INVESTIGATIONS

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost $	Allocations Prior to FY 2015 $	Allocation in FY 2015 $	Allocation in FY 2016 $	Allocation in FY 2017 $	Budgeted Amount in FY 2018 $	Additional to Complete After FY 2018 $
	2,469,900	1,457,400	25,000 1/	200,000	500,000 2/	287,500	0

Village Creek, Alabama – Flood Risk Management (Completion)

Mobile District

The study focuses on approximately 16 miles of the stream of Village Creek from the Birmingham City Limits located just upstream of the confluence of Village Creek and Black Creek to the head of Village Creek at Alabama Highway 75. This is the portion of the stream within the city limits of Birmingham, which is located in Jefferson County, Alabama. The entire watershed drains an area of approximately 40 square miles. A flood event in 1995 on this part of the stream, which is the focus area of this study, flooded an area that approximated the 25-year floodplain and affected about 1,000 homes with damages totaling about five million dollars. The Corps completed a non-structural evacuation project in 1995, which removed 642 structures for a total project cost of about $29.6 million. Since that time, the City of Birmingham has acquired about 200 parcels as part of FEMA's Hazard Mitigation Grant Program.

The purpose of this study is to develop options for improved flood risk management within the study area. The reconnaissance phase was completed in 1998. The Department of the Army and the City of Birmingham, the non-Federal sponsor, executed a Feasibility Cost Sharing agreement on March 19, 1999 and an amendment to that agreement on June 9, 2016.

Fiscal Year 2017 funds will be used to select the Tentatively Selected Plan. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study, including public coordination, Agency Decision, Civil Works Review Board, and Chief's Report. The total cost of the feasibility study is $4,561,800 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is $138,000 and funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Study Cost	$4,681,800
Reconnaissance Phase (Federal)	120,000
Feasibility Phase (Federal)	2,349,900
Feasibility Phase (Non-Federal)	2,211,900

Study Authority: House Resolution 2477 adopted March 7, 1996.

1/ $25,000 reprogrammed to this study in FY 2015

2/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $181,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY2015	Allocation in FY2015	Allocation in FY2016	Amount FY2017	Budgeted Amount FY2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,968,170	318,170	100,000	1,180,000	0 1/	370,000	0

Kotzebue Harbor, Alaska – Navigation (Completion)

Alaska District

Kotzebue, Alaska is located in northwestern Alaska about 550 miles northwest of Anchorage and about 25 miles north of the Arctic Circle. The city itself is actually located on a 3-mile long spit located on the northwest tip of the peninsula. The spit faces Kotzebue Sound to the north and west and Kotzebue Lagoon to the east. Because of shallow water in Kotzebue Sound, oceangoing barges that deliver general cargo and fuel from Anchorage and the Pacific Northwest are forced to anchor about 15 miles offshore and cargo is lightered to Kotzebue, requiring additional time and cost. Kotzebue is a hub community that provides supplies to many surrounding communities. Often times the same goods that are lightered off of barges bringing supplies to Kotzebue are lightered out to barges delivering the same supplies to communities. At the end of the commercial navigation season, lightering tugs and barges are typically removed from the water to avoid damage from winter ice. However, currently two large barges (around 470 tons, empty weight), owned by two different companies, are too large to remove from the water thus risking damage from ice flow conditions. Most of the communities served by Kotzebue are Alaska Native Villages.

The purpose of the study is to identify opportunities to reduce transportation costs and decreased vessel damages. A Feasibility Cost Sharing Agreement was signed between the Department of Army and the Native Village of Kotzebue, the non-Federal sponsor, in November 2015.

Carry-in funds will be used to continue the feasibility phase. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of this study. The cost of the feasibility phase is $3,150,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review which is estimated to cost $150,000 and will be funded at 100 percent Federal expense.

A summary of the study cost sharing is as follows:

Total Estimated Study Cost	$3,468,170
Reconnaissance Phase (Federal)	318,170
Feasibility Phase (Federal)	1,650,000
Feasibility Phase (Local)	1,500,000

This study is authorized by Section 204 of the Flood Control Act of 1948.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $1,010,000, including $36,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2017. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

	Total Federal Cost	Allocation Prior to FY 2016	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Balance to Complete after FY 2018
Study	$ 1,550,000	$ 0	$ 200,000	$ 400,000	$ 950,000	$ 0

Lowell Creek Tunnel Flood Diversion, AK - Flood Risk Management (Completion)

Alaska District

Lowell Creek is located in Seward, Alaska approximately 125 miles south of Anchorage, Alaska. Seward is the southern terminus of the Alaska Railroad and is also connected to the Alaska Highway system. The City of Seward is built on the alluvial outwash plain originally formed by Lowell Creek. The U.S. Army Corps of Engineers diverted Lowell Creek away from the community in 1940 in the Lowell Creek flood control project, which was authorized by Congress on August 25, 1937. Construction was completed in November 1940. The existing project consists of a diversion dam and tunnel to carry the floodwaters and debris of Lowell Creek away from Seward, through Bear Mountain into Resurrection Bay. The existing tunnel lining suffers erosive damage from rocks and debris being carried by the flood flows and has required significant repair and replacement. The Alaska District has repaired the tunnel four times; three times under the authority of P.L. 84-99 and an additional time under the authority and direction of Section 510 of P.L. 106-60 (WRDA 2000). Floods in 1986, 1989, and 1995 pointed out the potential for property damage and life safety concerns associated with overtopping of the diversion dam as a result of high flows and blockage of the tunnel by landslides or debris. The City of Seward had been maintaining the project since 1940, but maintenance of the tunnel has been a challenge because of the very short time frame the tunnel is able to be entered and maintenance and repairs accomplished, a maximum of six to eight weeks per year. Section 5032 of WRDA 2007 directs the Secretary to assume responsibility for the long-term maintenance and repair of the Lowell Creek Tunnel, Seward, Alaska until an alternative method of flood diversion is constructed and operational or 15 years after the date of enactment of WRDA 2007 (8 November 2007), whichever is earlier.

The purpose of the study is to evaluate the benefits and costs of options for flood risk management, including whether there may be an alternative method for diverting water from Lowell Creek during a flood. The Department of the Army and the City of Seward, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement in August 2016.

Fiscal Year 2017 funds are being used to continue the study, including conducting Alternative Formulation and Analysis, In-Progress Reviews and developing the Tentatively Selected Plan. Fiscal Year 2018 funds will be used to complete the feasibility phase of the study. The total cost of the feasibility phase is $3,050,000, which is to be cost shared 50 percent Federal and 50 percent non-Federal, except for $50,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense.

A summary of study cost sharing is as follows:

Total Estimated Study Cost	$3,050,000
Feasibility Phase (Federal)	$1,550,000
Feasibility Phase (non-Federal)	$1,500,000

Authority: Section 5032 of the Water Resources and Development Act of 2007

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $198,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocation Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	2,010,900	210,900	150,000	1,288,000	0 1/	362,000	0

St. George Harbor Improvement, Alaska – Navigation (Completion)

Alaska District

St. George is located on the northeast shore of St. George Island, the southern-most of five islands in the Pribilofs, which are located in the Bering Sea. It lies 47 miles south of St. Paul Island, 750 air miles west of Anchorage and 250 miles northwest of Unalaska. Most freight and supplies are delivered by ship from Anchorage on a monthly or bimonthly schedule; cargo from Seattle arrives five or six times a year. A harbor was constructed by the City of St. George with assistance from the State in the late 1980s and early 1990s. The harbor is barely useable due to dangerous wave conditions in the entrance channel, wave surging in the mooring area and deteriorating breakwaters.

The purpose of the feasibility study is to determine the feasibility of providing navigation improvements at St. George Harbor, Alaska. A reconnaissance level report was prepared and approved in August 2002. The Department of the Army and the City of St. George, the non-Federal sponsor, executed a Feasibility Cost Share Agreement in October 2015.

Carry-in funds will be used to continue the feasibility study, develop the final array of alternatives and identify a Tentatively Selected Plan. Fiscal Year 2018 funds will be used to complete the feasibility phase of this study. The preliminary estimated cost of the feasibility phase is $3,000,000 and is shared 50 percent Federal and 50 percent non-Federal, except for $150,000 for the Independent External Peer Review which is funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Study Cost	$3,510,900
Reconnaissance Phase (Federal)	$360,900
Feasibility Phase (Federal)	$1,650,000
Feasibility Phase (Local)	$1,500,000

This study was authorized in Section 4010 of the Water Resources Development Act of 2007.

1/Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $1,240,500. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,650,000	0	0	200,000	500,000 1/	950,000	0

Unalaska (Dutch Harbor), Alaska - Navigation (Completion)

Alaska District

Dutch Harbor is located in Unalaska, Alaska on Amaknak Island in the Aleutian Chain. It lies 800 air miles from Anchorage and 1,700 miles NW of Seattle. It is the only deep water port serving the west coast of Alaska that is free of ice year round. The depth of the naturally occurring entrance channel at MLLW is 42 feet, resulting in entering/exiting the harbor being dependent upon the tides and sea state. The entrance channel is threatened by the growth of a shoal and channel depth is limiting the size of vessels able to utilize the harbor. The City of Unalaska is concerned that the harbor entrance will continue to get shallower further impeding vessels trying to use the port.

This study will identify problems and opportunities for providing navigation improvements at Dutch Harbor, Alaska. The Department of the Army and the City of Unalaska, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement in August 2016.

Fiscal Year 2017 funds are being used to continue the study, including conducting Alternative Formulation and Analysis, In-Progress Reviews and developing the Tentatively Selected Plan. Fiscal Year 2018 funds will be used to complete the feasibility phase of the study. The total cost of the feasibility phase is $3,150,000 and is shared 50 percent Federal and 50 percent non-Federal, except for $150,000 for the Independent External Peer Review, which will be funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Estimated Study Cost	$3,150,000
Feasibility Phase (Federal)	$1,650,000
Feasibility Phase (non-Federal)	$1,500,000

This study is authorized by Section 204 of the Flood Control Act of 1948.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $130,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
$	$	$	$	$	$	$
3,814,000	2,341,000	651,000	122,000	286,000 1/ 2/	414,000	0

Little Colorado River (Winslow), AZ - Flood Risk Management (Completion)

Los Angeles District

The study is located on the Little Colorado River in Navajo County, Arizona. In 1993, the Little Colorado River overtopped the Winslow levee, inundating 204 parcels, which damaged 140 structures. In 2004, the levee suffered a piping failure. In both cases the timely and emergency actions taken by Navajo County prevented catastrophic and complete failure. The Winslow levee runs 7.2 miles along the Little Colorado River, and reduces the flood risk in the City of Winslow and adjoining unincorporated areas. An engineering study conducted by Navajo County found that that this levee will not contain a 100-year flood. In that case, urbanized areas west of the river and north of Interstate 40 could experience flooding in a flood of that magnitude. Navajo County also submitted a Technical Data Notebook to the Federal Emergency Management Agency, November 14, 2005, that redefines the floodplain for the Little Colorado River near the Winslow Levee. The County submittal to the Federal Emergency Management Agency acts to decertify the levee and increase the width of floodplain in the area adjacent to the levee. Flooding could affect historic and cultural resources at Homolovi Ruins State Park. Additionally, salt cedar thickets have crowded out less dense native riparian vegetation, which has increased flooding potential, decreased the amount of water available for water supply, and adversely affected biodiversity and habitat for species, including several state and Federally listed species of concern.

The primary purpose of the study is to develop options to reduce the risk of flood damages along the Winslow Levee. The reconnaissance study was completed in August 2008 as part of a Supplemental Reconnaissance Report for the Little Colorado River Watershed Study. The Department of the Army and the Navajo County Flood Control District, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement in August 2008.

Fiscal Year 2017 funds are being used to continue the feasibility phase of the study. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study. The total cost of the feasibility phase is $7,465,000 and is shared 50 percent Federal and 50 percent non-Federal interests, except for $163,000 for Independent External Peer Review, which is funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Study Cost	$7,465,000
Feasibility Phase (Federal)	$3,814,000
Feasibility Phase (Non-Federal)	$3,651,000

Study Authority: Flood Control Act of 1937 and House Resolution 2425 dated May 17, 1994.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $76,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.
2/ Allocation in FY 2017 includes $57,000 reprogramming

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
$	$	$	$	$	$	$
1,750,000	100,000	300,000	700,000	400,000	250,000 1/	0

Lower Santa Cruz River, AZ – Flood Risk Management (Completion)

Los Angeles District

The Santa Cruz River begins in southern Arizona then turns south on its way through a 35-mile loop in northern Mexico before reentering the United States near Nogales, Arizona. Santa Cruz River flooding impacts Pinal County, the City of Maricopa, and three Native American Tribes. Major flood events occurred in 1983 and 1993, impacting residences, businesses, schools, agriculture, and transportation infrastructure. The damage from these floods was widespread and included forced aerial evacuations; bridge closures; and extensive river and stream erosion, channel migration, and sediment deposition. The Santa Cruz River Data Collection Report found that 34 major flood events have occurred since the late 1800s, an average of roughly one every 4 years. Six of the seven largest flood events have occurred since the 1960s. In FY 2013, the Corps completed a Flood Plain Management Services study for basic data collection and stakeholder coordination to characterize the relative risk in the Lower Santa Cruz River Watershed. The information was provided to the Lower Santa Cruz River Alliance, a coalition representing various stakeholders, to identify the scale of flood risk problems and support for a larger study effort.

The purpose of the feasibility study is to identify potential solutions to improve flood risk management within the study area. The reconnaissance report was completed in September 2014. The Department of the Army and the Pinal County Flood Control District and the City of Maricopa, the non-Federal sponsors, executed a Feasibility Cost Sharing Agreement on August 28, 2015.

Fiscal Year 2017 funds are being used to continue the feasibility phase of the study. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study. The total cost of the feasibility phase is $3,200,000 and is shared 50 percent Federal and 50 percent non- Federal, except for $200,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Estimated Study Cost	$3,250,000
Reconnaissance Phase (Federal)	50,000
Feasibility Phase (Federal)	1,700,000
Feasibility Phase (Non-Federal)	1,500,000

Study Authority: Flood Control Act of 1938, Section 6.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $1,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $22,000.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,700,000	0	150,000	430,000	850,000 1/	270,000	0

Three Rivers, Arkansas – Navigation (Completion)

Little Rock District

The study is located on the McClellan-Kerr Arkansas River System (MKARNS) within the confluence of the Mississippi, White, and Arkansas Rivers in Desha and Arkansas Counties, in southeast Arkansas. Prominent features include MKARNS Post Canal and the 160,000-acre Dale Bumpers U.S. Fish and Wildlife Service National Wildlife Refuge. The Arkansas Post Canal connects the Arkansas to the White Rivers for navigation onto the Mississippi River to complete the 445-mile navigation system. The study area is downstream of Lock No. 1 of the MKARNS and upstream of the Montgomery Point Lock & Dam. In 1964, USACE constructed a concrete levee closure structure at the Historic Ark-White Cutoff to reduce the natural flow (cross currents) between the Arkansas and White Rivers for navigation. There is a risk to navigation of up to $300 million in lost benefits with a 7-10 percent annual chance of breach between the two rivers that would close navigation for more than 100 days as estimated in the 2009 Draft Ark-White Cutoff General Re-evaluation Report. Five states: Arkansas, Oklahoma, Texas, Kansas, and Missouri are affected by the MKARNS operations. Arkansas is a Top Ten State for producing sorghum, soybeans, cotton, and livestock and the number one producer of rice. These foodstuffs are transported on the MKARNS. Many structures were built over 40 years to stabilize the system in this area. In 1974, headcutting breached Owens Lake and formed a flow path between the two rivers in which a 3-mile long containment levee was constructed to reduce overland flows. In 1989, the Melinda Structure was constructed downstream of the Owens Lake Structure to provide a lower elevation grade structure to control flow between the two rivers at a cost of over $10 million. During flood events, head differential of greater than 3 feet (a 12.5 percent annual chance) between the rivers results in headcutting, geomorphic instability, and structure damage. Since 1989, headcutting resulted in 3 major rehabilitations at a cost of more than $30 million. Annual damage to the containment structure is $775,000. More structures were built costing more than $15 million in the past 10 years. The instability of the navigable river at this location would affect all traffic passing through that point. The sequencing between flood and drought, as occurred in Arkansas in 2006-2014, caused river banks to deteriorate more rapidly and increased the risk of a cutoff. A breach could result in the loss of thousands of acres of wetlands and pristine bottomland hardwoods. Without a sustainable solution to the active head-cutting, loss of habitat may impact four federally listed endangered species (ivory-billed woodpecker, interior least tern, pink mucket mussel, and fat pocketbook mussel), plus migratory habitat for the wood stork, which is a federally endangered species in the Southeast.

The Tentatively Selected Plan (TSP) has been identified as a new containment structure at elevation 157 feet mean sea level (MSL), with an opening at the Historic Cutoff at elevation 147 feet MSL. A Feasibility Cost Sharing Agreement was signed between the Department of Army and the Arkansas Waterways Commission, the non-Federal sponsor, in June 2015.

Fiscal Year 2017 funds, plus carry-in funds, are being used to continue the feasibility study, specifically to prepare and review the draft report and conduct the agency decision milestone. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study including preparation for the Civil Works Review Board documentation leading to the Chief's Report in June 2018. The estimated cost of the feasibility phase is $3,000,000, which is to be shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $200,000 and will be funded

at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$3,200,000
Feasibility Phase (Federal)	$1,700,000
Feasibility Phase (Non-Federal)	$1,500,000

The study authorization is Section 216, PL 91-611, River and Harbor and Flood Control Act of 1970.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $57,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Total Estimated Federal Cost	Allocation Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
$	$	$	$	$	$	$
3,670,000	2,528,000	717,000	0	325,000 1/	100,000	0

Aliso Creek Mainstem, CA – Aquatic Ecosystem Restoration (Completion)

Los Angeles District

The study area is located in south Orange County about 40 miles southeast of Los Angeles, California. This watershed covers approximately 36 square miles. The study was previously funded as part of the overall Aliso Creek Watershed Management study. Channel degradation and flood damage along the mainstem of Aliso Creek and some of its tributaries have caused severe environmental degradation. This multi-objective study addresses degradation of scarce riparian and freshwater marsh habitat in a significant undeveloped coastal canyon resource in Southern California associated with 28 listed plant and animal species. The mouth of Aliso Creek is designated critical habitat by the United States Fish and Wildlife Service for the Tidewater goby. Other threatened and endangered species with potential to occur in the study area include the Coastal California gnatcatcher and Least Bell's vireos for bird species and thread-leaved brodiaea, Laguna Beach dudleya, and big-leaved crownbeard for plant species. The study area also contains numerous California Species of Concern.

The purpose of the study is to examine channel stability, aquatic ecosystem restoration, flood risk management and recreation in the lower 6.5 miles of Aliso Creek. The reconnaissance phase was completed in September 2004. A Feasibility Cost-Sharing Agreement was signed between the Department of Army and the Orange County Watershed Group, the non-Federal sponsor, in September 2004.

Fiscal Year 2017 funds are being used to continue the feasibility phase of the study. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study including preparation for the Civil Works Review Board documentation leading to the Chief's Report. The total cost of the feasibility phase is $6,775,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review which is $175,000 and funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Study Cost	$6,970,000
Reconnaissance Phase (Federal)	195,000
Feasibility Phase (Federal)	3,475,000
Feasibility Phase (Non-Federal)	3,300,000

Study Authority: Santa Ana River Basin & Orange County adopted by Resolution of Committee of Public Works, House: May 8, 1964 and 1964 and Section 4015 of the Water Resources Development Act of 2007.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $135,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Total Federal Cost 1/	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
$	$	$	$	$	$	$
2,002,000	0	400,000	520,000	400,000 2/	682,000	0

Corte Madera Creek, CA General Reevaluation Report (GRR) - Flood Risk Management (Completion)

San Francisco District

Corte Madera Creek drains a 28-square mile area of Marin County, and flows into San Francisco Bay about 12 miles north of San Francisco, California. Corte Madera Creek has a history of flooding with the largest flow in the winter of 1982 and more recently in December 2005 and January 2006. There are over 400 structures within the 0.2 percent annual chance exceedance floodplain. The study area consists of Units 1, 2, 3, and 4 along approximately 2 miles of Corte Madera Creek. The Corps of Engineers completed improvements for three flood control study units (Units 1, 2 and 3) of the Corte Madera Creek Flood Control Project in the 1960s and 1970s. Unit 4 was never constructed.

The primary purpose of study is to evaluate options to reduce flood risk in the City of Kentfield, Town of Ross, and surrounding unincoporated lands. The Department of the Army and the Marin County Flood Control and Water Conservation District, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on February 25, 2014.

Fiscal Year 2017 funds are being used to complete the Tentatively Selected Plan milestone. Fiscal Year 2018 funds, plus any carry-in funds will be used to complete the feasibility phase. The total cost of the feasibility phase is $3,804,000 and is shared 50 percent Federal and 50 percent non-Federal, except for $200,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Study Cost	$ 3,804,000
Feasibility Phase (Federal)	2,002,000
Feasibility Phase (Non-Federal)	1,802,000

Authority: Section 11 of the Flood Control Act of 1944

1/ A GRR was initiated in 1999 using construction funds until 2011 at a cost of $3.5 million to evaluate the remaining unconstructed section; however, that effort was not completed due to litigation and lack of community consensus on the path forward.

2/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $273,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $2,000.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete after FY 2018
	$	$	$	$	$	$	$
	1,685,000	0 2/	300,000	700,000	425,000 1/	260,000	0

Dry Creek (Warm Springs) Restoration, CA – Aquatic Ecosystem Restoration (Completion)

San Francisco District

The study area is located in northern California along the Russian River at Lake Sonoma and Warm Springs Dam, near the cities of Geyserville and Cloverdale, about 100 miles northwest of San Francisco, California. The Russian River drains an area of 1,485 square miles. Approximately two-thirds of this area is in Sonoma County, with the remainder in Mendocino County. The existing Corps project, Warm Springs Dam, is an earthen dam 319 feet high and 3,000 feet long, completed in 1983. The project authorization was amended by Section 95 of the Water Resources Development Act of 1974 to compensate for fish losses on the Russian River. The September 24, 2008 Biological Opinion (BiOp) issued by the National Oceanic Atmospheric Administration's (NOAA's) National Marine Fisheries Service on Dry Creek at Warm Springs Dam, mandates that the United States Army Corps of Engineers perform various actions to save threatened salmonids species.

The purpose of the study is to evaluate ecosystem restoration opportunities in Dry Creek. A Feasibility Cost Sharing Agreement was signed between the Department of Army and the Sonoma County Water Agency, the non-Federal sponsor, on May 6, 2015.

Fiscal Year 2017 funds are being used to complete the Tentatively Selected Plan, release the draft feasibility report for public review, and work towards the Agency Decision Milestone. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the Agency Decision Milestone and complete the feasibility phase of this study. The estimated cost of the feasibility phase is $3,170,000; $2,970,000 will be shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review that will cost $200,000 and will be funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$3,170,000
Feasibility Phase (Federal)	1,685,000
Feasibility Phase (Non-Federal)	1,485,000

Study Authority: Section 216 of the Flood Control Act of 1970 (33 U.S.C. § 549a) as amended and Section 209 of the Flood Control Act of 1962 (Public Law 87-874).

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in on this study from FY 2016 to FY 2017 was $462,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $218,000.
2/ Does not include reconnaissance level funding.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	997,000	103,000	50,000	77,000	275,000 1/	194,000	298,000

East San Pedro Bay Ecosystem Restoration, CA – Aquatic Ecosystem Restoration (Continuing)

Los Angeles District

The study area is located offshore of the City of Long Beach, California in the eastern part of San Pedro Bay. It includes the area between the Long Beach shoreline and the offshore Middle and Long Beach Breakwaters. Past dredging and filling, construction of breakwaters and other structures, plus intensive use of the area have significantly altered the water quality and biodiversity in the Bay. The purpose of the study is to evaluate opportunities for providing ecosystem restoration and other improvements to the near shore area off the City of Long Beach, within East San Pedro Bay, to improve habitat for various rockfish species, ling cod, various invertebrates, kelp, eelgrass, and sand bass.

The City of Long Beach conducted a study in 2008 and the U.S. Army Corps of Engineers completed a reconnaissance study in April 2010. A Feasibility Cost-Sharing Agreement was signed between the Department of the Army and the City of Long Beach, the non-Federal sponsor, in November 2010; an amended agreement was signed in January 2016 to allow the non-Federal sponsor to provide accelerated and contributed funds. Contributed funds were received and the feasibility study was resumed in February 2016.

Fiscal Year 2017 funds, plus carry-in funds, are being used to continue the feasibility study, including finalizing the Tentatively Selected Plan. Fiscal Year 2018 funds, plus any carry-in funds, will be used to continue the feasibility phase of the study to include conducting the Agency Decision Milestone and developing the final report. The estimated cost of the feasibility phase is $3,214,000 and is shared 26 percent Federal and 74 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $100,000 and will be funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$ 3,304,000
Reconnaissance Phase (Federal)	90,000
Feasibility Phase (Federal)	907,000
Feasibility Phase (Non-Federal)	2,307,000

The study authority is Senate Committee on Environment and Public Works Resolution adopted June 25, 1969, to review the Chief's Report for Los Angeles San Gabriel Rivers Ballona Creek, House Doc #838 76th Congress.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $3,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,877,000	150,000	300,000	700,000	400,000 1/	327,000	0

Port of Long Beach Navigation Improvements, CA – Navigation (Completion)

Los Angeles District

The Port of Long Beach is on the coast of southern California in San Pedro Bay, approximately 20 miles south of downtown Los Angeles, California. It is the second busiest seaport in the nation with trade, valued at more than $140 billion, moving through the Port each year. This study will evaluate the costs and benefits of the following options for navigation improvements to reduce transportation costs and improve safety in maneuvering for the current container vessel and liquid bulk fleet: (1) Deepen/establish the east approach channel and turning basin for the Pier J container terminal. The Pier J container terminal includes 256 acres of land and intermodal rail yard and three berths accessed by the east approach channel. (2) Deepen/establish the channel and turning basin for the Pier T Berth T124 and T126, which are adjacent to the main channel (-76 feet) MLLW. These berths can accommodate the latest liquid bulk vessels to support the import of crude and refined petroleum products and the import/export of additional liquid bulk products. (3) Deepen/establish the east access channel for Basin Six and the Southeast Basin container terminal. There are container terminals, break bulk, and liquid bulk in this location. (4) Adding additional deep draft anchorage sites to accommodate the number of large deep draft vessels that currently call at the Port. The protected anchorage sites currently maintained are too shallow to accept fully-loaded crude petroleum ocean-going vessels and thus meet the Port's needs for safety and efficiency; all of the deep water anchorages are outside the breakwaters. The reconnaissance report was completed in September 2014. The Department of the Army and the Port of Long Beach, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on August 27, 2015.

Fiscal Year 2017 funds are being used to complete work on the Tentatively Selected Plan. Fiscal Year 2018 funds, plus any carry-in funds, will be used to release the draft report and complete the feasibility phase. The total cost of the feasibility phase is $3,200,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which will cost $200,000 and will be funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Study Cost	$3,377,000
Reconnaissance Phase (Federal)	177,000
Feasibility Phase (Federal)	1,700,000
Feasibility Phase (Non-Federal)	1,500,000

Study Authority: Resolution of the Senate Committee on Public Works adopted May 11, 1967; Resolution of the House Committee on Public Works adopted July 10, 1968.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $257,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $111,000.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost $	Allocations Prior to FY 2015 $	Allocation in FY 2015 $	Allocation in FY 2016 $	Allocation in FY 2017 $	Budgeted Amount in FY 2018 $	Additional to Complete After FY 2018 $
	3,025,000	200,000	200,000	500,000	1,643,000 1/	482,000	0

Sacramento River Bank Protection Project (Phase 3 General Reevalution Report (GRR)), CA – Flood Risk Management (Completion)

Sacramento District

The Sacramento River Flood Control Project consists of 1,125 miles of levees plus overflow weirs, pumping plants and bypass channels along the Sacramento River from River Mile 0 near Collinsville to River Mile 194 near Chico, including several sloughs and the lower reaches of major tributaries. The Sacramento River levee system was initiated as a purely local project and many of the levees were constructed close to the riverbanks without a protective berm. The then existing levee system was authorized as the Sacramento River Flood Control Project in 1917. It has been modified and expanded several times since that date but no major change in the basic levee alignment has been made since the original conception of the project, which predates 1917.

High flows in January and March 1995 caused flooding and erosion in the Butte Basin area along the Sacramento River, RM 188 at Glenn County Road 29. During moderately high flows in February 1996, a 500 foot portion of berm on the American River failed, threatening the levee protecting the city of Sacramento; this portion has since been repaired. The 1997 flood event and the high flows experienced in 1998 again put additional stress on the levee system. The sustained high water in January/February 2006 caused great concern and instigated an emergency declaration from the Governor of California relative to levee repair.

The areas behind the levees comprise over one million acres in which about 50 communities are located. Approximately 2.3 million people live within this flood plain. The value of improvements (October 2003 prices) now located there is about $38 billion. The fertile flood plain lands produce about 6.6 percent of the total agricultural production of the state and over 88 percent of the state's rice production.

Under the Sacramento River Flood Control Project, the Corps has been constructing bank protection to reduce the risk that a levee will fail due to erosion. Since the initial bank protection contract was let in June 1963, about 837,462 lineal feet of bank protection has been provided. Approximately an additional 83,491 lineal feet of bank protection, including the 80,000 lineal feet authorized by WRDA 2007, are authorized. The purpose of this GRR is to evaluate options for additional modifications to improve system integrity and resilience within the Sacramento River Flood Control Project footprint. The Department of the Army and the State of California, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on June 19, 2015.

Fiscal Year 2017 funds are being used to continue the GRR, including completion of the Tenatively Selected Plan milestone. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase. The total cost of the feasibility phase is $5,800,000 and is shared 50 percent Federal and 50 percent non-Federal, except for $250,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Study Cost	$5,800,000
Feasibility Phase (Federal)	3,025,000
Feasibility Phase (Non-Federal)	2,775,000

Study Authority: Flood Control Act of 1950, Pub .L. 81-516, § 205; Flood Control Act of 1960, Pub. L. 86-645, § 203, 74 Stat. 488, 498 (1960); River Basin Monetary Authorization Act, Pub. L. 93-252, § 202, 88 Stat. 49 (1974); Water Resources Development Act of 2007, Pub. L. 110-114, § 3031, 121 Stat. 1041, 1113.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $8,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Cost	Allocation Prior to 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$2,782,000	$150,000	$300,000	$700,000	$813,000 1/	$819,000	$0

Yuba River Fish Passage, CA (Englebright and Daguerre Point Dams) – Aquatic Ecosystem Restoration (Completion)

Sacramento District

The Yuba River is a tributary of the Feather River in the Sacramento Valley of California. The study area begins in the City of Marysville and extends upstream approximately 90 miles, including the Yuba River channel downstream from Bassetts Station on the North Fork of the Yuba River and downstream of Jones Bar on the South Fork of the Yuba River to the city of Marysville, Yuba County, California, which lies at the confluence of the Feather and Yuba Rivers. The Yuba River drains about 1,340 square miles of the western slopes of the Sierra Nevada mountain range as well as a small portion of the Sacramento Valley. Daguerre Point Dam, located approximately 11 miles upstream of Marysville, was constructed in 1906 and is owned and operated by the Corps; the dam is about 25 feet high, and training walls constructed of cobble extend approximately 15 miles downstream of the dam. Englebright Dam, located about 12 miles upstream from Daguerre Point Dam, was completed in 1941 and is also owned and operated by the Corps; the dam is a concrete arch structure over 1,000 feet wide and 260 feet high. Englebright Dam was constructed to contain hydraulic mining sediment in the event that hydraulic mining resumed. The Corps is responsible for the operation and maintenance of both dams. New Bullards Bar Dam, located on the North Fork of the Yuba River approximately 18 miles upstream from Englebright Dam, is the largest dam on the river and is owned and operated by the Yuba County Water Agency.

The purpose of the study is to recommend a plan to undertake project modifications for implementation of ecosystem restoration and would focus on the opportunities to reestablish habitat, including riparian habitat, along the Yuba River that was degraded through past hydraulic mining, dam construction and other activities, as well as increase spawning and rearing habitat for anadromous fish. Englebright Dam is a complete barrier to fish passage. Daguerre Point Dam provides fish passage. A United States Geological Survey study conducted in 2001, measuring the geochemistry of the sediment retained behind Englebright Dam indicated a relatively high concentration of mercury, methyl mercury and other toxic materials. The Environmental Protection Agency regulates the handling and disposal of these kinds of toxic materials. Mobilizing the sediment into the water column could result in relocation of the hazardous materials downstream to the lower Yuba, Feather, and Sacramento Rivers potentially contaminating existing anadromous fisheries habitat. Identical conditions exist at Daguerre Point Dam. Habitat along the Yuba River is degraded due to past mining practices and dam construction. Extensive hydraulic mining occurred in the Yuba River watershed during the late 1800s washing millions of cubic yards of gravel and debris into the river system. In addition to eliminating much of the riparian vegetation corridor along the lower Yuba River, the hydraulic mining debris had devastating impacts on salmonids. The Yuba River includes threatened California red-legged frog, threatened Central Valley spring-run Chinook salmon, and threatened California Central Valley steelhead, as well as designated critical habitat for these species. The threatened Southern distinct population segment of North American green sturgeon and their designated critical habitat also occur in the lower Yuba River.

In 2000, and again in 2007, the Corps initiated Endangered Species Act consultation with the National Marine Fisheries Service for a Biological Opinion on the impacts of routine operation of the dams to threatened salmon, steelhead trout and green sturgeon. On July 10, 2010, a Federal District Court Judge issued an

order remanding the 2007 Biological Opinion to National Marine Fisheries Service for further consideration and directed National Marine Fisheries Service to complete its review under the remand order by February 29, 2012. In July 2011, the same Judge ordered additional fish passage improvement measures at Daguerre Point Dam, which the Corps completed in September 2011, except for certain fish ladder maintenance requirements which are ongoing.

In October 2011, the Corps reinitiated consultation with National Marine Fisheries Service for a new Biological Opinion on the routine operations and maintenance activities at both dams, after submitting a Biological Assessment to National Marine Fisheries Service. Per court order, on February 29, 2012, National Marine Fisheries Service issued the Corps a jeopardy Biological Opinion, concluding that the dams threaten the continued existence of listed species and result in adverse modification of critical habitat. On November 27, 2012, National Marine Fisheries Service wrote a letter to the Corps extending the Biological Opinion deadlines for Corps actions. Per Court order, National Marine Fisheries Service was required to issue a new Biological Opinion in May 2014. On May 12, 2014, the National Marine Fisheries Service issued a Biological Opinion for Daguerre Point Dam and a final letter of concurrence with the Corps' determination that proposed operations and maintenance activities at Englebright Dam were "not likely to adversely affect" species listed under the Endangered Species Act.

A Feasibility Cost Sharing Agreement was signed between the Department of Army and the Yuba County Water Agency, the non-Federal sponsor, on June 2, 2015.

Fiscal Year 2017 funds, plus carry-in funds, are being used to complete the Tentatively Selected Plan and work toward the Agency Decision Milestone. Fiscal Year 2018 funds, plus any carry-in funds, will be used to release the draft feasibility report for public and agency review, conduct the agency decision milestone, and complete the feasibility phase of the study including preparation for the Civil Works Review Board documentation leading to the Chief's Report. The estimated cost of the feasibility study is $5,140,000; $4,990,000 will be shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which will cost $150,000 and be funded at 100 percent Federal expense.

A summary of study cost sharing is as follows:

Total Estimated Study Cost	$5,277,000
Reconnaissance Phase (Federal)	137,000
Feasibility Phase (Federal)	2,645,000
Feasibility Phase (Non-Federal)	2,495,000

Study Authority: Rivers and Harbors Act of 1962, P.L. 87-874, Section 209

The reconnaissance phase completed in September 2014 at a total cost of $137,000.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $314,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2018 from prior appropriations for use on this effort is $87,000.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost $	Allocations Prior to FY 2015 $	Allocation in FY 2015 $	Allocation in FY 2016 $	Allocation in FY 2017 $	Budgeted Amount in FY 2018 $	Additional to Complete After FY 2018 $
	2,079,000	50,000	216,000	1,300,000	0 1/	513,000	0

Rota Harbor Modifications, CNMI General Reevaluation Report – Navigation (Completion)

Honolulu District

Rota Harbor is located on the west coast of the island of Rota, Commonwealth of the Northern Mariana Islands (CNMI). The CNMI is comprised of a chain of 16 islands in the western Pacific approximately 3,700 miles west southwest of Hawaii and 1,400 miles south of Tokyo, Japan. The island of Rota is located 53 miles south-southwest of the main island of Saipan and is approximately 11 miles long and averages about 4 miles in width. Rota Harbor was constructed by the Corps of Engineers and completed in April 1985 under Section 107 of the River and Harbor Act of 1960, as amended. As an island community, Rota's population and economy are vitally linked to the shipment of goods into and out of Rota Harbor, the island's only commercial port. The existing harbor's size and configuration restricts larger sized vessels from calling on Rota Harbor and requires the transshipment of goods and material to and from Rota. The added cargo transportation cost associated with transshipment is estimated at $13 million annually. Additionally, adverse wave conditions within the harbor often result in vessel delays and damages, and disruption to port operations adding to the already high cost of cargo transportation.

The purpose of the study is to identify the need for navigation improvements to the existing harbor which was originally constructed by the U.S. Army Corps of Engineers in 1985. The reconnaissance report was completed in October 2001 under the Navigation Improvements, CNMI study. The Department of the Army and the Commonwealth Ports Authority, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on December 4, 2015.

Carry-in funds are being used to continue the feasibility phase, develop the final array of alternatives and identify a Tentatively Selected Plan. Fiscal Year 2018 funds will be used to complete the feasibility phase, including the Agency Decision, Final Report and Chief's Report. The total cost of the feasibility phase is $2,998,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is $150,000 and funded at 100 percent Federal expense. Additionally, Section 1156 of the Water Resources Development Act of 1986 (Public Law 99-662) as amended by Section 1032 of the Water Resources Reform and Development Act of 2014 (Public Law 113-121) provides the Commonwealth of the Northern Mariana Islands with a cost share waiver of $455,000 towards the local cost of the study, which is also funded at 100 percent Federal expense.

A summary of cost sharing is as follows:

Total Study Cost	$3,048,000
Reconnaissance Phase (Federal)	50,000
Feasibility Phase (Federal)	2,029,000
Feasibility Phase (Non-Federal)	969,000

The study is authorized under Section 216 of the Flood Control Act of 1970 (Public Law 91-611).

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $1,342,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost $	Allocations Prior to FY 2015 $	Allocation in FY 2015 $	Allocation in FY 2016 $	Allocation in FY 2017 $	Budgeted Amount in FY 2018 $	Additional to Complete After FY 2018 $
	2,080,000	50,000	216,000	1,300,000	0 1/	514,000	0

Tinian Harbor Modifications, CNMI General Reevaluation Report – Navigation (Completion)

Honolulu District

Tinian Harbor is located on the southwestern coast of the island of Tinian, Commonwealth of the Northern Mariana Islands (CNMI). The CNMI is comprised of a chain of 16 islands in the western Pacific approximately 3,700 miles west-southwest of Hawaii and 1,400 miles south of Tokyo, Japan. Tinian is located 3 miles south-southwest of the main island of Saipan, is approximately 13 miles long, and averages about 6 miles in width. The shoreline is formed predominantly by sea cliffs 20 to 100 feet high. Tinian Island is subject to storm waves associated with tropical cyclones. Tinian Harbor was originally constructed during World War II by the U.S. Navy Seabees. As the island of Tinian's only commercial port and primary facility for the import and export of goods and material, Tinian Harbor is vital to the island's economic and social welfare.

The purpose of the study is to investigate general navigation feature improvements to the existing harbor. The reconnaissance report was completed in October 2001 under the Navigation Improvements, CNMI study. The Department of the Army and the Commonwealth Ports Authority, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on December 4, 2015.

Carry-in funds are being used to continue the feasibility phase, develop the final array of alternatives and identify a Tentatively Selected Plan. Fiscal Year 2018 funds will be used to complete the feasibility phase including Agency Decision, Final Report and Chief's Report. The total cost of the feasibility phase is $3,000,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is $150,000 and funded at 100 percent Federal expense. Additionally, Section 1156 of the Water Resources Development Act of 1986 (Public Law 99-662) as amended by Section 1032 of the Water Resources Reform and Development Act of 2014 (Public Law 113-121) provides the Commonwealth of the Northern Mariana Islands with an additional credit of $455,000 towards the study. A summary of cost sharing is as follows:

Total Study Cost	$3,050,000
Reconnaissance Phase (Federal)	50,000
Feasibility Phase (Federal)	2,030,000
Feasibility Phase (Non-Federal)	970,000

The study is authorized under Section 444 of the Water Resources Development Act of 1996 (Public Law 104-303).

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $1,345,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,700,000	0	0	0	300,000 1/	700,000	700,000

Delaware Inland Bays and Delaware Bay Coast, DE – Flood Risk Management (Continuing)

Philadelphia District

This study area was identified as a focus area in the North Atlantic Coast Comprehensive Study (NACCS) conducted in response to Hurricane Sandy and includes all of the tidally influenced bays and estuaries in Delaware located landward of the Atlantic Ocean and Delaware Bay coastlines. The Delaware Inland Bays and the Delaware Bay Coast area is characterized by flat, low-lying coastal plains that are vulnerable to coastal flooding during a coastal storm from wind-driven storm surge and storm waves. Past flood events that cause significant damage are the Ash Wednesday storm of 1962 with a storm surge of 9.5ft above MLLW and Hurricane Floyd in September 1999 that caused more than $8 million in damages. The National Climatic Data Center has reported 57 flood events from March 1993 to November 2009, resulting in more than $45 million in property damage in Sussex County and about $24 million in damages for New Castle County. Hurricane Sandy in October 2012 resulted in over $6.4 million in damage to property and the public infrastructure. The NACCS identified this area as one of the nine focus areas based on its vulnerability to erosion, wave attack, and inundation from coastal storms including hurricanes and nor'easters.

The study will evaluate flood reduction measures in the densely populated portions of the Delaware backbay and mainland coastline areas bordering the bays and tidal tributaries. The Department of the Army and the Delaware Department of Natural Resources and Environmental Control, the non-Federal sponsor, are scheduled to execute a Feasibility Cost Sharing Agreement in August 2017.

Upon execution of the Feasibility Cost Sharing Agreement, Fiscal Year 2017 funds will be used to develop the project management plan, initial screening and plan formulation, and completion of the Alternatives milestone. Fiscal Year 2018 funds will be used to continue the feasibility phase of the study, including additional plan formulation, economic and environmental analyses, and accomplishing the Tentatively Selected Plan milestone. The preliminary estimated cost of the feasibility phase is $3,200,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $200,000 and will be funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Estimated Study Cost	$3,200,000
Feasibility Phase (Federal)	$1,700,000
Feasibility Phase (Non-Federal)	$1,500,000

This study was authorized by resolution adopted by the U.S. Senate Committee on Environment and Public Works on June 23, 1988.

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

Division: North Atlantic District: Philadelphia Delaware Inland Bays and Delaware Bay Coast, DE

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,500,000	0	300,000	50,000 2/	700,000 1/	450,000	0

Proctor Creek Watershed Study, Atlanta, Georgia - Aquatic Ecosystem Restoration (Completion)

Mobile District

The study area includes the Proctor Creek watershed which lies completely within the City of Atlanta, Fulton County, Georgia. The watershed consists of approximately 24 miles of the urban stream. The drainage area contains approximately 16 square miles. The uppermost 9 stream miles of Proctor Creek headwaters are the most severely degraded within the basin. Proctor Creek drains northwesterly and directly to the Chattahoochee River and passes through an urbanized area. The United States Geological Society (USGS) and The Nature Conservancy (TNC) have documented a major loss of riffle/pool habitat, once supporting diverse endemic assemblages of species, throughout the Mid-Chattahoochee river basin due to altered flow and sedimentation. The project could include restoration and protection of valuable habitat for all life stages of native fishes and at least one endemic state threatened species, the bluestripe shiner. There is also a need to reduce the potential for flood damages along the creek. Development occurred in this area prior to implementation of the National Flood Insurance Program (NFIP) and, as a consequence, occurred in what was later found to be the 100-year floodplain. Development since that time has had to comply with the restrictions of the NFIP. An opportunity to integrate existing and potential recreation plans of the community into potential flood damage reduction and ecosystem restoration projects along the riparian corridor also exists. Other key points: CSX Transportation, Norfolk Southern Railway and Amtrak all have rail lines through the study area; the watershed is home to 20 parks including Maddox Park, a 51.5 acre community park with existing rail, proposed BeltLine route and expansion plans; there are 33 schools in the Proctor Creek Watershed (19 Elementary Schools, 9 Middle Schools, 5 High Schools). Some of these schools have been identified to take part in different projects within the watershed.

The primary purpose of the feasibility study is to identify problems, opportunities, and potential solutions to enhance the aquatic and ecological functions of the watershed that have been lost or degraded due to urbanization. A Feasibility Cost Sharing Agreement was signed between the Department of Army and the City of Atlanta, Georgia, the non-Federal sponsor, on October 5, 2015.

Fiscal Year 2017 funds, plus carry-in funds, are being used to continue the feasibility study including conducting further alternative formulation and analysis to finalize the Tentatively Selected Plan. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study including further analysis and refinement to develop and coordinate the recommended plan and preparation for the Civil Works Review Board documentation leading to the Chief's Report in October 2018. The preliminary estimated cost of the feasibility phase is $3,000,000 and is shared 50 percent Federal and 50 percent non-Federal. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$3,000,000
Feasibility Phase (Federal)	1,500,000
Feasibility Phase (Non-Federal)	1,500,000

The study is authorized in House Resolution 2445 of the Committee on Public Works and Transportation of the United States House of Representatives, adopted September 28, 1994.

1/ Estimated Unobligated “Carry-in” Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $72,000, including $12,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2017. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

2/ $50,000 reprogrammed to this study in FY 2016

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
$	$	$	$	$	$	$
1,500,000	0	0	200,000	550,000 1/ 2/	750,000	0

Sweetwater Creek, Georgia (GA) – Flood Risk Management (Completion)

Mobile District

The study area is comprised of the watershed of Sweetwater Creek which originates in southwestern Paulding County, flowing generally eastward into southwestern Cobb County, then turning south into eastern Douglas County. It is a tributary of the mid-Chattahoochee River, and flows through Sweetwater Creek State Park. This basin consists of 246 square miles with a stream length of about 46 miles. The basin is located just northwest of Atlanta, Georgia and runs through multiple municipalities (including the cities of Austell, Powder Springs, and Lithia Springs). During the flood of September 2009, Paulding County, Cobb County, and Douglass County were ground zero for record rainfall that sent local waterways to unprecedented levels. Typically, Sweetwater Creek flows at 3 feet water depth, but during the flood, the Creek rose to 30.8 feet and the flood included impacts to Interstate 20. The Sweetwater Creek watershed has experienced significant land use changes as urban development in communities continues expanding around the City of Atlanta.

The primary purpose of this study is to investigate structural and non-structural options for improved flood risk management. The Department of the Army and Cobb County, GA, the non-Federal sponsor, executed the Feasibility Cost Sharing agreement on May 25, 2016. This study will also be coordinated with the North Georgia Water Resources Agencies. The cities of Austell and Lithonia Springs, and Paulding and Douglass counties, are also interested in this study.

Fiscal Year 2017 funds are being used to continue the feasibility study including collection of data and forecasting potential flood risk management benefits leading up to a TSP. Fiscal Year (FY) 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study. The total cost of the feasibility phase is $3,000,000 which is to be shared 50 percent Federal and 50 percent non-Federal sponsor, except for $150,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Study Cost	$3,000,000
Feasibility Phase (Federal)	1,650,000
Feasibility Phase (Non-Federal)	1,350,000

Study Authority: House Resolution 2445 of the Committee on Public Works and Transportation of the United States House of Representatives, adopted September 28, 1994.

1/ FY 2017 Allocation includes $50,000 reprogramming

2/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $155,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocation Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation FY 2017	Budget Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	$1,800,000	0	0	$200,000	$500,000	$1,000,000 1/	$100,000

Grand River Basin, Iowa and Missouri – Aquatic Ecosystem Restoration (Continuing)

Kansas City District

The Grand River Basin is a Missouri River tributary that drains 7,900 square miles in southern Iowa and north central Missouri. Riparian, wetland, floodplain and other natural system functions have been seriously degraded over decades due the impacts of Federal and local projects and land use practices. Construction alteration and land practices have contributed to loss of floodplain conveyance and degradation of riparian and wetland habitat throughout the basin. Since the mid-1800s, thousands of acres of wetland and bottomland hardwood habitat have been lost. Over 300 miles of natural stream corridor have been channelized, adversely impacting thousands of linear feet of riparian aquatic habitat. Degradation, erosion, and sediment deposition have increased in intensity, which are now serious problems. The pervasive and systemic problems are also undermining and threatening critical water and transportation infrastructure. The Grand River Basin contains some of the most pristine, high value natural habitat in the State in the form of legacy wetlands and large stands of bottom land hardwoods. The Grand River has been designated in the State's "Our Missouri Waters" initiative, and represents one of the top two priority basins by the state for restoration funding and action.

The Grand River Basin is in the heart of what is known as the "Golden Triangle" of Missouri because of the presence and importance of the area to migratory waterfowl and other bird species. It lies near the border of the Central and Mississippi waterfowl flyways and is the core component of a wetland complex that includes over 22,000 acres of state and federal lands and 16,000 acres of privately owned United States Department of Agriculture (USDA) Wetlands Reserve Program (WRP) easement properties. The area adjacent to the lower Grand River has been designated as an Important Bird Area (IBA) by the Audubon Society. Fifty-one percent of the Lower Grand River IBA is publicly-owned conservation land. Swan Lake National Wildlife Refuge (NWR) (10,795 acres) is managed by the US Fish and Wildlife Service (USFWS). Under management of the Missouri Department of Conservation (MDC) are Fountain Grove Conservation Area (7,405 acres) and Yellow Creek Conservation Area (593 acres). Pershing State Park (3,566 acres) is managed by the Missouri Department of Natural Resources. Together the Grand River basin wetlands and associated uplands provide vital habitat for migrating waterfowl, shorebirds, and many other wetland dependent species, representing some of the most premier wetland habitat in the Midwest.

The Locust Creek watershed is centrally positioned within the basin and will be a priority area for plan formulation in evaluation of the creek and network of tributaries highly impacted by channelization. Through analysis of existing and future without project conditions, a robust array of measures will be evaluated including stream / aquatic and riparian restoration, and wetland restoration. The objectives of the recommended plan will be to protect and enhance the connectivity between the existing high value ecosystem features in the Golden Triangle area, and restore bottomland hardwood and high value wetland habitat supporting resident and migratory species. The study will address impacts to Federal endangered species including the Topeka shiner, Indiana Bat, and Northern long-eared bat. The recommended plan will restore habitat in this critically important flyway that serves 19 migratory bird species listed as conservation concerns by the USFWS. The plan will have an ancillary benefit of protection of water and transportation infrastructure.

Flood risk management is an ancillary purpose with structural and non-structure flood risk management measures considered to address residual flood risks within the basin. The Grand River Basin has experienced frequent damaging floods, the record flood being the 1947 event that caused approximately $22,600,000 of damages in unadjusted dollars.

The Department of the Army and the State of Missouri, the non-Federal partner, executed a Feasibility Cost Sharing Agreement on August 30, 2016.

Fiscal Year 2017 funds, plus any carry-in funds, will be used to continue the study, including Alternative Formulation and Analysis and In-Progress Reviews. Fiscal Year 2018 funds would be used to select a Tentatively Selected Plan, document the agency's decision in a draft feasibility report and environmental assessment, conduct internal quality control, independent external peer review, and public and agency reviews. The estimated cost of the feasibility phase is $3,300,000 and is shared 50 percent Federal and 50 percent non-Federal, except for $300,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense.

A summary of study cost sharing is as follows:

Total Estimated Study Cost	$3,300,000
Feasibility Phase (Federal)	$1,800,000
Feasibility Phase (Non-Federal)	$1,500,000

The study has been authorized by a resolution of the Senate Committee on Environment and Public Works, June 23, 2004.

1/ Estimated Unobligated "Carry-in" Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $188,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this study effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost $	Allocations Prior to FY 2015 $	Allocation in FY 2015 $	Allocation in FY 2016 $	Allocation in FY 2017 $	Budgeted Amount in FY 2018 $	Additional to Complete After FY 2018 $
	1,700,000	0	300,000	700,000	400,000 1/	300,000	0

DuPage River, IL – Flood Risk Management (Completion)

Chicago District

The DuPage River and tributaries drain approximately 350 square miles in suburban Cook, DuPage and Will Counties in the Chicago Metropolitan area. Major storm events occurred in the basin in 1996, 2008, 2009, and most recently in April 2013 resulting in overbank flooding to at least 20 communities and significant damage to residential and non-residential structures, and infrastructure, including the closure of two major interstate highways (I-80 and I-55) for several days. Average annual flood damages are currently estimated at $30 million.

The purpose of the study is to develop both structural and non-structural flood risk management alternatives for reducing flood risk within DuPage River watershed, including an assessment of damages to structures (residential, commercial, industrial, public) and transportation impacts due to overbank flooding. The Department of the Army and DuPage and Will Counties, the non-Federal sponsors, signed a Feasibility Cost Sharing Agreement on July 14, 2015.

Fiscal Year (FY) 2017 funds will be used to continue work on a feasibility study, including identification of the Tentatively Selected Plan and release the draft feasibility report for public review. Fiscal Year 2018 funds will be used to complete the feasibility phase and the Report of the Chief of Engineers. The total cost of the feasibility phase is $3,200,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review which is $200,000 and is funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Study Cost	$3,200,000
Feasibility Phase (Federal)	1,700,000
Feasibility Phase (Non-Federal)	1,500,000

This study is authorized by Section 206 of the Flood Control Act of 1958 (Public Law 85-500).

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $641,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

	Total Estimated Federal Cost	GLRI 1/ Allocations Thru FY16	Allocation Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017 2/	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$	$
GLMRIS	32,276,451	15,167,641	12,044,810	418,000	700,000	2,300,000	1,550,000	96,000
GLMRIS Program Mgt	TBD	0	0	82,000	300,000	300,000	300,000	TBD
Total	TBD	15,167,641	12,044,810	500,000	1,000,000	2,600,000	1,850,000	TBD

Interbasin Control of Great Lakes- Mississippi River Aquatic Nuisance Species, IL, IN, OH, & WI – Aquatic Ecosystem Restoration (Continuing)

Chicago District

The Mississippi River Basin includes approximately 1.3 million square miles of drainage area and 873 tributaries within 31 States and 2 Canadian provinces. The Chicago Area Waterway System (CAWS), which includes the Chicago Sanitary and Ship Canal, is considered to be the primary aquatic pathway that aquatic nuisance species may utilize to spread between the Mississippi River and Great Lakes basins because it provides a highly-utilized, multipurpose, continuous connection. The potential for significant economic and ecological impact to the Mississippi River and connected waterways from the uncontrolled transfer of aquatic nuisance species through the CAWS is high.

The purpose of the Great Lakes & Mississippi River Interbasin Study (GLMRIS) is to evaluate options and technologies available to prevent the spread of aquatic nuisance species in either direction between the Great Lakes and Mississippi River basins through the Chicago Sanitary and Ship Canal, and other aquatic pathways. In the context of this study, the Corps has interpreted the term “prevent” to mean the reduction of risk to the maximum extent possible, because it may not be technologically feasible to achieve an absolute solution. A Corps of Engineers January 2014 GLMRIS Report identified multiple alternatives; three alternatives identified the Brandon Road Lock and Dam as a location to establish controls that would create a buffer zone to address upstream transfer of Mississippi River species through all Chicago Area Waterway System pathways. Funding for program management includes vertical team coordination, coordination among and support to project elements within the geographical boundaries of the GLMRIS program, budget development and defense, public outreach, Asian Carp Regional Coordinating Committee and Chicago Area Waterway System Advisory Committee related activities, stakeholder engagement, and response to Congressional and media inquiries. Study efforts and program management are funded at 100 percent Federal expense.

Fiscal Year 2017 and Fiscal Year 2018 funds, plus carry-in funds, are being utilized to continue to evaluate options and technologies available to prevent the spread of aquatic nuisance species between the Great Lakes and Mississippi River basins.

This study was authorized by WRDA 2007, P. L.110-114, Section 3061(d), 121 Stat. 1121.

1/ Great Lakes Restoration Initiative (GLRI) funding from FY 2010, FY 2011, FY 2012, FY 2013, FY 2014, FY 2015 and FY 2016. As of the date this justification sheet was prepared, no funding is anticipated in FY 2017 or FY 2018.

2/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $502,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,700,000	0	0	0	0	200,000	1,500,000

City of Baltimore, MD – Flood Risk Management

Baltimore District

This study area was identified as a focus area in the North Atlantic Coast Comprehensive Study (NACCS) conducted in response to Hurricane Sandy. This study will primarily focus on the coastal areas of the Patapsco and Back Rivers in North-Central Maryland, but may also include coastal areas of Baltimore and Anne Arundel Counties, including Essex, Middle River, Bowleys Quarters, Curtis Bay, and Riviera Beach. The Patapsco River is one of the most heavily utilized and populated waterways within the Chesapeake Bay and is the main shipping channel for the Port of Baltimore. The upstream area flows through Carroll, Howard, Baltimore and Anne Arundel Counties before entering the tidal portion of the Middle Branch Patapsco River in Baltimore City. The Back River Watershed is located to the north of the Patapsco River. The Back River, after draining approximately 56 square miles of intensely developed urban lands in Baltimore County and Baltimore City, empties into the Chesapeake Bay approximately 4.6 miles northeast of the entrance to Baltimore Harbor (shipping channel). Baltimore was developed as a port city and as such, there is a large population and significant infrastructure in the affected areas. The study area is tidally-influenced and subject to the effects of coastal storms, such as Tropical Storm Isabel in 2003. The NACCS identified this area as one of the nine focus areas based on its vulnerability to erosion, wave attack, and inundation from coastal storms including hurricanes and nor'easters.

The purpose of this study is to investigate the impacts of coastal flooding and other related problems within the study area and to identify potential solutions. The study will consider the linkage between coastal flooding, storm damages, navigation, riverine flooding and ecosystem function as appropriate. The State of Maryland, the non-Federal sponsor, is prepared to sign a Feasibility Cost Sharing Agreement upon receipt of funding, understands the cost-sharing for the feasibility phase of the study, and submitted a Letter of Intent dated June 7, 2016.

Fiscal Year 2018 funds will be used to initiate the feasibility phase of the study including execution of the Feasibility Cost-Sharing Agreement, development of the project management plan and data gathering. The preliminary estimated cost of the feasibility phase is $3,200,000 and will be shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $200,000 and will be funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Estimated Study Cost	$3,200,000
Feasibility Phase (Federal)	$1,700,000
Feasibility Phase (Non-Federal)	$1,500,000

The study is authorized by resolution of the House of Representatives Committee on Public Works and Transportation, 30 April 1992.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,700,000	0	125,000	300,000	575,000	448,500 /1	251,500

New Jersey Backbays, NJ – Flood Risk Management (Continuing)

Philadelphia District

This study area was identified as a focus area in the North Atlantic Coast Comprehensive Study (NACCS) conducted in response to Hurricane Sandy. The study area includes all of the tidally influenced bays and estuaries in New Jersey located landward of the Atlantic Ocean and Delaware Bay coastlines. The shorelines of most of the NJ backbays are low in elevation, developed with residential and commercial infrastructure, and subject to flooding during storms. Recent storm events to the coastal region include floods associated with Tropical Storm Ida and a nor'easter in December 2009, a severe storm in April 2010 and more recently Hurricane Sandy in October 2012. The NACCS identified this area as one of the nine focus areas based on its vulnerability to erosion, wave attack, and inundation from coastal storms including hurricanes and nor'easters.

The purpose of the study is to evaluate coastal storm damage reduction measures in the study area. The Department of the Army and the New Jersey Department of Environmental Protection, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement April 11, 2016.

Fiscal Year 2017 funds, plus carry-in funds, are being used to continue the feasibility phase of the study, including plan formulation, evaluation and comparison of alternatives, economic and environmental analyses, and public coordination, completing preliminary designs and accomplishing the Tentatively Selected Plan Milestone. Fiscal Year 2018 funds, plus any carry-in funds, will be used to continue the feasibility phase of the study, including completing agency reviews, developing the recommended plan, and completing the Agency Decision Milestone. The preliminary estimated cost of the feasibility phase is $3,200,000 and will be shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $200,000 and will be funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Estimated Study Cost	$3,200,000
Feasibility Phase (Federal)	$1,700,000
Feasibility Phase (Non-Federal)	$1,500,000

This study is authorized by resolutions of the Committee on Environment and Public Works of the U.S. Senate in December 1987, and by the House Committee on Public Works and Transportation on December 10, 1987.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $317,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Allocation in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	4,270,000	3,250,000	615,000	175,000	165,000 1/ 2/	65,000	0

Espanola Valley, Rio Grande and Tributaries, NM – Aquatic Ecosystem Restoration (Completion)

Albuquerque District

The study area is located in southern Rio Arriba County and includes a small portion of northern Santa Fe County. Study area boundaries currently extend one mile east and west of the centerline of both the Rio Chama and Rio Grande from the northern border of Ohkay Owingeh Pueblo, through the Santa Clara Pueblo lands and to the southern border of San Ildefonso. The Rio Grande tributaries Santa Cruz River, Arroyo Guachupangue, and the Rio Pojoaque are also included in the study area.

The purpose of this study is to identify options for ecosystem restoration within the study area. The reconnaissance phase was completed in December 2005. The Department of the Army and the non-Federal sponsors for this study, the Pueblos of Santa Clara, San Ildefonso and Ohkay Owingeh, executed a Feasibility Cost Sharing Agreement on December 21, 2005.

Fiscal Year 2017 funds will be used to continue the feasibility study. Fiscal Year 2018 funds be used to complete the feasibility phase.

The total cost of the feasibility study is $7,496,000 and is shared 50 percent Federal and 50 percent non-Federal. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$8,018,000
Reconnaisance Phase (Federal)	522,000
Feasibility Phase (Federal)	3,748,000
Feasibility Phase (Non-Federal)	3,748,000

Study Authority: Flood Control Act of 1941 (Public Law 77-228) as amended by Resolution of the Senate Committee on Environment and Public Works dated December 10, 2009.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $49,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

2/ FY 2017 allocation amount include $50,000 that was reprogrammed to this study in FY 2017.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	2,720,000	1,070,000	0	200,000	295,000 /1	800,000	355,000

Hudson River Habitat Restoration, Hudson River Basin, New York – Aquatic Ecosystem Restoration (Continuing)

New York District

The study area includes 140 miles of the Hudson River ecosystem associated with the existing Federal channel from New York to the Federal lock and dam at Troy, NY. The downstream boundary for this investigation is the Tappan Zee Bridge, which is the upstream boundary of the Hudson Raritan Estuary Feasibility Study. The study area includes the estuarine and tidal freshwater portions of the Hudson River, including riverine, open water, tidal wetlands and adjoining floodplains and contains 300 miles of tidally influenced, coastal shoreline and more than 200 species of fish and birds. Resource management officials have long recognized the ecological significance of the Hudson River ecosystem. Thirty-four areas have been designated Significant Coastal Fish and Wildlife Habitats, and four locations are included in the Hudson River National Estuarine Research Reserve. In 2011, the study area became part of the New York-New Jersey Harbor & Estuary Program, which is one of the Nation's 28 Estuaries of National Significance. Among terrestrial vertebrates, 85% (28 species) of New York's total amphibian species, 73% (27 species) of New York's total reptile species, 87% (199 species) of New York's total breeding bird species, and 92% (54 species) of New York's total mammal species can be found in the Hudson River Estuary Study Area. Large wetlands support the highest diversity of turtles in New York State, containing concentrations of important turtle habitats for six state-listed endangered, threatened and special concern species. The Federally endangered shortnose and Atlantic sturgeon (New York Bight Distinct Population Segment) both use the river and tributary mouth habitats near Kingston. Dredging the channels by the Corps for more than 100 years resulted in the disposal of 83,000,000 cubic yards of dredged material in embayments, marshes, backwaters and secondary channels. Since 1891, approximately 2,800 acres of wetland and aquatic habitat have been lost and 60 miles of shallow habitat deepened. Specifically, an ecological assessment conducted by The Nature Conservancy (TNC) and Columbia University indicated that 3,212 acres of habitat have been filled as a result of USACE dredging operations to create the navigation channel. The watershed is characterized by lost and degraded fish and wildlife habitat, impediments to fish passage, eroding shorelines and sediment contamination.

A Feasibility Cost Sharing Agreement was signed between the Department of the Army and the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of State (NYSDOS), the non-federal sponsors, in May 1996. In 2013, NYSDEC and NYSDOS enhanced their relationships with regional organizations to facilitate the resumption of the Feasibility Study. The coalition "Partners Restoring the Hudson" was established, composed of non-governmental organizations including The Nature Conservancy (TNC), Scenic Hudson, Hudson Riverkeeper, and Clearwater, among others. The study was resumed in FY 2016.

Fiscal Year 2017 funds, plus carry-in funds, are being used to continue this study, including existing conditions baseline data. Fiscal Year 2018 funds, plus any carry-in funds, will be used to conduct and complete the Alternatives milestone and initiate work towards the Tentatively Selected Plan. The estimated cost of the feasibility phase is $2,720,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $200,000 and will be funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Estimated Study	$4,715,000
Reconnaissance Study (Federal)	$ 525,000
Feasibility Phase (Federal)	$2,195,000
Feasibility Phase (Non-Federal)	$1,995,000

The study is authorized by Section 551, Water Resources Development Act (WRDA) 1996 (P.L. 104-303). The reconnaissance phase was completed in February 1995.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $157,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into the Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocation Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,500,000	0	0	200,000	900,000 1/	400,000	0

Souris River Basin, ND - Flood Risk Management (Completion)

St. Paul District

The Souris River, a part of the Red River of the North drainage basin, flows from Canada into North Dakota and passes through the cities of Burlington, Minot, Sawyer and Velva, then flows back into Canada. The Souris River Basin experienced a catastrophic flood event in 2011, and annual flooding in the basin continues to stress the area. The 2011 flood damaged or destroyed more than 5,000 structures and directly impacted more than 11,000 people, many of whom live below the poverty line. The transportation networks were severely disrupted and emergency facilities, medical care, and infrastructure were cut off to nearly half of the residents. Total damages exceeded $1 billion.

Based on updated hydrology the area is at significant risk. The total population at risk behind the two Minot levee systems is approximately 10,000. The population in the urban area surrounding Minot, ND is nearly 70,000 and Minot is home to the Minot Air Force Base and Minot State University. The area is a regional center supporting the North Dakota oil industry.

Since the 1970's the U.S. Army Corps of Engineers (USACE) has constructed a number of projects in the Souris River Basin. In the 1980's Lake Darling Dam (owned by US Fish and Wildlife Service and operated by USACE during flood events) was modified to add gates and raise pool levels. Although there are a number of existing projects, the level of risk reduction is significantly less than the 1-percent event. Current hydrology for the basin has increased the 100-yr event from 5,000 cfs to 10,000 cfs. Operations of all four reservoirs are governed by an international agreement with Canada. Any flood risk management alternative that considers modifications to the reservoir operations either within Canada or the US will require international coordination. Federal involvement in developing and assessing options for flood risk on the Souris River, focused on the City of Minot, can serve as a point of discussion from which to revitalize international engagement on water management within the international Souris River watershed.

The feasibility study will holistically examine modifications to existing reservoirs, channels, and levees within the project area, focused primarily on the Minot metropolitan area, and any possible new structural or nonstructural measures to address flood risk management. The Department of the Army and the Souris River Joint Water Resource Board, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on May 6, 2016.

Fiscal Year 2017 funds will be used to continue the study, including selection of the tentatively selected plan, release of the draft report and continued work toward the agency decision. Fiscal Year 2018 funds will be used to complete feasibility phase. The total cost of the feasibility phase is $3,000,000 and is shared 50 percent Federal and 50 percent non-Federal. A summary of study cost sharing is as follows:

Total Study Cost	$3,000,000

Feasibility Phase (Federal)	$1,500,000
Feasibility Phase (Non-Federal)	$1,500,000

This study is authorized by Section 209 of the Rivers and Harbors Act of 7 November 1966.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $1,000. As of the date of this justification was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$1,500,000	$115,000	$275,000	$460,000	$415,000 1/	$235,000	$0

Arkansas River Corridor, OK - Ecosystem Restoration (Completion)

Tulsa District

The study area is comprised of the 42 mile long Arkansas River corridor in Tulsa County that begins at the Lake Keystone Dam and proceeds downstream through Tulsa County to the Wagoner County line. The construction of Keystone Dam, built in 1964 with flood control, water supply, hydroelectric power, navigation, and fish and wildlife as authorized purposes, changed the natural hydrology of the downstream Arkansas River. Frequent river fluctuations as a result of hydropower generation at the dam, consisting of high flows followed by low flows, has resulted in streambank erosion problems at various downstream locations and the destruction of riverine wetlands, backwater, and oxbow habitats that were once important fish nurseries and feeding/resting areas for migrant and resident waterfowl. Of particular importance in this prairie riverine habitat is the loss of islands and sand bars which are important nesting habitat for the Federally endangered Interior Least Tern, a seasonal resident of this area. Within the 42 mile study reach this degradation is primarily below Keystone Dam for a distance of approximately 25 miles to the vicinity of Jenks, Oklahoma. However, the degradation continues to move downstream. This structural and functional degradation of the aquatic and riparian habitats has decreased the connectivity, species diversity, and overall productivity of the entire study reach. The Arkansas River Corridor Master Plan identified key restoration areas along the Arkansas River including but not limited to; Prattville Creek, Franklin Creek, Vensel Creek and Crow Creek.

The principle purpose of the study is aquatic and riparian ecosystem restoration focused on restoring streamflow, stabilizing degraded streambanks, wetlands, Interior Least Tern island habitat, riparian vegetation, and fisheries habitat within the study area. The study is being conducted in close coordination with the cities of Tulsa, Jenks, and Sand Springs, Tulsa County, and the Indian Nations Council of Governments. Scoping of the study efforts and methods of analysis has included collaboration with the U.S. Fish and Wildlife Service, U.S. Geological Survey, and the Tennessee Valley Authority. The Feasibility Cost Sharing agreement was originally signed in October 2010; an amended Feasibility Cost Sharing Agreement was executed with Tulsa County, Oklahoma in May 2015.

Fiscal Year 2017 funds, plus carry-in funds, are being used to continue the feasibility study, conduct the agency decision milestone, undertake public and agency review of the draft report, and continue work on the draft final report. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study including preparation for the Civil Works Review Board documentation leading to the Chief's Report in May 2018. The estimated cost of the feasibility phase is $2,820,000 and is shared 50 percent Federal and 50 percent non-Federal. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$2,910,000
Reconnaissance Phase (Federal)	90,000
Feasibility Phase (Federal)	1,410,000
Feasibility Phase (Non-Federal)	1,410,000

Study authority: Section 3132 of the Water Resources Development Act (WRDA) of 2007.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $29,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017 1/ 2/	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	TBD	0	0	0	5,300,000	9,500,000	TBD

Columbia River Treaty 2024 Implementation, OR - Flood Risk Management (Continuing)

Northwestern Division

The Columbia River Basin spans British Columbia, Canada and seven states in the Northwestern United States. The Corps of Engineers supports the Department of State efforts by providing technical guidance on flood risk management. This work is required to support the Interagency Policy Committee, Department of State, National Security Council, and U.S. Entity in developing a position that is in the national interest of the United States for use in discussions/negotiations with Canada. The current Columbia River Treaty provides for assured flood control operations through September 16, 2024. The Corps of Engineers will use the requested funding to inform the Department of State on options for the United States regarding reservoir operations post 2024, including how to operate and potentially pay for changes to the operation of Canadian reservoirs to benefit flood risk management in the United States.

The focus of this work is to evaluate flood risk management options and potential changes in reservoir operations, develop updated joint operating plans with Canada, and related U.S. operating plans, and complete technical and environmental compliance on new operations prior to September 2024.

Fiscal Year (FY) 2017 funds are being used to prepare planning documentation and analysis defining the rights and obligations of the United States under the Treaty with respect to power production and flood risk management. FY 2018 funds will be used to prepare preliminary studies necessary for long term Treaty planning.

The study authority is the Boundary Waters Treaty of 1909 between US and Canada, the Columbia River Treaty of 1961, and Exchange of Notes of 1964 between the United States and Canada.

1/ The FY 2017 funding to initiate this effort was appropriated in the Operation and Maintenance account under Surveillance of Northern Boundary Waters, but was moved to the Investigations account in FY 2018 due to the nature, magnitude, and duration of the required Investigations work.

2/ Estimated Unobligated Carry-in Funding: As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocation Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$2,030,000	$0	$200,000	$700,000	$730,000 /1	$400,000	$0

San Juan Harbor Channel Improvement Study, PR – Navigation (Completion)

Jacksonville District

San Juan Harbor is located on the north coast of Puerto Rico. It is the island's principal port, handling over 75 percent of the Commonwealth's non-petroleum waterborne commerce and is the only harbor on the north coast affording protection during inclement weather. Stakeholders are concerned with reducing navigation transportation costs for the ships using this port and improving navigation safety, consistent with maintaining a resilient and sustainable coastal and estuarine environment. The Alternative Analysis will investigate those concerns and opportunities; and develop alternatives that are environmentally sustainable.

The study will explore the benefits and costs of options for improving (deepening and/or widening) the existing Federal channels to accommodate larger vessels and wide enough to allow two-way traffic. The project components to be evaluated for improvement are: the Bar (entrance) Channel currently with depths stepping from 56 to 49 feet and width of up to 950 feet; the 40-foot deep, 800 feet wide Anegado channel; the 40-foot deep, 350 feet wide Army Terminal Channel; the 39-foot deep, 350 feet wide Puerto Nuevo Channel; the 34-foot deep Sabana Approach; the 36-foot deep, 350 feet wide, Graving Dock Channel; the 30-foot deep Graving Dock Turning Basin; the 36-foot deep San Antonio Channel; the 30-foot deep extension to the San Antonio Channel; two 36-foot deep Cruise Ship Basins; the 36-foot deep Anchorage Area E; and the 30-foot deep Anchorage area F. The benefits will result from transportation savings for the primary commodities of containerized and bulk cargo and petroleum products, and from increased safety of wider channels. The Department of the Army and the Puerto Rico Ports Authority, the non-Federal sponsor, executed a Feasibility Cost-Sharing Agreement on September 16, 2015.

Fiscal Year 2017 funding will be used to continue the feasibility study with the identification of the Tentatively Selected Plan. Fiscal Year 2018 funds will be used to complete the feasibility phase of the study, including identification and reviews (District Quality Control and Agency Technical Review) of a final array of alternatives, arrive at Agency Decision Milestone, completion of the Independent External Peer Review process, Civil Works Review Board, State and Agency review and complete the Report of the Chief of Engineers. The total cost of the feasibility phase is $3,000,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review which will cost $150,000 and is funded at 100 percent Federal expense. Additionally, Section 1032 of the Water Resources Reform and Development Act of 2014 (Public Law 113-121) provides the Commonwealth of Puerto Rico with an additional credit of $455,000 towards the study. A summary of the study cost sharing is as follows:

Total Study Cost	$3,000,000
Feasibility Phase (Federal)	2,030,000
Feasibility Phase (Non-Federal)	970,000

The study authority is House Docket 2764, adopted September 20, 2006.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $201,000, including $200,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2017. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,700,000	0	0	0	0	300,000	1,400,000

Rhode Island Coastline, RI – Flood Risk Management

New England District

This study area was identified as a focus area in the North Atlantic Coast Comprehensive Study (NACCS) conducted in response to Hurricane Sandy. The study area is comprised of the Rhode Island coastline from the western shore of Narragansett Bay to the Massachusetts border in the east, including portions of Kent, Providence, Bristol and Newport Counties. Due to the geography of southern New England in relation to the Atlantic coast, Rhode Island is vulnerable to both extra-tropical storms such as nor'easters, and tropical storms such as hurricanes. Rhode Island has had nineteen (19) storm-related emergency declarations since 1954 involving coastal flooding. The most recent storm to affect the Rhode Island coast was Hurricane Sandy. The arrival of Hurricane Sandy was preceded by coastal flood warnings and mandatory evacuations for coastal towns, low-lying areas and mobile homes. The storm surge destroyed houses and businesses, damaged pilings and deck supports, blew out walls on lower levels, and moved significant amounts of sand and debris into homes, businesses, streets, and adjacent coastal ponds. More than $39 million in support from federal disaster relief programs is helping Rhode Island recover from Hurricane Sandy's effects. FEMA's website reports the National Flood Insurance Program has paid more than $31 million for more than 1,000 claims. In addition to NFIP claims, Federal aid also includes more than $5 million in Public Assistance grants for state and local agencies and private nonprofits. The Department of Housing and Urban Development allocated over $3 million dollars to the State of Rhode Island to assist the State's recovery from Hurricane Sandy. The NACCS identified this area as one of the nine focus areas based on its vulnerability to erosion, wave attack, and inundation from coastal storms including hurricanes and nor'easters.

The purpose of the study is to evaluate options for reducing the flood risk along the coast within the study area. The Rhode Island Coastal Resources Management Council, the non-Federal sponsor, is prepared to sign a Feasibility Cost Sharing Agreement upon receipt of funding and understands the cost-sharing for the feasibility phase of the study.

Fiscal Year 2018 funds will be used to initiate the feasibility phase of the study including execution of the Feasibility Cost-Sharing Agreement, development of the project management plan and data gathering. The preliminary estimated cost of the feasibility phase is $3,200,000 and will be shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $200,000 and will be funded at 100 percent Federal expense. A summary of the study cost sharing is as follows:

Total Estimated Study Cost	$3,200,000
Feasibility Phase (Federal)	$1,700,000
Feasibility Phase (Non-Federal)	$1,500,000

The study is authorized by resolution adopted by the Senate Public Works Committee dated 12 September 1969, resolution adopted by the Senate Committee on Environment and Public Works date August 2, 1995 and by PL 84-71.

Division: North Atlantic District: New England Rhode Island Coastline, RI

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

	Total Estimated Federal Cost	Allocations Prior to FY 2014	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
Study	$	$	$	$	$	$	$
	$10,480,000	$200,000	$300,000	$1,253,000	$1,825,000 1/	$ 2,175,000	$4,727,000

Coastal Texas Protection and Restoration, TX – Flood Risk Management (Continuing)

Galveston District

The study is evaluating options for reducing the flood risk along the entire Texas Gulf Coast, from the mouth of the Sabine River to the mouth of the Rio Grande River, except for the specific areas for which such measures are being considered under the Sabine Pass to Galveston Bay feasibility study. The study area includes Gulf and tidal waters, barrier islands, marshes, coastal wetlands, rivers and streams and adjacent areas that make up the interrelated coastal area of Texas. The Texas coastal zone contains several large cities at risk during storm events including the nation's 4th largest city based on population, Houston, Texas. The coastal region is home to approximately 6,100,000 people, or 25 percent of the State's population. Mineral production has a value of nearly one billion dollars per year and commercial fisheries generate another $156 million. Agriculture in the less populated counties generates approximately $500 million of product per year. The study area includes coastal ecosystems consisting of 3.9 million acres of wetlands, 235,000 acres of sea grass, 367 miles of sea turtle nesting habitat, 380,000 acres of piping plover critical habitat, and 328 square miles of whooping crane critical habitat, as well as 21 state and Federal wildlife refuges. Of the 367 miles of shoreline, more than 60 percent has been identified by the Texas General Land Office as subject to high rates of erosion. Flooding from hurricanes and other rainfall events makes the 25 percent of the state population that live within the 18 coastal county area vulnerable to impact from storms. The 10 tropical storms and hurricanes that struck Texas in the last decade resulted in 176 fatalities and over $36 billion in damages. According to the Federal Emergency Management Agency, Hurricane Ike in 2008 was the third most destructive hurricane at that time ever to hit the United States, with losses of more than $27 billion and 112 deaths. Rice University estimates that if Hurricane Ike had hit the coast 30 miles further south, the storm surge would have been between 20-25 feet in the Houston Ship Channel (home to one fourth of the United States oil refineries) and could have caused damages exceeding $100 billion. It would also be a challenge to evacuate all of the one million residents in hurricane evacuation zones along this coast today, and 500,000 more people are expected to move to these zones by 2035. Forty percent of the nation's petrochemical industry, 25 percent of national petroleum-refining capacity, eight deep draft ports (four of the 10 largest U.S. seaports), 750 miles of shallow draft channels (including 400 miles of the Gulf Intracoastal Waterway), other transportation infrastructure, and many communities are potentially at risk of damage from flooding in a large storm, and the aquatic ecosystem of the coast could sustain significant damage as well.

In a companion study (the Sabine Pass to Galveston Bay feasibility study), the Corps has been evaluating options for certain areas of the upper Texas coast, from the Sabine River to Brazoria County. The goal of the Coastal Texas Protection and Restoration study will be to develop a comprehensive strategy for reducing flood risk for all of the Texas coast, except for the specific areas for which such measures are being considered under the Sabine Pass to Galveston Bay feasibility study. In developing this strategy, the Coastal Texas Protection and Restoration study will consider both structural and nonstructural measures, including options such as restoring and protecting natural features like barrier islands and wetlands, which can help reduce storm surge. The reconnaissance study was completed in November 2015. The strategy will reflect an integrated approach to flood damage reduction, which may include beach and dune ecosystem restoration, and barrier island restoration. This study will include an assessment of structural, nonstructural, and environmental project elements based on their contributions to reducing the risk of flood damage and loss of life in a hurricane, as well as their effects on the natural functions and values of the coastal aquatic ecosystem.

Because of the expanse of the Texas Coast, the coastline has been divided into four separate regions based on hydrologic conditions, water resources challenges and opportunities, and political subdivisions of the State of Texas. The regions range from: 1) Jefferson to Brazoria County; 2) Matagorda to Calhoun County; 3) Aransas to Kleberg County; and 4) Kenedy to Cameron County. The four regions include Galveston Bay (Region 1), Matagorda Bay (Region 2), Nueces County (Region 3), and Cameron County (Region 4). The Department of the Army and the State of Texas, acting through the General Land Office, Matagorda County, Nueces County/Corpus Christi, and Cameron County, as the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on November 16, 2015.

Fiscal Year 2017 funds, plus carry-in funds, are being utilized to continue the feasibility phase of the study to include evaluation and analysis of the selected array of alternatives. Fiscal Year 2018, plus any carry-in funds, will be used to continue the feasibility phase of the study, specifically to identify the tentatively selected plan, develop the integrated draft Feasibility Report and Environmental Impact Statement, and for concurrent reviews of the draft report including public, policy, Agency Technical Review and Independent External Peer Review. The cost of the feasibility phase is $19,800,000 and is shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review which is estimated to cost $400,000 and is funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$20,180,000
Reconnaissance Phase (Federal)	380,000
Feasibility Phase (Federal)	10,100,000
Feasibility Phase (non-Federal)	9,700,000

The study is authorized by Section 4091 of the Water Resource Development Act of 2007.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY2017 was $150,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY2015	Allocation in FY2015	Allocation in FY2016	Allocation in FY2017	Budgeted Amount in FY2018	Additional to Complete After FY2018
	$	$	$	$	$	$	$
	3,250,000	0	0	600,000	1,700,000	900,000 1/	50,000

GIWW Brazos River Floodgates and Colorado River Locks, TX, – Navigation (Continuing)

Galveston District

The Brazos River Floodgates and Colorado River Locks are located along the intersections of the Gulf Intracoastal Waterway (GIWW) with the Brazos River in Brazoria County and Colorado River in Matagorda County, respectfully. The GIWW is authorized as part of the Inland Waterways System to provide navigation through a 12-foot deep by 125-foot wide channel. The Brazos River Floodgates project consists of flood gates on each side of the Brazos River that are 75 feet wide by 750 feet long. The Colorado River Locks project consists of one lock chamber on each side of the Colorado River consisting of two sector gates, each creating a chamber 75 feet wide by 1,200 feet long. Both projects serve to control flood flows from the Brazos and Colorado Rivers to the GIWW, improve navigation safety by controlling traffic flow and currents at the intersection with the GIWW, and aid in preventing sand and silt deposition into the GIWW. The average tonnage that passes through this reach of the GIWW is over 30 million tons per year. This represents products ranging from gasoline and chemicals, to sugar valued at over $117 billion annually. Due to the age of the structures, their size and alignments no longer accommodate typical tows that navigate on the GIWW. Time delays occur due to the requirement to break tows apart to pass through the structures. Frequent accidents occur when tows strike the structures while trying to line up and enter the structures. As a result, a barge collision occurs on average once every five days requiring frequent traffic restrictions while repairs are made. Navigation traffic delay costs are estimated to exceed $10 million annually at each location. The scope of the study will assess the feasibility of realigning approaches into the structures, increasing the size of the structures to accommodate current day tows, and modifying existing structures to minimize cross currents.

Fiscal Year 2017 funds are being utilized to continue the feasibility phase of the study, evaluation and comparison of the selected array of alternatives presented at the Alternative Milestone Meeting. Fiscal Year 2018 funds, plus any carry-in funds, will be used to continue the feasibility phase of the study, specifically to identify the Tentatively Selected Plan and prepare the Draft Report. The estimated cost of the feasibility phase is $3,250,000, including $250,000 for the Independent External Peer Review. As the GIWW is part of the Inland Waterways System, the feasibility study will be accomplished at full Federal expense.

The study is authorized by Section 216 of Flood Control Act 1970 (P.L. 91-611).

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $151,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$5,368,000	$150,000	$200,000	$700,000	$2,214,500 1/	$1,500,000	$603,500

Houston Ship Channel, TX - Navigation (Continuing)

Galveston District

The Houston Ship Channel System is comprised of the Houston Ship Channel, Bayport Ship Channel, Barbour Terminal Channel, and Greens Bayou. The Houston Ship Channel extends 52 miles from its juncture with Texas City Channel at the entrance to Galveston Bay and terminates at its turning basin in the city of Houston. The HSC System also inherently includes, though not owned by the Port of Houston, the Galveston Entrance and Texas City Channels. From channel mile 0 to channel mile 40 (Boggy Bayou), the authorized channel depth is 45 feet, with a bottom width of 530 feet. The remaining channel depth from channel mile 40 (Boggy Bayou) to channel mile 52 (turning basin) varies from 36 feet to 40 feet, with a bottom width of 300 feet. The Bayport Ship Channel extends 4.1 miles from its juncture with the Houston Ship Channel at mile 20.5 and terminates at its turning basin near the community of Shore Acres. The authorized channel depth is 40 feet, with a bottom width of 300. Barbour Terminal Channel extends 1.5 miles east from its juncture with the Houston Ship Channel at mile 26.3 and terminates at its turning basin. The authorized channel depth is 40 feet with a width of 300 feet. Both the Bayport Ship Channel and Barbour Terminal Channel have been deepened to 45 feet by the Port of Houston Authority under the authority of section 204, Water Resources Development Act of 1986, as amended. In May 2014, the Assistant Secretary of the Army (Civil Works) approved the assumption of federal operation and maintenance for the work that the port performed under section 204 on these channels. The latest improvement to the Houston Ship Channel included deepening of the channel to 45 feet from the Gulf of Mexico up to Boggy Bayou, which was completed in June 2005. The Galveston Channel from the Entrance Channel to the vicinity of Pier 33, a distance of 11,400 feet (2.11 miles), is authorized and constructed to a depth of 45 feet with a bottom width ranging from 650 feet to 1,112 feet. The existing Texas City Channel was deepened to 45 feet by 400 foot width in April 2012. The existing Galveston Channel has experienced increased traffic for vessels with drafts greater than 40 feet for the remaining 2,600 feet of channel, which is currently authorized at 40 feet. The Port of Houston has expressed an interest in improvements to the entire Houston–Galveston Ship Channel System. The Port of Texas City has not requested improvement to the Texas City Channel.

Development along the Houston Ship Channel has continued to increase, resulting in more vessel traffic and creating an increased risk of collisions and other incidents between vessels. The increased traffic could also increase the benefits associated with channel deepening or widening, or other measures to improve efficiencies. The port may experience an increase in the size of some of the vessels utilizing these channels after the Panama Canal Expansion Project opens in 2015. The Port of Houston is the Nation’s number one port in terms of foreign waterborne tonnage with an estimated tonnage of 167,000,000 and number two in total US tonnage with an estimated tonnage of 238,000,000 based on fiscal year 2011 Waterborne Commerce data. The major commodities include petroleum, chemicals, and bulk goods. Currently, some vessels calling at the Port of Houston experience channel depth and width constraints. The light loading of some of these vessels results in an increased number of vessel trips, which increases the total number of vessels on the Houston Ship Channel. One-way traffic is required for vessels with beams greater than 105 feet, causing time delays in areas of the Boggy Bayou to Main Turning Basin. Current channel configurations require slowing and tug assistance for cargo vessels with a capacity over 150,000 dead weight tonnage classes. The level of traffic, relative to channel

dimensions in some places, has increased the potential safety risks (life safety, vessel safety, and environmental safety). The study will investigate increases of the Houston Ship Channel Boggy Bayou Reach from 1-foot to 5-foot depth in addition to options for widening to include passing lanes to accommodate larger vessels. Alternatives will analyze additional management measures including anchorage and turning basins, mooring areas in the Bay Reach of the channel; breakwaters, jetties and an offshore crude terminal. Any deepening and widening activities in the Houston Ship Channel system may also require channel modification such as bend easing or widening. A major challenge in this study, due to the industrial growth in the area, will be the coordination of new environmentally suitable placement areas in conjunction with beneficial use of dredge material. The non-Federal sponsor, the Port of Houston Authority, signed a Feasibility Cost Sharing Agreement with the Department of the Army on November 13, 2015.

Fiscal Year 2017 funds are being used to continue the feasibility phase of the study, specifically to identify a tentatively selected plan and prepare the draft report. Fiscal Year 2018 funds, plus any carry-in funds, will be used to continue the study, specifically to conduct the Agency Decision Milestone and finalize the draft report. The estimated cost of the feasibility phase is $9,750,000 and is shared 50 percent Federal and 50 percent non-Federal except for the Independent External Peer Review which will cost $250,000 and will be funded at 100 percent Federal expense.

Total Estimated Study Cost	$ 10,243,000
Reconnaissance Phase (Federal)	$ 243,000
Feasibility Phase (Federal)	$ 5,125,000
Feasibility Phase (Non-Federal)	$ 4,875,000

The study is authorized by Section 216 of the Flood Control Act of 1970, dated December 31, 1970.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $409,000, including $9,000 of unobligated funds that are committed within the Corps for scheduled ongoing requirements in FY 2017. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into FY 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	4,193,000	2,542,000	235,000 2/	0	900,000 1/	516,000	0

Jefferson County Shoreline Protection, TX - Aquatic Ecosystem Restoration (Completion)

Galveston District

This study is a resumption of the original Sabine Pass to Galveston Bay Feasibility Study, which was initiated when Jefferson and Galveston Counties entered into an agreement with the Department of the Army on September 6, 2001. The study area consists of approximately 35 miles of shoreline along the upper coast of Texas in Jefferson County. The areas protected by the shoreline include the community of Sabine Pass, the McFaddin (59,000 acres) and Texas Point (9,000 acres) National Wildlife Refuges (NWR), the J.D. Murphree Wildlife Management Area (25,000 acres), and Sea Rim State Park. The marsh complex that makes up these Federal and State protected areas is the largest contiguous extent of coastal marsh in Texas. The marsh is part of the central flyway, utilized by migrating coastal water fowl, and is also the only Chenier plain in Texas. Just inland of the protected coastal marshlands lay the city of Port Arthur and the largest oil refinery in the United States (Motiva), which is protected by the existing Federal Port Arthur Hurricane Flood Protection Project. The existing marshes provide a natural barrier protection to storm surges. Shoreline losses range from 80 to 500 feet over the last twenty years. Past and current erosion of the beach ridge along the McFaddin/Texas Point NWR and Sea Rim State Park property continue to allow Gulf seawater to wash into and heavily impact the interior marshes during high tides and storm surges. The introduction of higher salinity waters has the potential to cause conversion of these large marsh complexes into open water areas.

The purpose of the study will focus on creating natural barriers that would minimize future shoreline erosion, including the potential for beneficial use of dredged material. The Department of the Army and the Sabine Neches Navigation District, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on July 20, 2016 to resume this study.

Fiscal Year 2017 funds, plus carry-in funds, are being utilized to continue the feasibility study, including inventory and forecasting conditions, and formulating alternative plans to present a focused array of alternatives at the Alternative Milestone Meeting. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study, including Independent External Peer Review, completion of the final report, and Civil Works Review Board. The total cost of the feasibility phase, inclusive of the original effort under the Sabine Pass to Galveston Bay Feasibility Study is $8,016,000 and is shared 50 percent Federal and 50 percent non-Federal, except for $200,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense.

Total Study Cost	$8,101,000
Reconnaissance Phase (Federal)	85,000
Feasibility Phase (Federal)	4,108,000
Feasibility Phase (non-Federal)	3,908,000

The study is authorized by House Committee on Transportation and Infrastructure Resolution, Docket 2620 adopted 16 February 2000.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $253,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use of this effort is $0.

2/ $65,000 was reprogrammed from the study.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY2015	Allocation in FY2015	Allocation in FY2016	Allocation in FY2017	Budgeted Amount in FY2018	Additional to Complete After FY2018
	$	$	$	$	$	$	$
	1,700,000	0	0	200,000	500,000 1/	800,000	200,000

Matagorda Ship Channel, TX – Navigation (Continuing)

Galveston District

The project is located in the vicinities of Port O'Connor, Port Lavaca, and Point Comfort in Matagorda and Calhoun Counties, Texas. The Matagorda Ship Channel (MSC) consists of an outer bar and jetty channel 38 feet deep Mean Lower Low Water (MLLW) and 300 feet wide from the Gulf of Mexico through a man-made cut across Matagorda Peninsula; an inner channel 37 feet deep MLLW, 200 feet wide and about 22 miles long across Matagorda and Lavaca Bays to Point Comfort; a Turning Basin at Point Comfort 37 feet deep MLLW and 1,000 feet square; and dual jetties at the entrance from the Gulf of Mexico. Port records indicate that liquid bulk (tankers) and dry bulk cargo vessels are the dominant deep-draft vessels operating in the MSC. The current channel is economically inefficient, with the majority of deep-draft ships using the MSC having design drafts equal to or in excess of the 37 foot MLLW operating depth of the channel (data collected from 2011-2013). In 2013, the median vessel calling had a design draft of 43 feet MLLW, with a beam of 109 feet. Given the restrictive drafts, the current fleet must be light-loaded to safely navigate the channel. While current data shows a small percentage of vessel trips in the 34 foot MLLW and deeper increment, these are the vessel trips bringing in the most tonnage (i.e., larger vessels that are more efficient). As vessels get larger, the channel will be unable to adequately accommodate the traffic with the potential for an increased number of accidents.

The purpose of the study is to investigate the Federal interest in deepening and/or widening of the entire channel. A Feasibility Cost Sharing Agreement was signed between the Department of Army and the Calhoun County Navigation District, the non-Federal sponsor, on August 5, 2016.

Fiscal Year 2017 funds, plus carry-in funds, are being used to conduct the Alternative Milestone Meeting and complete a Value Engineering Study. Fiscal Year 2018 funds, plus any carry-in funds, will be used to continue the feasibility phase of the study, specifically to identify the Tentatively Selected Plan, develop the draft report, and begin public review. The estimated cost of the feasibility phase is $3,000,000, which is to be cost shared 50 percent Federal and 50 percent non-Federal, except for the Independent External Peer Review, which is estimated to cost $200,000 and will be funded at 100 percent Federal expense.

A summary of study cost sharing is as follows:

Total Estimated Study Cost	$3,200,000
Feasibility Phase (Federal)	$1,700,000
Feasibility Phase (non-Federal)	$1,500,000

The study is authorized by Section 216 of Flood Control Act 1970 (P.L. 91-611).

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $181,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use on this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	2,689,800	1,238,800	300,000	0	900,000 1/	251,000	0

Resacas at Brownsville, Texas – Aquatic Ecosystem Restoration (Completion)

Galveston District

Resacas are former channels of the Rio Grande River that have been cut off from the river, having no inlet or outlet. The study area is located in the southern half of Cameron County, Texas, and encompasses the Resacas network of approximately 3,500 acres of existing oxbows of the Rio Grande River that are not hydraulically connected due to historical meandering of the river. The lack of hydraulic connectivity and agricultural practices has resulted in siltation of the oxbow channels, and loss of native aquatic and riparian habitat. The riparian vegetation associations of the Resacas are found exclusively in Resaca and riparian corridors of the Lower Rio Grande Valley. These thorn scrub riparian vegetation associations have been designated by Texas Parks and Wildlife as habitats critically imperiled with extinction or elimination. The aquatic ecosystem of the Resacas, which includes the water and the imperiled riparian habitats, is an important component of habitat for both Federal and State listed threatened and endangered species.

The purpose of this study is to develop and evaluate alternatives for ecosystem restoration within some of the Resacas in the city of Brownsville. The Department of the Army and the Brownsville Public Utility Board, the non-Federal sponsor, executed an amendment to the 2002 Feasibility Cost Sharing Agreement to resume the study on August 12, 2015.

Fiscal Year 2017 funds are being utilized to continue the feasibility phase of the study to include preparation of the draft report, concurrent public and agency reviews, and confirmation of the Tentatively Selected plan at the Agency Decision Milestone. Fiscal Year 2018 funds, plus any carry-in funds, will be used to complete the feasibility phase of the study. The total cost of the feasibility phase is $5,179,600 and is shared 50 percent Federal and 50 percent non-Federal.

Total Study Cost	$5,279,600
Reconnaissance Phase (Federal)	100,000
Feasibility Phase (Federal)	2,589,800
Feasibility Phase (non-Federal)	2,589,800

The study is authorized by Resolution of the House Committee on Transportation and Infrastructure, 10 November 1999.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $151,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into Fiscal Year 2018 from prior appropriations for use of this effort is $0.

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Estimated Federal Cost	Allocations Prior to FY 2015	Allocation In FY 2015	Allocation In FY 2016	Allocation In FY 2017	Budgeted Amount In FY 2018	Additional Balance To Complete
	$	$	$	$	$	$	$
	3,200,000	0	0	0	400,000	600,000	2,200,000

Atlantic Intracoastal Waterway Bridge Replacement at North Landing, Virginia – Navigation (Continuing)

Norfolk District

The study area includes the Atlantic Intracoastal Waterway (AIWW) in the vicinity of the North Landing Bridge. The North Landing Bridge passes over the Albemarle and Chesapeake Canal, connecting the cities of Chesapeake, VA and Virginia Beach, VA. The AIWW waterway intersects several existing highways. In terms of commercial vessel traffic, there were 1,532 vessel trips reported in 2013 (latest year of record) carrying 1,042,000 tons of commerce. Opened to traffic in 1951, the North Landing Bridge is a double-swing, dual-lane span that conveys VA Route 165 over the canal. The bridge carries an average of nearly 11,000 vehicles per day, in excess of its design capacity of 8,000 vehicles per day. As a result of this highway traffic, navigation is adversely constrained by the limited number of scheduled bridge openings. Outage of the bridge due to accident or equipment failure can affect both vehicular traffic and vessel traffic. When the bridge cannot open for vehicle traffic, the detour route is an additional 15 miles. Operation and maintenance of the North Landing Bridge is the responsibility of the Corps of Engineers. The current weight limit of the bridge restricts certain ladder trucks, tankers and other emergency vehicles from using the bridge, and others may cross under a variance to the load limit, but only in coordination with the bridge operator, one vehicle at a time at reduced speed. The bridge is at a relatively low elevation, and experiences outages to navigation as a result of high water conditions during tropical storms. When the bridge is unable to open for navigation, all commercial vessel traffic comes to a halt. Only the smaller recreational vessels can cross under the bridge when it is closed. If not replaced, the bridge continues to create a bottleneck and future risk to both navigation and vehicular traffic.

The purpose of the study is to investigate the feasibility of replacing the bridge and turning it over to the non-Federal sponsor for future operation and maintenance similar to the replacement of two other bridges over the waterway – the drawbridges at Great Bridge and at Deep Creek.

Fiscal Year 2017 funds are being used to initiate this study. Fiscal Year 2018 funds will be used to continue the study, including data collection, economic and environmental analyses. The preliminary estimated cost of the feasibility study is $3,200,000, including an estimated $200,000 for the Independent External Peer Review. The feasibility study will be funded at 100 percent Federal expense because the Atlantic Intracoastal Waterway is part of the national Inland waterway system.

The study authority is Section 216 of the Flood Control Act of 1970. The Initial Appraisal was approved by the North Atlantic Division in June 2012.

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

APPROPRIATION TITLE: Investigations, Fiscal Year 2018

Study	Total Federal Cost	Allocations Prior to FY 2015	Allocation in FY 2015	Allocation in FY 2016	Allocation in FY 2017	Budgeted Amount in FY 2018	Additional to Complete After FY 2018
	$	$	$	$	$	$	$
	1,700,000	0	125,000	300,000	575,000 1/	700,000	0

City of Norfolk, VA – Flood Risk Management (Completion)

Norfolk District

This study area was identified as a focus area in the North Atlantic Coast Comprehensive Study (NACCS) conducted in response to Hurricane Sandy. The City of Norfolk, VA, is located approximately 210 miles southeast of Washington, D.C., on the Elizabeth River and Chesapeake Bay. Norfolk is a highly urbanized area with nearly all portions of the City below elevation 15 feet. The low elevation increases the risk of flooding in certain parts of the City during a coastal storm. Relative sea level rise and land subsidence is also contributing to this flood risk. Norfolk is one of the cities having the highest rate of relative sea level rise among Atlantic coastal communities, as documented in the "Evidence of Sea Level Acceleration at U.S. and Canadian Tide Stations, Atlantic Coast, North America", and the U.S. Geological Survey Report, "National Assessment of Coastal Vulnerability to Sea Level Rise" reports. Recent storm events that flooded major portions of the City were Hurricane Isabel in 2003, the November 2009 Northeaster, Tropical Storm Irene in 2011, and Hurricane Sandy in 2012. The NACCS identified this area as one of the nine focus areas based on its vulnerability to erosion, wave attack, and inundation from coastal storms including hurricanes and nor'easters.

The purpose of this study is to evaluate potential structural and non-structural flood damage reduction measures in areas susceptible to flooding by storm surges including The Hague, Masons Creek, Ohio Creek, Pretty Lake, Larchmont, Lockhaven, and Glencove and other low-lying sections within the City of Norfolk. The Department of the Army and the City of Norfolk, VA, the non-Federal sponsor, executed a Feasibility Cost Sharing Agreement on February 3, 2016.

Fiscal Year 2017 funds plus any carry-in funds are being used to continue the feasibility phase, including plan formulation, economic and environmental analyses and public coordination to meet the Tentatively Selected Plan milestone. Fiscal Year 2018 funds will be used to complete the feasibility phase.

The total cost of the feasibility phase is $3,000,000 and is shared 50 percent Federal and 50 percent non-Federal, except for $200,000 for the Independent External Peer Review, which is funded at 100 percent Federal expense. A summary of study cost sharing is as follows:

Total Estimated Study Cost	$3,200,000
Feasibility Phase (Federal)	$1,700,000
Feasibility Phase (Non-Federal)	$1,500,000

The study is authorized by a resolution adopted by the Committee on Environment and Public Works of the U.S. Senate, dated 25 July 2012.

1/ Estimated Unobligated Carry-in Funding: The actual unobligated carry-in from FY 2016 to FY 2017 was $188,000. As of the date this justification sheet was prepared, the total unobligated dollars estimated to be carried into the Fiscal Year 2018 from prior appropriations for use on this effort is $0.