 2019; due to size and complexity, all of these basins will be completed in FY 2020. At the end of FY 2019, 137 of the 201 basins will be implemented. With the basins scheduled for completion through FY 2019, 79% of the total USACE land area will be modeled, 89% of the USACE river miles will be modeled, and 84% of the USACE reservoirs will be modeled. In addition, the funding will be used to help establish a National Enterprise Water Management System with continuity of operations capabilities that fully supports the water management mission and complies with US Army Corps of Engineers and Department of Defense Corporate Information Assurance and Security requirements.

1/ Prior to FY 2016, funding for the activities covered by this remaining item were sourced out of other programs, projects, and activities within the Civil Works program. An individual line item to capture the cost and improve the transparency of those costs was created in FY 2016.

2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$599,000. There was an additional \$1,061,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

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Civil Works Water Management System

APPROPRIATION TITLE: Operation & Maintenance, Fiscal Year 2019

PROJECT NAME: Coastal Ocean Data System (CODS) Program 1/ 2/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$5,346,000	\$5,346,000	\$5,940,000	\$2,500,000 3/ 4/	\$2,500,000

AUTHORIZATION: 33 USC 426a which originated with the River and Harbor Act of 1945, which originated in the River and Harbor Act of 1930.

DESCRIPTION: The over-arching objective of the CODS Program is to provide high-quality long-term coastal wave information along with storm-event data nationwide, to develop and provide tools for using wave and other data for managing coastal sediment, and to support sustainable coastal and navigation projects under a changing climate.

Ocean observations are used to validate numerical hindcast models that calculate wave information over 30 to 50 year periods on the Atlantic & Pacific coasts, Gulf of Mexico and Great Lakes. This wave climate information is combined with storm wave information producing validated long-term and storm waves that drive our next generation risk-based coastal models.

Ocean waves deliver energy to the coast and impact Corps projects and operations. Wave information is imperative for products for operational guidance of USACE dredging, navigation, maintenance, and emergency operations. Wave observations are used in the development and validation of new hindcast wave models and for storm analysis and new wave products are transforming how the Corps, other Federal Agencies, States, Academia, Public, and the Nation use and access accurate wave information. High quality wave information is required for the design of storm protection and navigation projects; to inform regional sediment management strategies; and as boundary conditions for all coastal modeling. Inaccurate and insufficient coastal wave data can result in project operation and design uncertainty. Long-term (multiple decades) wave and storm information are also required to determine how climatic changes and extreme events will impact Corps' facilities, projects and mission operations.

Because of the Corps interest and expertise in waves, this program has been involved in the global effort to test and evaluate various wave-measuring systems. Evidence indicates that differences in the quality of wave parameters depend on the platform/sensor combination being used, with the potential that during extreme storm scenarios, there could be as much as a 50% over-estimation in the significant wave height from commonly used platforms. This activity is guided under the international Intergovernmental Oceanographic Commission (of UNESCO), and the World Meteorological Organization.

The latest Engineering Regulation governing implementation of the CODS program is ER 1110-2-1406 dated 1990.

In addition to the specific examples below, annual funding is used to support the following CODS activities:

- (1) Wave Observations: Observation efforts are conducted in partnership with the NOAA National Data Buoy Center (NDBC, www.ndbc.noaa.gov) and through the state of California, the Scripps Institution of Oceanography that maintains a network of shallow-water coastal gauges under their Coastal Data Information Program (<http://cdip.ucsd.edu>). These observations are high resolution and of appropriate accuracy for use in Corps wave information hindcast efforts for validation. The data are automatically provided to national data servers of NOAA and are publically available. The popularity of the program is evident from the usage statistics, daily hits averaged 330,000 (2015) and increased significantly during El Nino (415,000) with an average data download of 15 gigabytes per day. In 2009, the Interagency Ocean Observation Committee (IOOC) finalized the first *National Operational Wave Observation Plan* developed by the Corps in collaboration with the NOAA Integrated Ocean Observing System (IOOS) program office. This was a science-based assessment of the nation's wave observation requirements that identified observation gaps and for the first time, defined a measurement accuracy requirement sufficient to satisfy the directional resolution required by the Corps and others. The plan has already led to national improvements. An update to the Plan was completed in FY16 and is a milestone requirement of the National Ocean Policy (NOP). The update includes a re- assessment of the number, location, and priority for new locations; tighter integration between wave observations and wave modeling; and strategic recommendations for new products to meet national needs for wave information. Annual funding is used to support the directional wave measurements presently conducted by the NOAA NDBC program and the Scripps Institution of Oceanography under CODS; continue intra-measurement evaluations conducted under the Joint Oceanographic Commission of Oceanography and Marine Meteorology; and continue monitoring sand level changes on several southern California beaches to evaluate response to variable wave conditions. These observations and long term observations at the Field Research Facility in Duck, NC are being used in the development of coastal process models.
- (2) Wave Information Studies. The objective of wave information studies is to provide high-quality coastal wave information, wave analysis products, and decision tools nationwide. The focus is to integrate measurements with model results so that the Corps has access to all available wave information (real-time observations, model hindcasts, and long-term archives) to perform their mission. Wave hindcasts use high quality wind fields and the latest wave modeling technology. To satisfy the Corps requirement for risk-based designs, at least 20-30 years of continuous wave climatology data are required. Hindcast datasets provide hourly wave information for locations every few miles along the coast. Because of this coverage, the Corps, the coastal engineering community, and the public routinely use these datasets for coastal studies. The long-term hindcast wave data are accessible through a website that receives over 16,000 monthly requests for data downloads and over 1 million visits per year (<http://wis.usace.army.mil/>). Available observations are used to confirm and validate the hindcast/model data, for quantifying actual conditions, and for understanding long-term wave climatology. Under this activity, wave data users are able to access either hindcast or observed wave data transparently and select powerful analysis products and tools for wave climate and extreme event planning and for decision making using either observations or model estimates, or both. Annual funding is used to provide annual updates to the Hindcast for all domains (Atlantic, Pacific, Gulf of Mexico, Great Lakes).
- (3) Storm Event Data Sets. Corps project designs require estimates of the extreme conditions that define and quantify an acceptable level of risk. Because project life cycles can be 50-100 years, it is desirable to extend the extreme event climatologies to be as long as possible, much longer than the maximum wave observation record, which is only 35 years. This also suggests going back in time, defining extreme events (meteorological, and/or hydrodynamic), develop the wind forcing, and perform wave hindcasts. The wave climatology (similar to that

now used by FEMA) based on storm events could be extended over possibly 60 to 70 years. Storm event data of interest besides waves include storm track, wind fields, atmospheric pressure, surge levels, wave run up and beach/channel response.

- (4) The Integrated Ocean Observing System Participation: CODS observations are a Corps contribution to the IOOS. They support the Coastal Hazards topic under the National Ocean Policy. IOOS is an interagency activity with NOAA as the lead agency. Participating agencies pool, share and coordinate their ocean observations for the benefit of all. To facilitate this coordination, the Corps participates in IOOS workshops, regional associations, and meetings. The Corps has also established a liaison with the IOOS program office. Annual funding is used to support the activities of IOOS by participating in the IOOC; promote the involvement of Corps District and Division offices in their local IOOS regional associations through meetings and workshops; and to serve on the IOOS Quality Assurance or Real-time Oceanographic Data Board of Advisors and other IOOS Committees.

DESCRIPTION OF WORK FOR FY 2018:

- Update WIS data management and delivery system by migrating processing algorithms from Matlab code to *python* to reduce software costs and improving interoperability through refined graphical displays and data download capabilities.
- Use results from the FLOSSIE intra-measurement experiment in Monterey Bay (the experiment measured response of different buoys and sensor packages to optimize spectral data capabilities) to determine the quality of the past three decades of NOAA's NDBC 6N (NOMAD) buoy data. These 6N buoy systems are generally deployed in deep water and are the basis of altimeter algorithms to estimate wave height from satellite data. Updated WaveEval Tools will be used for rigorous spectral analysis evaluation of historical data.

DESCRIPTION OF WORK FOR FY 2019:

- Initiate efforts to enable users to download more information than before, including populating files to a Thredds/Opendap server that will house all WIS files. These files will be hdf5-netCDF constructs where the *oneline*, spectral estimates and wave fields are contained. All other domains and files have been converted to this construct and are contained on the Thredds/Opendap server. WIS will also maintain its permanent archive on the HPC system and duplicate files on resident RAID systems
- Develop and assess the ability to use Unmanned Aerial Systems (UAS) to improve the Corps management of coastal flood risk. Coastal and riverine shorelines are dynamic landscapes that change continually in response to environmental forcing. The combination of static infrastructure with the dynamic landscapes creates management challenges for navigation, storm damage reduction, and ecosystem health that are exacerbated during natural disasters. UAS provides accurate, detailed, and timely data that is critical to monitoring of topography and bathymetry, flood risk management infrastructure, and ecosystem health. The work unit team consists of Principle Investigators from the Geospatial Research Laboratory, the Environmental Laboratory, the Cold Regions Research Laboratory, and the Coastal and Hydraulics Laboratory to identify defensible and consistent UAS-based methodology to support flood risk management actions. The project goals include (1) developing, testing, and evaluating existing UAS technology to determine best practices for collection of terrain, infrastructure, and ecosystem health data with appropriate error and uncertainty quantification; (2) developing and evaluating UAS-based capabilities to collect simultaneous topographic and bathymetric data of the coastal zone; and (3) developing model-data assimilation frameworks that can

seamlessly integrate variable data types, sources, and quality with the Corps numerical models to provide robust risk assessments and planning tools with proper uncertainty quantification.

- Deploy an array of acoustic altimeters to precisely monitor changes in nearshore morphology continuously and in real-time. Bathymetric surveys can only be conducted safely in calm conditions before and after storms leaving researchers with very little information about the morphology of the surf zone during storms. This large scale deployment is part of a multi-program effort to evaluate and improve Corps nearshore morphologic modelling capabilities by integrating CSHORE and C2SHORE in the Coastal Model Test Bed. Building on the dataset collected by three acoustic altimeters deployed in the FRF surf zone in 2017, an additional twelve altimeters will be deployed creating three cross-shore transects of five altimeters each. The acoustic altimeters will resolve seafloor elevation changes of as little as a few centimeters and report values as often as every two minutes even during strong storms. Previous data from the three existing altimeters have demonstrated an incredibly dynamic seafloor with measured elevation changes of as much as a meter in a few hours. These expanded measurement capabilities will facilitate model improvement and validation and elucidate feedbacks between waves and morphology in the highly dynamic surf zone in a full range of conditions.

1/ The costs of this activity are accounted for in the Flood and Coastal Storm Damage Reduction and Navigation business lines.

2/ This program has also been budgeted under the title Coastal Data Information Program (CDIP).

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$103,000. There was an additional \$2,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

4/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Coastal Inlets Research Program, Engineer Research and Development Center – Navigation

Allocation in FY 2015	Allocation in FY 2015	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$946,000	\$3,173,000	\$2,673,000	\$2,700,000 1/ 2/	\$2,700,000

AUTHORIZATION: Authorization for the Corps of Engineers' Engineer Research and Development Center (ERDC) to conduct research and development is codified in 10 U.S.C. 2358: "The Secretary of Defense or the Secretary of a military department may engage in basic research, applied research, advanced research, and development projects that are necessary to the responsibilities of such Secretary's department in the field of research and development."

DESCRIPTION: The Corps operates and maintains more than 1,000 coastal navigation projects that cover 13,000 miles of coastal navigation channels. Coastal inlet navigation channels must be maintained in a complex environment of waves, tidal and wave-induced currents, sediment transport, and vessel-induced flow and wake, with consideration of ecological and sustainable practices. In Fiscal Year (FY) 2014, the Corps spent approximately \$734 million for routine dredging of 142 million cubic yards from Federal navigation channels, and an additional \$450 million for the supplemental and emergency dredging of 27 million cubic yards. Adjusted for inflation, dredging costs have increased approximately \$5.9 million per year (from \$1.53 to \$2.97 per cubic yard) from FY 1963 through FY 2012. Additionally, harbors and ports have elected to deepen and widen navigation channels to accommodate larger vessels due to the increased ship sizes allowed by the expanded Panama Canal; however, deeper and wider channels are more efficient sediment traps, therefore increasing shoaling and O&M costs. Modifications to coastal inlet channels and jetties can have a profound effect on the integrity of the navigation structures, adjacent beaches, estuaries, and ecosystems. Renewable, cost-effective placement sites for dredging must also be designed such that sand moves onshore, fine sediments are dispersed offshore, and re-deposition into the navigation channel is minimized. Such projects require characterization of hydrodynamics, wave forcing, sediment transport, and morphology change, as well as geomorphologic approaches. Thus, navigation project O&M, structure integrity and implications of ongoing and future dredging actions must be considered within a sediment-sharing system including the inlet, navigation channels, structures, and adjacent beaches.

Annual funding for the Coastal Inlets Research Program is used to advance knowledge and tools to better predict future channel shoaling, to provide quantitative and practical predictive tools and data to reduce the cost of dredging for Federal navigation projects and to maintain jetties, identify potential unintended consequences, mitigate for engineering activities related to navigation channels, and prioritize maintenance options.

ACCOMPLISHMENTS IN FY 2017:

Structures and Navigation Focus Area

- **Identified Critical Dredging Needs in Navigation Portfolio (Addresses Statement of Need (SoN) 2009-N-8).** Incorporated international cargo and country of origin/destination information into the Channel Portfolio Tool (CPT). In addition, the user interface was updated to improve functionality for Corps employees.
- **Developed Advanced Waterborne Fluidity Metrics (SoN 2012-N-5).** Using travel time and vessel wait time data for deep-draft entrance channels provided by the Automated Information System (AIS) Analysis Package (AISAP), developed advanced waterborne freight fluidity metrics that incorporated annual tonnage throughput rates (as \$-value of cargo) for major commodity groupings.
- **Established Guidance and Best Practices for Efficiency of Deep-Draft Channels.** Compared deep-draft entrance channels nationally in terms of the efficiency with which waterborne freight (imports, exports, and domestic shipments) moves through the marine transportation system. Using knowledge gained, established guidance, and recommended best practices for deep-draft navigation channel maintenance dredging and maintenance of coastal jetties and breakwaters.
- **Updated the Coastal Structure Management, Analysis, and Ranking Tool (CSMART).** Continued populating datasets relating to commercial shipping, commercial fishing, US Coast Guard Incident reports, cruise and ferry data, and structure condition ratings, to keep CSMART output current and timely. Developed functional performance indices to capture the influence of coastal structures on navigating vessels. Wherever practical, new datasets were incorporated (e.g. vessel counts from AIS, Census figures, recreational fishing, etc.) to serve as proxy metrics for the socio-economic significance of coastal jetty and breakwater structures in supporting resilient coastal communities.
- **Continued Development of Coastal Inlet Navigation Vessel Behavior Atlas (SoN 2016-N-14, 2016-N-16).** Expanded a coastal inlets navigation atlas that provides detailed statistical profiles of vessel movement patterns within high-use coastal channels, based on aggregated datasets compiled from the AIS vessel position reports archive. The Atlas update expanded coverage to provide a desktop application for critical harbors of refuge, and included information on the number and proximity of vessels to coastal structures to begin identifying standard guidance principles that may be used to support prioritizing rehabilitation. This also included observed seasonal changes in the number of vessels or proximity to structures.
- **Assessed historical trends in channel shoaling with regard to channel deepening.** Leveraged work completed by the Dredging Innovations Group in FY 2016 to utilize over 100 years of dredging records and determine the resulting impacts to O&M dredging requirements from harbor deepening or the constriction of coastal structures. These results enabled navigation managers to better understand how to balance the need for harbor deepening with the cost to maintain deeper harbors through dredging.
- **Optimized the Corps Shoaling Analysis Tool (CSAT) for server application (SoN 2013-N-17).** Leveraged the Asset Management work completed in FY 2016 to integrate CSAT into a server application to better align with the standard eHydro process and allow for efficient management of the large datasets by optimizing the frequency of CSAT analyses to meet O&M needs with flexibility for specific project objectives.

- **Developed Method to Delineate Channel Shoal Boundary using CSAT datasets (SoN 2013-N-17).** Developed a methodology to identify channel shoal boundaries using the CSAT shoaling rate datasets and provide users with a web map application to delineate areas of interest and calculate the shoaling rate. In addition, the changes to shoal size and location through time are determined in order to provide outputs that are valuable for determining the projected location of future shoaling.
- **Implemented Design Procedures for Navigation Structures in Wave Models (SoN 2016-N-14).** Included methods and engineering guidelines in wave models to optimize the performance and design of navigation structures. Provided additional capabilities for the design of structures to protect navigation channels, inlets, harbors, and adjacent beaches.
- **Developed Web-based Metocean Data Access, Processing and Analysis Tools (SoN 2013-N-22).** Developed, tested, and released two web-based metocean data tools, WaveNet and TideNet, for District applications. These tools, using the web and GIS-technologies with custom-developed engineering analyses and statistical models, allow USACE Districts to seamlessly access available winds, waves, water levels, tides, and currents from different data sources. These tools facilitate the selection, formatting, and analyses of data for use in District projects and numerical models. Accomplished technical transfer via Coastal and Hydraulics Engineering Tech Notes (CHETN), Dredging Operations Technical Support (DOTS) sponsored training courses, and webinars.
- **Developed Guidance for Reducing Surge within Ports and Harbors (SoN 2012-N-10, 2016-N-13).** Developed improved design guidance directed at modifying existing port infrastructure for reducing surge within port and harbor basins. Utilized advanced numerical models with previous physical model results and field data to optimize siting and sizing (orientation, length, width, and elevation) to control and manage the surge impacts to port and harbor operations. Used field data from several west coast applications and evaluated the skills of harbor wave models for generation and growth of infragravity waves which cause surge within ports, harbors, and marinas. Investigated impacts of multi-directional wind-waves and long-period infra-gravity waves on harbor surge, navigation, reefs, and structural design using recent field data at inlets and ports. Included short-period seas and swells in wave model forcings to study the potential effects on navigation safety, harbor surges, ship transits, moorings, structural design, and repair. Implemented new analyses capabilities in models and documented findings in user guides.
- **Developed Tool to Evaluate a Critical Harbor of Refuge (SoN 2016-N-16).** Developed a port planning and design tool to evaluate requirements for a USACE and U.S. Coast Guard (USCG) Harbor of Refuge. Coordinated interagency outreach to determine USCG and USACE requirements, including port layout, facility, safety, draft, helicopter, and lifeboat rescue. The Critical Harbor of Refuge Tool requires an integrated system with advanced numerical modeling capabilities coupled to Geographic Information System (GIS) and USCG Automated Information System (AIS) data.
- **Implemented Water Level and Wave Inputs for Design of Navigation Structures in Wave Models (SoN 2016-N-14).** Included methods and engineering guidelines in wave models to optimize performance and design of navigation structures. Provided additional capabilities for design of structures to protect navigation channels, inlets, harbors, and adjacent beaches. Summarized advancements in guidance documents.
- **Developed Web-based Metocean Data Access, Processing and Analysis Tools (SoN 2013-N-22).** Developed, tested, and released two web-based metocean data tools, WaveNet and TideNet, for District applications. These tools, using the web- and GIS-technologies with custom-

developed engineering analyses and statistical models, allow USACE Districts to access available winds, waves, water levels, tides, and currents from different data sources seamlessly. Tools facilitate selection, formatting, and analyses of data for use in District projects and numerical models. Accomplished technical transfer via CHETNs, DOTS trainings, and webinars.

- **Continued Analysis of Effects of Relative Sea Level Change (RSLC) on Five High-Use Navigation Systems (SoN 2017-N-71; SoN 2013-N-11).** Continued analyses initiated in FY 2015 analyzing the effects of RSLC on navigation channel infilling for five of the high-use (>10M tons annually) navigation systems in the Nation. Estimated adjacent beach erosion, changes in tidal prism, and navigation channel shoaling with the Coastal Modeling System (CMS), and compared results with depth-utilization profiles of the corresponding deep-draft navigation channels in order to determine potential impacts on commercial shipping.

Sediment Management Focus Area

- **Linked Sediment Mobility Tool with NACCS Data (SoN 2011-N-15, SoN 2011-N-19, and SoN 2016-N-4).** In FY 2016, a scoping level tool, the Sediment Mobility Tool (SMT), was developed to determine the frequency of sediment mobility and the general sediment transport direction of sediment placed in the nearshore. The tool is available online as a web application. In FY 2017, the SMT was updated to include the North Atlantic Coast Comprehensive Study (NACCS) data, which ran 1,050 synthetic storms using the ADvanced CIRCulation (ADCIRC) model for currents coupled with the STEady WAVE (STWAVE) model for waves. The NACCS data was included in the SMT web application as a static layer from the 19,000 save points that were created in the study, so that District engineers in NAD can use the data to aid in siting nearshore placements.
- **Quantified Uncertainty in the Sediment Mobility Tool (SoN 2011-N-15, SoN 2011-N-19, and SoN 2016-N-4).** Quantified the aleatory and epistemic uncertainties from the forcing and sediment movement in this model for future use in the Sediment Mobility Tool. The Engineer Research and Development Center developed StormSim software system applied a Monte Carlo simulation to the Wave Information Study (WIS) wave hindcasts, and the epistemic uncertainties from the empirical equations used in the tool were quantified using the originally derived documentation of the equation derivation.
- **Updated Gravity TRANSport (GTRAN) Model for Nearshore Berm Migration and Deflation (SoN 2011-N-15, SoN 2011-N-19, and SoN 2016-N-4).** GTRAN is an Engineer Research and Development Center developed 2-D sediment transport model that has been used to site the nearshore placement of dredged material at Tybee Island, Georgia, Sand Island, Mississippi, and Grays Harbor, Washington. This model has historically used forcing conditions from the ADvanced CIRCulation circulation model and STEady WAVE wave model. The dredged sediment's grain size distribution and cohesive sediment erosion resistance, if applicable, can be input into GTRAN. The sediment transport is calculated using one of three methods depending on the hydrodynamic conditions (current dominated, waves and currents, and high energy, wave dominated). The model was updated to create an easy to use interface for a simple nearshore berm with basic input from the user and applied WIS wave hindcast to calculate sediment transport and deflation of a nearshore berm. GTRAN is a slightly higher fidelity and more computationally expensive model compared to the Sediment Mobility Tool, making it a logical next step for engineers to predict the transport of sediment placed in the nearshore.

- **Initiated Field Studies of Nearshore Berm Placements (SoN 2011-N-15, SoN 2011-N-19, and SoN 2016-N-4).** Monitored and evaluated two nearshore berm placement sites at Fort Myers Beach, Florida and Sand Island, Mississippi. The data was used to validate several models including SMT, GTRAN, and the Particle Tracking Model (PTM).
- **Released Version 3 of the Regional Shoreline and Inlet Sand Sharing Model, GenCade (SoN 2008-N-6).** Released Version 3 of the regional shoreline and inlet shoal evolution model, GenCade with upgraded inlet configurations, channel evolution, transport relationship enhancements, and sea level change. Documented application in wiki User's Guide. Release Technical Reports describing the integration of GenCade with an external wave model (STWAVE) and the recommended calibration procedure. Conducted a webinar short-course to transfer recent upgrades. Investigated implementation of a curvilinear grid/shoreline to better resolve regional morphological trends.
- **Developed a Verification and Validation (V&V) strategy for GenCade (SoN 2008-N-6).** In order to obtain a greater level of confidence in GenCade, conducted an acceptable V&V protocol similar to established procedures for other models.
- **Developed a model focusing on the improving the widening and closing mechanisms of breaching (SoN 2014-N-14).** Improved the formulation of breach widening by implementing the method used in river bank/channel erosion. Improved the closing mechanism by incorporating spit growth. Implement computer-based Parameter Estimation for the most sensitive input variable for the model. Developed a method to take into account the uncertainty related to the future wave climate. Adapted existing research codes into a stand-alone tool in the form of a user-friendly Graphical User Interface (GUI) package with visualization.
- **Documented Dune Guidance (SoN 2014-N-10).** Finished the investigation of meso-scale dune recovery processes at the Field Research Facility (FRF) using 30-year beach profile and Argus video imaging data sets. Completed terrestrial Light Detection and Ranging (LIDAR) based monitoring of short-term dune erosion and recovery processes at a developed and undeveloped dune field site. Submitted results in 2 peer-reviewed journal articles highlighting spatial variability in dune recovery and erosion rates at short and long-time scales. Developed and tested a probabilistic model to predict dune erosion and accretion over short to meso-scales. Published results in a peer-reviewed journal article.
- **Upgraded the Coastal Modeling System with Capability in Sediment Mapping (SoN 2016-N-4; 2011-N-19).** Applied the Eulerian approach to “tag” sediment in one location and map its path and fate through the model simulation, and identify sediment pathways. Validated model results against sediment tracer studies on the west coast, east coast, and the Gulf of Mexico.
- **Documented Application and Guidance for the Coastal Sediment Mapping Capability.** Applied and documented technology developed in FY 2016 to “tag” sediment in one location and map its path and fate through the end of simulations. Provided guidance for District transfer.
- **Upgraded the Coastal Modeling System with Coastal 2D steady-state nearshore (C2SHORE) (SoN 2016-N-10).** Incorporated C2SHORE) in Coastal Modeling System (CMS) to enhance CMS's capability in modeling sediment transport processes in swash zone and surf zone.
- **Upgraded the Particle Tracking Model within the Coastal Modeling System (CMS-PTM).** Incorporated bed-load algorithms into PTM to simulate properly the sand particle movement in a coastal environment.

- **Upgraded the Coastal Modeling System with USACE’s Next-Generation Breach Models – Applicable to Inlets, Dams, and Levees (SoN 2014-N-14).** Implemented dam/levee/barrier breach algorithms in CMS to predict breach formation and development.
- **Added Cohesive Sediment and Mixed Sediment Capabilities to the CMS (SoN 2016-N-4; 2011-N-15; 2011-N-19).** Incorporated the Coastal and Hydraulics Lab’s (CHL) mixed sediment bed model in CMS to simulate the transport of cohesive and mixed sediments.
- **Continued Applications and Validation of the CMS (SoN 2016-N-4; 2016-N-10; 2014-N-7; 2008-N-6).** Continued verification & validation of CMS, with extended data sets, coastal forcing, and settings, using available analytical, laboratory, and field data sets.
- **Released Beta-Version Tool to Quantify Erosion Caused by Vessel Wake (SoN 2014-N-6; 2011-N-24, SoN 2017-N-09).** Released beta-version tool to quantify the vessel wake-induced erosion to assist District planners and engineers in designing and improving navigation channels and determining mitigation alternatives for erosion. The tool includes physics-based approaches to determine erosion potential based on statistical distributions of vessel traffic as well as methods to aid in channel design and shoreline protection strategies.
- **Continued technology transfer.** Continued tech transfer through workshops, webinars, publication of technical reports and notes, eNewsletters, and website/wiki updates.

DESCRIPTION OF WORK FOR FY 2018:

Structures and Navigation Focus Area

- **Identify Critical Dredging Needs in Navigation Portfolio (Addresses Statement of Need (SoN) 2009-N-8, SoN 2017-N-52).** Updates to the Channel Portfolio Tool (CPT) are on-going to better support the districts/divisions with a more efficient and robust tool that identifies critical dredging needs for deep-draft navigation channels within the national USACE navigation portfolio. Using the latest channel condition data and shoaling forecast capabilities of the Corps Shoaling Analysis Tool (CSAT, which was integrated with CPT during FY 2015), populate the full national portfolio of navigation channels to complete a national picture of critical dredging needs. Provide spatial view results.
- **Establish Guidance and Best Practices for Efficiently Maintained Deep-Draft Channels (SoN 2009-N-8).** Compare deep-draft entrance channels nationally in terms of the efficiency with which waterborne freight (imports, exports, and domestic shipments) transports through the marine transportation system, in terms of cumulative dredging costs relative to commerce supported. Using the knowledge gained, establish guidance and recommend best practices for cost-effective (relative to national baselines) deep-draft navigation channel maintenance dredging and coastal navigation structure upkeep.
- **Develop a Coastal Inlet Navigation Vessel Behavior Atlas Dashboard (SoN 2012-N-5, SoN 2017-N-52).** Improvements to the user interface for navigation managers to observe changes in vessel use patterns within high-use coastal channels, based on aggregated datasets compiled from the USCG's Automated Information System (AIS) vessel position reports archive. Interface updates include more efficient data request and download routines. Comparative metrics (i.e. year over year call frequency, vessel counts, tidal delay, etc.) will provide insight into user behavior for waterway managers to better inform operational decisions at high-use navigation channels.

- **Update the Coastal Structure Management, Analysis, and Ranking Tool (CSMART).** Migrate the existing CSMART database that is populated with datasets related to commercial shipping, commercial fishing, US Coast Guard Incident reports, cruise and ferry data, and structure condition ratings, to a new platform that will support the user query functions necessary for structure functional performance as it relates to vessel traffic. Developed functional performance indices to capture the influence of coastal structures on navigating vessels. Wherever practical, incorporated new datasets (e.g. vessel counts from AIS, Census figures, recreational fishing, etc.) to serve as proxy metrics for the socio-economic significance of coastal jetty and breakwater structures in supporting resilient coastal communities.
- **Integration and Support of CPT/CSMART/AISAP/CSAT (SoN 2013-N-22, SoN 2017-N-52).** Automatically link CSAT output to CPT, CSMART, and AISAP for efficient transfer of data between the tools. Continue support of the server maintenance activities to ensure these tools are functioning and readily available to all Corps employees.
- **Develop long-term predictive capability to examine the effects of climate change to coastal navigation (SoN 2013-N-11).** Studies will build upon existing work in long-term morphodynamic predictions using the CMS wave, current, and morphology modeling system. This work will include evaluating model performance, efficiency, and accuracy in the context of predicting the response of coastal inlet systems to climate change. Specific response metrics may include changes to tidal prism, water levels, bay area, and navigation channel sedimentation under a regime of rising sea level. The research will aid long range planning efforts by developing quantitative methodologies to predict physical coastal change over the next century.
- **Develop and Release Portable Numerical Modeling Libraries.** Develop and document libraries of highly portable numerical modeling modules, such as friction, structure, wind, turbulence.
- **Upgrade the Coastal Modeling System with Lab-Based Bedload Algorithms.** Develop bedload algorithms based on lab experiments and incorporate the new formulations to calculate bedload transport process in CMS.
- **Upgrade Tool to Quantify Erosion Caused by Vessel Wake (SoN 2014-N-6; 2011-N-24; SoN 2017-N-09).** Based on District feedback, upgrade tool to quantify the erosion created by vessel wakes. With the arrival of New Panamax vessels and projected increases in US seaport traffic and other navigation activities, the effects of vessel wake on shoreline erosion and water quality is an increasing concern for the USACE Civil Works mission. The beta tool will be revised based on feedback from planners and engineers. The tool includes physics-based approaches to determine erosion potential based on statistical distributions of vessel traffic as well as methods to aid in channel design and shoreline protection strategies.
- **Develop Web-based Metocean Data Access, Processing and Analysis Tools (SoN 2013-N-22).** Continue to develop, test, and update of WaveNet and TideNet tools for District applications. Major additions will include both data and numerical modeling databases of directional wave spectra, two-dimensional currents, and two-dimensional wind and pressure fields, the upgrades will provide input data for circulation and wave models supported by the USACE.
- **Develop Guidance for Reducing Surge within Ports and Harbors (SoN 2012-N-10, 2016-N-13).** Continue to use time- and frequency-domain analyses of NOAA 1-Hz data at selected sites to identify the contribution and influence of infragravity wave (IG) phenomena in the recorded water

levels. The study will be steered by a District-led advisory PDT to identify project-specific conditions and problems experienced at each selected test-bed site. Evaluation of capabilities will build on existing models at test sites with comparison to field data to develop guidance for application of models. Modeling deficiencies will be identified with the help of data to develop improvements to numerical models. New features will be added to predictive tools and findings will be documented in technical notes, reports, and journal articles. Study results will be incorporated into design guidance through Engineering Manuals to advance the state-of-the-art for design procedures.

- **Implement Design Procedures for Navigation Structures in Wave Models (SoN 2016-N-14).** Included methods and engineering guidelines in wave models to optimize performance and design of navigation structures. Provided additional capabilities for design of structures to protect navigation channels, inlets, harbors, and adjacent beaches. Summarized advancements in guidance documents.
- **Upgrade Web-based Metocean Data Access, Processing and Analysis Tools (SoN 2013-N-22).** Upgraded two web-based metocean data tools, WaveNet and TideNet, based on District user feedback. These tools, using the web- and GIS-technologies with custom-developed engineering analyses and statistical models, allow USACE Districts to access available winds, waves, water levels, tides, and currents from different data sources seamlessly. Tools facilitate selection, formatting, and analyses of data for use in District projects and numerical models. Transferred upgrades via CHETNs, DOTS trainings, and webinars.
- **Incorporate Vegetation Effects on Wave Propagation (SoN 2014-N-12).** Incorporated and validated vegetation effects on wave propagation in CMS-Wave, a wave model in Coastal Modeling System (CMS). Vegetation effects for Natural and Nature-based Features (NNBF) are included in the reduction of waves and storm surges in coastal areas. Model wave damping effects as a function of water level, wave height and period, and vegetation characteristics. Quantified and documented the protective sheltering effects of islands and emergent NNBF in regional wave predictions in guidance documents.
- **Develop and enhance capabilities of the Coastal Inlets Research Program's (CIRP) wave models (SoN 2015-N-35, 2009-N-5, 2017-N-01).** Used existing field data and evaluated capabilities of CIRP wave models for wave processes common to applications in U.S. coastal waters, including East Coast, Gulf of Mexico, West Coast, Pacific Islands, and Alaska. Validated models with recent field data sets from near and at inlets, ports and harbors. Investigated impacts of multi-directional wind-waves and long-period infra-gravity waves on harbor surges, navigation, reefs, and structural design in District projects. Incorporated combined forcings of the short-period seas and swells in models to quantify their impacts on navigation safety, harbor surges, ship transits, moorings, and infrastructure design and maintenance. Documented findings in project reports.
- **Develop Guidance for Reducing Surge within Ports and Harbors (SoN 2012-N-10, 2016-N-13).** Developed improved design guidance by modifying infrastructures for reducing surge within port and harbor basins. Utilized advanced numerical models with previous physical model results and field data to optimize siting and sizing (orientation, length, width, and elevation) to control and manage the surge impacts to port and harbor operations. Utilized field data from several west coast applications to evaluate the skills of harbor wave models for generation and growth of infragravity waves which cause surge within ports, harbors and marinas. Investigated impacts of multi-directional wind-waves and long-period infra-gravity waves on harbor surge, navigation, reefs, and structural design using recent field data at inlets and ports. Included short-period seas and swells in wave model forcings to study potential effects on navigation safety, harbor surges, ship transits, moorings, structural design and repair. Implemented new analyses capabilities in models and document findings in user guides.

Sediment Management Focus Area

- **Release Version 4 of the Regional Shoreline and Inlet Sand-Sharing Model, GenCade (SoN 2008-N-6).** Version 4 of GenCade will include the implementation of a curvilinear grid/shoreline to better resolve regional morphological trends; Technical Reports and the CIRP Wiki will provide documentation. The process of integrating GenCade with the breaching model (2014-N-14) will begin in FY 2018. Ten new GenCade videos will be produced describing advanced cards, post-processing, calibration strategies, and other advanced topics.
- **Develop inlet breaching code as a stand-alone model (2014-N-14).** Conduct a tech-transfer webinar to describe the concept and introduce the GUI package. The tool will be available in a form that allows engineers and managers to make a rapid assessment of the breach growth and closure potential. Will write a Technical Report/User's Guide describing the breaching tool and a journal paper describing the theory.
- **Quantify Dune Resilience (SoN 2014-N-11; 2015-N-11; 2014-N-10).** Develop and transition an approach to quantify engineering resilience of coastal dunes which utilized the R&D knowledge gained in the field studies and data analysis during FY 2014-FY 2018. This will include testing and evaluating dune evolution models in other locations and development of a web-based tool that can be used by the Districts to both design more resilient systems and adequately assess and predict the resilience of their existing coastlines with proper uncertainty quantification. Results will be published in either a technical report and/or peer reviewed journal article documenting model performance and use. . Continue collaborative interagency work with the U.S. Geological Society and Naval Research Lab on developing numerical models to predict dune scarping and overwash magnitudes during storms for improved planning and vulnerability assessments. Publish a journal article documenting the influence of development on dune morphological evolution.
- **Monitor a Full-Scale Nearshore Berm composed of Mixed-Sized Sediments (SoN 2011-N-15, SoN 2011-N-19, and SoN 2016-N-4).** The majority of sediment dredged in the USACE is composed of mixed sand, silt, and clay. Predicting transport of these mixed-sediments is an active area of research, and of keen interest to resource agencies that often restrict placement of dredged material in the nearshore. Nearshore berms are created through placement of sediment in the nearshore and are desirable to keep sand in the littoral system and facilitate "engineering with nature" to sort fines offshore and transport coarser sand to the nearshore. However, there is little guidance to design and evaluate the spatial and temporal characteristics of nearshore berm migration, and resource agencies are presently not allowing placement because of concerns of dispersion of fines during and following placement. This research task will conduct a large scale sediment transport experiment on a nearshore berm at a location that will be determined. Nearshore sediment transport processes will be studied to aid in modeling for nearshore berm placements and future design guidance.
- **Sediment Mobility Tool (SMT) Web Application Improvements (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4).** The web application for the Sediment Mobility Tool (SMT) will be improved by incorporating the methodology created in FY 2017 to calculate the aleatory and epistemic uncertainties in the model equations. The addition of the uncertainties in the web application will provide users with more knowledge to make informed decisions using the results of the SMT.
- **GTRAN Nearshore Berm Web Application (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4).** Districts have regularly asked for more tools to

be converted to web applications so software is not required to be installed on their computers. GTRAN can be developed into a web application to make the use of the sediment transport model more accessible and easily applied to nearshore berms. The web application will use hindcast data from the Wave Information Study (WIS) as input for the tool which will be applied to a simple nearshore berm created by the user input. The web application will calculate the sediment transport and berm deflation.

- **Numerically Model Field Studies of Nearshore Berm Placements (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4, SoN 2017-N-69, and SoN 2017-N-70).** The nearshore placement of dredged sediment at Sand Island, Mississippi has been monitored with sediment tracers and the wave conditions have been monitored with two Acoustic Doppler Current Profilers (ADCP's). The data collected is being used to validate several models including SMT, GTRAN, and the Particle Tracking Model (PTM).
- **Rapid Method for Statistically Averaged Wave Climate (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4, SoN 2017-N-69, and SoN 2017-N-70).** Various statistical techniques were evaluated for determining a rapid method to statistically average wave climate from WIS wave hindcasts that were then applied to the SMT model to improve understanding of sediment mobility under typical wave conditions and applied to GTRAN to estimate nearshore berm deflation.
- **Initiate Field Studies of Nearshore Berm Placements at South Padre Island (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4, SoN 2017-N-69, and SoN 2017-N-70).** The nearshore berm at South Padre Island, TX was monitored with sediment tracers, altimeters, Acoustic Doppler Velocimeters (ADV's), and ADCP's. The data was used as a demo project to quantify the shoreline response and benefit of nearshore placements. The data collected was also be used to validate several models including SMT, GTRAN, and the Particle Tracking Model (PTM).
- **Implement "Dredging Module" in the Coastal Modeling System (SoN 2017-N-12; 2016-N-10).** Incorporated the process of dredging operations in CMS to enhance CMS's capability in modeling sediment transport and morphology change.
- **Integrate CMS into the Coastal Model Test Bed Framework (SoN 2017-N-1).** Nearshore numerical models (CMS-Flow and CMS-Wave) are used by the Corps' Districts to estimate the wave conditions, circulation, and the morphology potentially impacting a project site. The FRF has established the Coastal Model Test Bed (CMTB), a live modeling framework which utilizes the high temporal and spatial resolution morphologic, oceanographic, and meteorological data collected at the FRF. This modeling framework has been designed to exploit the FRF's real-time data collection and assess nearshore numerical models. The CMS models will be integrated into a live work flow that already exists and validated on a dedicated CMTB cluster.
- **Continue technology transfer.** Continue tech transfer through workshops, webinars, publication of technical reports and notes, eNewsletters, and website/wiki updates.
- Supported the nearshore coastal processes research initiative to conduct collaborative research across the coastal community.

DESCRIPTION OF WORK FOR FY 2019:

Structures and Navigation Focus Area

Engineer Research and Development Center

Coastal Inlets Research Program

- **Upgrade Web-based Metocean Data Access, Processing and Analysis Tools: WaveNet and TideNet (SoN 2013-N-22).** Upgrade WaveNet and TideNet tools for District applications. Major additions will include both data and numerical modeling databases of directional wave spectra, two-dimensional currents, and two-dimensional wind and pressure fields; the upgrades will provide input data for circulation and wave models supported by the USACE.
- **Develop Guidance for Reducing Surge and Infragravity Waves within Ports and Harbors (SoN 2012-N-10, 2016-N-13).** Continue to use time- and frequency-domain analyses of NOAA 1-Hz data at selected sites to identify the contribution and influence of infragravity wave (IG) phenomena in the recorded water levels. The study will be steered by a District-led advisory PDT to identify project-specific conditions and problems experienced at each selected test-bed site. Evaluation of capabilities will build on existing models at test sites with comparison to field data to develop guidance for application of models. Modeling deficiencies will be identified with the help of data to develop improvements to numerical models. New features will be added to predictive tools and findings will be documented in technical notes, reports, and journal articles. Study results will be incorporated into design guidance through Engineering Manuals to advance the state-of-the-art for design procedures.
- **Develop and enhance capabilities of CIRP wave models (SoN 2015-N-35, 2009-N-5, 2017-N-01).** Continue verification and validation (V&V) of CMS, with extended data sets, coastal forcing, and settings, using available field data sets. Use existing field data to evaluate skills of CIRP wave models for wave processes common to typical CMS applications in East Coast, West Coast, Pacific Islands, Alaska, and Great Lakes. Validate models with recent field data near and at inlets and ports/harbors by investigating impacts of multi-directional wind-waves and long-period infra-gravity waves on harbor operations, surges, navigation issues, and wave effects on reefs, and structural design in District projects. Incorporate combined forcings of the short-period seas and swells in models to quantify their impacts on navigation safety, harbor surges, ship transits, moorings, and infrastructure design and maintenance. Document findings in technical guidance.
- **Critical Dredging Needs in Navigation Portfolio (Addresses Statement of Need (SoN) 2009-N-8; SoN 2017-N-52).** Continue with improvements to the Channel Portfolio Tool (CPT) to better support the districts/divisions with a more efficient and robust tool that identifies critical dredging needs for navigation channels within the national USACE navigation portfolio. Efficiencies to process large data queries is essential for continued utility. In addition, the spatial interconnection of the data in CPT, AISAP, CSMART, and CSAT will continue to be explored with the goal of identifying new coastal navigation metrics.
- **Update the Coastal Structure Management, Analysis, and Ranking Tool (CSMART).** Develop functional performance indices to capture the influence of coastal structures on navigating vessels. Incorporate ancillary datasets within the tool to support structure function and condition monitoring. These new datasets may include vessel counts and tracks from AIS, Census figures, remote sensing data such as high resolution lidar datasets that can be used to extract key metrics that may be used to quantify the socio-economic significance of coastal jetty and breakwater structures in supporting resilient coastal communities.

Sediment Management Focus Area

- **GTRAN Nearshore Berm Web Application (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4, SoN 2017-N-69, and SoN 2017-N-70).** Districts have regularly asked for more tools to be converted to web applications so software is not required to be installed on their computers. GTRAN

will be developed into a web application to make the use of the sediment transport model more accessible and easily applied to nearshore berms. The web application will use hindcast data from the Wave Information Study (WIS) as input for the tool which will be applied to a simple nearshore berm created by the user input. The web application will calculate the sediment transport and berm deflation.

- **Monitor a Full-Scale Nearshore Berm composed of Mixed-Sized Sediments (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4, SoN 2017-N-69, and SoN 2017-N-70).** The majority of sediment dredged in the USACE is composed of mixed sand, silt, and clay. Predicting transport of these mixed-sediments is an active area of research, and of keen interest to resource agencies that often restrict placement of dredged material in the nearshore. Nearshore berms are created through placement of sediment in the nearshore and are desirable to keep sand in the littoral system and facilitate "engineering with nature" to sort fines offshore and transport coarser sand to the nearshore. However, there is little guidance to design and evaluate the spatial and temporal characteristics of nearshore berm migration, and resource agencies are presently not allowing placement because of concerns of dispersion of fines during and following placement. This research task will conduct a large scale sediment transport experiment on a nearshore berm with different shapes and cross-shore placement locations. Nearshore sediment transport processes will be studied to aid in modeling for nearshore berm placements and future design guidance.
- **Addition of SACCS into Sediment Mobility Tool (SMT) (SoN 2011-N-15, SoN 2011-N-19, SoN 2016-N-4, SoN 2017-N-69, and SoN 2017-N-70).** In FY 2017, the NACCS data were integrated into the SMT to assist user determine the sediment mobility of dredged sediment placed in the nearshore under storm wave conditions. In FY 2018, SACCS data were generated for the entire SAD. The SACCS data will be implemented into SMT in FY 2019 to assist users in the SAD to understand nearshore placed sediment transport under storm wave conditions.
- **Develop Long-term Predictive Capability in a Selected Inlet System (SoN 2017-N-71; SoN 2013-N-11).** Studies will build upon existing work in long-term morphodynamic predictions in a selected inlet system using the CMS wave, current, and morphology modeling system. This work will predict physical coastal change and the response of coastal inlet systems to climate change over the next century. Specific response metrics may include changes to tidal prism, water levels, bay area, and navigation channel sedimentation under a regime of rising sea level.
- **Continue Applications and Validation of the Coastal Modeling System (CMS) (SoN 2017-N-1; 2016-N-4; 2016-N-10; 2014-N-7).** Continue verification & validation of CMS, with extended data sets, coastal forcing, and settings, using available analytical, laboratory, and field data sets.
- **Continue to Test New CMS Features (SoN 2017-N-1).** As requested by district applications new features implemented in CMS will be tested. These features included newly merged CMS code, C2SHORE, dredging module, and mixed-sized sediment routine.
- **Rollout Operational Tool to Quantify Erosion Caused by Vessel Wake (SoN 2014-N-6; 2011-N-24; SoN 2017-N-09).** Rollout operational tool to quantify the potential effects of vessel wake to shoreline erosion. The tool will be distributed as an executable and will be vetted based on feedback from USACE planners and engineers. The tool will be maintained on the CIRP website with user guidance documentation. Operational effectiveness will be gauged by monitoring use statistics and feedback from District users.
- **Quantifying Dune Resilience (SoN 2014-N-11; 2015-N-11; 2014-N-10, 2017-N-72).** Transition tools for estimating dune morphological response at short and long time-scales to District engineers. This will include incorporation of improved physics-based dune response inside of

BeachFx as well as the creation of new tools for simulating dune response to potential storms and wind/wave climates for planning and vulnerability assessments.

- Support the nearshore coastal processes research initiative to conduct collaborative research across the coastal community.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$10,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Cultural Resources 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
2/	2/	\$1,500,000	\$1,000,000 3/ 4/	\$1,000,000

AUTHORIZATION: The Native American Graves Protection and Repatriation Act (NAGPRA) enacted on 16 November 1990, and the implementing regulations at 43 CFR Part 10, contains data gathering, reporting, consultation, repatriation, and permitting provisions that have near-term and long-term implications for Civil Works programs and projects. The Curation of Federally Owned and Administered Archeological Collections (36 CFR Part 79), required by the Antiquities Act (16 U.S.C. 431-433), the Reservoir Salvage Act (16 U.S.C. 469-469c), National Historic Preservation Act (16 U.S.C. 470h-2), and the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm), requires Civil Works programs and projects to properly house their archaeological collections to federal standards including NAGPRA-related materials.

DESCRIPTION: Annual funding is used to provide overall management of the Corps' NAGPRA programs and serves as a centralized base for compliance, an information source, and contracting. The Corps facilitates consistent nationwide NAGPRA program implementation and operation, which includes inventorying and summarizing collections, consulting with Indian tribes, researching cultural affiliation and aboriginal occupation, and returning NAGPRA collections to the appropriate Indian tribes.

The Corps is responsible for the management of at least 46,255 cubic feet of artifacts collected from its water resources development projects and at least 3,511 linear feet of associated records. NAGPRA review and proper storage of these materials, which are over 80 percent of the total DoD collections and the largest volume of all federal agencies responsible for this activity, is required by a number of public laws including NAGPRA with implementing guidance in 43 CFR Part 10 and 36 CFR Part 79. Corps wide NAGPRA collections are estimated to include 5,000 individual sets of human remains and 200,000 objects. Through FY 2018, a total of 75 NAGPRA compliance notices were published, resulting in the repatriation of over 1,600 individuals and 187,000 objects. The costs are to accomplish NAGPRA work and to fund compliance support to the districts, including Native American consultation. Funding this item will ensure full USACE compliance with NAGPRA legislation, facilitate Native American consultation, and will enable districts to repatriate Native American human remains and NAGPRA cultural items to the affiliated and aboriginal Indian tribes.

1/ The costs of this activity are accounted for between the Navigation, Flood Risk Management, Hydropower, and Environmental Stewardship business lines.

2/ Prior to FY 2017, funding for this activity was appropriated under the Cultural Resources (NAGPRA/Curation) line item.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$23,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

4/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

Division: Mississippi Valley

District: St. Louis

Cultural Resources

APPROPRIATION TITLE: Operation and Maintenance

PROJECT NAME: Civil Works Cyber Security Control Systems (CICSCX)

Allocation in FY 2017 NA 1/	Allocation in FY 2018 NA 1/ 2/ 3/	Budgeted Amount for FY 2019 \$4,000,000
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DESCRIPTIONS OF WORK AND JUSTIFICATIONS FOR FY 2019:

The requested funding will support the following FY 2019 activities to be executed through the US Army Corps of Engineers (USACE) Critical Infrastructure Cyber Security Center of Expertise (CICSCX): to conduct cybersecurity posture assessments of industrial control systems (ICS) including FISMA security reviews for systems currently in service which are utilized for the operation and monitoring of infrastructure at USACE Civil Works (CW) projects nationwide, and the access control and security and surveillance systems utilized to monitor the same; to support the development of specific engineered solutions to improve project readiness and reduce the probability of ICS compromise from the increasing cyber threats directed at hydropower, lock, dam, flood protection, water supply, and environmental infrastructure and assets; to coordinate and conduct security risk assessments as required by the Risk Management Framework (RMF) utilizing the Cyber Risk Module of the Common Risk Model for Dams which integrates physical and cybersecurity and supports the evaluation of ICS cybersecurity readiness in collaboration with the Critical Infrastructure Protection and Resilience (CIPR) Program; to utilize the results of the cybersecurity risk assessments to identify specific cybersecurity protective measures and/or enhancements to ensure the probability of system compromise is minimized; to bench test newly released or modified network security appliances and associated software that have wide application potential and could possibly improve the security posture of the control systems and access control/surveillance systems in service or in design at USACE projects, and to perform adequate operational verification in a test environment prior to deployment of the equipment; to coordinate and cooperate with Army's Cyber Protection Teams in development, installation, and commissioning of network monitoring and response infrastructure IAW OPORD 2015-366 (Builders Fence) at hydropower generating stations across the organization; to coordinate and collaborate with Office of Secretary of Defense and Army CIO/G6 in the means and methods to apply the Risk Management Framework for authorization of control systems controlling or monitoring critical infrastructure in the Civil Works portfolio; to develop authorization supporting documentation that will be applied to systems across USACE as the transition to the DoD Information Assurance Risk Management Framework (DIARMF) process for system authorization is fully implemented; to conduct assessments for system authorization under RMF and serve in the Security Controls Assessor – Validator(SCA-V) role when that role can be performed by the system-owning organization per Army guidance; to provide guidance and assistance to all of CW with eMASS registration and each step of the RMF process; to provide national training opportunities for USACE personnel appointed to information assurance (IA) duties to obtain and maintain IA certification qualification standards as mandated by DoD and DA; to provide critical training to new personnel to develop the expertise necessary to support the cybersecurity mission across the organization, and to provide training for experienced personnel to ensure our organization stays abreast of changes in tactics and methodologies used by persons and organizations who might desire to conduct a cyber-attack against CW critical infrastructure. The expertise and capability of the Information Assurance (IA) Division, U.S. Army School Cyber Leader College out of Fort Gordon will be utilized to organize and conduct the training at a USACE facility to minimize the overall cost to the organization.

FY17 Accomplishments:

The CICSCX was established in October 2013 as a regional center to provide services related to the cybersecurity of ICS within the Southwestern Division. The role of the CICSCX has evolved and the center is now providing critical support for ICS security to each USACE Division in CONUS. The CICSCX serves as the premier organization within USACE for all matters related to ICS cybersecurity in Civil Works (CW). During FY 17, the CICSCX provided cybersecurity services to projects in LRD, MVD, NWD, SAD, SPD, NAD, and SWD. Services ranged from providing assistance with documentation preparation in support of the Risk Management Framework authorization efforts to serving as the lead organization responsible for complete system assessment and authorization activities. The CICSCX has taken a proactive approach as the DoD transforms the traditional Certification and Accreditation (C&A) process (DIACAP) into the six-step Risk Management Framework (RMF) and has developed the processes and procedures necessary to ensure proper and consistent application of the revised standards across CW ICS. To this end, CICSCX has completed Civil Works Risk Management Strategy and the Civil Works RMF Policy & Procedures documents. The CICSCX continued to work in close coordination with the OSD in all matters related to RMF for control systems. The Center has developed a standardized risk assessment methodology in coordination with the Critical Infrastructure Protection & Resilience program based on the Common Risk Model for Dams (CRM-D) risk methodology. The CRM-D Cyber Module became available for use in FY 16 and has been used in multiple system authorization efforts in FY 17. In FY16, the CICSCX began a joint project with the Army's CPTs for developing, testing, and commissioning a Network Monitoring System that could detect adversarial presence on networks utilized for the control and monitoring of Hydropower Generation and Delivery Equipment across the organization. Initial deployments of this NSM were completed in FY 16 with four additional deployments completed during FY 17. The CICS and the Army CPT will continue modifying and deploying the continuous monitoring solution in hydropower facilities in FY 18. The CICS and the CPT coordinated to conduct a full scale cyber incident response exercise lasting 2 weeks in FY 17. The exercise enabled the 2 teams to enhance incident response capabilities and learn how each can support the other during a cyber-crisis. The CICSCX continues to work closely with the ESS TCX at HNC to ensure consistent application of RMF requirements for electronic security and surveillance systems that will be deployed at CW Project Sites.

1/ Prior to FY2019, Civil Works Cyber Security Control Systems (CICSCX) was funded as part of the Asset Management/FEM and CIPR Remaining Item.

2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was approximately \$0. There was an additional approximately \$100,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

3/ There was no Conference Amount available at the time this J-sheet was prepared. The amount shown is the President's budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance

PROJECT NAME: Dredging Data and Lock Performance Monitoring System – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation In FY 2018	Budgeted Amount in FY 2019
\$1,107,810	\$1,283,000	\$1,108,000	\$1,120,000 1/ 2/	\$1,120,000

AUTHORIZATION: The authority for the U.S. Army Corps of Engineers to collect data on vessel operations and cargo transiting navigation locks is contained in 33 C.F.R Part 207.800 Collection of Navigation Statistics (b)(2)(F)(3)(iv). These data are necessary to provide dredging and lock data for efficient management of Congressionally authorized navigation projects, to meet the Office of Management and Budget performance requirements, to supply data for analysis and modeling, as well as to respond to specific public laws, including P.L. 96-269 (Minimum Dredge Fleet), P.L. 100-656 (Small Business Set-Aside), and to meet the Government Performance and Results Act (GPRA), the Government Paperwork Elimination Act (GPEA) and Clinger-Cohen/IT Management Reform Act.

DESCRIPTION: The dredging and lock data collection and processing programs provide baseline navigation information and analysis to support operational and strategic management decisions, the budget formulation process and performance measures for the Corps navigation projects and program. This includes lock operations on the inland waterways; the operation and maintenance of federally authorized navigation channels, performance measures to determine the quality and level of service and meet Office of Management and Budget performance measures, implementation of findings from Government Accountability Office review of the Corps Dredging program, support for the projections of capital investments, and justification and validation of future national navigation needs. Information includes Corps performed and contracted dredging (location, quantity, cost etc.); all lock activities (barges and tons of commodities, chamber unavailability, processing times, delays etc.), and physical descriptions of all the Corps owned/operated locks. The funds support the database management, operation, quality control, user assistance, training, compliance with security requirements and Corps-centric information technology services. The Lock Performance Monitoring System (LPMS) is the sole source of lock data information for the Corps, Federal government and industry. LPMS and Dredging Information System databases are transactional systems within the Corps centralized Operation and Maintenance corporate information system.

Technological change in the shipping industry is a continual process requiring ongoing analytical efforts to estimate the nation's future maintenance dredging needs. Update of current and future vessel characteristics, channel dimensions, commodity origins-destinations, vessel cost parameters, and other shipping data are needed to support the Corps dredging program.

This funding is used to continue to support the Corps Navigation responsibilities and respond to changing data needs by maintaining the Lock and Dredging information systems and data warehouse; providing essential upgrades, security and user support; maintaining and upgrading the automatic data recording of lock timing data, and developing additional data warehouse reports within the Enterprise Data Warehouse to support emerging data requirements for the performance based budget. Maintain the standardized National Notice to Navigating Interests (NTNI) database and continue coordinating with the Coast Guard to integrate their notice system. Enhance the search capabilities on the NTNI public website. Prototype the use of voice activated data recording for lock operators. Provide uninterrupted database access by migrating to a Department of Defense approved cloud based computing site. Develop and implement an approved method to Common Access Card enable the dredging and lock data collection applications. Work with the other Federal agencies (including U.S. Coast Guard, National Oceanic and Atmospheric

Institute for Water Resources

Dredging Data and Lock Performance Monitoring System

Administration, Federal Communications Commission) to enhance the LPMS to identify vessels not currently in the database. Work with the Lock Operators Management Application team to deploy additional capabilities for the navigation information portal for Corps and industry; maintain a working relationship with the Inland Marine Transportation System to update the data entry portion of the Lock Operators User Guide and to monitor performance as implementation progresses. Through the Navigation Data Integration Framework effort coordinate and share data with other navigation information databases such as Dredging Quality Management, Asset Management, and Resident Management System to reduce data redundancy and provide more robust information. Continue tracking forecasts for the world vessel fleet, commodities and trade; expand voyage ports-of-call information for containerships; and continue analyses of marine transportation system current and future channel and infrastructure requirements for coastal harbors and inland waterways. Provide dredging and lock analytical, technical, and data support for Corps Headquarters, division and district offices.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$91,000. There was an additional \$0 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this J-sheet was prepared. The amount shown is the President's budget amount for FY 2018.

APPROPRIATION TITLE: Operation & Maintenance, Fiscal Year 2019

PROJECT NAME: Dredging Operations and Environmental Research (DOER) Program – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$6,886,000	\$6,385,000	\$6,386,000	\$6,450,000 1/ 2/	\$6,450,000

AUTHORIZATION: The Clean Water Act; the Marine Protection, Research and Sanctuaries Act; and Water Resources Development Acts from 1986 and following contain numerous requirements and provisions addressing contaminated sediments in navigation channels, dredged material management, and beneficial uses of dredged sediments that focus the continued need for innovation and technology development.

DESCRIPTION: The Dredging Operations and Environmental Research (DOER) program is the only research program in the Federal government that addresses the science, engineering, and technology needs related to dredging and managing between 200 and 300 million cubic yards of sediment that must be removed from navigation channels, ports, and harbors in the United States every year. The risks and opportunities related to 1) contaminated sediments in navigation channels and harbors, 2) optimizing dredged material management, and 3) beneficial use of dredged sediment to enhance habitat, ecosystems, and coastal recreation services mandate a continuing need for developing and applying innovative practice and technology. Contaminant detection limits are now so low that sub-trace levels of toxic substances are identified. High profile contaminants continue to plague numerous Federal and permitted dredging projects. Traditional upland disposal areas have reached or are rapidly approaching capacity with few opportunities for new facilities. Aquatic placement of dredged material, which can provide both economic and environmental benefits, must be performed in a sustainable manner that addresses and manages the risks associated with contaminant exposures, the presence of threatened and endangered species, and other uses of the water body. Innovative management practices are required to ensure that environmental standards can be achieved for dredging operations in a way that minimizes costs while maximizing sustained environmental benefits from using dredged material to accomplish habitat and ecosystem restoration and produce recreational benefits. Existing knowledge gaps in physical, chemical, biological, and engineering processes lead to inefficient operations, higher management costs, and limited management and beneficial use options. Performance standards and guidance for existing and improved practices are critical needs. Risk-based assessment and management practices are needed to ensure both the economic and environmental viability of navigation dredging operations. Beneficial use of dredged material is a priority and environmental resource protection is a mandate; however, costs are increasing due to the constraints noted above. Continued economic viability and security of the nation will depend upon our ability to remove, manage and beneficially use dredged material in a cost-effective and environmentally responsible manner. Continued engineering and environmental innovation will be essential to managing costs and risks.

The DOER Program is an integral and highly beneficial component of the Corps' navigation dredging and environmental protection missions. Dredging and dredged material management must be accomplished within a climate of increased dredging workload, fewer placement sites, increased environmental constraints, and decreasing fiscal and manpower resources. Balancing environmental protection, restoration opportunities and critical economic needs, while maintaining and enhancing navigation infrastructure, presents significant technical challenges. The DOER program has validated innovative technologies for managing high profile contaminants and developed risk-based assessment and management

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Dredging Operations Environmental Research Program

practices that will significantly reduce costs for all navigation projects, ports, and harbors. Advancing the assessment and management practices used by the U.S. Navigation Program is critical to sustaining the economic and environmental benefits produced by the USACE dredging program.

The funds under this program are not used for work at specific projects, but are used to fund activities that can be used to benefit both current and future projects. Major focus areas of DOER include:

(1) Sediment and Dredging Processes:

- a. develop improved understanding for dredged sediment properties and transport processes associated with mixtures of sand, silt, and clay to support regulatory compliance, habitat enhancement, dredged material management, beneficial use of dredged sediment, Natural and Nature-based features, regional sediment management, and Engineering with Nature;
- b. develop more accurate characterization methods for transport and deposition of suspended sediment to support environmental evaluations of dredging projects and engineering design for wetland and other habitat creation using dredged material;
- c. develop engineering and operational practices that enable more mixed-grain sediments from navigation projects to be used for beach and nearshore nourishment;
- d. develop experimental results demonstrating the use of strategic sediment placement associated with dredging operations to support coastal resilience;
- e. develop more accurate understanding of hopper dredge suction velocities to facilitate better understanding of entrainment risk to threatened and endangered species;
- f. demonstration and documentation of methods for measuring very small amounts of sedimentation (on the order of 1 mm) necessary to evaluate risk resulting from dredged sediment deposition on sensitive resources;
- g. develop tools to support optimization of shallow water pipeline placement operations;
- h. Improve dredged sediment fate models used to evaluate regulatory compliance, long term management strategies, beneficial use options, and risk characterization
 - i. develop, test, and calibrate new sediment process algorithms;
 - ii. improve sediment process descriptions; and
 - iii. expand applicability to include vegetated and wetting/drying environments;
- i. develop methods for measuring site-specific cohesive sediment processes including erosion, settling, flocculation, aggregation and probability of deposition;
- j. improve science-based risk assessment for beneficial use and Engineering with Nature (EWN) sites that include robust sediment fate and sediment exposure predictions; and
- k. measure and predict sediment accretion at beneficial use sites.

(2) Dredged Material Management:

- a. develop new capability for the Dredging Portal to support efficient operational design and management;
- b. improve database and model integration to improve system-scale management of dredging operations;
- c. demonstrate use of a GIS tool for identifying and ranking dredged material beneficial use opportunities;
- d. demonstrate use of a channel in-filling tool to predict and reduce dredging needs;
- e. develop guidance for the implementation of thin layer placement to enhance beneficial use of dredged material for increasing the resilience of eroding wetlands,

- f. develop barge production measurement system to improve measurement accuracy and increase dredge crew safety;
- g. develop new laboratory analysis procedures to evaluate suitability of innovative water injection dredging to reduce dredging costs by utilizing gravity instead of hoppers or pipelines to transport the sediment (Engineering With Nature);
- h. develop guidance and tools to standardize and optimize design of wetland restoration using dredged material;
- i. develop an improved open water dredged material placement numerical model to facilitate more efficient and effective planning to increase the amounts and frequency of open water placement;
- j. expand suite of planning tools to facilitate increased beneficial use of dredged sediments; and
- k. illustrate the importance of applying Engineering with Nature (EWN) principles that result in the collaborative outcomes for dredge material management.

(3) Environmental Resource Management:

- a. develop design guidance for incorporating Natural and Nature-based features for engineered resilience;
- b. develop quantitative methodology for incorporating ecological resilience into beach nourishment;
- c. develop a quantitative model for modeling episodic sediment pulses into marsh dynamic models;
- d. developed technology that integrates remote sensing data and computational ecological models to determine critical habitat for endangered species near Corps project sites;
- e. Develop a framework for managing risk related to underwater sound produced by dredging;
- f. develop guidance on incorporating section 7(a)(1) of the Endangered Species Act into USACE planning and operations;
- g. improve multi-model integration to determine environmental benefits from beneficial use and other Engineering with Nature (EWN) projects; and
- h. enhance modeling capabilities for quantifying multiscale impacts and benefits from Corps projects.

(4) Risk Management:

- a. emphasize development and evaluation of risk-based technology and approaches to improve cost efficiencies and sustainability of the navigation dredging program;
- b. enhance model and laboratory evaluations for designing innovative caps for contaminated dredged material in order to reduce management costs;
- c. improve test procedures and interpretative tools to reduce cost and enhance accuracy and reliability of dredged material assessments;
- d. validate toxicity test methods to increase the accuracy and reliability of environmental assessments;
- e. demonstrate successes and lessons learned in utilizing dredged material in contaminated sediment source control;
- f. review prevalence and potential risks associated with micro-plastics in dredged materials;
- g. evaluate new capping technologies to improve resiliency and reduce long-term O&M costs;
- h. develop guidance on constraints and opportunities for utilizing dredged material in contaminated sediment source control to reduce long-term O&M costs and environmental liabilities;
- i. improve test procedures and interpretative tools to reduce cost and enhance accuracy and reliability of dredged material assessments; and
- j. evaluate thin layer capping for reducing sediment contaminant risk.

ACCOMPLISHMENTS IN FY 2017:

Sediment and dredging products include:

- Published results of nearshore placement experiments supporting model development and engineering design
- Documented methods for sediment plume characterization and deposition
- Published results of beach nourishment demonstration using mix-grained sediments
- Published methods to measure sediment accretion in marshes built with dredged material
- New, remote methods for monitoring water quality for regulatory compliance
- Documented physical model results of hopper dredge suction flow-field
- Published results for cost-effective alternative engineering control to reduce sea turtle entrapment
- Published sandy dredged sediment color change index to increase permitting of beach and littoral zone placement
- Published results from laboratory and field testing of methods to accurately measure sedimentation on the scale of 1 mm accuracy

Dredged material management products include:

- Published new capability for Dredging Portal to support efficient operations
- Documented case study application of channel in-filling tool
- Published results of analyzed sediment data to calculate consolidation of dredged material for estimating resultant wetland elevation to optimize ecosystem performance
- Provided user-friendly interfaces for key dredging models
- Published new capability for optimizing dredged material management and beneficial use

Environmental resource management products include:

- Published additional methods for using Natural and Nature-based features for engineered resilience
- Published case studies documenting use of Engineering with Nature practices to address threatened and endangered species issues associated with navigation projects
- Published method for characterizing risks related to underwater sound produced by dredging
- New technology for reducing operational costs and risks to marine mammals
- Demonstrated techniques for using native plants to support dredging operations through Engineering with Nature
- Published new quantitative methodology for modeling dynamics of episodic dredge material placement
- Demonstrated success by designing/constructing breakwaters that created common least tern habitat/nesting areas
- Published results from development of new technology that integrated remote sensing data and computational ecological modeling to project critical habitat for endangered sea turtles

Risk management products include:

- An enhanced model for the evaluation and design of caps utilizing amendments to manage contaminated dredged material
- Evaluation of three innovative technologies for capping of contaminated sediments in navigation channels and slips
- Published new elutriate test method for more accurate and reliable assessment of dredged materials

- Published validation results for more accurate and reliable toxicity tests
- Published Standard Operating Procedure for streamlining bioaccumulation test procedures to reduce cost
- Literature review summarizing use of dredged material in contaminated sediment source control
- Literature review of potential impacts of micro-plastics in sediments

DESCRIPTION OF WORK FOR FY 2018:

Sediment and dredging products will include:

- Draghead flow model to facilitate quantification of entrainment risk
- Documentation of methods to feed mudflats and marshes using strategic placement of muddy dredged sediments
- Published guidance for inclusion of mud clods in dredged sediment fate predictions for improved management methods and to address regulatory needs
- Published guidance for applying new technologies to measure fine-scale dredged material sedimentation (1 mm scale) near resources such as seagrass
- Peer-reviewed journal article on the beneficial loss of fine-grained sediment fraction during dredging and placement of predominately sandy material
- Dredged sediment transport models that include cohesive sediment aggregate processes
- Published Engineering with Nature (EWN) Technical Report and Technical Note that describes sediment and dredging processes that maximize benefits derived from strategic placement of dredge material

Dredged material management products will include:

- Published guidance to design wetland restoration projects using dredged material beneficially
- Model to calculate consolidation of dredged material to optimize sustainability of wetland thin layer placement projects
- Model for optimization of dredged material placement in open water
- Laboratory analysis procedures to determine suitability of water injection dredging
- Peer-reviewed journal article on evaluation of wetlands ecological performance
- Verified barge production measurement system, contract specifications, and operational guidance
- Published guidance for standardized monitoring to determine ecological performance of wetlands
- Develop EWN-based, collaborative framework that illustrates interagency, local sponsor, and stakeholder support for construction of created islands as a preferred option for management of dredge material

Environmental Resource management products will include:

- Published engineering design guidelines for using Natural and Nature-based features in USACE operations
- Published Engineering with Nature case study on managing upland confined disposal facilities to produce habitat benefits for endangered birds
- Published case studies that document using Endangered Species Act section 7(a)(1) and Engineering with Nature practices to address

- threatened and endangered species issues associated with navigation projects
- New quantitative model for modeling dynamics of episodic dredge material placement
- Peer-reviewed journal article on results from modeling study describing impacts of sediment plumes on fish population dynamics
- A Technical Report that integrates and uniformly characterizes a diverse number of EWN case studies, which are derived from USACE, other US practitioners and the international community

Risk management products will include:

- Peer-reviewed journal article: Preliminary constraints and considerations for mobile cap design
- Peer-reviewed journal article: Case study on sustainability improvements in support of navigation dredging program
- SOP for size fractionation of sediments to establish tolerance limits for DM test species
- Technical Report summarizing guidance for streamlining selection of DM bioaccumulation COCs
- Peer-reviewed journal article: Thin layer capping contaminant risk reduction case study
- Peer-reviewed journal article: Fate and effects of micro-plastics in bottom sediments
- Technical Note focused on incorporating Engineering with Nature practices into levee management resulting in minimized risks and enhanced ecosystem service benefits

DESCRIPTION OF WORK FOR FY 2019:

Sediment and dredging products will include:

- Sediment Profile Imaging methods for in-situ evaluation of dredged sediment accretion, consolidation and recolonization at aquatic placement sites
- Published guidance for applying radiochronology to accurately measure post-construction accretion in constructed and thin-layer placement wetlands
- Peer-reviewed publication on sediment aggregate erosion from open-water dredged material placement sites and the influence of these aggregates on sediment fate
- Prepare Engineering with Nature (EWN) Technical Note that describes the transport/fate of sediments directly and/or strategically placed for the purpose of maintaining created/restored marsh fringe areas

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$15,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation & Maintenance, Fiscal Year 2019

PROJECT NAME: Dredging Operations Technical Support (DOTS) Program – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2018
\$2,792,000	\$2,792,000	\$2,792,000	\$2,820,000 1/ 2/	\$2,820,000

AUTHORIZATION: 10 U.S.C. 2358 ("The Secretary of Defense or the Secretary of a military department may engage in basic research, applied research, advanced research, and development projects that are necessary to the responsibilities of such Secretary's department in the field of research and development.")

DESCRIPTION: The Dredging Operations Technical Support (DOTS) Program fosters a "one-door-to-the-Corps" clearinghouse for access to comprehensive information on technology related to navigation O&M functions, including technology demonstrations and training essential to all stakeholders involved in Federal and permitted navigation projects. DOTS is structured as a centralized source for technology transfer and is intended to maximize cost effectiveness and facilitate expeditious and consistent implementation of national policies and laws. The DOTS program's technology transfer function provides access to an extensive, up-to-date, consistent technology base whereby timely, proactive responses to technical issues can be made as they emerge. This approach promotes networking and solutions to common problems confronting the navigation dredging community. DOTS supports knowledge-based exchange of information throughout the interagency coordination process. DOTS fosters productive, collaborative relationships with other federal and state agencies with missions relevant to navigation. The DOTS Program also fosters application of new and existing technologies and ongoing research for high priority problems identified by field offices, including short-term work efforts to address generic Corps-wide technical problems encountered during maintenance of navigable waterways and infrastructure.

The Dredging Innovations Group (DIG), within DOTS, fills an important functional gap for the Corps Dredging Program through highly responsive and adaptive management for the delivery of innovative solutions to the most pressing problems and evolving issues affecting the execution of the Corps' navigation mission. The DIG engages Corps interests to anticipate and identify priority problems, needs, and opportunities; address requirements; translate R&D program knowledge and products into best practice; lower technical execution barriers under changing conditions; inform decision-making with credible, defensible science; and build and sustain USACE institutional capacity.

Annual funding is used to:

- Continue expansion of technical response support to field offices encountering problematic navigation and dredging issues and increase vital investments in training of Corps staff in dredging and other navigation mission processes
- Conduct face-to-face training sessions at the regional level. Tailor the training to meet regional needs including sessions providing dredged material management, in-water assessment and management, upland and aquatic placement, regional threatened and endangered species dredging issues, and emerging research and development from the Dredging Operations Environmental Research Program.

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- Continue to sponsor the Webinar Series which has proven to be an efficient and effective technology transfer mechanism to communicate advances in the navigation and dredging community.
- DOTS and DIG will continue to document good navigation and dredging practices to be shared across the Corps.
- DOTS and DIG will continue to be proactive by updating existing tools and databases to maintain functionality and compatibility with emerging Information Technology requirements.
- DIG will continue technology transfer and dissemination of significant research findings to dredging practitioners at all levels of Corps management.

ACCOMPLISHMENTS IN FY 2017:

- Conducted one face-to-face training session at the regional level.
- Continued to support the collaborative effort of the Corps and U.S. Environmental Protection Agency (USEPA) to update and combine the Inland and Ocean Testing Manuals. These documents have not been revised since the 1990's and are being revised to reflect the various advancements related to testing, evaluation and management of dredged material. The final product will be published as a joint Corps-USEPA document which will be disseminated widely.
- Updated specific DOTS databases and models and modernized associated websites. Focused on the platforms which provide data related to environmental residue effects. The Automated Dredging and Disposal Alternatives Management Systems (ADDAMS) model is a set of continually evolving, state-of-the-art computer- based tools that increase the accuracy, reliability, and cost-effectiveness of dredge material management activities in a timely manner. Updated ADDAMS to address compatibility of executable files with modern computers.
- Pursued rollout of an enhanced version of the dredge fleet scheduling optimization model to all six of the Pacific coast Districts (Los Angeles, San Francisco, Portland, Seattle, Alaska, and Hawaii) as well as to all of the South Atlantic Division (Wilmington, Charleston, Savannah, Jacksonville, and Mobile Districts). Both efforts were at the request of field-level practitioners seeking to inform their dredging business practices and budget development processes via the robust mathematical formulations and insights afforded by the dredge fleet scheduling model. Conducted data gathering efforts for project dredging requirements, environmental work windows, and dredge fleet production rates and costs in close coordination with district practitioners.
- Conducted several data mining studies using readily available archival databases of Corps dredging activities. These data sets included those of the Dredge Quality Management (DQM) program as well as the DOTS-funded Ocean Disposal Database. Both databases are structured and offer a wealth of information concerning historical trends and baseline performance measures that could be used to inform dredging operations.

They also served to inform high-level, programmatic questions concerning the overall efficiency and cost-effectiveness of the Corps dredging program in support of the Navigation mission. Completed a separate effort extracting historic, quantitative dredging data from scanned versions of the annual Chief of Engineers' Reports to Congress dating to the early 20th century.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$3,000. There was an additional \$40,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Earthquake Hazards Reduction Program – Flood and Coastal Storm Damage Reduction

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$270,000	\$270,0000	\$ 99,000	\$300,000 1/ 2/	\$300,000

AUTHORIZATION: This program is being conducted under the authority of Public Law 101-614, November 1990, National Earthquake Hazards Reduction Program Re-Authorization Act.

DESCRIPTION: The objective of Public Law 101-614 is to establish and initiate, for buildings and lifelines, a systematic approach designed to reduce the loss of life, reduce injuries and to reduce the economic costs resulting from earthquakes occurring in the United States. This program also supports the Seismic Safety Committee which is made up of expert structural engineers, geotechnical engineers and geologist.

These funds are used to develop and implement a Seismic Safety Action Classification System (SSAC) for buildings. This program provides evaluation procedures for ranking civil works buildings in order of greatest seismic risk. This program will meet the executive order requirements, while continuing to develop technical seismic building evaluation and mitigation procedures. Funds are also used to provide seismic input to Headquarters publications as needed, provide interpretation of seismic codes and criteria as needed, maintain technical seismic expertise, supplement development of guidance for seismic design of Civil Works projects, address lifeline systems not previously covered in commercially available standards or existing USACE guidance, and to develop guidance for operations personnel.

Over 12,000 owned buildings and powerhouses have been inventoried. Seismic screenings of over 700 buildings in all seismic regions have been accomplished. Seismic evaluations have been performed on over 200 buildings and powerhouses in various geographic regions, primarily in high and moderate seismic regions. Reports have been developed for FEMA to be forwarded to Congress on buildings and powerhouses. Criteria has been developed and published for the evaluation and mitigation of buildings and lifelines. In addition, building evaluation criteria, powerhouse evaluation criteria and lifeline criteria for intake towers, navigation locks, and powerhouses have all been developed. Seismic evaluation and mitigation seminars have been conducted for district and division personnel. Technical support has been provided to the districts and divisions in accomplishing evaluations.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$28,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Fish & Wildlife Operating Fish Hatchery Reimbursement 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$4,653,000	\$5,346,000	\$5,346,000	\$5,400,000 2/ 3/	\$5,400,000

AUTHORIZATION: Public Law 111-85

DESCRIPTION: The U.S. Fish and Wildlife Service (USFWS) was authorized by Congress in 2008 to seek reimbursement from the U.S. Army Corps of Engineers (Corps) for operation and maintenance costs incurred by National Fish Hatchery System for mitigation of certain Corps dam projects which typically predated the National Environmental Policy Act. Subsequent congressional direction as well as concurrence by the Office of Management and Budget and the Assistant Secretary of the Army for Civil Works has resulted in a specific line item in the Corps budgets to meet the Corps mitigation requirements. This funding is transferred to the USFWS to produce and release approximately 12 million mitigation fish at 45 different receiving waters impacted by 37 Corps dams to meet mitigation requirements.

1/ The costs of this activity are accounted for between the Flood Risk Management and Hydropower business lines.

2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$0. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$ 0.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance

PROJECT NAME: Facility Protection – Flood and Coastal Storm Damage Reduction

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
3,965,000	3,960,000	3,960,000	4,500,000 1/ 2/	4,500,000

DESCRIPTION: This funding supports security risk assessment and prioritization efforts for Civil Works projects in order to enhance project security, protection, and resilience and mitigate risks against physical and cyber security threats and ultimately to improve the risk profile of Civil Works projects. As established by ER1110-2-1156 (Dam Safety Policy and Procedures), the CIPR program security risk assessment framework is fully aligned with national policy defined by Presidential Policy Directive PPD-21, Critical Infrastructure Security and Resilience, Executive Order 13636, Improving Critical Infrastructure Cyber Security, Executive Order 13800, Strengthening the Cybersecurity of Federal Networks and Critical Infrastructure, and Presidential Policy Directive PPD-8 National Preparedness Goal. These goals will be attained by developing solutions, methodologies, and tools to address key vulnerabilities to manmade incidents, implementing effective programs to minimize consequences, improving the response and recovery capabilities, and prioritizing life-cycle investments. In future Budgets, efforts will be made to capture all cybersecurity funding within a single cybersecurity line item.

FY2019 funding will be used to support risk management efforts under the Critical Infrastructure Protection & Resilience (CIPR) Program to: develop and maintain web-based engineering analysis tools and capabilities supporting screening, prioritization, and characterization of dam critical assets (Corps of Engineers Security Assessment Tool, CESAT); support the development of blast analysis and consequence assessment studies at Corps Civil Works projects for the conduct of Common Risk Model for Dams (CRM-D) physical security risk assessments; develop and implement a comprehensive training program that incorporates engineering tools and risk analysis methods supporting the implementation of CRM-D security risk assessments at Civil Works projects; and; support emergency preparedness and response activities to enhance resilience at Civil Works critical infrastructure projects for all-hazard conditions.

In FY2018, the USACE CIPR program will implement the 2018 consequence-based screening and prioritization efforts at USACE Civil Works projects using the Dams Sector Consequence-Based Top Screen (CTS) methodology to identify and prioritize those high-consequence (critical) facilities in USACE’s Civil Works portfolio whose potential failure, damage, or disruption could lead to the most severe impacts to the Nation’s public health and safety, economy, and/or national security. This identification and relative prioritization informs which projects represent the highest priority to conduct CRM-D security risk assessments, and guides USACE’s Critical Infrastructure Cyber Security Center of Expertise (CICS CX) efforts in the prioritization of cyber security accreditation activities on industrial control systems associated to Civil Works projects to meet the requirements to achieve “Authority to Operate”. Additional accomplishments in FY2018 will include: sustained enhancements of web-based capabilities (Corps of Engineers Security Assessment Tool); the development of consequence and interdependency-analysis studies at Civil Works projects as part of consequence-based screening efforts; training of the USACE Common Risk Model for Dams (CRM-D) security risk

assessment methodology to MSC/District security and operations personnel; subject-matter support to MSCs and Districts on CRM-D implementation at USACE Civil Works projects; and, interagency collaboration with Department of Homeland Security Office of Infrastructure Protection and Office of Cybersecurity and Communications, and other Dams Sector stakeholders on implementation of national critical infrastructure security and resilience program initiatives.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$88,000. There was an additional \$605,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$100,000.

2/ There was no Conference Amount available at the time this J-sheet was prepared. The amount shown is the President's budget amount for FY 2018.

APPROPRIATION: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Inland Waterway Navigation Charts – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$3,945,922	\$4,455,000	\$4,455,000	\$4,500,000 1/ 2/	\$4,500,000

AUTHORIZATION: Public Law 85-480, approved 2 July 1958, authorizes the Commander, U.S. Army Corps of Engineers (Corps) to publish information pamphlets, maps, brochures, and other material on river and harbor, flood control, and other civil works activities, including related public park and recreation facilities that may be of value to the general public.

DESCRIPTION: The Corps provides Electronic Navigational Chart (ENC) data for all inland waterways and other federal navigation channels maintained by the Corps to be used by commercial Electronic Chart Systems (ECS), which when combined with the existing Differential Global Positioning System (DGPS), will improve the safety and efficiency of marine navigation in both inland and coastal waterways of the United States. The use of ENC data with commercial ECS will allow for safe navigation through bridge openings during fog and other bad weather conditions as well as during heavy traffic situations, and provide an accurate base display for other systems such as radar and Automatic Identification Systems (AIS).

Within inland waterways (rivers), the Corps is responsible for the creation and provision of navigation charts in both paper and electronic format. Where the paper chart products are updated every 2-5 years, the Inland Electronic Navigational Chart (IENC) data are updated on a monthly basis, and as such, help to tremendously improve safety of navigation. The IENC data format is based on the S-57 international data exchange format, the electronic data transfer standard prepared by the International Hydrographic Organization, however additional inland features have been added to the standard to allow for proper encoding of all real-world features. The IENC standard is consistent with electronic chart products produced by the National Oceanic and Atmospheric Administration (NOAA) and the chart products produced by the two agencies are coordinated for compatibility in adjoining areas. The Corps also coordinates with the U.S. Coast Guard for aids to navigation information and collaboration on rules for chart carriage by inland waterway users.

In coastal and Great Lakes areas, the Corps produces and provides standardized channel condition chart products and hydrographic survey data to NOAA, which ensures consistent and reliable information to NOAA for chart updates, in accordance with Water Resources Development Act of 2000, Section 558. The standardization of these products has been made possible through the implementation of eHydro, which uses Navigation Channel Framework (NCF) as its foundational data. NCF is a GIS geodatabase which contains channel limits, construction centerlines, top of slope lines, channel reach positions, and inside channel quarters for all Corps-maintained navigation channels. In addition to providing foundational data for eHydro, NCF supports the Dredging Quality Management program, and other applications and connects to the Corps Project Notebook, providing consistent inventory of projects and subprojects across the Navigation business line.

HQUSACE

Inland Waterway Navigation Charts

Such development and publication activities are in accordance with National Transportation Safety Board recommendations to the Corps, and subsequent commitments made by the Chief of Engineers.

ACCOMPLISHMENTS IN FY 2017: Updated and maintained 107 navigational charts on a monthly basis. On a weekly basis, charted over 12,000 buoy locations provided by the US Coast Guard. Produced all 107 charts and made them available for download on the IENC web site. Provided over 1 million chart downloads to public through Amazon Web Services. Held annual IENC Program Review meeting to review all aspects of the program including quality control and new data collection collecting new features for charts. Presented IENC briefings at several national conferences. Attended international meetings regarding inland standards. Made all paper navigational charts available for Print On Demand through the Government Publishing Office website. eHydro application and reporting formally implemented and operational through a Daily Tasking Order, involving 22 Corps Districts with coastal navigation missions. The NCF was reported and completed for High and Moderate use channels; began integrating low use waterways into NCF. Further developed the Navigation data portal for reporting all surveys and NCF. Began operational status of eHydro for inland waterways on a voluntary basis.

DESCRIPTION OF WORK FOR FY 2018: Continue to update all existing IENCs on a monthly basis. Subject to chart production software capability, convert charts from IENC 2.3 to IENC 2.4 Product Specification. Continue to develop an on-line IENC Quality Control interface, which will allow Districts to submit new source, Chart Producers to integrate source into History Files, and Districts to perform Quality Assurance to verify that source updates were correctly implemented. Continue international coordination to include the development of IEHG S-401, the product specification for IENCs that aligns with the International Hydrographic Organization's S-100 Universal Hydrographic Data Model. S-401 development is anticipated to be a long-term (5 year) task, as migration to S-401 cannot occur until S-101, the Electronic Navigational Chart Product Specification (for maritime) is completed. Continue increasing inland Districts utilizing eHydro and continue populating eHydro (all Districts) with new survey data in a timely manner. Produce IENC overlay files for the U.S. Coast Guard (USCG) using survey data downloaded from eHydro; overlays aid the USCG in more accurate buoy placement and increase safety to navigation.

DESCRIPTION OF WORK FOR FY 2019: Continue to update all existing IENCs on a monthly basis. Migrate all IENC maintenance to the same software platform: CARIS Hydrographic Production Database (HPD). Expand the capability of the on-line IENC Quality Control interface to include direct linkage to CARIS HPD. Continue international coordination to include the development of IEHG S-401, the product specification for IENCs that aligns with the International Hydrographic Organization's S-100 Universal Hydrographic Data Model. S-401 development is anticipated to be a long-term (5 year) task, as migration to S-401 cannot occur until S-101, the Electronic Navigational Chart Product Specification (for maritime) is completed. Full integration of all District survey data into eHydro. Expand IENC overlay coverage for USCG use in the placement of buoys. Begin developing a mechanism for providing similar IENC overlay products to the towing industry. Continue technical assistance to districts and end users.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$20,000. There was an additional \$460,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

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Inland Waterway Navigation Charts

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Inspection of Completed Federal Flood Control Projects – Flood and Coastal Storm Damage Reduction

Allocation in FY 2014	Allocation in FY 2015	Allocation in FY 2016	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$27,720,000	\$27,720,000	\$30,196,000	\$20,000,000 1/ 2/	\$20,000,000

AUTHORIZATION: Section 221 of the Flood Control Act of 1970, as amended (84 Stat. 1831, 42 U.S.C. 1962d-5b).

DESCRIPTION: This funding is used to perform risk screenings and risk assessments of authorized U.S. Army Corps of Engineers (USACE) flood and storm damage reduction projects (primarily levees, but also associated features such as channel work in some cases) to determine whether these projects are able to perform as intended in a flood. USACE uses this information to help stakeholders better understand their flood risk. These funds will also be used for related programmatic activities, including development of guidance, development of technical competencies including training, and coordination with FEMA and other stakeholders. USACE also uses this information to guide the development of options for improving the flood risk management program.

OTHER INFORMATION: Pursuant to Section 221 of the Flood Control Act of 1970, as amended, USACE enters into a written agreement with the non-federal sponsor, before undertaking a water resources project, which identifies the responsibilities of each party. These "items of local cooperation" include that the non-Federal sponsor will be responsible for all future operation, maintenance, repair, replacement, and rehabilitation work, and associated costs.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$122,000. There was an additional \$897,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation & Maintenance

PROJECT NAME: Monitoring Completed Navigation Projects (MCNP)

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018	Budgeted Amount for FY 2019
\$7,920,000	\$6,440,000	\$7,920,000	\$ 3,300,000 1/ 2/	\$ 3,900,000

AUTHORIZATION: Authorization for the Corps of Engineers Engineer Research and Development Center (ERDC) to conduct R&D is codified in 10 U.S.C. 2358 ("The Secretary of Defense or the Secretary of a military department may engage in basic research, applied research, advanced research, and development projects that are necessary to the responsibilities of such Secretary's department in the field of research and development.")

JUSTIFICATION: These monitoring efforts, governed by Engineer Regulation 1110-2-8151 (Monitoring Completed Navigation Projects [MCNP]), are essential for providing data for efficient and effective management of critically important Federal shallow- and deep-draft navigation projects and infrastructure for both national economic and military sealift security reasons. The Corps operates and maintains more than 1,000 navigation projects encompassing more than 25,000 miles of waterways. The Corps requires a national program to identify the best navigation project practices, and to use them to improve all other navigation project performance. Optimizing Civil Works navigation infrastructure performance requires that they be monitored upon completion, evaluated against preconstruction and present needs, and lessons learned translated into proactive operations management and design guidance for Corps Districts. Information gained from the MCNP program, including changes in sediment transport, water levels, currents, waves, flushing, river flows, ice, structure deterioration, and other coastal and river hydraulic phenomena with associated marine transportation and environmental impacts, will be used to verify design expectations, determine benefits, and identify operational and maintenance efficiencies. Information collected will significantly improve projects' performance, and optimize opportunities for marine transportation and environmental enhancement. The MCNP program collects valuable navigation data, documents successful designs, disseminates data and lessons learned on projects with problems, and provides upgraded field guidance for solutions that will reduce life-cycle costs on a national scale.

The MCNP program includes development of a real-time monitoring capability of the navigation system through River Information Services, to improve inland navigation reliability and address the Administration High Priority Performance Goal for USACE Navigation that calls for decreasing unscheduled navigation lock closures on the inland waterways. Additionally, MCNP enhances research and development specific to Navigation Structures and USACE Infrastructure to link the knowledge gained through navigation project monitoring with emerging technology and materials, to reduce unscheduled repairs and increase system efficiency and reliability. No other programs in the USACE or Federal sector address these critical requirements. Non-destructive techniques for Structural Health Monitoring (SHM) are being developed to provide damage detection and condition assessment tools and technologies for structural managers. Application of such tools and techniques for SHM at large civil navigation infrastructure has been exceedingly limited. Low-cost and rapidly deployable systems and tools also are being developed to assess biological characteristics of USACE low-use locks and dams to assist managers in operating USACE infrastructure optimally for navigation, recreation, and ecosystem benefits.

Shallow- and deep-draft navigation projects located in ports, harbors, rivers, reservoirs, lakes, estuaries, and in the coastal zone are included in this program. Projects that provide maximum cost savings are identified, and those that best address high-priority life-cycle O&M project cost savings are selected for monitoring and evaluation. The Corps Districts and the Engineer Research and Development Center develop monitoring plans jointly.

Engineer Research and Development Center

Monitoring Completed Navigation Projects

Coordination between the Corps and other Federal, state, and local agencies and with industry is essential for proper accomplishment of this program. In addition to satisfying Corps' requirements, the data are made available through publications and electronic technology transfer, and will be of great value to local, state, and other Federal agencies with navigation management policies. Results are communicated immediately to other member agencies of the Marine Transportation System (MTS).

DESCRIPTION OF WORK FOR FY 2018:

Focus Area 1: Monitoring Existing Structures

Reliability Analysis of Coastal Rubble-Mound Structures

- Complete StormSim software components for Monte Carlo simulation of storms by computing response for various performance functions with either empirical equations or numerical hydrodynamic software, and compute reliability for each performance function and each limit state.
- Enhance rubble-mound structure analysis methods (numerical, empirical) by reducing epistemic uncertainty to improve reliability of coastal structures.
- Conduct model experiments in existing physical model to improve uncertainty estimates in the application of empirical relationships for computing primary stability responses of jetty structures.

Monitoring Fiber Reinforced Polymer (FRP) Composite Material Demonstrations at Navigation Lock and Dams

- Continue conducting inspections of 8 field demonstrations of different FRP composites, and document weathered conditions.
- Develop inspection protocols to be used by field site personnel for future material inspections.
- Continue all laboratory-scale long-term testing, and correlate all field and laboratory FRP data.
- Continue development of all material degradation prediction algorithms and plots.

Navigation Pile-Dike Structures: Monitoring for Repair and Maintenance Guidance (new study initiated FY18)

- Survey coastal and Great Lakes District offices for locations and types of pile-dike structures 50-100 years old to implement asset management, requested by USACE Coastal Navigation Structure Asset Management (CNSAM) team for Operational Condition Assessment (OCA).
- Initiate on-the-ground visual and photographic documentation of deterioration and partial failures to ascertain functional condition, to the point of requiring full replacement.
- Begin developing techniques for determining best repair and replacement options for various structure types.
- Initiate formulation of design elements to prioritize pile-dike repair actions and prevent critical structure failure.

Focus Area 2: River Information Services (RIS)

Enhancing Inland Waterway and Traffic Information to Users

- Continue interagency and international work to implement RIS services in alignment with existing standards and guidelines. Participate in applicable bodies to provide USACE input on new and evolving standards and guidelines.
- Participate in PIANC WG125 "River Information Services" to work on updates to PIANC RIS guidelines incorporating output of WG156, and ensure that USACE requirements are addressed in the new Guidelines.
- Establish and conduct RIS test beds and pilot projects under the IMTS BoD, and provide recommendations on development of RIS capabilities to be implemented USACE-wide based on outcomes of the pilot projects.

Engineer Research and Development Center

Monitoring Completed Navigation Projects

- Expand on prototype industry reporting portal and RIS data exchange framework based on lessons learned in FY17.

Focus Area 3: Structural Health Monitoring (SHM)

Advancing Structural Health Monitoring (SHM) Methods for USACE Infrastructure

- Enhance trunnion friction system to include uneven hoisting monitoring capability.
- Demonstrate combined spillway gate trunnion friction and uneven hoisting monitoring systems at 1 to 3 District sites.
- Expand spillway gate trunnion friction monitoring to include non-conventional strut arm geometries.
- Model and demonstrate crack initiation on a miter gate, leveraging existing SMART Gate systems.
- Investigate efficient methods for predicting crack growth and remaining life for lock gates based on sensor data.
- Update expired design guidance for modeling fatigue in miter lock gates.

DESCRIPTION OF WORK FOR FY 2019:

Focus Area 1: Monitoring Existing Structures

Reliability Analysis of Coastal Rubble-Mound Structures (study will conclude in FY19)

- Will include beach morphology into Monte Carlo life cycle modeling of structure reliability.
- Will quantify uncertainty of reliability by application of optimized forcing through design of experiments techniques.
- Will expand stochastic forcing methodologies to additional types of coastal structures (breakwaters and groins).
- Will provide design guidance update through the Guidance Update and Maintenance Program (GUMP) for computed response and reliability for primary failure modes of rubble-mound coastal structures.
- Will incorporate design guidance into USACE Coastal Engineering Manual (CEM) for application by the Coastal Navigation Structure Asset Management (CNSAM) product delivery team. Design guidance will be available for Facilities Equipment Management (FEM) users, and for the Operational Condition Assessment (OCA) team for critical decisions regarding Asset Management Rehabilitation and Maintenance funding.
- Reliability analysis guidance for rubble-mound coastal structures will be applicable for desktop computing by USACE District Design Engineers.

Monitoring Fiber Reinforced Polymer (FRP) Composite Material Demonstrations at Navigation Lock and Dams

- Will continue to conduct inspections at 8 field demonstrations of different FRP composites, and document weathered conditions.
- Will assign field demonstration materials to a continued bi- or tri-annual performance inspection based on performance to date.
- Will train field site personnel on previously developed inspection protocols to perform performance inspections.
- Will finalize most of the laboratory-scale long-term testing and correlate all field and laboratory FRP data.
- Will continue to weather and test a few remaining samples on a yearly basis, as deterioration results indicate appropriate.
- Will finalize material degradation prediction algorithms and plots, and prepare Technical Report to include all data and results obtained to date.
- Will provide study results and recommendations for update to field guidance for use of FRP composite materials as various components of navigation locks.

Navigation Pile-Dike Structures: Monitoring for Repair and Maintenance Guidance

- Will complete on-the-ground visual and photographic documentation of deterioration and partial failures to ascertain functional condition.

Engineer Research and Development Center

Monitoring Completed Navigation Projects

- Will determine whether existing design is optimal for stabilizing channel morphology, reducing O&M dredging, and protecting dredged material placement sites and shallow water habitat.
- Will continue development of techniques for determining best repair and replacement options for various structure types.
- Will ascertain relationship between shallow water habitat (i.e., juvenile salmonids) and different types of pile dike structures, both of which are in danger without major maintenance repair.
- Will continue development of functional design guidance and repair evaluation methods so that Operational Condition Assessment (OCA) by Asset Management can prioritize repair or replacement.
- Will ensure guidance covers various design elements, critical structure failure mechanisms, functional losses related to structural failure, and optimal methods for repairing or replacing pile-dike structures.

Focus Area 2: River Information Services (RIS)

Enhancing Inland Waterway and Traffic Information to Users

- Will conduct test beds in support of RIS development, and integrate capabilities developed with existing RIS key technologies and services.
- Will continue interagency and international work to develop and implement RIS services. Will participate in applicable standards bodies to provide USACE input on new and evolving standards and guidelines.
- Will make capabilities developed available through web services and cloud capabilities. Will begin migration of RIS capabilities to the cloud environment.

Focus Area 3: Structural Health Monitoring (SHM)

Advancing Structural Health Monitoring (SHM) Methods for USACE Infrastructure

- Construct prototype lifecycle performance model for a multi-purpose lock project that takes in inspection information and sensor data and outputs predicted performance over time.
- Develop method for efficiently computing remaining fatigue life of Hydraulic Steel Structures (HSS) which avoids High Performance Computer (HPC) usage by USACE District Design Engineers.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$25,000. There was an additional \$291,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this J-sheet was prepared. The amount shown is the President's budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: National Coastal Mapping Program - Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$6,511,280	\$6,737,000	\$6,237,000	\$6,300,000 1/ 2/	\$6,300,000

AUTHORIZATION: Section 516 of Water Resources Development Act of 1996

DESCRIPTION: The National Coastal Mapping Program (NCMP) is the only Federal coastal mapping program that produces regional, operational data along the coast of the U.S. on a re-occurring basis. Regional Sediment Management and Quantifying Coastal Resilience requires regional measuring and monitoring to provide engineering, environmental, and economic data and information for decision makers and managers. No other program in the Corps (or other Federal agencies) provides consistent, re-occurring, regional data to characterize physical, environmental, and economic conditions along the shoreline, and their changes over time. Quantification of regional conditions and changes leads to improved management practices of entire regions and projects within those regions. Without these data, the Corps cannot fulfill its goal of a resilient, systems approach to coastal management, including navigation, coastal flood risk reduction, and ecosystem restoration projects. The National Coastal Mapping Program also continues evolution of technologies for regional characterization and change detection of engineering, environmental, and economic conditions along the shoreline. Coastal Zone Mapping and Imaging Lidar (CZMIL) advances the state-of-the-art in data exploitation workflows, algorithms, hardware, and software, and provides a sustained focus and collaboration among academia, industry, and the federal government to constantly review, refine, and expand our capability to produce a wider range of engineering, environmental, and economic data and products over a broader range of operating environments.

Since 2004, the NCMP has collected re-occurring data along the Gulf of Mexico, Atlantic, Great Lakes, and Pacific coasts. The data collected during these surveys have been developed into products that are widely used by the Corps for regional sediment management, regulatory, flood damage reduction, asset management, emergency operations, and environmental stewardship in the coastal zone, and by other agencies: for the FEMA RiskMap modeling efforts; the USGS Coastal and Marine Geology Program's National Assessment of Shoreline Change and extreme storm studies; and National Oceanic and Atmospheric Administration (NOAA) nautical chart production. NCMP funding is used to extract new information products quantifying shoreline, sediment volume, infrastructure, and habitat changes from consecutive datasets collected on the Great Lakes (Ontario, Erie) shorelines from 2006 to 2011. Survey data help quantify coastal changes that have occurred since previous surveys for the formulation of sediment budgets, quantifying area change of sensitive habitats like submerged aquatic vegetation and wetlands, identifying patterns of erosion and accretion, and for assessing the condition of coastal infrastructure. The data are made available to the public through NOAA's Digital Coast website and to emergency responders through the USGS Hazard Data Distribution System and are also used to inform formulation of plans for potential new projects as well as for management of existing Corps assets. State and local agencies use the data for shoreline management, environmental permitting, emergency management, marine spatial planning, and planning for resilient communities. The CZMIL effort has resulted in new airborne technologies and supporting software that improves operational efficiency, decreases time between data collection and final decision-support product, expands the variety of products derived from the basic datasets in a data fusion approach, improves performance in very shallow and turbid waters, improves navigation hazard detection, and improves overall data accuracy. Development

Division: South Atlantic

District: Mobile

National Coastal Mapping Program

under CZMIL focuses on automating extraction of key operational metrics like dune vegetation density and submerged aquatic vegetation density and metrics to support evaluation of functional performance of navigation structures. Evolution of airborne hardware will improve performance on navigation structures and improve accuracy of data in challenging conditions like turbid water, shallow water, muddy seafloor, and glassy water surface. Evolution of processing software will produce uncertainty metrics for lidar bathymetry that can be propagated into engineering analyses, and shorten timelines between data collection and product delivery. Hardware and software evolution will improve operational and processing efficiency.

ACCOMPLISHMENTS IN FY 2017: Funds were used to continue NCMP survey operations on the U.S. East Coast. These survey operations will collect the third consecutive engineering and environmental dataset for the US Atlantic Coast (2005, 2010, 2017). This will be the first regional coastal survey in the Federal Government to document coastal recovery of areas impacted by Hurricane Sandy.

DESCRIPTION OF WORK FOR FY 2018: Funds are being used to commence NCMP survey operations on the U.S. Great Lakes shorelines. These survey operations will collect the third consecutive engineering and environmental dataset for the Great Lakes (2006-2008, 2011-2013, 2018-2020).

DESCRIPTION OF WORK FOR FY 2019: Funds will be used to continue NCMP survey operations on the U.S. Great Lakes shorelines. At the current level of funding, the program takes 7 years to cover the sandy shorelines of the U.S. Coast. These survey operations will collect the third consecutive engineering and environmental dataset for the Great Lakes (2006-2008, 2011-2013, 2018-2020).

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$1,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this J-sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation & Maintenance

PROJECT NAME: National Dam Safety Program (Portfolio Risk Assessment)

Allocation FY 2015	Allocation FY 2016	Allocation FY 2017	Presumed Allocation FY 2018	Budgeted Amount FY 2019
\$10,000,000	\$9,900,000	\$9,900,000	\$10,000,000 1/ 2/	\$10,000,000

AUTHORIZATION: Section 2 of National Dam Inspection Act of 1972, P.L. 92-367 (authorized the Secretary of the Army to inspect dams across the country, to create the National Inventory of Dams and to provide recommendations for a national program for the inspection and regulation for the safety of dams), Section 215 of the Water Resources Development Act of 1996, P.L. 104-303 (establishing National Dam Safety Program, directing implementation of Federal programs to enhance dam safety); Section 1 of Dam Safety Act of 2006, P.L. 109-460 (directing Secretary of the Army to maintain national inventory of dams including requiring inclusion of condition assessments performed by agency); Section 3001 of Water Resources Reform and Development Act of 2014 , PL 113-121 (reauthorizing National Dam Safety Program).

DESCRIPTION: Nationwide Corps program that helps reduce risks of loss of life and property damage that would occur from failure of a Corps dam. The NDSP accomplishes this through the direction and management of Corps-wide Portfolio Risk Assessment (PRA) efforts by the Risk Management Center (RMC) and implementation of a risk analysis program for all Corps dams, including recurring mapping and interim risk reduction work. The Corps has 715 dams and appurtenant structures located at 555 projects. For each of these dams, the risk assessment provides estimates of the probability of failure and consequences by each initiating event. In addition, risk reduction measures are formulated and their cost and effectiveness estimated. The results of the detailed PRA's are used at the national level to further formulate study plans, identify appropriate corrective actions, and determine the urgency of such actions. The program also supports updates to the Dam Safety Investment Plan (DSIP) with the goal of determining short-term and long-term strategies for modification and repair of the dams in the portfolio that pose the highest risk. The DSIP is used to demonstrate how these strategic investments reduce the overall risk of the portfolio in the most efficient and cost-effective manner. The NDSP also supports other advancements in technical areas related to dams such as investigations of dam internal erosion, filtering materials, seepage and piping incidents, dam grouting, spillway systems reliability, dam instrumentation, and hydrologic methodology development. The NDSP also helps ensure our technical manuals and policy guidance keeps pace with the state-of-the-art in these disciplines.

Through the funding provided for this program since FY 2011, the Corps has completed 232 Periodic Assessments (PA), representing about 42% of the 555 Corps projects; and addressed Independent External Peer Review (IEPR) comments from the FY 2013 IEPR review.

ACCOMPLISHMENTS IN FY 2017: In FY 2017, 43 Periodic Assessments (PA) were completed, representing about 6% of the dams that the Corps owns and operates nationwide. The Corps also completed another IEPR review, performed consistency reviews on 61 Semi-Quantitative Risk Assessments (SQRA) and PA reports, completed instrumentation reviews on 7 dams, completed MMC modeling and consequence products on 57 dams, published two Engineering Manuals, and funded or partially funded five workshops attended by staff from across the Corps.

DESCRIPTION OF WORK FOR FY 2018: In FY 2018, 51 PAs are planned to be conducted, representing about 7% of the Corps dams. Funding will also be used for program and quality management, training to maintain Corps staff technical competency, policy and guidance development, consistency reviews on SQRA and PA reports, responses to and implementation of IEPR comments, data management, risk assessments, and technical and programmatic support for dam safety activities.

HQUSACE and Institute for Water Resources

National Dam Safety Program

DESCRIPTION OF WORK FOR FY 2019: FY 2019 funds will be used to address independent National Dam Safety Program (NDSP) review comments regarding emergency preparedness and the need for improvements to instrumentation and monitoring programs; and to fund additional training to maintain dam safety expertise in our PA facilitators and dam safety experts. The Corps will also continue detailed risk analysis on the highest risk dams in the portfolio and identify appropriate studies and corrective actions. Periodic Assessments are planned for 50 dams in the portfolio. The program will continue support of ICODS and Corps membership and participation in various national and international dam organizations; will continue to provide trained PA Facilitators to assist districts in completing their PAs; continue training on dam safety related topics; continue updates to the hydrologic loading study methodology; will continue to fund the Modeling, Mapping, and Consequences Center's work to complete dam modeling, inundation mapping, and consequence work products in support of the PAs; and will continue to support updates of Corps dam safety policy and technical manuals (Engineering Regulations, Manuals, Circulars, etc.) such as Safety of Dams – Policy and Procedures, spillway design, cutoff wall construction, seismic design considerations, dewatering system design and construction, and temporary cofferdam design.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$99,000. There was an additional \$1,021,158 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance

PROJECT NAME: National Emergency Preparedness Program (NEPP) – Emergency Management

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
4,500,000	\$4,455,000	\$4,484,000	\$5,500,000 1/ 2/	\$5,500,000

AUTHORIZATION: Executive Orders 10480 and 12656, National Security Presidential Directive-51/Homeland Security Presidential Directive-20 (NSPD-51/HSPD-20), the National Continuity Policy Implementation Plan (NCP/IP) and the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 USC 5121 et seq.

DESCRIPTION: In accordance with NSPD-51/HSPD-20 and the NCP/IP, the NEPP program ensures the Corps is ready to respond rapidly to a catastrophic disaster, should one arise, whether caused by natural phenomena or man-made disaster (acts of terrorism), and includes planning to provide for continuity of operations of the Corps and government missions during such a disaster. More specifically, these funds ensure that the Corps' work force is capable of shifting from routine missions to crisis operations, with the organizational command and control structure(s) necessary to provide a coordinated comprehensive response in the critical early stages of a catastrophic disaster. Preparedness activities supported by these funds include development of national level preparedness plans; training employees; and conducting national level training exercises, including support to Federal Emergency Management Agency (FEMA) exercises and coordination within DOD, other Federal agencies, and state and local governments. Preparation also includes the USACE Headquarters sponsored Corps-wide programs necessary to provide the capabilities and operational command and control required by Corps field commands in order to accomplish their NEPP responsibilities, both routinely and in specific emergency response situations. NEPP builds upon, but differs from, the preparedness work that the Corps performs with the funding provided through the Flood Control and Coastal Emergencies (FCCE) appropriation. The two programs are complementary.

With Fiscal Year 2017 funds, the Corps conducted training, exercises and completed catastrophic plans development. We executed our base program activities and labor and performed National Exercise Program (NEP) building block activities in preparation for National Level Exercise (NLE) 2018, Gotham Shield 2017 in conjunction with Vibrant Response 17 and Ardent Sentry 17 focusing on an Improvised Nuclear Device scenario in New York City/New Jersey, and National Disaster Recovery Framework recovery exercises, New Madrid Seismic Zone planning and exercises, as well as Cascadia Subduction Zone planning, Power Grid Catastrophic Planning (Mass Power Outage Annex) with state and interagency partners in the Pacific Northwest, Catastrophic planning for Guam Typhoon Annex, in conjunction with FEMA's 5-year Plan Alignment and HQ Continuity of Operations Program (COOP)/Devolution Plan during Eagle Horizon 17. Training included five USACE Urban Search & Rescue Structures Specialist training classes attended by both USACE and other National disaster response teams.

Fiscal Year 2018 funds are being used to execute the base program for NEPP activities and labor. FY 2018 activities include training, catastrophic disaster planning and the execution of the National Level Exercise (NLE). NLE 2018 is designed to evaluate interagency partners at all levels: federal, state, local, tribal and private sector. In addition, we support Ardent Sentry 18 that tests and validates DOD's ability to support DSCA (Defense Support to Civil Authorities) and Continuity of Operations exercise Eagle Horizon 18. Other exercise scheduled include: Vibrant

HQUSACE

National Emergency Preparedness Program (NEPP)

Response 18, planning for a catastrophic CBRN (Chemical, Biological, Radiological and Nuclear)/ Improvised Nuclear Device (IND) incident, New Madrid Seismic Zone Rehearsal of Concept, Southern California catastrophic planning, National Exercise Program New Madrid Seismic Zone planning for FY 19, National Exercise Program NLE 2020 initial planning, Wabash Valley Earthquake Workshop, Alaska Shield, and Cascadia Subduction Zone Tabletop, and San Francisco Bay Area Earthquake planning. We will also continue our support for FEMA Search and Rescue training that involves USACE Urban Search and Rescue Structures Specialist classes.

Fiscal Year 2019 funds will be used to support the base program for NEPP activities and labor. FY 2019 activities include training, participation in and conducting National Level Exercise, interagency and intergovernmental coordination, catastrophic disaster planning and updating and exercising continuity of operations plans (COOP). USACE uses these funds to participate in interagency discussions on homeland security planning, as demonstrated by support to Department of Homeland Security strategic planning efforts, Secretary of Defense's Complex Catastrophe Initiative, development of the National Capitol Region Response Plan, updates to both the National Response Framework (NRF) and National Disaster Recovery Framework (NDRF), development of catastrophic hurricane and earthquake plans, including Southern California Earthquake catastrophic planning and other man-made contingencies with national-level implications. Exercises include National Exercise Program New Madrid Seismic Zone 19 involving interagency partners on federal, state, local, tribal and private sector, including Ardent Sentry 19 that test and validates DOD's ability to support DSCA (Defense Support to Civil Authorities), Vibrant Response 19 which test and validates DOD's specialized response forces in their mission to assist civilian authorities in saving lives and relieving suffering following a catastrophic CBRN (Chemical, Biological, Radiological and Nuclear/Improvised Nuclear Device (IND) incident, Southern California Earthquake, New Madrid Seismic Zone, Utah Wasatch Fault exercise, planning for National Level Exercise 2020, Alaska Shield, Makani Pahili, Guam and CNMI Catastrophic Typhoon, and COOP Eagle Horizon 19 Exercise. Training includes USACE Urban Search & Rescue Structure Specialist classes.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$1,022,000, including \$17,000 committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance

PROJECT NAME: National (Levee) Flood Inventory – Flood and Coastal Storm Damage Reduction

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018	Budgeted Amount in FY 2019
\$10,000,000	\$15,840,000	\$4,950,000	\$10,000,000 1/ 2/	\$5,000,000

AUTHORIZATION: Title IX of the Water Resources Development Act (WRDA) 2007, as amended

DESCRIPTION: The National Levee Database (NLD), publicly available since October 2011, serves as a central national source of levee information for use on activities such as flood risk management and risk communication. This funding is being used to operate and maintain the NLD, including updating the existing data to reflect the best available risk-based levee information, and implementing software revisions to improve functionality and usability based on user feedback. Operation and maintenance activities for the NLD include supporting NLD related tools such as the Levee Inventory System and Levee Screening Tool, including training for these tools. These funds will also be used to continue work with Federal agency partners, such as FEMA, on Federal voluntary levee safety best practices and guidelines and public awareness efforts.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$26,000. There was an additional \$241,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: National (Multiple Project) Natural Resources Management Activities 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$6,800,000	\$6,492,000	\$4,562,000 2/	\$3,700,000 3/ 4/	\$3,700,000

AUTHORIZATION: Flood Control Act of 1944 (58 Stat. 887), Public Law 78-534.

DESCRIPTION: This remaining item is used to conduct certain, specified operation and maintenance activities, such as procurement of park ranger uniforms through a contract administered by the National Park Service, that benefit all or a majority of operating Civil Works projects. This project is an agency-wide project that is directed by HQUSACE.

ACCOMPLISHMENTS IN FY 2017: A wide variety of national program initiatives were accomplished such as, the park ranger uniform contract was funded at nearly \$700,000; \$350,000 supported the national partnership program including 9 “Handshake” partnerships; \$600,000 supported the Water Safety MCX and national programs; \$400,000 supported environmental compliance work; \$150,000 supported the printing and publishing of a wide array of NRM materials; \$125,000 supported volunteer clearinghouse; \$175,000 supported national sign program activities; \$140,000 supported the Career Assignment Program; and \$2,300,000 supported a variety of sustainability work efforts including energy audits, Energy Savings Performance Contract (ESPC) work, sustainable buildings assessments, campground metering, and data management to support USACE Sustainability Plan, year-end report, and Scorecard submission.

DESCRIPTION OF WORK IN FY 2018: A similar set of national recreation program initiatives will be accomplished such as the funding of: the park ranger uniform contract; a dozen “Handshake” partnership; the Water Safety MCX and associated national programs; environmental compliance work; the printing and publishing of NRM materials; support to volunteer clearinghouse; and a variety of sustainability work efforts including more energy audits, ESPC work, power purchase agreements, and data management to support USACE Sustainability Plan development and Scorecard submission.

DESCRIPTIONS OF WORK FOR FY 2019:

1. National NRM Activities work that will be accomplished with these funds include the following:

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$4,500,000	\$3,247,000	\$2,262,000	\$2,700,000 2/ 3/	\$2,700,000

The National (Multiple Project) Natural Resources Management Activities supports many national programs, including:

- a. **Water & Public Safety Program.** The Water and Public Safety Program is centrally managed at the Corps Water Safety National Operating Center (NOC) which provides national guidance, programs, educational materials, media outlets, and printed and electronic information to ensure a nationally coordinated and consistent safety campaign is delivered to the public.
- b. **Park Ranger/Manager Uniforms.** The Corps Uniform Program is managed centrally out of HQUSACE. Implementation of national policy and oversight of an interagency uniform contract administered by the National Park Service ensures program cost effectiveness and adherence to uniform standards across the Corps. The Corps purchases uniforms for field personnel through the interagency contract. Since this arrangement was established in 1984, significant economies of scale have been achieved. Costs include the authorized employee allowance funds, NPS contract administration costs, buy out of discontinued items, program management/committee support, and the purchase of required emblems.
- c. **Sign Program.** The Corps Sign Program is managed centrally at the Sign Program Center of Excellence (MCX). The MCX ensures consistent implementation of Corps Sign Standards and oversees the management, use, and implementation of national sign standard policies. The MCX works with project, district and MSC sign program coordinators to resolve policy and legal issues. The MSX provides technical support and assistance to all projects and maintains the Sign Standards Program Manual and software. These efforts allow the Corps to maintain consistent standards for public safety and information.
- d. **Partnership Program.** The National Partnership Program oversees the management and implementation of national partnership and volunteer policies to ensure coordinated and consistent program execution nationwide, including the deployment of training opportunities. The program leverages the financial and human resources provided by partners and volunteers to support recreation and environmental stewardship programs.
- e. **Volunteer Clearinghouse Operation.** The Volunteer Clearinghouse that coordinates volunteer recruitment and data collection is operated under contract with Goodwill Industries to support volunteer efforts at all Corps projects. Use of a single nationwide contract achieves economies of scale and reduces administrative costs by eliminating the need to transfer funds from each project.
- f. **Printing and Publishing.** The centralized printing of regulations, forms, and public information and interpretive materials used by all Corps projects achieves economies of scale and reduces total administrative and procurement costs. Printed materials are stored at the Corps Publications Depot for distribution to all projects upon request.
- g. **Other Nationwide NRM Activities.** The following centrally-managed program initiatives are supported at the national level: Environmental Compliance support; Challenge Partnership Funds; Natural Resources Management Website Information (Gateway); Nationwide Recreation Visitation Surveys (Visitation Estimation and Reporting System (VERS)); and support for the

Partnership Advisory Committee, Recreation budget Coach, Assist and Train Team, Career Assignment Development Program, and Bilingual Support Team.

2. Energy Sustainability and Environmental Management System (EMS) Implementation work that will be accomplished with these funds include:

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$2,300,000	\$3,245,000	\$2,300,000	\$1,000,000 2/ 3/	\$1,000,000

Navigation and Flood and Coastal Storm Damage Reduction Projects: The latest revision of Engineering Regulation (ER) 200-2-3 in October 2010 expanded the coverage of the USACE EMS to include all Civil Works missions and facilities with significant environmental compliance requirements, and also incorporated Federal statutory and executive order-based sustainability and energy requirements.

In addition to traditional water, air, waste and materials compliance requirements, the USACE EMS includes the energy, water and petroleum efficiency requirements of the Energy Independence and Security Act of 2007 and the Energy Policy Act of 2005, as well as sustainable acquisition, electronics stewardship, waste reduction/recycling, and various federal energy, water and petroleum related accounting and reporting requirements. Funding these requirements as a nationwide activity allows USACE to reduce costs and improve performance by implementing standardized compliance and sustainability policies, procedures, and tools for auditing, data management, metrics, reporting, and management review at USACE facilities. Specific requirements include:

- a. Centralized energy and sustainability data management, tracking and reporting capability;
- b. Preparing and submitting sustainability and energy submittals in accordance with Administration and congressional requirements. Examples of annual, recurring submittals include the Strategic Sustainability Performance Plan (SSPP), Comprehensive Greenhouse Gas Inventory, Energy Management Report, and federal Sustainability/Energy scorecards
- c. Advanced metering system operation and maintenance serving all facilities that trigger the Federal Energy Management Program advanced metering requirements under Energy Policy Act (EPAAct) Section 103.

1/ This activity is accounted for in the Recreation, Navigation, and Flood and Coastal Storm Damage Reduction business lines.

2/ \$248,000 was reprogrammed away from this line item in FY 2017.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$3,287,000. There was an additional \$606,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

4/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

HQUSACE

National Natural Resource Management Activities

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: National Portfolio Assessment for Reallocations – Water Supply

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$946,000 1/	\$1,060,000 1/	\$792,000	\$800,000 2/ 3/	\$500,000

AUTHORIZATION: Specific project authorizations, Section 216 of the River and Harbor and Flood Control Act of 1970.

DESCRIPTION: These funds are used to assess data and develop a consistent national approach to achieving consistent and sustainable water withdrawals (permanent reallocations and surplus water) including identification of status and challenges for USACE Reservoirs and to conduct initial assessments of pending reallocation requests. These assessments represent a streamlined approach to obtaining the information necessary to determine Federal interest.

The National Portfolio Assessment for Reallocations began as a two year appraisal, initiated in FY 2008, to develop a portfolio of existing Corps of Engineers multipurpose projects to be used as a screening tool to identify the best candidates for opportunities for operational changes and/or reallocation opportunities. During the development of the survey for the National Portfolio Assessment, the USACE was considering two other national surveys, one on the water management aspects of Corps reservoir projects and another on sedimentation management concerns. USACE leaders recognized that combining these efforts would result in cost and time savings. This combined effort provided not only data for the Portfolio but also created a database to examine the status of USACE water management from local, regional, and national perspectives, an engineering and scientific foundation for a national adaptive management program, a baseline data set for investigating the evolution of operational water management policies, an assessment of sediment infilling, its impacts to operating purposes and management practices, and a database for sediment data collection efforts.

These efforts have proven relevant to the assessment of reallocation opportunities at multi-purpose reservoirs where any change in operation affects multiple purposes. As a result, after the initial Portfolio Report was completed, this effort was transformed into an Assessment of Data study for FY 2011 and FY 2012 and included the water supply, water management, and sediment management components as well information gained through collaboration with other USACE work efforts. Major products developed include a portfolio of USACE projects that identified the best candidates for opportunities for operational changes and/or reallocation opportunities to ensure existing USACE reservoirs contribute to enhance economic and ecosystem values as water demands evolve and a better understanding of climate change issues are gained, (2) a paper on alternative funding arrangements for water supply reallocation studies, and (3) a final report on the National Portfolio Assessment of Data for Reallocations: Status and Challenges for USACE Reservoirs.

1/ Prior to FY 2017, this remaining item included funds for the Sustainable Rivers Program, which is now funded under its own remaining item.

2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$170,000. There was an additional \$30,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

3/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Optimization Tools for Navigation – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$319,000	\$319,000	\$319,000	\$322,000 1/ 2/	\$322,000

DESCRIPTION: This funding is necessary to provide practical quantitative and predictive tools and data for minimizing and optimizing the costs of dredging of Federally-sponsored navigation projects. The objective is to be able to identify more efficient and effective management strategies for existing navigation infrastructure and to improve the analysis of proposals to deepen and widen channels. These efforts will help lead to an improvement of channel design criteria across the Corps, the U.S. Navy, and other government and academic institutions. The National Navigation Operation & Maintenance Performance Evaluation Assessment System (NNOMPEAS) has been developed to demonstrate whether such a metric can be provided across all coastal deep-draft harbors and waterways. This tool uses domestic and foreign trade data to determine and analyze the loaded or immersed drafts and related utilization of vessel cargo-carrying capacity for all recorded cargo vessel calls for individual harbors and channels. The system in turn can provide for the estimation of incremental transportation cost benefits foregone with reduction or absence of maintenance for waterway depth, and of the transportation cost savings with a limited increase in depth. This could offer the potential to optimize maintenance dredging requirements for individual channel reaches and across much of the overall USACE dredging program. A companion tool being developed under the OTN program is the Channel Analysis Design Evaluation Tool (CADET), which allows sophisticated vessel hull modeling not previously available. The Institute for Water Resources (IWR) is conducting this modeling activity jointly with the USACE Engineering Research and Development Center and the U.S. Naval Surface Warfare Center. CADET will render advanced technologies for methods of analysis and compilation of new physical and numerically-generated data sets descriptive of vessel movement and response within confined waterways and offshore channel areas subject to significant wave climate.

The FY 2019 funding will be used for to continue the deployment and maintenance of the NNOMPEAS capabilities and methodology and further its use as a budgeting tool and general navigation project evaluation tool. Funding will also be used for continued maintenance of the CADET and development of a comprehensive vessel lines library to allow use of CADET without proprietary hull line information and to ensure technology transfer to USACE so that USACE can independently support general update and maintenance of the algorithms integral to CADET. Funds will also be used to continue compiling dredging cost and quantity data at the channel segment level through implementation of changes to the Resident Management System database and to expand the system structure, and to implement changes to NNOMPEAS deemed critical by field analysts to more efficiently facilitate project evaluation and analysis. Funding will also be used to assess the feasibility of expanding NNOMPEAS and availability of data for including inland harbors.

ACCOMPLISHMENTS IN PRIOR YEARS: Funding for this ongoing activity in FY 2018 allowed for general completion of the deep-draft self-propelled hull vessel lines library for CADET with limited additions to support evolving vessel classes. In addition, efforts for primary technical transfer for basic support of CADET from NAVSEA-Carderoc to USACE IWR were completed along with scoping for enhanced capabilities for evaluation of confined waterways. Ongoing CADET activities also includes field verification and tests on current studies and providing technical support to Districts in helping to determine need or applicability with associated support to be extended for the subject fiscal year with availability of funding. Work continued on development of NNOMPEAS to expand the number of harbors covered to approximately 225 coastal deep-draft projects and continuing efforts for development of data error checking or validation routines for critical parameters. Additional routines are being developed to support data extraction per request from analysts at the District level. NNOMPEAS was enhanced with updates of ocean-going distances between ports for more ports than previously available and included additional enhancements to the capability for probabilistic tide cycle evaluation for estimation of vessel delays due to limitations on project depth versus availability of tidal advantage. Continued use of NNOMPEAS allowed for further development of efforts to measure incremental transportation costs and benefits, and development of relative rankings based on Return of Investment (ROI) for major coastal harbors under annual ongoing initiatives for Value-to-the-Nation and for HQUSACE O&M Program budgeting input. NNOMPEAS was also employed for evaluation of vessel calling patterns and supporting load factor analysis (LFA) critical to coastal deep-draft studies, and as an input to prioritization of survey work performed by NOAA and evaluations by MARAD. Correspondingly, efforts for CADET involved continued deployment and training for use on coastal waterway projects, which supported better evaluation of depth needed in offshore environments with simultaneous objectives of minimizing related dredging costs.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$1,000. There was an additional \$0 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance

PROJECT NAME: Performance Based Budgeting Support Program

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018	Budgeted Amount for FY 2019
\$3,999,000	\$3,917,000	\$4,158,000	\$4,200,000 1/ 2/	\$2,000,000

AUTHORIZATION: Modernizing Government Technology Act

DESCRIPTION: The success rate of government digital services improves when agencies utilize resources to provide modern design, software engineering, and product management. To ensure U.S. Army Corps of Engineers (Corps) Finance Center can effectively build and deliver important digital services, Digital IT funding supports modernization of the Corps of Engineers Financial Management System (CEFMS). CEFMS fully supports USACE business processing, project and financial management, reporting and audit readiness with ten consecutive, unqualified unmodified opinions, but needs to move to support budgeting. An FY 2017 contract award in support of the CEFMS modernization effort will provide the Corps with a prototype system architecture to support CEFMS as a modern enterprise system, improve user interface capability and provide improvements and benefits to the overall IT structure of USACE as well as other USACE information systems. The production application of this modernization architecture will enable the Corps to improve the support for budgeting, execution and transparency in financial reporting of Civil Works Appropriations and support the continued improvements for DATA ACT reporting to USASPENDING.gov. CEFMS modernization will provide new capability to systematically produce mock SF133 and automated reconciliations of the mock SF133 to the SF132 prior to financial information being submitted to the Government-wide Treasury Account Symbol system (GTAS). This will improve and ensure the integrity of the financial data in OMB MAX A-11 system. CEFMS modernization will also provide automated capability to readily produce monthly/quarterly or annual execution and status of fund reports that will provide Public Law level detail data. Stakeholders will have access to modern enterprise financial reporting, data analytics and dashboards for management and transparency of Civil Works Programs and Projects.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$180,000. There was an additional \$67,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this budget justification was prepared. The amount shown is the President's Budget amount for FY 2018.

HQUSACE and Finance Center

Performance Based Budgeting Support Program

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Recreation Management Support Program – Recreation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018 for	Budgeted Amount FY 2019
\$1,633,500	\$1,633,000	\$1,534,000	\$1,550,000 1/ 2/	\$1,550,000

AUTHORIZATION: Flood Control Act of 1944 (58 Stat. 887), Public Law (P.L.) 78-534.

DESCRIPTION: Annual funding supports the recreation program through the conduct of focused management studies to improve operational efficiencies and the provision of technical assistance, to include technology transfer and technology support and maintenance for recreation-specific automated information systems. Funding also supports strategic planning for and performance monitoring of the Corps recreation business program, subject to the Government Performance and Results Act.

The Recreation Management Support Program (RMSP) has 5 major components, which together provide comprehensive support to the Corps Recreation Business Program:

1. **Focused Management Studies.** RMSP provides focused management studies and reports to acquire and analyze information about recreation trends, accessibility, emerging issues, user conflicts, visitor diversity, use fee impacts and similar elements affecting the Corps recreation program. Analyses are conducted to support the recreation area modernization program, implementing facility and service standards, and in similar product delivery improvement efforts. Information and technology transfer pursuant to these studies is funded by the RMSP. Ongoing trends analysis provides valuable data on which to base decisions about necessary short and long term adjustments to the program to meet public needs.
2. **Management/Technical Assistance.** RMSP provides technical assistance to the Recreation Community of Practice in the development of management tools, which quantify recreation program outputs and relate them to customer needs and budget allocations for the purpose of measuring performance. This includes gathering and analyzing information about customer satisfaction with the Corps recreation program. RMSP assures the field workforce is equipped with "state-of-the-art" skills and knowledge to deal with a rapidly changing public. RMSP provides technical support and maintenance of performance based budgeting tools, visitation monitoring and analysis systems, fee collection and reporting, economic analysis, facility inventory and condition assessment, and similar automated information programs. RMSP provides short-term assistance to projects in solving specific technical problems.
3. **Support to Recreation Program Strategic Planning.** Funding to support the activities of the Recreation Leadership Advisory Team (RLAT) is included in this program. The RLAT is composed of representatives from the division, district and project levels of the Corps natural resources management program. It provides input, advice and support to the Corps strategic planning for the recreation business program.

4. RMPS supports nationwide recreation visitation surveys. Accurately estimating the number of visitors to our projects is key to making wise investment and management decisions. The Visitation Estimation and Reporting System (VERS) modernization effort is centrally managed within RMSP to bring greater accuracy to our visitor estimates across the Corps.

5. Recreation.gov and Volunteer.gov are two initiatives designed to improve access to recreation-related information from the Federal government, streamline the systems used to manage that information, and increase sharing of recreation-related information among government and non-government organizations. Providing a nationwide funding source at HQUSACE for centralized procurement of these items used by all operating projects having a natural resources management program precludes the need for funds to be transferred by each project or district to a single procurement agent, a savings of from 60 to 300 transactions a year. Funding for these initiatives is sufficient to also cover the costs of the Recreation One-Stop Initiative, which was previously funded as a separate line item in the Budget.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$190,000. There was an additional \$41,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operations & Maintenance, Fiscal Year 2019

PROJECT NAME: Regional Sediment Management Program - Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$2,282,000	\$2,282,000	\$1,782,000	\$3,500,000 1/ 2/	\$3,500,000

AUTHORIZATION: Section 516 of the Water Resources Development Act of 1996 authorizes the development of long-term strategies for the management and control of sediments through studies and operational activities.

DESCRIPTION: The Regional Sediment Management (RSM) Program objectives are to establish regional sediment management strategies that link sediment management actions across multiple authorized U.S. Army Corps of Engineers (Corps) projects, and to coordinate management activities with other Federal agencies, State, and local governments within the boundaries of physical systems including inland watersheds, rivers, estuaries, and the coast. The goal is to demonstrate short- and long-term cost savings and increased economic and environmental benefits through adaptive management of sediments from a regional perspective. The approach provides opportunities to achieve greater effectiveness and efficiency and to realize significant cost savings relative to traditional project management practices. The improved regional approach to the navigation program assists nationally to identify common issues that are better solved on a regional basis, improving channel availability and subsequently life cycle costs and project benefits through more efficient practices, and improving regional efficiencies by engaging cross-mission objectives of the Corps (i.e., navigation, flood risk management, and environmental restoration regarding sediments). Cost savings may be realized from leveraging multiple project resources (funding, sediments), reduced re-handling of material, reduced sedimentation, optimized beneficial use or placement of material, extended dredging cycles and combined equipment mobilization and demobilization for linked projects (e.g., dredging and shore protection). Costs may also be reduced by sharing information, improved data management, and reduced duplication of field data collection, or by reducing duplication in model and tool development and application.

The funds under this program are not used for work at specific projects, but are used to fund activities that will benefit the entire Civil Works program.

In addition to the specific examples below, annual funding is used to:

- Coordinate RSM efforts nationally to improve the management and use of sediments across multiple projects to benefit a region in support of the Civil Works mission, including an annual RSM Workshop and In-Progress-Review to promote program goals, shared knowledge and experiences, and technology transfer among RSM practitioners; bi-monthly Corps-wide webinars and University Workshops to share knowledge, tools, and case studies;
- Develop and enhance tools and technologies for implementing RSM approaches;
- Update RSM database and web-based viewer of USACE navigation projects which utilized RSM principles/Beneficial Use in placing sediments; the database quantifies the volume of navigation sediments placed in the various beneficial use categories, and provides this information at Project, District, Division, Region, and National levels;

Engineer Research and Development Center

Regional Sediment Management Program

- Participate in regional and national initiatives to promote the RSM concepts and approach; and
- Document successes, challenges and lessons learned through technical reports.

DESCRIPTION OF WORK FOR FY 2018:

- Integrate sediment budget repository and viewer into the Corps' Navigation Portal.
- Continue development of district regional sediment budgets, building the sediment budget repository, and enhancing the Sediment Budget Analysis System.
- Continue to work with Districts to populate dredging data (dredging histories, placement areas, sediment data, etc.) in the CE-Dredge and Sediment Analysis System enterprise databases and enhance these tools for improving implementation of regional approaches.
- Continue support of the USACE Data Integration Framework (DIF) effort to populate National enterprise databases with USACE data and integrate the tools and models that utilize the data. The goal is to provide data access and tools to assist in the management of sediment and dredging information and project information to provide the capability to identify needs and opportunities to implement sediment management strategies.
- Complete research and field experiments to improve our understanding of the losses of fined grained material through the process of dredging and placing sediment using hopper dredges. In collaboration with the Bureau of Ocean Energy Management (BOEM), these efforts will improve the Corps ability to dredge mixed sediments and beneficially place along our nation's shorelines rather than removing the total volume from the system.
- Coordinate and implement sediment management actions to optimize the use of sediments to improve operational efficiencies while keeping sediments in the system, reducing shoreline erosion, reducing sedimentation, and/or improving environmental habitat while reducing overall costs by linking projects, reducing timelines, and leveraging data, information, and resources. Actions will be coordinated with partners and stakeholders to ensure needs are met.
- Continue to improve integration of RSM principles and practices into the Corps inland systems through increased understanding of Riverine and Reservoir challenges regarding regional management (technical, economic, environmental, and social) and increased participation with the inland Corps Districts.
- Enhance guidance and numerical modeling capabilities to assist in the planning, design, construction, and monitoring of near shore berms for improved sediment management.
- Evaluate the response of crabs and other benthic communities to nearshore placement of dredged material. The Portland and Norfolk District will collaborate to evaluate the impacts to dredged material placement to benthic communities, and crab species in particular, which are a major concern among stakeholders.
- Through an outreach program, the Detroit district will continue to educate professionals and non-professionals about the importance of maintaining the sand supply in Lake Michigan and identify where fluvial supplies to the littoral zone are high. The effort establishes a coastal roundtable for promoting collaboration between coastal professionals around Lake Michigan.
- The Baltimore District will develop local project scale sediment management strategies into a comprehensive Regional Sediment Management strategy in order to identify, prioritize, and coordinate implementation of the RSM actions across the region.

DESCRIPTION OF WORK FOR FY 2019:

- Continue to expand regional approaches developed for the operation and maintenance of navigation projects to a Corps-wide capability.
- Outreach and apply lessons learned through the inland RSM initiatives to apply regional approaches to link multiple projects (navigation, shore protection, environmental enhancement) across a region.
- Continue integration of Corps dredging, environmental, sediment, and monitoring related databases to provide data access and tools to assist in the management of sediment and dredging information, project information, etc. to provide the capability to identify needs and opportunities to implement sediment management strategies.
- Continue development of District's regional sediment budgets, building the sediment budget repository, and enhancing the Sediment Budget Analysis System.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$2,000. There was an additional \$384,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Review of Non-Federal Alterations of Civil Works Projects (Section 408) – Flood Risk Management 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
2/	\$4,000,000	\$3,465,000	\$8,500,000 3/ 4/	\$8,500,000

AUTHORIZATION: Section 14 of the Rivers and Harbors Appropriations Act of 1899, as amended, 33 U.S.C. 408 (Section 408) authorizes the Secretary of the Army to grant permission to other entities for the temporary or permanent alteration or use of a U.S. Army Corps of Engineers (USACE) civil works project if the Secretary determines that the alteration or use will not be injurious to the public interest and will not impair the usefulness of the project.

DESCRIPTION: In FY 2016, this remaining item was established to improve transparency over the management and use of funds used to review requests under Section 408 to alter an authorized Corps project. The funding enables the Corps to coordinate with the requester and review of the proposed alteration. Through Section 408 reviews, the Corps ensures that the alteration will not adversely impact the public interest and will not impair the usefulness of the authorized Corps project. The number of Section 408 requests in any year is dependent on many factors – primarily actions, schedules, and resources external to USACE. In its review of section 408 requests, the Corps considers a range of factors, such as the effects of the proposed alteration on the reduction of risk to life safety, the reduction of the risk of flood damages, the environment, the project’s ability to meet its other authorized purpose(s), and tribal considerations.

In FY 2019, the requested funds will be used to review those Section 408 requests not reviewed in FY 2018 (approximately 1,500 requests) and to review new requests received in FY 2019. This funding will also be used for program management activities, to include coordination and tracking activities, and construction oversight. It will not be used to review requests for non-Federal hydropower projects. Review of Section 408 requests that are for non-Federal hydropower development at a USACE facility will continue to be funded using existing Federal Energy Regulatory Commission licensees' annual payments pursuant to 16 U.S.C. 810(a).

1/ The total funding is accounted in the Flood Risk Management (FRM) business line but will be allocated to the appropriate business line based on the Section 408 requests actually received.

2/ Prior to FY 2016, funding for the activities covered by this remaining item were sourced out of other programs, projects, and activities within the Civil Works program

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$107,000. There was an additional \$5,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

4/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Stewardship Support Program – Environmental Stewardship

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$990,000	\$986,000	\$941,000	\$900,000 1/ 2/	\$900,000

DESCRIPTION: These funds will be used to conduct focused management action studies and recommend guidance to address high priority program efficiency and effectiveness concerns, including responses to new protocols for asset and risk management, regulation changes, and administration priorities through the Stewardship Support Program (SSP). Efforts will continue in support of performance based budgeting, in monitoring program performance and risk analysis, and in development of strategies to improve program outputs and outcomes.

Progress in recent years on developing standards, published protocols, and web-based data entry programs have resulted in improvements in advancing completion of the inventories and will result in expanded data from national GIS analysis to prioritize work. The SSP will also continue support of the Environment-Stewardship CoP including further development of the Natural Resources Management (NRM) Gateway, a knowledge management tool for the NRM community, for information and technology exchange. The Gateway continues to be the central location of program knowledge within the Corps to quickly share policy updates, emerging issues and technical support. These activities will provide benefits in increased program effectiveness through implementation of assessment recommendations. Improved program performance will be facilitated through increased CoP access to best practices and policy guidance and effective development and execution of performance based budgets.

The SSP was established by regulation in FY 2002 to provide broad support to Environment-Stewardship function at operating projects by assisting in the identification of national program needs, the development of new national program activities, strategic program planning, and the recommendation of national stewardship program funding priorities. Support will be provided in refining the Environment–Stewardship business program strategic plan and goals, and budget processes, to address the targeted outcomes of the overall Corps Civil Works Strategic Plan, using input from the Stewardship Advisory Team, other associated Corps business programs and stakeholders. Goals and objectives have been refined, and actions will be identified to achieve them. Funding this program from a single source reflects the nationwide application and supports standardization in program direction and outputs.

The three basic components of the SSP are:

- (1) Focused Management Actions. These activities are to implement a course of action or practice within field office activities, a region, or nationwide. Management actions may include collaboration and participation with stakeholders to improve interagency efficiencies and focus on habitats of national concern. Examples include geospatial decision tools for use at the projects and nationally to address land use challenges such as threats to resources including property and boundary line encroachments; request to use federal property and impacts due to rapidly increase adjacent development which aid in prioritizing preventative measures to reduce encroachments and prioritization of project master plan updates.

(2) Policy Guidance and Management Support. Such activities relate to the development and/ or implementation of guidance. Specific work will include amending the annual Budget Engineer Circular and the Environmental Stewardship budget program development manual to provide emphasis on new environmental threats or nationally significant resources that adjust to administration initiatives and priorities, national pollinator strategy and supporting land, water conservation, overall asset management, and continue efforts to prioritize Federal investment in environmental stewardship activities across the Nation. Funding to support the activities of the Stewardship Advisory Team (SAT) is included in this program. The SAT is composed of representatives from the division, district, and project levels of the Corps Environmental Stewardship Program. It provides input, advice, and support to the Corps strategic planning for the Environment-Stewardship business program.

(3) Information Exchange. These activities are designed to build, integrate, and share our knowledge base to support greater understanding of the environment and the impacts of program work. The development of the NRM Gateway to provide technical knowledge as well as improved understanding of interagency national programs that contribute to national priorities.

ACCOMPLISHMENTS IN PRIOR YEARS: Components of the Environment–Stewardship portion of the NRM Gateway have been completed, including pollinator initiatives such as the National Pollinator Strategies and pollinator best management practices; posting of guidance, training modules and examples of Master Plan revisions to support increasing Master Plan development; and content specific information on invasive species especially those species that are causing eminent threats to Corps projects.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$119,000. There was an additional \$72,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Sustainable Rivers Program

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
1/	1/	\$396,000	\$400,000 2/ 3/	\$400,000

AUTHORIZATION: Specific project authorizations, Section 216 of the Rivers and Harbors and Flood Control Act of 1970.

DESCRIPTION: The Sustainable Rivers Program (SRP) was initiated in 2002 and is implemented in partnership with The Nature Conservancy and numerous other Federal, state, and nongovernmental partners. SRP efforts complement other reservoir-centric water resource projects by demonstrating that a strategic and science-based approach can be used at USACE projects to maintain or enhance benefits provided to the nation while reducing negative environmental consequences.

Annual funding is used to evaluate flows below specific USACE reservoirs and use the resulting information to inform project operations. USACE prioritizes work on reservoirs based on size, level of downstream influence, authorized purposes, and several other factors. The SRP process for implementation follows:

- Define the flows needed to maintain ecosystems in sustainable condition below USACE reservoirs;
- Perform trade-off analyses to quantify effects of potential reservoir reoperations;
- Implement and monitor operational changes to meet flow needs resulting from changes to the operation of particular reservoir systems;
- Assess the economic impacts or enhancements that result from operational changes; and
- Update reservoir management policies to ensure operations reflect current, increasing, and competing demands for water and associated effects on biodiversity.

These funds will be used to accomplish national and site work in accordance with the following SRP principles: 1) Build capacity within the water management community to implement environmental flows with little or no direct involvement of SRP resources; 2) Engage partners to focus on sustainability and avoid conflict, including Endangered Species Act (ESA) consultations; and 3) Advance innovative efforts to implement environmental flows.

1/ Prior to 2017, Sustainable Rivers Program was funded as part of the National Portfolio Assessment for Reallocations. This remaining item is the only national funding source for SRP.

2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$26,000. There was an additional \$1,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Veterans Curation Program and Collections Management 1/

Allocation in FY 2015	Allocation in FY 2016	Allocation In FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
2/	2/	\$6,435,000	\$6,500,000 3/ 4/	\$6,500,000

AUTHORIZATION: The Curation of Federally Owned and Administered Archeological Collections (36 CFR Part 79), required by the Antiquities Act (16 U.S.C. 431-433), the Reservoir Salvage Act (16 U.S.C. 469-469c), the National Historic Preservation Act (16 U.S.C. 470h-2), and the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm), requires Civil Works programs and projects to properly house their archaeological collections to federal standards. On 6 July 2016, H.R. 3114, a bill to support Wounded Warriors and Veterans through the formal recognition of the Chief of Engineers' Veterans Curation Program was signed by President Obama and is now Public Law 114-189. On 7 September 2017, a policy memo (Regionalization of U.S. Army Corps of Engineers Archaeological Collections to be Managed by the Mandatory Center of Expertise MCX for the Curation and Management of Archaeological Collections (CMAC)) was signed by the Director of Civil works to designate the Mandatory Center of Expertise (MCX) CMAC to manage the Corps-wide regionalization effort.

DESCRIPTION: The Veterans Curation Program serves as a primary means of rehabilitating and processing archaeological collections owned and administered by U.S. Army Corps of Engineers (USACE) collections to meet federal standards. The Corps is responsible for the curation of an estimated 46,255 cubic feet of artifacts collected from its water resources development projects and an estimated 3,511 linear feet of associated records. Curation of these materials, which are over 80 percent of the total DoD collections and the largest volume of all federal agencies responsible for this activity, is required by a number of public laws with implementing guidance in 36 CFR Part 79. These extensive collections are located in over one hundred fifty curation facilities across the nation. The Mandatory Center of Expertise, located at the St. Louis District, provides overall management of the Corps' collections management programs and serves as a centralized base for curation and collection compliance, an information source, and for contracting collections related services. The MCX leads the implementation of an agency-wide long-term plan for the curation and collections management of USACE archeological collections, which involves addressing the rehabilitation needs of USACE's most critical archeological collections through the Veterans Curation Program (VCP). The MCX has been operating the Veterans Curation Program since 2009 to ensure proper processing of Corps archaeological collections through the employment and training of veterans. The MCX facilitates consistent nationwide curation and collections management programs implementation and operation. The MCX has accelerated the process of effectively managing the Corps curation effort with the Veterans Curation Program, which provides disabled veterans with employment and additional job skills in archaeological collections management, while providing for the rehabilitation of the fragile collections. The MCX, in providing collections assessments, has assisted in establishing the extent and locations of USACE holdings. The MCX has established standardized, uniform curation assessment procedures, which were used to assess all USACE collections, and is working to verify the long-term curatorial responsibilities for all collections. A phased task plan using the Veterans Curation Program for appropriate processing and curation has been developed and is being implemented on at-risk collections. Data for USACE archaeological collections derived from prior year surveys of districts and from the VCP laboratories has also been used to populate an updated collections dataset that provides accurate accounting information for the total collections holdings of the USACE. These funds are used to fund MCX's operation of the Veterans Curation Program laboratories and expedite collection stabilization, proper storage, and collection management support to all Districts.

Division: Mississippi Valley

District: St. Louis

Veterans Curation Program

The MCX continued to fulfill its chartered activities in support of USACE districts, other military services, and DoD. MCX leads in the implementation of an agency-wide, long-term plan for the curation of USACE archeological collections (heritage assets). The MCX continued to address the rehabilitation needs of USACE's most critical archeological collections through the Veterans Curation Program. The staffing of veterans and the rehabilitation of at-risk archeological materials and associated records in FY 2017 was 89 veterans employed by the five labs, which included the first full year of veterans in an expanded Alexandria laboratory, as well as in two smaller laboratories established at Arizona State University (ASU) and at the reservation for the Confederated Tribes of the Colville Reservation. ASU maintains a digital repository known as the Digital Archaeological Record (tDAR) and the artifacts and records being rehabilitated by all VCP labs began being placed on tDAR in FY2017. This provides educators, researchers, and the public digital access to this material. In FY2017, the process of entering VCP digital collections data for tDAR was done by ASU student veterans as part of the VCP. VCP graduate veterans are also being hired by other contractors working on rehabilitation of collections under the consolidation effort. At the end of FY2017, the program had employed 418 veterans since its inception in 2009. For the collections management program, MCX continued to populate a database that was developed to track USACE collections. Data in the database is being drawn from the VCP, consolidation research, and data provided by districts. MCX continues to work with MSCs on consolidation plans for their collections. NWD and SPD continued their real estate research to identify the collections for which they have long-term responsibility. MVD established one regional repository which now houses all collections from two districts and hosted two tribal consultation meetings on this effort. Regionalization discussions were initiated within SWD, LRD, and NAD.

Annual funding is used to implement the agency-wide long-term plan for the curation and collections management of Corps archeological collections through the Veterans Curation Program.

1/ The costs for this activity are accounted for evenly between the Navigation, Hydropower, Flood and Coastal Storm Damage Reduction, and Environmental Stewardship business lines.

2/ Prior to FY 2017, funding for this activity was appropriated under the NAGPRA/Curation line item.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$9,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

4/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance, Fiscal Year 2019

PROJECT NAME: Waterborne Commerce Statistics – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$4,622,310	\$4,772,000	\$4,622,000	\$4,670,000 1/ 2/	\$4,670,000

AUTHORIZATION: Section 3 of the 1945 River and Harbor Act (as amended by Section 915 (g) of the Water Resources Development Act of 1986); Sections 15, 19, and 20 of the Rivers and Harbors Act of 1899, as amended; River and Harbor Act of 1922 as amended; Public Law (P.L.) 103-182.

DESCRIPTION: The Corps serves as the Federal central collection agency, and is the sole U.S. Government source for U.S. domestic waterborne commerce and vessel statistics. The Office of Management and Budget (OMB) pursuant to Title 44 U.S.C. 3509 and 3510 transferred primary responsibility for U.S. foreign waterborne transportation statistics mission from the Bureau of the Census to the Corps in 1998. Funding for this activity is used to develop data that provide essential information for navigation project investment analyses and annual funding prioritization for operation and maintenance of existing projects; as project output information for computation of performance measures; for input into the U.S. National Accounts; and for regulatory compliance, emergency management decisions, and homeland defense. Activities supporting this national statistics mission include:

- a. Collecting and reporting of water transportation statistical data. Under Federal law, vessel operating companies must report domestic waterborne commercial movements to the Corps;
- b. Developing and operating automated systems (transactional systems within Operation and Maintenance corporate information system), processing, compiling, and publishing statistical data and information on waterborne commerce and vessels moving on the internal U.S. waterways, the Great Lakes, and through all U.S. ocean channels and ports;
- c. Documenting and publishing the Nation's commercial port infrastructure served by Federal channels;
- d. Documenting and publishing the U.S. vessels available for operation in waterborne commerce, their principal trades and zones of operation; and
- e. Acquiring and using software tools for program analysis, diagnostics and quality control. This item is reported under Civil Works Business Intelligence (CWBI) in Information Technology Investment Portfolio System (ITIPS) and the OMB 300b.

Fiscal Year 2019 funds will be used to perform operation, maintenance and necessary enhancements of the nation's waterborne commerce, vessel and shipper data and statistics programs. Funds will also be used to increase project detail data requirements for budget submission and economic justification and to collaborate with partner agencies to improve navigation data from a Federal perspective including, acquiring and using software tools for program analysis, diagnostics and quality control. Implementation, with continued modification of Corps automated systems, to accept new real-time domestic electronic data to improve accuracy of domestic statistics; and modification of programs to integrate U.S. foreign import/export data from the International Trade Data System and U.S. Customs and Border Protection (CBP) to improve processing efficiency and accuracy of foreign transportation statistics in accordance with Executive Order 13659, *Streamlining the Export/Import Process for American's Businesses* (Executive Order), signed on February 19, 2014 by President Obama. Among other things, this Executive Order mandated

the completion and government-wide utilization of the International Trade Data System. When implemented, the International Trade Data System will provide an automated and electronic single window for businesses to provide the information required by government for the export or import of cargo and for government agencies to download their required datasets.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$25,000. There was an additional \$101,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operations & Maintenance, Fiscal Year 2019

PROJECT NAME: Water Operations Technical Support (WOTS) – Flood and Coastal Storm Damage Reduction

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$2,475,000	\$5,445,000	\$5,445,000	\$500,000 1/ 2/	\$500,000

DESCRIPTION: The purpose of this program is to maintain the environmental and water quality conditions at 562 Corps reservoirs (5,500,000 surface acres), 237 navigation locks, 926 harbors, 75 hydropower projects, and 25,000 miles of inland and coastal waterways, that require compliance with numerous statutes and State standards. Providing the technology and knowledge base necessary to broadly address environmental requirements in accordance with laws and regulations can best be accomplished through a comprehensive centralized program that will maximize cost effectiveness, and ensure broad dissemination and implementation of technology and information. In FY 2015, Congress added \$2,000,000 for the study of atmospheric rivers and their possible effects upon the Corps' reservoir operations. Congress added \$5,000,000 for the continuing study in FY 2016.

These funds are used to provide effective environmental and water quality management technologies to address a wide range of issues at Corps reservoir and waterway projects, and in river systems nationwide. A key component of the program is to offer sustainable innovative engineering solutions to complex environmental problems. The program supports the incorporation of Green Infrastructure and Low Impact Development (GI-LID) technologies through integration of Engineering with Nature (EWN) principles to support USACE environmental objectives. The program provides technology to address: problems caused by aquatic invasive species; water quality impacts of land use, sediment and nutrient loadings, erosion, and reservoir sedimentation; tailwater fisheries concerns at pump-back hydropower projects; enhancement of habitat for aquatic endangered species at risk; and project operations related to environmental and water quality issues. WOTS provides technical support to the Corps' mission-related project responsibilities, with special emphasis on the transfer of technology. The program ensures that the technologies developed by the Corps and other Federal agencies are current and readily available to all Corps field offices. The effective use of technologies will be secured through direct technical assistance, specialty workshops, information bulletins, technical notes, executive notes, technical reports, webinars, miscellaneous papers, instruction manuals, videos, meetings, seminars, briefings, congressional testimony, and the Internet.

Funds are also used for research and development of Forecast Informed Reservoir Operations (FIRO), an effort investigating the feasibility of using predictive capabilities of atmospheric river events to inform reservoir operations at Corps dams in the Western United States. Prior year funds focused on two main areas: 1) quantifying the predictability of atmospheric rivers in timing and location of precipitation and the resulting stream flow; and 2) developing a prototype reservoir operations simulator for the pilot watershed and reservoir, Lake Mendocino, on which to test alternative operations scenarios. Current efforts include: 1) conducting retrospective evaluations of events over the past 20 years of record using potential alternative operations scenarios; and 2) designing a demonstration prototype system for conducting quantitative evaluation of a FIRO-based system.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$195,000. There was an additional \$9,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Operation and Maintenance and Harbor Maintenance Trust Fund, Fiscal Year 2019

PROJECT NAME: Project Condition Surveys 1/

STATE	FY2016 Allocations	FY 2017 Allocations	Presumed FY 2018 Allocations 2/ 3/	FY 2019 Budgeted Amounts
Alaska	\$693,000	\$693,000	\$750,000	\$750,000
Alabama	\$146,000	\$188,000	\$149,000	\$110,000
Arkansas 4/	\$2,000	\$1,000	\$1,000	-
California	\$1,576,000	\$1,363,000	\$1,433,000	\$1,350,000
Connecticut	\$841,000	\$842,000	\$850,000	\$900,000
District of Columbia	\$25,000	\$25,000	\$25,000	\$30,000
Delaware	\$198,000	\$198,000	\$200,000	\$200,000
Florida	\$1,411,000	\$1,411,000	\$1,375,000	\$1,275,000
Georgia	\$110,000	\$87,000	\$100,000	\$100,000
Hawaii	\$790,000	\$699,000	\$752,000	\$663,000
Illinois	\$103,000	\$104,000	\$104,000	\$106,000
Indiana	\$183,000	\$183,000	\$185,000	\$190,000
Kentucky 4/	\$2,000	\$1,000	\$1,000	-
Louisiana	\$46,000	\$51,000	\$54,000	\$11,000
Massachusetts	\$1,041,000	\$991,000	\$1,000,000	\$950,000
Maryland	\$396,000	\$446,000	\$450,000	\$485,000
Maine	\$889,000	\$989,000	\$1,000,000	\$1,000,000
Michigan	\$703,000	\$713,000	\$746,000	\$833,000
Minnesota	\$87,000	\$92,000	\$96,000	\$103,000
Missouri 4/	\$2,000	\$1,000	\$1,000	-
Mississippi	\$149,000	\$149,000	\$151,000	\$131,000
North Carolina	\$643,000	\$693,000	\$700,000	\$700,000
New Hampshire	\$298,000	\$248,000	\$300,000	\$300,000
New Jersey	\$984,000	\$1,925,000	\$2,017,000	\$2,223,500
New York	\$1,717,000	\$2,229,000	\$2,323,000	\$2,522,000

Division: National

District: National

Project Condition Surveys

STATE	FY2016 Allocations	FY 2017 Allocations	Presumed FY 2018 Allocations 2/ 3/	FY 2019 Budgeted Amounts
Ohio	\$302,000	\$302,000	\$305,000	\$306,000
Oregon	\$396,000	\$471,000	\$400,000	\$400,000
Pennsylvania	\$168,000	\$168,000	\$170,000	\$170,000
Puerto Rico	-	\$1,000	\$150,000	\$100,000
Rhode Island	\$346,000	\$347,000	\$300,000	\$300,000
South Carolina	\$866,000	\$866,000	\$875,000	\$875,000
Tennessee 4/	\$2,000	\$1,000	\$1,000	-
Texas	\$147,000	\$222,000	\$323,000	\$325,000
Virginia	\$1,435,000	\$1,301,000	\$1,195,000	\$1,215,000
Virgin Islands	-	\$1,000	\$100,000	\$50,000
Washington	\$574,000	\$606,000	\$779,000	\$1,046,000
Wisconsin	\$301,000	\$307,000	\$321,000	\$325,000
TOTAL PROGRAM	\$17,572,000	\$18,915,000	\$19,682,000	\$20,044,500

AUTHORIZATION: Public Law 85-480, approved in 1958 authorizes the Chief of Engineers to publish information, including condition surveys that may be of value to the general public.

DESCRIPTION: This national program consists of performing hydrographic and topographic project condition surveys (PCS) for Federally-authorized navigation projects, including navigation channels, inlets, anchorages, structures such as jetties and breakwaters, and other navigation features within the states. The surveys are used to ascertain channel and structure conditions and disseminate the conditions to users of the waterways and to plan future channel and structure maintenance activities. Funds are also used to respond to unanticipated needs, including concerns raised by the U.S. Coast Guard, local harbor masters, or other agencies regarding projects that have become shoaled as a result of severe storms and/or abnormal deposition rates that may have compromised safe navigation. The selection of which projects to survey and scheduling of surveys is based upon channel usage, shoaling rates, maintenance dredging schedules, and when that project was last surveyed. The surveys are generally conducted on a rotational basis, taking into account the expected sedimentation rates and historic maintenance. This generally includes projects that do not routinely receive O&M appropriations and that are not regularly maintained. For those projects scheduled to be dredged or maintained in the budget year, funds for PCS of the project are included within that project.

1/ The costs of this activity are accounted for in the Navigation business line.

2/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$4,935,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

3/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

4/ Funded out of the Operation and Maintenance account.

Division: National

District: National

Project Condition Surveys

APPROPRIATION TITLE: Harbor Maintenance Trust Fund, Fiscal Year 2019

PROJECT NAME: Surveillance of Northern Boundary Waters 1/

STATE	FY2016 Allocations	FY 2017 Allocations 2/	Presumed FY 2018 Allocations 3/ 4/	FY 2019 Budgeted Amounts
Illinois	\$582,000	\$712,000	\$738,000	\$680,000
Indiana	\$140,000	\$142,000	\$149,000	\$55,000
Maine	\$25,000	\$25,000	\$30,000	\$30,000
Michigan	\$2,760,000	\$2,797,000	\$2,912,000	\$3,138,000
Minnesota	\$485,000	\$485,000	\$509,000	\$246,000
North Dakota	\$32,000	\$30,000	\$82,000	\$85,000
New York	\$610,000	\$604,000	\$610,000	\$610,000
Ohio	\$255,000	\$252,000	\$255,000	\$255,000
Oregon	\$4,510,000	\$6,145,000	\$525,000	\$0
Pennsylvania	\$105,000	\$104,000	\$105,000	\$105,000
Washington	\$63,000	\$63,000	\$64,000	\$80,000
Wisconsin	\$561,000	\$569,000	\$596,000	\$200,000
TOTAL PROGRAM	\$10,128,000	\$11,928,000	\$6,575,000	\$5,484,000

AUTHORIZATION: Boundary Waters Treaty of 1909

DESCRIPTION: Program work is located across the entire Canada-United States Northern Boundary Waters covered under the International Boundary Waters Treaties and other International agreements between the U.S. and Canada. The main activities conducted under the Surveillance of Northern Boundary Waters Program is the support of the Boundary Waters Treaty of 1909, including technical and secretarial support of the International Joint Commission (IJC), its Boards of Control, Committees, and other various study boards. Activities are centered supporting the principles and mechanisms to help resolve disputes and to prevent future ones, primarily those concerning water quantity and water quality along the boundary between Canada and the United States. Annual funding provides for monitoring of lake levels and outflows; monitoring and approving international apportionment of water; forecasting lake levels and river flows during periods of high or low water collecting, analyzing, and maintaining hydrometeorologic data, including post-flood reports; monitoring flood operations; assisting in transboundary dispute resolution; and preparing and disseminating information to the public.

1/ The costs of this activity are accounted for in the Flood and Coastal Storm Damage Reduction business line.

2/ The FY 2017 allocations included \$5.3 million in Oregon for Columbia River Treaty 2024 Implementation efforts, but the continued funding for those efforts was moved to the Investigations account in FY 2018 due to the nature, magnitude, and duration of the required Investigations work.

Division: National

District: National

Surveillance of Northern Boundary Waters

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$409,000. There was an additional \$52,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

4/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Construction and Harbor Maintenance Trust Fund, Fiscal Year 2019

Continuing Authorities Projects Not Requiring Specific Legislation (Continuing Authorities Program (CAP))

Aquatic Ecosystem Restoration (CAP Section 206) – Construction, Aquatic Ecosystem Restoration

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 206 1/		\$8,000,000	\$8,000,000	\$ 8,000,000	\$ 6,500,000	\$1,500,000

Description: Annual funding is used to investigate, design, and construct aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest and are cost-effective. Not more than \$10,000,000 in Federal funds may be allocated to a project at a single locality. Up to \$50,000,000 may be appropriated annually to the Section 206 program.

Authority: Section 206 of the Water Resources Development Act of 1996 (PL 104-303), as amended.

1/ Non-Federal interests are required to share in a minimum of 35 percent of the implementation cost of construction including provision of all lands, easements, rights-of-way, and necessary relocations. Non-Federal interests pay 100 percent of the cost of operation, maintenance, replacement and rehabilitation.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY 2018. 3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 \$5,569,000. There was an additional \$7,373 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is less than \$200,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

Beneficial Uses of Dredged Material (CAP Section 204) – Harbor Maintenance Trust Fund, Navigation

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 204 1/		\$3,500,000	\$ 500,000	\$ 1,000,000	\$ 500,000	\$ 500,000

Description: Annual funding is used to investigate, design, and construct projects for the protection, restoration and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of an authorized navigation project. Not more than \$10,000,000 in Federal funds may be may be allocated to a single modification or measure. Up to \$50,000,000 may be appropriated annually to the Section 204 program.

Authority: Section 204 of the Water Resources Development Act (WRDA) of 1992 (PL 102-580), as amended.

1/ Non-Federal interests are required to share in a minimum of 35 percent of the implementation cost of each project.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY

2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 into FY 2018 was \$2,245,000. There was an additional \$12,340 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is less than \$1,000,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

Flood Control (CAP Section 205) – Construction, Flood and Coastal Storm Damage Reduction

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 205 1/		\$10,000,000	\$ 8,000,000	\$ 8,000,000	\$ 1,000,000	\$ 500,000

Description: Annual funding is used to investigate, design, and construct flood and coastal storm damage reduction projects, including structural and/or nonstructural measures that are designed to provide the same complete project and same degree of protection provided under regular authorization procedures. Each project selected must be economically justified and complete within itself. Federal cost participation is limited to \$10,000,000 per project at a single locality. Up to \$55,000,000 may be appropriated annually to the Section 205 program.

Authority: Section 205 of the Flood Control Act of 1948 (PL 80-858), as amended.

1/ Non-Federal interests are required to share in a minimum of 35 percent of the implementation cost of each project.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President’s Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 into FY 2018 was \$16,171,000. There was an additional \$50,564 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$9,000,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

Project Modifications for Improvement of the Environment (CAP Section 1135) – Construction, Aquatic Ecosystem Restoration

		Allocation for FY 2015	Allocation for FY 2016	Allocation for FY 2017	Presumed Allocation for FY 2018 2/ 3/	FY 2019 Budget
CAP Section 1135 1/		\$6,600,000	\$ 3,000,000	\$ 3,000,000	\$ 1,000,000	\$ 1,000,000

Description: Annual funding is used to review Corps water resources projects to determine the need for structural or operational modifications for the purpose of improving the quality of the environment in the public interest; to determine if the operation of such projects has contributed to the degradation of the quality of the environment; and to carry out a program of such modifications that are feasible and consistent with authorized project purposes. Not more than \$10,000,000 in Federal funds may be expended on any single modification or measure pursuant to Section 1135. Up to \$40,000,000 may be

appropriated annually to the Section 1135 program.

Authority: Section 1135 of the Water Resources Development Act of 1986 (PL 99-662), as amended.

1/ Non-Federal interests are required to share in a minimum of 25 percent of the implementation cost of each project.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$5,866,000. There was an additional \$1,318 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is less than \$200,000. This amount will be used to perform work on the project as follows: Continue planning, design, coordination, and construction activities.

APPROPRIATION: Harbor Maintenance Trust Fund, Fiscal Year 2019

PROJECT NAME: Dredge McFarland Ready Reserve –Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$11,573,100	\$11,573,000	\$11,573,000	\$11,690,000 1/ 2/	\$11,690,000

AUTHORIZATION: Water Resources Development Act (WRDA) of 1996 (PL 104–303) as modified by Section 2047 of WRDA 2007 (PL 110-114), which limits use of the dredge solely for urgent and emergency purposes and limited training days.

DESCRIPTION: The Government dredge McFarland was placed in ready reserve status in December 2009. The dredge will be placed in an active status in order to perform work in those instances when private industry fails to submit a responsive or responsible bid for advertised dredging, or where industry has failed to perform under an existing contract or other urgent or emergency requirements as determined by the Secretary. The dredge remains available for any activation requests throughout Fiscal Year (FY) 2019.

This funding is used to maintain the dredge McFarland in ready reserve status with sufficient crew to respond within 72 hours when directed to do so for urgent and emergency purposes, and to perform 70 days of required training work in the Delaware River and Bay as specified in its authorization, with dredging work charged to the project dredged.

In FY 2017, the Government dredge McFarland performed 70 days of training work in the Delaware River and Bay with dredging work charged to the project dredged. The McFarland was not activated in FY 2017.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$0. There was an additional \$0 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Harbor Maintenance Trust Fund, Fiscal Year 2019

PROJECT NAME: Dredge Wheeler Ready Reserve, LA – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$14,850,000	\$14,850,000	\$14,850,000	\$15,000,000 1/ 2/	\$15,000,000

AUTHORIZATION: Section 237 of the Water Resources Development Act (WRDA) of 1996 contained a provision requiring the Corps Hopper Dredge Wheeler placed in a ready reserve status.

DESCRIPTION: The hopper dredge Wheeler is docked at the U.S. Army Corps of Engineers' New Orleans District. Section 237 of WRDA 1996 requires that no individual project funds may be used to fund the dredge in its ready reserve status unless the dredge is specifically used in conjunction with a project. The dredge Wheeler is funded out of project funds when it is performing dredging during readiness exercises or when the dredge is activated to perform work on a project. During September 1982, the dredge was placed in an active service status in order to perform work in those instances when private industry fails to submit a responsive or responsible bid for advertised dredging, or where industry has failed to perform under an existing contract. The Wheeler has been called out to perform urgent dredging to assist industry dredges in restoring navigation channels and waterways most years since it was placed in Ready Reserve on October 1, 1997.

This funding is used to maintain the Wheeler in ready reserve status, and will not be assigned any scheduled hopper dredging work other than 70 days of maintenance dredging that will be completed in conjunction with readiness exercises to maintain the skills of the crew, and ensure that the Wheeler remains in a fully operational state, ready to respond to any emergent dredging requirements. The Wheeler will remain at the dock, with sufficient crew to respond within 72 hours when directed to do so.

During Fiscal Year (FY) 2017, the Wheeler completed 119 days dredging through a combination of readiness exercises and multiple deployments by Headquarters, U.S. Army Corps of Engineers to perform urgent dredging on the Mississippi River's Southwest Pass and the Calcasieu River Bar Channel.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$370,000. There was an additional \$0 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no Conference Amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Harbor Maintenance Trust Fund, Fiscal Year 2019

PROJECT NAME: Harbor Maintenance Fee Data Collection – Navigation

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$837,050	\$787,000	\$787,000	\$795,000 1/ 2/	\$795,000

AUTHORIZATION: Section 3 of the 1945 River and Harbor Act (as amended by Section 915 (g) of the Water Resources Development Act of 1986).

DESCRIPTION: Up to \$5,000,000 is authorized to be used annually for the administration of the Harbor Maintenance Trust Fund (HMTF). Most of these funds are used by U.S. Customs and Border Protection (CBP). The Corps performs analyses of the HMTF revenues and transfers to document the operation of the trust fund and to prepare and distribute the Annual Report to Congress on the Status of the Harbor Maintenance Trust Fund. Analysis of waterborne commerce shipments and vessel movement data is also needed to respond to legal questions to the Harbor Maintenance Tax (HMT); to analyze alternative funding options; and to assess the economic and competitiveness impacts of other potential funding sources. The Corps is also required to collect data on foreign and domestic shippers subject to the fee. Therefore, the Corps requires a portion of the administrative funding to continue its ongoing HMTF support efforts. The General Accountability Office (GAO) issued its final report (GAO-08-321), which recommended that the CBP and the Corps improve their coordination and procedures in order to increase HMT collections by auditing domestic shippers failing to pay or underpaying the HMT mandated by law. This item is reported under CWBI in ITIPS and the OMB 300b.

Annual funding will be used by the Corps to document the operation of the trust fund, analyze waterborne commerce shipments and vessel movement data to respond to legal questions to the HMT and the increasing requests for HMTF data/analyses, collaborate with CBP to improve CBP-Corps data communication systems to target delinquent domestic shippers for audit to increase HMT collections, continue ongoing HMT data collection and analysis programs, and to develop and implement improved data collection processes and systems and data analysis models and program computer enhancements to provide more complete/accurate domestic shipper information, as well as, the origin/destination of the vessel movements in order to more accurately identify those moves subject to the HMT.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$8,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

APPROPRIATION TITLE: Mississippi River Tributaries

PROJECT NAME: Inspection of Completed Works (Flood Damage Reduction) – Operation and Maintenance

STATE	FY2016 Allocations	FY 2017 Allocations	Presumed FY 2018 Allocations 1/ 2/	FY 2019 Budgeted Amounts
Arkansas	\$284,000	\$557,000	\$421,000	\$364,000
Illinois	\$170,000	\$38,000	\$27,000	\$38,000
Kentucky	\$100,000	\$28,000	\$20,000	\$95,000
Louisiana	\$1,648,000	\$2,078,000	\$725,000	\$807,000
Mississippi	\$293,000	\$92,000	\$180,000	\$135,000
Missouri	\$220,000	\$237,000	\$165,000	\$208,000
Tennessee	\$80,000	\$87,000	\$33,000	\$47,000
TOTAL PROGRAM	\$2,795,000	\$3,117,000	\$1,571,000	\$1,694,000

AUTHORIZATION: The Rivers and Harbors Act of 1899 (30 Stat. 1151) and the Flood Control Act of May 15, 1928 (70th Congress, 1st session, Ch. 596).

DESCRIPTION: Annual funding is used to inspect locally maintained flood damage reduction projects that the Army Corps of Engineers constructed in the lower Mississippi River valley and its tributaries. For each of these projects, the Department of the Army and the non-Federal sponsor have executed an agreement that identifies the "items of local cooperation" that are a non-Federal responsibility, including operation and maintenance requirements necessary to ensure the project will function as intended, as well as preserve the value of the Federal investment. The inspections are used to identify deficiencies or areas which need monitoring or immediate repair; to identify any changes over time; and to collect information in order to be able to make informed decisions about future actions. Funds are also used to review updates to project operation and maintenance manuals.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$165,556. There was an additional \$3,931 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

Division: Mississippi Valley

Memphis, Vicksburg, and
New Orleans Districts

Inspection of Completed Works, AR,
IL, KY, LA, MS, MO, and TN

APPROPRIATION TITLE: Mississippi River and Tributaries, Fiscal Year 2019

PROJECT NAME: Collection and Study of Basic Data, Investigations – Flood Damage Reduction

Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount in FY 2019
\$9,646,000	\$10,029,000 1/	\$7,000,000	\$2,700,000 2/ 3/	\$600,000

DESCRIPTION: Annual funding will be used to continue the collection of basic data, which are used in the planning, design, and operation of the flood risk management projects of the lower Mississippi River and its tributaries, and to replace and repair stage gages.

This activity is authorized by the Flood Control Act of 1928.

1/ \$3,400,000 reprogrammed away from this line item in FY 2016.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget amount for FY 2018.

3/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$815,885. There was an additional \$357,411 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2019 from prior appropriations for use on this effort is \$0.

Division: Mississippi Valley

Memphis, Vicksburg, and
New Orleans Districts

Collection and Study of Basic Data,
AR, IL, KY, LA, MS, MO, and TN

APPROPRIATION TITLE: Mississippi River and Tributaries

PROJECT: Mississippi River Commission (New) 1/

LOCATION: Mississippi Valley Division

DESCRIPTION: The Mississippi River Commission works with stakeholders in the lower Mississippi River valley and its tributaries, and with the U.S. Army Corps of Engineers on the flood damage reduction challenges posed by the river. Mississippi River Commission expenses are for the three presidentially appointed Civilian Members.

AUTHORIZATION: The Mississippi River Commission (MRC) was established by the 1879 Mississippi River Commission Act, Sixth Congress, Session I Ch. 43. 1879.

SUMMARIZED FINANCIAL DATA:

Allocation in FY 2014	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Presumed Allocation in FY 2018	Budgeted Amount for FY 2019
\$ N/A	\$ N/A	\$ N/A	\$ N/A	\$ 90,000	\$ 90,000

JUSTIFICATION: The purpose of this line item is to provide transparency on the expenses incurred by the Mississippi River Commission and to keep track of those costs over time.

FISCAL YEAR 2019: The budget amount of \$90,000 will be applied as follows:

Civilian Members Stipends and associated travel	\$90,000
Total	\$90,000

PROPOSED ACTIVITIES FOR FISCAL YEAR 2019: The Fiscal Year 2019 funds will be used to meet expenses for three Civilian Members (a stipend of \$21,500 for each of them annually) and their associated travel expenses. The remaining four Commission Members are military officers, who receive no extra compensation for their service on the Commission.

1/ This activity is funded at 100 percent Federal expense.

APPROPRIATION TITLE: Mississippi River and Tributaries, Fiscal Year 2019

PROJECT NAME: Mapping, AR, IL, KY, LA, MS, MO, and TN – Operation and Maintenance

AUTHORIZATION: The Flood Control Acts of 1928 (P.L. 70-391) and 1937 (P.L. 75-406).

LOCATION AND DESCRIPTION: This activity involves the preparation of topographic maps of the alluvial valley of the lower Mississippi River and its tributaries for use in flood and floodplain management.

FISCAL YEAR 2017 ALLOCATION: \$1,127,000

DESCRIPTIONS OF WORK FOR FY 2017: FY 2017 funds were used to perform mapping activities related to the Mississippi River and its tributaries, including, but not limited to, environmental, cultural, navigation, flood risk management, and potamology maps.

PRESUMED FISCAL YEAR 2018 ALLOCATION : \$1,139,000 2/

DESCRIPTIONS OF WORK FOR FY 2018: FY 2018 funds will be used to perform mapping activities related to the Mississippi River and its tributaries, including, but not limited to, environmental, cultural, navigation, flood risk management, and potamology maps.

BUDGETED AMOUNT FOR FY 2019: M: \$0 O: \$819,000 T: \$819,000 1/

DESCRIPTIONS OF WORK AND JUSTIFICATIONS FOR FY 2019:

N: N/A

FRM: \$819,000 – Funds will be used for mapping activities for flood risk management, historical data preservation, and providing basic topographic information for engineering studies.

RC: N/A

H: N/A

EN: N/A

WS: N/A

Division: Mississippi Valley

Memphis, Vicksburg, and
New Orleans Districts

Mapping, AR, IL, KY,
LA, MS, MO, and TN

OTHER INFORMATION: The existing 1-to-62,500 quadrangle maps are currently being converted from the original hard copy format to a computer-aided design format. The digital format will allow the maps to be used in the computer-aided design environment for a multitude of uses including geographic information systems.

1/ Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2017 to FY 2018 was \$26,454. There was an additional \$11,885 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2018. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2019 from prior appropriations for use on this effort is \$0.

2/ There was no conference amount available at the time this justification sheet was prepared. The amount shown is the President's Budget Amount for FY 2018.