NEW YORK, N.Y. DISTRICT

This district comprises western Vermont, small portions of western Massachusetts and Connecticut, eastern New York including Long Island, and northeastern New Jersey, embraced in the drainage basins tributary to Lake Champlain and St. Lawrence River system east thereof and to the Atlantic Ocean from New York-Connecticut State line to, but not including, Manasquan Inlet, N.J. It exercises jurisdiction, however, over all matters pertaining to improvement of Great Lakes to Hudson River waterway. Under the direction of the Secretary of the Army, the District Engineer, as Supervisor of New York Harbor, also exercises jurisdiction under the laws enacted for the preservation of the tidal waters of New York Harbor, its adjacent or tributary waters, and the waters of Long Island Sound.

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Navigation

1. AQUATIC PLANT CONTROL

Location. Navigable waters, tributary streams, connecting channels, and other allied waters in New York District.

Existing Project. Provides for control and progressive eradication of water-hyacinth, alligator-weed, Eurasian water milfoil, and other obnoxious aquatic plant growths, from the navigable waters, tributary streams, connecting channels, and other allied waters of the United States, in the combined interest of navigation, flood control, drainage, agriculture, fish and wildlife conservation, public health, and related purposes, including continued research for development of the most effective and economic control measures (See Table 2-B for Authorizing Legislation.)

Local cooperation. Local interests must provide 30 percent of the cost of the program except as modified by 1962 River and Harbor Act and agree to hold the United States free from damages.

Operations and results during period. During the fourth year of a ten year control program for removal of nuisance aquatic plants in Lake Champlain, work was performed for removal of these plants in South Bay and St. Albans Bay at a cost of $126,000.

Condition as of September 30. Reconnaissance report covering the aquatic plant problems of the North Atlantic Division area was completed in August 1967. Planning for the waterchestnut control in the Hudson-Mohawk basin was completed by the New York District, contracts for $181,562 accomplished during FY1971 through FY1976. Reconnaissance report for Lake Champlain, Vermont and a General Design Memorandum have been completed.

2. BAY RIDGE AND RED HOOK CHANNELS, N.Y.

Location. These channels lie along east shore of Upper Bay, New York Harbor and, with Buttermilk Channel, form an easterly channel along Brooklyn waterfront from the Narrows to East River. (See Coast and Geodetic Survey Charts 12327 and 12334)

Previous projects. For details see Annual Reports for 1915 and 1938, pages 1768 and 195, respectively.

Existing projects. A channel 1,200 feet wide and 40 feet deep at mean low water from the Narrows to Bay Ridge Avenue, Brooklyn, thence 1,750 feet wide to junction of Bay Ridge and Red Hook channels, thence 1,200 feet wide through Red Hook Channel to junction with Buttermilk Channel and a channel of same depth extending into Gowanus Bay from junction of Bay Ridge Channel with Red Hook channel, narrowing uniformly in width to about 500 feet at 28th Street, Brooklyn. Section included in project is 4 miles long. Mean tidal range, 4.7 feet; mean range of spring tides, 5.6 feet; irregular fluctuations due to wind and atmospheric pressure vary from 3.9 feet below mean low water up to 5.2 feet above mean high water. New work for completed project cost $4,277,197, exclusive of amounts expended on previous projects. (See Table 2-B for Authorizing Legislation).

Local cooperation. None required.

Terminal facilities. See Port Series No. 5, revised 1978. Vol. 2.

Operations and results during period. A continuing contract for the removal and satisfactory disposal of all material except ledge rock, lying above the planes of 40 feet below mean low water in specified sections of Bay Ridge Channel, New York, was awarded December 21, 1984. Work commenced March 12, 1985 and was completed July 12, 1985.

Condition as of September 30. Work under existing project was commenced March 1901 and completed June 1940.

3. BRONX RIVER, N.Y.

Location. Empties into a shallow bay in north shore of East River, 11 miles by water northeast of the Battery, New York City. (See National Ocean Survey Chart 12339.)

Previous projects. For details see Annual Report for 1915, page 1762, and Annual Report for 1938, page 166.

Existing project. A channel 10 feet deep at mean low water and 100 feet wide to extend from deep water in East River to the head of navigation at the dam at East 177th Street, involving the first dredging from East River at Randall Avenue to a width of 200 feet; thence to Spofford Avenue, 150 feet; thence to Watson Avenue, 125 feet; thence to railroad bridge near Westchester Avenue, 100 feet, except in southern approach to bridge, where it is to be 140 feet. Section included in project is about 2.4 miles long. Mean tidal range is 6.9 feet in the estuary; mean range of spring tides, 8.2 feet; irregular fluctuations due to wind and barometric pressure vary from 4 feet below mean low water up to 8.5 feet above mean high water. New work for completed active portion of project as described above cost $1,080,910, exclusive of amounts expended under previous projects, and exclusive of $10,000 contributed by local interests. Channel widening from Westchester Avenue to East 172d Street is considered inactive and excluded from foregoing description of existing project and cost estimate. Estimated cost of this portion (1953) is $299,000. For latest published map, see Annual Report for 1912, page 1470. (See Table 2-B for Authorizing Legislation.)

Local cooperation. River and Harbor Act of 1913, provides that any right-of-way that may be necessary for the execution of the project shall be furnished free of cost to the United States. Right-of-way within bulkhead lines below Westchester Avenue Bridge was accepted by Chief of Engineers June 1920, and above the Westchester Avenue Bridge October 1928. On September 10, 1940, the Chief of Engineers approved releases from damages furnished by adjoining property owners between Westchester Avenue and East 174th Street. On November 12, 1940, the Chief of Engineers approved an agreement under which City of New York would reimburse the United States for cost of a retaining wall to protect adjoining property in reach of river between Westchester Avenue and New York, New Haven and Hartford Railroad bridge in lieu of furnishing additional right-of-way. On October 28, 1940, the Secretary of War authorized the acceptance of $10,000 from the city of New York to defray the cost of retaining wall. Additional right-of-way required in the section below East 172d Street has not been furnished. Ci-

ty of New York indicated it does not feel justified in acquiring any additional land along the river.

Terminal facilities. See Port Series No. 5, revised 1978, Vol. 2.

Operations and results during period. Operations and Maintenance funds in the amount of $59,390 was expended on engineering and design of maintenance dredging specifications for work which will be accomplished in FY 1986.

Condition as of September 30. Work under entire existing project is about 82 percent complete. Active portion of existing project was commenced in 1914 and completed in 1941. A channel to project dimensions was completed from deep water in East River up to the Westchester Avenue Bridge in 1926. A channel 10 feet deep and 123 to 65 feet wide from Westchester Avenue Bridge to East 174th Street was completed in 1941. Work remaining under existing project consists of widening reach between Westchester Avenue Bridge and East 172d Street. Channel between 172d Street and the upper limit of authorized project was filled in by City of New York under a Department of the Army permit and is no longer a waterway.

4. BUTTERMILK CHANNEL, N.Y.

Location. Connects deep water in Upper Bay, New York Harbor, southwest of Governors Island, with deep water in East River northeast of Governors Island, and, with Bay Ridge and Red Hook Channels, forms an easterly channel along Brooklyn waterfront from Narrows to East River. It lies between Governors Island and Borough of Brooklyn, New York City. (See Coast and Geodetic Survey Charts 12334 and 12335).

Previous projects. For details see page 205, Annual Report for 1932.

Existing project. A channel 1,000 feet wide, 40 feet deep at mean low water for width of existing 500-foot channel and 35 feet deep for remaining 500-foot width of existing channel. Suitable widening at junctions with East River and Anchorage Channel to 35 feet deep and with Red Hook Channel to 40 feet deep and for additional widening with Anchorage and Red Hook Channels to provide a minimum clear channel width of 2,100 feet to 35 feet deep. Section included in project is 2.25 miles long. Mean tidal range 4.4 feet; mean range of spring tides, 5.3 feet, irregular fluctuations due to wind and atmospheric pressure vary from 3.8 feet mean low water up to 5.2 feet above mean high water. New work for completed projected cost $4,093,951, exclusive of amounts expended on previous projects. (See Table 2-B for Authorizing Legislation.)

Local cooperation. None required.

Terminal facilities. See Port Series No. 5, revised 1978.

Operations and results during period. A contract was awarded December 4, 1984 for the removal and satisfactory disposal of all material except ledge rock, lying above the planes of 35/40 feet below mean low water in specified sections of Buttermilk Channel, New York. Work commenced January 9, 1985 and was completed February 6, 1985. Removed 113,382 cubic yards, place measurement of material at a total packet cost of $640,000.

Condition as of September 30. Work under existing project commenced October 1903 and was completed March 1965. Easterly 500-foot width of channel, from Anchorage Channel to East River, was completed to a 40-foot depth in May 1935. Westerly 500-foot channel, including widening the junction with East River, was completed to a 35-foot depth in July 1961. Widening the junctions with Anchorage and Red Hook Channels was completed in March 1965. Total cost of existing project to September 30, 1982 was $8,971,475, $122,051 public works funds and $3,971,900 regular funds, a total of $4,093,951 for new work and $4,877,524 for maintenance.

5. EAST CHESTER CREEK, N.Y.

Location. This creek, also known as Hutchinson River, is a small tidal stream emptying into East Chester Bay, and indentation in north shore of Long Island Sound immediately north of Throgs Neck, 12 miles southwest of Connecticut State line and 21 miles by water northeast of the Battery, New York City. (See Coast and Geodetic Survey Chart 12366.)

Previous projects. For details see Annual Reports for 1915, 1929, 1938 and 1949, pages 1761, 167, 163, and 208, respectively.

Existing project. A channel.10 feet deep at mean low water and generally 150 feet wide from Long Island Sound through East Chester Bay to a point 700 feet below Boston Post Road Bridge, and thence 70 feet wide extending to a point where the creek divides into a Y, thence approximately 1,000 feet into east branch of the Y and approximately 500 feet into west branch of the Y; a passing basin south of Boston Post Road Bridge; widening channel at Boston Post Road Bridge; and construction of a check dam at head of navigation. Section included in project is 5 miles. Mean tidal range, 7.3 feet in the estuary; mean range of spring tides, 8.6 feet; irregular fluctuations due to wind and atmospheric pressure vary from 3.9 feet below mean low water up to 8.1 feet above mean high water. Estimate of cost for new work is $2,550,000 (October 1975) exclusive of amounts expended on previous projects and inclusive of an estimated $40,000 non-Federal cost for lowering utilities, (See Table 2-B for authorizing legislation.)

Local cooperation. River and Harbor Act of May 17, 1950, provides that local interests furnish lands, rights-of-way, and suitable areas for disposal of dredged material during construction and future maintenance, and hold the United States free from damages. City of New York has complied with requirements. Assurances are yet to be received from other local interests concerned with improvement.

Terminal facilities. See Port Series No. 5, revised 1965, Vol. 2, Part 2.

Operations and results during period. A contract for the removal and disposal of all material except ledge rock lying above the planes of 8 feet below mean low water in specified sections of East Chester Creek, New York was awarded February 20, 1985. Work commenced March 25, 1985 and was completed May 11, 1985. Removed 57,451 cubic yards, place measurement, of material for a total cost to project of $716,771. This work was performed under the previous project adopted in 1930 which provided for a channel 8 ft. deep at mean low water and generally 150 ft. wide from Long Island

Sound through East Chester Bay to a point 700 ft. below the Boston Post Road Bridge, and thence 70 ft. wide to the northern terminus of the project, about 300 ft. above the Fulton Avenue Bridge and for a passing basin in the vicinity of the Boston Post Bridge. Work was completed in August 1941.

Condition as of September 30. No work has been accomplished under the existing project. Work under the 1930 project was completed in August 1941.

6. EAST RIVER, N.Y.

Location. A tidal strait about 16 miles long and 600 to 4,000 feet wide, connecting Hudson River and the Upper Bay at the Battery, New York City, with Long Island Sound at Throgs Neck, New York City, and separating Long Island from Manhattan Island and the mainland. (See National Ocean Survey Charts 12335, 12339, and 12366.)

Previous projects. For details see page 210 of Annual Report for 1932.

Existing project. Channels of following dimensions (depths refer to mean low water): From deep water in Upper New York Bay to Wallabout Channel, 40 feet deep and 1,000 feet wide; from Wallabout Channel to Throgs Neck, 35 feet deep, with widths varying from about 550 to 1,000 feet according to locality; east of F.D. Roosevelt Island up to English Place (43d Dr.), Long Island City, 30 feet deep and varying in width from 500 to 900 feet, with widening in approach from main channel; between South Brother and Berrian Islands, 20 feet deep and 300 feet wide, with widening in approach from main channel; from East River channel to Astoria waterfront, a flared 0.31 mile entrance channel 1,600 to 400 feet wide, a 0.64 mile channel 400 feet wide, and a turning basin 1,000 feet wide and 1,600 feet long, all 37 feet deep in rock and 35 feet in soft material (South Brother Island Channel); removal of Coenties Reef to a depth of 40 feet, also removal of following rocks and reefs lying outside of limiting lines of main channel to give access to wharves: Along Brooklyn shore, Brooklyn Bridge to Manhattan Bridge (Fulton Ferry Reef), to a depth of 25 feet; Jay Street Reef, 25 feet; Corlears Reef, 35 feet; Shell Reef, 25 feet; Horns Hook, 40 feet; Rhinelander Reef, 26 feet; and reef off Oak Point, 30 feet; and construction of a dike in Pot Cove in Hell Gate. Section included in improvement is about 17.8 miles long. Mean range of tide varies according to locality from 4 feet at North Third Street, Brooklyn, and 4.4 feet at the Battery to 4.9 feet at Hallets Point, 6.3 feet at Port Morris, and 7.1 feet at eastern entrance at Throgs Neck; mean range of spring tides 4.8, 5.3, 5.9, 7.6, and 8.5 feet, respectively; irregular fluctuations due to wind and atmospheric pressure vary according to locality from 3.8 feet below mean low water at the Battery, 2.4 feet at North Third Street, Brooklyn, and 3.8 feet at Throgs Neck up to about 5.2 feet above mean high water at the Battery and 8.4 feet above mean high water at Throgs Neck; extreme fluctuations do not seriously affect navigation.

Local cooperation. Resolutions of 1970 require local interests to furnish lands, easements and rights-of-way for construction and maintenance; hold the United States free from damages; provide and maintain depths in berthing areas and local access channels serving the terminals commensurate with project depth; provide upon transfer to the United States, a depth in the existing South Brother Island Channel and turning basin of not less than 30 feet; and establish regulations prohibiting discharge of untreated sewage, garbage, and other pollutants in the waters of the harbor, which shall be in accordance with regulations of Federal, State and local authorities responsible for pollution control. Assurances of local cooperation were furnished by the Port Authority of New York and New Jersey under date of April 9, 1974.

Terminal facilities. See Port Series No. 5, revised 1978. Vol. 2.

Operations and results during period. A contract for the removal and disposal of all material except ledge rock lying above the plane of 35 feet below mean low water in specified areas of the South Brother Island Channel, East River, N.Y. was awarded April 5, 1985. Work commenced June 3, 1985 and was completed July 13, 1985. Removed 257,102 cubic yards place measurement, of material for a total cost to project of $1,436,030.

Condition as of September 30. Work under existing project was commenced June 1916 and was essentially completed in November 1976. Construction of dike at Pot Cove in Hell Gate and a part of widening near pierhead line in Jay Street Reef are considered unnecessary for the needs of current navigation.

7. EAST ROCKAWAY INLET, N.Y.

Location. On south shore of Long Island between main body of island and western end of Long Beach. It is 10 miles east of Rockaway Inlet and about 27 miles by water south and east from the Battery, New York City. (See National Ocean Survey Chart 12352.)

Existing project. A channel 12 feet deep at mean low water and 250 feet wide from 12-foot contour in Atlantic Ocean for about 0.6 mile to 12-foot contour in Long Beach Channel protected by a jetty. Mean tidal range, 4.3 feet; mean range of spring tides, 5.2 feet; irregular fluctuations due to wind and atmospheric pressure vary from 3.9 feet below mean low water up to 5.6 feet above mean high water. New work for completed project cost $603,969, including $100,000 contributed funds. (See Table 2-B for Authorizing Legislation.)

Local cooperation. Complied with.

Terminal facilities. There are 39 terminals in Oceanside, Island Park, Long Beach, and East Rockaway. Nine of these are oil terminals, one of which has a railroad spur. Other terminals are repair and mooring docks with a berthage of 7,655 feet. Of these, 21 have marine railways and 1 has mechanical-handling facilities. There are public wharves at East Rockaway and Woodmere. Waterfront on northside of Long Beach has been bulkheaded. Facilities are considered adequate for existing commerce.

Operations and results during period. A continuing contract for the removal and disposal of all material except ledge rock lying above the plane of 14 feet below mean low water in the Inlet was awarded June 28, 1985. Work commenced September 19, 1985 and was continuing at the end of the Fiscal Year.

Removed 132,000 cubic yards, place measurement, of material under this contract in FY 1985 at a cost to project of $377,768.

Condition as of September 30. Work under existing project began February 1933 and is 100 percent complete. East jetty, 4,250 feet long, was completed in July 1934. Project channel was completed in May 1935.

8. FIRE ISLAND TO JONES INLET, N.Y.

Location. On south shore of Long Island, about 50 miles by water south and east of the Battery, New York City. Fire Island Inlet is the main entrance into Great South Bay from the Atlantic Ocean. (See Coast and Geodetic Survey Chart 12352)

Existing project. A jetty extending generally southwest and south for 5,000 feet from high ground on Democrat Point at the west end of Fire Island and a channel 18 feet deep and 500 feet wide from a littoral reservoir (sediment trap) in the ocean to deep water in the inlet. Mean tidal ranges at the ocean and inlet ends of Democrat Point are 4.1 ft. and 2.4 ft. respectively. Irregular fluctuations due to wind and atmospheric pressure vary from 2.5 feet below mean low water up to 6.2 feet above mean high water on the ocean side. (See Table 2-B for Authorizing Legislation).

Local cooperation. Requires cost sharing and lands easements & rights-of-way.

Terminal facilities. None within the area immediately adjacent to the Federal improvement.

Operations and results during period. At the request of local interests, maintenance dredging was postponed in 1979 until the completion of an Inlet Dymanic Study. The residents of Oak Beach contend that dredging the Inlet exposes Oak Beach to direct wave attack thereby causing an erosion problem. The Inlet Dynamic Study was completed in 1985 and a resumption of the project with provision for possible protection of Oak Beach if necessary is being studied.

Condition as of September 30. Work under the existing project was commenced in late 1973. As a result of three consecutive dredging operations completed in 1977, the project channel was brought to the approximate authorized dimension at that time. No maintenance dredging was accomplished in the ensuing time period. Due to the aforementioned local concerns maintenance has been deferred since 1979 which has allowed the complete shoaling of the authorized channel.

9. HUDSON RIVER, N.Y.

Location. Originates in Adirondack Mountains, about 250 miles in a direct line and 315 miles along its course from the Battery, New York City, and flows generally southerly into New York Bay. Section under improvement extends from New York City about 156 miles to Waterford. (See National Ocean Survey Charts 12335, 12341, 12343, 12347, 12348, and 14786.)

Previous projects. For details see Annual Reports for 1915 and 1938, pages 1764 and 226, respectively.

Existing project. A channel 600 feet wide from New York City to Kingston and thence 400 feet wide to Albany, with widening at bends, a turning basin 700 fet wide and 1,200 feet long at Albany, and 2 anchorages, 1 near Hudson and 1 near Stuyvesant, each 400 feet wide and an average length of 2,400 feet; all with depths of 32 feet in soft material and 34 feet in rock to 2,200 feet south of the Mall Bridge; thence 27 feet deep and 400 feet wide to 900 feet south of the Mall Bridge, thence 14 feet deep at lower low water and generally 400 feet wide to Federal lock at Troy; and thence of same depth and 200 feet wide to southern limit of State barge canal at Waterford; and removal of State dam at Troy and construction of a lock and dam about 2.50 miles below Waterford. Channel is to be formed by dredging and rock excavation, and maintained by dredging and constructing new, and raising and repairing old, longitudinal dikes, built partly under previous projects and partly by the State of New York. Mean range of pool elevation above Federal dam at Troy, in seasons of moderate rains, is about 2.2 feet, as determined in 1934. Mean tidal range is about 4.8 feet between May and October and 5.1 feet between July and September at Albany, extreme range due to freshets is 33.1 and 25.9 feet, respectively normal pool level above Federal dam from Troy to Waterford is 14.33 feet above mean sea level. In tidal section of river below dam, assumed lowest low water plane from Troy to Albany is 3 feet below mean sea level. (See Table 2-C for features of lock and dam included in existing project.) New work for completed project cost $39,050,019 exclusive of amounts of expended on previous projects. Widening to form harbors at Albany and Troy, N.Y., to 12 feet deep at a cost of $552,000 (1954) and completion of 27-foot channel at Albany at a cost of $458,000 (1957) are inactive. Construction of dikes at a cost of $642,000 (1957) was placed in deferred for restudy category. All three features of work are excluded from foregoing description of existing project and cost estimate. Construction of mooring facilities has been authorized. (See Table 2-B for Authorizing Legislation.)

Local cooperation. Complied with except that local interests must furnish suitable soil disposal areas for future maintenance as required.

Terminal facilities. See Port Series No. 6, revised 1979.

Operations and results during period. A contract in the amount of $96,500 was awarded August 14, 1985 for construction of rip-rap along the shoreline of the Albany Turning Basin, Hudson River at Rensselaer, New York. Of the contract amount, $80,000 was federal funds, while the remaining $16,500 were contributed funds for the reconstruction of a storm sewer outfall through the rip-rap. Work commenced on 16 September 1985 and was continuing at end of Fiscal Year.

Operations and Maintenance funds in the amount of $74,060 was expended on engineering, design and preparation of maintenance dredging specifications for work which will be accomplished in FY1986.

By use of Government plant and hired labor, stumps and snags which formed a potential menace to navigation, and other obstructions, were removed from the shores and channel of the river at a cost of $190,055 for maintenance in FY1985.

Government plant and hired labor were employed intermittently through the fiscal year in performing surveys to restore horizontal and vertical controls at a cost of $166,811 for maintenance in FY1985.

Government plant and hired labor were employed intermittently through the fiscal year on repairs to Cedar Hill Dike at a cost of $120,079 for maintenance in FY1985.

The lock and dam on the Hudson at Troy, N.Y. were operated and maintained. Operation of Lock for 1985 navigation season was suspended December 10, 1984 and resumed April 26, 1985. Cost incurred was $507,056 for Operation and Maintenance in FY1985.

In Fiscal Year 1984, two contracts were let to determine the extent of deterioration and needed repairs to the Troy Lock and Dam.

In Fiscal Year 1985, it was decided to defer the recommended concrete repairs to the dam and resurfacing of the lock pending completion of an ongoing investigation of concrete resurfacing surfaces by W.E.S. under R.E.M.R. program. Scopes of work for an interim repair program to ensure continual safe operation of the lock and dam will be prepared in Fiscal Year 1986.

Condition as of September 30. Work under existing project began in July 1910 and was substantially completed in November 1965. New lock and dam at Troy, removal of dam at Troy and construction of 15,545 linear feet of dikes also are complete. In reconstruction of old dikes 39,676 linear feet were raised to adopted crest height. Channel from New York City to Albany is complete to a depth of 32 feet except for the 1,500 linear-foot section at the northern end of the 32-foot project which has never been dredged to project depth. Additionally, the 1,300 linear feet of the 27-foot project remains undredged. Channel from Albany to Waterford is complete to a depth of 14 feet except for a small part of the widening to form a harbor at Troy. Work remaining under the project consists of completion of the 12-foot harbor at Troy and dredging the 27-foot and the remainder of the 32-foot channels at Albany which are not deemed necessary at this time; and reconstruction of dikes. Started coordination with State regarding mooring facilities. (See Table 2-D for total costs of existing project to September 30, 1983.)

10. JAMAICA BAY, N.Y.

Location. Inside south shore of Long Island, the entrance being about 17 miles by water south and east of the Battery, New York City. (See National Ocean Survey Chart No. 12350).

Previous projects. For details see page 1770 of Annual Report for 1915, and page 185 of Annual Report for 1938.

Existing project. Provides for an interior channel extending from vicinity of Marine Parkway Bridge along west and north shores of the bay, 18 feet deep at mean low water and 300 feet wide to Mill Basin, with a swinging basin, 1,000 feet wide and 1,000 feet long at the point; thence 12 feet deep and 200 feet wide to Fresh Creek Basin; and interior channel extending from the same locality along south shore to Head of Bay, 15 feet deep and 200 feet wide; a channel in Mott Basin, 15 feet deep and 200 feet wide extending from the channel along south shore, 3,000 feet to junction of the two branches, thence 2,200 feet in north branch (Inwood Creek) and 3,200 feet in south branch; and an entrance channel connecting the two interior channels with deep water in Atlantic Ocean, of suitable hydraulic dimensions to maintain present tidal prism in the bay, but not less than 18 feet deep and 500 feet wide from opposite Barren Island to Rockaway Point, thence enlarging to not less than 200 feet deep and 1,000 feet wide to the sea, protected by one riprap jetty. Length of section included in project is 19.7 miles. Mean tidal range, 4.9 feet at Barren Island, and 5.1 feet at Head of Bay; mean range of spring tides, 5.9 and 6.1 feet, respectively; irregular fluctuations due to wind and atmospheric pressure vary from 4 feet below mean low water to 4.9 feet above mean high water.

Cost for new work for completed project is $4,466,421 (July 1961), excluding amounts expended on previous projects.

Local cooperation. River and Harbor Act of 1945 provides that in lieu of conditions heretofore prescribed local interests furnish suitable areas for disposal of dredged materials for new work and subsequent maintenance, and hold the United States free from damages. City of New York was notified of conditions of local cooperation in letter dated January 25, 1946. In letter dated February 7, 1946, the Mayor of City of New York advised that disposal areas are available and necessary document "holding the United States free from claim for damages" would be executed.

River and Harbor Act of 1950 provides local interests furnish lands, easements, rights-of-way, and suitable areas for disposal of dredged material during construction and subsequent maintenance, hold the United States free from damages and peform all necessary alterations to existing terminals and bulkheads, and dredge adequate approaches thereto. These conditions have been fulfilled.

Terminal facilities. See Port Series No. 5 revised 1978.

Operations and results during period. A contract was awarded June 21, 1985 for removal and disposal of all material except ledge rock lying above the plane of 20 feet below mean low water in the entrance channel to Jamaica Bay, New York. Work commenced July 1, 1985 and was completed July 26, 1985. Removed, 181,685 cubic yards, place measurement, of material at total cost to project of $1,284,412.

Condition as of September 30. Work under existing project was commenced in August 1912 and completed in June 1961. Westerly interior channel from Barren Island to Fresh Creek Basin and swinging basin at Mill Basin were completed in April 1929. Southerly interior channel and channel in Mott Basin, including its two branches were completed in June 1961. No new work dredging of entrance channel was done, since depths provided under previous project were greater than those required under existing project. East jetty was restored to project dimensions in August 1963.

11. JONES INLET, N.Y.

Location. A small inlet on south shore of Long Island connecting Hempstead Bay with Atlantic Ocean, 37 miles by water southeast of the Battery, New York City. (See National Ocean Survey Chart 12352).

Existing project. An entrance jetty and a channel 12 feet deep and 250 feet wide, from that depth in the ocean through the inlet to Loop Causeway Bridge over Long Creek. Section included in project is about 2.1 miles long. Mean tidal range varies from 4.2 feet at ocean entrance to 3.1 feet at Loop Causeway Bridge; mean range of spring tide varies from 5 to 3.7 feet, respectively; irregular fluctuations due to wind and atmospheric pressure vary from 3.9 feet below mean low

water up to 8.5 feet above mean high water. (See Table 2-B for Authorizing Legislation.)

Local cooperation. Complied with except that local interests must furnish suitable spoil-disposal areas for future maintenance as required, and must maintain a channel 12 feet deep and generally 200 feet wide from Loop Causeway Bridge over Long Creek to head of navigation in Freeport Creek at Mill Road.

Terminal facilites. Within area tributary to Jones Inlet there are a number of privately owned small wharves and 40 boat repair and storage yards. The latter are equipped for repair of pleasure craft and fishing vessels. In addition, there are nine public wharves open to the public free of charge, with a total dockage of 2,180 feet. Additional terminals would have to be constructed for receipt of commercial freight in any sizable quantity.

Operations and results during period. A contract was awarded June 28, 1985 for removal and disposal of all material except ledge rock lying above the plane of 14 feet below mean low water in specified sections of the Inlet. Work commenced August 17, 1985 and was completed September 14, 1985. Removed, 136,980 cubic yards, place measurement of material at a total project cost of $1,699,398.

Condition as of September 30. Work under existing project was commenced August 1953 and completed June 1959. JONES INLET - JETTY REHABILITATION ($34,500.00). The purpose of this study is to develop a feasible and cost effective design for rehabilitation of the Jones Inlet Jetty to insure structural stability and maximize the sand trapping efficiency of the structure. Inlet hydrographic and existing jetty condition surveys have been performed. Preliminary design and cost estimates for alternative schemes have been developed and the superior scheme recommended. Study completion is January 1985. JONES INLET -MAINTENANCE MODIFICATIONS ($49,264.40). The purpose of this study is to develop feasible and cost efficient alternatives which would minimize channel maintenance requirements. Existing tidal/inlet hydraulics, inlet/bay stability, jetty impoundment rates, etc., have been evaluated. Several methods of shoaling analysis were reviewed and the most applicable used. Preliminary design layouts and cost estimates for a deposition basin and navigation channel have been developed and the superior scheme recommended. Study completion is January 1985.

12. KEYPORT HARBOR, N.J.

Location. At mouth of Matawan Creek, on south side of Raritan Bay, about 9 miles west of Sandy Hook. (See Coast and Geodetic Survey Chart No. 12327).

Existing project. A channel about 1 mile long from Raritan Bay to the steamboat dock at Keyport, 200 feet wide and 8 feet deep. Mean range of tides is 4.9 feet; mean range of spring tides, 5.9 feet. High easterly or westerly winds cause tides to fluctuate from 3.8 feet below mean low water up to 5.9 feet above mean high water.

Local cooperation. None required.

Terminal facilities. There are two privately owned wharves located at the head of improvement, both in poor condition.

Operations and results during period. A contract for maintenance dredging of channel to restore project depths was awarded in FY 84. Work started October 22, 1984 and was completed November 7, 1984. A total of 135,294 cubic yards, place measurement, of material was removed. Expended $30,979 in Fiscal Year 1985 for a total project cost of $603,000.

Condition. As of September 30. Work under the existing project was commenced June 1883 and was completed October 1911.

13. MORICHES INLET, N.Y.

Location. On the south shore of Long Island, about 80 miles by water east of the Battery, New York City. It is an opening through the narrow sandy barrier beach on the south shore of Long Island which separates the Atlantic Ocean from a series of interconnected bays. (See Coast and Geodetic Survey Chart 12352.)

Existing project. Provides for a channel, 10 feet deep at mean low water and 200 feet wide extending from that depth in the Atlantic Ocean to Moriches Bay, a distance of 0.7 mile; thence a channel 6 feet deep and 100 feet wide to the Long Island Intracoastal Waterway, a distance of 1.1 miles; rehabilitation of the existing jetties and revetments.

Estimate of cost for work is $10,000,000 (October 1985 P.L.) including $50,000 from Coast Guard and $5,000,000 to be contributed by local interests. (See Table 2-B for Authorizing Legislation.)

Local cooperation. In accordance with the project authorization, local interests are required to furnish all easements, rights-of-way including relocations that are necessary for improvements and operate and maintain the project at a cost sharing basis to be negotiated subsequent to the passage of Federal legislation. The annual Operations and Maintenance cost is estimated to be $1,810,000. Local interests have agreed to voluntarily pay 50% of the project cost but not less than that required by the project authorization presently estimated at $5,000,000. The New York State Department of Environmental Conservation, the local sponsor, in a January 6, 1983 letter, indicated its intent of comply with the items of local cooperation and reaffirmed this on November 8, 1985.

Terminal facilities. No terminals are within the area immediately adjacent to the Federal improvement. However, numerous public and private terminal facilities are available in Moriches Bay and in the connecting canals. Several yacht clubs, boatyards, and public wharfs and landings, and numerous private landings are located in Moriches Bay. The yacht clubs and boatyards have equipment for servicing boats. There are boat basins open to the public. The facilities existing in the bay are considered adequate for present and probable future needs under present conditions of Moriches Inlet. There is room for expansion should future commerce warrant.

Operations and results during period. Preconstruction planning resumed in October 1977. Coordination continued with Federal, State and local agencies on current problems and need for all project purposes (i.e. navigation; beach erosion control; water quality improvement). Formulated plans for single purpose navigation project.

In January 1980, a breach occured adjacent to the eastern jetty. Emergency funds ($11.3 million) were authorized under the authority of PL84-99 to close the breach. About 1,185,000 yards of sand fill were used to effect closure of the breach by March 1981.

Condition as of September 30. Construction has not been initiated. Preconstruction planning (advance engineering and design) has been completed and contract plans and specifications are being prepared.

14. NARROWS OF LAKE CHAMPLAIN, N.Y. AND VT.

Location. This waterway, 37 miles long, comprises southern end of Lake Champlain and extends from Whitehall to Crown Point, N.Y. at southern extremity of lake, northerly to Benson Landing, Vt. (See National Ocean Survey Chart 14784).

Previous projects. For details, see Annual Reports for 1931, and 1963, pages 256 and 177, respectively.

Existing project. A channel extending from Whitehall, N.Y., at head of Lake Champlain, to Benson Landing, 12 feet deep at low lake level and generally 150 feet wide, and installation of fender booms at Putts Rock, Putts Leap, Narrows near Dresden Pulpit Point and Cedar Mountain. Reference plane of low lake level is 93 feet above mean sea level. Section included in project is about 13.5 miles. Usual annual variation of lake level is 5.8 feet and extreme variation varies from 0.6 foot below up to 8.8 feet above low lake level.

Widening channel throughout its entire length to project width of 20 feet is inactive and excluded from foregoing description of existing project and cost estimate. Estimated cost of this portion, revised in (1954), was $1,573,000. (See Table 2-B for Authorizing Legislation.)

Local cooperation. None required.

Terminal facilities. In Whitehall Harbor consisting of three timber wharves, aggregating 4,200 feet in length. State of New York constructed a barge canal terminal at Whitehall, just south of terminus of canal, which has been equipped with a 5-ton hand-operated derrick and a storehouse. Facilities are considered adequate for present commerce.

Operations and results during period. Government and hired labor were employed intermittently during the fiscal year in removal of stumps and snags at a cost of $10,556.

Government plant and hired labor were employed in replacing deteriorated fender booms at a cost of $7,048. Total costs for the project was $25,228. Operations and Maintenance funds in the amount of $4,099 was expended on engineering and design of maintenance dredging specifications for work which will be accomplished in FY1986.

Condition as of September 30. Work under the existing project was commenced June 1919 and is about 77 percent complete. A channel 12 feet deep at low lake level and least a width of 150 feet has been excavated throughout the length of the improvement, except at the Elbow (Putts Leap and Putts Rock). (Fender booms opposite the Delaware and Hudson Railroad trestle have been removed as they are no longer considered necessary for navigation). The work remaining to complete the project consists of widening the channel throughout its entire length to the project width of 200 feet.

15. NEWARK BAY, HACKENSACK AND PASSAIC RIVERS, N.J.

Location. Newark Bay is an estuary about 1.25 miles wide and 6 miles long extending southerly from confluence of Hackensack and Passaic Rivers to New York and New Jersey Channels. Hackensack River rises near Haverstraw, Rockland County, N.Y. and flows about 45 miles into Newark Bay. Passaic River rises in highlands of northeastern New Jersey and flows about 80 miles into Newark Bay. (See Coast And Geodetic Survey Charts 12333 and 12337.)

Previous projects. For details see 1926 Annual Report, pages 265 and 266; and Annual Reports for 1929, 1938, 1954, and 1976, pages 301, 244, 134, and 2-11, respectively.

Existing project. A main channel 700 feet wide to the branch channel to Port Newark, thence 500 feet wide to a turning basin 1,300 feet long and 900 feet wide at the junction of the Hackensack and Passaic River channels, length about 4.7 miles; a maneuvering area south of the former Central Railroad of New Jersey Bridge 2,200 feet long and 300 feet wide with depths of 38 feet in the south half and 35 feet in the north half; a combined bend cutoff and maneuvering area at the south side of the junction with Elizabeth branch channel; and widening of bends at the Kill Van Kull and Port Newark Channels. (Authorized depth 35 feet except as noted above.) (adopted 1966).

At Port Newark—A branch channel 800 feet wide leading to an inshore channel 400 feet wide 1.6 miles (adopted 1945). Authorized depth 37 feet in rock and 35 feet in soft material; a pierhead channel 200 feet wide along the east bulkhead between the Port Newark and Elizabeth branch channels, length 4,100 feet. Authorized depth 35 feet (adopted 1962).

At Elizabeth Marine Terminal—A branch channel 500 feet wide, length about 1.4 miles; a pierhead channel along the east bulkhead 290 feet wide, length about 1.1 miles; a south channel along the south bulkhead 290 feet wide, length about 2,600 feet; a southern approach area just above Central Railroad of New Jersey Bridge enlarged for turning and maneuvering, with a maximum length of about 2,700 feet and width (between the pierhead channel and Newark Bay channel) of about 800 feet. Authorized depth 35 feet (adopted 1962).

Local cooperation. River and Harbor Act of 1954 provides local interests furnish lands, rights-of-way, and suitable spoil-disposal areas for initial construction and future maintenance; provide depths commensurate with channel depth in approaches and berths at terminals of companies which would use improvement; and hold the United States free from damages. River and Harbor Act of 1962 provides that local interests must provide lands, easements and rights-of-way for maintenance and construction, hold United States free from damages. River and Harbor Act of 1962 provides that local interests must provide lands, easements and rights-of-way for maintenance and construction, hold United States free from damages, provide and maintain adequate public terminal and transfer facilities, and accomplish without cost to the United States, removal or relocation of pipelines, cable and other utilities. Assurances were furnished by Port of New York Authority and accepted June 12, 1964. Local cooperation required by previous modifications is fully complied with.

Terminal facilities. See Port Series No. 5, revised 1978, Vol. 2.

Operations and results during period. Operations and Maintenance funds in the amount of $33,598 was expended on engineering and design of maintenance dredging specifications for work which will be accomplished in FY1986.

Condition as of September 30. Work under the active portion of project began June 1976 and is 100 percent complete. Work remaining to complete existing project consists of; deepening the Hackensack River channel to depths of 32 feet and 15 feet.

Work was initiated for modification of project consisting of additional widening at junction with Kill Van Kull by deepening to 37 feet a triangular area at the eastern end of the 30 foot channel south of Shooters Island. Two contacts for the removal of all material including ledge rock to 37 feet mean low water were completed at a total cost of $4,402,631.

16. NEW YORK AND NEW JERSEY CHANNELS

Location. Extends from deep water northwest of Sandy Hook, through Lower New York bay and Raritan bay, to Perth Amboy, and thence through Arthur Kill, lower Newark Bay, and Kill Van Kull to deep water in Upper New York Bay. This route is appoximately along boundary line between states of New York and New Jersey. (See Coast and Geodetic Survey Charts 12333, 12331, and 12327.)

Previous projects. For details see 1963 Annual Report pages 184 and 185.

Existing project. A channel through Lower New York Bay, Raritan Bay, Arthur Kill, lower Newark Bay, and Kill Van Kull to Upper New York Bay, depths of 37 feet in rock and 35 feet in soft material throughout, 600 feet wide across Lower New York Bay and Raritan Bay and in Arthur Kill to a point 1,000 feet north of Smith Creek, widened to 800 feet in vicinity of Seguine Point and Wards Point, respectively; thence 500 wide to a point 1,000 feet south of Piles Creek; thence 500 to 600 feet wide and passing north of Shooters Island and protected by a dike on its northern side to junction of channel into Newark Bay; thence 800 feet wide through Kill Van Kull to Constable Hook; thence 1,000 feet wide from a point opposite the east end of Constable Hook to a point near the intersection with the channel along New Jersey pierhead line; and thence 1,400 feet wide through Kill Van Kull to Upper New York Bay; with an anchorage 38 feet deep to accommodate five vessels south of Perth Amboy, all with suitable easing at bends and junctions. Section included in project is 30.8 miles long. In addition, construction of a dike north of Shooters Island and two secondary channels 30 feet deep and 400 feet wide, one south of Shooters Island and the other in Raritan Bay connecting with Raritan River, were completed under previous projects and maintained under existing project. A triangular area at the eastern end of the 30 foot channel south of Shooters Island was deepened to 35 feet in order to provide additional widening in the vicinity of Bergen Point and is included in the Newark Bay project. All depths refer to plane of mean low water. Mean range of tides varies between 4.7 and 5.1 feet; mean range of spring tides, 5.7 to 6.3 feet; irregular fluctuations due to wind and atmospheric pressure vary from 3.9 feet below mean low water up to 6.9 feet above mean high water. Anchorage at Sandy Hook, and cutoff at junction of Main Ship Channel are deferred for restudy and excluded from foregoing description and cost estimate. Estimated cost of this portion (1957) is $2,150,000. (See Table 2-B for Authorizing Legislation.)

Local cooperation. Fully complied with except for the middle section of Arthur Kill where local interest must furnish spoil disposal areas for maintenance.

Terminal facilities. See Port Series No. 5, revised 1978, Vol. 2.

Operations and results during period. U.S. Army Corps of Engineers Dredge "McFARLAND" was employed from April 4, 1985 to May 31, 1985 to restore project dimensions in Wards Point Bend vicinity. Removed 165,298 cubic yards, place measurement, of material at a cost of $1,096,073.

Conditions as of September 30. Work under active portion of existing project began in October 1933. Work completed consists of providing authorized project depth and widths throughout entire channel from Lower New York Bay to Upper New York Bay and providing depths of 37 and 25 feet in Perth Amboy Anchorage. In addition to above mentioned work, construction of a dike north of Shooters Island, two secondary channels 30 feet deep and 400 feet wide, one south of Shooters Island, the other in Raritan Bay connecting with Raritan River were completed under previous projects. Work remaining under existing project consists of dredging cutoff at junction of Main Ship Channel to dimensions authorized by River and Harbor Acts of August 30, 1935, and May 17, 1950, dredging anchorage in vicinity of Sandy Hook. (See Table 2-D for total cost for existing project to September 30, 1982.)

17. NEW YORK HARBOR COLLECTION AND REMOVAL OF DRIFT

Location. Applies to Lower and Upper Bays, New York Harbor; East River, Harlem River, Hudson River Channel, N.Y., New York and New Jersey Channels, Newark Bay, N.J., and their tributaries.

Existing project. Provides for collection, removal and disposal of drift, derelict vessels, deteriorated shore structures and debris along shores of New York Harbor and tributary waters, and for the repair of certain other piers, wharves and shore structures. Work authorized before Act of 1970 was restricted solely to removal of drift from waterways and was funded as a maintenance activity. Estimate of first cost of improvement under Act of 1974 is $77,000,000 (October 1985) including $25,700,000 cash contribution from local interests, plus $51,300,000 to be contributed for repair and disposal of deteriorated shore structures in use. (See Table 2-B for Authorizing Legislation.)

Local cooperation. Local cooperation conditions of the plans currently under review by the Chief of Engineers provide that local interests must furnish all lands, easements and rights-of-way required for the improvement; hold the United States free from damages; enact and enforce local legislation to prevent creation of sources of drift, contribute in cash one third of the first cost of the Federal work, and make necessary

repairs to deteriorated structures in use so as to eliminate them as a source of drift. These conditions are subject to approval by the Secretary of the Army and the President, as stipulated in Section 113 of the authorizing law, Public Law 91-611.

Operations and results during period. New work: Liberty State Park Contract IVB was completed at a cost of $1,268,000. East River-Manhattan Waterfront contract was completed at a cost of $1,477,806. A contract for the removal of Piers 17 and 18 on the East River was completed at a cost of $219,609. The City of Elizabeth contract was completed at a cost of $791,700. The Stapleton, Staten Island Contract was completed at a cost of $2,820,000. A contract for the City of Hoboken reach was awarded in August 1983 at an estimated cost of $2,165,000. A continuing contract for the Jersey City South Reach was awarded in September 1984 at an estimated cost of $838,000. Engineering and design for the balance of project continued.

Maintenance. U.S. Debris Boats Driftmaster, Gelberman and Hayward and auxiliary plant were assigned the work of removing and disposing of drift. Removed and disposed of 560,000 cubic feet (4,379 cords) of driftwood, ranging in size from small blocks to timbers of large dimensions, including piles and pieces of wreckage at a cost of $2,819,538 in FY1985.

Conditions as of September 30. Work authorized under River and Harbor Acts of 1915, 1917, and 1930 is continuous maintenance for which no percentage of completion exists. For work authorized by the 1974 Water Resources Development Act, removal of drift sources has been completed in New Jersey at Liberty State Park and the City of Elizabeth. In New York City, work has been completed along the Manhattan side of the East River inclusive of Piers 17 and 18 Stapleton, Staten Island. Removal work is currently underway in Hoboken, Weehawken and Jersey City, N.J.

18. NEW YORK HARBOR—ENTRANCE CHANNELS AND ANCHORAGE AREAS

Location. In Upper and Lower bays, New York Harbor is 330 miles southwest by water of Boston Harbor, Mass., and 165 miles northeast of entrance to Delaware Bay, N.J. The Upper Bay extends about 5.5 miles southerly from junction of Hudson and East Rivers opposite the Battery, New York City to the Narrows. Lower Bay extends about 9 miles from the Narrows to the sea. (See National Ocean Survey Charts 12327, 12334, 12335, and 12349.)

Existing project. Ambrose Channel 45 feet deep and 2,000 feet wide, extending about 10.2 miles from sea to deep water in the Lower bay; Anchorage Channel, an extension of Ambrose Channel, with same depth and width, in the Upper bay, opposite anchorage grounds, about 5.7 miles long; a southerly entrance channel, Sandy Hook Channel (East Section) 35 feet deep and generally 800 feet wide extending 3.4 miles from 35-foot ocean contour to Bayside Channel along an alignment generally west of the South Channel; and elimination from authorized project of that portion of Bayside-Gedney Channel east of junction with new southerly entrance channel; for Bayside Channel 35 feet deep and 800 feet wide, extending about 3.7 miles from junction with new southerly entrance to junction with Main Ship Channel; Main Ship Channel 30 feet deep and 1,000 feet wide, extending about 5.3 miles from Bayside Channel to deep water in Lower bay; a channel along New Jersey pierhead line connecting Kill Van Kull with deep water in Anchorage Channel, south of Liberty Island anchorage, 20 feet deep for 500 feet wide with widening at bends to 800 feet and about 3 miles long; an anchorage in vicinity of Liberty (Bedloes) Island (about 160 acres in extent) 20 feet deep; and for removal of Craven Shoal to 30 feet deep; for a channel 16 feet deep, 200 feet wide, and about 2.3 miles long, extending from bell buoy 23 to Hoffman and Swinburne Island; for an anchorage area in Red Hooks Flats to depths of 45, 40 and 35 feet and an anchorage area in Gravesend Bay to 47 feet deep. Project depths refer to mean low water. Mean tidal range is 4.7 feet at Fort Hamilton; mean range of spring tides, 5.7 feet; irregular fluctuations due to wind and atmospheric pressure vary from 3.9 feet below mean low water up to 6.2 feet above mean high water.

Local cooperation. Fully complied with.

Terminal facilities. See Port Series No. 5, revised Vol. 2, 1978.

Operations and results during period. U.S. Army Corps of Engineers Dredge "McFARLAND" was employed from October 20, 1984 to October 23, 1984 to restore present dimensions to Ambrose Channel & from March 7-31 & May 2 - June 1, 1985 to restore project dimensions in Mainship Channel, New York. Removed approximately 720,980 cubic yards, place measurement of material at a cost of $2,388,129.

Condition as of September 30. Work under existing project began in 1885 and is 100 percent complete. Main Ship and Bayside-Gedney Channels were completed to 30 feet deep in February 1891. Deepening of Bayside-Gedney Channel to 35 feet for a width of 800 feet was completed in June 1939. Ambrose Channel was completed to a 40 feet deep for a width of 2,000 feet in April 1914 and substantially completed to 45 feet deep for a width of 2,000 feet in 1951. Relocation of Anchorage Channel was completed to 40 feet deep in October 1932. Center 800 feet was dredged to 45 feet in June 1947 and westerly 600-foot strip in April 1948. Easterly 600-foot strip was substantially completed in June 1953. Channel between Staten Island and Hoffman and Swinburne Islands was completed in December 1920 up to within 300 feet of southerly limits of the project. Dredged channel meets all needs of navigation and no further work of improvement is contemplated for the present. Channel along New Jersey pierhead line from Kill Van Kull to Anchorage Channel was completed in March 1939. Widening at bends near southerly and northerly ends authorized in 1948 was completed to depths of 45, 50, and 35 feet in October 1976. Anchorage Channel was relocated to the westward in 1982. Red Hook Flats Anchorage was accordingly increased in area. No dredging was required. Liberty (Bedloes) Island anchorage was completed to 20 feet in October 1944. Sandy Hook Channel (east section) was completed to a depth of 35 feet in June 1963. Gravesend Bay Anchorage was completed to a 47-foot depth in November 1977.

19. PORT CHESTER HARBOR, N.Y.

Location. At boundary between States of New York and Connecticut, comprises the tidal mouth, about 1.7 miles long, of Byram River whose source is in Byram Lake about 12 miles north of Port Chester. River empties into Long Island Sound about 32 miles by water east of the Battery, New York City.

(See Coast and Geodetic Survey Chart 12367.)

Previous projects. For details see Annual Report for 1915, page 1758, and Annual Report for 1938, page 157.

Existing project. An anchorage basin near breakwater constructed at Byram Point under a prevous project, 12 feet deep, for fenders on east bank opposite southern end of Fox Island, and a channel 12 feet deep at mean low water and 150 feet wide from Long Island Sound to mouth of river at southerly point of Fox Island; thence 10 feet deep and 100 feet wide to 900 feet below fixed bridge at Mill Street in Port chester, including a turning basin opposite steamboat landing; and thence 3 feet deep and 175 to 100 feet wide to 100 feet below fixed bridge. Section included in project is about 1.7 miles long. Mean tidal range, 7.1 feet; mean range of spring tides, 8.5 feet; irregular fluctuations due to wind and barometric pressure vary from 4 feet below mean low water up to 8.6 feet above mean high water. Cost of new work for completed project was $358,475, exclusive of amounts expended on previous projects, and $5,500 to be contributed by local interests. Widening turning basin and construction of fenders on bank opposite southern end of Fox Island, at a cost of $93,000, (1954) is considered inactive and excluded from foregoing description of existing project and cost estimate.

Local cooperation. River and Harbor Act of 1930 provides that local interests contribute $5,500 in cash toward widening channel at turning basin. This condition has not been fulfilled and there is no indication as to when compliance may be expected.

Terminal facilities. There are 34 terminals in Port Chester Harbor between Fox Island and Mill Street Bridge, with a total berthage of about 5,300 feet, of which 3,120 feet are available for dockage. Village of Port Chester owns several bulkheads which are used as public landings for small pleasure craft. Several boatyards with storage space for 75 boats and equipped with a total of 3 marine railways are available for pleasure craft. Facilities adequate for existing commerce.

Operations and results during period. A contract for the removal and disposal of all material except ledge rock lying above the planes of 10 and 3 feet below mean low water in specified sections of Port Chester Harbor, New York was awarded February 4, 1985. Work commenced March 9, 1985 and was completed April 12, 1985. Removed 91,592 cubic yards, place measurement of material at a total cost to project of $616,303.

Condition as of September 30. Work on active portion of existing project was completed October 1938. Controlling mean low water depth (June 1952 and Nov. 1965) was 12 feet for a width of 140-50 feet from Long Island Sound to Fox Island, 8 feet in anchorage, thence 10 feet for a width of 90-40 feet to turning basin, 10 feet in turning basin, thence depths varying from 3 to zero feet for full width to upper limit of 3-foot project. Work remaining under existing project consists of widening turning basin and constructing fenders on bank opposite southern end of Fox Island (inactive).

20. RARITAN RIVER, N.J.

Location. Rises in north-central part of New Jersey and flows generally southeasterly into Raritan Basin, between Perth Amboy and South Amboy, about 24 miles by water south of the Battery, New York City. (See coast and Geodetic Survey Chart 12332.)

Previous projects. For Details see Annual Reports for 1915, 1918, and 1938, pages 1777, 359, and 259 respectively.

Existing projects. A channel 25 feet deep and 300 feet wide extending 5.8 miles from turn in New York and New Jersey Channels near Great Beds Light to Government wharf on Main Channel, widened to 600 feet for 1,000 feet long opposite wharf to form a turning basin of same depth; thence a channel 15 feet deep and 200 feet wide 3 miles to Washington Canal; thence 10 feet deep in soft material, 11 feet deep in rock, and generally 100 feet wide with widening at bends 5 miles to Delaware and Raritan Canal entrance at New Brunswick, and a South Channel 25 feet deep and 300 feet wide 0.8 mile from junction with Main Channel at Keasby to upper limit of Titanium Pigment Co. property; thence 15 feet deep and 150 feet wide 0.4 mile to dock of Middlesex County Sewerage Authority; thence 10 feet deep and 150 feet wide 2 miles to a point 1,300 feet below upper junction with Main Channel at Crab Island. Plane of reference is mean low water. Mean range of tides is 5.1 feet at mouth of river and 5.6 feet at New Brunswick; mean range of spring tides, 6.1 and 6.6 feet respectively. Irregular fluctuations due to winds and atmospheric pressure vary from 3.6 feet below mean low water up to 6.9 feet above mean high water. New work for completed portion of project, consisting of channels described above cost $1,237,000, exclusive of amounts expended on previous projects and including $66,000 contributed by local interests. Dredging South Channel to 10 feet deep and 150 feet wide for 1,300 feet to upper junction with Main Channel at Crab Island is inactive and excluded from foregoing description and cost estimate. Cost estimate for this portion is $86,000 (1954). (See Table 2-B for Authorizing Legislation.)

Local cooperation. Complied with except local interests must furnish spoil-disposal areas for maintenance to 25-foot channel from New York & Long Branch Railroad bridge to junction of Main and South Channels, and in South Channel to Titanium Pigment Co. property. River and Harbor Act of 1962, provides local interests furnish spoil-disposal areas and necessary retaining dikes, bulkheads and embankments therefore, required for maintenance of improvement, and hold the United States free from damages.

Terminal facilities. See Port Series No. 5, revised 1965, Vol. 2, Part 2, pages 274-279 and 281.

Operations and results during period. A continuing contract for maintenance dredging to restore project depths was awarded in Fiscal Year 1984. Work commenced November 26, 1984 and was completed January 12, 1985. Removed 281,364 cubic yards, place measurement, of material at a total project cost of $1,119,269.

Condition as of September 30. Entire existing project is about 96 percent complete. Work under active portion of existing project was commenced September 1919 and completed

July 1941. A shoal along northerly channel line in vicinity of Victory Bridge was eliminated by relocation of channel in February 1959. Main Channel dredged 25 feet deep and 300 feet wide from junction with New York and New Jersey Channels to and including a turning basin of same depth opposite Government wharf, thence 15 feet deep and 200 feet wide to mouth of Washington Canal, thence 10 and 11 feet deep and 100 feet wide to Delaware and Raritan Canal outlet locks at New Brunswick. South Channel dredged 25 feet deep and 300 feet wide for 3,200 feet, thence 10 feet deep and 150 feet wide for 12,400 feet to within 1,300 feet of junction with Main Channel at Crab Island. Model study of Raritan River was completed in March 1952. Work remaining under existing project is dredging South Channel to 10 feet deep and 150 feet wide for 1,300 feet to upper junction with Main Channel at Crab Island.

21. SANDY HOOK BAY, N.J.

Location. This bay is the southern portion of lower New York Bay, west of and adjoining the projecting arm of Sandy Hook, N.J. (See U.S. Coast and Geodetic Survey Charts Nos. 12327 and 12324.)

Existing project. This provides for the construction of a continuous rubble-mound breakwater about 4,000 feet in length extending eastward from the New Jersey Central Railroad steamboat dock at Atlantic Highlands, N.J., and dredging of the area in its lee and seaward of the new pierhead line to a depth of 8 feet at mean low water. Mean range of tides, 4.6 feet; mean range of spring tides, 5.6 feet; irregular fluctuations due to wind conditions vary from 1 to 2 feet above or below the mean range.

Local cooperation. Fully complied with, except that local interests must furnish easements and rights-of-way necessary for subsequent maintenance as and when required.

Terminal facilities. There are 3 piers with a total berthage of 1,330 feet, located along the waterfront at Atlantic Highlands westerly of and adjacent to the anchorage area. One of these terminals has railroad connections. Under the conditions of local cooperation, 5 boat basins with mooring stalls and servicing facilities for pleasure boats were constructed. The existing terminals will be sufficient for present needs. There is ample space for additional wharves and boat basins should future needs warrant their construction.

Operations and results during period. A contract for the removal and satisfactory disposal of all material except ledge rock in Sandy Hook Bay at Atlantic Highlands, New Jersey was awarded January 30, 1985. Work commenced February 16, 1985 and was completed May 24, 1985. Removed 639,710 cubic yards, place measurement, of material at a cost of $3,737,763.

Condition as of September 30. The existing project was completed in 1941. The breakwater was completed in 1940 and the anchorage area was completed in 1941.

22. SHINNECOCK INLET, N.Y.

Location. On the south shore of Long Island, about 95 miles east of the Battery, New York City. It is an opening through the sandy barrier beach, connecting Shinnecock Bay with the Atlantic Ocean. (See USCCT Chart 12352)

Existing project. Provides for a channel 10 feet (mlw) and 200 feet wide extending through the inlet to Shinnecock Bay for a distance of about 0.6 miles; thence a channel 6 feet deep and 100 feet wide to the Long Island Intracoastal Waterway, a distance of about 1 mile; rehabilitation of the existing jetties and revetments. Estimate of coast for work is $18,230,000 (Oct 85 P.L.) including $130,000 from the Coast Guard and $6,600,000 to be contributed by local interests (see Table 2-3 for Authorizing Legislation).

Local cooperation. The share of local cooperation is 36.5 percent of the initial coast and 38 percent of maintenance, operating and replacement costs (based on the cost sharing provisions of the 1960 R&H Act). The authorizing document also requires that local authorities: furnish, free of cost to the United States, all lands easements, rights-of-way, and suitable spoil-disposal areas for the initial work and for subsequent maintenance, when and as required; hold and save the United States free from damages due to the construction and maintenance of the project; provide and maintain suitable terminal facilities when and as required for the accommodation of vessels that would navigate the inlet and adjacent bays, open to all on equal terms; maintain, for the duration of the economic life of the project, continued public ownership of the publicly owned shores and their administration for public use, and continued availability for public use of the privately owned shores upon which a portion of the Federal share of the costs is based. The New York State Department of Environmental Conservation expressed their intent to provide required items of local cooperation by letter dated 7 September 1983.

Terminal Facilities. Shinnecock Bay, and adjacent ocean area, constitute an important marine fishery. It is part of the Long Island resort region, which affords recreation to thousands of people participating in fishing, pleasure boating, and bathing. Many hotels and tourists homes are located in the area, as well as yacht clubs, boat yards, public wharves and landings, and numerous private landings. Safe access to the ocean is necessary for commercial fishing and recreational craft.

Operations and results during period. Work was done on preparation of the Environmental Impact Statement.

Condition as of September 30. No Federal construction has been done. Preconstruction planning is continuing.

23. SHREWSBURY RIVER, N.J.

Location. Mainly a large tidal basin in eastern part of New Jersey, the outlet being at the southeast end of Sandy Hook bay, about 4 miles south from the point of Sandy Hook. (See Coast and Geodetic Survey Chart 12324.)

Previous Projects. For details see Annual Reports of 1915, 1918, and 1938, pages 1778, 373, and 267, respectively.

Existing project. A channel 12 feet deep and 300 feet wide, following the westerly shore, from deep water in Sandy Hook Bay 2.2 miles to a point 500 feet south of former location of railroad bridge at Highlands; then 9 feet deep and generally 150 feet wide, suitably widened at bends and turns, in south branch of river 6.8 miles to Branchport Avenue Bridge in city of Long Branch; and a channel in north branch (Navesink R.) 6 feet deep and 150 feet wide 6.1 miles from the junction to Red Bank. Plane of reference is mean low water. River and Harbor Act of 1965 modified existing project to include an in-

let channel across base of Sandy Hook Peninsula between Spermaceti Dove and Island Beach connecting the Atlantic Ocean and Shrewsbury River. The ocean channel to be 15 feet deep, 200 feet wide and 830 feet long protected by parallel jetties spaced 500 feet apart and through the land cut to be protected by bulkheads in extension of jetties; thence a bay channel 9 feet deep, 200 feet wide, and 2,860 feet long extending to existing Shrewsbury River channel. Plane of reference is mean low water. New inlet is to be spanned by a 6-lane fixed highway bridge with a vertical clearance of 35 feet above mean high water and a total length of 1,560 feet. Mean range of tide at Highlands, 3.8 feet; at Seabright, 1.7 feet; at Branchport; 1.7 feet; and at Red Bank, 3 feet. Mean range of spring tides is 4.7, 2.1, 2.2, and 3.6 feet, respectively. Irregular fluctuations due to wind and atmospheric pressure vary from 1.9 feet below mean low water up to 6.5 feet above mean high water. Estimate of cost for new work is $12,946,000 (July 1971) including $6,200,000 to be contributed and $36,000 already contributed by local interests and exclusive of amounts expended on previous projects. This work was reclassified to Inactive in December 1973 because of state and local opposition. Dredging turning basin and anchorage in vicinity of Red Bank, 6 feet deep and about 19 acres in area; a channel in Claypit Creek, 6 feet deep and 100 feet wide about 1 mile from 6-foot curve in north branch to head of the creek; a channel in Oceanport Creek, 6 feet deep, 100 feet wide and 2 miles long from channel in south branch to New York and Long Branch Railroad Bridge; and a channel in Little Silver Creek, 6 feet deep, 100 feet wide, and 1.6 miles long from channel in south branch to Seven Bridge Road Bridge is also inactive and excluded from foregoing description and cost estimate. Cost estimate for this portion (1960) is $578,000 exclusive of $86,000 to be contributed by local interests. (See Table 2-B for Authorization Legislation.)

Local cooperation. River and Harbor Act of 1950 provides local interests furnish lands, rights-of-way, and spoil-disposal areas for construction and future maintenance; hold the United States free from damages; provide and maintain a suitable public wharf on each of the creeks to be improved, which shall be open to all on equal terms; remove Locust Avenue bridge over Claypit Creek; and make cash contributions of $25,000, $33,000, and $27,500 toward cost of improvement of Claypit, Oceanport, and Little Silver Creeks, respectively. Provided further that construction of any unit of proposed improvement may be undertaken independently of the other units when the required local cooperation has been provided. These conditions have not been fulfilled. Requirements under prior acts have been fully complied with. River and Harbor Act of 1965 provides that local interests furnish lands, rights-of-way outside of the Federally owned lands, for construction and future maintenance and for aids to navigation and future maintenance and for aids to navigation upon request of the Chief of Engineers, including suitable spoil-disposal areas, and necessary retaining dikes, bulkheads, and embankments therefore or the costs of such retaining works; hold the United States free from damages; assume all obligations of owning, operating and maintaining highway bridge, with such obligations to be assumed by local interests upon final completion of its construction; assign to a competent and properly constituted public body the power to regulate the use, growth, and free development of adequate boating facilities in the area to be served by the inlet, with the understanding that such facilities will be open to all equally; and provide, maintain, and operate necessary mooring and terminal facilities and utilities including an adequate public landing or wharf with provisions for the sale of motor fuel, lubricants and potable water, available to all equally. Requirements under 1965 River and Harbor Act have not been complied with.

Terminal facilities. There are 33 terminals with a total berthage of 7,986 feet on the waterway. Eight terminals with a total berthage of 1,000 feet are open to the public. In addition, many private pleasure boat landings have been constructed by owners of riverfront estates. Fifteen boatyards with storage space for 670 craft and equipped with 21 marine railways are available. None of the terminals has direct rail connections. Facilities considered adequate for existing commerce.

Operations and results during period. A continuing contract was awarded September 6, 1985 for removal and disposal of all material except ledge rock lying above the planes of 9 and 6 feet below mean low water in specified areas of the Shrewsbury and Navesink Rivers. Expended $79,472 for engineering and design of maintenance dredging specifications. Contractor will commence dredging in Fiscal Year 1986.

Condition as of September 30. Work under the active portion of existing project began in October 1919 and is about 10 percent complete. Work completed consisted of providing authorized project dimensions in 12-foot entrance channel, 9-foot channel in South Branch, and a 6-foot channel in North Branch of the river. Work remaining under the existing project consists of dredging an inlet channel across the base of Sandy Hook protected by jetties and bulkheads, a bay channel extending to the existing Shrewsbury River Channel and a six-lane fixed highway bridge to span the new inlet as authorized by the River and Harbor Act of 1965. Preconstruction planning (advance engineering and design) for work under this Act is about 50 percent complete. Planning included a physical model study, which was completed. The remaining work was subsequently reclassified to inactive because of state and local opposition. Close out report underway. Formal close out of this work remains. Under the River and Harbor Act of 1950 work remaining consists of dredging turning basin and anchorage in vicinity of Red Bank and channels in Claypit, Oceanport, and Little Silver Creeks.

24. SUPERVISOR OF NEW YORK HARBOR (Prevention of Obstruction and Injurious Deposits)

The District Engineer, New York District, was designated Supervisor of New York Harbor under the provisions of the River and Harbor Act of June 29, 1888 (33 U.S.C. 441-451), as amended July 12, 1952. Under this Act, the Supervisor of New York Harbor is charged with the mission of preventing the deposit of obstructive and injurious materials in New York Harbor and its adjacent and tributary waters, including Long Island Sound. The River and Harbor Act of August 18, 1894 (33 U.S.C. 452) makes it unlawful for any person or persons to engage in fishing or dredging for shellfish in any of the channels leading to and from New York Harbor, or to interfere in any way with the safe navigation of those channels by ocean steamships and ships of deep draft; the River and Harbor Act of March 3, 1899 (33 U.S.C. 403, 307, 409) pro-

hibits obstructions to navigable waters such as unauthorized structures, unauthorized fill, deposit of refuse, and willful or negligent abandonment of vessels. Other laws relating to the supervision of New York Harbor and its tributary waters are the Clean Water Act, the Marine Protection, Research and Sanctuaries Act of 1972, the Coastal Zone Management Act of 1969, the Fish and Wildlife Act of 1956, the Federal Power Act of 1920, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, the Deepwater Port Act of 1972, the Wild and Scenic Rivers Act, and the Land and Water Conservation Fund Act.

Direct supervision of the waters under jurisdiction of the New York District was accomplished by means of two patrol vessels whose scope of duty includes surveillance of the waterfront for unauthorized construction or fill, surveillance to the 3-mile limit of tows enroute to dumping grounds in the Atlantic Ocean to ensure that material is not illegally desposited in the waters of New York Harbor, and investigation of wrecks and abandoned vessels. In addition to the patrol vessels, whose range of patrol was limited to New York Harbor, inspectors utilizing government vehicles equipped with two-way radios patrolled shorefront facilities and property. These inspectors operate out of field offices located at Riverhead, New York and one inspector working at the New York District Office. Their duties include inspection of authorized construction, fill or excavation in waterways, including wetland areas, to ensure that work is performed in accordance with the Corps permit. The inspectors also patrol all waterways in their respective areas and inform the public of the Corps role and jurisdiction as well as provide assistance in the preparation of permit application. (See Table 2-E at end of chapter.)

25. RECONNAISSANCE AND CONDITION SURVEYS

(See Table 2-F at end of chapter.)

26. OTHER AUTHORIZED NAVIGATION PROJECTS

(See Table 2-G at end of chapter.)

27. NAVIGATION WORK UNDER SPECIAL AUTHORIZATION

Navigation Activities pursuant to Section 3 of Public Law 14, 79th Congress - River and Harbor Act of 2 March 1945.

Navigation Activities pursuant to Section 107, Public Law 645, 86th congress as amended (Preauthorization).

(See Table 2-N at end of Chapter.)

Beach Erosion Control

28. EAST ROCKAWAY INLET TO ROCKAWAY INLET & JAMAICA BAY, N.Y. (PT. 1)

Location. Atlantic coast of New York City, between East Rockaway and Rockaway Inlets, and the lands within and surrounding Jamaica Bay. The coastal area (about 10 miles long) is a peninsula in Queens County separating the ocean and the bay. (See Coast and Geodetic Survey Charts 12327, 12350, and 12326.)

Existing project. The project provides for approximately 8.7 million cubic yards of sand fill including the advanced placement of a two year supply of beach nourishment, and Federal participation in the cost of periodic beach nourishment of the shore protection works for 10 years after completion of the initial beach fill. Federal participation (50 percent) includes first cost and periodic beach nourishment, the total estimated at $25,600,000 (Oct. 1985 P.L.)

Local cooperation. Local interests must provide lands and rights-of-way, including borrow areas; bear 50 percent of total first cost presently estimated at $25,600,000 consisting of a cash contribution of $8,800,000 the final apportionment of cost to be made after actual costs and values have been determined and $16,800,000 for periodic nourishment, hold the United States free from damages; maintain, during economic life of project, continued public ownership and use of non-Federal publicly-owned shores upon which Federal participation in beach protection is based; maintain and operate all works after completion, control water pollution to the extent necessary to safeguard the health of bathers; local cooperation agreement was executed by the State May 17, 1974 and approved for Secretary of Army May 21, 1974. On May 22, 1974 sent to State an approved Escrow Agreement.

Operations and results during period. Periodic Nourishment Contract No. 2 and groin construction at Beach 149th Street completed in August and September 1982, respectively.

Condition as of September 30. Advance engineering and design is completed. Final Environmental Impact Statement on file with Council of Environmental Quality on April 16, 1971. Initial beach restoration completed in FY1977. Contract for first increment of periodic nourishment completed in May 1980. Contract for second increment of periodic nourishment was completed in August 1982. Contract for construction of stone groin at Beach 149th Street was completed in September 1982. Contract for third periodic nourishment was completed in August 1984. Periodic nourishment contract No. 4 is scheduled to awarded in May 1986. Completion of 10-year periodic nourishment remains.

29. SEA BRIGHT TO OCEAN TOWNSHIP, N.J.

Location. That portion of the Atlantic Coast of New Jersey in Moumouth County extending from Sea Bright southerly to Ocean Township - length about 12 miles. Sea Bright is about 30 miles by water south of the Battery, New York City. Erosion has seriously reduced the width of most beaches in the study area with consequent exposure of the shore to storm damage. Because of this erosion of the shore the area does not provide sufficient recreational beaches for the proper accommodation of the present and prospective tributary population.

Existing project. Provides for Federal participation in the restoration and protection of the shore from Sea Bright to Ocean Township by artificial placement of sand to widen the

beach to a minimum width of 100 feet at an elevation of 10 feet above mean low water and by the construction of 23 new groins and the extension of 14 existing groins in the Sea Bright-Ocean Township section. The project provides for Federal participation in periodic nourishment costs for a period of 10 years from the year that the total quantity of fill placed has equaled that required to restore the beach to project dimensions in that section. Total estimated Federal cost is $86,200,000. Total estimated non-Federal for all requirements of local cooperation is $11,500,000. (See Table 2-B for Authorizing Legislation.)

Local cooperation. Reconstruction of the seawall at Sea Bright and Monmouth was funded by the State. In addition the State provided funds in the amount of $100,000 for a limited analysis by the New York District with a view to deferring certain construction elements.

Operations and results during period, and Condition as of September 30. Construction has not been initiated, but the project is in an active status. No environmental impact statement was prepared.

30. OTHER AUTHORIZED BEACH EROSION CONTROL PROJECTS

(See Table 2-H at end of chapter.)

31. BEACH EROSION CONTROL WORK UNDER SPECIAL AUTHORIZATION

Beach Erosion Control activities pursuant to Section 103 Public Law 826, 84th Congress as amended (preauthorization).

(See Table 2-O at end of chapter.)

Flood Control

32. ARDSLEY, N.Y.

Location. The Village of Ardsley in Westchester County, New York is located on the Saw Mill River approximately 5 miles upstream from its junction with the Hudson River. (See U.S. Geological Survey Map, White Plains, N.Y.)

Existing project. The Federal flood control project provides for relocation of the existing channel from the upstream limit of the project downstream for approximately 1,000 feet, and approximately 290 feet of concrete channel upstream of the new Ashford Avenue Bridge. Upstream of the concrete channel along the left bank of the Saw Mill River, 425 feet of floodwall will be constructed along the modified channel with an additional 400 feet of closure wall. Between the Conrail Bridge and the New York State Thruway, a total of 230 feet of floodwall will be constructed on the right bank. A 325 foot closure levee is to be constructed running north of the Conrail Bridge. Ponding areas, drainage ditches and other drainage structures will be provided. The total estimated Federal cost for the project is $4,430,000 exclusive of land, relocations and other work to be provided by local interests at an estimated cost of $1,470,000 (October 1985 P.L.)

Local cooperation. In accordance with cost sharing and financing concepts reflected in S.1567, local interests are required to furnish all lands, easements and rights-of-way including relocations that are necessary for flood control improvements presently estimated at $860,000 and operate and maintain the project at an estimated cost of $27,000; interests have agreed to voluntarily pay 25 percent of the costs allocated to flood control for a total cost of $1,470,000 project cost but not less than that required by project authorization presently estimated at $1,470,000. The New York State Department of Environmental Conservation, the local sponsor, in an 11 December 1973 letter, indicated its intent to comply with the items of local cooperation and reaffirmed this on 15 August 1979 and 23 August 1985. The State of New York, in a 18 October 1985 letter, expressed this willingness to assume responsibility as local sponsor in accordance with the Cost Sharing and financing concepts agreed to by the Administration and Senator Majority Leadership Compromise as reflected in S.1567.

Operation and results during period. Preconstruction planning continued.

Condition as of September 30. Plan of Study approved in March 1979. Construction has not been initiated.

33. ELIZABETH, N.J.

Location. In city of Elizabeth, N.J. (Union County), extending 4.2 miles upstream from mouth of Elizabeth River at Arthur Kill. The river continues 7.7 miles northward through Union and Essex counties to its headwaters in East Orange, N.J. (See Geological Surveys quadrangles, Roselle, Elizabeth, Caldwall and Orange; and Army Map Service quadrangles, similarly designated.)

Existing project. Includes an improved channel with levees and/or walls where necessary between Bridge Street and Arthur Kill (2.1 miles); a concrete channel between Trotter's Lane and U.S. Highway No. 1 (1.4 miles); closure to high ground at upstream and downstream ends; interior drainage, including 5 pumping stations and 11 ponding areas; reconstruction or replacement of 16 bridges and associated street regrading; and utilities relocations. Total estimated Federal cost is $54,600,000. Total estimated non-Federal cost for all requirements of local cooperation excluding maintenance is $12,900,000 including $1,170,000 cash contribution. (See Table 2-B for Authorizing Legislation.)

Local cooperation. Local interests must provide lands and rights-of-way for construction and subsequent maintenance, the costs and values incurred in the interest of hurricane tidal flood protection to be credited to required local contribution to the project firsts costs allocated to hurricane tidal protection; hold the United States free from damages; maintain and operate completed works including all dredging required in the channel to maintain the design depths in the tidal reach; reconstruct all bridges and approaches except railroad bridges, and relocate existing sewerage and drainage facilities, streets, utilities, and other structures, such costs and valued incurred in interest of hurricane tidal flood protection to be credited to required local contribution to protect first costs allocated to hurricane tidal flood protection; bear 30 percent of first costs allocated to hurricane tidal flood protection, including the two items listed above pertaining to lands,

reconstruction and alterations, and a cash contribution now estimated at $1,170,000 to be paid either in a lump sum before starting construction, or in installments before starting construction, or in installments before starting pertinent work items in accordance with construction schedules as required by the Chief of Engineers; take necessary action to protect channels from future obstruction or encroachment including waste disposal that would reduce their flood-carrying capacity; take appropriate measures to control development in partially protected areas and fringe areas not included in the project with a view to preventing an undue increase in flood damage potential; maintain existing natural detention areas along the Elizabeth River between Union Avenue and Trotters Lane free from encroachment so as not to reduce their detention capacity; to provide an additional gravity outlets or pumping station capacities made necessary by any modifications or encroachments on the ponding areas; bear any increased Federal costs for the improvement that may result from any future requirements for parkway developments; and at least annually, notify interests affected that the improvements will not provide complete protection for fluvial floods greater than in July 1897. Agency responsible for local cooperation is City of Elizabeth (with concurrence of Union County and State of New Jersey.) Signed assurances of local cooperation were accepted by the District Engineer on January 9, 1970.

Operations and results during period. Construction of the Downstream Section was completed December 17, 1981. The Upstream Section of the project was awarded in March, 1982 at a cost of $22,964,500 and is 99 percent complete.

Condition as of September 30. Advance planning (begun January 1966), leading to first construction (Ursino Basin) and the Penn-Central Bridge and downstream dredging contracts, has been completed. General design memorandum and its supplement submitted. Penn-Central Railroad Bridge agreement executed. Environmental Impact Statement submitted to the Council on Environmental Quality on April 20, 1971. Upstream Ursino Basin construction complete. Contract, executed with New Jersey Department of Transportation on June 2, 1977 for placement of 132 foot section of flume to be accomplished in conjunction with bridge replacement, has been completed.

Contract for the Downstream Area Arthur Kill to U.S. Highway 1, was awarded September 29, 1978 and completed in December 1981. Upstream contract was awarded in March 1982. Project scheduled for completion in September 1986.

34. LIBERTY STATE PARK LEVEE AND SEAWALL, N.J.

Location. At Liberty Park, in Jersey City, Hudson County, New Jersey, directly behind Ellis Island and the Statue of Liberty, in Upper New York Bay (see Coast chart 12334)

Existing project. Construction of a levee, seawall, and walkways; rehabilitation of certain existing structures; landscaping with trees and shrubbery; and a boat basin and marina. The construction of the levee project will allow the creation of a large Greenpark to include a wetlands preserve, an inland watercourse and boatbasin, a marina, an ampitheater, indoor and outdoor recreation facilities, picnic areas, historic areas, community facilities, restaurants, plazas and many other areas for both active and passive recreational and aesthetic benefit to visitors. The stone armored levee will also serve as a settlement-free base for subsequent construction of a tree-lined promenade, the Liberty walk, curving along the water's edge. The Federal cost of construction is estimated at $19,000,000; with an additional $19,000,000 contribution by local interests including lands, certain relocations, utilities, and interior drainage.

Local Cooperation. In accordance with the project authorization, local interests are required to furnish all lands easements and rights of way including relocations, save those existing utilities passing through the proposed levee, necessary for the flood control improvements and to operate and maintain the project at an annual cost estimated to total $55,000. The State will assume all costs for construction of an interior drainage system to provide a ten (10) year level of protection estimated to be $5,000,000. Local interests have agreed to voluntary pay 50% of project cost. The New Jersey Department of Environmental Protection, the local sponsor, has indicated its willingness to comply with items of local cooperation in a letter dated 28 October 1985. In relation to the provision for cost sharing, they have indicated that they would negotiate this item subsequent to the passage of appropriate legislation.

Operations and results during period, and Conditions as of September 30. Phase I is completed. The District has completed their review of 90% (and final) contract documents for seawall (Area 2) and walkways (Areas 3 and 4) contracts.

35. PASSAIC RIVER BASIN, N.J. & N.Y.

Location. The Passaic River Basin, comprising 787 square miles in northeastern New Jersey and 148 square miles in southern New York State, is located in the greater New York City Metropolitan area. The Passaic River Basin is roughly elliptical in shape 26 miles long and 56 miles wide—and contains portions of Bergen, Essex, Morris, Passaic, Hudson, Somerset, Sussex and Union Counties in New Jersey. The Basin also includes parts of Orange and Rockland Counties in New York.

Previous Projects. Two Federal flood control projects have been completed by the Corps of Engineers in Passaic River Basin.

A $67,400 desnagging, debris removal and channel restoration project was completed in 1951 along Beaver Brook and the Pequannock Township Ditch, tributaries of the Pompton River in Pequannock Township, N.J.

Along the Pompton River, a channel clearing project including shoal removal and channel restoration was implemented in the two-mile reach from the Delaware, Lackawanna and Western Railroad Bridge to the Erie Railroad (Greenwood Lake Branch) Bridge. This work, in Pequannock Township, Wayne Township and Lincoln Park Borough, N.J., was completed in 1954 at a cost of $50,000.

Existing project. The project was authorized for Phase I advance engineering and design study in Section 101 (a) of the Water Resources Development Act of 1976 in accordance with the February 18, 1976 report of the Chief of Engineers. The estimate of Federal cost under the authorizing legislation is $1,330,000,000 (October 1985 P.L.), plus a $3,120,000

cash contribution from local interests and $146,880,000 for items of work to be contributed by local interests. The recommended plan for flood protection, navigation, hurricane protection and recreation, included a flood detention reservoir, channel diversions and modifications, levees and floodwalls, and streambank filling and grading. These works would provide protection against storm with a recurrence interval of 235 years, which is 20 percent larger than the October 1903 flood of record. Six independent tributary local protection plans were also recommended. However, because of a lack of public support for structural components of the project in the New Jersey portion of the Basin, the entire project is being reformulated during the Phase I study.

The House Public Works Committee Report (94-1702) on the 1976 Water Resources Development Act directed "...the reformulation of the plan for water management and flood control for the entire Passaic Basin." This report further states that local opposition to any plan which relies upon extensive use of dikes, dams and levees, such as those proposed in previous survey reports, mandates that the following alternatives, or any combination thereof, shall be the only ones surveyed and considered: (a) A full range of nonstructural flood control alternatives to include land acquisition, flood plain mapping, flood-proofing, developing early warning systems and relocation of buildings; (b) A tunnel diversion plan; (c) A system of tunnels addressing the needs of the entire basin; (d) Plans that combine local protection works where locally acceptable and nonstructural solutions including improvements to stream carrying capacity in accordance with different needs in the Lower Basin and in the Central basin; (d) Evaluation of fulfilling water supply objectives together with flood control; (f) Aquifer recharge and underground storage; and (g) Reservoir management in the headwaters. The Phase I Study is evaluating these alternatives in the formulation of revised plans.

Conditions as of September 30. The reformulation study was initiated in October 1977 under the existing authorization and Congressional Guidance in House Report 94-1702. The Study schedule runs through September 1987 at an estimated cost of $21,000,000. During FY1984, major effort was made to present feasibility basin-wide plan alternatives to the public. These alternatives included plans featuring tunnel diversions, channel improvements, levees and floodwalls, and nonstructural measures. During this period, the basin experienced severe flooding in April which was estimated to be the worst flooding in 40 years. In June the State of New Jersey selected the dual inlet tunnel plan as the local option plan for further study. Study effort is now focused on this plan and the candidate NED plan. Plan formulation has been completed for tributary flood damage areas along the Ramapo and Mahwah Rivers at Mahwah, N.J., and Suffern, N.Y., Molly Ann's Brook at Haledon, Prospect Park and Paterson, N.J., the Ramapo River at Oakland, N.J., and the Lower Saddle River in Bergen County, N.J. These areas have been recommended for early implementation under the interim flood protection guidance provided by the Congress.

The Longwood Valley Reservoir plan is now part of the Passaic River basin study as a result of a Congressional resolution. This plan will include water resource development for flood control on the Upper Rockaway River, water supply and proposed storage hydroelectric power.

36. SAW MILL RIVER AT ELMSFORD AND GREENBURGH, N.Y.

Location. On the Saw Mill River in the town of Greenburgh, N.Y. One portion known as Babbitt Court lies along the river immediately south of the Village of Elmsford. The second portion of the project, known as the Elmsford-Greenburgh area, is north of the Village of Elmsford, separated from Babbitt Court by approximately 4,000 feet. (See U.S. Geological Survey Map, White Plains, N.Y.)

Existing project. In the Babbitt Court area, the project provides for approximately 1,450 feet of levees and flood walls with associated ponding and interior drainage facilities. Within the Elmsford-Greenburg area, the existing channel is to be widened and deepened for 2,450 feet with an additional 600 feet of channel modification on the tributary Mine Brook. Levees and flood walls will be constructed on both banks of the Saw Mill River totaling approximately 4,400 feet and extending along Mine Brook to high ground. Ponding areas, a pumping station and other drainage structures will be provided. The total estimated Federal cost (October 1985 P.L.) for the project is $5,580,000 exclusive of land, relocations and other work to be provided by local interests at an estimated cost of $420,000 (See Table 2-B for Authorizing Legislation.)

Local cooperation. Local interests must provide lands and rights-of-way for construction, including borrow, ponding, and waste disposal areas; hold the United States free from damages; maintain and operate completed works; provide all alterations, relocations, and necessary replacements of existing facilities, including bridges, highways, sewers, (including those storm sewers and drains required to convey interior drainage to improved channels of ponding areas) utilities, and railroad modifications and relocations other than bridges and bridge approaches; protect the channel and other flood works from future encroachment or obstruction, including waste disposal which would reduce or otherwise impair their flood-carrying capacity, or provide a pumping station or additional gravity outlets, as appropriate, to compensate for any loss in ponding area effectiveness due to modification of or encroachment upon such areas; take appropriate measures to control development in partially protected areas and fringe areas not included in the project with a view toward preventing an undue increase in the flood damage potential; and at least annually, notify those affected that flooding will still be possible from large floods. New York State is Local Cooperating Agency. The New York State Department of Environmental Conservation, by letter dated June 12, 1974, indicated the State's intention to cooperate in the proposed plan.

Operation and results during period. During Phase I preconstruction planning the authorized project was found to be no longer economically justified. Phase I project reformulation to develop an alternative plan of improvement has been completed.

Condition as of September 30. Plan of Study approved January 28, 1977. Preconstruction planning started in February 1977. Indications from Phase I Planning accomplished to date, are that some features of the authorized project are no longer economically justified. The final Phase I General Design Memorandum was completed in Sept. 1985 and transmitted to North Atlantic Division for review.

37. INSPECTION OF COMPLETED FLOOD CONTROL PROJECTS.

Inspections of completed flood control works are performed semi-annually to determine the extent of compliance by local interests with the requirements of operation and maintenance.

38. OTHER AUTHORIZED FLOOD CONTROL PROJECTS

(See Table 2-I at end of chapter.)

39. DAM SAFETY PROGRAM

Beginning in FY1985 the New York District is performing a two phase modification to Waterbury Dam in an attempt to drastically reduce or totally eliminate a long existing seepage problem at the dam. The first phase of construction is the addition of 48 inch pipe to the two existing 54 inch pipes that comprise the existing outlet works of the dam. This work was completed in July 1985 at a cost of $513,400. The second phase of work is the partial rebuilding of the toe of the dam to include a seepage filter and monitoring system and to fill voids by means of sand injection and to fill voids in the river gorge by grouting. A contract for construction of the seepage filter and monitoring system was awarded in July 1985 at an estimated cost of $818,000 and is expected to be completed in Nov. 1985. The sand injection and gorge grouting work was initiated by hired labor in April 1985 at an estimated cost of $780,000. The sand injection and gorge grouting work is being done by the Baltimore District for the New York District.

40. FLOOD CONTROL WORK UNDER SPECIAL AUTHORIZATION

Natural Disaster and Emergency Flood Control Activities.

Pursuant to Public Law 84-99 and antecedent legislation -advance preparation, emergency operations, rehabilitation, emergency drinking water, advance measures and drought assistance.

Under disaster preparedness, the New York District completed revisions of various emergency manuals and pamphlets, attended meetings and seminars dealing with emergency response and preparation, provided in-house training to District employees in emergency operations activities, and purchased supplies and equipment to maintain its' flood fighting and response capability.

Under emergency operations, the New York District monitored the effects of Hurricane Gloria which threatened the coastal regions of southern Long Island and New Jersey in late September 1985. As a result of the severity of this storm, the District dispatched reconnaissance survey team to ascertain the extent and type of damages which had occurred in the affected locations. Technical assistance and sandbags were also provided to local, county and state governmental organizations which requested such aid. It is anticipated that the District will receive mission assignments from the Federal Emergency Management Agency (FEMA) under the provisions of PL93-288 to perform preliminary damage assessments and to prepare detailed damage survey reports in Long Island and New Jersey in FY 1986.

As a result of continued low precipitation in northern New Jersey and southeastern New York State, the New York District has been actively monitoring the water levels of the reservoir systems in these areas on a weekly basis in order to determine possible response measures to assist the States of New York and New Jersey during the on-going drought emergency, although drought restrictions were eventually lifted in New Jersey in late summer, monitoring will continue in New York State until water levels approach the normal reservoir level percentage capacity during FY 1986.

41. EMERGENCY STREAMBANK AND SHORELINE PROTECTION

Activities pursuant to Section 14, Public Law 526, 79th Congress as amended (Preauthorization)

(See Table 2-Q at end of chapter.)

42. SURVEYS

(See Table 2-J at end of chapter.)

43. COLLECTION AND STUDY OF BASIC DATA

Costs for the period of $110,300 for flood plain management services are set forth in Table 2-L at the end of chapter.

44. DEAUTHORIZED PROJECTS

A total of 23 projects were deauthorized by Congressional Action pursuant to Section 12 of Public Law 93-251, Water Resources Development Act of 1976. (See Table 2-M at end of chapter.)

TABLE 2-A COST AND FINANCIAL STATEMENT

See Section in Text	Projects	Funding	FY82	FY83	FY84	FY85	Total Cost to September 30, 1985
1.	Aquatic Plant Control	New Work					
		Approp.	84,000	105,000	100,000	185,000	903,806[1]
		Cost	150,771	102,224	43,973	176,102	818,567[2]
2.	Bay Ridge & Red Hook Channels, N.Y.	New Work					
		Approp.	-	-	-	-	5,523,297
		Cost	-	-	-	-	5,523,297[27]
		Maint.					
		Approp.	1,598,000	336,000	1,339,000	7,059,000	30,004,988
		Cost	1,590,956	343,044	1,339,000	7,056,993	30,002,981
3.	Bronx River, N.Y.	New Work					
		Approp.	-	-	-	-	1,149,946
		Cost	-	-	-	-	1,149,946
		Maint.					
		Approp.	-	-	-	60,000	2,007,853
		Cost	-	-	-	59,390	2,007,243[5]
4.	Buttermilk Channel, N.Y.	New Work					
		Approp.	-	-	-	-	4,590,201
		Cost	-	-	-	-	4,590,201[9]
		Maint.					
		Approp.	-	-	-	640,000	4,239,773
		Cost	-	-	-	640,000	4,239,773
5.	East Chester Creek, N.Y.	New Work					
		Approp.	-	-	-	-	592,056
		Cost	-	-	-	-	592,056
		Maint.					
		Approp.	-	-	-	717,000	1,471,042
		Cost	-	-	-	716,771	1,471,813
6.	East River, N.Y.	New Work					
		Approp.	-	-	-	-	32,750,745
		Cost	-	-	-	-	32,723,662[11]
		Maint.					
		Approp.	-	-	-	1,437,000	4,449,769
		Cost	-	-	-	1,436,030	4,448,799[11]
7.	East Rockaway Inlet	New Work					
		Approp.	-	-	-	-	83,969
		Cost	-	-	-	-	533,334[4]
		Maint.					
		Approp.	1,039,000	-800	-	390,034	5,492,736
		Cost	988,914	45,349	3,937	377,768	5,480,470
8.	Fire Island To Jones Inlet, N.Y.	New Work					
		Approp.	-	-	-	-	594,355
		Cost	-	-	-	-	594,355[28]
		Maint.					
		Approp.	-	100,000	-	1,695,700	4,700,404
		Cost	5,614	129,779	21,005	1,681,761	4,742,863
9.	Hudson River, N.Y.	New Work					
		Approp.	-	-	-	-	44,249,803[678]
		Cost	18	-	-	-	44,249,865
		Maint.					
		Approp.	488,000	1,838,256	758,400	673,000	27,582,815
		Cost	482,930	1,314,247	1,299,002	579,097	27,396,426
10.	Jamaica Bay, N.Y.	New Work					
		Approp.	-	-	-	-	4,545,753
		Cost	-	-	-	-	4,545,753
		Maint.					
		Approp.	-	-	-	1,310,000	3,914,547
		Cost	-	-	-	1,284,412	3,888,959
11.	Jones Inlet, N.Y.	New Work					
		Approp.	-	-	-	-	1,822,530[10]
		Cost	-	-	-	-	1,822,530[10]
		Maint.					
		Approp.	1,315,000	-	98,000	1,709,966	11,137,176
		Cost	1,315,000	-	98,000	1,699,398	11,126,607
12.	Keyport Habor, N.Y.	New Work					
		Approp.	-	-	-	-	40,475
		Cost	-	-	-	-	40,475
		Maint.					
		Approp.	-	-	603,000	31,000	848,148
		Cost	-	-	603,000	30,979	848,127

TABLE 2-A (Continued) COST AND FINANCIAL STATEMENT

See Section in Text	Projects	Funding	FY82	FY83	FY84	FY85	Total Cost to September 30, 1985
13.	Moriches Inlet, N.Y.	New Work					
		Approp.	-	-	100,000	15,000	1,046,000
		Cost	60,390	20,660	81,283	-0-	1,012,282
		Maint.					
		Approp.	-	-	-	-0-	9,422
		Cost	-	-	-	-0-	9,422
	(Required	New Work					
	Contributed	Contrib.	-	-	-	-0-	3,390,000
	Funds)	Cost	43,446	358,855	-	-0-	402,301
14.	Narrow of Lake	New Work					
	Champlain,N.Y.	Approp.	-	-	-	-	681,811[12]
		Cost	-	-	-	-	681,811[12]
		Maint.					
		Approp.	16,000	25,000	29,000	30,000	939,695
		Cost	14,453	26,547	28,744	29,326	938,744
15.	Newark Bay,	New Work					
	Hackensack &	Approp.	-	630,000	-	-	29,014,510
	Passaic Rivers,N.J.	Cost	-	630,000	-	-	9,014,511[22,23]
		Maint.					
		Approp.	2,224,000	7,681,000	3,866,000	(295,000)	27,251,036
		Cost	2,218,610	2,615,509	3,936,107	(296,200)	22,254,452[24]
16.	New York and New	New Work					
	Jersey Channels	Approp.	-	-	-	-	73,053,435
		Cost	-	-	-	-	73,052,435[15,16,17]
		Maint.					
		Approp.	3,632,000	680,000	8,704,000	1,162,000	4,976,359
		Cost	3,623,281	657,732	8,386,840	1,096,073	39,259,674[18]
		Rehab.					
		Approp.	-	-	-	-	454,773
		Cost	-	-	-	-	454,773
17.	New York Harbor-	New Work					
	Collection and	Approp.	1,100,000	2,570,000	2,700,000	1,930,000	17,229,000
	Removal of Drift	Cost	1,293,239	1,654,623	2,960,800	1,801,315	16,220,742
		Maint.					
		Approp.	4,435,000	-	-	-	42,192,896[19]
		Cost	4,363,879	-	-	-	42,387,718[19]
		Maint&Oper					
		Approp.	3,025,000	-	2,700,000	2,820,000	18,069,000
		Cost	2,850,036	3,245,344	2,960,800	2,786,239	17,205,706
	(Required	New Work					
	Contributed	Approp.	286,222	470,459	1,380,950	707,096	6,464,328
	Funds)	Cost	727,405	181,077	1,250,972	537,350	5,593,622[29]
18.	New York Harbor-	New Work					
	Entrance Channel	Approp.	-	-	-	-	45,009,710[20]
	and Anchorage Areas	Cost	970	-	-	-	45,009,710[20]
		Maint.					
		Approp.	-	8,047,000	8,739,000	3,419,900	36,349,524
		Cost	-	7,525,976	9,132,502	3,508,699	39,071,938[30]
19.	Port Chester Harbor	New York					
	N.Y.	Approp.	-	-	-	-	433,470
		Cost	-	-	-	-	433,470
		Maint.					
		Approp.	-	-	-	617,000	1,060,795
		Cost	-	-	-	616,303	1,060,098
20.	Raritan River, N.J.	New York					
		Approp.	-	-	-	-	1,551,470[21]
		Cost	-	-	-	-	1,551,470[25]
		Maint.					
		Approp.	-	-	180,000	1,119,000	11,412,703[26]
		Cost	-	-	177,126	1,119,269	11,410,298
21.	Sandy Hook Bay, N.J.	New Work					
		Approp.	-	-	-	-	508,936
		Cost	-	-	-	-	508,936
		Maint.					
		Approp.	-	-	-	3,750,000	3,904,565
		Cost	-	-	-	3,747,763	3,902,328

TABLE 2-A (Continued) COST AND FINANCIAL STATEMENT

See Section in Text	Projects	Funding	FY82	FY83	FY84	FY85	Total Cost to September 30, 1985
22.	Shinnecock Inlet, N.Y.	New Work					
		Approp.					
		Cost					
		Maint.					
		Approp.				-0-	-0-
		Cost				151	173
23.	Shrewsbury River,N.J.	New Work					
		Approp.	-	-	-	-	1,145,457
		Cost	-	-	-	-	1,145,457
		Maint.					
		Approp.	-	-	-	80,000	1,812,880
		Cost	-	-	-	79,472	1,813,352
24.	Supervisor of New York Harbor	Maint.					
		Approp.	745,000	832,000	483,006	560,000	27,563,447
		Cost	745,758	784,221	526,571	564,738	28,046,393
28.	East Rockaway Inlet to Rockaway Inlet and Jamaica Bay, N.Y. (Part I)	New Work					
		Approp.	3,800,000	-	2,900,000	2,250,000	17,900,356
		Cost	3,664,868	220,088	2,918,123	2,224,852	17,871,469
	(Required Contributed Funds)	New Work					
		Contrib	3,457,300	127,660	-	2,316,000	17,120,961
		Cost	3,479,764	186,169	3,967	2,251,199	14,633,942
29.	Sea Bright to Ocean Tnp,N.J.	New Work					
		Approp	-	-	-	1,300,000	1,300,000
		Cost	-	-	-	1,252,310	1,252,310
32.	Ardsley, N.Y.	New Work					
		Approp.	-	-	45,000	15,000	360,000
		Cost	48,886	846	32,325	-0-	332,324
33.	Elizabeth, N.J.	New Work					
		Approp.	7,650,000	9,663,000	6,300,000	3,100,000	54,556,800
		Cost	7,841,068	8,841,979	7,293,978	2,634,945	54,091,744
	(Other Contributed Funds)	New Work					
		Approp.	1,136,390	1,214,707	-	990,000	4,353,665
		Cost	882,918	1,635,180	-	885,914	4,891,004
34.	Liberty State Park and Seawall, N.J.	New Work					
		Approp.	-6,000	-	-	20,000	200,043
		Cost	20,519	-	-	-0-	180,038
35.	Passaic River Basin, N.J.&N.Y., Phase I 3122(516)	New Work					
		Approp.	1,845,076	1,634,000	1,535,000	37,000	13,557,700[3]
		Cost	1,845,076	1,635,287	1,523,696	30,902	13,473,580
36.	Sawmill River, Elmsford-Greenburg, N.Y.	New Work					
		Approp.	-	-	-	-	490,000
		Cost	5,638	7,600	-	-	490,000

TABLE 2-A (Continued) COST AND FINANCIAL STATEMENT

1. Of which $12,500 is for North Atlantic Division Accounts.
2. Of which $12,127 is for North Atlantic Division Accounts.
3. Include $1,040,000 for new work and $1,040,000 expended for the portion under construction general.
4. Excludes $100,000 for new work expended from contributed funds and includes $82,600 for new work expended from public work funds.
5. Includes $68,036 for new work and $26,931 for maintenance for previous projects.
6. Includes $5,112,694 for new work for previous project.
7. Includes $238,350 for new work expended from public works funds and $311,461 emergency relief funds. Excludes $81,373 expended from contributed funds.
8. Excludes $454,273 expended between August 18, 1915 and June 30, 1935, for operation and care of lock and dam at Troy, N.Y., under permanent indefinite appropriation. Excludes $23,735 reimbursement for repairs to Troy Lock.
9. Includes $122,051 public works funds and $496,250 for new work for previous projects.
10. Excludes $1,882,530 for new work expended from contributed funds.
11. Includes $6,187,694 for new work and $37,664 for maintenance for previous projects.
12. Includes $115,000 for new work expended from contributed funds.
15. Includes $12,809,975 for new work for previous projects and $6,621 for new work for Lemon Creek, Staten Island, N.Y.
16. Excludes $7,712 for new work expended from contributed funds.
17. Includes $807,000 for new work expended from public works funds and $2,023,308 for new work expended from emergency relief funds.
18. Includes $1,160,380 for maintenance for previous project, and $1,621 for maintenance of Lemon Creek, Staten Island, N.Y.
19. Includes $2,491,206 expended to date for construction of a land-based overfire air pit incinerator ($1,493,393 in maintenance funds and $997,813 in O&M funds).
20. Includes $116,530 applied to removing wrecks authorized by acts prior to adoption of existing project.
21. Includes $673,155 for new work for previous project.
22. Includes $1,836,403 for new work expended from contributed funds.
23. Excludes $285,600 for new work expended from contributed funds.
24. Includes $1,490,715 for maintenance for previous projects.
25. Excludes $292,685 for new work expended from Ordinance funds and $66,000 for new work expended from contributed funds.
26. Includes $111,419 for maintenance for previous projects and $64,560 extended from public works funds.
27. Includes $1,246,100 for new work for previous projects and $64,560 extended from public works funds.
28. Excludes $90,190 for new work expended from contributed funds.
29. Includes $400,000 Jobs Bill funds.
30. Includes $200,000 Jobs Bill funds.

TABLE 2-B AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	AQUATIC PLANT CONTROL (See Section 1 of Text)	
River and Harbor Act of 1958	Control and Progressive Eradication of obnoxious Aquatic Plant growths	H. Doc. 37, 85th Cong., 1st sess.
Section 104 and Harbor Act of 1958	Provided that all research and Planning cost to be borne fully by the United States.	
Section 302 River and Harbor act of 1965	Modified project to include control of waterchestnut.	
	BAY RIDGE AND RED HOOK CHANNELS, N.Y. (See Section 2 of Text)	
Mar. 3,1899	Channel 40 feet deep and 1,200 feet wide.	H. Doc. 337, 54th Cong. 2d Sess. (Annual Report 1899, P. 1177).
Mar. 2, 1907	Dredging to obtain first a depth of 35 feet, subsequently increasing depth of 40 feet for full width.	
July 3, 1930	Widening of Bay Ridge Channel to 1,780 feet.	Rivers and Harbors Committee Doc. 44, 71st Cong. 2d sess.
	BRONX RIVER, N.Y. (See Section 3 of Text)	
Mar. 4, 1913	Channel 10 feet deep and 100 feet wide from East River to Dam at East 177th Street.	H. Doc. 897, 62d Cong. 2d sess.
	BUTTERMILK CHANNEL, N.Y. (See Section 4 of Text)	
June 13, 1902	Channel 1,200 feet wide and not less than 30 feet deep.	H. Doc. 122, 56th Cong., 2d sess. (Annual report 1901, p. 1299)
	EAST CHESTER CREEK, N.Y. (See Section 5 of Text)	
May 17, 1950	Channel 10 feet deep and 150 to 70 feet wide.	H. Doc. 749, 80th Cong., 2d sess.
	EAST RIVER, N.Y. (See Section 6 of Text)	
Mar. 2, 1915	Removal of Coenties Reef to 35 feet, conditioned upon local interests increasing depth to 40 feet	H. Doc. 188, 63d Cong., 1st sess.
July 27, 1916	Channel across Diamond Reef 35 feet deep and 1,000 feet wide.	Do.
Aug. 8, 1917	Channel east of Blackwells Island to 20 feet; channel between South Brother and Berrian Islands, to 20 feet; channel between North and South Brother Islands to 26 feet.	Do.
Do.	Channel 40 feet deep through East River and Hell Gate.	H. Doc. 140, 65th Cong., 1st sess.
July 18, 1918	Secure a depth of 40 feet in channel through East River and Hell Gate as soon as practicable.	Specified in act
Sept. 22, 1922	Depth limited to 35 feet in through channel between Wallabout Channel and Throgs Neck, Channel east of Blackwells Island, 30 feet to English Pl. and eliminated 20-foot channel north of English Pl. Eliminated channel between North and South Brother Islands except as authorized prior to existing project. Remove certain rocks and reefs and construct dike in pot cove, Hell Gate.	Rivers and Harbors Committee Doc. 3, 67th Cong., 2d sess.
E. Pub. Wks. Comm. Res., Dec. 15, 1970 and S. Pub. Wks Comm. Dec. 17, 1970	Spur channel to Astoria waterfront 37 feet in rock, 35 feet in material, for a length of 0.95 mile for varying widths, and a turning basin. (South Brother Island Channel).	S. Doc. 91-60, 91st Cong., 2d sess.
	EAST ROCKAWAY INLET, N.Y. (See Section 7 of Text)	
July 3, 1930	Channel 12 feet deep and 250 feet wide, and a jetty.	H. Doc. 19, 71st Cong., 1st sess.
	FIRE ISLAND TO JONES INLET, N.Y. (See Section 8 of Text)	
Aug. 26, 1937	Construction of jetty.	Rivers and Harbors Committee Doc. 33, 75th Cong. 1st sess.
May 17, 1950	Channel 10 feet deep.	H. Doc. 762, 80th Cong., 2d sess.

TABLE 2-B (Continued) AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	HUDSON RIVER, N.Y. (See Section 9 of Text)	
June 25, 1910	Channel 12 feet deep from Hudson to Waterford, remove State lock and dam at Troy and construct a new lock and dam.[2]	H. Doc. 719, 61st Cong., 2d sess.
Mar. 3, 1925	Channel 27 feet deep below Hudson to Albany, N.Y.	H. Doc. 350, 68th Cong., 1st sess.
July 3, 1930	Channel 27 feet below Hudson	H. Doc. 210, 70th Cong., 1st sess.
	Operation and care of lock and dam at Troy were included in project July 1, 1935.	
Aug. 30, 1935	Relocation of 12-foot channel between Troy and Waterford.	S. Doc. 155, 72nd Cong., 2d sess.
June 20, 1938	Deepen channel between Albany and Waterford to 14 feet with no change in depths for harbors in front of Albany and Troy.	H. Doc. 572, 75th Cong., 3d sess.
Sep. 3, 1954	Deepen channel between New York City and Albany to 32 feet and construct a turning basin and 2 anchorages.	H. Doc. 228, 83d Cong. 1st sess.
P.L. 89-72	Mooring facilities.	
	JAMAICA BAY, N.Y. (See Section 10 of Text)	
June 25, 1910 March 2, 1945	Construction of 1 jetty Interior channel along. west shore of bay, 18 and 12 feet deep; interior channel along south shore, 15 feet deep; entrance channel 20 and 18 feet deep; and 1 riprap jetty all in lieu of work heretofore authorized. Modified conditions of local cooperation.	H. Doc. 1488, 60th Cong. 2d sess. H. Doc. 700, 76th Cong. 3d sess.
May 17, 1950	Channel 15 feet deep in Mott Basin including its 2 branches.	H. Doc. 665, 80th Cong., 2d sess.
	JONES INLET, N.Y. (See Section 11 of Text)	
Mar. 2, 1945	Construction of jetty and channel 12 feet deep and 250 feet wide.	H. Doc. 409, 77th Cong.
	KEYPORT HARBOR, N.J. (See Section 12 of Text)	
Aug. 2, 1882	A channel 8 feet deep, 200 feet wide from Raritan Bay to the former Steamboat Dock at Keyport	R&H Act Public Law 42-153 3d. sess.
	MORICHES INLET, N.Y. (See Section 13 of Text)	
July 14, 1960	Channel 10 feet deep and 200 feet wide in inlet and 6 feet deep and 100 feet wide in the Bay, and 2 jetties	H. Doc. 126, 86th Cong., 1st sess.
	NARROWS OF LAKE CHAMPLAIN, N.Y. AND VERMONT (See Section 14 of Text)	
Aug. 8, 1917	Channel 12 feet deep and 150 feet wide.	H. Doc. 1387, 62d Cong., 3d sess.
	NEWARK BAY, HACKENSACK AND PASSAIC RIVERS, N.J. (See Section 15 of Text)	
Mar. 2, 1907	16-foot channel in Passaic River	H. Doc. 441, 59th Cong., 2d sess.
Feb. 27, 1911	Widening 16-foot channel in Passaic River	H. Doc. 441, 59th Cong., 2d sess.
July 25, 1912	20-foot channel in Passaic River.	H. Doc. 707, 62d Cong.,
Jan. 21, 1927	10-foot channel in Passaic River.	H. Doc. 284, 60th Cong., 2d sess.
July 3, 1930	30-foot channel in Passaic River.	H. Doc. 156, 71st Cong., 2d sess.
Mar. 22, 1945	35 and 37 feet in main channel of Newark Bay and branch channel to an inshore channel at Port Newark terminal and remove portion of rock area at Bergen Point to same depths.	S. Doc. 250, 79th Cong., 2d. sess.
Mar. 2, 1945	Modification of local cooperation for 10-foot channel in Passaic River	H. Doc. 430, 76th Cong., 1st sess.
Sept. 3, 1954	34-32 foot channel in Hackensack River including approach channel in Newark Bay from branch channel at Port Newark Terminal and a 25-foot turning basin.	H. Doc. 252, 82d Cong., 1st sess.
Oct. 23, 1962	35-foot channels at Port Elizabeth.	H. Doc. 289, 88th Cong., 2d sess.

TABLE 2-B (Continued) AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
Nov. 7, 1966	Widening 35-foot channel in Newark Bay, provision of two maneuvering areas, widening entrance into Port Elizabeth and Port Newark branch channels, deepening and widening Newark Bay 32-foot channel, and provision of a turning basin at junction of Hackensack and Passaic Rivers; and deepening 12 foot channel in Hackensack River to 15 feet.	H. Doc. 494, 89th Cong., 2d sess.
	Additional widening at junction with Kill Van Kull by deepening to 35 feet a triangular area at the eastern end of the 30-foot channel south of Shooters Island.	Report on file in the Office of the Chief of Engineers.
	NEW YORK AND NEW JERSEY CHANNELS (See Section 16 of Text).	
Sept. 6, 1933 Aug. 30, 1935	Anchorage off Perth Amboy to 35 feet.	Rivers and Harbors Committee Doc. 17, 71st Cong., 2d sess.
May 28, 1935	Channels 35 feet deep from lower bay to upper bay, except between vicinity of Smith Creek and vicinity of Piles Creek to 30 feet with anchorage 38 feet deep at Sandy Hook and Perth Amboy.	H. Doc. 133, 74th Cong., 1st sess.
May 17, 1950	Channel 35 feet deep from vicinity of Smith Creek to vicinity of Piles Creek.	H. Doc. 233, 81st Cong., 1st sess.
Oct. 27, 1965	Widen entrance to Kill Van Kull to 1,400 feet narrowing to a minimum width of 1,000 feet.	H. Doc. 108, 89th Cong., 1st sess.
	NEW YORK HARBOR, COLLECTION AND REMOVAL OF DRIFT (See Section 17 of Text)	
Mar. 4, 1915 Aug. 8, 1917	Allotment from appropriations made for New York Harbor and its immediate tributaries may be used for collection and removal of drift in these waterways.	
July 3, 1930	Carrying on this work as a separate and distinct project.	
Dec. 31, 1970	Increase scope of project to include removal and disposal of derelict vessels, some deteriorated shore structures and debris along shores; and the repair of other shore structures; all subject to approval by Secreatry of the Army and the President.	P.L. 91-611, 91st Cong., H.R. 19877
Mar. 7, 1974	Removal and disposal of derelict vessels, some deteriorated shore structures and debris along shores and the repair of other shore structures.	P.L. 93-251, 93rd Cong., H.R. 10203
	NEW YORK HARBOR, ENTRANCE CHANNELS AND ANCHORAGE AREAS (See Section 18 of Text)	
July 5, 1884	Main-Ship-Bayside-Gedney to 30 feet for width of 1,000 feet (dimensions fixed by Secretary of War, Dec. 27, 1886 by authority of act of Aug. 5, 1886).	Annual Reports 1887, p. 62 and 1888, p. 63
Mar. 3, 1899	Ambrose Channel (East Channel) to 40 feet.	H. Doc. 159, 55th Cong., 3d sess. (Annual Report 1899, p. 1279)
June 25, 1910	Maintenance of entrance channel under 1 head.	
Aug. 8, 1917	Anchorage Channel, extension of Ambrose Channel into Upper Bay	H. Doc. 518, 63d Cong., 2d sess.
Aug. 8, 1917	Removal of Craven Shoal	H. Doc. 557, 64th Cong., 1st sess.
	PORT CHESTER HARBOR, N.Y. (See Section 19 of Text)	
June 25, 1910	Entrance channel 12 feet deep, thence 10 feet deep to and and including turning basin, thence 3 feet deep to head of improvement.	H. Doc. 1165, 60th Cong., 2d sess.
July 3, 1930	Widening turning basin, dredging anchorage basin, and constructing fenders on east bank.	Rivers and Harbors Committee Doc. 23, 70th Cong., 2d sess. (contains published map).
	RARITAN RIVER, N.J. (See Section 20 of Text)	
Mar. 2, 1919	Channel 15 feet deep and 200 feet wide to Washington 10 feet deep and 150 feet wide to canal locks and 10 feet deep thru South Channel.[7]	H. Doc. 1341, 62d Cong., 3d. sess.

TABLE 2-B (Continued) AUTHORIZING LEGISLATION

Acts	Works Authorized	Documents
Jul. 3, 1930	Channel 25 feet deep and 300 feet wide up to New York and Long Branch Railroad bridge.	H. Doc. 127, 70th Cong., 1st sess.
Jul. 3, 1930	Channel 10 feet deep in earth and 11 feet in rock to New Brunswick. Width reduced to 100 feet.	H. doc. 454, 70th Cong., 2d sess.
Jul. 3, 1930	Relocation of lower reach of South Channel.	Rivers and Harbors Doc. 31, 71st Congs., 2d sess.
	Committee	
Aug. 26, 1937	Channel 25 feet deep and 300 feet wide to junction of main and south channels thence of same depth on South Channel to Titanium Pigment Co.	Rivers and Harbors Committee Doc. 74, 74th Cong., 2d sess.
Oct. 17, 1940	Channel 25 feet deep and 300 feet wide from junction of main and south channels to government wharf, including a turning basin.	Report on file in the Office, Chief of Engineers (report not printed)
Oct. 23, 1962	In South Channel, maintenance of 15-foot channel to dock of Middlesex County Sewerage Authority.	H. Doc. 455, 86th Cong., 2d sess.
	SANDY HOOK BAY, N.J. (See Section 21 of Text)	
Aug. 26, 1937		H. Doc. 292, 75th Cong., 1st sess.
	SHINNECOCK INLET, N.J. (See Section 22 of Text)	
July 14, 1960	Channel 10 feet deep and 200 feet wide in Inlet, and 6 feet deep and 100 feet wide in the Bay, and 2 jetties.	H. Doc. 126, 86th Cong. 1st sess. FY83 Supplemental Approp. Act
	SHREWSBURY RIVER, N.J. (See Section 23 of Text)	
Mar. 2, 1919	Channel 6 feet in North Branch	H. Doc. 1296, 62d. Cong., 3d sess.
Aug. 30, 1975	Channel 12 feet deep.	H. Doc. 157, 71st Cong., 2d sess.
Aug. 30, 1935	Channel 9 feet deep.	Rivers & Harbors Committee Do. 31, 74th Cong.,
May 17, 1950	Turning basin and anchorage 6 feet at Red Bank and Channels 6 feet deep in Claypit, Oceanport, and Little Silver Creeks.	H. Doc. 285, 81st Cong., 1st sess.
	EAST ROCKAWAY INLET TO ROCKAWAY INLET AND JAMAICA BAY, N.Y. (PART 1). (See Section 28 of Text)	
1965 Flood Control Act	Hurricane barrier, dikes, levees, floodwalls, fill, placement, stoplog structures, stairways, ramps, road raising, fishing platforms, annual nourishment.	H. Doc. 215, 89th Cong., 1st sess.
1974 Water Resources Development Act	Authorized beach erosion control aspect to be constructed independent of the hurricane flood protection aspect of the project.	
	SEA BRIGHT TO OCEAN TOWNSHIP, N.J. (See Section 29 of Text)	
July 3, 1958	Restoration of beach to minimum width of 100 feet at height of 10 feet above mlw, and construction of 23 new groins and extension of 14 existing groins.	H. Doc. 332, 85th Cong., 2d sess., modified by Appr. Act for Energy and Water Dev. for FY85
	ARDSLEY, N.Y. (See Section 32 of text)	
Section 201 Flood Control Act of 1965	Channel improvement, concrete flume, flood walls, levees, various drainage structures.	H. Doc. 215/89/1.
	ELIZABETH, N.J. (See Sction 33 of Text)	
1965 Flood Control Act	Channel improvement, flume, levees, floodwalls, bridges, interior drainage facilites.	Doc. 249, 89th Cong., 1st sess.
	LIBERTY STATE PARK LEVEE AND SEAWALL, N.J. (See Section 34 of Text)	
1976 Water Resources Development Act	Approxmately 7,000 feet of seawall and elevated pedestrian walkway.	

TABLE 2-B (Continued)

Acts	Works Authorized	Documents
	PASSAIC RIVER BASIN, N.J. & N.Y., PHASE I (See Section 35 of Text)	
1976 Water Resources Development Act Section 101 (a)	Advanced engineering and design study, involving reformulation of plans for flood control and water resource management.	H. Rpt. 94-1702
	SAW MILL RIVER AT ELMSFORD AND GREENBURGH, N.Y. (See Section 36 of Text)	
1965 Flood Control Act	Levess, floodwalls, channel improvement.	H. Doc. 94-465, 94th Cong., 2d sess.

TABLE 2-C

HUDSON RIVER, N.Y.
FEATURES OF LOCK AND DAM INCLUDED IN EXISTING PROJECT
(See Section 9 of Text)

Location:	
Below Waterford	2.2 miles
Above Battery, New York City	153.8 miles
Locks:	
Clear Width	44.4 feet
Greatest length available for full width	492.5 feet
Lift at lowest stages	17.3 feet
Depth on miter sills:	
Upper (at normal pool level)	16.3 feet
Lower (at lowest low water)	13.0 feet

Character of foundation: Rock
Kind of dam: Fixed Crest
Type of construction: Concrete
Completed: 1917
Cost: $1,463,014

TABLE 2-D

TOTAL COSTS FOR EXISTING PROJECT TO SEPTEMBER 30, 1985

See Section of Text	Project	Funds	New York	Rehabilitation	Maintenance	Operation and Cost	Total
6.	Hudson River, N.Y.	Regular	$38,560,839	-	$579,097	$512,382	$42,379,312
		Public Works	238,350	-	-	-	238,350
		Emergency Relief	311,461	-	-	-	311,461
		TOTAL	$39,110,650	-	$579,097	$512,382	$42,929,123
16.	N.Y. and N.J. Channels	Regular	$57,412,152	-	$1,096,073	-	$67,901,957
		Public Works	807,000	-	-	-	807,000
		Emergency Relief	2,023,308	-	-	-	2,023,308
		Contributed	7,712	-	-	-	7,712
		TOTAL	$60,250,172	-	$1,096,073	-	$70,739,977

TABLE 2-E

SUPERVISOR OF NEW YORK HARBOR
(See Section 24 of Text)
STATEMENT OF ACTIVITIES—FY 1985

1. Number of Patrols	
a. Shore	310
b. Vessel	350
. Air (helicopter)	-
Total	660
2. Number of Inspections	
a. Shore Facilities	4,225
b. Vessels	1,050
Total	5,275
3. Disposition of Cases	
a. Voluntary Restoration	30
b. After-the-fact Permit Applications Accepted	45
c. Permit not required or already under permit	54
d. Submitted for litigation to OCE or US Attorney	0
e. Cases pending as of October 1, 1982	82
Total	211

TABLE 2-F

RECONNAISSANCE AND CONDITION SURVEYS

FY 1985

NAME OF PROJECT	DATE SURVEY CONDUCTED
NEW JERSEY	
Keyport Harbor	Nov. 1984
Matawan Creek	Nov. 1984
Newark Bay, Hackensack & Passaic Rivers	Oct., Nov., 1981-Feb. 1985
Raritan River	Dec., 1984-Feb., 1985
Sandy Hook Bay	May, June, 1985
Shark River	*
Shrewsbury River	Oct., Dec., 1984-Feb., Apr., June 1985
NEW YORK	
Bay Ridge & Red Hook Channel	Mar., Jun., Jul. 1985
Bronx River	Oct., Nov., 1984
Browns Creek	*
East River	Dec., 1984-Aug. 1985
East Rockaway Inlet	Mar., Aug., Sept., Oct. 1985
Eastchester Harbor	Dec., Nov., 1984-Apr., May 1985
Fire Island Inlet	Nov., Dec., 1984-Apr., Jul. 1985
Great South Bay	*
Hudson River	*
Huntington Harbor	*
Jamaica Bay	Mar., Jul., Aug., 1985
Jones Inlet	Aug., Sept. 1985
Long Island Intracoastal Waterway	Oct., 1984-Apr., May 1985
Mamaroneck Harbor	*
Mattituck Harbor	June 1985
Moriches Inlet	*
Narrows of Lake Champlain	*
New Rochelle Harbor	*
Newton Creek	*
Plattsburg Harbor	*
Port Chester Harbor	*
Port Jefferson Harbor	*
Rondout Point	*
Rouses Point	*
Shinnecock Inlet	*
Sumpawanus Inlet	*

*Items for which no date is furnished reflect costs for gathering data only.

Total cost of Reconnaissance and Condition Surveys in Fiscal Year 1985 was $789,817.

TABLE 2-G OTHER AUTHORIZED NAVIGATION PROJECTS

Projects	For Last Full Report See Annual Report For	Cost to Sept. 30, 1985 Construction	Cost to Sept. 30, 1985 Operation and Maintenance
Burlington Harbor, Vt.[1]	1966	706,414[9]	283,556
Channel between North and South Hero Island, Lake Champlain, Vt.[1,2]	1909	31,000	1,288
Coney Island Inlet, N.Y.	1973	111,371	284,109
Echo Bay Harbor, N.Y.[1]	1953	64,584	11,571
Flushing Bay and Creek, N.Y.	1984	2,102,905[7]	4,352,089
Glen Cove Creek, N.Y.	1981	29,760[12]	126,820
Gordons Landing, Lake Champlain, Vt.[1,2]	1892	34,750	115
Gowanus Creek Channel, N.Y.	1972	346,831	255,291
Great Chazy River, N.Y.	1980	18,000	292,919
Great Kills Harbor, N.Y.[1,2]	1962	137,301[15]	88,029
Great Lakes to Hudson River Waterway, N.Y.	1976		457
Great South Bay, N.Y.[1]	1974	266,857	1,290,469
Greenport Harbor, N.Y.[1]	1953	74,681	21,720
Harlem River, N.Y.[1]	1969	3,616,119	480,777
Hempstead Harbor, N.Y.	1969	39,468	76,497[16]
Hudson River Channel, N.Y.	1980	6,771,870[27]	24,970,637
Jamaica Bay, N.Y.	1981	4,545,753	2,604,547
Lake Montauk Harbor, N.Y.	1984	791,680[11]	849,709
Larchmont Harbor, N.Y.	1970	76,065	267,768
Lemon Creek, N.Y. (Inactive)[2,3]	1937	6,621	1,621
Little Neck Bay, N.Y.[1]	1969	1,741,210[19]	537
Long Island Intra Coastal W/W, N.Y.	1984	235,964	3,716,834
Mamaroneck Harbor, N.Y.	1981	513,764	551,677
Manhasset Bay, N.Y. (Inactive)[3]	1948	-	4,636
Matawan Creek, N.J.	1984	21,000	237,097
Mattituck Harbor, N.Y.	1981	177,925[32]	935,786
Milton Harbor, N.Y.	1984	151,373[18]	986,520
New Rochelle Harbor, N.Y.[1,2]	1971	73,214[8]	142,411
Newtown Creek, N.Y. (Active)[1,5]	1974	1,168,354	1,626,351[22]
Northport Harbor, N.Y.[1]	1956	78,644[23]	1,487
Orowoc Creek, N.Y.(Inactive)[3]	1949	-	4,951
Otter Creek, Vt.	1977	60,254	27,059
Peconic River, N.Y.[1]	1953	25,000	116,509
Peekskill Harbor, N.Y.[1]	1951	19,400	66,037
Plattsburgh Harbor, N.Y.[1]	1972	198,415	229,111
Port Henry Harbor, N.Y.[1]	1931	69,406[25]	1,299
Port Jefferson Harbor, N.Y.	1977	221,128[31]	359,294
Raritan River to Authur Kill Cutoff Channel, N.J.[1]	1972	810,500	2,019,141
Rondout Harbor, N.Y.[1]	1972	142,437	260,441
Rouses Point, Lake Champlain, N.Y.[1]	1895	98,468	249
Sag Harbor, N.Y.[1]	1964	121,805[26]	11,710
St. Albans Harbor, Lake Champlain, Vt.[1,2]	1917	3,125	385
Sandy Hook Bay at Leonardo, N.J.[1,2]	1967	56,470	93,964
Saugerties Harbor, N.Y.[1,2]	1968	81,905	169,181[28]
Shark River, N.J.	1984	488,048[29]	1,129,100[29]
Sheepshead Bay, N.Y.[1]	1948	33,828	5,364
Shoal Harbor & Compton Creek, N.J.	1984	124,572[20]	1,104,940[21]
Shooters Island, N.Y.&N.J.	1983	100,000	-
Staten Island Rapid Transit Railway Co. bridge across Arthur Kill, N.Y.	1973	7,730,476	-
Sumpawanus (Babylon Creek) Inlet, N.Y.[1,2]	1895	7,000	13
Tarrytown Harbor, N.Y.[1]	1974	69,836	431,199
Wallabout Channel, N.Y.[1]	1953	18,174	36,312
Wappinger Creek, N.Y.[1,2]	1950	13,000	44,691
Washington Canal and South River, N.J.[1]	1953	206,116	212,827[30]
Waycake Creek, N.J.[2,3]	1949	-	2,781
Woodbridge Creek, N.J.[1]	1953	49,823	178,398

TABLE 2-G (Continued) OTHER AUTHORIZED NAVIGATION PROJECTS

1. Completed.
2. No commerce reported.
3. Awaiting local cooperation.
5. A portion of this project is classified "inactive."
6. Includes $69,036 for new work and $26,921 for maintenance for previous project. Excludes $10,000 for new work expended from contributed funds.
7. Excludes $419,879 for new work expended from contributed funds and $580,425 contributed funds other and $8,752 expended by the Worlds Fair Corp. for riprap protection of rubble dike.
8. Includes $43,175 for new work for previous projects.
9. Includes cost of maintenance prior to July 1, 1886. Excludes $1,425,133 for rehabilitation.
11. Excludes $82,738 expended for new work from Navy Dept. funds.
12. Excludes $29,774 for new work expended from contributed funds.
13. Includes $4,813,400 for new work expended from emergency relief funds.
14. Excludes $94,366 for rehabilitation.
15. Excludes $104,805 for new work expended from contributed funds.
16. Includes $64,034 for maintenance of previous projects.
17. Excludes $19,546 for new work expended from contributed funds and $31,454 to be contributed.
18. Excludes $119,276 required contributed funds and $72,619 other contributed funds.
19. Excludes $1,741,210 for new work expanded from contributed funds.
20. Includes $17,000 for new work for previous projects.
21. Includes $169,700 for maintenance for previous projects.
22. Includes $421,817 for maintenance for previous projects.
23. Excludes $15,000 for new work expended from contributed funds.
24. Includes $16,369 for maintenance for previous projects.
25. Excludes $10,000 for new work expended from contributed funds.
26. Excludes $66,758 for rehabilitation.
27. Includes $668,820 public works funds.
28. Includes $15,000 for maintenance for previous projects.
29. Includes $338,048 contributed funds.
30. Includes $84,934 for maintenance for previous projects.
31. Includes costs for new work $171,427 and maintenance $20,646 for previous projects.
32. Excludes $34,580 for new work from contributed funds.

TABLE 2-H OTHER AUTHORIZED BEACH EROSION CONTROL PROJECTS

Projects	For Last Full Report See Annual Report For	Cost to Sept. 30, 1985 Construction	Cost to Sept. 30, 1985 Operation and Maintenance
Atlantic Coast of N.J., Sandy Hook to Barnegat Inlets	1959	-	-
Fire Island Inlet to Jones Inlet, N.Y.	1981	18,044,667	217,899
North Shore of Long Island, Suffolk County, N.Y.	1979	8,880,000	-
Perth Amboy, N.J.	1966	-	-

TABLE 2-I OTHER AUTHORIZED FLOOD CONTROL PROJECTS

Projects	For Last Full Report See Annual Report For	Construction to Sept. 30, 1985	
		Construction	Operation and Maintenance
Adams, Hossic River Basin, Mass.[1]	1964	6,282,307[2]	—
Bennington, Vt.	1974	670,000	—
Byram River at Pemberwick, Conn.[1,3]	1959	363,515	—
East Barre Dam, Winooski River, Vt.[1]	1963	2,832,084	—
East Rockaway Inlet to Rockaway Inlet and Jamaica Bay, N.Y. (Part II)	1976	1,185,365	—
Fire Island to Montauk Point, N.Y.	1984	13,441,864[6]	143,753
Herkimer, N.Y.	1973	1,201,275[9]	—
Hoosic Falls, Hoosic River Basin, N.Y.[1]	1956	1,064,626	—
Lamoille River, Vt.: Hardwich Dams [4,5,9]	1939	—	—
Missisquoi River at Richford, Vt. [1,3]	1965	221,476	—
North Adams, Hoosic River Basin, Mass.	1968	15,409,325[7]	—
North Ellenville, N.Y.	1978	3,900,650	—
Rahway, N.J.	1971	973,142[8]	—
Rahway, South Branch, N.J.	1979	15,863,723	—
Raritan Bay and Sandy Hook Bay, N.J.	1981	11,061,256	262
Rosendale, N.Y.	1975	3,684,966	—
Rutland, Otter Creek, Vt.[4]	1963	211,015	—
Sandburg Creek, Spring Glen, N.Y.	1976	109,702	—
South Amsterdam, Mohawk River, N.Y.[1]	1967	1,564,976	—
South Ellenville, N.Y.	1984	289,702	—
South Orange, N.J.	1981	6,857,484	—
Staten Island, N.Y.	1983	644,998	—
Wappinger Creek at Pleasant Valley, N.Y.[1,3]	1959	142,075	—
Waterbury Reservoir, Winooski River Basin, Vt.	1976	886,769	8,200
Winooski River, Vt.[1]	1940	5,897,427	—
Wrightsville Dam, Winooski River Basin, Vt.	1970	1,549,929	—
Yonkers, N.Y.	1984	13,641,771[10]	—

1. Completed.
2. Excludes costs of $913,360 under other contributed funds.
3. Authorized by Chief of Engineers pursuant to Sec. 205, Public Law 858, 80th Cong., as amended.
4. Inactive.
5. Includes $23,507 emergency relief funds.
6. Includes $3,788,341 contributed funds.
7. Excludes cost of $21,000 under other contributed funds.
8. Excludes cost of $51,500 under other contriubted funds.
9. Uncompleted portion has been deauthorized on August 5, 1977.
10. Includes $622,871 contributed funds.

TABLE 2-J

SURVEYS
(See Section 42 of Text)

Study Class	Cost
Navigation Studies	$1,850,738
Flood Control Studies	6,525
Beach Erosion Studies	0
Special Studies[1]	1,966,311
Total Surveys	$3,623,574

[1]Includes review of Authorized Projects, Inspection of Dams, Coordinations Studies with Other Agencies, Planning Assistance to States, International Water Studies Special Investigations, Review of FERC Licenses, Continuation of Planning and Engineers, Advance Engineering and Design and $3,842 by North Atlantic Division.

TABLE 2-K

FLOOD PLAIN STUDIES COMPLETED DURING THE PERIOD

Location	Requesting Agency	Date Completed	Federal Cost
NONE-PROGRAM TERMINATED			

TABLE 2-L

COSTS FOR FLOOD PLAIN MANAGEMENT SERVICES
(See Section 43 of Text)

Studies and Services	Cost
Flood Plain Technical Services	$50,300
Flood Plain Management Unit	60,000
Total	$110,300

TABLE 2-M

DEAUTHORIZED PROJECTS
(See Section 44 of Text)

Projects	For Last Full Report See Annual Report For	Date And Authority	Federal Funds Expended	Construction	Contributed Funds Expended	Operation and Maintenance
Bronx River, N.Y.[4,6]	1981	Aug. 1982	1,149,946	1,159,946[12]	10,000	1,947,853[6]
Brown's Creek, N.Y.	1980	Aug. 1977	33,976	33,976[8]	-	505,369
Cheesequake Creek, N.J.[4,6]	1953	Aug. 1982	40,000	40,000	-	30,675
Coney Island Creek, N.Y.[4,6]	1952	Aug. 1982	69,489	69,489	-	1,622
East Rockaway (DEBS) Inlet, N.Y.	1963	Aug. 1977	503,969	603,969[13]	100,000	829,421
Elizabeth, N.J.	1948	Aug. 1977	60,481	60,481	-	59,391
Glen Cover Harbor, N.Y.	1966	Aug. 1977	165,882	165,882[4,11]	-	2,455
Hudson River, NYC to Albany[4,18]	1982	Aug. 1982	-	-	-	-
Huntington Harbor, N.Y.	1953	Aug. 1977	49,035	68,581[4,5,14]	19,546	51,566
Irvington Harbor, N.Y.	1947	Aug. 1977	-	-	-	-
Lamoille River, Vt.	1939	Aug. 1977	49,837	49,837	-	-
Newark Bay, Hackensack and Passaic Rivers, N.J.[7,16]	1982	Aug. 1982	-	-	-	-
New York and New Jersey[4,17]	1982	Aug. 1982	-	-	-	-
Portchester Harbor, N.Y.[2,3]	1967	Aug. 1977	433,470	433,470[4]	-	441,656
Proctor, Otter Creek, Basin, Vt.[6,7]	1937	Aug. 1977	-	-	-	-
Rahway River, N.J.[7,9]	1948	Aug. 1982	-	37,000[4]	-	307[4]
Raritan River, N.J.[4,6]	1981	Aug. 1982	1,551,470	1,617,470[15]	66,000	10,113,903
Rome Mohawk River, N.Y.[6,7]	1959	Aug. 1982	7,000	7,000	-	-
Swanton Harbor, Vt. (Inactive)[6]	1888	Aug. 1977	-	70,500[4]	-	235
Ticonderoga River, N.Y.[1,6]	1895	Nov. 1983	17,760	16,500	-	1,260
Waterbury (1941 Act), Vt.[7,6]	1951	Nov. 1981	9,253	9,253	-	-
Waterford, N.Y.[6,7]	1939	Aug. 1982	-	-	-	-
Westchester Creek, N.Y.	1981	Aug. 1982	175,933	175,933	-	2,921,311

1. No commerce reported.
2. Completed.
3. A portion of this project is classifed "inactive."
4. Uncompleted portion deauthorized.
5. Excludes $19,546 for new work expended from contributed funds and $31,454 to be contributed.
6. Inactive.
7. Entire project deauthorized.
8. Excludes $71,423 for rehabilitation.
9. Deferred.
10. Under Section 12 Public Law 93-251.
11. Includes $93,882 for Rehabilitation.
12. Includes $10,000 expended from contributed funds.
13. Includes $100,000 expended from contributed funds.
14. Includes $19,546 expended from contributed funds.
15. Includes $66,000 expended from contributed funds.
16. 1912 authorization.
17. 1935 authorization.
18. 1910 construction dikes.

TABLE 2-N

SECTION 3 CONTINUE DETAILED PROJECT REPORT
(See Section 27 of Text)

Name of Project	Cost to Sept. 30, 1985
Shinnecock Inlet, N.Y.	$279,487

SECTION 107 PLANS & SPECIFICATIONS
(See Section 27 of Text)

Name of Project	Cost to Sept. 30, 1985
CONTINUE	
Sheepshead Bay, N.Y.	$20,000

TABLE 2-O

SECTION 103
(See Section 31 of Text)

Name of Project	Cost to Sept. 30, 1985
CONTINUE DETAILED PROJECT STUDY	
Orchard Beach, Bronx, N.Y.	$215,000

TABLE 2-P

SECTION 205
(See Section 40 of Text)

Name of Project	Cost to Sept. 30, 1985
COMPLETE RECONNAISSANCE REPORT	
Lamoille River, Hardwick, Vt.	$164
Winooski River, Richmond, Vt.	$7,500
Bashbish Brook, Copake, N.Y.	$7,500
Clavarack Creek, Stockport, N.Y.	$7,500
Lake Champlain, Plattsburgh, N.Y.	$7,200
CONTINUE DETAILED PROJECT REPORTS	
Beaver Brook, Dolgeville, N.Y.	$179,000
Elizabeth River, Hillside, N.J.	$218,800
Missisquoi River, Vt.	$219,300
Ramapo River, Monroe, N.Y.	$192,300
Sauquoit Creek, Whitesboro, N.Y.	$134,200
Yonkers, Nepera Park, N.Y.	$76,000
COMPLETE DETAILED PROJECT REPORTS	
Esopus Creek, Ulster, N.Y.	$50,907
Halesite Area, Huntington, N.Y.	$7,264
Sheldon Brook, Tarrytown, N.Y.	$19,036
CONTINUE PLANS AND SPECIFICATIONS	
Sawkill Creek, Kingston, N.Y.	$98,800
Passaic River (Field Emergency Preparedness System), N.J.	$30,900
CONTINUE CONSTRUCTION	
Wallkill River (Black Dirt Area), N.Y.	$1,127,877
COMPLETE CONSTRUCTION	
Chappaqua, N.Y. (Saw Mill River)	$7,960

TABLE 2-Q

SECTION 14
(See Section 41 of Text)

Name of Project	Cost to Sept. 30, 1985
CONTINUE PLANS AND SPECIFICATIONS	
Bouquet River, Elizabethtown, N.Y.	$12,664
COMPLETE PLANS AND SPECIFICATIONS	
Chichester Creek, Shandaken, N.Y.	$5,623
COMPLETE CONSTRUCTION	
Sandburg Creek, Ellenville, N.Y.	$168,657

PHILADELPHIA, PA DISTRICT*

This district comprises a portion of southeastern New York, eastern Pennsylvania, western and southern New Jersey, northern and southeastern Delaware, and a small part of northeastern Maryland embraced in the drainage basins tributary to the Atlantic Ocean from Manasquan River, N.J. inclusive, to south boundary of Delaware. It also includes Chesapeake and Delaware Canal and approach channel thereto in Chesapeake Bay and Elk River, Md.

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Navigation

1. BARNEGAT INLET, NJ

Location: On the east coast of New Jersey about 50 miles south of Sandy Hook, between Island Beach on the north and Long Beach on the south (See U.S. Coast and Geodetic Chart Nos. 825 and 1216). This inlet is main entrance to Barnegat Bay, largest of the bays on New Jersey coast which are separated from the ocean by narrow barrier beaches.

Existing project: Provides for a channel 8 feet deep through inlet and 10 feet through outer bar, channel to be protected by two converging stone jetties extending to 12-foot contour in the ocean and spaced 1,000 feet apart at outer ends; a channel of suitable hydraulic characteristics extending in a northwesterly direction from gorge in inlet to Oyster Creek Channel just northwest of Sunset Shoal, thence via Oyster Creek Channel to deep water in the Bay; and maintenance of a channel 8 feet deep and 200 feet wide to connect Barnegat City harbor with main inlet channel. Total length of section included in project is about 4.5 miles. Plane of reference is mean low water. Extreme tidal range at inlet is from about 2 feet below mean low water to about 3 feet above mean high water. Project was completed in 1940. (For details, see page 203, Annual Report for 1964.) (See Table 3-B at end of chapter for Acts authorizing existing projects.)

Recommended modifications: The existing Federal project at the inlet, which was completed in 1940, has failed to maintain a suitable and safe channel for navigation. As a result of the finding of AE&D studies on this matter, the Chief of Engineers decided on 20 January 1983 that modification to the project should be implemented to correct a design deficiency. The recommended modification would serve to correct the design deficiency through the construction of a new south jetty aligned more nearly parallel to the existing north jetty, the dredging and maintenance of a new realigned navigation channel, and the removal of the shoal located between the proposed navigation channel and the north jetty.

Local cooperation: Fully complied with.

Terminal facilities: There are four docks or terminals in inner harbor at Barnegat Light which furnish adequate facilities for present commerce of locality.

Operations during fiscal year: Maintenance, contract: Maintenance dredging at Oyster Creek by Speckard Enterprises from 18 July 1985 to 28 August 1985, removing 38,000 cubic yards at a cost of $147,000.

Maintenance, hired labor: Maintenance dredging by U.S. Government Side Casting Dredge FRY was performed from 29 August 1985 to 30 September 1985. Removed an estimated 64,000 cubic yards of material at a cost of $110,000. Work also included subsurface testing, preparation of design deficiency memorandum, general maintenance, engineering surveys on dredging, and supervision and administration.

2. COHANSEY RIVER, NJ

Location: Rises in Salem County, N.J., flows southerly and southwesterly 27 miles through Cumberland County, and empties into Delaware Bay about 62 miles below Philadelphia, Pa. (See Coast and Geodetic Survey Chart 1218).

Previous projects: For details see page 1785, Annual Report for 1915, and page 348, Annual Report for 1938.

Existing project: A channel 12 feet deep, 100 feet wide from that depth in Delaware Bay through a neck of land at the mouth and within the river to the south side of Glass Street in Bridgeton, 19 miles above the mouth; thence a channel 8 feet deep, 100 feet wide to Broad Street; and thence 75 feet wide to Commerce Street Bridge, 19.25 miles above the mouth; and a turning basin 12 feet deep and 800 feet long formed by widening the channel on the south side to a maximum width of 250 feet just below Glass Street. Section included in project is about 19.5 miles long. All depths refer to the plane of mean low water. Extreme tidal range is from about 2 feet below mean low water to about 3 feet above mean high water. Completed project cost $110,756 for new work, exclusive of amounts expended on previous projects. (See Table 3-B at end of chapter for Acts authorizing existing project.) Existing project was completed in 1939.

Local cooperation: Complied with except local interests must furnish suitable spoil-disposal areas for required maintenance.

Terminal facilities: Twenty wharves, of which 16 are at Bridgeton and 4 at Greenwich. Facilities considered adequate for existing commerce.

Operations during fiscal year: Maintenance, contract: Work included Cultural Resource Investigation.

Maintenance, hired labor: Work included BCR update, environmental assessment, plans and specifications on maintenance dredging, engineering surveys on dredging, and supervision and administration.

3. DELAWARE RIVER BETWEEN PHILADELPHIA, PA, AND TRENTON, NJ

Location: Rises in southeastern New York, flows

generally southerly 367 miles, forming boundary line between New York and New Jersey on the east and Pennsylvania and Delaware on the west, and empties into Delaware Bay. (See U.S. Coast and Geodetic Survey Charts 1218, 280, 294, 295, and 296.)

Previous projects: For details see page 1778 of Annual Report for 1915, page 311 of Annual Report for 1924, page 220 of Annual Report for 1934, and page 296, Annual Report for 1938.

Existing project: A channel from Allegheny Avenue, Philadelphia, 23.5 miles to upstream end of Newbold Island 40 feet deep and 400 feet wide, with suitable widening of bends, including relocation of channel at Delair Railroad bridge, and reconstruction of bridge, thence 5.5 miles to upper end of Trenton Marine Terminal, 35 feet deep and 300 feet wide, with a turning basin 800 feet wide and 1,700 feet long at the terminal; and maintenance of a channel 12 feet deep and 300 feet wide from upper end of 34-foot channel to Penn Central Railroad Bridge at Trenton, dredged under a previous project. Project also provides for an auxiliary channel 20 feet deep and 200 feet wide east of Burlington Island, extending easterly from main channel to upper end of U.S. Pipe and Foundry Co.'s property at East Burlington, with a turning basin 450 feet wide at upper end; for initial excavation, only, of a cross channel 8 feet deep and 200 feet wide through artificial island opposite Delanco, N.J., and for construction such bank protection works as may be necessary. Section included in project is about 30.5 mile long, excluding auxiliary channel east of Burlington Island, which is 1.4 miles long, and cross channel opposite Delanco. Lower end is about 55 miles above river mouth at Liston Point and about 105 miles above Harbor of Refuge at mouth of Delaware Bay. Freshets, which occur usually during February and March, attain a height of 9 to 20 feet above mean low water in vicinity of Trenton. Navigation is occasionally suspended during a portion of winter months due to ice. Existing project is 90 percent complete. A 40-foot channel under the 1954 modification from Allegheny Avenue to upper end of Newbold Island was completed April 1964. Work remaining is dredging from upper end of Newbold Island to Trenton Marine Terminal and widening turning basin at terminal which is in deferred category. (See Table 3-B at end of chapter for Acts authorizing existing project.) (See Table 3-C at end of chapter for total cost for existing project to Sept. 30, 1984.)

Local cooperation: Modification authorized by 1954 River and Harbor Act provides local interests must provide suitable terminal facilities, furnish lands and rights-of-way for construction and future maintenance, and hold the United States free from damages. Local interest complied with requirements, except city of Trenton has not provided suitable terminal facilities.

Terminal facilities: There are 21 piers, wharves, and docks from Allegheny Avenue, Philadelphia, Pa. to Trenton, N.J. Facilities are considered adequate for existing commerce. (For details see Port Series No. 8 (revised 1966) Corps of Engineers).

Operations during fiscal year: Maintenance, contract: Maintenance dredging performed by American Dredging Company during the period of 24 July 1985 through 30 September 1985. Removed a total of 585,000 cubic yards of material at a cost of $3,000,000. Work included environmental monitoring, operation of stream gages in USGS cooperative stream gaging program, maintenance dredging, and aerial survey.

Maintenance, hired labor: Work included environmental monitoring, maintenance dredging and surveys, plans and specifications, supervision and administration on maintenance dredging and general engineering and design.

4. DELAWARE RIVER, PA, NJ AND DEL., PHILADELPHIA TO THE SEA

Location: See U.S. Coast and Geodetic Survey Charts 1218, 394, 295, and 280.

Previous projects: For details see page 1779 of Annual Report for 1915, and page 299, Annual Report for 1938

Existing project: Provides for a channel from deep water in Delaware Bay to a point in the bay, near Ship John Light, 40 feet deep and 1,000 feet wide; thence to Philadelphia Naval Base, 40 feet deep and 800 feet wide, with 1,200-foot width at Bulkhead Bar and 1,000-foot width at other bends; thence to Allegheny Avenue, Philadelphia, Pa., 40 feet deep and 500 feet wide through Horseshoe Bend and 40 feet deep and 400 feet wide through Philadelphia Harbor, along west side of channel; and for anchorages at Reedy Point, Deepwater Point, Marcus Hook, and Mantua Creek, each 40 feet deep and 2,300 feet wide with respective length of 8,000, 5,200, 12,650, and 11,500 feet; anchorage at Gloucester 30 feet deep and about 3,500 feet long. Project also provides for construction of dikes and training works for regulation and control of tidal flow; for maintenance of an area on north side of channel opposite Philadelphia Naval Base between Shipway 3 and Schuylkill River to 40 feet deep and width of 150 feet on Mifflin Range and 200 feet on West Horseshoe Range; and for maintenance of any areas dredged by local interests to 35 feet deep between channel and a line 100 feet channelward of pierhead line between Point House wharf and Philadelphia Naval Base, when in opinion of Chief of Engineers such areas are so located as to be of benefit to generate navigation. Section included in project is about 96.5 miles long. All depths refer to plane of mean low water. Under influence of heavy and long-continued winds extreme tidal range is about 14 feet. Normal maximum velocity of tidal currents in the

dredged channel varies between 2 and 3.5 miles per hour. Storm tides may increase maximum to as much as 4.5 miles per hour. Estimated cost for new work is $71,630,000 (July 1972) exclusive of amounts expended on previous projects. Channel to 37 deep and 500 feet wide through Horseshoe Bend and 37 feet deep and 60 feet wide through Philadelphia Harbor along east side of channel and Port Richmond anchorage to 37 feet deep, except for that portion of channel which forms a part of 40 feet deep and 400 feet wide channel portion is to be restudied and excluded from foregoing cost estimate. Estimated cost (July 1960) of this portion of project is $2,951,000. Existing project, excluding work deferred for restudy, is about 66 percent complete. The 40-foot channel from Naval Base to the sea was completed in 1942. Dredging Naval Base to Allegheny Avenue to 40 feet deep was completed in 1962. Enlarging anchorage at Marcus Hook was completed in 1967. Work remaining is to construct new anchorages at Reedy Point and Deepwater Point, and enlarge Mantua Creek anchorage, channel dredging from 35 to 37 feet deep over a width of 500 feet through Horseshoe Bend and about 600 feet through Philadelphia Harbor, and deepening Port Richmond Anchorage to 37 feet, all of which have been deferred for restudy. (See Table 3-B at end of chapter for Acts authorizing existing project.) (See Table 3-C at end of chapter for total costs for existing project to Sept. 30, 1984.)

Local cooperation: Requirements under 1938 River and Harbor Act for maintaining channel and anchorage in Philadelphia Harbor annually by cities of Philadelphia and Camden were removed (see 1962 Annual Report for details).

Terminal facilities: There are 217 piers, wharves, and docks between Allegheny Avenue, Philadephia and the sea, 135 on waterfront of Philadelphia, Camden, and Gloucester, and 82 below Philadelphia. Facilities are considered adequate for existing commerce. (For further details see Port Series Nos. 7, revised 1967, and 8, revised 1966-Corps of Engineers.)

Operations during fiscal year: Maintenance, contract: Maintenance dredging of Mifflin Range, Mantua Creek Anchorage, and New Castle Range performed by American Dredging Company during period 1 October 1984 through 26 February 1985. Removed a total of 2,654,000 cubic yards of material at a total cost of $6,143,000. Maintenance dredging of Cherry Island, Marcus Hook Anchorage and New Castle Range was performed by American Dredging Company during period of 31 May 1985 through 30 September 1985. Removed a total of 1,860,000 cubic yards of material at a total cost of $9,025,000. Other work included sturgeon studies, lease and maintenance of equipment for disposal areas, construction of dikes and sluices at disposal areas, general maintenance, disposal area groundwater testing, subsurface exploration, bucket dredging study, replaced sluice pipes, maritime practices, air survey, and operation of stream gages by USGS.

Maintenance, hired labor: Dredging performed by U.S. Hopper Dredge McFARLAND during the period 1 October 1984 through 27 June 1985. Removed 283,000 cubic yards of material at a cost of $1,286,000. Other work included engineering survey, miscellaneous environmental research coordination, maintenance of disposal area equipment, general maintenance, sturgeon studies, snagging and clearing, debris removal, ditching at disposal areas, groundwater testing, bucket dredging study, environmental assessment, subsurface explorations, handling shore pipe, engineering and design, supervision and administration, plans and specifications on surveys and dredging.

5. HARBOR OF REFUGE, DELAWARE BAY, DEL.

Location: At lower end of Delaware Bay, a few miles from Atlantic Ocean on Delaware side of bay. It is about 120 miles south of New York Harbor, about 114 miles north of entrance to Chesapeake Bay and about 101 miles from Philadelphia, Pa. (See Coast and Geodetic Survey Charts Nos. 1218, 1219 and 379.)

Previous projects: For details see Annual Reports for 1874, Chart II, page 146; page 330; and 1938, page 330.

Existing project: Existing project was completed in 1951. Controlling depth at low water in channel in July 1963 was 16.8 feet. For details see page 229 of Annual Report for 1962.

Local cooperation: Fully complied with.

Terminal facilities: See page 229 of Annual Report for 1962.

Operations during fiscal year: Maintenance, hired labor: BCR update prepared.

6. INDIAN RIVER INLET AND BAY, DEL.

Location: Indian River rises in Sussex County, Del., and flows easterly 13 miles into Indian River Bay which is a shallow lagoon 6 miles long and 2 miles wide on the Delaware Coast about midway between Cape Henlopen and the Maryland State line. The inlet is an opening through the barrier beach separating Indian River Bay and the Atlantic Ocean (See U.S. Coast and Geodetic Survey Chart No. 1219.)

Previous projects: Adopted by River and Harbor Act of August 2, 1882. For further details see page 744, Annual Report for 1888.

Existing project: This provides for the fixation of

the inlet by the construction of two parallel jetties of steel-sheet pile and stone design extending to approximately the 14-foot depth curve in the ocean, and for dredging an entrance channel 15 feet deep and 200 feet wide, for a distance of 7,000 feet inshore from the jetties; thence a channel 9 feet deep, 100 feet wide in the bay, and 80 feet wide in the river, to and including a turning basin 9 feet deep, 175 feet wide, and 300 feet long at Old Landing; thence a channel 4 feet deep and 60 feet wide to the highway bridge at Millsboro. The project also provides that the interior channel dimensions may, in the discretion of the Chief of Engineers, be modified as found desirable to increase the hydraulic efficiency of the channel, without increasing the cost. The total length of the section included in the project is about 13.75 miles. All depths refer to the plane of mean low water. The extreme tidal range at the highway bridge is about 6 feet. Existing project was completed in 1951. For details see Annual Report for 1963.

The cost for new work for the completed project was $511,210, exclusive of $10,000 expended on previous projects and exclusive of $210,000 contributed funds. (See Table 3-B at end of chapter for Acts authorizing existing project.)

Local Cooperation: Fully complied with except that local interest are required to furnish suitable areas for disposal of dredged material during maintenance as and when needed, and provide terminal facilities.

Terminal facilities: There is a privately owned basin with berthing facilities for small boats located .75 mile west of the highway bridge near the inlet and .25 mile north of the inlet channel, connected therewith by a channel 6 feet deep and 40 feet wide; a U.S. Coast Guard wharf on the north side of the inlet channel in the same locality; and two wharves at Oak Orchard in Indian River Bay. The facilities are considered adequate for existing commerce.

Operations during fiscal year: Maintenance, hired labor: Work included preparing BCR update and project monitoring.

7. INLAND WATERWAY, REHOBOTH BAY TO DELAWARE BAY, DEL.

Location: A tidal canal in southeasterly part of Sussex County, Del. It extends 12 miles northward from Rehoboth Bay through high land west of town of Rehoboth to Gordon Lake; thence through marshes back of Cape Henlopen to Lewes River; thence down Lewes River to its junction with Broadkill River near its mouth. An entrance to the waterway from Delaware Bay is about 4 miles above Cape Henlopen. (See U.S. Coast and Geodetic Survey Charts 379, 1218, and 1219.)

Previous projects: A canal along a slightly different route formed a part of projected waterway from Chincoteague Bay, Va. to Delaware Bay, begun in 1886 and abandoned in 1905.

Existing project: This provides for an entrance channel near Lewes 10 feet deep and 200 feet wide protected by two parallel jetties 500 feet apart; thence a channel 10 feet deep and 100 feet wide to South Street Bridge at Lewes, and a basin of the same depth 1,200 feet long and up to 375 feet in width at the latter point; thence a channel 6 feet deep and 50 feet wide (40 feet wide through Deep Cut near Rehoboth Bay) to Rehoboth Bay; a channel 6 feet deep and 100 feet wide from the entrance to Broadkill River; two parallel rubble jetties 725 feet long at the Rehoboth Bay entrance; and the construction of one highway bridge and on railroad bridge at Rehoboth. The total length of the section included in the project is about 12 miles.

The cost for new work for the completed portion of the project was $561,514 exclusive of amounts expended on previous projects and $60,000 contributed funds. The extension of the jetties at the Delaware Bay entrance is considered to be inactive and is excluded from the foregoing cost. The cost of the portion was last revised in 1960 and was estimated to be $816,000. Existing project is about 70 percent complete. For details on completed work see page 241 of Annual Report for 1963. Work remaining, extension of existing jetties at Delaware Bay entrance, is considered inactive. (See Table 3-B at end of chapter for Acts authorizing existing project.)

Local cooperation: Complied with except local interest must furnish suitable terminal facilities and necessary spoil-disposal areas.

Terminal facilities: See page 228, Annual Report 1962.

Operations during fiscal year: Maintenance, hired labor: Work included BCR update, engineering and design, and supervision and administration.

8. INLAND WATERWAY FROM DELAWARE RIVER TO CHESAPEAKE BAY, DEL., AND MD.

Location: Begins at Reedy Point on Delaware River, about 41 miles below Philadelphia, Pa., and passes through sea level Chesapeake and Delaware Canal, a distance of 14 miles, to Back Creek, at Chesapeake City, Md. It then passes for 5 miles down Back Creek, thence 9 miles down Elk River to Chesapeake Bay and thence 18 miles down Chesapeake Bay to a point near Pooles Island. A branch channel connects Delaware River at Delaware City, Del., with main channel at a point about 1.5 miles west of Reedy Point. (See U.S. Coast and Geodetic Survey Charts 294, 1226, 570, and 572.)

Previous projects: For details see Annual Report for 1934, page 242, and Annual Report for 1938, page 312.

Existing project: A channel 35 feet deep and 450 feet wide from Delaware River through Elk River and Chesapeake Bay to water of natural 35-foot depth in Chesapeake Bay including a cutoff at Penn Central Railroad crossing, and having a maximum radius of curvature of 7,000 feet at bends; a high-level, fixed railroad bridge with vertical clearance of 135 feet and horizontal clearance of 600 feet at the railroad crossing over the cutoff (economic study of railroad crossing requested by Office of Management and Budget resulted in construction of a single track vertical lift bridge in lieu of a high-level fixed railroad bridge); high-level fixed highway bridges over canal at Reedy Point, St. Georges, Summit, and Chesapeake City; a bascule drawbridge across Delaware City Branch Channel; extension of entrance jetties at Reedy Point; and anchorage in Elk River, 35 feet deep and 1,200 feet wide, with an average length of 3,700 feet; enlargement of anchorage and mooring basin in Back Creek to afford an area about 400 feet wide, 1000 feet long, and 12 feet deep; dredging Delaware City Branch Channel to 8 feet deep and 50 feet wide, and deepening existing basin to same depth; revetment of banks of canal as required between Delaware and Elk Rivers, and on banks of Delaware City Branch Channel east of Fifth Street Bridge; and construction of bulkheads. Total of section included in project, excluding Delaware City Branch Channel, which is about 2 miles long, is about 46 miles. All depths refer to plane of low water in Delaware River. Extreme tidal range is from 6.3 feet above mean high water to 3 feet below mean low water. Existing project is about 89 percent completed. Channel 27 feet deep and 250 to 400 feet wide. Delaware River to Pooles Island, completed in 1938. High-level fixed highway bridges were completed at St. Georges (4-lane) in 1942; at Chesapeake City (2-lane) in 1949; and at Summit (4-lane) in 1960. Relocation of Penn Central Railroad bridge was completed December 21, 1965. Enlargement to 35 feet deep and 450 feet wide St. Georges and Summit bridges and Summit and Goose Island was completed on June 20, 1972 and February 18, 1972, respectively. Removing the old Penn Central railroad bridge was completed on January 21, 1972. Channel work for Part II is about 87 percent complete. Work remaining consists of completing channel enlargement to 35 feet deep and 450 feet wide between Reedy Point Bridge and St. Georges Bridge; widening and deepening the channel between Delaware River and Reedy Point Bridge, the completion of recreation facilities, and miscellaneous completion items. Deepening Delaware City Branch Channel from 6 to 8 feet from a point 400 feet east of Fifth Street Bridge to its junction with the canal has been deferred for study.

Original cost of canal including purchase was $10,709,755; estimated cost of new work for modifications of 1935 and 1954 is $139,574,000 (October 1977). Total estimated cost of new work including original purchase is $151,683,755. Portion of project comprising completion of Delaware City Branch Channel from a point 400 feet east of Fifth Street Bridge to its junction with canal is to be restudied and excluded from foregoing estimate. Estimated cost of this portion is $145,000 (July 1954). (See Table 3-B at end of chapter for Acts authorizing existing project.)

Local cooperation: River and Harbor Act of 1954 provided that local interests furnish lands and rights-of-way required for bridges. Assurances accepted and approved February 16, 1955. Requirements for Summit and Reedy Point Bridges have been met.

Terminal facilities: Ample mooring facilities at eastern and western ends of canal and bulkheads at Delaware City and St. Georges were constructed by the United States. A small-boat harbor was provided and a wharf constructed at Chesapeake City. Facilities are considered adequate for existing commerce.

Operations during fiscal year: Maintenance, contract: Maintenance dredging performed by Norfolk Dredging Company in the Upper Chesapeake Bay during the period 1 October 1984 through 27 November 1984, removing a total of 64,000 cubic yards of material at a cost of $194,000; and during period 19 September 1985 through 30 September 1985 removing 23,000 cubic yards of material at a cost of $440,000. Maintenance dredging was performed by American Dredging Company on the C&D Canal removing a total of 976,000 cubic yards of material at a cost of $3,806,000 during the period 1 October 1984 through 11 April 1985; and during the period 23 September 1985 through 30 September 1985 removing 110,000 cubic yards of material at a cost of $240,000. Other work included maintenance of Chesapeake City, Summit, St. Georges and Reedy Point bridges; general maintenance of disposal areas; maintenance of rip-rap, roadways, night lighting, buildings and grounds, banks, auxiliary works and traffic controlled TV; environmental, dredge and sludge monitoring, drainage of disposal areas, disposal area construction, lease equipment, handling pipe at Courthouse Pt. disposal area, Reedy Pt. bridge overlay, fish and wildlife study, bridge inspection, trash removal, subsurface and testing of disposal areas, and supervision and administration.

9. MANASQUAN RIVER, NJ

Location: This small stream flow, in eastern part of New Jersey, rises near Freehold, flows easterly and empties into the Atlantic Ocean, about 26 miles south of Sandy Hook. (See U.S. Coast and Geodetic Survey Chart No. 795.)

Previous projects: For details see Annual report for 1909, page 186, and Annual Report for 1938, page 269.

Existing project: A channel 14 feet deep and 250

feet wide, protected by jetties and other works, extending from the Atlantic Ocean to inner end of north jetty, thence 12 feet deep and 300 feet wide to within 700 feet of New York and Long Branch Railroad bridge, thence of same depth and narrowing to 100 feet wide to within 300 feet of bridge; for a widening on northerly side of channel of 200 feet for 3,150 feet to a depth of 8 feet; for a 19-acre anchorage to 10 feet deep on south side of channel and for a 27.5-acre anchorage to 12 feet deep about 0.5 miles west of Route 35 highway bridge. Section included in project is about 1.5 miles long. Mean tidal range is 3.7 feet at inner end of inlet and 4 feet at ocean end; mean range of spring tides, 4.4 and 4.8 feet, respectively, irregular fluctuations due to wind and barometric pressure vary from 2.7 feet below to 7.5 feet above mean low water at inner end of inlet. Project, excluding 10-and 12-foot anchorages, cost $518,243. Estimated cost (1958) for 10 and 12-foot anchorages portion of project considered inactive is $504,000. Restoration of bulkheads completed 16 August 1965 at a cost of $117,807. Existing project was completed in June 1963. Dredging 19-acre anchorage south of channel and 27.5-acre anchorage west of highway bridge is in the inactive category. (See Table 3-B at end of chapter for Acts authorizing existing project.)

Local cooperation: River and Harbor Act of 1945 provides that local interests must furnish lands and rights-of-way for construction and future maintenance and hold the United States free from damages. Assurances to date have been complied with.

Terminal facilities: Five landings with a total wharfage of 700 feet used by commercial fishermen, and 7 landings and boat basins for pleasure craft. Existing facilities are considered adequate for present requirements.

Operations during fiscal year: Maintenance, contract: Work included CERC and air monitoring, repairs to north Bulkhead, and monitoring jetty.

Maintenance, hired labor: Work included engineering and design and supervision and administration.

10. MISPILLION RIVER, DEL.

Location: Rises in Kent and Sussex Counties, Del., flows northeasterly 15 miles along the boundary line between the two counties and empties into Delaware Bay about 16 miles above Cape Henlopen. (See Coast and Geodetic Survey Chart 1218).

Previous projects: For details see page 1786, Annual Report for 1915, page 448 of Annual Report for 1918, and page 327 of Annual Report for 1938.

Existing project: Project is about 31 percent complete. Four cutoffs for 6-foot channel were completed in 1923; 6-foot channel from Delaware Bay to Milford in 1924; and jetties at the mouth in 1939. Work remaining is dredging channel to 9-foot depth, 80 feet wide in Delaware Bay to the mouth, thence 60 feet wide to Milford, with the provision of three cutoffs to eliminate bends, and a turning basin at Milford. Controlling depths at mean low water: In October 1964 from Delaware Bay to mouth 7.1 feet, and thence to fixed highway bridge at Milford, 6.1 feet. For details see page 243 of Annual Report for 1957.

Local cooperation: Assurances required by 1954 River and Harbor Act have not been furnished. For details see page 243, Annual Report for 1957. Prior requirements fully complies with.

Terminal facilities: For details see page 244, Annual Report for 1957.

Operations during fiscal year: Maintenance, contract: Work included rip-rap bank stabilization, supervision and administration on dredging.

11. NAVIGATION WORK UNDER SPECIAL AUTHORIZATION

Navigation Activities Pursuant To Section 107, Public Law 86-645 (Preauthorization)

Name of Project	Cost to 30 Sep 1985
Initial Appraisal	
Mispillion River-Conch, Del.	$ 7,500
Reconnaissance Reports	
Schuylkill River-Fairmount Park, Pa.	62,232
Detailed Project Reports	
Wilmington Harbor, Del.	69,989

12. NEW JERSEY INTRACOASTAL WATERWAY

Location: A sea level inland water route approximately parallel with New Jersey coast, extends from Atlantic Ocean at Manasquan Inlet, about 26 miles south of Sandy Hook, N.J. to Delaware Bay about 3 miles above Cap May point. Waterway extends through inlet and up Manasquan River about 2 miles; thence by Point Pleasant Canal through high ground for 2 miles to head of Barnegat Bay. It then passes through a series of bays, lagoons, and thoroughfares along New Jersey coast to Cape May Harbor; thence across Cape May County to Delaware Bay through a land cut by way of New England Creek basin. (See U.S. Coast and Geodetic Survey Charts, 234, 795, 825, 826, 827, 1216, 1217, 1218, and 1219.)

Existing project: This provides for a channel 12 feet deep at mean low water and generally 100 feet

wide, extending from the Atlantic Ocean at Manasquan Inlet, N.J. to Delaware Bay above Cape May, N.J., by the further improvement of Manasquan River and Inlet, N.J., and the present New Jersey Intracoastal Waterway, and by the construction of a canal of similar dimensions from Cape May Harbor to Delaware Bay via the New England Creek basin, with adequate jetties at the Delaware Bay entrance. The total length of the project is about 117 miles. Normal tide range in sections of the waterway remote from inlets is 0.5 foot.

Estimated cost for new work is $71,549 (July 1969), exclusive of $1,824,940 Navy Department funds and $99,000 contributed by local interests. Portion of project extending from Manasquan River to Cape May Harbor is to be restudied and excluded from new work costs estimate. Estimated cost of this portion is $6,470,000 (July 1954). Existing project was adopted by 1945 River and Harbor Act (H.Doc133,76th Cong., 1st Sess.) Latest published map is in project document. River and Harbor Act of 1946 (Public Law 525, 79th Cong., 2nd Sess., as extended by Public Law 240,82d Cong.), authorized use for a period not to exceed 6 years, of funds from appropriations heretofore or hereafter made for maintenance and improvement of rivers and harbors, for maintenance of canal from Cape May Harbor to Delaware Bay constructed as an emergency wartime project with Navy Department funds, including cost of maintaining temporary railroad and seashore highway bridges over canal.

Existing project is about 25 percent complete. A canal 12 feet deep and 100 feet wide from Cape May Harbor to Delaware Bay was completed in 1942; two parallel stone jetties at Delaware Bay entrances and a temporary highway and a railroad bridge in 1944, all with Navy Department funds. Work remaining, dredging a channel 12 feet deep and 100 feet wide from Atlantic Ocean at Manasquan Inlet to Cape May Harbor, has been deferred for restudy; however, the project between Ottens Harbor and Richardson Channel and from that point to Cape May are being maintained to 10 feet and 12 feet, respectively, since they were originally dredged to these depths by the State.

Local cooperation: The project is subject to the conditions that the State of New Jersey cede to the United States all right, title, and interest that it has acquired to lands, easements, rights-of-way, and structures other than bridges for the Bayhead-Manasquan Canal; that the State of New Jersey furnish, free of cost to the United States, all lands, easements, rights-of-way, and disposal areas required for construction of the Cape May Canal and for improvement of the proposed waterway and for their subsequent maintenance; that local interests provide, maintain, and operate suitable bridges over the waterway; that the State of New Jersey donate to the United States the navigation aids in use on the present New Jersey Intracoastal Waterway; and that the State of New Jersey hold and save the United States and its agents free from any claims for damages resulting from the work of improvement. Compliance with these conditions was completed January 15, 1954, except that local interests are required to furnish disposal areas for the construction and the subsequent maintenance of the proposed improvement.

Terminal facilities: See Annual Report for 1962.

Operations during fiscal year: Maintenance, contract: Dredging performed by Spickard Enterprises on the Cape May Canal, Great Sound and Shad Islands during the period from 29 August 1985 through 30 September 1985 removing 31,000 cubic yards of material at a cost of $207,000. Other Work included general maintenance, Pt. Pleasant Canal Bulkhead design, erosion report on West End Cape May Canal, and maintenance dredging.

Maintenance, hired labor: Work included engineering, plans and specifications, erosion construction, lease plant dredging, engineering and design, and supervision and administration.

13. SALEM RIVER, NJ

Location: This river rises in Salem County, N.J., flows through the county westerly 13 miles, thence southerly 7 miles to the City of Salem, and thence westerly 3 miles, emptying into Delaware River about 45 miles below Philadelphia, Pa. It is joined at Salem by Little Salem River, or Fenwick Creek, from the east. (See U.S. Coast and Geodetic Survey Chart No. 294.)

Existing project: The River and Harbor Act of July 11, 1870, provided for a survey and the original project was adopted by River and Harbor Act of March 3, 1871, and modified in 1878, and a subsequent project adopted by River and Harbor Act of March 2, 1907. For further details see page 1784, Annual Report for 1915; page 349 of Annual Report for 1924; and page 346 of Annual Report for 1938.

Previous projects: This provides for a channel 12 feet deep at mean low water, 150 feet wide in Delaware River across Salem Cove to the mouth, thence 100 feet wide to the fixed highway bridge in Little Salem River at Salem, 2 1/4 miles above the mouth. It also provides for a cutoff to eliminate a large horseshoe bend between the mouth and Salem. The total length of the section included in the project is about 4 miles. The mean tidal range is 5.4 feet. The extreme tidal range is from about 1 foot below mean low water to about 2 feet above mean high water.

The estimate of cost for new work is $51,825 exclusive of amounts expended on previous projects and $51,825 contributed by local interests. The portion of the project comprising the deepening of Little Salem River to 12 feet is to be restudied and is excluded from the foregoing

estimate. The estimated cost of this portion revised in 1953 is $28,000 excluding and equal amount to be contributed by local interests.

The existing project is about 64 percent complete. The dredging of the channel from Penns Neck Bridge to project dimensions, including the cutoff, was completed in 1928. The channel from Penns Neck Bridge to the fixed highway bridge in Little Salem River was dredged to a depth of 9 feet under a previous project. The work remaining to be done is the deepening of the channel in Little Salem River from 9 feet to 12 feet.

The controlling depths at mean low water were as follows: In January 1961, Delaware River to Penns Neck Highway Bridge 12.0 feet; and thence in December 1956 to the fixed highway bridge at Salem, 0.9 feet.

The existing project was adopted by the River and Harbor Act of March 3, 1925 (H.Doc. 110,68th Cong. 1st Sess.) The latest published map is in the document.

Local cooperation: The existing project required local interest contribute 50 percent of the estimated costs of new work and that a right-of-way for the proposed cutoff shall be conveyed to the United States free of cost. The contributions thus far made provided the right-of-way for the cutoff and 50 percent of the cost of the 12-foot channel up to a point 225 feet above the county (Penns Neck) highway bridge, amounting to $51,825.

Terminal facilities: There are 9 wharves on the river all at Salem, N.J. Eight wharves are privately owned and one is owned by the City. The facilities are considered adequate for existing commerce.

Operations during fiscal year: Maintenance, hired labor: Work included surveys on dredging.

14. SCHUYLKILL RIVER, PA

Location: Rises in Schuylkill County, Pa., flows generally southeasterly 150 miles, and empties into Delaware River at Philadelphia, Pa. (See U.S. Coast and Geodetic Survey Charts 295 and 280.)

Previous project: For details see page 325, Annual Report for 1932.

Existing project: This provides for a channel 33 feet deep and 400 feet wide in Delaware River to the mouth and within the river to 29th Street, .75 mile above the mouth; thence the same depth and 300 feet wide to Passyunk Avenue Bridge, 3.5 miles above the mouth; thence 26 feet deep and 300 feet wide to Gibson Point, 4.5 miles above the mouth; and thence 22 feet deep and 200 feet wide to University Avenue Bridge, 6 miles above the mouth, including widening at bends. The total length of the section included in the project is about 6.5 miles. All depths refer to the plane of mean low water. The extreme tidal range, due to freshets and prolonged heavy winds, is about 14 feet.

The cost for new work for the completed existing project was $2,809,007. Existing project was completed in September 1962. For details see Annual Report for 1962. (See Table 3-B at end of chapter for acts authorizing existing project.)

Local cooperation: The River and Harbor Act of July 24, 1946, imposed the condition that the City of Philadelphia agree to remove 60,000 cubic yards, place measurement, of material annually from that portion of those portions of the project which the District Engineer may designate until such time as adequate municipal sewage-treatment works are constructed and placed in effective operation. Compliance with this condition has been met through the completion of sewage-treatment works by the City of Philadelphia. All other requirements have been fully complied with.

Terminal facilities: There are 38 wharves, piers, and docks within limits of improvement. Facilities are considered adequate for existing commerce. (For further details see Port Series No. 7, Revised 1967, Corps of Engineers.)

Operations during fiscal year: Maintenance, contract: Dredging by the American Dredging Company was performed from 8 July 1985 through 10 September 1985 removing 224,000 cubic yards of material at a cost of $1,531,000. Other work included general maintenance, plans and specifications, and supervision and administration.

Maintenance, hired labor: Work included environmental monitoring, bucket dredge study, plans and specifications, dredging surveys, and supervision and administration.

15. WILMINGTON HARBOR, DEL.

Location: Formed by Christina River, which rises in New Castle County, Del., flows northeasterly 16 miles, passing through the city of Wilmington, Del., and empties into Delaware River about 29 miles below Philadelphia, Pa. (See U.S. Coast and Geodetic Survey Chart 294.)

Previous projects: For details see page 1785 of Annual Report for 1915 and page 308 of Annual Report for 1938.

Existing project: This provides for a channel 35 feet deep and 400 feet wide from west edge of Delaware River ship channel to Lobdell Canal, a distance of about 1.2 miles; thence 21 feet deep and 250 feet wide for

the distance of .8 mile to the mouth of Brandywine River; thence the same depth and 200 feet wide for a distance of about 2.2 miles to a point approximately 4.2 miles from the Delaware River ship channel; thence decreasing a depth of 10 feet in a distance of 750 feet to Penn Central Railroad bridge No. 4; and thence 7 feet and 100 feet wide for a distance of about 5.6 miles to Newport, Del., approximately 9.9 miles above Delaware River ship channel, including a turning basin 35 feet deep opposite the Wilmington Marine terminal and extending upstream from the mouth to Lobdell Canal, 200 feet wide, 2,900 feet long on the north side of the channel and decreasing to a length of 2,000 feet on the north side of the basin. It also provides for the removal of about 1,200 feet of the outer end of a stone-filled, pile-and-timber crib jetty constructed 2,150 feet long on the north side of the entrance; for a steel sheet-pile jetty 2,300 feet long, with 120-foot inshore wing, on the south side of the entrance, and for a V-shaped stone-filled pile-and-timber jetty at the mouth of Brandywine River 430 feet along the north side of Brandywine and 260 feet long on the Christina. Depths refer to the plane of mean low water. The extreme tidal range, due to prolonged heavy winds, is about 13 feet. Existing project was completed in 1962. (For details see page 222, Annual Report 1962.) (See Table 3-B at end of Chapter for Acts authorizing existing project.)

Local cooperation: Fully complied with.

Terminal facilities: There are 18 piers, wharves, and docks within improvement. Facilities considered adequate for existing commerce. (For further details see Port Series No. 8, revised 1966-Corps of Engineers.)

Operations during fiscal year: Maintenance, contract: Maintenance dredging in the Christina River was performed by the American Dredging Co. during the period 12 November 1984 through 23 November 1984. Removed 68,000 cubic yards of material at a cost of $414,000; during the period 14 June 1985 through 28 June 1985 removing 381,000 cubic yards of material at a cost of $556,000. Maintenance dredging performed by Norfolk Dredging Company from 13 December 1984 through 15 June 1985 removing a total of 524,700 cubic yards at a total cost of $461,000. Other work included cultural resource survey phase II, subsurface testing, general maintenance, artificial reef study, environmental monitoring, construction of dike sluices, environmental and design survey, cultural research, fish and wildlife, miscellaneous real estate action, ditching at Wilmington Harbor south, and Edgemore disposal area, lease of equipment, cross section bank and access, survey maintenance dredging.

Maintenance, hired labor: Work included biological surveys, preparation of environmental impact statement, environmental monitoring, general maintenance at Wilmington Harbor South and Edgemoor disposal areas, plans and specifications for dredging, survey on maintenance dredging of the Christina River, ditching, supervision and administration, general maintenance, cultural research, engineering and design, dredging and completion of GDM.

Beach Erosion Control:

16. SHORELINE EROSION CONTROL DEMONSTRATION

Location: Demonstration projects were undertaken at a total of 16 sites nationwide, 6 of which are located in the Delaware Bay and include Pickering Beach, Kitts Hummock, Slaughter Bowers Beach, Broadkill Beach, and Lewes, Delaware. The latter three sites were only monitored as there are presently Federal and State projects in progress.

Existing project: Section 54 of Water Resources Development Act of 1974 authorized a nationwide, 5 year program to test and evaluate low cost shoreline erosion control measure, both structural and vegetative, which can be implemented by individual private property owners. The emphasis of the program was not to solve individual problems, so much as to explore the effectiveness of various ways to control erosion at different types of shorelines, and provide this information to private and public landowners. The construction and evaluation at all sites are completed and information dissemination has been started.

Operations during fiscal year: Maintenance, hired labor: Only costs incurred were in support of information dissemination program. Cost during this period was $3,369.70.

17. BEACH EROSION CONTROL WORK UNDER SPECIAL AUTHORIZATION

Beach erosion control activities pursuant to Section 103, Public Law 87-874 (Preauthorization).

Name of project	Cost to 30 Sep 1985
Detailed Project Reports	
North Shore-Indian River Inlet	$35,000.00
South Shore-Indian River Inlet	35,000.00

Flood Control

18. BELTZVILLE LAKE, PA

Location: Damsite is on Pohopoco Creek about 4.5 miles upstream from its confluence with Lehigh River and 4 miles east of Lehighton, Pa. (See Geological Survey Quadrangle Map for Lehighton, Pa.-1960.)

Existing project: A multiple-purpose development

project providing water supply, flood control, and recreation. Plan of improvement provides for an earth and rock fill dam 4,200 feet long rising 170 feet above creekbed; a spillway around north end of dam; and gate control outlet works discharging through a conduit on rock along right abutment. The lake, a unit of comprehensive plan for flood control and other purposes of Delaware River Basin, has a reservoir capacity of 68,250 acre-feet at spillway crest level with 1,390 acre-feet of inactive storage, 39,830 acre-feet for water supply and recreation, and 27,030 acre-feet for flood control. The cost of project was $22,931,400 including $6,100,000 required non-Federal reimbursement for costs allocated to water supply storage during life of project. The construction of the dam and appurtenances was completed in 1971.

Local cooperation: Project was approved subject to certain requirements of cooperation by local interests as defined in approved House Document. Resolution of Delaware River Basin Commission providing assurances of repayment of water supply and pollution control costs was accepted June 7, 1965. A contract for repayment of water supply costs was signed October 16, 1966.

Operations during fiscal year: Maintenance, contract: Work included reservior operation and maintenance, operation of stream gages in cooperative stream gaging program, snow surveys, correcting electric problems, water quality data collection and monitoring, replacing 16-inch water line valve, finalizing O&M manual, sedimentation survey, and repairing outlet Channel side slope.

Maintenance, hired labor: Work included reservoir operation and minor maintenance, annual safety inspection, water quality monitoring, instrumentation survey, snow survey, operation of stream gages in cooperative stream gaging program, finalizing O&M manual, sedimentation survey, inndation mapping, dam safety training, monitoring tower leakage, dam survey, electrical repairs, engineering and design, and supervision and administration.

19. BLUE MARSH LAKE, PA

Location: Dam site is on Tulpehocken Creek about 1.5 miles upstream from its confluence with Plum Creek and about 6 miles northwest of Reading, Pa. (See Geological Survey Quadrangle Sheet, Bernville, Pa.)

Existing project: This is a multiple-purpose development project providing water supply, flood control, and recreation. Construction started in 1974 and was completed in 1980. The dam is 1,775 feet long and rises 98 feet above creekbed, with at spillway about 1,500 feet south of dam, and gate-controlled outlet works discharging through a conduit on rock along right abutment. The lake, a unit of comprehensive plan for flood control and other purposes of Delaware River Basin, has a capacity of 50,010 acre-feet at spillway crest level, with 3,000 acre-feet of inactive storage, 14,620 acre-feet for water supply and recreation, and 32,390 acre-feet for flood control. (For details see H.Doc 533 87th Cong., 2nd Sess.) Cost of project (October 1984), $63,163,791 includes $16,132,000 required non-Federal reimbursement for costs allocated to water supply storage during life of project after use of this storage is initiated. Existing project was authorized by 1962 Flood Control Act (H. Doc. 533, 87th Cong., 2d Sess., contains latest published maps.)

Local cooperation: Project was approved subject to certain requirements by local interests, as prescribed in House Document cited above. Delaware River Basin Commission on December 29, 1964, adopted a preliminary resolution providing for repayment of water supply costs.

Operations during fiscal year: Maintenance, contract: Work included reservoir operation and maintenance, drilling well at recreation area, operation and maintenance of recreation area, snow survey, operation of stream gages in cooperative stream gaging program, water quality testing and monitoring, mowing and fertilizing recreation area, janitorial services, trash removal, dam break analysis, maintenance of sewage treatment plant, lawn maintenance, dam survey, and cost incurred for Bern and Heidelberg Township police.

Maintenance, hired labor: Work included reservoir operation and maintenance, annual safety inspection, water quality monitoring, instrumentation survey, snow survey, operation of stream gages in cooperative stream gaging program, finalization of O&M manual, sedimentation survey, plans and specifications to correct shoreline erosion, dam break analysis, seasonal employment, dam safety training, emergency planning, repair to pressure condition, dam survey, plans and specifications to reproduce Courtesy Book, improvements to gate house, and engineering and design and supervision and administration.

20. DELAWARE COAST PROTECTION, DEL.

Location: The project is located in Sussex County, Delaware, on the Atlantic Ocean and starts immediately south of Delaware Bay extending in a southerly direction a distance of 24.5 miles to Fenwick Island on the Delaware-Maryland border.

Existing project: Provides a plan of improvement which consists of the construction of dunes and beach fill; the construction of bulkheads at Rehoboth and Dewey beaches; periodic nourishment of the beaches; placement of sand fences; planting dune grass and maintenance and replacement of existing structures. (For details, see S. Doc. 90, 90th Cong. 2d Sess.)

Estimated cost of project (October 1985) $14,300,000 includes $2,700,000 required non-Federal costs. The construction of the feeder beach north of Indian River Inlet was completed in 1973 and nourished in 1978, and 1984. Other work undertaken has been engineering and design associated with the rest of the project.

Local cooperation: Assurances of local cooperation were provided by the State of Delaware, January 13, 1981.

Operations during fiscal year: New Work, contract: Work included construction of Feeder Beach, aerial topography, study management, fish and wildlife study, and advance engineering and design.

New Work, hired labor: Work included environmental studies, hydrology and hydrographic studies, study management, construction of feeder beach, design and cost estimates, engineering and supervision and administration.

21. FLOOD CONTROL WORK UNDER SPECIAL AUTHORIZATION

Flood control activities pursuant to Section 205, Public Law 838, 80th Congress, as amended (Preauthorization).

Name of Project	Cost to 30 Sept. 1985
Reconnaissance Reports	
Huntingdon Valley, Pa.	$7,500
Sacony Creek-Berks Co, Pa.	7,500
Detailed Project Reports	
Poquessing Creek, Bucks County, Pa.	27,216
Plans and Specifications	
Delaware River, Port Jervis, NY	281,078
Construction	
Wallkill River (Black Dirt Area), N.J.	3,100

Also feasibility study pursuant to Emergency Bank Protection Authority provided by Section 14 of the 1946 Flood Control Act.

Name of Project	Cost to 30 Sept 1985
Construction	
Equinunk Creek, Wayne County, Pa.	$191,000

Emergency flood control activities-repair, flood fighting, and rescue work (Public Law 99, 84th Congress, and antecedent legislation).

Fiscal year costs were $202,850 for disaster preparedness, and $51,278 for emergency operations.

22. FRANCIS E. WALTER DAM, PA

Location: Reservoir is in northeastern Pennsylvania on Lehigh River between White Haven and Stoddartsville. Dam is about 0.4 mile below mouth of Bear Creek, about 60 miles above confluence of Lehigh River and Delaware River at Easton, Pa. (See Geological Survey Quadrangle Sheet, Stoddartsville, Pa.)

Existing project: Plan of improvement authorized by 1946 Flood Control Act (H. Doc 587, 79th Cong., 2d Sess.) provided for a single-purpose flood control reservoir. Modification of project, authorized by 1962 Flood Control Act (H. Doc. 522, 87th Cong., 2d Sess.), provides for a multiple-purpose development for water supply and recreation in addition to present single-purpose flood control project. Plan of improvement requires altering spillway increasing height of dam, extending outlet tunnel by addition of a concrete conduit, and constructing new dikes and raising existing dikes. Modified dam will rise 263 feet above riverbed and be 3,500 feet long. Reservoir modification, a unit of comprehensive plan for flood control and other purposes of Delaware River Basin, will have a reservoir capacity of 180,000 acre-feet spillway crest level with 2,000 acre-feet of inactive storage, 70,000 acre-feet for water supply and recreation and 108,000 acre-feet for flood control. Estimated Federal cost of new work (October 1985) is $127,000,000 including $110,700,000 required non-Federal reimbursement for costs allocated to water supply storage during life of project after use of this storage is initiated. Project as authorized under the 1946 Flood Control Act was completed June 1961. Settlement for lands was completed October 1962. The advance engineering and design for the modified project is now underway.

Local cooperation: None required under 1946 Flood Control Act. Under 1962 Flood Control Act, project was approved subject to certain requirements by local interests, as defined in House Document 522 cited above. The Delaware River Basin Commission reiterated its sponsorship for the modified project in August 1982.

Operations during fiscal year: Maintenance, contract: Work included operation and minor maintenance of reservoirs, fire protection, snow survey, operation of stream gages in cooperative stream gaging program, repair of stream gages, water quality testing, instrumentation survey and general maintenance of equipment.

Maintenance, hired labor: Work included reservoir operation and minor maintenance, instrumentation surveillance, minor maintenance of recreation facilities, period inspections, operation of stream gages in USGS cooperative stream gaging program, annual safety inspection, general engineering and design, and supervision and administration.

23. GENERAL EDGAR JADWIN DAM AND RESERVOIR, PA

Location: In Dyberry Creek valley in central part of Wayne County, Pa., between borough of Honesdale and village of Tanners Falls. Dam is about 3 miles above confluence of Dyberry Creek and Lackawaxen River in Honesdale and 29 miles above confluence of Lackawaxen and Delaware Rivers. (See Geological Survey Quadrangle Sheet, Honesdale, Pa.)

Existing project: A single-purpose flood control reservoir with a capacity of 24,500 acre-feet formed by an earth embankment, about 1,225 feet long at crest and rising 109 feet above creek bed. It also has a tunnel with intake structure and a chute-type spillway with a stilling basin in left abutment. Reservoir controls runoff from a drainage area of 65 square miles which is 91 percent of watershed of Dyberry Creek and 39 percent of Lackawaxen River watershed above Honesdale, Pa. Construction of project was authorized by 1948 Flood Control Act (H. Doc. 113, 80th Cong., 1st Sess.). Federal cost of new work was $4,064,510. Non-Federal funds not required. Project completed in June 1960.

Local cooperation: Assurances of Compliance with requirements of local cooperation were accepted July 30, 1956. For details see page 251, Annual Report for 1962.

Operations during fiscal year: Maintenance, contract: Work included reservoir operation and maintenance, operation of stream gages in USGS cooperative stream gaging program, and dam survey.

Maintenance, hired labor: Work included inundation mapping, reservoir operation and minor maintenance, safety and engineering inspections, operation of stream gages in cooperative stream gaging program, instrumentation and surveillance analysis, general engineering and design, construct trash boom, dam break analysis, dam surveys, and supervision and administration.

24. INSPECTION OF COMPLETED FLOOD CONTROL PROJECTS

To ascertain whether local interests were maintaining and operating completed projects as required, inspections were made as follows:

PROJECT	INSPECTION DATES
Lehigh River at Allentown, Pa.	10 October 1984 1 May 1985
Lehigh River at Bethlehem, Pa.	14 November 1984 24 April 1985
Delaware River at East Branch, N.Y.	7 November 1984 15 May 1985
Rancocas Creek at Mount Holly, N.J.	30 October 1984 22 April 1985
Chester River at Chester, Pa.	1 November 1984 15 April 1985

Local interests are satisfactorily maintaining and operating projects in accordance with regulation. Costs during the period were $12,303. Total costs were $104,882.

25. INSPECTION OF NON-FEDERAL LEVEES

Inspection of non-Federal levees were conducted at a cost of $1,031 at the following sites:

Port Jervis, NY	12 Feb. 1985

26. PROMPTON LAKE, PA.

Location: In Lackawaxen River Valley in central part of Wayne County, Pa., between borough of Prompton and village of Aldenville. Dam is within corporate limits of Prompton, 4 miles upstream from Honesdale, Pa., and approximately 30 miles above confluence of Lackawaxen and Delaware River. (See Geological Survey Quadrangle Sheet, Honesdale, Pa.)

Existing project: Plan of improvement authorized by 1948 Flood Control Act (H. Doc. 113, 80th Cong., 1st Sess.) provides for a single-purpose flood control reservoir. Modification of project authorized by 1962 Flood Control Act (H. Doc. 522, 87th Cong., 2d Sess.) provides for a multiple-purpose development for water supply and recreation in addition to present single-purpose flood control project. Plan of improvement requires construction of control tower with gates and service bridge, placing an impervious blanket on valley walls and floor upstream from dam, widening spillway, and clearing land and relocating roads in reservoir. Dam, completed under 1948 Flood Control act which will not be modified, is 1,230 feet long and rises 140 feet above riverbed. Existing spillway, cut into rock of right abutment, will be modified and present uncontrolled outlet works discharging into a concrete conduit along right bank, will be provided with gates and a control tower. Reservoir modification, a unit of comprehensive plan for flood control and other purposes of Delaware River basin has a capacity of 52,000 acre-feet; 3,500 acre-feet for inactive storage, 28,200 acre-feet for water supply and recreation, and 20,300 acre-feet for flood control. Estimated Federal cost of new work (October 1985) is $43,300,000 including $38,100,000 required non-Federal reimbursement for costs allocated to water supply storage during life of project after use of this storage is initiated. Project as authorized under the 1948 Flood Control Act was completed in November 1960. (For details, see page 358, Annual Report for 1963.) Work accomplished under the 1962 Flood Control Act was advance engineering and design.

Local cooperation: Project modification was approved subject to certain requirements by local interests, as defined in House Document 522 cited above. Assurances of compliance under Flood Control Act of 1948 have been met. Delaware River Basin Commission on March 18, 1966, gave their view that the need for water supply was not urgent at that time. However recent studies conducted by DRBC have determined that there is now a need for water supply. In August 1983, DRBC expressed their strong support for the project modification. Therefore resumption of planning will take place when funds are made available.

Operations during fiscal year: Maintenance, contract: Work included operation and minor maintenance, water quality monitoring, USGS cooperative stream gaging, survey analysis, dam survey, supervision and administration, and engineering and design.

Maintenance, hired labor: Work included inundation mapping, dam break analysis, annual safety inspection, dam safety training, water quality data collection, instrumentation and surveillance, dam survey, repair of instrumentation and engineering and design.

27. RECONNAISSANCE AND CONDITION SURVEYS

Project	Date Survey Conducted
Salem River	31 October 1985
Burlington Island Back Channel	14-15 January 1985
Salem River	2 February 1985
Cohansey River	21 March to 2 May 1985
Delaware City Br Channel	19 April 1985

28. NATIONAL EMERGENCY PREPAREDNESS

The total fiscal year cost for this category amounted to $131,096.

GENERAL INVESTIGATIONS

29. SURVEYS

Cost for the period were $618,632 for navigation studies: $298,617 for flood control studies: $115,390 for special studies: a total of $1,082,639.

30. COLLECTION AND STUDY OF BASIC DATA

Cost and expenditures during the period for flood plain information studies were $172,018.

31. ADVANCE ENGINEERING AND DESIGN

The total costs for this category amount to $2,099.

TABLE 3-A COST AND FINANCIAL STATEMENT

See Section in Text	Projects	Funding	FY82	FY83	FY84	FY85	Sept. 30, 1985
1.	Barnegat Inlet, N.J. (Regular Funds)	New Work Approp.	—	—	210,000	—	658,849
		Cost	—	—	206,975	—	655,824
		Maint. Approp.	362,500	703,000	670,000	289,000	10,010,135
		Cost	365,491	680,607	694,337	286,860	10,007,853
	(Contributed Funds)	New Work Approp.	—	—	—	—	300,000
		Cost	—	—	—	—	300,000
2.	Cohansey River, N.J. (Regular Funds)	New Work Approp.	—	—	—	—	146,756[2,3]
		Cost	—	—	—	—	146,756[2,3]
		Maint. Approp.	—	30,000	—3,000	66,000	838,931
		Cost	—	11,049	15,951	65,367	838,298
3.	Delaware River Between Philadelphia, Pa. and Trenton, N.J. (Regular Funds)	New Work Approp.	—	—	—	—	72,147,800[1]
		Cost	—	—	—	—	72,147,800[1]
		Maint. Approp.	3,158,000	967,000	298,125	3,328,000	26,508,860[2]
		Cost	3,167,472	968,187	298,476	3,321,857	26,508,857[2]
	(Contributed Funds)	New Work Approp.	—	—	—	—	15,000
		Cost	—	—	—	—	15,000
4.	Delaware River Pa., N.J. and Del., Philadelphia to the Sea (Regular Funds)*	New Work Approp.	—	—	—	—	57,879,872[3]
		Cost	—	—	—	—	57,879,872[3]
		Maint. Approp.	13,794,188	16,782,000	21,533,300	25,051,285	284,583,867[4]
		Cost	13,743,314	16,775,510	21,639,776	25,051,285	284,565,048[4]
		Rehab. Approp.	—	—	—	—	508,324
		Cost	—	—	—	—	508,324
5.	Harbor of Refuge Delaware Bay, Del. (Regular Funds)	New Work Approp.	—	—	—	—	5,162,230[6]
		Cost	—	—	—	—	5,162,230[6]
		Maint. Approp.	—1,091	—	9,000	—	1,147,363[7]
		Cost	—	—	8,706	267	1,147,069[7]
6.	Indian River Inlet and Bay, Del. (Regular Funds)	New Work Approp.	—	—	—	—	511,210[5]
		Cost	—	—	—	—	511,210[5]
		Maint. Approp.	—	-16,000	4,000	22,000	2,763,923
		Cost	634	697	4,171	20,617	2,762,540
		Rehab. Approp.	—	—	—	—	1,323,775
		Cost	—	—	—	—	1,323,775
	(Contributed Funds)	New Work Approp.	—	—	—	—	210,000
		Cost	—	—	—	—	210,000
7.	Inland Waterway Rehoboth Bay to Delaware Bay, Del. (Regular Funds)	New Work Approp.	—	—	—	—	561,514
		Cost	—	—	—	—	561,514
		Maint. Approp.	11,000	114,000	30,000	19,000	1,323,978
		Cost	11,175	112,228	32,572	16,346	1,321,324
	(Contributed Funds)	New Work Approp.	—	—	—	—	60,000
		Cost	—	—	—	—	60,000
8.	Inland Waterway from Delaware River to Chesapeake Bay, Del. and Md. (Regular Funds)	New Work Approp.	—	—	—	—	132,535,591[8]
		Cost	—	—	297	—	132,532,598[8]
		Maint. Approp.	7,078,400	12,045,500	10,488,275	12,068,000	148,435,705[9]
		Cost	6,836,659	12,225,774	10,667,119	11,940,091	148,233,310[9]

TABLE 3-A (continued) COST AND FINANCIAL STATEMENT

See Section in Text	Projects	Funding	FY82	FY83	FY84	FY85	Sept. 30, 1985
9.	Manasquan	New Work					
	River, N.J.	Approp.	—	—	—	—	577,249[16]
	(Regular	Cost	—	—	—	—	577,249[16]
	Funds)	Maint.					
	*	Approp.	100,000	15,000	25,000	273,000	3,394,557[17]
		Cost	4,612	94,659	40,081	264,024	3,384,933[17]
		Rehab.					
		Approp.	—	—	—	—	7,410,600[20]
		Cost	1,378,056	177,314	1,028	—	7,343,858[20]
	(Contributed	New Work					
	Funds)	Approp.	—	—	—	—	300,000
		Cost	—	—	—	—	300,000
10.	Mispillion	New Work					
	River, Del.	Approp.	—	—	—	—	377,848[18]
	(Regular	Cost	—	—	—	—	377,848[18]
	Funds)	Maint.					
		Approp.	—4,020	—	11,000	111,000	1,364,127[19]*
		Cost	1,400	—	11,000	110,600	1,368,727[19]*
		Rehab.					
		Approp.	—	—	—	—	253,491
		Cost	—	—	—	—	253,491
11.	New Jersey	New Work					
	Intracoastal	Approp.	—	—	—	—	71,549[10]
	Waterway	Cost	—	—	—	—	71,549[10]
	(Regular	Maint.					
	Funds)	Approp.	1,446,100	818,000	1,121,000	979,000	19,582,571[11]
		Cost	1,554,708	849,876	1,152,487	981,788	19,582,342[11]
		Rehab.					
		Approp.	—	—	—	—	1,196,581
		Cost	—	—	—	—	1,196,581
	(Contributed	New Work					
	Funds)	Approp.	—	—	—	—	99,000
		Cost	—	—	—	—	99,000
12.	Salem, River, N.J.	New Work					
	(Regular	Approp.	—	—	—	—	107,634[21]
	Funds)	Cost	—	—	—	—	107,634[21]
		Maint.					
		Approp.	—	35,000	992,000	45,225	1,317,779[22]
		Cost	—	21,181	1,005,818	45,011	1,317,778[22]
	(Contributed	New Work					
	Funds)	Approp.	—	—	—	—	51,825
		Cost	—	—	—	—	51,825
13.	Schuylkill	New Work					
	River, Pa.	Approp.	—	—	—	—	3,334,007[12]
	(Regular	Cost	—	—	—	—	3,334,007[12]
	Funds)	Maint.					
		Approp.	108,000	770,100	1,241,000	1,693,000	25,942,033[25]
		Cost	104,454	768,856	1,244,884	1,641,466	25,941,386[25]
14.	Wilmington	New Work					
	Harbor, Del.	Approp.	—	—	—	—	1,954,725[13]
	(Regular	Cost	—	—	—	—	1,954,725[13]
	Funds)	Maint.					
		Approp.	1,524,100	2,011,000	2,006,000	3,226,600	30,797,765
		Cost	1,501,336	1,980,620	2,069,777	3,215,739	30,779,558
	(Contributed	New Work					
	Funds)	Approp.	—	—	—	—	60,000
		Cost	—	—	—	—	60,000
15.	Beltzville Lake,	New Work					
	Pa.	Approp.	—	—	—	—	22,931,831
	(Regular	Cost	—	—	—	—	22,931,130
	Funds)	Maint.					
		Approp.	342,400	721,000	655,800	521,000	4,803,175
		Cost	364,321	691,749	713,170	521,407	4,801,389

TABLE 3-A (continued) COST AND FINANCIAL STATEMENT

See Section in Text	Projects	Funding	FY82	FY83	FY84	FY85	Sept. 30, 1985
16.	Blue Marsh Lake, Pa. (Regular Funds)	New Work Approp.	—	—	—	—	63,180,300
		Cost	-93,855	118,186	3,212	—	63,163,790
		Maint. Approp.	794,200	787,000	1,002,200	1,186,000	5,509,200
		Cost	836,190	742,145	1,068,725	1,167,543	5,464,539
17.	Delaware Coast Protection (Regular Funds)	New Work Approp.	—	50,000	775,000	200,000	2,453,953[24]
		Cost	—	43,580	455,165	200,000	2,127,649[24]
	(Contributed Funds)	New Work Approp.	—	85,000	—921	—	84,079
		Cost	—	69,557	11,538	—	81,095
18.	Francis E. Walter Dam, Pa. (Regular Funds)	New Work Approp.	—	—	—	—	11,503,432[14]
		Cost	91,375	512	—	—	11,501,971[14]
		Maint. Approp.	423,300	331,000	383,700	422,000	4,533,521
		Cost	446,749	330,420	388,882	421,975	4,522,653
19.	General Edgar Jadwin Dam and Resevoir, Pa. (Regular Funds)	New Work Approp.	—	—	—	—	4,073,105
		Cost	—	—	—	—	4,073,105
		Maint. Approp.	38,000	104,000	74,200	243,000	1,390,564
		Cost	40,266	91,463	88,156	242,742	1,390,236
20.	Prompton Lake Pa, (Regular Funds)*	New Work Approp.	—	—	—	—	4,609,483[15]
		Cost	—	—	—	—	4,609,483[15]
		Maint. Approp.	149,300	167,000	298,000	353,000	2,413,162
		Cost	147,927	173,611	306,608	348,359	2,401,883

*Total Adjustment to correct discrepancies in prior years.

1. Includes $2,489,173 for new work for previous projects, $105,000 for preauthorization studies and minus $142,015 adjustment (new work) to Delaware River, Philadelphia to Sea project from this project under 1954 modification.
2. Included $552,720 for maintenance for previous projects, and $685,000 Jobs Bill Funds.
3. Excludes $12,976,054 for new work for previous projects and $142,015 adjustment from Delaware River, Philadelphia to Trenton, N.J. under 1954 modification.
4. Includes $1,025,409 for maintenance of previous projects, and $8,000 Jobs Bill funds.
5. Excludes $10,000 for previous project.
6. Includes $2,749,452 for new work for previous projects.
7. Excludes $1,089 for reconnaissance and condition surveys, fiscal year 1963.
8. Includes $10,709,755 for new work for previous projects.
9. Includes $6,903,748 for maintenance for previous projects, and $9,500 Jobs Bill funds.
10. Excludes $1,824,940 Navy Department Funds.
11. Excludes $286,953 Navy Department funds expended for maintenance.
12. Includes $525,000 for previous projects.
13. Includes $402,121 for new work for previous project, and $206,177 emergency relief funds.
14. Includes $40,000 appropriated and expended under Code 710 Recreation Facilities.
15. Includes $63,000 appropriated and $61,551 expended under Code 710 Recreation Facilities, excludes $23,600 preauthorization studies under 1948 modification.
16. Includes $39,000 for new work for previous projects.
17. Includes $2,054 for maintenance for previous projects.
18. Includes $148,798 for new work on previous projects.
19. Includes $61,172 for maintenance on previous projects.
20. Includes $555,600 for previous project.
21. Includes $55,809 new work funds expended on previous project.
22. Includes $1,285 for reconnaissance and condition survey in fiscal year 1957, $1,792 operation and maintenance cost incurred for preparation of environmental impact statement, and $48,000 expended for maintenance on previous project.
23. Includes $36,000 for new work for previous projects.
24. Includes $438,953 AE&D.
25. Includes $50,000 Jobs Bill Funds.

TABLE 3-B AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	BARNEGAT INLET, N.J. (See Section 2 of Text)	
Aug. 30, 1935	An 8-foot depth through inlet to Oyster Creek Channel across inner bar, 10-foot depth through outer bar and for jetties.	Rivers and Harbors Committee Doc. 19, 73d Con., 2d sess.[1]
Aug. 26, 1937	A channel of suitable hydraulic characteristics from gorge to Oyster Creek Channel, and thence to deep water in bay.	Rivers and Harbors Committee Doc. 85, 74th Cong., 2d sess.[1]
July 24, 1946	Maintenance dredging of channel to connect main inlet channel with Barnegat City Harbor.	H. Doc. 358, 79th Cong. 2d sess.
	COHANSEY RIVER, N.J. (See Section 3 of Text)	
Mar. 2, 1907	Channel 7 feet deep over entire project.	H. Doc. 645, 59th Cong. 1st sess.
Aug. 26, 1937	Channel 12 feet deep to Glass Street, thence 8 feet to Commerce Street with turning basis.	Senate Committee print, 75th Cong., 1st sess.
	DELAWARE RIVER BETWEEN PHILADELPHIA, PA. AND TRENTON, N.J. (See Section 5 of Text)	
July 3, 1930	A channel 28 feet deep, 300 feet wide between Alleghney Ave., Philadelphia, PA and Delair Bridge.	Rivers and Harbors Committee Doc. 3, 71st Cong., 1st sess.
Aug. 30, 1935[2]	Channel 25 feet deep from Delair Bridge to Trenton, N.J., and maintenance of 12-foot channel from upper end of 25-foot project to Penn Central R.R. Bridge at Ferry St., Trenton.	Rivers and Harbors Committee Doc.11, 73d Cong., 1st sess.
Aug. 30, 1935[2]	Auxiliary channel, 20 feet deep east of Burlington Island.	Rivers and Harbors Committee Doc. 66, 74th Cong., 1st sess.[1]
Aug. 26, 1937	A cross channel 8 feet deep, opposite Delanco, N.J.	Rivers and Harbors Committee Doc. 90, 74th Cong., 2d sess.
July 24, 1946	Anchorage at mouth of Biles Creek	H. Doc. 679, 79th Cong., 2d sess.
Sept. 3, 1954	A channel 40 feet deep and 400 feet wide between Alleghney Ave., Philadelphia, PA., and upstream end of Newbold Island, thence 35 feet deep to Trenton Marine Terminal and turning basin to 800 feet wide. Relocate channel at railroad bridge at Delair and suitably reconstruct bridge. Construct necessary bank protection works; and eliminate authorized anchorage near mouth of Biles Creek, PA.	H. Doc. 358, 83rd Cong., 2d sess.[1]
	DELAWARE RIVER, PA., N.J., AND DE, PHILADELPHIA TO THE SEA (See Section 6 of Text)	
June 25, 1910	Channel 35 feet deep from Allegheny Ave., Philadelphia, PA to Delaware Bay.	H. Doc. 733, 61st Cong. 2d sess.
July 3, 1930	Anchorages 35 feet deep at Port Richmond and Mantua Creek, a 30 foot anchorage at Gloucester, N.J. and extend 1,000 foot channel in Philadelphia Harbor to Horseshoe Bend.	H. Doc. 304, 71st Cong. 2d sess.[1]
Aug. 30, 1935[3]	An anchorage 35 feet deep at Marcus Hook, PA.	Rivers and Harbors Committee Doc. 5, 73d Cong., 1st sess.
June 20, 1938[4]	A channel 37 feet deep from Philadelphia — Camden Bridge to Navy Yard, thence 40 feet deep to deep water in Delaware Bay.	S. Doc. 159, 75th Cong. 3d sess.[1]
Mar. 2, 1945[5]	A 37-foot depth channel from Allegheny Ave., Philadelphia, PA. to Philadelphia-Camden Bridge and	H. Doc. 580, 76th Cong. 3d sess.[1]
Mar. 2, 1945[5]	A 37-foot depth in an enlargement of anchorage near Mantua Creek and Marcus Hook.	H. Doc. 340, 77th Cong. 1st sess.[1]
Mar. 2, 1945[5]	Maintain enlarged channel opposite Philadelphia Navy Yard.	Specified in Act. H. Doc. 358, 83rd Cong. 2d sess.[1]
Sept. 3, 1954	A channel from Allegheny Ave., to Naval Base 40 feet deep, 400 feet wide along side of channel through Philadelphia Harbor and 500 feet wide through Horseshoe Bend.	
July 3, 1958	Anchorages at Reedy Point, Deepwater Point, Marcus Hook, and Mantua Creek 40 feet deep and 2,300 feet wide with mean lengths of 8,000, 5,200, 13,650 and 11,500 feet respectively.	H. Doc. 185, 85th Cong. 1st sess.

TABLE 3-B (Continued) AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	HARBOR OF REFUGE, DELAWARE BAY, DE (See Section 7 of Text)	
June 3, 1896	Breakwater construction Construction of 10 ice piers Construction of 5 additional ice piers	H. Doc. 112.53rd Cong. 2d sess (subproject, approved by War Department, Apr 23, 1900). Subproject, approved by War Department, June 30, 1902.)
July 3, 1930	Channel 18 feet deep to Queen Anne pier at Lewes, DE (No work has been done on this channel.)	River and Harbors Committee Doc. 15, 70th 1st sess.[1]
Aug. 30, 1935	Channel 15 feet deep to pier of Atlantic Fisheries Co. about 0.7 mile east of Queen Anne pier.	Rivers and Harbors Committee Doc. 56, 74th Cong., 1st sess.[1]
	INDIAN RIVER INLET AND BAY, DE (See Section 8 of text)	
Aug. 26, 1937	A 15-foot inlet channel, steel and stone jetties, 6 foot channel from end of inlet channel to deep water in the bay and authority to modify interior inlet channel.	Rivers and Harbors Committee Doc. 41, 75th Cong. 1st sess.
Mar. 2, 1945	A 9-foot channel from inlet to Old Landing, including basin, and 4-foot channel to highway bridge at Millsboro.	H. Doc. 330, 76th Cong., 1st sess.[1]
	INLAND WATERWAY, REHOBOTH BAY TO DELAWARE BAY, DE.	
July 25, 1912	For a 6-foot depth canal to connect Rehoboth Bay and Delaware Bay.	H. Doc. 823, 60th Cong., 1st sess. and Rivers and Harbors Committee Doc. 51, 61st Cong., 3d sess.
Aug. 30, 1935	For a 6-foot depth entrance near Lewes, for jetties, for widening the canal from Broadkill River to Lewes and basin.	Rivers and Harbors Committee Doc. 56, 75th Cong., 1st sess.[1]
Mar. 2, 1945	For a 10-foot depth from Delaware Bay to Lewes and in basin, and for extending jetties.[6].	H. Doc. 344, 77th Cong., 1st sess.[1]
	INLAND WATERWAY FROM DELAWARE RIVER TO CHESAPEAKE BAY, DE & MD. (See Section 10 of Text)	
Aug. 30, 1935	A sea level channel 27 feet deep, 250 feet wide from Delaware River to Elk River and 400 feet down Elk River and Chesapeake Bay to deep water at or near Pooles Island; alter existing bridges over canal; enlarge Delaware City Branch Channel to 8 feet deep and 50 feet wide, with a basin same depth and revetment of both banks east of Fifth Street; enlarge anchorage and mooring basin in Back Creek to 400 feet wide, 1,000 feet long and 12 feet deep; extend jetties at Reedy Point; and construct bulkheads.	H. Doc. 201, 72d Cong., 1st sess. and Rivers and Harbors Committee Docs. 18 and 24, 73d Cong., 2d sess.[1]
Aug. 7, 1939	Construct a 4-lane high-level fixed highway bridge at or near St. Georges.	Public Law 310, 76th Cong., 1st sess.
Sept. 3, 1954	A channel 35 feet deep and 450 feet wide from Delaware River through Elk River and Chesapeake Bay at water of that depth in the bay, including a cutoff at Penn Central Railroad crossing, with a minimum radius of curvature of 7,000 feet at bends; a high level fixed railroad bridge over cutoff; high level fixed highway bridge at Reedy Point and Summit; and an anchorage in Elk River 35 feet deep and 1,200 feet wide, averaging 3,700 feet long.	S. Doc. 123, 83rd Cong. 2d sess.[1]
	MANASQUAN RIVER, N.J. (See Section 11 of Text)	
July 3, 1930	Channel 8 feet deep and provision of works designed to secure channel.	H. Doc. 482, 70th Cong., 2d sess.
Aug. 30, 1935	Widening channel on northerly side.	Senate Committee Doc., 74th Cong., 1st sess.
Mar. 2, 1945	Deepening channel to 12 and 14 feet, 10 and 12 foot anchorages.[7]	H. Doc. 356, 77th Cong., 1st sess.
	MISPILLION RIVER, DE (See Section 12 of Text)	
Mar 2, 1919	A 6-foot depth and extension of south jetty.	H. Doc. 678, 62d Cong., 2d sess.[1]
Aug. 26, 1937	Extension of north jetty.	Rivers and Harbors Committee, Doc. 83, 74th Cong., 2d sess.[1]
Sept. 3, 1954	A channel 9 feet deep, 80 feet wide from like depth in Delaware Bay to the landward end of the jetties and thence 60 feet wide to Milford including 3 cutoffs, with a turning basin at Milford.	S. Soc. 229, 81st Cong., 2d sess.[1]

TABLE 3-B (Continued) AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	SCHUYLKILL RIVER, PA. (See Section 17 of Text)	
Aug. 8, 1917	Depths of 35 feet from mouth to Girard Point thence 30 feet, 26, and 22 feet to University Avenue Bridge, Philadelphia.	H. Doc. 1270, 64th Cong., 1st sess.
July 3, 1930	A depth of 30 feet instead of 35 feet between the mouth and the conditional restoration and maintenance of the channel below Passyunk Ave., by the United States.	Rivers and Harbors Committee Doc. 40, 71st Cong., 2d sess.[1]
July 24, 1946	A depth of 33 feet from the channel in Delaware River to Passyunk Ave., restoration of the project channel dimensions between Passyunk Ave., and University Ave., and full maintenance of the entire project.	H. Doc. 699, 79th Cong., 2d sess.[1]
	SALEM RIVER, N.J.	
July 3, 1930	A channel of 10-foot depth from Delaware River to Masters Sand Plant.	H. Doc. 217, 70th Cong. 1st sess.[1]
Aug. 30, 1935	Extension of project to Clements Bridge.	Rivers and Harbors Committee Doc. 15 73d Cong., 1st sess.[1]
	WILMINGTON HARBOR, DE (See Section 18 of Text)	
June 3, 1896	Depths of 21, 10 and 7 feet and jetties.	H. Doc. 66, 54th Cong., 1st sess. Annual Report, 1897 p. 1250[1]
July 25, 1912	Purchase or construct a dredge and auxiliaries including a wharf and depot, and maintenance of project.	H. Doc. 359, 62d Cong., 2nd sess.
Sept. 22, 1922	Entrance channel and basin with 25-foot depth and construction by local interests of new south jetty.	H. Doc. 114, 67th Cong., 1st sess. and S. Committee Print, 68th Cong., 1st sess.
July 3, 1930	A 30-foot depth between Delaware River and Lobdell Canal and modification or removal of a portion of north jetty.	Rivers and Harbors Committee Doc. 20, 71st Cong. 2d sess.
Aug. 30, 1935[8]	Completion of new south jetty by the United States subject to provision that city of Wilmington reimburse the United States for cost, without interest, of any part of structure that may subsequently be occupied and utilized for city activities.	Rivers and Harbors Committee Doc. 32 73d Cong., 2d sess.
Oct. 17, 1940	Permit temporary occupancy by city of Wilmington of any part of south jetty for city activities under revocable license, provided occupied portion of jetty is properly maintained without expense to the United States.	H. Doc. 658, 76th Cong., 3rd sess.
July 14, 1960	A 35-foot depth between Delaware River ship channel and Lobdell Canal including turning basin of same depth, opposite Wilmington Marine Terminal, 200 feet wide, 2,900 feet long on north side of channel, and 2,000 feet long on north side of basin.	S. Doc. 88, 86th Cong., 2d sess.

1. Contains latest published maps.
2. Also Public Works Administration, September 6, 1933, and Emergency Relief Administration, May 28, 1935.
3. Also Public Works Administration.
4. Channel 37 feet deep and 600 feet wide from Naval Base to Philadelphia-Camden Bridge, deferred for restudy.
5. Channel 37 feet deep and 600 feet wide from Philadelphia-Camden Bridge to Allegheny Ave. deferred for restudy.
6. Extension of jetties considered to be active.
7. The 10 and 12 foot anchorages are considered inactive.
8. Also May 28, 1935, under Emergency Relief Administration.

TABLE 3-C OTHER AUTHORIZED NAVIGATION PROJECTS

Completed Projects	Status	For Last Full Report See Annual Report for	Cost to September 30, 1985	
			Construction	Operation and Maintenance
Absecon Creek, N.J.[1]	COMPLETED	1969	11,935	167,682*
Absecon Inlet	COMPLETED	1984	534,209	5,939,362
Appoquinimink River DE	COMPLETED	1931	36,973	41,270
Big Timber Creek, N.J.[1]	COMPLETED	1962	58,665[2]	53,986*
Broadkill River, DE	COMPLETED	1976	68,228	243,641
Cape May Inlet, NJ	COMPLETED	1984	149,995	1,115,354
Cedar Creek, Sussex City, DE	COMPLETED	—	256,100	—
Cold Spring Inlet, NJ	COMPLETED	1984	879,275	2,391,507
Cooper River, N.J.[1]	COMPLETED	1962	33,102	379,244*
Delaware River at Camden, N.J.	COMPLETED	1982	464,906	362,799[12]
Delaware River, Pennsville, N.J.	COMPLETED	—	256,624	—
Double Creek, N.J.[1]	COMPLETED	1912	7,800	—[5]
Inland Waterway from Chincoteague Bay to Delaware Bay	COMPLETED	1981	168,412[18]	98,360[19]
Little River, DE	COMPLETED	1980	12,016	288,310
Mantua Creek, N.J.	COMPLETED	1966	169,687	339,340*
Maurice River, N.J.	COMPLETED	1948	—	—
Delaware Bay to Millville fixed Bridge	COMPLETED	—	143,984[10]	147,050
Millville fixed bridge to upper end of project	SEE TABLE 3-G			
Murderkill River, DE	COMPLETED	1984	37,630	1,114,354
**Neshaminy State Park Harbor	COMPLETED	1968	128,203[21]	54,601
Oldmans Creek, N.J.	COMPLETED	1941	31,188	32,125
**Pepper Creek, DE[1]	COMPLETED	1965	138,094[22]	1,797*
Raccoon Creek, N.J.	COMPLETED	1981	83,665[20]	341,734
St. Jones River, DE		1961	—	—
Delaware Bay to Lebanon[1,11]	COMPLETED	—	207,102	66,093
Jetties and entrance at mouth[9]		—	—	—
Schuylkill River above Fairmount Dam, PA.[1]	COMPLETED	1955	4,291,810	—[5]
Smyrna River, DE		1949	—	—
Delaware River to Wharf at Smyrna Landing[15]	COMPLETED	—	198,844	197,327
Wharf at Smyrna Landing to fixed bridge	SEE TABLE 3-G	—	—	—
Toms River, N.J.		1950	—	—
Channel 5 feet deep[1]	COMPLETED	—	10,050	33,311
Channel 12 feet deep[9]	SEE TABLE 3-G	—	—	—
Tuckerton Creek, NJ.	COMPLETED	1972	60,242	623,917*
Waterway from Indian River Inlet to Reboboth Bay, DE	COMPLETED	1981	90,908	241,497
Woodbury Creek, N.J.[1]	COMPLETED	1940	27,093[16]	56,474

Inactive Projects	Status	For Last Full Report See Annual Report for	Cost to September 30, 1985	
			Construction	Operation and Maintenance
Alloway Creek, N.J.[1]	INACTIVE	1931	21,398	35,761
Aquatic Plant Control		1975	87,594	—
Chester River, PA[3]	INACTIVE	1931	6,000	1,139
Dennis Creek, N.J.[1]	INACTIVE	1897	4,701	—
Goshen Creek, N.J.[1]	INACTIVE	1905	15,359	870
Ice Harbor at Marcus Hook, PA.[1-6]	INACTIVE	1928	208,964	14,336
Ice Harbor at New Castle, DE[1-6]	INACTIVE	1898	224,704	—
Leipsic River, DE[1]	INACTIVE	1931	36,956	32,345
Little Egg Harbor, N.J.[1,4]	INACTIVE	—[7]	15,048	—
Maurice River, N.J.		1948		
Channel 8 feet deep, Delaware Bay to mouth	INACTIVE		—	—

TABLE 3-C OTHER AUTHORIZED NAVIGATION PROJECTS (Cont'd)

Deferred Projects	Status	For Last Full Report See Annual Report for	Cost to September 30, 1985	
			Construction	Operation and Maintenance
St. Jones River, DE		1961	—	—
Delaware Bay to Lebanon[1,11]		—	207,102	66,093
Jetties and new entrance at mouth[9]	DEFERRED	—	—	—

1. Completed.
2. Excludes $50,000 contributed funds expended for new work.
3. Includes $6,000 new work and $63 maintenance funds expended on previous projects.
4. Abandonment recommended in House Doc. 467, 69th Congress, 1st Sess.
5. Maintenance assumed by local interests.
6. Harbor not now required by commerce.
7. Last appropriation for project was in 1852. No information is at hand relative to work done.
8. Includes $3,000 for new work for previous projects.
9. Deferred
10. Includes $43,000 new work funds expended on previous projects.
11. Includes $54,590 new work and $28,935 maintenance funds expended on previous projects.
12. Excludes $15,000 contributed funds.
15. Includes $55,085 new work and $22,723 maintenance funds expended on previous projects.
16. Includes $2,950 new work funds expended on previous projects.
18. Entire amount expended on previous projects repealed in 1905.
19. Excludes $2,000 contributed funds and includes $25,330 for maintenance for previous projects.
20. Includes $757 new work funds expended on previous projects.
21. Excludes $327,957 contributed funds allotted expended for new work.
22. Excludes $38,988 non-Federal Funds.

*Operation and maintenance figure includes cost incurred for preparation of environmental impact statements.
**Projects authorized by the Chief of Engineers.

TABLE 3-D OTHER AUTHORIZED BEACH EROSION CONTROL PROJECTS

Project	Status	For Last Full Report See Annual Report For	Cost to September 30, 1985	
			Construction	Operation and Maintenance
Corson Inlet and Ludlam Beach, N.J.	ACTIVE*	1978	314,400	—
Great Egg Harbor Inlet and Peck Beach, N.J.	ACTIVE*	1978	387,882	
Townsend Inlet and Seven Mile Beach, N.J.	ACTIVE*	—	—	—
Atlantic City, N.J.	INACTIVE	1972	2,083,289	—[1]
Ocean City, N.J.	INACTIVE	1969	395,831[3]	—[1]
Stone Harbor, N.J.	INACTIVE	1961	—	—[1]
Barnegat Light, N.J.	DEFERRED	1964	70,908	—[1]
Cape May City, N.J.	DEFERRED	1961	22,957[2]	—[1]
Long Beach Island, N.J.	DEFERRED	1964	40,665	—[1]
North Wildwood, N.J.	DEFERRED	1961	—	—[1]
Rehoboth Beach to Indian River Inlet, DE[4]		1965	326,116	—[1]
Ventnor, Margate and Longport, N.J.	DEFERRED	1961	—	—[1]

1. Operation and maintenance required by law to be assumed by local interests.
2. Excludes $58,585 Accelerated Public Works funds expended for extension to two groins.
3. Excludes cost of $1,146,325 to local interests and $272,766 Federal participation expended under Public Works Acceleration Program for Extension of five existing groins completed 11 May 1964.
4. This project was included in and modified by the Delaware Coast project.

* NO CURRENT YEAR FUNDS.

TABLE 3-E OTHER AUTHORIZED FLOOD CONTROL PROJECTS

Project	Status	For Last Full Report See Annual Report For	Cost to September 30, 1985	
			Construction	Operation and Maintenance
Allentown, Lehigh River, PA.	COMPLETED	1961	1,615,581	—[1]
Bethlehem, Lehigh River, PA.	COMPLETED	1966	4,520,995	—[1]
Mt. Holly, N.J.	COMPLETED	1946	283,655	—[1]
Hay Creek, Birdsboro, PA	ACTIVE	1984	335,299	—
Pottstown, PA	ACTIVE	1984	487,366	—
Tamaqua, PA	ACTIVE	1984	524,373	—
Trexler Lake, PA.[3]	INACTIVE	1981		
Aquashicola Reservoir, PA.[2]	DEFERRED	1963	—	—
Maiden Creek Reservoir, PA.[2]	DEFERRED	1963	—	—[1]

1. Maintenance assumed by local interest as required by authorizing project.
2. New project deferred.
3. $1,316,464 expended for preconstruction planning only.
4. Transferred to Baltimore Dist. in 1982.

TABLE 3-F MULTIPURPOSE PROJECT INCLUDING POWER

Project	For Last Full Report See Annual Report for	Cost to September 30, 1985	
		Construction	Operation and Maintenance
Tocks Island, PA., N.J. and NY[2]	1979	65,106,260[1]	—
Tocks Island (Relocation of U.S. Route 209 only) PA[2]	1979	195,223	—

1. Includes $3,489,088 for AE&D.
2. National Parks and Recreation Act of 1978 terminated Corps' authority to proceed with the project. Legislation would be required to proceed with the project.

TABLE 3-G DEAUTHORIZED PROJECTS

Navigation Projects	For Last Full Report See Annual Report For	Date And Authority	Federal Funds Expended	Contributed Funds Expended
Appoquinimink River, DE[1]	1931	3 Oct 78 HD 95-351	$ 78,243	—
Delaware River, Mouth of Neversink	1917	5 Aug 77 HD 94-192	—	—
Maurice River, N.J. Millville fixed bridge to upper end of project[2]	1948	Section 12 PL 93-251	—	—
Oldmans Creek, N.J.	1941	2 Nov 79 Section 12 PL 93-251	$ 63,313	—
Rancocas River, N.J.[4]	1942	2 Nov 79 Section 12 PL 93-251	$ 57,590	—
Smyrna River, DE[5] Wharf at Smyrna Landing to fixed bridge.	1949	2 Nov 79 HD 95-157	$396,169	—
Toms River, N.J.[6] Channel 12 feet deep	1950	2 Nov 79 Section 12 PL 93-251	$ 43,361	—
Flood Control Projects				
Lehigh River at Bethlehem, PA.[7]	1966	2 Nov 79 Section 12 PL 93-251	$4,520,995	

1. Includes $36,973 new work, and $41,270 for maintenance.
2. There is no need now for this portion of the project.
3. Includes $31,188 new work, and $32,125 for maintenance.
4. Includes $44,500 new work, and $13,090 for maintenance.
5. Includes $143,759 new work, $55,085 previous project, $174,602 for maintenance, and $22,723 maintenance, previous project.
6. Includes $10,050 new work, and $33,311 for maintenance.
7. Maintenance assumed by local interest.

BALTIMORE, MD DISTRICT

This district comprises the watershed of Susquehanna River and its tributaries from headwaters in south central New York State through central Pennsylvania to its mouth in Chesapeake Bay; watershed of the Potomac River and its tributaries from headwaters in Maryland, eastern West Virginia, and northern Virginia to its mouth in Chesapeake Bay; District of Columbia; and southwestern portion of Delaware. It includes that portion of Chesapeake Bay and its tributaries north of Smith Point, MD, on western shore of the bay, and includes that portion of Maryland between Chesapeake Bay and Atlantic Ocean.

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Navigation

1. BALTIMORE HARBOR AND CHANNELS, MD AND VA

Location. Baltimore Harbor is at the head of the navigable portion of Patapsco River about 12 miles from Chesapeake Bay. The Patapsco River rises near the town of Westminster in Carroll County, MD, and flows generally southeast for about 65 miles to enter Chesapeake Bay. (See National Ocean Survey Chart 12278.)

Existing Project.

a. A uniform main channel depth of 50 feet between Cape Charles, VA, and Fort McHenry at Baltimore, MD, with dimensions as follows: (1) Cape Henry Channel: 50 feet deep and 1,000 feet wide from the 50-foot depth curve in the Atlantic Ocean to that depth in Chesapeake Bay, a distance of 2.3 miles; (2) York Spit Channel: 50 feet deep and 1,000 feet wide connecting the 50-foot depth curves in Chesapeake Bay near York Spit, a distance of 18.2 miles; (3) Rappahannock Shoal Channel: 50 feet deep and 1,000 feet wide connecting the 50-foot depth curves in the Chesapeake Bay opposite the Rappahannock River, a distance of 8.9 miles; and (4) Baltimore Harbor Approach Channels: 50 feet deep and generally 800 feet wide, widened at the approach and bends, from the 50-foot depth curve in Chesapeake Bay opposite the mouth of the Magothy River to Fort McHenry on the Patapsco River, a distance of 19.9 miles.

b. Branch channels with dimensions as follows: (1) Connecting Channel to Chesapeake and Delaware Canal Approach Channel: 35 feet deep, 600 feet wide, and 13.0 miles long from the Cutoff-Brewerton Angle in the main channel to the 35-foot depth curves in the natural channel on the east side of Chesapeake Bay which is part of the inland waterway from Delaware River to Chesapeake Bay. The channel includes the Brewerton Extension and Swan Point and Tolchester Sections; (2) Curtis Bay: 50 feet deep, 600 feet wide, and 2.3 miles long from the main channel to and including a turning basin at the head of Curtis Bay; (3) Curtis Creek: (a) a channel, 35 feet deep and generally 200 feet wide, from the 50-foot channel in Curtis Bay to 750 feet downstream of the Pennington Avenue Bridge; (b) a channel, 22 feet deep and generally 200 feet wide, from the 35-foot channel to and along the marginal wharf of the Curtis Bay Ordnance Depot; (c) an irregular shaped 3-acre basin, with a depth of 18 feet, adjacent to the head of the 22-foot channel; (d) a basin, 15 feet deep and 450 feet wide, from the end of the 22-foot channel to the end of the marginal wharf; and (e) a channel, 22 feet deep and 200 feet wide, from the 22-foot channel south of the Baltimore and Ohio Railroad Bridge to the vicinity of Arundel Cove, a distance of 2,800 feet, thence 100 feet wide in Arundel Cove for a distance of 2,100 feet, with an anchorage basin, 700 feet square, adjacent to the channel and southwest of the wharf of the Coast Guard Depot at Curtis Bay; (4) Middle Branch: (a) Ferry Bar East Section: a channel, 42 feet deep and 600 feet wide, from the main channel at Fort McHenry to Ferry Bar, a distance of 1.4 miles; (b) Ferry Bar West Section: a channel, 35 feet deep and 400 feet wide, from the Ferry Bar East Section to Ferry Bar, a distance of 0.8 mile; (c) Spring Garden Section: a channel, 27 feet deep and 250 feet wide, from Ferry Bar to and including a turning and anchorage basin immediately below the Western Maryland Railway Bridge, a distance of 1.0 mile; and (5) Northwest Branch: Federal maintenance of 39-foot or 35-foot deep channels after either depth has been provided by local interests: (a) East Channel: a channel, 49 feet deep, 600 feet wide, and 1.0 mile long with a turning basin at the head of the channel from that depth existing at the time of construction; and (b) West Channel: a channel, 40 feet deep, 600 feet wide, and 1.2 miles long with a turning basin at the head of the channel from that depth existing at the time of construction.

c. The following anchorages: (1) Quarantine Anchorage: 35 feet deep, 3,500 feet long, and 600 feet wide; (2) Riverview Anchorage No. 2: 30 feet deep, 2,400 feet long, and 1,300 feet wide; (3) Riverview Anchorage No. 1: 35 feet deep, 4,500 feet long, and 1,500 feet wide; and (4) Fort McHenry Anchorage: 35 feet deep, 3,500 feet long, and 400 feet wide.

The mean range of tide is 2.8 feet at the Cape Henry Channel, 2.3 feet at the York Spit Channel, 1.4 feet at the Rappahannock Shoal Channel, 0.8 foot at the Craighill Entrance, 0.9 foot in the Cutoff Section, 1.1 feet at Fort McHenry, and 1.2 feet at Pooles Island in the upper Chesapeake Bay. Depths refer to mean low water.

Estimated cost for new work is $412,880,000 which includes: $8,330,000 for completed work through the River and Harbor Act of 1945; $47,350,000 (October 1985 prices) for work authorized by the River and Harbor Act of 1958 of which $42,800,000 is Corps of Engineers, $60,000 is U.S. Coast Guard and $4,490,000 is non-Federal; and $357,200,000 (October 1985 prices) for work authorized by the River and Harbor Act of 1970, of which $400,000 is U.S. Coast Guard and $356,800,000 is Corps of Engineers and non-Federal.

Widening 35-foot depth from Port Covington Channel from 150 to 400 feet to Ferry Bar, widening 27-foot depth channel from 150 to 250 feet to Hanover Street Bridge, and providing a channel 27 feet deep by 250 feet wide to Western Maryland Railway Bridge with an anchorage and turning basin at upper end is considered inactive and is excluded from the foregoing estimate. Estimated cost (1954) of this portion is $1,603,000.

Local cooperation. Requirements are described in full on page 4-3 of Fiscal Year 1982 Annual Report.

Terminal facilities. The Port of Baltimore has 45 miles of waterfront of which 25 miles are industrially developed. There are 94 covered and open overseas piers for the loading and discharging of 173 ships, providing 84 general cargo, 65 specialized cargo, and 24 public bulk cargo berths. The existing ground storage is equivalent to 53,700 railroad cars of cargo. There are 31 public general merchandise warehouses, with 4.9 million square feet of storage space and 4.7 million cubic feet of cold storage space. Eight ship-building, ship repair, and ship dismantling yards are available for handling up to 90 vessels. The three grain elevators in the port have a capacity of about 13 million bushels. Latest description of terminal facilities is in "Port Series No. 10 (revised 1983)"

on Port of Baltimore, MD, (issued by Board of Engineers for Rivers and Harbors).

Operations and results during fiscal year. New Work. Remaining work under the River and Harbor Act of 1958 (i.e., deepening and widening the Brewerton Extension) was reactivated 15 May 1985 and preconstruction planning was essentially completed at a cost of $198,183. Preconstruction planning under the River and Harbor Act of 1970 was completed in FY1985 and construction funds of $15,000 were allocated from the 1985 Supplemental Appropriations Act (P.L. 99-88).

Maintenance, Baltimore District: Condition surveys of the project channel were made. Maintenance dredging of the Brewerton Channel, Brewerton Angle, Ft. McHenry Channel, and Curtis Bay Channel, by contract, which began on May 15, 1984, was completed on November 2, 1984, a total of 3,908,346 cubic yards of material were removed and deposited in the Hart-Miller Island containment facilities at a cost of $12,079,400. Maintenance dredging of the cutoff Angle, Fort McHenry Channel, Ferry Bar Channel, and Riverview Anchorages, by contract, began on May 18, 1985, and was completed on September 15, 1985. A total of 3,119,482 cubic yards of material were removed and deposited in the Hart-Miller Island containment facilities at a cost of $14,805,591.

Maintenance, Norfolk District: Condition surveys of the Cape Henry, York Spit and Rappahannock Shoal Channels were performed at a cost of $75,500.

2. BALTIMORE HARBOR, MD COLLECTION AND REMOVAL OF DRIFT

Location. Project applies to Baltimore Harbor, MD, and its tributaries.

Existing project. Provides for collection and removal of drift from Baltimore Harbor and its tributary waters, and authorizes the Secretary of the Army to allot such amounts as may be necessary for work from appropriations for maintenance and improvement of existing river and harbor works or other available appropriations, and that this work shall be carried as a separate and distinct project. It is wholly a work of maintenance. Purpose of work is to afford relief from variable conditions of obstruction.

Local cooperation. None required.

Terminal facilities. See Section 1 of this text.

Operations and results during fiscal year. Maintenance: Operations, by hired labor, consisted of collection and disposal of 26,460 cubic feet of driftwood, ranging from small blocks up to timbers of large dimensions.

3. CLAIBORNE HARBOR, MD

Location. The harbor is located on the eastern side of Eastern Bay, an arm of Chesapeake Bay, about 42 miles southeast of Baltimore Harbor. (See U.S. Coast and Geodetic Survey Chart No. 1225.)

Existing project. This provides for a channel 14 feet deep from the vicinity of the harbor wharves to deep water in Eastern Bay with widths of 100 feet at mean low water for a distance of 1,800 feet to the bend opposite the existing Black Beacon, thence widening in a distance of 260 feet to 150 feet to the 14-foot depth in Eastern Bay, with necessary widening at the bends. The total length of the channel is about 4,400 feet. The project also provides for a 250-foot extension of the jetty built by the railway company.

Terminal facilities. There are two solid bulkhead wharves, with open pile piers at their outer ends, served by this improvement.

Operations and results during fiscal year. Maintenance: Engineering and design work in connection with the proposed rehabilitation of the jetty was accomplished.

4. FISHING BAY, MD

Location. McCreadys, Goose, and Farm Creeks are small tidal estuaries of Fishing Bay, a large estuary at head of Tangier Sound. Fishing Bay is connected by Hooper Strait with Chesapeake Bay to the west about 15 miles above mouth of Potomac River. Goose Creek enters the bay about 3.5 miles above the mouth. Farm Creek enters Fishing Bay about 6 miles above the mouth and approximately opposite mouth of McCreadys Creek. (See Coast and Geodetic Survey Chart 1224.)

Existing project. Provides for channels 6 feet deep and generally 60 feet wide at mean low water, suitably widened where necessary to offer adequate sheltered anchorage space from deep water in Fishing Bay to vicinity of county or packing house wharves in McCreadys, Farm, and Goose Creeks. Mean range of tide is about 2 feet.

Cost of new work for completed project was $33,874.

Terminal facilities. A public wharf built with aid of Federal funds is on McCreadys Creek about 200 feet above the mouth. There is a privately owned pile-and-timber pier about 1,500 feet above the mouth of Goose Creek. There are two privately owned wharves on Farm Creek and a public wharf owned by Dorchester County. Private wharves on each of the waterways are open to the public for transaction of business with the owners.

Operations and results during fiscal year. Maintenance: Engineering and design work was accomplished in connection with proposed maintenance dredging.

5. FISHING CREEK, MD

Location. A narrow winding tidal stream which enters Chesapeake Bay from the west 56 miles south of Baltimore and about 26 miles south of Annapolis, MD. (See Coast and Geodetic Survey Chart 12266.)

Existing project. A channel 7 feet deep with widths of 100 and 60 feet from deep water in the Chesapeake Bay to an anchorage of same depth, 120 feet wide and 400 feet long, located in marsh 500 feet above mouth of creek, and twin stone jetties at entrance; north jetty is

about 1,050 feet long, and south jetty about 1,100 feet long. The mean range of tide is about 1 foot. Cost of new work for the completed project was $111,242.

Local cooperation. Fully complied with except that local interests are to furnish spoil disposal areas as needed for future maintenance.

Terminal facilities. Seven hundred feet of bulkhead wharf are available on the south side of the entrance channel running west from bay shore, and the U.S. Navy Department constructed a pile-and-timber wharf on west side of basin.

Operations and results during fiscal year. Maintenance: Engineering and design was accomplished in connection with rehabilitation of the twin stone jetties.

6. HERRING BAY AND ROCKHOLD CREEK, MD

Location. Herring Bay is a wide-mouthed indentation on the west side of Chesapeake Bay about 20 miles below Annapolis, MD. It is about 3 miles long from north to south and penetrates the shore for a depth of about 1 mile. Rockhold Creek, which is about 2.5 miles long, is an estuary which extends northward from the northerly end of Herring Bay. (See Coast and Geodetic Survey Chart 1225.)

Existing project. Provides for channel 7 feet deep and 60 feet wide from 7-foot contour in Herring Bay to vicinity of county wharf on Rockhold Creek, with turning basin of same depth, 100 feet wide and 150 feet long at head of channel, and a stone breakwater approximately 900 feet long east of entrance channel. Mean range of tide is about 1.5 feet and extreme tidal range about 4 feet. The Federal cost of new work for completed project was $50,591.

Local cooperation. Fully complied with except local interests are to furnish disposal areas for future maintenance as needed.

Terminal facilities. Consists of a public wharf on Rockhold Creek about 600 feet below the county bridge, open to all, together with a few private landing stages. No freight-handling devices are installed on any of the wharves which are considered adequate for existing commerce.

Operations and results during fiscal year. Maintenance: Engineering and design was accomplished in connection with proposed maintenance dredging.

7. HONGA RIVER & TAR BAY (BARREN ISLAND GAPS), MD

Location. Honga River is a tidal estuary of Chesapeake Bay and penetrates Dorchester County on Eastern Shore of Maryland between Hooper Islands and the mainlands; Tar Bay lies between Barren Island and the mainland and Hooper Islands. Fishing Creek connects Tar Bay and Honga River. Back Creek is a branch of Honga River extending into Hooper Islands; the mouth is about 2 miles south of Fishing Creek. (See Coast and Geodetic Survey Chart 1224.)

Existing project. Provides for a channel 60 feet wide and 7 feet deep at mean low water from the 7-foot contour in Chesapeake Bay, through Tar Bay and Fishing Creek to the 7-foot contour in Honga River, 25,300 feet long, and a channel in Back Creek 7 feet deep and 60 feet wide from the 7-foot depth curve in Honga River to a point near the head of Back Creek with a turning basin of the same depth 150 feet long and 200 feet wide at the head of channel, about 5,500 feet long. Mean range of tide is about 1.4 feet. Federal cost of new work for the completed project was $66,119.

Local cooperation. Fully complied with except that local interests are to furnish spoil disposal areas for future maintenance as needed.

Terminal facilities. Numerous small private wharves are scattered along Fishing Creek and Back Creek. A public wharf is on Fishing Creek. A public wharf, 4 oyster houses, and a marine railway are on Back Creek. Facilities are adequate for existing and reasonably prospective commerce.

Operations and results during fiscal year. Maintenance: A maintenance dredging contract was completed in January 1985. A total of 155,600 cubic yards of material were removed.

8. KNAPPS NARROWS, MD

Location. A small channel separating Tilghman Island from mainland of eastern shore of Chesapeake Bay about 40 miles south of Baltimore, MD. (See Coast and Geodetic Survey Chart 1225.)

Existing project. A channel 9 feet deep at mean low water, 75 feet wide, widened at the bends from deep water in Chesapeake Bay to deep water in Harris Creek, MD. Mean range of tide is 1.4 feet. Cost of new work for completed project was $46,121. Existing project channel was authorized by the Public Works Administration, September 16, 1933, and later adopted by 1935 River and Harbor Act.

Local cooperation. Complied with except local interests must furnish spoil disposal areas as needed for future maintenance.

Terminal facilities. A bulkhead wharf exists on each side of the southerly abutment of the bridge across the Narrows. There are several small-boat landings within the Narrows and several marine railways for repairing boats of a few feet in draft. A bulkhead landing is available for public use at the turning basin.

Operations and results during fiscal year. Maintenance: A maintenance dredging contract was completed in April 1985. A total of 58,413 cubic yards of material were removed.

9. LITTLE WICOMICO RIVER, VA

Location. A tidal estuary 6 miles long in Northumberland County, VA, flowing southeasterly to Potomac River, which it enters on the right bank one-half mile upstream of its mouth and about 108 miles downstream from Washington, DC. (See Coast and Geodetic Survey Chart 12233.)

Existing project. A channel 8 feet deep, 150 feet wide, and 4,800 feet long, extending from deep water in the Potomac River to deep water in the Little Wicomico River; two stone jetties, extending to the 8-foot contour in Potomac River; and bulkhead walls from the inner ends thereof extending sufficiently into Little Wicomico River to stabilize the dredged inner channel. Plane of reference is mean low water. Tidal ranges in Potomac River at the entrance are: Mean 1.2 feet; irregular, 2.5 feet; and extreme, about 7 feet. Mean tidal range within the river is about 1 foot. Federal cost of new work for the completed project was $81,885, exclusive of $5,000 contributed by local interests.

Local cooperation. Fully complied with.

Terminal facilities. Two wharves open to the public and numerous small wharves and stagings for private use, an oyster shucking, and packing plant, and a marine railway and boat-building yard. Facilities are considered adequate for present commerce.

Operations and results during fiscal year. Maintenance: A contract for rehabilitation of the twin stone jetties was awarded on August 20, 1985. A contract for maintenance dredging was completed in April 1985. A total of 85,000 cubic yards of material were removed.

10. LOWER THOROFARE, DEAL ISLAND, MD

Location. This is a tidal waterway, about 1.5 miles long and from one-eighth to one-half mile wide, branching off from Tangier Sound between Deal Island and Little Deal Island, Md. It is about 12 miles north of Crisfield Harbor, Md. (See Coast and Geodetic Survey Chart 78.)

Previous project. The original project was dated March 3, 1881. For further details see page 1790 of Annual Report for 1915.

Existing project. Provides for a channel 60 feet wide and 7 feet deep from that depth in Tangier Sound to and including a mooring basin of the same depth, 100 feet wide and 300 feet long, in the marsh at the head of the cove at Wenona. The cost for new work for the completed project was $39,658, exclusive of amounts expended under previous projects.

Local cooperation. Fully complied with except local interests are required to furnish spoil disposal areas for future maintenance as needed.

Terminal facilities. There are three packing-house wharves and a small marine railway above the head of the project channel at Wenona. The facilities are privately owned but are open to the public for transaction of business with the owners. Present facilities are adequate for existing commerce. Sufficient areas are available for the construction of additional terminals when and as required.

Operations and results during fiscal year. Maintenance: Engineering and design work was accomplished in connection with proposed maintenance dredging.

11. OCEAN CITY HARBOR AND INLET AND SINEPUXENT BAY, MD

Location. Ocean City is on a barrier island between Sinepuxent Bay and Atlantic Ocean about 35 miles south of entrance to Delaware Bay. (See Coast and Geodetic Survey Chart 1220.)

Existing project. This provides for an inlet channel 300 feet wide and 16 feet deep from the 16-foot depth curve in Atlantic Ocean through the inlet to the channel in the Isle of Wight Bay, protected on the south side by a stone jetty with a top elevation of 8.8 feet above mean low water and a top width of 18 feet, and on the north side by a stone jetty with a top elevation of 9 feet above mean low water and a top width of generally 20 feet, thence generally 200 feet wide and 16 feet deep to the project harbor; a depth of 14 feet and 150 feet wide to the head of the harbor, a length of approximately 3,400 feet; a channel 6 feet deep and 150 feet wide in Sinepuxent Bay from the inlet to Green Point, and thence 100 feet wide in Chincoteague Bay; and for a channel 6 feet deep and 125 feet wide from the inlet channel to a point opposite North Eighth Street in Ocean City, thence 75 feet wide into the Isle of Wight Bay. Depths in the inlet channel and harbor refer to project datum. Depths in the bay channels refer to mean low water.

The elevation of mean low water in the bays above mean low water in the ocean at Ocean City varies from about 0.8 foot in the vicinity of the inlet to 1.7 feet at their heads. The mean range of ocean tide is 3.4 feet. The extreme range is from 3 feet below mean low water to about 3.5 feet above mean high water, a total of 9.9 feet. In the bays the mean range of tide varies from approximately 2.5 feet at the inlet to 0.3 foot at their heads. Greater fluctuations are caused by prolonged high winds. Federal cost of new work for the completed project was $1,190,530, exclusive of $500,000 contributed by local interests and exclusive of $3,700,000 for rehabilitating the south jetty.

Local cooperation. Fully complied with except local interests must furnish spoil disposal areas for future maintenance as needed.

Terminal facilities. On bay side of Ocean City: two storage basins, for pleasure and small commercial craft, and numerous privately owned pile-and-timber piers and bulkhead wharves. At project harbor: a public landing about 1,000 feet long, several privately constructed bulkhead wharves open to the public for transaction of business with the owners, and a boat repair yard with a marine railway capable of handling boats up to about 150 tons. All piers and wharves are accessible by highway. Port facilities have been expanded to include all available space in the Fish Harbor.

Operations and results during fiscal year. New Work: Continuing construction for the south jetty rehabilitation is 95% complete.

Maintenance: Filling of scour hole completed. Maintenance dredging of the Isle of Wight Bay was completed in June 1985. A total of 21,000 cubic yards of material were removed.

12. PARISH CREEK, MD

Location. A small branch of West River, an estuary of Chesapeake Bay on Maryland western shore, at Shadyside, Md., about 7 miles south of mouth of Severn River. (See U.S. Coast and Geodetic Survey Chart No. 1225.)

Existing project. Provides for a channel 8 feet deep and 50 feet wide, widened at ends, from deep water in West River to head of south fork of Parish Creek, and an anchorage basin at junction of north fork having a depth of 6 feet and an area not exceeding 1½ acres. Mean tidal range is about 2 feet.

Cost of new work for completed project was $19,170 exclusive of $1,000 contributed by local interests. Average annual maintenance cost for past 5 years was $6,000.

Existing project was adopted by River and Harbor Act of August 30, 1935. (See H. Doc. 185, 72d Cong., 1st sess., which contains latest published map.)

Local cooperation. Local interests must contribute $1,000 toward cost of improvement, furnish suitable spoil-disposal areas, and provide a suitable water freight terminal at head of Parish Creek, open to all on equal terms. Total funds required to complete project were provided by Works Progress Administration. Local interests furnished disposal areas. Not fully complied with in that a public wharf has not been provided.

Terminal facilities. There are numerous timber piers, one bulkhead wharf, two marine railways, 300 feet of concrete bulkhead and 350 feet of timber bulkhead on Parish Creek. Piers and bulkheads are privately owned, but open to the public for transaction of business with owners. Facilities are considered adequate for existing commerce.

Operations and results during fiscal year. Maintenance: Engineering and design work was accomplished in connection with proposed maintenance dredging.

13. POCOMOKE RIVER, MD

Location. Pocomoke River is a tributary of Pocomoke Sound, a tidal estuary on the east side of Chesapeake Bay about 40 miles north of Cape Charles, VA.

Existing project. Provides for a channel 11 feet deep at mean low water and 150 feet wide from the 11-foot depth in Pocomoke Sound to Tulls Point, thence 100 feet wide to deep water in Pocomoke River above Williams Point, and for construction of a dike along the offshore side of channel between Tulls Point and the end of the existing dike; and a channel 9 feet deep at mean low water and 100 to 130 feet wide from Shad Landing to the bridge at Snow Hill. Length of project is about 8.7 miles from Pocomoke Sound to Williams Point, and about 4.5 miles from Shad Landing to Snow Hill, MD. Shad Landing is about 25.7 miles above the mouth of the river.

Mean range of tide is 2.4 feet in Pocomoke Sound and 2.5 feet in the river at Snow Hill. Prolonged high winds on Chesapeake Bay frequently cause greater fluctuations. Estimated cost (1969) for new work is $1,071,458 exclusive of amounts expended under previous projects. Extension of channel above the bridge at Snow Hill, 100 feet wide, 9 feet deep and widened to 150 feet to form a turning basin at upper end, is considered inactive and is excluded from the foregoing estimate. Estimated cost of this portion is $22,000 (1956).

Local cooperation. Complied with for section of project from Pocomoke Sound to Pocomoke River and from Shad Landing to the highway bridge at Snow Hill, authorized by acts of June 3, 1896, and August 30, 1935, except local interests must furnish releases from damage to oyster beds and spoil disposal areas as required for future maintenance. Terms for the section of the project above the highway bridge at Snow Hill, authorized by act of March 2, 1945, required local interests to furnish all lands, easements, rights-of-way, and spoil disposal areas for initial work and future maintenance, hold the United States free from damages resulting from the improvement; and contribute one-half the initial cost of that portion of project, but not to exceed $4,250. This portion is considered inactive. Terms for the 11-foot depth channel from Pocomoke Sound to deep water in Pocomoke River above Williams Point, authorized by act of September 3, 1954, require local interests provide all lands, easements, rights-of-way, and spoil disposal areas for construction and future maintenance of the project; and hold the United States free from damages due to construction and maintenance, including such damages as may occur to the public or leased oyster beds.

Terminal facilities. Waterfronts at Pocomoke City and Snow Hill are built up principally with earthfilled timber bulkheads, the majority of which are privately owned. A few of the warehouses and factories on the river at these communities have railroad sidings and mechanical freighthandling facilities. Any appreciable increase in commerce at Pocomoke City or Snow Hill would necessitate construction of new facilities and repair of existing structures. Adequate space is available for development of additional terminals.

Operations and results during fiscal year. Maintenance: A maintenance dredging contract was completed in February 1985. A total of 45,000 cubic yards of material were removed.

14. POTOMAC AND ANACOSTIA RIVERS, DC COLLECTION AND REMOVAL OF DRIFT

Location. Project applies to the Potomac and Anacostia Rivers, Washington, DC and their tributaries.

Existing project. Collection and removal of drift from the waters of the Potomac and Anacostia Rivers and their tributaries in the Washington Area from the head

of tidewater to Mount Vernon, VA. Total length of project, considering both sides of the waterway, is about 50 miles.

Local cooperation. None required.

Terminal facilities. See Section 23 of this text.

Operations and results during fiscal year. Maintenance: Operations by hired labor consisted of collection and disposal of 216,270 cubic feet of driftwood, ranging from small blocks up to timbers of large dimensions.

15. PREVENTION OF OBSTRUCTIONS & INJURIOUS DEPOSITS, BALTIMORE, MD

Location. Project applies to tidal waters of the harbor of Baltimore and its adjacent and tributary waters and to all tidal waters of Chesapeake Bay and in Maryland.

Existing project. Patrol and inspection throughout the project location to detect violations of sections 13 and 15 of the River and Harbor Act of March 3, 1899 and to investigate obstructions to navigation pursuant to Federal regulations (33 CFR 209.109).

Local cooperation. None required.

Operations and results during fiscal year. Maintanance: Operations, by Supervisor of Harbor of Baltimore included inspections of approximately 75 Federal navigation channels within the project location to insure channels are not obstructed to general navigation by debris, sunken vessels/wrecks and/or fishing appurtenance. There were 7 detailed investigations of sunken vessels/wrecks resulting in no declarations of "Hazards to Navigation" issued.

16. QUEENSTOWN HARBOR, MD

Location. Queenstown Creek is an estuary of Chester River about 2 miles long on the easterly side of the Chesapeake Bay about 35 miles southeast of Baltimore. (See U. S. Coast and Geodetic Survey Chart No. 548.)

Previous projects. The original project was dated March 3, 1871. The cost and expenditures on it prior to adoption of the existing project in 1902 were $19,000. For further details of previous projects see page 1789 of Annual Report for 1915.

Existing project. This provides for a channel 10 feet deep at mean low water and 200 feet wide from that depth in Chester River to the 10-foot contour in Queenstown Creek, a distance of about 4,000 feet; and for a channel 7 feet deep at mean low water and 75 feet wide extending from the 7-foot contour in Queenstown Creek to and including a mooring basin of the same depth and 300 feet square opposite of the town wharf in Little Queenstown Creek. The mean range of tide is about 1.3 feet; however, greater fluctuations frequently result from prolonged or high winds.

The cost of new work for the completed project was $53,858. The existing project was adopted by the River and Harbor Acts of June 13, 1902 (H. Doc. 92, 56th Cong., 1st sess.) and September 3, 1954 (H. Doc. 718, 81st Cong., 2d sess.). Maps are published in the project documents.

Local cooperation. None required for the 10-foot depth and 200-foot width portion of the project, authorized by the River and Harbor Act of June 13, 1902.

Under the remaining portion of the project, authorized by the River and Harbor Act of September 3, 1954 fully complied with except that local interests are to furnish without cost to the United States all lands, easements, rights-of-way, and suitable spoil-disposal areas for subsequent maintenance when and as required; and hold and save the United States free from damages due to maintenance of the project, including such damage as may occur to the public or leased oyster beds.

Terminal facilities. There are several small private wharves and bulkheads on Little Queenstown Creek. A public bulkhead wharf has been constructed and dredging to a depth of 7 feet of the area around the wharf has been accomplished by order of the town commissioners of Queenstown, Md. Local interests are planning to install gasoline tanks on the town wharf in the near future. Adequate space is available for the construction of additional private or public wharves.

Operations and results during fiscal year. Maintenance: A maintenance dredging contract was completed in June 1985. A total of 36,154 cubic yards of material were removed.

17. RHODES POINT TO TYLERTON, MD

Location. Rhodes Point and Tylerton are two settlements about 1.5 miles apart on Smith Island, between Chesapeake Bay and Tangier Sound, about 60 miles north of Virginia Capes and about 110 miles south of Baltimore. (See Coast and Geodetic Survey Chart 1224.)

Existing project. Channel 6 feet deep, 50 feet wide from that depth in Tyler Creek to and including an anchorage basin of the same depth 150 feet wide and 400 feet long at Tylerton; channel 6 feet deep and 50 feet wide from that depth in Shanks Creek to and including an anchorage basin of the same depth 100 feet wide and 400 feet long at Rhodes Point; channel 6 feet deep and 50 feet wide from that depth in Big Thorofare River to Tylerton; channel 6 feet deep and 50 feet wide from Rhodes Point to Tylerton. Mean range of tide is 1.7 feet. On January 22, 1982, the Chief of Engineers under authority of Section 107 of the 1960 River and Harbor Act, as amended, authorized a channel 6 feet deep and 50 feet wide a distance of about one mile from the anchorage basin at Rhodes Point through Sheep Pen Gut to deep water in the Chesapeake Bay.

Local cooperation. Fully complied with for work authorized by the Chief of Engineers January 22, 1982. See section 19 of 1982 Annual Report for requirement details.

Terminal facilities. There are numerous pile-and-timber wharves along waterfronts at Rhodes Point and Tylerton. Facilities are privately owned, but open to the

public without charge when not in use by the owners, and are adequate for existing commerce. Sufficient space for construction of additional facilities is available, if required.

Operations and results during fiscal year. Maintenance: Engineering and design work was accomplished in connection with proposed maintenance dredging.

18. ST. GEORGE CREEK, MD

Location. The project is on a tributary of the Potomac River located about 90 miles south of Baltimore, 60 miles southeast of Washington, DC, and approximately 10 miles from the mouth of the Potomac River. (See National Ocean Survey Chart No. 12233.)

Existing project. On April 29, 1983 the Chief of Engineers under authority of Section 107 of the 1960 River and Harbor Act, as amended, authorized a channel 1,500 feet in length, 60 feet wide and 7 feet deep at mean low water, from St. George Creek Island Bridge to deep water in the Potomac River.

Local cooperation. Requirements are described in full on page 4-9 of Fiscal Year 1983 Annual Report.

Terminal facilities. Many of the shoreline community residents are commercial watermen and seafood processing establishments are located on St. George Island. Recreational boating is abundant and St. Mary's County owns a public boat ramp on the north side of St. George Island. The Harry Lundeberg School of Seamanship, located at St. George Harbor is used to train individuals in the basic seamanship skills required by the United States Maritime Industry.

Operations and results during fiscal year. New Work: Construction was physically completed on May 22, 1984, but liquidated damages are still being assessed.

19. ST. PATRICKS CREEK, MD

Location. St. Patricks Creek in St. Marys County, MD is a small tidal stream 1½ miles long which flows in a southeasterly direction and enters the west side of St. Clement Bay at its junction with the Potomac River. The creek is 33 miles upstream from the Chesapeake Bay and 83 miles downstream from Washington, DC (See U. S. Coast and Geodetic Survey Chart No. 558).

Existing project. Provides for an entrance channel 7 feet deep, 60 feet wide, and approximately 2,450 feet long from deep water in St. Clement Bay to deep water within the creek. The plane of reference is mean low water. The tidal ranges are: mean, 1.9 feet; irregular, 2.5 feet; and extreme, approximately 7 feet.

The cost to the Federal Government for new work for the completed project was $15,752, exclusive of $1,000 contributed by local interests. The latest (1950) approved estimate for the annual cost of maintenance is $4,800.

Local cooperation. The existing project was approved subject to the provisions that (a) local interests contribute $1,000 in cash toward the cost of new work; (b) hold and save the United States free from any damage resulting from construction and maintenance of the improvement; (c) furnish releases from damages to oyster grounds; (d) furnish free of cost to the United States suitable spoil-disposal areas for new work and subsequent maintenance, when and as required; and (e) agree to provide a suitable public wharf with access road open to all on equal terms. Items (a) through (d) have been fully complied with. Local interests have initiated action to complete item (e).

Terminal facilities. There are 41 small wharves and stagings located in the creek. All are privately owned, but one is open to the public. There is also one marine railway in the creek. The terminal facilities are considered adequate for present commerce.

Operations and results during fiscal year. Maintenance: Engineering and design work was accomplished in connection with proposed maintenance dredging.

20. SUSQUEHANNA RIVER ABOVE AND BELOW HAVRE DE GRACE, MD

Location. The Susquehanna River flows generally southward 400 miles to the head of Chesapeake Bay at Havre de Grace, MD, 8 miles north of the entrance to the Chesapeake and Delaware Canal, and 45 miles northeast of Baltimore, MD.

Existing project. A channel 200 feet wide and 15 feet deep from that depth in Chesapeake Bay to Havre de Grace, for removal of a shoal opposite Garrett Island to a depth of 8 feet, and for maintenance of an existing boat basin 400 feet long, 380 feet wide, and 7 feet deep adjacent to the city park at Havre de Grace and the 75 foot wide approach channel to the same depth.

Local cooperation. Fully complied with for the active portion of the project.

Terminal facilities. A concrete bulkhead 500 feet long along north side of the harbor and a timber breakwater about 1,000 feet along the south side. There are no wharves within limits of the desired improvements. Yachts are charged a nominal fee for use of mooring stalls in the harbor. Space for construction of additional stalls at convenient locations is limited. Commercial wharves at Havre de Grace are on Susquehanna River upstream from Concord Point. Wharves are privately owned, but open to the public for transaction of business with the owners.

Operations and results during fiscal year. Maintenance: A maintenance dredging contract was completed in July 1985. A total of 114,000 cubic yards of material were removed.

21. TRED AVON RIVER, MD

Location. This stream, formerly called Treadhaven Creek, rises in Talbot County, MD, flows southerly and empties into Choptank River 10 miles above its mouth. It is about 10 miles long and is a tidal estuary with very little natural flow. Draining area is 36 square miles. (See Coast and Geodetic Survey Chart 78.)

Previous project. For details see page 397 of Annual Report for 1951.

Existing project. Provides for a channel 12 feet deep and 150 feet wide in Tred Avon River from that depth in river near Peach Blossom Creek to Easton Point, thence a channel of same depth and width and about 1,400 feet long in the North Fork, thence a channel of same width and 8 feet deep and about 700 feet deep long with a turning basin of same depth at upper end. Project also provides for a turning basin in South Fork 12 feet deep and 250 feet wide and 600 feet long on east side of main channel at Easton Point Section included in project is about 2 miles long, and its lower end is about 7.5 miles above mouth. Mean range of tide is about 2 feet.

Local cooperation. Requirements are described in full on page 4-11 of Fiscal Year 1979 Annual Report.

Terminal facilities. Five large terminals for receiving and distributing petroleum products, and a marina with stalls and ships, marine railway, a launching ramp, and a 6-ton travel-lift at Easton Point. These facilities are in good condition.

Operations and results during fiscal year. Maintenance: Engineering and design work was completed in connection with proposed maintenance dredging. Work was deferred because locals were unable to provide the required contributed funds.

22. TWITCH COVE AND BIG THOROFARE, MD

Location. A tidal waterway about 4 miles long traversing Smith Island, MD, southeasterly from Chesapeake Bay on the west to Tangier Sound on the east. (See Coast and Geodetic Survey Chart 1224.)

Existing project. A channel 7 feet deep at mean low water and 60 feet wide from Twitch Cove on Tangier Sound through Big Thorofare, thence through canal at Ewell, MD, thence through Levering Creek and Big Thorofare to vicinity of Swan Point, thence of same depth and 100 feet wide through offshore bar to deep water in Chesapeake Bay, with twin stone jetties at entrance, north jetty is about 2,080 feet long, and south jetty about 1,800 feet long; and anchorage basin 7 feet deep, 100 feet wide, and 700 feet long connecting with west side of existing project channel at Ewell; extension of existing project channel in Levering Creek, 6 feet deep, 60 feet wide, and 1,000 feet long; and a channel 4 feet deep and 25 feet wide around point between Big Thorofare and Tylers River. Mean range of tide is 1.7 feet, and extreme tidal range is 3 feet. Federal cost of new work for completed project was $193,175.

Local cooperation. Fully complied with, except that local interests are to furnish spoil disposal areas for future maintenance as needed.

Terminal facilities. Numerous privately owned pile-and-timber wharves and bulkheads at Ewell are open to the Public for business transactions with the owners. A county wharf is also at west end of town. Five crab houses are on Levering Creek, and one oyster house on project waterway west of Town of Ewell.

Operations and results during fiscal year. Maintenance: Engineering and design work was completed in connection with proposed maintenance dredging.

23. UPPER THOROFARE, DEAL ISLAND, MD

Location. Natural waterway lying between Deal Island and mainland of Somerset County, Md., on eastern shore of Chesapeake Bay. (See Coast and Geodetic Survey Chart 1224.)

Previous project. For details see page 277 of Annual Report for 1962.

Existing project. Entrance channel from Tangier Sound 9 feet deep and 100 feet wide, thence of irregular width to and along south shore of Thorofare, protected by two stone breakwaters at entrance, north breakwater is about 410 feet long and South breakwater about 310 feet long, with a turning basin at inner end 9 feet deep on south side of channel to within 50 feet of bulkhead along south shore, an anchorage area 6 feet deep and 150 feet wide extending across waterway parallel to highway bridge to within 50 feet of bulkhead on south shore, and an anchorage area 650 feet long, 300 feet wide, and 9 feet deep on north side of channel between breakwater and 6-foot anchorage. Mean range of tide is about 2 feet. Cost of new work for completed project was $62,116.

Local cooperation. Fully complied with.

Terminal facilities. A small packing-house wharf on shore of Tangier Sound south of project channel: two small packing houses along approach channel at which seafood is landed; and a public wharf at turning basin with a suitable road connecting it with the road system.

Operations and results during fiscal year. Maintenance: Engineering and design was accomplished in connection with proposed maintenance dredging.

24. WASHINGTON HARBOR, DC

Location. Within District of Columbia at junction of Anacostia River with Potomac River which flows southeasterly 108 miles to Chesapeake Bay. It is southerly 202 miles by water from Baltimore, MD, and northerly 195 miles from Norfolk, VA. (See Coast and Geodetic Survey Chart 12289.)

Existing projects. A combination and extension of latest projects for Potomac River at Washington, DC, and Anacostia River, DC. The Washington Harbor project provides for a channel in the Potomac River from Giesboro Point to Key Bridge, a second channel from Giesboro Point to the end of Washington Channel, and a third channel from the mouth of the Anacostia River to the foot of 15th Street, SE, with turning basins opposite the Naval Weapons Plant (800 feet wide and 2,400 feet long) and at the head of the Anacostia Channel (400 feet square). Channel dimensions are 24 feet deep and 400 feet wide except upstream from Anacostia Bridge where the width is reduced to 200 feet and from Giesboro Point to a point 3,000 feet downstream of Arlington Memorial

Bridge and above Easby Point where channel dimensions are 20 feet deep and 200 feet wide. Channel lengths including turning basins are: Virginia Channel, 5,000 feet; Washington Channel, 10,000 feet; and Anacostia River, 15,000 feet; and operation and maintenance of the inlet gates and lock and the outlet gates of the Tidal Basin constructed under a previous project to flush Washington Channel. Plane of reference is low-water datum which is 0.35 foot below mean low tide as observed from 1932 to 1942. Tidal ranges are: mean, 2.9 feet; irregular, 4.5 feet; and extreme, 10.7 feet. Federal cost of new work for the completed project was $162,006.

Local cooperation. None required.

Terminal facilities. There are four wharves generally of bulkhead type on Virginia Channel that are privately owned and not open to the public except by special arrangement. On Washington Channel there are four piers under jurisdiction of District of Columbia, two of which are open to the public and one open to the public by special arrangement. In Anacostia River there are four privately owned piers and eight governmental piers and slips. None of the piers are open to the public except by special arrangement. Terminal facilities are considered adequate for existing commerce.

Operations and results during fiscal year. Maintenance: A contract for maintenance dredging was completed in April 1985. A total of 25,000 cubic yards of material were removed.

25. WICOMICO RIVER, MD

Location. Wicomico River has its source in northern part of Wicomico County, MD, and flows generally southwardly emptying into Monie Bay, a tributary of Tangier Sound on the east side of Chesapeake Bay about 85 miles southeast of Baltimore. Webster Cove is site of improved small-boat harbor on southeast bank of Wicomico River about 3 miles above the mouth. (See Coast and Geodetic Survey Charts 567 and 1224.)

Existing project. Channel 14 feet deep and 150 feet wide from Chesapeake Bay to Salisbury, section included in project is 37 miles long, including about 12 miles from mouth of river to Chesapeake Bay; 14 feet deep in channels and turning basins in north and south prongs with channel widths of 100 feet, and a channel 6 feet deep and 60 feet wide extending from 6-foot contour in Wicomico River to and including a basin in Webster Cove of same depth, 100 feet wide and 400 feet long; and extension of basin 200 feet long and 100 feet wide on each side. Plane of reference is mean low water. Mean range of tide is about 3 feet and extreme tidal range is 4.4 feet. Cost of new work for completed project was $421,609, exclusive of amounts expended on previous project.

Local cooperation. Fully complied with, except that local interests are to furnish spoil disposal areas for future maintenance as needed and hold the United States free from such damages as may occur to public or leased oyster beds.

Terminal facilities. Present waterfront at Salisbury consists of pile-and-timber bulkheads with earthfills. Some wharves have warehouses and factories with mechanical freight-handling facilities and rail sidings. All terminals are privately owned. A shipyard, with two marine railways with capacities of 1,200 and 500 tons, respectively, is on right bank of river below prongs. Areas for development of new terminals on north prong are limited. Areas for considerable expansion of terminal facilities are available on main river. There is a pile-and-timber wharf about 4 miles above mouth of river at Mount Vernon. A wharf of similar construction is at White Haven. There is a county wharf at head of basin in Webster Cove, a pile-and-timber pier at oyster house on southwest side of basin, a T-shaped pile-and-timber pier at cafe on southwest side of basin and several small timber piers on walkways that local interests constructed around the basin. Fueling facilities are available at the T-shaped pier. Sufficient areas are available for construction of additional facilities when required.

Operations and results during fiscal year. Maintenance: Maintenance dredging of the channel near Webster Cove was completed in July 1985. A total of 110,000 cubic yards of material were removed.

26. RECONNAISSANCE AND CONDITION SURVEYS

(See Table 4-H at end of chapter.)

27. NAVIGATION WORK UNDER SPECIAL AUTHORIZATION

Navigation activities pursuant to Section 107, Public Law 86-645 (preauthorization).

Fiscal year costs were $86,196 for Hull Creek, VA; $70,420 for Lower Thorofare, MD; and $10,943 for Coan River, VA.

Mitigation of Shore Damages pursuant to Sec. 111 of Public Law 90-483 (preauthorization).

Fiscal year costs were $66,918 for Herring Creek, Tall Timbers, MD.

Aquatic Plant Control pursuant to Sec. 302 of Public Law 89-298, as amended (preauthorization).

Fiscal year costs were $694,703 for Potomac River (Hydrilla), DC.

Beach Erosion Control

28. COLONIAL BEACH, VA

Location. Colonial Beach, Westmoreland County, VA, is located on the right bank of the Potomac River 40 miles upstream from its mouth at Chesapeake Bay and 69 miles downstream from Washington, DC. (See U.S. Coast and Geodetic Survey Chart No. 558.)

Existing project. On May 29, 1980, the Chief of Engineers under authority of Section 103 of the 1960 River and Harbor Act, as amended, authorized construction of the following work: Extending and widening the existing Central Beach area downstream from Hawthorne Street southward to provide an additional beach area of

about 107,200 square feet, stablizing with vegetation about 200 feet of the bank behind the beachfill and constructing four segments of offshore breakwater with estimated lengths of 200 feet each, to stablize the beachfill area; and extending and widening the existing beach at Castlewood Park to provide an additional beach area of about 59,300 square feet; constructing three segments of offshore breakwater with estimated lengths of 200 feet each for two of the segments and 300 feet for the third segment; removing debris in the beachfill area; and constructing a 100-foot long terminal groin at the southern end of the Castlewood Park beachfill. The estimated cost of this work is $1,910,977 of which $1,000,000 is Federal cost and $910,977 is required local cash contribution. The $1,910,977 includes $992,000 for periodic beach nourishment as needed, after FY 1983.

Local cooperation. Among other requirements, local interests must provide all lands, easements, and rights-of-way and relocations required for construction including periodic nourishment and provide a cash contribution equal to 50 percent of the final project construction cost (excluding lands and relocations).

Operations and results during fiscal year. New Work: Beach nourishment was accomplished in FY 1985 at a total cost of $25,000 of which $12,500 was federally funded.

29. BEACH EROSION CONTROL WORK UNDER SPECIAL AUTHORIZATION

Beach Erosion Control pursuant to Sec. 103 of Public Law 727, as amended (preauthorization).

Fiscal year costs were $11,000 for Rocky Point Beach, MD, and $7,500 for Isle of Wight Bay, Ocean City, MD.

Flood Control

30. BLACK WALNUT POINT, MD

Location. The southern end of Tilghman Island, about 17 miles south of the William P. Lane JR. Memorial (Chesapeake Bay) Bridge eastern shore landing. (See National Ocean Survey Chart Numbers 12266 and 12263.)

Existing project. On December 22, 1982 the Chief of Engineers under authority of Section 14 of the Flood Control Act of 1946, as amended, authorized construction for 375 linear feet of 43-foot wide stone revetment to stabilize existing shorebank.

Local cooperation. Requirements are described in full on page 4-12 of Fiscal Year 1983 Annual Report.

Operations and results during fiscal year. New Work: Construction was physically completed May 4, 1984 and project was fiscally closed early FY 1985.

31. BLOOMINGTON LAKE, MD & WV

Location. Project is located on the North Branch Potomac River on the state line between Garrett County, MD, and Mineral County, WV. The damsite is located approximately 7.9 miles upstream from the confluence with Savage River at Bloomington, MD. It is also about 5 air miles southwest of the tritowns of Luke and Westernport, MD, and Piedmont, WV. (See Geological Survey quadrangle sheets, "Kitzmiller" and "Westernport," MD.)

Existing project. The improvement consists of a rolled earth and rock fill dam with an impervious core and an 800-foot long dike on the left bank. Top of dam is 296 feet above streambed with a total length of 2,130 feet. When filled to spillway crest, the reservoir will extend about 6.6 miles upstream and inundate 965 acres. Flood control storage of 36,200 acre-feet is provided. Storage available for low flow augmentation for water supply and water quality improvement is 92,000 acre-feet. The reservoir controls a drainage area of 263 square miles. Recreation facilities are provided for picnicking, camping and boating. Estimated cost (October 1983) of new work is $174,480,300 of which $57,927,000 is required non-federal reimbursement.

Local cooperation. See page 4-15 of the 1977 Annual Report for requirements. A water supply contract between the Federal Government and the Washington Suburban Sanitary Commission in concert with the Fairfax County Water Authority, VA, and the District of Columbia has been executed for repayment of all water supply costs. The first of 50 annual payments began in July 1981. Federally approved water quality standards put into effect by Maryland, Virginia, West Virginia, and the District of Columbia are considered satisfactory assurances of intent to control pollution. Satisfactory assurances have been received from Maryland, West Virginia, and Virginia that they will protect downstream channels from encroachment that would adversely affect operation of the project.

Operations and results during fiscal year. New Work: The project became operational for water supply, flood control, and for water quality control in July 1981. Construction for improving the spillway flow was completed.

Maintenance: Normal operation and maintenance of the project continued.

32. CUMBERLAND, MD, AND RIDGELEY, WV

Location. On North Branch of Potomac River, 21 miles upstream from its junction with the South Branch of the Potomac River and 197 miles upstream from Washington, DC. (See Geological Survey Quadrangles, Frostburg and Flintstone, MD, WV, and PA.)

Existing project. Channel improvements of North Branch of Potomac River from the Western Maryland Railway bridge in South Cumberland upstream to the mouth of Wills Creek, with levees and fill along the left bank and levees along the right bank from downstream corporate limits of Ridgeley, WV, to a point about 150 feet above Johnson Street Bridge; channel improvements along Wills Creek from its mouth upstream to a point

in the Narrows about 500 feet upstream from the highway bridge on U.S. Highway 40; levee and floodwall in West Cumberland, MD, on the left bank of the North Branch of the Potomac River from the mouth of Wills Creek upstream to Kelly Boulevard; levee and floodwall in Ridgeley, WV, on the right bank of the North Branch of the Potomac River from Carpenter Avenue upstream to Patapsco Street near the upstream corporate limits of Ridgeley, WV; interior drainage facilities in Cumberland and West Cumberland, MD, and Ridgeley, WV; removal of the Chesapeake and Ohio Canal dam and construction of a new industrial dam on the North Branch of the Potomac River immediately above mouth of Wills Creek; and alteration and reconstruction of highway and railroad bridges. Federal costs of new work for the completed project were $15,633,970, which includes $49,998 emergency relief funds and is exclusive of $197,513 public works acceleration funds. Estimated cost to local interests is $2,900,000 of which $1,402,001 is contributed funds and $1,497,999 is for lands and damages.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Removal of gravel deposits, grass cutting of areas channelward of levees, and removal of brush and debris from channel were accomplished as required in channel area.

33. LACKAWANNA RIVER BASIN, PA

Flood Control Act of 1962 authorized construction of Aylesworth Creek Lake, Fall Brook Lake, and local protection works on Lackawanna River at Scranton, PA, substantially as recommended by the Chief of Engineers (S. Doc. 141, 87th Cong., 2d sess). The Basin includes an area of 346 square miles in northeastern Pennsylvania.

33A. AYLESWORTH CREEK LAKE, PA

Location. Project is located in Lackawanna County on Aylesworth Creek about one mile above its confluence with the Lackawanna River, near the community of East Jermyn, PA.

Existing project. Provides for an earthfill dam with a maximum height of 90 feet above streambed and a top length of 1,200 feet. The spillway located adjacent to the left abutment is an open cut channel 80 feet wide with a concrete sill. The outlet works consist of a 3-foot diameter uncontrolled conduit. Project controls a drainage area of 6.2 square miles and provide flood control storage of 1,700 acre-feet equivalent to 5.1 inches of runoff from the drainage areas. The lake will extend about 4,600 feet and inundate 87 acres when filled to spillway crest. Recreation facilities constructed by local interest include a bathing beach, bathhouse, and picnic area. Federal cost of new work was $2,268,200 of which $2,153,559 was for construction and $114,641 for lands and damages. In addition $52,200 Federal and $52,200 non-Federal funds were expended for construction of bathhouse facilities under the recreation facilities for completed projects program.

Local cooperation. None required. The Aylesworth Creek Reservoir Park Authority, representing the Boroughs of Archbald and Jermyn, operate and maintain limited day use facilities including a small beach. In September 1978 a cost sharing agreement for construction of bathhouse facilities was signed. The cost for the facilities which were completed in July 1979 was $104,400 of which $52,200 was Federal and $52,200 was non-Federal.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

34. RAYSTOWN LAKE, RAYSTOWN BRANCH, JUNIATA RIVER, PA

Location. Damsite is on Raystown Branch, about 5.5 miles upstream from its confluence with Juniata River. Project is about 10 miles south of Huntingdon, PA. (See Geological Survey Quadrangle sheets, Huntingdon, Mt. Union, Broad Top and Everett, PA.)

Existing project. The rock and earthfill dam rises 225 feet above streambed with a gated concrete spillway and auxiliary spillway in the right abutment. The reservoir has a storage capacity of 762,000 acre-feet, of which 248,000 acre-feet are for flood control, 476,000 acre-feet for recreation and water quality control, and the balance for sediment reserve. At full flood control pool elevation, the reservoir would inundate 10,800 acres and extend 34 miles upstream. Recreation facilities are provided for boating, fishing, camping, swimming, hunting, and picnicking. Federal cost for new work was $77,408,700 of which $46,120,931 was for construction and $31,287,769 was for lands and damages including relocations.

Local cooperation. None required.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35. SOUTHERN NEW YORK FLOOD CONTROL PROJECTS

Authorized plan provides for construction of reservoirs and related flood control works for protection of towns in New York and Pennsylvania. The improvements are located in the upper watershed of the Susquehanna River to and including the Chemung River.

35A. ADDISON, NY

Location. At confluence of Tuscaroroa Creek and Canisteo River in the City of Addison, NY. (See Geological Survey map for Addison, NY.)

Existing project. Provides for construction of about 3,100 feet of earth levee and 700 feet of concrete floodwall on the right bank of the Canisteo River, extending from high ground on Steuben Street near the Baltimore & Ohio Railroad to the mouth of Tuscarora Creek; removal of existing dam, mill, and raceway from the

channel; construction of about 2,200 feet of earth levee on the left bank of Tuscarora Creek, extending from Tuscarora Street to Canisteo River; construction of 4,600 feet of earth levee on the right bank of Tuscarora Creek, extending from high ground at the southwest edge of the village to high ground at the southeast edge of the village; and appurtenant drainage structures.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35B. ALMOND LAKE, NY

Location. Dam is located two miles upstream from Hornell, NY, on Canacadea Creek, a tributary of the Canisteo River. (See Geological Survey map for Hornell, NY.)

Existing project. The dam is an earthfill structure, 1,260 feet long rising 90 feet above the streambed, with a concrete spillway and a gated outlet conduit in the left abutment. The outlet works consist of three 5-foot by 10-foot service gates and three emergency gates of the same size. The reservoir has a storage capacity of 14,640 acre-feet at spillway crest. The project controls a draining area of 56 square miles, 36 percent of the watershed of the Canisteo River upstream from Hornell, NY. Recreation facilities include a boat-launching ramp and dock, bathing beach, picnic area, and tent and trailer camping area.

Local cooperation. None required. Local interests have developed recreational facilities at the lake in conjunction with the Federal Government. These facilities are operated and maintained by the Steuben County Board of Supervisors.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of project continued. A debris removal contract was let and a total of 6,000 cubic yards of material was removed.

35C. ARKPORT DAM, NY

Location. Dam is located five miles upstream from Hornell, NY, on the Canisteo River, a tributary of the Chemung River which flows into the Susquehanna River. (See Geological Survey map for Arkport, NY.)

Existing project. The dam is an earthfill structure, 1,200 feet long, exclusive of spillway, rises 113 feet above the streambed, with a concrete spillway and an ungated outlet in the right abutment. The outlet structure consists of an 8-foot diameter reinforced concrete lined conduit, 660 feet long. A cast iron nozzle is placed in the lower end of the conduit, reducing the outlet size to 4 feet 4 inches. The reservoir has a storage capacity of 7,950 acre-feet at spillway crest. The project controls a drainage area of 31 square miles, 20 percent of the watershed of the Canisteo River upstream from Hornell.

Local cooperation. None required.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35D. AVOCA, NY

Location. On the Cohocton River at the Village of Avoca, NY, about 30 miles upstream from the confluence of the Cohocton and Chemung Rivers. (See Geological Survey map for Avoca, NY.)

Existing project. Provides for improvement and realinement of about 8,300 feet of Cohocton River channel, extending from above the Erie Railroad to below the junction of Main Street and U.S. Highway 15; construction of about 8,500 feet of earth levee on left bank of the Cohocton River, extending from high ground above Alexander Avenue to about 1,300 feet below the junction of Main Street and U.S. Highway 15; and 4,500 feet of earth levee on the right bank of Salmon Creek, extending from high ground above Alexander Avenue to the Erie Railroad; a new highway bridge for U.S. Highway 15 over Cohocton River, raising of the Erie Railroad bridge 4 feet; and appurtenant drainage structures.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35E. BINGHAMTON, NY

Location. At the confluence of the Chenango and Susquehanna Rivers in the City of Binghamton, NY. (See Geological Survey map for Binghamton, NY.)

Existing project. Provides for construction of earth levees, concrete floodwalls, and appurtenant drainage structures, consisting of about 850 feet of channel excavation and about 1,375 feet of earth levee along Phelps Creek, Town of Port Dickinson; new concrete wall on the right bank of the Chenango River, extending downstream from high ground near the city limits to an existing floodwall below DeForest Street, a distance of about 520 feet; about 150 feet of concrete wall just below Cutler Dam; about 180 feet of concrete wall at the pumphouse near McDonald Avenue; raising existing earth levees on the right bank of Chenango River, extending from Cutler Dam downstream for about 1,220 feet; about 2,915 feet of earth levee on the left bank of Chenango River north of the city limits in the Village of Port Dickinson, extending from Church Street to high ground just north of the city line; about 3,900 feet of earth levee on the left bank of Chenango River, extending from DeForest Street to Cutler Dam; new concrete floodwalls and riverbank revetment for about 5,570 feet extending on the left bank of Chenango River from Cutler Dam to the junction with the Susquehanna River; about 540 feet of new concrete floodwall and raising about 1,085 feet of concrete floodwall on the right bank of the Susquehanna River, extending from the Delaware, Lackawanna & Western Railroad downstream to Tompkins Street Bridge; about 1,940 feet of earth levee; about 1,940 feet of concrete floodwall and

capping about 125 feet of concrete floodwall, on the right bank of the Susquehanna River from Stuyvesent Street to mouth of Chenango River; about 8,380 feet of earth levee, about 2,180 feet of new concrete floodwall and raising about 125 feet of existing floodwall on the left bank of the Susquehanna River extending from Pierce Creek to high ground at State Highway 17; a debris dam and flume between Corbett and Hotchkiss Streets and a concrete pressure conduit, 1,060 feet long to carry flow of Park Creek from Vestal Avenue to the Susquehanna River; about 665 feet of levee extending from the Erie Railroad to high ground along the right bank of Chamberlain Creek near the mouth; closure structures at Erie Railroad and at Court Street; a weir, a drop structure, and about 1,800 feet of earth levee, about 2,235 feet of channel excavation, about 645 feet of channel paving and raising, about 470 feet of existing concrete floodwall, and about 200 feet of new concrete floodwall for improvement of Pierce Creek from its mouth to about 1,000 feet above Conklin Avenue; and appurtenant drainage structures. Improvement, supplemented by authorized flood control dams above the area, will provide protection for the City of Binghamton against a flood discharge about 20 percent greater than the maximum flood of record, which occurred in July 1935 on the Chenango River and in March 1936 on the Susquehanna River.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35F. CANISTEO, NY

Location. On Purdy and Bennetts Creeks in the Town of Canisteo, NY, situated along the south side of the Canisteo River, at the confluence of Bennetts Creek and the Canisteo River. (See Geological Survey map for Canisteo, NY.)

Existing project. Provides for construction of about 8,000 feet of earth levees on the right bank of the Canisteo River, extending from high ground 1,570 feet west of State Highway Route 21 above the Town to a point at the intersection of Ordway Lane and East Main Street; about 7,400 feet of earth levee on the left bank of Purdy and Bennetts Creeks, extending from the Main Street Bridge to high ground above Greenwood Street; 1,000 feet of earth levee on the right bank of Bennetts Creek extending upstream from the Main Street Bridge; a concrete check dam with wing levees from Greenwood Street; a new highway bridge at Greenwood Street; alterations to existing timber check dams in Bennetts Creek; channel excavation in Bennetts and Purdy Creeks; and appurtenant drainage structures.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35G. CORNING, NY

Location. On the Chemung River in the City of Corning, NY, about 44 miles upstream from the confluence of Chemung River and North Branch of Susquehanna River. (See Geological Survey map for Corning, NY.)

Existing project. Flood protection for this community was originally authorized by the Flood Control Act of 1936. Plan of improvement provides for construction of a pumping station, earth levees, and concrete floodwalls, consisting of: about 4,300 feet of earth levee, enlargement of about 8,610 feet of existing earth levee and about 3,100 feet of concrete floodwall on the right bank of the Chemung River, extending from the Erie Railroad Bridge to high ground at Park Avenue below the city; about 200 feet of concrete floodwalls; about 2,500 feet of earth levees and enlargement of about 11,500 feet of existing earth levee on the left bank of the Chemung and Cohocton Rivers, extending from the Erie Railroad Bridge over Cohocton River to the mouth of Post Creek; about 2,500 feet of earth levee and enlargement of about 4,700 feet of existing earth levee on the right bank of Post Creek from its mouth to Watkins Street; realignment of about 3,000 feet of channel, about 8,800 feet of earth levee, about 3,000 feet of channel excavation, a pressure conduit about 400 feet long, a drop structure and a weir for improvement of Cutler Creek, extending from its mouth to high ground at Deckertown Road and Hornby Road; and appurtenant drainage structures. Flood protection on Monkey Run was authorized by the Flood Control Act of 1950. Plan of improvement provides for construction of 2,010 feet of open flume, 2,320 feet of pressure conduit storm sewers, and appurtenant facilities between the existing improved channel above Sixth Street and the Chemung River at a point immediately east of Pine Street East. Modified improvement will provide protection for the City of Corning against a flood discharge in Chemung River approximately equal to the maximum flood of record, which occurred in May 1945, and on tributary streams against floods of greater magnitude than known to date.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operaton and maintenance of the project continued.

35H. EAST SIDNEY LAKE, NY

Location. Dam is located near East Sidney, NY, on the Ouleout Creek, about five miles above the confluence of the creek with the Susquehanna River. (See Geological Survey map for Franklin, NY.)

Existing project. The dam is an earthfill and concrete structure, 2,010 feet long, including spillway, rises 130 feet above the streambed and consists of a concrete gravity-type section with a compacted earth-dike section at the right abutment. The outlet works consist of five rectangular conduits each 3.5 feet by 5.85 feet and 105

feet long. The reservoir has a storage capacity of 33,500 acre-feet at spillway crest. The project controls a drainage area of 102 square miles which is 93 percent of the Ouleout Creek drainage area, and 5 percent of the watershed of the Susquehanna River upstream from Binghamton, NY, exclusive of the separately controlled Chenango River. Recreation facilities include a bathing beach, picnic and camping areas, and boat-launching and docking facilities.

Local cooperation. None required. The Town of Sidney, NY, cooperated in the development of recreation facilities and operates and maintains all the facilities with the exception of the recreational pool, which is the responsibility of the Federal Government.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35I. ELMIRA, NY

Location. On the Chemung River in the City of Elmira, NY, about 27 miles upstream from the confluence of the Chemung River and North Branch of Susquehanna River. (See Geological Survey map for Elmira, NY.)

Existing project. Provides for about 17,700 feet of earth levees, and about 4,100 feet of concrete floodwall on the right bank of the Chemung River, extending from South Hoffman Street to a point below the city near the upper end of Big Island; about 12,100 feet of earth levee and about 6,300 feet of concrete wall on the left bank of the Chemung River extending from Durland Avenue to the Delaware, Lackawanna & Western Railroad at the mouth of Newton Creek; about 10,000 feet of earth levee on right bank of Newton Creek, extending from about the intersection of Delaware, Lackawanna & Western Railroad and east Church Street to high ground near intersection of Sullivan and Warren Streets; about 4,300 feet of earth levee on the right bank of Divan Creek; about 2,000 feet of concrete conduit enclosing Hoffman Brook from West Second Street to the Chemung River; clearing islands and riverbanks of trees and brush for about 3.5 miles in the Chemung River; about 14,300 feet of earth levee on the left bank of Seely Creek, extending from the Erie Railroad to high ground approximately 1,000 feet northwest of the intersection of South Broadway and Pennsylvania Avenue; a pumping plant for disposal of interior drainage; an interceptor sewer about 6,000 feet long varying in size from 48 to 96 inches in diameter; and appurtenant structures.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35J. HORNELL, NY

Location. On the Canisteo River in the City of Hornell, NY, about 42 miles upstream from the confluence of the Canisteo and Tioga Rivers. (See Geological Survey map for Canisteo, NY.)

Existing project. Provides for channel realignment and earth levees, concrete floodwalls, and check dams consisting of: realignment of about 4,600 feet of the Canisteo River channel, and about 5,800 feet of earth levee on its right bank, extending from Seneca Street upstream to the junction of the Pittsburgh, Shawmut & Northern Railroad and the Erie Railroad; about 4,500 feet of earth levee, extending on both sides of Seneca Street from the Canisteo River to Wrightman Avenue and the junction of Cleveland Avenue and Bethesda Drive; about 7,200 feet of earth levee, about 2,500 feet of concrete floodwall, and raising about 1,500 feet of existing concrete floodwall, on the right bank of the Canisteo River, and about 12,000 feet of channel improvement, extending from Seneca Street to the Erie Railroad; about 2,500 feet of earth levee, about 2,100 feet of concrete floodwall on the left bank of the Canisteo River extending from a point opposite Walnut Street to the Erie Railroad; a ring-earth levee about 2,800 feet long around the sewage-disposal plant on the left bank of the Canisteo River; about 4,500 feet of realignment and improvement of the Canisteo River Channel with about 4,500 feet of earth levee on its right bank extending from Cedar Street downstream to about 1,400 feet above East Avenue; about 2,400 feet of channel paving, 1,400 feet of earth levee, raising about 1,900 feet of concrete floodwall, and construction of one check dam on Canacadea Creek; about 1,600 feet of channel paving and construction of three check dams on Chauncey Run with about 300 feet of new wall and about 300 feet of capping; a weir, a check dam, 3,030 feet of channel paving, 4,800 feet of floodwalls and levees, and related work on existing walls, on Crosby Creek; removal of 6 bridges, erection of 4 bridges, miscellaneous bridge structures, and 3 drop structures; and appurtenant drainage structures and small stream control works. Improvement, supplemented by Arkport and Almond Reservoirs above the area, provides protection for the City of Hornell against a flood discharge approximately double the maximum flood of record, which occurred in July 1935.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35K. LISLE, NY

Location. On the Tioughnioga River in the Village of Lisle, NY, about 12 miles upstream from the confluence of the Tioughnioga and Chenango Rivers. (See Geological Survey map for Lisle, NY.)

Existing project. Provides for channel realignment and construction of earth levees and concrete floodwalls, consisting of: relocation of about 3,000 feet of Dudley Creek Channel, extending from 1,200 feet west of the intersection of Cortland and Main Streets to the confluence with Tioughnioga River, realignment of some 5,700 feet of Tioughnioga River Channel east of the Village; about 4,150 feet of earth levee and 970 feet of concrete wall on the right bank of Dudley Creek and Tioughnioga River; realignment of some 5,700 feet of Tioughnioga Street to

the railroad crossing on River Street; raising about 1,860 feet of the Delaware, Lackawanna & Western single track railroad over the levee; relocation of about 1,600 feet of Cortland Street; a new bridge over relocated Dudley Creek; and appurtenant drainage structures.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35L. OXFORD, NY

Location. On the Chenango River in the Village of Oxford, NY, about 40 miles upstream from the confluence of the Chenango and Susquehanna Rivers. (See Geological Survey map for Oxford, NY.)

Existing project. Provides for earth levees and clearing of Chenango River channel, consisting of about 2,100 feet of earth levees on the left bank of the Chenango River, extending from high ground near Cemetery Drive and running mostly along the railroad to high ground near Main Street; removal of dam and island below Main Street; raising the Delaware, Lackawanna & Western Railroad over the levee; and appurtenant closure and drainage structures. Improvement provides protection for the Village of Oxford on the left bank against a flood discharge substantially larger than the maximum flood of record, which occurred in July 1935.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35M. WHITNEY POINT LAKE, NY

Location. Dam is located near Whitney Point, NY, on the Otselic River about 0.7 mile upstream from its confluence with Tioughnioga River. (See Geological Survey map for Whitney Point and Willet, NY.)

Existing project. The dam is an earthfill structure, 4,900 feet long, exclusive of a spillway, rises 95 feet above the streambed, with a concrete spillway and gated outlet in the left abutment. The outlet works consist of three 5-foot by 10-foot gates and one emergency gate of the same size. The reservoir has a storage capacity of 86,440 acre-feet at spillway crest. The project controls a drainage area of 255 square miles, the entire watershed of Otselic River, or 16 percent of the Chenango River watershed upstream from Binghamton, NY. Recreation facilities, constructed in cooperation with local interests, provide for swimming, picnicking, camping, boating, fishing, and hunting.

Local cooperation. None required. Local interests operate and maintain all of the recreation facilities.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

35N. WHITNEY POINT VILLAGE, NY

Location. On the Tioughnioga River at the confluence of the Tioughnioga and Otselic Rivers, tributaries of the Susquehanna River. (See Geological Survey map for Whitney Point, NY.)

Existing project. Provides for channel realignment and earth levees, consisting of realignment of about 1,800 feet of Tioughnioga River channel, above the confluence with Otselic River; about 7,100 feet of earth levee along the right bank of the Tioughnioga River, extending from high ground on Main Street above the village to Collins Street just below the Village; and appurtenant drainage structures.

Local cooperation. Fully complied with.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

36. STILLWATER LAKE LACKAWANNA RIVER, PA

Location. Dam is on the Lackawanna River, 39 miles from the mouth of the stream and about 4 miles upstream from Forest City, Susquehanna County, PA (See Geological Survey Quadrangle sheet: for Honesdale, PA.)

Existing project. Dam is earthfill type, rising 77 feet above the streambed, with a controlled outlet conduit and side channel spillway in the left abutment. Reservoir capacity is 12,000 acre-feet, of which 11,600 acre-feet is flood control storage and the remainder utilized to maintain the existing water supply reservoir for Forest City, PA, at this site. Reservoir area is 422 acres,and the pool extends about 2.1 miles upstream. Reservoir controls 52 percent of the watershed above Carbondale, 26 percent above Olyphant, and 17 percent above Scranton. Federal cost of new work, completed in 1965, was $5,725,700 of which $4,500,500 was for construction and $1,225,200 was for lands and damages.

Local Cooperation. None required. Section 2, Flood Control Act of June 28, 1938, applies.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of project continued.

37. SUSQUEHANNA RIVER FLOOD CONTROL PROJECTS, NY AND PA

Plan of improvement authorized by the 1958 Flood Control Act provides for construction of Cowanesque Lake, PA, Tioga-Hammond Lakes, PA, local protection works at Elkland, PA, and Nichols, NY, and channel improvements at Cortland, NY. This project plan supplemented the comprehensive flood control program for Southern New York and Northern Pennsylvania which included the Southern New York flood control project and Stillwater, Genegantslet, and South Plymouth Reservoirs.

37A. COWANESQUE LAKE, PA

Location. Dam is on the Cowanesque River about 2.2 miles above its confluence with Tioga River at Lawrenceville, PA. (See Geological Survey map for Tioga, PA.)

Existing project. The project constructed under the Flood Control Act of 1958 provides for an earthfill dam 3,100 feet long and rising 151 feet above the streambed, an uncontrolled spillway in the right abutment, a gated conduit in the Valley floor, and flood control storage is 82,000 acre-feet. Relocation of the Town of Nelson to a new townsite was authorized by Section 121 of the Water Resources Development Act of 1976. The Federal cost of this new work was $106,030,700 of which $61,743,600 was for construction and $44,287,100 was for lands and damages and relocations (which includes $5,755,000 for relocation of the Town of Nelson). Within the discretionary authority of the Chief of Engineers the project was modified in March 1983 in accordance with the Water Supply Act of 1958, as amended, and the Flood Control Act of 1944, as amended. The modification provides for reallocating 25,600 acre-feet of present flood control storage for water supply storage by raising the permanent pool from elevation 1045 to 1080 mean sea level. Other features include modifying the existing intake tower and two access ramps, stablizing the reservoir slope near the relocated Town of Nelson, replacing existing day-use recreation facilities, and expanding both day-and overnight-use recreation facilities to accommodate an expected increase in annual visitation due to the larger pool. Estimated cost (October 1985) of the modification is $61,260,000 of which $970,000 is Federal (for expanded recreation facilities) and $60,290,000 is non-Federal (which includes $47,690,000 for reimbursement of the cost of existing flood control storage reallocated to water supply storage, $11,630,000 cash contribution for the water supply modification, and $970,000 cash contribution for expanded recreation facilities).

Local cooperation. The Water Resources Development Act of 1976, which authorized relocation of the Town of Nelson, provides that before the Secretary of the Army acquires any real estate property for the new townsite appropriate non-Federal interests shall furnish binding contractual commitments that all lots in the new townsite will be either occupied when available, will be replacements for open space and vacant lots in the existing town, or will be purchased by non-Federal interests at the fair market value. The required contractual agreement for local cooperation was executed with Nelson Township on August 25, 1977. The March 1983 project modification (discussed above) requires non-Federal interests repay 100 percent of the investment cost of project modifications allocated to water supply, to terrestial wildlife habitat mitigation, and to in-kind replacement recreation, plus the allocated share of the project's original cost (escalated to current price levels). Additionally, they are required to pay annual costs of operation, maintenance, and major replacements allocated to water supply and to provide 50 percent of the cost of expanded recreation facilities, as well as, all operation, maintenance, and replacement costs for the expanded facilities.

Operation and results during fiscal year. New Work: Preconstruction planning was completed on the project modification and construction funds of $15,000 were allocated from the 1985 Supplemental Appropriations Act (P.L. 99-88).

Maintenance: Normal operation and maintenance of the project continued.

37B. TIOGA-HAMMOND LAKES, PA

Location. The dams are located in Tioga County, PA, upstream from the confluence of the Tioga River and Crooked Creek. Tioga Dam is located on the Tioga River and Hammond Dam on Crooked Creek, approximately opposite the Tioga damsite, about 3.3 miles above its mouth and less than one mile from the Village of Brooklyn. (See Geological Survey map for Tioga, PA.)

Existing project. Tioga Dam is 2,600 feet long, rising 140 feet above the streambed, with a controlled outlet conduit. Hammond Dam is 5,900 feet long, and has a maximum height of 121.5 feet above the streambed, with a concrete spillway. Both dams are of earth and rockfill construction. The Tioga-Hammond Lakes project controls a total drainage area of 402 square miles, with Tioga Dam controlling 280 square miles of the Tioga River Basin and Hammond Dam controlling 122 square miles of the Crooked Creek Basin. Recreation facilities are provided for swimming, camping, picnicking, boating, and fishing. Estimated Federal cost (October 1985) of new work is $192,540,000 of which $125,029,000 is for completed construction, $60,591,000 is for lands and damages and relocations and $6,920,000 is for construction of the Mill Creek recreation facilities.

Local cooperation. None required on the completed portion of the project; however, construction of the Mill Creek Area recreation facilities relies on local interests providing specialized facilities including buildings, lodges, demonstration centers, and non-water oriented equipment and accepting full responsibility for operation and maintenance of the entire recreation area.

Operations and results during fiscal year. New Work: Planning for the joint development of the Mill Creek Recreation Area was continued by the Baltimore District and Mansfield University.

Maintenance: Normal operation and maintenance of the project continued.

38. WEST BRANCH OF SUSQUEHANNA RIVER, PA

A system of three flood control reservoirs, in the headwaters of the West Branch Susquehanna River, PA, are known as Curwensville, Alvin R. Bush, (formerly known as Kettle Creek), and Foster Joseph Sayers (formerly known as Blanchard), on the West Branch about 2.5 miles upstream from Curwensville, PA; on Kettle Creek 8.4 miles above the mouth and 17 miles upstream from Renovo, PA; and on Bald Eagle Creek about one mile upstream from Blanchard, PA, respectively.

In accordance with the terms of local cooperation, the Commonwealth of Pennsylvania furnished assurances that it will coordinate operation of George B. Stevenson Reservoir, (formerly known as First Fork Reservoir), with operation of Curwensville, Alvin R. Bush, and Foster Joseph Sayers Reservoirs to secure optimum flood control benefits from system operation. George B. Stevenson Reservoir on the First Fork Sinnemahoning Creek in Cameron and Potter Counties, PA, was constructed by the Commonwealth of Pennsylvania at a first cost of $12,240,000 and an estimated $30,000 annually for operation and maintenance.

38A. ALVIN R. BUSH DAM, PA

Location. Alvin R. Bush Dam (formerly Kettle Creek Dam) is located on Kettle Creek about 8.4 miles above the mouth and 15 miles upstream from Renovo, PA. (See Geological Survey map for Keating, PA.)

Existing project. Dam is an earthfill structure,about 1,350 feet long, rises 165 feet above the streambed, with an uncontrolled spillway located in rock adjacent to the right abutment, and has a horseshoe-shaped outlet tunnel with 3 service gates. The reservoir has a storage capacity of 75,000 acre-feet at spillway crest. The project controls a drainage area of 226 square miles or about 92 percent of the Kettle Creek watershed.

Local cooperation. None required.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

38B. CURWENSVILLE LAKE, PA

Location. Dam is on the West Branch of the Susquehanna River approximately 2.5 miles upstream from Curwensville, Clearfield County, PA. (See Geological Survey map for Curwensville, PA.)

Existing project. Dam is an earthfill structure, about 1,850 feet long, rises 131 feet above the streambed, and has an open-cut concrete sill 1,750 feet from the left abutment. The outlet works, located in the left abutment, consist of a 15-foot diameter circular outlet conduit with 3 slide control gates 5.5 feet wide and 12 feet high. The reservoir has a storage capacity of 124,200 acre-feet at spillway crest. The project controls a drainage area of 365 square miles, or about 98 percent of the West Branch Susquehanna River at Curwensville and about 75 percent at Clearfield. Recreation facilities include a seasonal recreational pool of 790 acres, access roads, parking areas, beach area, boat dock, and launching ramp.

Local cooperation. None required.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of project continued.

38C. FOSTER JOSEPH SAYERS DAM, PA

Location. Dam is located on Bald Eagle Creek in Centre County, PA, about one mile upstream from Blanchard and about 14 miles above the confluence of Bald Eagle Creek with the West Branch Susquehanna River at Lock Haven, PA. (See Geological Survey map for Howard, PA.)

Existing project. Dam is an earthfill structure, about 6,835 feet long, rises 100 feet above the streambed, and has an open-cut concrete chute and uncontrolled concrete weir 600 feet wide located in rock in a saddle adjacent to the left abutment. The outlet works, located in the left abutment, consist of a 15-foot diameter circular outlet conduit with two hydraulically-operated wheel gates 7 feet wide and 15 feet high. The reservoir has a storage capacity of 99,000 acre-feet at spillway crest. The project controls a drainage area of 339 square miles or 88 percent of the drainage area above Beech Creek and 43 percent of the Bald Eagle Creek drainage area. Recreation facilities include a summer recreation pool of 1,730 acres, a conservation pool of 630 acres for the preservation of fish life, access roads, parking areas, boat docks and launching ramps, and camping areas.

Local cooperation. None required.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

39. WYOMING VALLEY, PA

Location. The project is located in Luzerne County, PA, on the Susquehanna River. The project area is limited to the four existing Federal flood control projects. These levee improvements are in Plymouth, Kingston-Edwardsville, Swoyersville-Forty Fort, and Wilkes-Barre and Hanover Township.

Existing project. The four projects were constructed during the period 1935 through 1976 and consist of levee, sheet piling, floodwall, and associated interior drainage structures along both banks of the Susquehanna River which provide flood control benefits estimated at $46.1 million annually. Remedial measures to protect against levee failure under future high discharge conditions consist of: weighted filter drains on the landside of the levees to protect against erosion due to seepage in certain areas; stability berms and toe protection on the riverside of the levees in certain areas to stabilize the riverbank and protect against erosion due to river flows; stabilization of sheet piling in certain areas; and additional relief wells to control the underseepage in other areas.

Local cooperation. Lands and relocations for construction of the existing projects at an estimated cost of $1,000,000 were provided by the Boroughs of Kingston, Edwardsville, Plymouth, the city of Wilkes-Barre, Hanover Township, and Luzerne County. These entities also operate and maintain the existing projects. Updated assurances were obtained during preparation of the

General Design Memorandum. Additional local costs in connection with the proposed remedial work are expected to be minor.

Operations and results during fiscal year. Construction was physically completed for the: sheet piling stabilization at Wilkes-Barre and Forty Fort on February 2, 1985; relief wells at Hanover Township on March 28, 1985; dug toe work at Forty Fort on April 28, 1985; stability berm and dug toe work at Wilkes-Barre on August 2, 1985. Construction contracts were awarded for the filter drain work at Wilkes-Barre, Hanover Township, and Plymouth on September 10, 1984 which is 36% complete, and for filter drain work at Kingston-Edwardsville and Swoyersville-Forty Fort on April 22, 1985 which is 5% complete.

40. YORK, INDIAN ROCK DAM, PA

Location. On Codorus Creek 10 miles above its confluence with the Susquehanna River. Codorus Creek has tributary branches in York County in the south and central parts of Pennsylvania. (See Geological Survey Quadrangle sheets: Pennsylvania—York and Hanover.)

Existing project. Indian Rock Dam, is an earth and rockfill dam about 1,000 feet long at the top, rising 83 feet above the streambed, with a reservoir providing for control storage of 28,000 acre-feet. Dam is on the main branch of Codorus Creek about 3 miles above York. Outlet works are in the right abutment and the uncontrolled spillway is on the right bank. Reservoir will control entire drainage area of the main branch of Codorus Creek and 41 percent of the drainage area above York. Improvements in Codorus Creek in the vicinity of and through the City of York provide for 22,969 feet of channel extending from 300 feet above Richland Avenue to a point downstream from the Pennsylvania Railroad crossing known as Black Bridge. Improvements, which will increase channel capacity to 24,000 cubic feet per second, include widening and deepening the channel, bank protection, removal of York Roller Mill Dam, and a low water channel about 3,900 feet long in the vicinity of York Roller Mill Dam. Cost of new work for the completed project was $5,061,167, of which $4,566,446 (regular funds) and $11,588 (emergency relief funds) were for construction and $483,133 (regular funds) was for lands and damages.

Local cooperation. Section 2, Flood Control Act of June 28, 1938, applies.

Operations and results during fiscal year. Maintenance: Normal operation and maintenance of the project continued.

41. INSPECTION OF COMPLETED FLOOD CONTROL PROJECTS

Projects in New York, Pennsylvania, Maryland, District of Columbia, and Virginia were inspected during the period by hired labor. See Table 4-I.

42. SCHEDULING FLOOD CONTROL RESERVOIR OPERATIONS

Operations and results during fiscal year. The operation of George B. Stevenson Dam, PA, was coordinated with the operation of Alvin R. Bush, Curwensville, and Foster Joseph Sayers Dams in the West Branch Susquehanna River Basin in order to secure optimum flood control benefits from the system operation. Costs during the period were $49,488.

Supplemental instructions for the operation of Savage River Dam, MD, were provided, during periods of high water, to insure maximum protection for downstream localities. Costs during the period were $76,632.

43. FLOOD CONTROL WORK UNDER SPECIAL AUTHORIZATION

Emergency flood control activities—repair, flood fighting, and rescue work (Public Law 99, 84th Congress, and antecedent legislation).

Cost for the period was $327,247 of which $198,692 was for Disaster Preparedness Program, and $128,555 was for Rehabilitation.

Flood control activities pursuant to Section 205, Public Law 858, 80th Congress, as amended (preauthorization).

Fiscal year costs were $27,904 for Conklin-Kirkwood, NY. Nonstructural study; $57,306 for Conklin-Broome (Ice Jam) NY; and $37,500 for Hyndmer, PA.

Water Supply

44. WASHINGTON AQUEDUCT

Location. The diversion dam and raw water supply intakes at Great Falls, the two collecting conduits, part of Dalecarlia receiving reservoir, the booster pumping station and the Little Falls raw water pumping station are located in Maryland. All other structures of the water supply system including parts of the raw water collecting system, two purification plants, pumping stations, storage reservoirs, and transmission mains are in the District of Columbia. Federal owned water mains are maintained in Virginia and Maryland.

Existing project. Control of the water supply system is vested in Chief of Engineers (See Acts of March 3, 1859, and March 2, 1867, November 22, 1973 and Sec. 1800 of Revised Statutes). The project includes: administration; operation and maintenance of the collection, purification, pumping, and transmission facilities; protection of the water supply system; engineering; and construction of major water system additions and improvements.

Authority to supply water to Arlington County, the City of Falls Church, and other jurisdictions in Virginia is contained in Public Law 119, 69th Congress, approved April 14, 1926; and Public Law 118, 80th Congress, June 26, 1947.

Local cooperation. Requirements are described in full on page 4-19 of the Fiscal Year 1981 Annual Report.

Operations and results during fiscal year. New Work: The McMillan Water Treatment Plant Replacement work authorized with "no year" funds is 99% complete. A contract for the new Chlorine Bldg. at Dalecarlia was awarded July 31, 1984 and construction is complete and operational.

Maintenance (operation): An uninterrupted and adequate supply of purified water was furnished to the District of Columbia; Arlington County, and Falls Church, Virginia; and to Federal establishments in the District of Columbia, Arlington County, Virginia and Montgomery and Prince Georges Counties in Maryland. Total consumption for Fiscal Year 1985 was 78,695 million gallons; the maximum daily consumption was 273 million gallons and average daily consumption was 216 million gallons. The amount furnished Arlington County and Falls Church, Virginia was 39.4 million gallons per day. The Corps of Engineers was reimbursed in the amount of $3,624,135 for water furnished to the Virginia communities by the Washington Aqueduct.

The treated water delivered to the 1.1 million consumers served by the Washington Aqueduct met or surpassed all Water Quality standards promulgated by the U.S. Environmental Protection Agency under the Safe Drinking Water Act (P.I. 93-523.)

General Investigations

45. SURVEYS

Costs for the fiscal year were $738,682 of which $234 was for flood damage prevention studies, $400,872 for shoreline protection studies, $113,285 for special studies, $4,790 for comprehensive basin studies, $8,000 for project deauthorization program, and $211,501 for coordination with other agencies and non-Federal interests.

46. COLLECTION AND STUDY OF BASIC DATA

Costs for flood plain management activities and general planning guidance during the period was $268,926. Providing assistance and guidance to local interests on methods and procedures for preventing and reducing flood damages was in progress at end of fiscal year.

47. CONTINUATION OF PLANNING AND ENGINEERING

Susquehanna Basin at Harrisburg, PA—The plan of improvement for the South Harrisburg area recommended in an interim report on the Susquehanna River Basin study includes a floodwall 3,800 feet long, a pump station and floodgates for interior drainage, a dry detention dam along Asylum Run (a small tributary of Paxton Creek), an enlarged earth and concrete channel for Paxton Creek about four miles long, and minor recreation and fish and wildlife facilities. Preparation of a General Design Memorandum continued during the fiscal year. Estimated planning and engineering cost is $2,900,000. Total costs during the fiscal year were $281,482.

Lock Haven, PA—The plan of improvement recommended in the Phase I General Design Memorandum includes 24,500 feet of levee, 6,500 feet of floodwall, eight closure structures, four pumping stations, diversion of Lusk Run, and minor recreation facilities. Preparation of a Phase II General Design Memorandum continued during the fiscal year. Estimated planning and engineering cost is $2,025,000. Total costs during the fiscal year were $736,851.

Wyoming Valley, PA (Levee Raising)—The plan of improvement in the Phase I General Design Memorandum includes raising the existing levees and floodwalls between five and seven feet, modifying closure structures, relocating utilities, and providing some new floodwalls and levees to maintain the system's integrity. The plan also includes raising five other local protection projects, removing an abandoned railroad bridge, and providing non-structural measures to mitigate any significant induced damages and the potential of a catastrophic failure of an existing project. The estimated planning and engineering cost is $5,700,000 and costs during the fiscal year were $175,498.

48. ADVANCED ENGINEERING AND DESIGN

Francis E. Walter Dam, PA—Modification—The authorized project would provide for modifying the existing single purpose flood control project by raising the existing dam 30 feet thereby adding water supply and recreation purposes. Preparation of the combined General Design Memorandum was completed and work was initiated on design memoranda for project features. Estimated preconstruction planning cost is $5,755,000. Total costs during the fiscal year were $738,319.

Tamaqua, PA—The authorized project would provide for a 9-foot diameter diversion tunnel 2,930 feet long, that starts at Wabash Creek at the west boundary of Tamaqua and terminates at the Little Schuylkill River. The project also includes an intake structure, a stilling basin, a highway bridge, and a small dry detention reservoir on a tributary of Wabash Creek. Plans and specifications for project construction were completed during the fiscal year. Estimated preconstruction planning cost is $1,750,000. Total costs during the fiscal year were $503,316.

TABLE 4-A COST AND FINANCIAL STATEMENT

See Section in Text	Project	Funding	FY82	FY83	FY84	FY85	Total to Sept. 30, 1985
1.	Baltimore Harbor and Channels, MD and VA	New Work					
		Approp.	33,997	1,300,000	770,000	455,000	46,851,712[1]
		Cost	33,677	851,317	1,055,174	555,821	46,779,414[1]
		Maint.					
		Approp.	3,626,349[2]	5,769,000[4]	12,865,000[6]	15,637,000[8]	65,976,860[10]
		Cost	2,657,421[3]	6,568,755[5]	13,035,814[7]	15,637,012[9]	65,976,856[10]
2.	Baltimore Harbor MD Collection & Removal of Drift	Maint.					
		Approp.	248,200	177,000	202,000	205,000	3,051,210
		Cost	240,536	186,916	202,323	201,424	3,047,633
3.	Claiborne Harbor, MD	New Work					
		Approp.	—	—	—	—	42,974[11]
		Cost	—	—	—	—	42,974[11]
		Maint.					
		Approp.	—	—	—	95,129	190,733
		Cost	—	—	—	95,127	190,731
4.	Fishing Bay, MD	New Work					
		Approp.	—	—	—	—	33,874
		Cost	—	—	—	—	33,874
		Maint.					
		Approp.	—	—	36,000	4,000	705,652
		Cost	—	—	36,000	4,000	705,652
5.	Fishing Creek, MD	New Work					
		Approp.	—	—	—	—	111,242
		Cost	—	—	—	—	111,242
		Maint.					
		Approp.	54,000	318,636	—	80,450	939,650
		Cost	39,604	333,032	—	80,450	939,650
6.	Herring Bay & Rockhold Creek, MD	New Work					
		Approp.	—	—	—	—	50,591
		Cost	—	—	—	—	50,591
		Maint.					
		Approp.	276,485	—	—	19,310	454,248
		Cost	273,267	—	—	19,310	454,248
7.	Honga River and Tar Bay, (Barren Island Gaps), MD	New Work					
		Approp.	—	—	—	—	66,119[12]
		Cost	—	—	—	—	66,119[12]
		Maint.					
		Approp.	1,397,000	-48,758	28,000	653,000	2,998,926
		Cost	882,730	467,475	28,000	653,000	2,998,926
8.	Knapps Narrows, MD	New Work					
		Approp.	—	—	—	—	46,121[13]
		Cost	—	—	—	—	46,121[13]
		Maint.					
		Approp.	—	—	35,000	237,750	1,553,075
		Cost	—	—	35,000	237,750	1,553,075
9.	Little Wicomico River, VA	New Work					
		Approp.	—	—	—	—	81,885[14]
		Cost	—	—	—	—	81,885[14]
		Maint.					
		Approp.	277,244	7,078	—	416,600	1,249,053
		Cost	277,499	7,079	—	416,600	1,249,051
10.	Lower Thorofare Deal Island, MD	New Work					
		Approp.	—	—	—	—	44,658[15]
		Cost	—	—	—	—	44,658[15]
		Maint.					
		Approp.	—	—	—	20,000	340,942
		Cost	—	—	—	20,000	340,942

TABLE 4-A (Continued) COST AND FINANCIAL STATEMENT

See Section in Text	Project	Funding	FY82	FY83	FY84	FY85	Total to Sept. 30, 1985
11.	Ocean City Harbor and Inlet and Sinepuxent Bay, MD	New Work					
		Approp.	—	—	—	—	350,193[16]
		Cost	—	—	—	—	350,193[16]
		Maint.					
		Approp.	557,500	1,343,000	935,000	781,000	9,228,908
		Cost	480,186	251,452	2,106,987	709,961	9,157,867
		Major Rehab.					
		Approp.	—	1,000,000	1,750,000	1,050,000	3,800,000
		Cost	—	—	2,734,267	1,056,190	3,790,457
12.	Parish Creek, MD	New Work					
		Approp.	—	—	—	—	19,170[17]
		Cost	—	—	—	—	19,170[17]
		Maint.					
		Approp.	—	—	—	31,578	94,434
		Cost	—	—	—	31,578	94,434
13.	Pocomoke River, MD	New Work					
		Approp.	—	—	—	—	191,726[18]
		Cost	—	—	—	—	191,726[18]
		Maint.					
		Approp.	—	25,000	32,000	312,500	1,537,535
		Cost	—	25,000	32,000	312,500	1,537,535
14.	Potomac and Anacostia Rivers, DC, Collection & Removal of Drift	Maint.					
		Approp.	459,800	486,000	352,000	410,000	5,803,175
		Cost	467,292	493,074	353,227	394,333	5,787,507
15.	Prevention of Obstructions & Injurious Deposits, Baltimore Harbor, MD	Maint.					
		Approp.	284,000	—	162,000	51,000	4,372,040
		Cost	243,179	40,929	162,000	50,949	4,371,989
16.	Queenstown Harbor, MD	New Work					
		Approp.	—	—	—	—	72,858[19]
		Cost	—	—	—	—	72,858[19]
		Maint.					
		Approp.	—	—	—	279,824	321,803
		Cost	—	—	—	279,824	321,803
17.	Rhodes Point to Tylerton, MD	New Work					
		Approp.	335,000	-51,000	—	—	304,000
		Cost	74,181	213,698	—	—	304,000
		Maint.					
		Approp.	—	—	—	41,488	312,994
		Cost	—	—	—	41,487	312,993
18.	St. George Creek, MD	New Work					
		Approp.	9,000	138,650	—	—	147,650
		Cost	—	38,137	94,136	577	132,577
19.	St. Patricks Creek, MD	New Work					
		Approp.	—	—	—	—	15,752
		Cost	—	—	—	—	15,752
		Maint.					
		Approp.	—	2,934	—	8,354	31,602
		Cost	—	2,934	—	8,354	31,602
20.	Susquehanna River above and below Havre De Grace, MD	New Work					
		Approp.	—	—	—	—	293,570[20]
		Cost	—	—	—	—	293,570[20]
		Maint.					
		Approp.	—	—	48,000	503,730	928,019
		Cost	—	—	47,999	503,730	928,018

TABLE 4-A (Continued) COST AND FINANCIAL STATEMENT

See Section in Text	Project	Funding	FY82	FY83	FY84	FY85	Total to Sept. 30, 1985
21.	Tred Avon, MD	New Work					
		Approp.	—	—	—	—	523,310
		Cost	—	—	—	—	523,310
		Maint.					
		Approp.	—	—	17,000	36,000	66,843
		Cost	—	—	17,000	36,000	66,843
22.	Twitch Cove & Big Thorofare, MD	New Work					
		Approp.	—	—	—	—	193,175
		Cost	—	—	—	—	193,175
		Maint.					
		Approp.	767,885	—	—	27,569	1,882,811
		Cost	768,221	—	—	27,569	1,882,811
23.	Upper Thorofare, MD	New Work					
		Approp.	—	—	—	—	62,446
		Cost	—	—	—	—	62,446
		Maint.					
		Approp.	—	—	—	10,000	347,441
		Cost	—	—	—	10,000	347,441
24.	Washington Harbor, DC	New Work					
		Approp.	—	—	—	—	3,191,077[21]
		Cost	—	—	—	—	3,191,077[21]
		Maint.					
		Approp.	581,750	-19,000	63,000	206,782	4,750,496[22,23]
		Cost	109,910	440,826	77,569	206,782	4,750,496[22,23]
25.	Wicomico River, MD	New Work					
		Approp.	—	—	—	—	471,609[24]
		Cost	—	—	—	—	471,609[24]
		Maint.					
		Approp.	822,079	824,730	134,000	681,000	5,913,737
		Cost	330,789	547,075	915,074	681,000	5,913,735
28.	Colonial Beach, VA	New Work					
		Approp.	370,000	-64,000	—	15,000	519,000[25]
		Cost	350,926	-7,138	—	12,500	516,500[25]
		Contrib.					
		Approp.	480,000	-65,023	—	—	414,977
		Cost	370,299	44,678	—	—	414,977
30.	Black Walnut Point, MD	New Work					
		Approp.	—	227,500	—	-27,000	200,500
		Cost	—	37,679	163,294	-473	200,500
31.	Bloomington Lake, MD & WV	New Work					
		Approp.	1,750,000	1,688,000	-110,000	1,900,000	176,270,300
		Cost	2,928,555	1,856,543	582,603	1,974,750	176,240,105
		Maint.					
		Approp.	611,500	893,200	988,978	1,160,200	3,974,978
		Cost	599,866	885,166	1,005,530	1,163,471	3,974,920
32.	Cumberland, MD and Ridgeley, WV	New Work					
		Approp.	—	—	—	—	15,633,970[26]
		Cost	—	—	—	—	15,633,970[26]
		Maint.					
		Approp.	54,000	64,600	45,000	55,930	578,229
		Cost	54,281	66,856	45,000	55,930	578,229
33A.	Aylesworth Creek Lake, PA	New Work					
		Approp.	—	—	—	—	2,320,400
		Cost	—	—	—	—	2,320,400
		Maint.					
		Approp.	55,400	67,000	72,925	113,500	862,602
		Cost	48,757	71,631	75,636	113,424	862,524

TABLE 4-A (Continued) COST AND FINANCIAL STATEMENT

See Section in Text	Project	Funding	FY82	FY83	FY84	FY85	Total to Sept. 30, 1985
34.	Raystown Lake, Raystown Branch, Juniata River, PA	New Work					
		Approp.	—	—	—	—	77,408,700
		Cost	—	—	—	—	77,408,700
		Maint.					
		Approp.	1,934,238	2,423,056	1,741,000	2,125,500	15,659,295
		Cost	2,053,846	2,447,276	1,778,456	2,077,231	15,610,959
35A.	Addison, NY	New Work					
		Approp.	—	—	—	—	827,050
		Cost	—	—	—	—	827,050
		Maint.					
		Approp.	20,600	12,900	16,049	17,200	164,055
		Cost	27,109	12,879	16,124	17,200	164,055
35B.	Almond Lake, NY	New Work					
		Approp.	—	—	—	—	5,760,211
		Cost	—	—	—	—	5,760,211
		Maint.					
		Approp.	233,600	221,000	160,772	379,500	2,788,840
		Cost	221,471	230,101	164,920	379,362	2,788,699
35C.	Arkport Dam, NY	New Work					
		Approp.	—	—	—	—	1,910,000[27]
		Cost	—	—	—	—	1,910,000[27]
		Maint.					
		Approp.	118,400	180,800	78,363	130,700	1,443,174
		Cost	126,940	178,847	87,246	130,621	1,443,092
35D.	Avoca, NY	New Work					
		Approp.	—	—	—	—	436,374[28]
		Cost	—	—	—	—	436,374[28]
		Maint.					
		Approp.	23,400	15,900	18,300	23,526	356,361
		Cost	22,701	16,788	18,300	23,525	356,360
35E.	Binghamton, NY	New Work					
		Approp.	—	—	—	—	2,952,000[29]
		Cost	—	—	—	—	2,952,000[29]
		Maint.					
		Approp.	11,100	34,300	28,300	18,000	378,581
		Cost	13,726	34,283	28,398	18,000	378,581
35F.	Canisteo, NY	New Work					
		Approp.	—	—	—	—	1,183,111[30]
		Cost	—	—	—	—	1,183,111[30]
		Maint.					
		Approp.	37,681	38,100	25,800	53,474	592,235
		Cost	38,020	40,321	25,802	53,472	592,233
35G.	Corning, NY	New Work					
		Approp.	—	—	—	—	3,322,000[31]
		Cost	—	—	—	—	3,322,000[31]
		Maint.					
		Approp.	44,300	24,800	25,600	53,900	603,058
		Cost	41,993	27,126	25,600	53,900	603,058
35H.	East Sidney Lake, NY	New Work					
		Approp.	—	—	—	—	6,049,504
		Cost	—	—	—	—	6,049,504
		Maint.					
		Approp.	187,600	347,500	300,118	262,100	3,117,319
		Cost	172,623	359,826	302,918	262,095	3,117,308
35I.	Elmira, NY	New Work					
		Approp.	—	—	—	—	6,883,305
		Cost	—	—	—	—	6,883,305
		Maint.					
		Approp.	15,700	22,800	20,400	25,900	236,249
		Cost	16,342	26,264	20,400	25,900	236,249

TABLE 4-A (Continued) COST AND FINANCIAL STATEMENT

See Section in Text	Project	Funding	FY82	FY83	FY84	FY85	Total to Sept. 30, 1985
35J.	Hornell, NY	New Work					
		Approp.	—	—	—	—	4,558,698[32]
		Cost	—	—	—	—	4,558,698[32]
		Maint.					
		Approp.	148,419	348,200	85,051	106,170	2,854,233
		Cost	150,972	257,415	176,056	106,168	2,854,229
35K.	Lisle, NY	New Work					
		Approp.	—	—	—	—	661,199[33]
		Cost	—	—	—	—	661,199[33]
		Maint.					
		Approp.	35,700	22,500	25,400	19,800	616,022
		Cost	33,824	26,382	25,453	19,800	616,022
35L.	Oxford, NY	New Work					
		Approp.	—	—	—	—	131,000[34]
		Cost	—	—	—	—	131,000[34]
		Maint.					
		Approp.	12,400	11,200	15,900	17,600	189,432
		Cost	9,863	13,737	15,900	17,600	189,432
35M.	Whitney Point Lake, NY	New Work					
		Approp.	—	—	—	—	5,421,539
		Cost	—	—	—	—	5,421,539
		Maint.					
		Approp.	235,900	259,500	265,843	304,800	3,451,140
		Cost	195,765	300,269	266,070	304,721	3,451,053
35N.	Whitney Point Village, NY	New Work					
		Approp.	—	—	—	—	424,096
		Cost	—	—	—	—	424,096
		Maint.					
		Approp.	24,700	26,300	33,200	20,500	305,261
		Cost	25,794	29,273	33,253	20,500	305,261
36.	Stillwater Lake, Lackawanna River, PA	New Work					
		Approp.	—	—	—	—	5,725,700
		Cost	—	—	—	—	5,725,700
		Maint.					
		Approp.	114,500	158,600	201,340	211,700	1,842,209
		Cost	111,732	161,139	201,680	211,631	1,842,134
37A.	Cowanesque Lake, PA	New Work					
		Approp.	270,000	—	670,000	1,065,000	107,765,700
		Cost	1,040,052	168,891	722,340	853,691	107,539,473
		Maint.					
		Approp.	675,350	851,200	743,904	932,800	3,775,154
		Cost	680,662	833,587	754,305	938,312	3,771,664
37B.	Tioga-Hammond Lakes, PA	New Work					
		Approp.	-30,000	-220,000	-60,000	35,000	18,654,800
		Cost	286,038	79,419	23,487	30,000	18,649,800
		Maint.					
		Approp.	1,095,864	1,269,200	1,144,289	1,540,700	7,124,854
		Cost	1,019,593	1,331,830	1,166,973	1,540,278	7,124,337
38A.	Alvin R. Bush Dam, PA	New Work					
		Approp.	—	—	—	—	7,103,001
		Cost	—	—	—	—	7,103,001
		Maint.					
		Approp.	330,300	488,800	403,810	427,300	3,667,622
		Cost	237,872	413,472	572,896	427,275	3,667,588
38B.	Curwensville Lake, PA	New Work					
		Approp.	—	—	—	—	20,396,060
		Cost	—	—	—	—	20,396,060
		Maint.					
		Approp.	543,000	360,500	405,491	491,100	5,361,389
		Cost	546,095	361,923	405,237	492,316	5,361,311

TABLE 4-A (Continued) COST AND FINANCIAL STATEMENT

See Section in Text	Project	Funding	FY82	FY83	FY84	FY85	Total to Sept. 30, 1985
38C.	Foster Joseph Sayers Dam, PA	New Work					
		Approp.	—	—	—	—	30,887,063[35]
		Cost	—	—	—	—	30,887,063[35]
		Maint.					
		Approp.	345,547	412,000	446,722	472,300	4,482,084
		Cost	342,872	412,339	449,450	472,515	4,482,075
39.	Wyoming, Valley, PA	New Work					
		Approp.	800,000	2,390,000	2,190,000	6,800,000	25,405,000
		Cost	667,635	1,388,786	3,205,348	2,686,198	21,202,967
40.	York, Indian Rock Dam, PA	New Work					
		Approp.	—	—	—	—	5,061,167[36]
		Cost	—	—	—	—	5,061,167[36]
		Maint.					
		Approp.	290,700	294,800	373,344	534,000	4,319,217[37]
		Cost	267,909	312,558	379,530	523,994	4,309,203[37]

1. Includes $8,764,003 for previous projects.
2. Includes $1,663,300 for sections of project in Norfolk District.
3. Includes $696,090 for sections of project in Norfolk District.
4. Includes $1,085,000 for sections of project in Norfolk District.
5. Includes $1,891,518 for sections of project in Norfolk District.
6. Includes $40,000 for sections of project in Norfolk District.
7. Includes $200,691 for sections of project in Norfolk District.
8. Includes $88,000 for sections of project in Norfolk District.
9. Includes $88,001 for sections of project in Norfolk District.
10. Includes $399,802 for previous projects.
11. Project deferred for restudy.
12. Excludes $2,200 contributed and includes $27,668 emergency relief funds.
13. Includes $46,121 public works funds.
14. Excludes $5,000 contributed funds.
15. Includes $5,000 for previous project.
16. Includes $283,008 public works funds and $67,185 emergency relief funds; excludes $500,000 contributed funds.
17. Includes $19,170 Works Progress Administration funds.
18. Unconstructed portion of the project is inactive. Includes $20,500 for previous project.
19. Includes $19,000 for previous project.
20. Unconstructed portion of the project was deauthorized November 6, 1977. Includes $22,905 Works Progress Administration funds and $97,390 for previous project.
21. Includes $3,029,001 for previous project.
22. Includes $1,831,609 for previous project.
23. Excludes $4,000 for emergency dredging under provisions of Section 3, 1945 River and Harbor Act.
24. Includes $50,000 for previous project and excludes $14,000 contributed funds.
25. Excludes $414,977 contributed funds.
26. Includes $49,998 emergency relief funds.
27. Includes $62,577 emergency relief funds.
28. Includes $109,944 emergency relief funds.
29. Excludes $163,096 contributed funds.
30. Includes $207,520 rehabilitation funds.
31. Excludes $34,729 contributed funds.
32. Includes $250,899 emergency relief funds and excludes $15,000 contributed funds.
33. Includes $71,557 emergency relief funds.
34. Includes $73,465 emergency relief funds.
35. Excludes $263,900 contributed funds in accordance with the Tri-party Agreement for construction of sanitary system for public use.
36. Includes $11,588 emergency relief funds.
37. Includes $15,000 for deferred maintenance.

TABLE 4-B AUTHORIZING LEGISLATION

See Section in Text	Date Authorizing Act	Project and Work Authorized	Documents
1.		**BALTIMORE HARBOR AND CHANNELS, MD and VA**	
	Aug. 8, 1917	Branch channel 35 feet deep to head of Curtis Bay, and one 35 feet deep and 400 feet wide Fort McHenry to Port Covington entrance channel, thence 150 feet wide to Ferry Bar, and thence 27 feet deep and 150 feet wide to Hanover Street Bridge, widen approaches and bends, and enlarge anchorage basin near entrance. Inclusion of Patapsco River and tributaries into one project for Baltimore Harbor.[2]	H. Doc. 799, 64th Cong., 1st sess.

TABLE 4-B (Continued) AUTHORIZING LEGISLATION

See Section in Text	Date Authorizing Act	Project and Work Authorized	Documents
	Jan. 21, 1927	Change in location of anchorage near upper end of Fort McHenry Channel.	
	Jul. 3, 1930	Increased anchorage facilities.	Rivers and Harbors Committee Doc. 11, 70th Cong., 1st sess.
	Jul. 3, 1930	For 37-foot depth in that portion of channel to Baltimore lying between 37-foot depth curve near Baltimore Light to Sparrows Point entrance channel; widen angle between Fort McHenry and Ferry Bar Section; and for width of 400 feet in Curtis Bay section.	H. Doc. 86, 85th Cong., 1st sess.
	Oct. 17, 1940	For 22-, 18-, and 15-foot channels in Curtis Creek from 22-foot depth below Pennington Ave. Bridge to upper end of marginal wharf of U.S. Ordnance Depot.	Adopted as a national defense project. (No printed report.)
	Mar. 2, 1945	Uniform main channel 39 feet deep from the ocean through York Spit section and Craighill entrance to Fort McHenry, additional anchorage area, 2,400 feet long, 1,200 feet wide, and 30 feet deep; a connecting channel 400 feet wide and 27 feet deep from Cutoff Brewerton Angle in main channel to Inland Waterway from Delaware River to Chesapeake Bay; a channel in Curtis Creek 200 feet wide and 35 feet deep from head of existing 35-foot project channel in Curtis Bay to a point in the creek about 750 feet below Pennington Ave. Bridge.	H. Doc. 741, 79th Cong., 2nd sess.
	Mar. 2, 1945	A channel 22 feet deep and 200 feet wide from 22-foot depth curve south of Baltimore & Ohio R.R. bridge about 2,800 feet to vicinity of Arundel Cove, thence 100 feet wide in Arundel Cove for about 2,100 feet; with an anchorage basin about 700 feet square adjacent to channel southwesterly of Coast Guard wharf.	In accordance with plans on file in the Office, Chief of Engineers.
	July 3, 1958	Main channel 42 feet deep and 1,000 feet wide in Cape Henry section at entrance to Chesapeake Bay and in York Spit section; 42 feet deep and 800 feet wide in Rappahannock Spit section and in approach channel to Baltimore Harbor from Craighill entrance to Fort McHenry, with widening at entrance and bends; channels 42 feet deep and 600 feet wide in Curtis Bay and Ferry Bar sections of harbor; a connecting channel 35 feet deep and 600 feet wide from main channel to approach channel to Chesapeake and Delaware Canal; and for three disjointed sections of channels of same depth and width in Chesapeake Bay leading to Chesapeake and Delaware Canal; and to provide Federal maintenance of 39-foot depth in Northwest Branch, in areas dredged to that depth by local interests.	H. Doc. 86, 85th Cong., 1st sess.
	Dec. 31, 1970	Deepening of the Cape Henry Channel to 50 feet at the existing width of 1,000 feet, with widening at bends; deepening of the Spit Channel to 50 feet at the existing width of 1,000 feet, with widening at bends; enlargement of the Rappahannock Shoal Channel to a depth of 50 feet and a width of 1,000 feet; deepening of the main ship channel from Chesapeake Bay to Fort McHenry to a depth of 50 feet at the existing width of 800 feet, with widening at bends and at the Craighill Entrance; deepening of the Curtis Bay Channel to a depth of 50 feet at the existing width of 600 feet, and deepening of the 950-foot wide and 980-foot long turning basin at the head of channel to the same depth; deepening of the Northwest Branch—East Channel to a depth of 49 feet from the depth existing at the time of construction at a width of 600 feet, and deepening of the 950-foot wide and 950-foot long turning basin at the head of the channel to the same depth; and deepening and extension of the Northwest Branch—West Channel to a depth of 40 feet from the depth existing at the time of construction, at a width of 600 feet, and with an irregularly shaped turning basin at the head of the channel 40 feet deep and about 2,000 feet long with a maximum width of 1,150 feet.	H. Doc. 181, 94th Cong., 1st sess.
2.		**BALTIMORE HARBOR, MD—COLLECTION AND REMOVAL OF DRIFT**	
	Jun. 30, 1948	Collection and removal of drift from Baltimore Harbor and its tributary waters.	River and Harbor Act of 1948.

TABLE 4-B (Continued) AUTHORIZING LEGISLATION

See Section in Text	Date Authorizing Act	Project and Work Authorized	Documents
3.		**CLAIBORNE HARBOR, MD**	
	Jun. 13, 1902	A channel 12 feet deep and 300 feet wide from deep water to the railroad pier in the harbor, and thence shoreward along the south side of the pier with a width of 195 feet and a length of 500 feet. An extension of the present jetty.	H. Doc. 81, 56th Cong., 1st sess.
4.		**FISHING BAY, MD**	
	Aug. 26, 1937	Provided for channels 6 feet deep and generally 60 feet wide at mean low water, suitably widened where necessary to offer adequate sheltered anchorage space from deep water and in Fishing Bay to vicinity of county or packing house wharves in McCreadys, Farm, and Goose Creeks.	H. Doc. 186, 75th Cong., 1st sess.[1]
5.		**FISHING CREEK, MD**	
	Aug. 26, 1937	A channel 7 feet deep with widths of 100 feet and 60 feet from deep water in Chesapeake Bay to an anchorage of the same depth, 120 feet wide and 400 feet long, located in the marsh 500 feet above the mouth of the creek and twin stone jetties at the entrance.	H. Doc. 241, 75th Cong., 1st sess.
6.		**HERRING BAY & ROCKHOLD CREEK, MD**	
	Jul. 3, 1930	A channel 60 feet wide, 5 feet deep, from the 6-foot contour in Herring Bay to the 3-foot contour in Rockhold Creek.	Rivers and Harbors Committee Doc. 34, 71st Cong., 2nd sess.
	Jun. 20, 1938	For the present project channel dimensions, 7 feet deep and 60 feet wide, the turning basin 7 feet deep, and a stone breakwater 900 feet long.	H. Doc. 595, 75th Cong., 3rd sess.[1]
7.		**HONGA RIVER AND TAR BAY (BARREN ISLAND GAPS), MD**	
	Aug. 30, 1935	Channel 60 feet wide and 7 feet deep from the 7-foot contour in Chesapeake Bay through Tar Bay and Fishing Creek to the 7-foot contour in Honga River.	Rivers and Harbors Committee, Doc. 35, 74th Cong., 1st sess.
	Jun. 30, 1948	Modification providing for a channel in Back Creek 7 feet deep and 60 feet wide from the 7-foot depth curve in Honga River to a point near the head of Back Creek, with a turning basin of the same depth, 150 feet long and 200 feet wide.	H. Doc. 580, 80th Cong., 2nd sess.[1]
8.		**KNAPPS NARROWS, MD**	
	Aug. 30, 1935	A channel 9 feet deep at mean low water, 75 feet wide, widened at the bends from deep water in Cheseapeake Bay to deep water in Harris Creek, MD, with a turning basin west of the drawbridge, 7 feet deep at mean low water, about 320 feet long and 120 feet wide. Project channel was authorized by the Public Works Administration September 16, 1933 and later adopted by 1935 River and Harbor Act.	H. Doc. 308, 72nd Cong., 1st sess.
9.		**LITTLE WICOMICO RIVER, VA**	
	Aug. 30, 1935	A channel 8 feet deep and 150 feet wide from Potomac River to deep water in Little Wicomico River; two stone jetties 1,000 feet and 1,300 feet long at the entrance; and 1,004 linear feet of timber bulkhead to stabilize the dredged inner channel.	Rivers and Harbors Committee Doc. 24, 74th Cong., 1st sess.
10.		**LOWER THOROFARE, DEAL ISLAND, MD**	
	Jun. 25, 1910	A channel 6 feet deep, 80 feet wide, from Tangier Sound to the wharves at Wenona; widening the angles and the end to furnish anchorage basins.	H. Doc. 76, 60th Cong., 1st sess.
	Mar. 2, 1945	Modified to provide a channel 60 feet wide, 7 feet deep from Tangier Sound to and including a mooring basin 7 feet deep, 100 feet wide, 300 feet long, in the marsh at the head of the cove at Wenona.	H. Doc. 238, 76th Cong., 1st sess.[1]
11.		**OCEAN CITY HARBOR & INLET & SINEPUXENT BAY, MD**	
	Aug. 30, 1935[3]	Construction of an inlet between the Atlantic Ocean and Sinepuxent, Bay, 10 feet deep and 200 feet wide, protected by jetties; a channel 8 feet deep and 100 feet wide from the inlet to Ocean City, 6 feet deep and 150 feet wide to Green Point, and 100 feet wide into Chincoteague Bay.	Rivers and Harbors Committee Doc. 38, 72nd Cong., 1st sess.
	Aug. 30, 1935[4]	Modification providing a 10-foot by 100-foot channel from the inlet to the west side of the bay with 2 turning basins; a channel 6 feet deep and 125 feet wide from the inlet channel to opposite North 8th Street, Ocean City, and 75 feet wide into Isle of Wight Bay.	Rivers and Harbors Committee Doc. 60, 74th Cong., 1st sess.

TABLE 4-B (Continued) AUTHORIZING LEGISLATION

See Section in Text	Date Authorizing Act	Project and Work Authorized	Documents
	Sep. 3, 1945[5]	Modification providing for raising the north jetty to an elevation 9 feet above mean low water, and a channel 300 feet wide and 16 feet deep from the ocean through the inlet to the Isle of Wight Bay channel, thence 200 feet to the project harbor, and a depth of 14 feet in the project harbor. Channel depths refer to project datum.	H. Doc. 444, 82nd Cong., 2nd sess.
12.		**PARISH CREEK, MD**	
	Aug. 30, 1935	Provide a channel 8 feet deep and 50 feet wide, widened at its ends, from deep water in West River to the head of the south fork of Parish Creek, and an anchorage basin at the junction with the north fork of Parish Creek, having a depth of 6 feet and an area not exceeding 1.5 acres.	H. Doc. 185, 72nd Cong., 1st sess.
13.		**POCOMOKE RIVER, MD**	
	Jun. 3, 1896	A 9-foot channel from Shad Landing to Snow Hill.	Annual Report for 1895, p. 1167.
	Aug. 30, 1935	A channel 7 feet deep and 100 feet wide from Pocomoke Sound to Pocomoke River.	H. Doc. 227, 74th Cong., 1st sess.[1]
	Mar. 2, 1945	Extend channel above bridge at Snow Hill, 100 feet wide, 9 feet deep, widened to 150 feet to form a turning basin at upper end.	H. Doc. 429, 76th Cong., 1st sess.[1]
	Sep. 3, 1954	Channel 11 feet deep by 150 feet wide from Pocomoke Sound to Tulls Point, thence a channel of the same depth and 100 feet wide to deep water in Pocomoke River above Williams Point, and dike construction along south side of channel from existing dike to Tulls Point.	H. Doc. 486, 81st Cong., 2nd sess.[1]
14.		**POTOMAC & ANACOSTIA RIVERS, DC—COLLECTION & REMOVAL OF DRIFT**	
	Oct. 27, 1965	Collection and removal of drift from waters of the Potomac and Anacostia Rivers and their tributaries in the Washington, DC area from the head of the tidewater to Mount Vernon, Virginia.	H. Doc. 286, 89th Cong., 1st sess.
15.		**PREVENTION OF OBSTRUCTIONS & INJURIOUS DEPOSITS, BALTIMORE HARBOR, MD**	
	Aug. 28, 1958	Continuous patrol and inspection of Baltimore Harbor, Chesapeake Bay, and its tributaries to prevent and detect violations, and issue permits as required for transporting and depositing waste materials in navigable waters. (The project is limited to the tidal waters of Chesapeake Bay and its tributaries that lie within the State of Maryland.)	River and Harbor Act, June 29, 1888 as amended by Public Law 85-802, dated August 28, 1958.
16.		**QUEENSTOWN HARBOR, MD**	
	Jun. 13, 1902	Provides for a channel 10 feet deep at mean low water and 200 feet wide from that depth in Chester River to the 10-foot contour in Queenstown Creek, a distance of about 4,000 feet; and for a channel 7 feet deep at mean low water and 75 feet wide extending from the 7-foot contour in Queenstown Creek to and including a mooring basin of the same depth and 300 feet square opposite the town wharf in Little Queenstown Creek.	H. Doc. 92, 56th Cong., 1st sess.
17.		**RHODES POINT TO TYLERTON, MD**	
	Jan. 22, 1982 Sec. 107 Jul. 14, 1960	A channel 6 feet deep and 50 feet wide at mean low water from the northern limit of existing Rhodes Point to Tylerton Federal navigation channel, a distance of about one mile, through Sheep Pen Gut to deep water in the Chesapeake Bay.	Detailed Project Report, June 1981
	Sep. 3, 1954	A channel 4 feet deep at mean low water and 50 feet wide from Tylerton to Rhodes Point via Rhodes Point Gut.	H. Doc. 51, 82nd Cong., 1st sess.[1]
	Aug. 1, 1968 Sec. 107 Jul. 14, 1960	Modification providing for a channel 6 feet deep and 50 feet wide from that depth in Tyler Creek to and including an anchorage basin of the same depth 150 feet wide and 400 feet long at Tylerton; channel 6 feet deep and 50 feet wide from that depth in Shanks Creek to and including an anchorage basin of the same depth 100 feet wide and 400 feet long at Rhodes Point; channel 6 feet deep and 50 feet wide from that depth in Big Thorofare River to Tylerton; channel 6 feet deep and 50 feet wide from Rhodes Point to Tylerton.	Detailed Project Report, February 1968

TABLE 4-B (Continued) AUTHORIZING LEGISLATION

See Section in Text	Date Authorizing Act	Project and Work Authorized	Documents
18.		**ST. GEORGE CREEK, MD**	
	Apr. 29, 1983 Sec. 107 Jul. 14, 1960	A channel 1,500 feet in length, 60 feet wide, and 7 feet deep at mean low water, from the St. George Island Bridge to deep water in the Potomac River.	Expanded Reconnaissance Report, April 83
19.		**ST. PATRICKS CREEK, MD**	
	May 17, 1950	Entrance channel 7 feet deep, 60 feet wide and approximately 2,450 feet long from deep water in St. Clement Bay to deep water within the creek.	H. Doc. 671, 80th Cong., 2nd sess.[1]
20.		**SUSQUEHANNA RIVER ABOVE AND BELOW HAVRE DE GRACE, MD**	
	Aug. 2, 1882	Channel 200 feet wide and 15 feet deep from Chesapeake Bay to Havre de Grace, and remove shoal opposite Watsons Island.	
	Aug. 26, 1937	Modifications to provide for maintenance of existing small boat harbor and approach channel below Concord Point.	H. Doc. 322, 75th Cong., 1st sess.
	Mar. 2, 1945	Modification to provide for improvement and maintenance of small boat harbor just below Concord Point for a width of 380 feet and length of 400 feet with an approach channel 100 feet wide, all to a depth of 10 feet.	S. Doc. 67, 76th Cong., 1st sess.[1]
21.		**TRED AVON RIVER, MD**	
	Jul. 25, 1912	Restore the channel, formerly dredged from Peach Blossom Creek to Easton Point, to 8 feet deep at mean low water, and 150 feet wide, widening out at the upper end.	H. Doc. 399, 62nd Cong., 2nd sess.[1]
	Mar. 2, 1919	A channel 8 feet deep and 150 feet wide up the North Fork, with a turning basin at the upper end.	H. Doc. 26, 63rd Cong., 1st sess.[1]
	Oct. 27, 1965	A 12-foot channel from a point near Peach Blossom Creek to Easton Point, thence 1,400 feet in North Fork and a turning basin 12 feet deep and 250 feet wide and 600 feet long in the South Fork.	H. Doc. 225, 89th Cong., 1st sess.[1]
22.		**TWITCH COVE AND BIG THOROFARE, MD**	
	Jul. 25, 1912	A channel 4 feet deep and 25 feet wide from Tangier Sound into Big Thorofare River, and one of same dimensions around point between said river and Tyler River.	H. Doc. 285, 62nd Cong., 2nd sess.
	Jul. 3, 1930	A channel 5 feet deep at mean low water and 25 feet wide from Twitch Cove on Tangier Sound through Big Thorofare River to a point on Levering Creek about 800 feet north of canal at Ewell, MD.	H. Doc. 313, 71st Cong., 2nd sess.
	Aug. 30, 1935	A channel 7 feet deep and 60 feet wide from Twitch Cove through Big Thorofare River to a point on Levering Creek about 800 feet north of canal at Ewell, MD.	Rivers and Harbors Committee Doc. 67, 74th Cong., 1st sess.
	Jun. 20, 1938	Present project dimensions of main channel with twin jetties at entrance.	Rivers & Harbors Committee Doc. 49, 75th Cong., 2nd sess.[1]
	May 17, 1950	Anchorage basin 7 feet deep, 100 feet wide and 700 feet long on west side of project channel at Ewell, MD, and an extension of existing project channel in Levering Creek, 6 feet deep, 60 feet wide, and 1,000 feet long.	H. Doc. 340, 81st Cong., 1st sess.
23.		**UPPER THOROFARE, DEAL ISLAND, MD**	
	Aug. 30, 1935	A 9-foot channel 75 feet wide protected by breakwater at entrance, with turning basin at inner end and anchorage area 6 feet deep and 150 feet wide.	Rivers and Harbors Committee Doc. 37, 72nd Cong., 1st sess.
	Aug. 26, 1937	Widen entrance channel to 100 feet, extend 9-foot turning basin and 6-foot anchorage, and dredging an additional anchorage area on north side of channel.	H. Doc. 76, 75th Cong., 1st sess.[1]

TABLE 4-B (Continued) AUTHORIZING LEGISLATION

See Section in Text	Date Authorizing Act	Project and Work Authorized	Documents
24.		**WASHINGTON HARBOR, DC**	
	Aug. 30, 1935	Provides for: (a) Virginia Channel, from Giesboro Point to area for 25,000 square feet; (b) Washington Channel, from Haines Point to head of Washington Channel, 24 feet deep and 400 feet wide; (c) Anacostia River from Giesboro Point to Anacostia Bridge, 24 feet deep and 400 feet wide, with turning basin 800 feet wide and about 2,400 feet long of same depth opposite Naval Weapons Plant; (d) Anacostia River from Anacostia Bridge 24 feet deep and 200 feet wide to turning basin 400 feet square of same depth at foot of 15th Street S.E. Channel lengths including turning basins are: Virginia Channel, 25,000 feet; Washington Channel, 10,000 feet; and Anacostia River, 15,000 feet; and (e) operation and maintenance of inlet gates and lock and outlet gates of Tidal Basin constructed under a previous project to flush Washington Channel.	Rivers and Harbors Committee Doc. 22, 74th Cong., 1st sess.[1]
25.		**WICOMICO RIVER, MD**	
	Sep. 19, 1890	Channel 9 feet deep from Main Street Bridge to about 2 miles below.	H. Doc. 20, 51st Cong., 1st sess., and Annual Report 1890, p. 947,
	Jun. 25, 1910	Extend 9-foot depth into north prong from Main Street Bridge to the Salisbury Dam and turning basin.	H. Doc. 569, 61st Cong., 2nd sess.
	Mar. 2, 1919	Extend 9-foot depth into south prong to head of navigation at Cathell St., including a turning basin, and extend project down to mouth of river in Monie Bay.	H. Doc. 1509, 63rd Cong., 3rd sess.
	Jul. 3, 1930	A 12-foot channel below the Main Street Bridge.	
	Aug. 26, 1937	A 14-foot channel, 150 feet wide; depths of 14 feet in the north and south prongs and a basin 6 feet deep at Webster Cove and approach channel thereto of the same depth.	Senate Committee Print, 75th Cong., 3rd sess.[1]
	Sep. 3, 1954	Enlarge existing basin at Webster Cove, by dredging an extension 6 feet deep, 100 feet wide, and 200 feet long on each side of existing basin to form a T-shaped harbor.	H. Doc. 619, 81st Cong., 2nd sess.[1]
28.		**COLONIAL BEACH, VA**	
	Sep. 15, 1980	Extending and widening the existing Central Beach area, stabilizing the bank behind the beachfill with vegetation, and constructing four segments of offshore breakwater; and extending and widening of the existing Castle Beach area, constructing three segments of offshore breakwater, removing debris in the beachfill area, and constructing a 100-foot long terminal groin at the southern end of Castlewood Park beachfill.	Detailed Project Report, May 1980
30.		**BLACK WALNUT POINT, MD**	
	Dec. 22, 1982 Sec. 14 Jul. 24, 1946	Construct stone revetment from north end of existing (state) shore protection to a point 375 feet north.	Expanded Reconnaissance Report Sept. 1982
31.		**BLOOMINGTON LAKE, MD & WV**	
	Oct. 23, 1962	Construction of Bloomington Lake project.	H. Doc. 469, 87th Cong., 2nd sess.
32.		**CUMBERLAND, MD AND RIDGELEY, WV**	
	Jun. 22, 1936	Levees, retaining walls, movable dam, and channel clearing for Cumberland, West Cumberland and South Cumberland, MD and Ridgeley, WV.	H. Doc. 101, 73rd Cong., 1st sess.
	Jul. 24, 1946	Levees, wall, channel improvement, remove Chesapeake and Ohio Canal Dam and construct new industrial dam.	Report on file in Office, Chief of Engineers.
33.		**LACKAWANNA RIVER BASIN, PA**	
	Oct. 23, 1962	Construction of Aylesworth Creek Lake, Fall Brook Lake, and local protection works on Lackawanna River at Scranton, Pennsylvania.	S. Doc. 141, 87th Cong., 2nd sess.

TABLE 4-B (Continued) AUTHORIZING LEGISLATION

See Section in Text	Date Authorizing Act	Project and Work Authorized	Documents
34.		**RAYSTOWN LAKE, RAYSTOWN BRANCH, JUNIATA RIVER, PA**	
	Oct.23, 1962	Construction of dam and appurtenant facilities.	H. Doc. 565, 87th Cong., 2nd sess.
35.		**SOUTHERN NEW YORK FLOOD CONTROL PROJECTS**	
	Jun. 22, 1936 modified by Acts of Jun. 28, 1938; Aug. 18, 1941; Dec. 22, 1944; May 17, 1950; and Jul. 3, 1958	Construction of detention reservoirs and related flood control works for protection of Binghamton, Hornell, Corning and other towns in New York and Pennsylvania.	H. Doc. 702, 77th Cong., 2nd sess.
36.		**STILLWATER LAKE, LACKAWANNA RIVER, PA**	
	Aug. 18, 1941	Construction of a flood control reservoir.	H. Doc. 702, 77th Cong., 2nd sess.
37.		**SUSQUEHANNA RIVER FLOOD CONTROL PROJECTS, NY AND PA**	
	Jul. 3, 1958	Construction of Cowanesque and Tioga-Hammond reservoirs, local flood protection works at Elkland, PA, and Nichols, NY and channel improvement at Cortland, NY.	H. Doc. 394, 84th Cong., 2nd sess.
	Oct. 22, 1976	Modification in connection with the construction of Cowanesque Lake to relocate the Town of Nelson, PA, to a new townsite.	
	Mar. 1, 1983	Modification of Cowanesque Lake to include water supply as provided by Section 4 of the Flood Control Act of 1944 (PL 78-534) and Section 301 of Water Supply Act of 1958 (PL 85-500).	
38.		**WEST BRANCH OF SUSQUEHANNA RIVER, PA**	
	Sep. 3, 1954	Construction of three flood control reservoirs.	H. Doc. 29, 84th Cong., 1st sess.
39.		**WYOMING VALLEY, PA**	
	Jun. 22, 1936	Construction of a levee and floodwall protection system with associated interior drainage facilities at Plymouth, Kingston-Edwardsville, Swoyersville-Forty Fort, and Wilkes-Barre and Hanover Township.	H. Doc. 308, 69th Cong. 1st sess.
40.		**YORK, INDIAN ROCK DAM, PA**	
	Jun. 22, 1936	Construction of Indian Rock Dam and channel improvements on Codorus Creek.	H. Doc. 702, 77th Cong., 2nd sess.

1. Contains latest published maps.

2. Exclusive of portion considered inactive. Inactive portion is widening 35-foot depth channel from 150 to 400 feet from Port Covington to Ferry Bar, widening 27-foot depth channel from 150 to 250 feet to Hanover Street Bridge, and providing a channel 27 feet deep by 250 feet wide to Western Maryland Railway Bridge with an anchorage and turning basin at the upper end.

3. Included in Public Works Administration program September 16, 1933. The site chosen for the inlet under this authorization was that opened just south of Ocean City by natural forces during a severe storm in August 1933. This eliminated the necessity for an 8-foot channel from the inlet to Ocean City.

4. Included in Emergency Relief program 1935.

5. Raising of the north jetty to an elevation of 9 feet above mean low water was accomplished with maintenance funds in 1956.

OTHER AUTHORIZED NAVIGATION PROJECTS

TABLE 4-C

Project	Status	For Last Full Report See Annual Report	Cost to September 30, 1985 Construction	Cost to September 30, 1985 Operation and Maintenance
Accotink Creek, VA[1]	Completed	1878	$ 5,000	$ —
Anacostia River and Flats[2]	Deferred	1953	3,910,582	—
Annapolis Harbor, MD	Completed	1946	34,250[3]	15,623
Aquia Creek, VA	Inactive	1928	52,465[4]	11,770
Back Creek, MD	Completed	1946	23,061	23,072
Betterton Harbor, MD	Inactive	1960	3,482	—
Black Walnut Harbor, MD	Completed	1982	32,631	412,349
Bonum Creek, VA[5]	Completed	1982	202,000[6]	144,576
Branson Cove, Lower Machodoc River, VA	Completed	1950	15,755	17,675
Breton Bay, MD[7]	Inactive	1950	47,924[8]	12,621
Broad Creek River, DE	Completed	1964	64,510[9]	114,373
Broad Creek, MD	Completed	1962	28,227	81,219
Cambridge Harbor, MD[7]	Inactive	1984	195,974[10]	678,258
Chester River, MD	Completed	1984	70,495[11]	1,339,473
Choptank River, MD[12]	Completed	1979	96,796	94,095
Corsica River, MD	Completed	1948	39,071[13]	80,285
Crisfield Harbor, MD	Completed	1980	349,154[14]	505,393[15]
Cypress Creek, MD	Completed	1947	3,057	10,528
Duck Point Cove, MD	Completed	1982	25,289	293,964
Elk and Little Elk Rivers, MD[16]	Completed	1932	90,121[17]	53,808[18]
Goose Creek, MD[5]	Completed	1973	75,900	8,312
Herring Creek, MD	Completed	1961	284,800[19]	66,229
Island Creek, MD	Completed	1948	6,230	34,457
Island Creek, St. Georges Island, MD	Completed	1981	23,836	328,110
La Trappe, MD	Completed	1980	8,064	40,475
Little Creek, Kent Island, MD	Completed	1958	23,000[20]	7,327
Lower Machodoc Creek, VA	Completed	1904	9,916	16,485
Lowes Wharf, MD	Completed	1984	21,000	275,519
Madison Bay, MD[5]	Completed	1977	125,550	20,854
Manokin River, MD[21]	Completed	1919	34,788[22]	43,534
Middle River and Dark Head Creek, MD	Completed	1947	38,715[23]	23,173
Monroe Bay and Creek, VA	Completed	1982	12,460	207,685
Muddy Hook and Tyler Coves, MD[5]	Completed	1984	64,001	360,602
Nan Cove, MD[5]	Completed	1965	34,861[24]	22,498
Nanticoke River at Bivalve, MD[16]	Completed	1983	240,817	131,878
Nanticoke River (Including Northwest Fork), DE & MD	Completed	1984	143,134[25]	584,777
Nanticoke River, MD	Completed	1971	73,243	76,895[26]
Neabsco Creek, MD	Inactive	1978	14,600	—
Neale Sound, MD	Completed	1982	12,600[27]	289,770
Neavitt Harbor, MD[5]	Completed	1968	36,500	28,084
Nomini Bay and Creek, VA[28]	Completed	1946	78,446	42,063
Northeast River, MD	Completed	1984	28,489[29]	905,044
Occoquan Creek, VA[16]	Completed	1971	66,253[30]	176,920
Patuxent River, MD[16]	Completed	1905	14,000[31]	—
Potomac River and Tributaries at and below Washington, DC, Elimination of Waterchestnut	Completed	1977	—	184,394
Potomac River at Alexandria, VA	Completed	1965	95,214	506,394
Potomac River at Lower Cedar Point, MD	Completed	1920	10,234	6,216
Potomac River at Mt. Vernon, VA[16]	Completed	1984	$ 17,000	306,574
Potomac River below Washington, DC	Completed	1984	153,836	1,876,673
Potomac River North Side of Washington Channel, DC[1]	Completed	1956	1,744,692[32]	27,461[26]
Rock Hall Harbor, MD	Completed	1982	1,072,500[33]	77,113
Shad Landing State Park, MD	Completed	1966	33,531[34]	6,719
Slaughter Creek, MD	Completed	1982	4,140	408,030
St. Catherines Sound, MD	Completed	1981	29,947[35]	253,578

OTHER AUTHORIZED NAVIGATION PROJECTS
TABLE 4-C (Continued)

Project	Status	For Last Full Report See Annual Report	Cost to September 30, 1985 Construction	Cost to September 30, 1985 Operation and Maintenance
St. George Creek, MD	Inactive	1971	—	—
St. Jeromes Creek, MD	Completed	1982	44,357[36]	371,386
St. Michaels Harbor, MD[5]	Completed	1964	16,723[35]	7,742
St. Peters Creek, MD[5]	Completed	1963	46,740[37]	17,084
Smith Creek, MD	Completed	1936	5,252	3,894
Susquehanna River at Williamsport, PA[5]	Completed	1974	57,031[38]	41,437
Tilghman Island Harbor, MD	Completed	1983	424,800[39]	378,783
Town Creek, MD	Completed	1950	43,220	17,453
Tuckahoe River, MD	Completed	1980	9,727	23,489
Tyaskin Creek, MD	Completed	1923	16,297[40]	45,295
Upper Machodoc Creek, VA	Completed	1971	20,281	34,777
Warwick River, MD	Completed	1984	22,041[41]	145,911

1. Unconstructed portion of the project was deauthorized August 5, 1977.
2. Project deferred for restudy.
3. Includes $8,476 for previous project.
4. Includes $31,065 for previous project.
5. Authorized by Chief of Engineers.
6. Unconstructed portion of the project is inactive.
7. Excludes $3,998 contributed funds.
8. Includes $37,500 for previous project.
9. Includes $50,000 for previous project.
10. Includes $61,321 for previous project.
11. Includes $38,041 for previous project.
12. Authorization for the unconstructed portion of the project was withdrawn by the Chief of Engineers January 22, 1979.
13. Includes $30,000 for previous project.
14. Includes $87,740 for previous project.
15. Includes $2,839 for previous project.
16. Unconstructed portion of the project was deauthorized November 2, 1979.
17. Includes $79,626 for previous project and excludes $8,414 contributed funds.
18. Includes $24,321 for previous project.
19. Excludes $10,306 contributed funds.
20. Excludes $1,100 contributed funds.
21. Abandonment recommended in 1926 (H. Doc. 467, 69th Cong., 1st sess.)
22. Includes $2,000 expended outside project limits.
23. Excludes $111,581 expended by Navy Department and $54,000 from contributed funds.
24. Excludes $565 contributed funds.
25. Includes $5,000 for previous project.
26. Excludes $101,162 Public Health Service funds expended for waterchestnut removal.
27. Excludes $1,000 contributed funds.
28. Unconstructed portion of the project was deauthorized November 6, 1977.
29. Includes $20,640 for previous project.
30. Includes $25,000 for previous project.
31. Includes $10,617 for previous project.
32. Excludes $389,000 contributed funds.
33. Excludes $672,880 contributed funds.
34. Excludes $24,125 contributed funds.
35. Excludes $600 contributed funds.
36. Includes $26,500 for previous project.
37. Excludes $6,984 contributed funds.
38. Excludes $40,000 contributed funds.
39. Excludes $16,409 contributed funds.
40. Includes $10,158 for previous project.
41. Includes $6,000 for previous project.

TABLE 4-D OTHER AUTHORIZED BEACH EROSION CONTROL PROJECTS

Project	Status	For Last Full Report See Annual Report	Cost to September 30, 1985 Construction	Cost to September 30, 1985 Operation and Maintenance
Oxford, MD[1]	Completed	1978	$ 97,750[2]	—

1. Authorized by Chief of Engineers.
2. Excludes $80,648 contributed funds.

OTHER AUTHORIZED FLOOD CONTROL PROJECTS

TABLE 4-E

Project	Status	For Last Full Report See Annual Report	Cost to September 30, 1985 Construction	Cost to September 30, 1985 Operation and Maintenance
Anacostia River and Tributaries, Flood Protection and Navigation Improvements, DC and MD	Completed	1980	$ 6,042,325	$1,417,655
Anacostia River and Tributaries, Prince Georges Co., MD[2]	Completed	1977	1,000,000[3]	—
Bainbridge, NY[3,4]	Completed	1959	382,000	—
Bath, NY[5]	Completed	1970	638,332	—
Bayard, WV[4]	Completed	1965	55,218[6]	—
Bridgewater, VA[4]	Completed	1953	136,500	—
Bull Run, PA	Completed	1984	2,742,000	—
Conklin-Kirkwood, NY[4]	Completed	1955	71,000	—
Cortland, NY[7]	Completed	1970	324,486	—
Elkland, PA	Completed	1971	1,297,850	—
Endicott Johnson City and Vestal, NY	Completed	1979	7,034,534[8]	—
Forest Heights, MD[4]	Completed	1964	430,000[9]	—
Fourmile Run, VA	Completed	1984	51,780,000	—
Greene, NY[4]	Completed	1951	37,000	—
Kingston-Edwardsville, PA	Completed	1979	4,731,394[10]	—
Kitzmiller, MD[4]	Completed	1965	501,500[11]	—
Latta Brook Rd., NY	Completed	1984	115,500	—
Lock Haven, PA[12]	Active	1980	450,000[13]	—
Nichols, NY	Completed	1974	1,487,800	—
Norwich, NY[4]	Completed	1950	94,500	—
Painted Post, NY[5]	Completed	1970	414,181	—
Plymouth, PA	Completed	1958	1,911,689[14]	—
Savage River Dam, MD	Completed	1954	2,271,939[15]	33,999
Scranton, PA[16]	Completed	1971	2,006,800	—
Sunbury, PA	Completed	1953	6,063,000[17]	—
Swoyersville-Forty Fort, PA	Completed	1968	2,728,113	—
Tyrone, PA[18]	Deferred	1980	6,401,016	—
Unadilla, NY	Completed	1970	1,000,000[19]	—
Upper Marlboro, MD[4]	Completed	1965	590,013	—
Verona Lake, VA[20]	Deferred	1978	992,000	—
Washington, DC and Vicinity	Completed	1953	331,927[21]	—
Wilkes-Barre, Hanover Township, PA	Completed	1958	3,853,457[22]	—
Williamsport, PA	Completed	1979	12,964,893[23]	—

1. Local interests will not accept operation and maintenance responsibility of the project until the severe erosion and sedimentation of the project caused by tropical storm Eloise is corrected and the project is restored to design condition.
2. Excludes $357,022 contributed funds.
3. Authorized by Chief of Engineers.
4. Unit of Southern New York Flood Control Projects.
5. Excludes $182,672 Public Works Acceleration funds and $4,290 contributed funds.
6. Unit of Susquehanna River Flood Control Projects.
7. Excludes $154,694 contributed funds.
8. Excludes $87,720 contributed funds.
9. Includes $1,162,548 emergency relief funds and excludes $225,877 emergency relief funds expended prior to adoption of project.
10. Excludes $6,616 contributed funds.
11. Authorized for Phase I design memorandum stage of advanced engineering and design.
12. Excludes $481,000 for Phase I funded under General Investigations beginning October 1, 1978.
13. Includes $4,357 emergency relief funds.
14. Includes $200,000 expended from contributed funds.
15. Unit of Lackawanna River Basin Projects.
16. Excludes $140,504 contributed funds.
17. The unconstructed portion of the project was reclassified to the deferred category January 8, 1981.
18. Excludes $132,578 contributed funds.
19. Authorized for the design memorandum stage of advanced engineering and design.
20. Cost of previous project. Includes $106,500 emergency relief funds.
21. Includes $872,715 emergency relief funds. Excludes $36,375 emergency relief funds expended for new work before adoption of project.
22. Includes $1,887 emergency relief funds and excludes $110,835 contributed funds.

DEAUTHORIZED PROJECTS

TABLE 4-G

Project	For Last Full Report See Annual Report For	Date and Authority	Federal Funds Expended	Contributed Funds Expended
Almond Village, NY[1,2]	1970	May 26, 1953 1941 Flood Control Act	$ 24,622[3]	—
Broadwater Creek, MD	1949	Nov. 6, 1977 1974 Water Res. Dev. Act	212	—
Cadle Creek, MD[2]	1949	Nov. 6, 1977 1974 Water Res. Dev. Act	—	—
Channel Connecting Plain Dealing Creek and Oak Creek, MD	1940	Aug. 5, 1977 1974 Water Res. Dev. Act	112	—
Coan River, VA	1937	Aug. 5, 1977 1914 Water Res. Dev. Act	—	—
Copes Corner Lakes, NY[2]	1970	May 6, 1981 1974 Water Res. Dev. Act	106,700[3]	—
Cuckold Creek, MD[4]	1978	Jan 22, 1979 1960 River and Harbor Act	5,720	—
Cunninghill Cove, MD[4]	1977	Jan 22, 1979 1960 River and Harbor Act	11,200	—
Davenport Center Lake, NY[2]	1970	May 6, 1981 1974 Water Res. Dev. Act	286,400[3]	—
Fall Brook Lake, PA[5]	1970	May 6, 1981 1974 Water Res. Dev. Act	46,100	—
Genegantslet Lake, NY	1954	May 6, 1981 1974 Water Res. Dev. Act	214,578[3]	—
Governors Run, MD	1950	Aug. 5, 1977 1974 Water Res. Dev. Act	—	—
Harpers Ferry, WV	1937	Aug. 5, 1977 1974 Water Res. Dev. Act	—	—
Hellens Creek, MD	1950	Nov. 6, 1977 1974 Water Res. Dev. Act	—	—
Lake Ogleton, MD	1950	Nov. 6, 1977 1974 Water Res. Dev. Act	—	—
Mill Creek, MD	1949	Nov. 6, 1977 1974 Water Res. Dev. Act	—	—
Moorefield, WV	1941	Oct. 3, 1978 1974 Water Res. Dev. Act	7,928[3]	—
Sixes Bridge Lake, MD & PA[6]	1974	Dec. 29, 1981 1974 Water Res. Dev. Act	—	—

DEAUTHORIZED PROJECTS

TABLE 4-G (Continued)

Project	For Last Full Report See Annual Report For	Date and Authority	Federal Funds Expended	Contributed Funds Expended
South Plymouth Lake, NY	1953	May 6, 1981 1974 Water Res. Dev. Act	100,036[3]	—
Waterway from Little Choptank River to Choptank River, MD	1939	Aug. 5, 1977 1974 Water Res. Dev. Act	305	—
West Oneonta Lake, NY[2]	1970	May 6, 1981 1974 Water Res. Dev. Act	189,100[3]	—

1. Local cooperation withdrawn, project authorization expired May 26, 1953.
2. Unit of Southern New York Flood Control Projects.
3. Cost for preliminary work only.
4. Project authorization was withdrawn by the Chief of Engineers.
5. Unit of Lackawanna River Basin Projects.
6. Authorized for the design memorandum stage of advanced engineering and design.

RECONNAISSANCE AND CONDITION SURVEYS

TABLE 4-H

Project	Date Survey Completed
MARYLAND	
Cypress Creek	August 1985
Herring Creek	June 1985
Island Creek	September 1985
Nanticoke River (Including Northwest Fork)	September 1985
Neavitt Harbor	July 1985
Slaughter Creek	September 1985
Tilghman Island Harbor	April 1985
Town Creek	August 1985
Warwick River	March 1985
PENNSYLVANIA	
Williamsport, West Branch, Susquehanna River	September 1985
VIRGINIA	
Monroe Bay and Creek	April 1985
Potomac River at Mt. Vernon	April 1985

BALTIMORE, MD DISTRICT

INSPECTION OF COMPLETED PROJECTS

TABLE 4-I

Project	Date Inspected
DISTRICT OF COLUMBIA	
Anacostia River	November 1984
Washington, DC & Vicinity	November 1984
MARYLAND	
Anacostia River Basin	October 1984
Cumberland	September 1985
Forest Heights	October 1984
Kitzmiller	October 1984
Savage	September 1985
Upper Marlboro	October 1984
NEW YORK	
Bainbridge	October 1984
Bath	October 1984
Cincinnatus	October 1984
Conklin-Kirkwood	October 1984
Corning-Monkey Run	October 1984
Cortland	October 1984
Endicott-Johnson City & Vestal	October 1984
Greene	October 1984
Nichols	October 1984
Norwich	October 1984
Oneonta	October 1984
Owego	October 1984
Painted Post	October 1984
Port Dickinson	October 1984
Sherburne	October 1984
Unadilla	October 1984
PENNSYLVANIA	
Elkland	October 1984
Kingston and Edwardsville	September 1985
Loyalsock	October 1984
Milton	September 1985
Plymouth	September 1985
Scranton	October 1984
Sunbury	September 1985
Swoyersville-Forty Fort	September 1985
Tyrone	October 1984
Wilkes-Barre-Hanover Twp.	September 1985
Williamsport	October 1984
S. Williamsport	October 1984
VIRGINIA	
Bridgewater	November 1984
WEST VIRGINIA	
Bayard	September 1985
Ridgeley	September 1985

NORFOLK, VA DISTRICT

This district comprises the State of Virginia, except the Potomac, Roanoke and Ohio River Basins; the entire area on the eastern shore of Virginia except for the project for Pocomoke River, Maryland and Virginia. On the west shore of Chesapeake Bay, all waterways south of Smith Point, Virginia, at the mouth of the Potomac River except the project for Little Wicomico River, Virginia. North Carolina, only the Chowan River Basin downstream to and including the mouth of the Meherrin River, and the Dismal Swamp Canal Route of the Atlantic Intracoastal Waterway to the Albemarle Sound. West Virginia, only the James River Basin.

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Navigation

1. ATLANTIC INTRACOASTAL WATERWAY BETWEEN NORFOLK, VA AND ST. JOHNS RIVER, FL (NORFOLK DISTRICT)

Location. Two inland water routes approximately paralleling Atlantic coast south of Norfolk, VA between a point in Southern Branch of Elizabeth River, VA, 2,500 feet upstream of Norfolk & Western Railway bridge and Virginia-North Carolina state line in North Landing River, a distance of 27.2 miles; and 64.6 miles between mouth of Deep Creek, VA and mouth of Pasquotank River, NC. These routes are shown on National Ocean Survey. Chart 12206.

Existing project. A channel 12 feet deep at mean low water and 90 to 250 feet wide following Southern Branch of Elizabeth River, 5.2 miles, Virginia Land Cut, 8.3 miles, and North Landing River, 13.7 miles; and construction of tidal guard lock at Great Bridge, VA. It also provides channels 10 feet deep at mean low water and 90 to 100 feet wide in Deep Creek, 3.1 miles, Turners Cut, 4.3 miles and Pasquotank River, 35.1 miles; maintaining Dismal Swamp Canal, 22.1 miles, to about 9 feet deep mean canal level over a width of 50 feet; protection of banks in Turners Cut with sheet piling, and cutting certain sharp points in Pasquotank River to shorten its course. (See Table 5-C at end of chapter on Data Relative to Completed Locks included in Project.)

Project includes operating and care of completed locks, dams and bridges, under maintenance. Southern Branch of Elizabeth River and Deep Creek sections of the two routes are tidal, mean range being about 3 feet with extremes of minus 3.5 and plus 9.6 feet. Remaining sections are nontidal with fluctuations of 1 to 2 feet in level due to winds. Cost for new work for completed project was $3,396,276. Protection to canal property at Great Bridge portion is considered inactive and excluded from foregoing cost. Estimated cost of this portion (1954) is $265,000. For details of previous projects, see page 476 of Annual Report for 1938. (See Table 5-B for Authorizing Legislation.)

Local cooperation. None required.

Terminal facilities. Existing facilities are considered adequate. See Annual Report for 1970.

Operations during fiscal year. Maintenance: The following work was accomplished by contract:

A five year contract to operate, maintain and repair facilities at the Atlantic Intracoastal Waterway was awarded Feb 83 for $4,117,981. The second year of contract was completed satisfactorily as of Jan 31, 1985. Work was completed on modification 13 to rewire locks at Deep Creek and South Mills. Contract is 70% complete. Total contractor's earnings to date is $2,396,353.

Work was completed on a bulk head replacement contract that was awarded in FY 84. Total contractor's earnings reported this fiscal year totalled $300,878.

In addition, another bulkhead replacement contract was awarded this FY for $1,004,900. Work is 60% complete and is progressing satisfactorily. Contractor's earnings in FY 85 were $809,000.

Maintenance dredging the Dismal Swamp Canal was accomplished during period May 24 - Jun 12, 1985. There were 41,240 cubic yards of credited material removed at a cost of $180,324.

Other work performed this fiscal year included engineering and design, supervision and administration, and ordinary operation and maintenance of the project using government plant and hired labor.

2. BALTIMORE HARBOR AND CHANNELS (NORFOLK DISTRICT)

Existing project. Provides for deep water approach channels in Baltimore Harbor. Northern portion including Baltimore Harbor is under jurisdiction of Baltimore District. Portion under jurisdiction of Norfolk District is more fully described below.

2A. CAPE HENRY CHANNEL, VA

Location. A t mouth of Chesapeake Bay opposite Cape Henry. (See National Ocean Survey Chart No. 12222.)

Existing project. A channel about 2.3 miles long, 1,000 feet wide, and 50 feet deep at mean low water through shoal at mouth of Chesapeake Bay opposite Cape Henry. Under ordinary conditions mean range of tide 2.5 feet and extreme 3 feet. Extremes of irregular fluctuation due to combined effect of wind and tides, referred to mean low water, are minus 2 feet and plus 9.5 feet. (See Table 5-B for Authorizing Legislation.)

2B. RAPPAHANNOCK SHOAL CHANNEL, VA

Location. In lower Chesapeake Bay opposite mouth of Rappahannock River and about 50 miles northerly from Atlantic Ocean at entrance of Chesapeake Bay. (See National Ocean Survey Chart No. 12225.)

Existing project. A channel about 9.9 miles long, 1,000 feet wide, and 50 feet deep at mean low water between contours of that depth in Chesapeake Bay, opposite Rappahannock River. Under ordinary conditions mean tidal range is 2.5 feet and extreme 3 feet. Extremes of irregular fluctuation due to combined effect of wind and tides, referred to mean low water, are minus 2 feet and plus 9.5 feet. (See Table 5-B for Authorizing Legislation.)

2C. YORK SPIT CHANNEL, VA

Location. In lower Chesapeake Bay opposite mouth of York River and about 20 miles northerly from Atlantic Ocean at entrance of Chesapeake Bay. (See National Ocean Survey Chart No. 12221).

Existing project. A channel about 18.2 miles long, 1,000 feet wide, and 50 feet deep at mean low water between contours of that depth in Chesapeake Bay opposite York Spit. Under ordinary conditions mean tidal range is 2.5 feet and extreme 3 feet. Extremes of irregular fluctuation, due to combined effect of wind and tides, referred to mean low water, are minus 2 feet and plus 9.5 feet. For details of previous projects see Annual Report for 1932. (See Table 5-B for Authorizing Legislation.)

Local cooperation. None required.

Terminal facilities. These three channels form the access between lower and upper Chesapeake Bay.

Operations during fiscal year. Maintenance: Condition studies were performed at a cost of $88,000.

3. BROAD CREEK, VA

Location. Broad Creek is a small tidal estuary in Middlesex County, VA, 1 mile long, flowing in a northerly direction into the Rappahannock River, which it enters on the right bank about 1 mile upstream of its mouth at Chesapeake Bay. The creek is 61 miles northerly of Norfolk, VA. (See National Ocean Survey Chart No. 12235).

Existing project. This provides for a channel 7 feet deep, 100 feet wide and 4,100 feet long from deep water in the Rappahannock River to deep water in Broad Creek. The plane of reference is mean low water. The tidal ranges are: Mean, 1.2 feet; irregular, 2 feet; and extreme, approximately 7.5 feet.

The cost to the Federal Government for new work for the completed project was $27,888.

The existing project was adopted by the River and Harbor Act of March 2, 1945 (H. Doc. 381, 76th Cong., 1st sess.). The latest published map is in the project document.

Local cooperation. Fully complied with except that local interests shall furnish, free of cost to the United States, suitable spoil-disposal areas when and as required for subsequent maintenance, and hold and save the United States free from claims for damages that may result from dredging.

Terminal facilities. There are privately owned wharves and landings on the creek, many of which are open to the public by special arrangements. There is one marine railway on the creek. The terminal facilities are considered adequate for present commerce.

Operations during fiscal year. Maintenance: A-E contract services totalled $12,000.

4. CHANNEL TO NEWPORT NEWS, VA

Location. West of north entrance to Norfolk Harbor Channel connects deep-water and James River with Hampton Roads. (See Coast and Geodetic Survey Chart No. 12245).

Existing project. A channel 45 feet deep at mean low water and 800 feet wide from that depth in Norfolk Harbor Channel about 4.5 miles to Newport News and 2 deepdraft anchorage berths opposite Newport News 45 feet deep over 1,200 swing radius. Under ordinary conditions mean tidal range is 2.7 feet and extremes 2.1 and 3 feet. Extremes of regular fluctuations due to combined wind and tides referred to mean low water are minus 2 feet and plus 9.5 feet. For previous project see page 459 of 1938 Annual Report. (See Table 5-B for Authorizing Legislation).

Local cooperation. None Required.

Terminal facilities. Latest published description of terminal is in Port Series No. 11 revised 1971, part 2 on Ports of Hampton Roads, VA, prepared by Board of Enginers for Rivers and Harbors. Since 1959 piers 3, 4, and 5 have been replaced by a new cargo pier. Container handling facilities have been added and the capability of the port for handling general cargo and coal has increased.

Operations during fiscal year. Maintenance: dredging was performed on the 45-ft Anchorages opposite Newport News, VA. There were 176,267 cubic yards of credited material removed at a total cost of $437,185. Ordinary operation and maintenance of the project, including engineering and design, supervision and inspection, was accomplished using government plant and hired labor.

5. CHINCOTEAGUE HARBOR OF REFUGE, VA

Location. Chincoteague is located on Chincoteague Island and Accomack County on the Atlantic Coast of Virginia, approximately midway between the entrance to Delaware Bay and the Virginia Capes. Chincoteague Island is separated from the mainland on the west by Chincoteague Channel and from the varying island known as Assateague Island, on the east by Assateague Channel and Assateague Bay. The Harbor of Refuge is at the lower end of Chincoteague Island. (See National Ocean Survey Chart No. 1220.)

Existing project. This provides for a channel 8 feet deep, mean low water and 60 feet wide from that depth in the canal at the lower end of Chincoteague Island into an anchorage basin of the same depth 235 feet wide and 650 feet long. The mean range of tide is about 2.6 feet. Greater fluctuations in water level are caused by high wind and storms. (See Table 5-B for Authorizing Legislation).

Local cooperation. Fully complied with for initial construction. (See 1962 Annual Report for items of local cooperation.)

Terminal facilities. Adequate public terminal facilities have been built by the town of Chincoteague. Additional facilities will be provided as the need develops.

Operations during fiscal year. Maintenance dredging was performed, by contract, during Jul 4- 12, 1985. There were 26,205 cubic yards of credited material removed at a total cost of $94,087. Ordinary operation and maintenance of the project, including engineering and design, supervision and inspection were accomplished using government plant and hired labor.

6. CHINCOTEAGUE INLET, VA

Location. Chincoteague Inlet at the southern end of Assateague Island provides access to the Atlantic Ocean from the inland waterway near the town of Chincoteague, VA. (See National Ocean Survey Chart No. 12211).

Existing project. Provides for a channel 12 feet deep and 150 feet wide across the ocean bar in the Atlantic Ocean and to the mouth of the inlet, a channel 9 feet deep and 100 feet wide from the inlet through the canal and then along Chincoteague Channel to a point approximately 2,000 feet north of the state highway bridge to Chincoteague, a distance of about 6.6 miles. Mean range of tide is about 3 feet. All depths are referred to mean low water. (See Table 5-B for Authorizing Legislation.)

Local cooperation. For details see Annual Report for 1974.

Terminal facilities. Existing facilities at Chincoteague are considered adequate for current and prospective traffic.

Operations during fiscal year. Maintenance dredging was accomplished, by contract, during Apr 21 - May 17, 1985. There were 182,216 cubic yards of credited material removed at a cost of $839,116. Ordinary operation and maintenance, including condition surveys, engineering and design and supervision and inspection, was accomplished with government plant and hired labor.

7. CRANES CREEK, VA

Location. Cranes Creek in Northumberland County, Virginia is a small tidal estuary approximately 2 miles long and entering the right bank of the Great Wicomico River 2-1/2 miles upstream to the Chesapeake Bay. The creek is about 76 miles northerly from Norfolk, Virginia. (See Coast and Geodetic Chart No. 12235)

Existing project. This provides for a channel 6 feet deep, 80 feet wide, and 1,500 feet long from deepwater in the Great Wicomico River to deepwater within Cranes Creek. The plane of reference is mean low water. The tidal ranges are mean 1.1 feet, irregular 2.0 feet, and extremes approximately 7.2 feet. (See Table 5-B for Authorizing Legislation)

Local cooperation. The existing project was approved subject to the conditions that local interest construct and maintain a public wharf with improved approach road, furnish spoil disposal areas for initial dredging, and subsequent maintenance when and as required and hold and save United States free from claims for damages resulting from the improvement. All conditions have been fully complied with.

Terminal facilities. There are several small privately owned wharfs and landings on the creek which are considered adequate for present commerce.

Operations during fiscal year. A maintenance dredging contract was awarded at the end of fiscal year, with completion scheduled for eary FY 1986. Total contractor's earnings totalled $106,821. Ordinary operation and maintenance of the project, including engineering and design and supervision and inspection, was accomplished.

8. HAMPTON ROADS AND HARBOR OF NORFOLK AND NEWPORT NEWS, VIRGINIA COLLECTION AND REMOVAL OF DRIFT

Location. Hampton Roads is a natural harbor 300 miles south of New York and 180 miles south of Washington, D.C. Its principal tributaries are James River, affording a natural deep harbor at Newport News, VA; Elizabeth River, with it Southern, Eastern, and Western Branches providing harbors for Norfolk and Portsmouth, VA; and Hampton Creek, serving the harbor at Hampton, VA. (See National Ocean Survey Charts No. 12248, 12245 and 12253)

Existing project. Collection and removal of drift in Hampton Roads and its tributary waters authorizes the Secretary of the Army to allot necessary amounts of work from appropriations for maintenance and improvement of existing river and harbor works or from other available appropriations and that this work shall be carried on as a separate and distinct project. It is wholly a work of maintenance. The purpose of work is to afford relief from variable conditions of obstruction. No advance estimate of the amount of work is required. (See Table 5-B for Authorizing legislation.)

Local cooperation. None required.

Terminal facilities. See Norfolk Harbor, VA and Channel to Newport News, VA.

Operations during fiscal year. Operation of the project resulted in collection and disposal of 73,000 cubic feet of a variety of floating refuse. Total project operations amounted to $178,200.

9. HOSKINS CREEK, VA

Location. A tributary 2.5 miles long flowing easterly and entering right bank of Rappahannock River in Essex County, VA, 42 miles upstream from its mouth in Chesapeake Bay and one-half mile downstream from town of Tappahannock, VA. Creek is 102 miles northerly of Norfolk, VA. (See National Ocean Survey Chart 535.)

Existing project. A channel 10 feet deep from that depth in the Rappahannock River to the highway bridge three-quarters of a mile above the mouth with widths of 100 feet through the bar in Rappahannock River and 80 feet within the creek suitably widened at bends, and a turning basin of same depth 250 feet long and 200 feet wide at public landing one-half mile above the mouth of creek. Improved section is 1.1 miles long. Plane of reference is mean low water. Tidal ranges are: Mean, 1.6 feet; irregular, 2.5 feet; and extreme, about 7.5 feet. (See Table 5-B for Authorizing Legislation.)

Local cooperation. Fully complied with.

Terminal facilities. There are two bulkhead landings and two wharves. State of VA operates a small boat launching ramp on the creek. Facilities considered adequate for navigation.

Operations during fiscal year. Engineering and design for periodic restoration of project dimensions in progress at the beginning of the fiscal year was suspended because an accectable disposal area is not available for maintenance dredging.

10. JAMES RIVER, VA

Location. The river is formed by junction of the Cowpasture and Jackson Rivers in Botetourt County, VA, flows easterly 340 miles and empties into Hampton Roads at Newport News, VA. (See National Ocean Survey Charts No. 12248 and 12251.)

Existing project. A channel 35 feet deep and 300 feet wide from the mouth to Richmond Deepwater Terminal, and a channel 18 feet deep and 200 feet wide from the deepwater terminal to Richmond Lock; a mooring basin 35 feet deep, 180 to 220 feet wide and 2,100 feet long along side the channel opposite waterfront at Hopewell; enlargement of the turning basin at Richmond Deepwater Terminal to 825 feet wide, 2,770 feet long and 35 feet deep; a turning basin in Richmond Harbor 200 feet wide, 600 feet long and 18 feet deep; and construction of spur and training dikes. Depth of channels are referred to mean low water. Total length of channel included in the project is 87 miles, which is the navigable section. Mean tidal ranges under ordinary conditions for different parts of the river are: mouth, 2.6 feet; Jamestown, 2 feet; City Point, 2.6 feet; and Richmond, 3.2 feet. Spring tide ranges under ordinary conditions at the same localities are mouth, 3.1 feet; Jamestown, 2.4 feet; City Point, 3 feet; Richmond, 3.2 feet. Ordinary fluctuations of stage at Richmond, due to floods are 6 to 12 feet above mean low water. Extreme fluctuations are 16 to 32 feet. Flood heights below Richmond diminish rapidly. The extreme according to available information is about 11 feet lower at Dutch gap, 14 miles below and 17 to 18 feet lower, 20 miles below. The estimated (1971) total cost for new work is $71,145,940 including required non-Federal cost for conditions of local cooperation imposed by the River and Harbor Act of 1930, 1945, and 1950, estimated (1939) to be $1,949,700; and by the River and Harbor Act of 1962, estimated (1971) to be $2,950,000. For previous projects, see Annual Report for 1938. (See Table 5-B for Authorizing Legislation).

Local cooperation. Fully complied with for conditions imposed by River and Harbor Act of 1930, 1945, and 1950. The conditions imposed by the River and Harbor Act of 1962 have not been complied with.

Terminal facilities. River commerce at Richmond is handled by city-owned terminals, city wharves, Richmond dock, and 16 privately-owned wharves within or in the immediate vicinity of Richmond Harbor. The city's Upper Terminal, located on the north bank within the manufacturing section of Richmond, provides for 750 feet of concrete wharf and 80,000 square feet of warehouse and transit shed. The other terminal is located approximately 4 miles downstream from the Upper Terminal which provides about 1,250 feet of wharf and 2 concrete warehouses with about 190,000 square feet of floor space. This deepwater terminal at the head of the 25-foot deep improved channel serves ocean-going vessels and larger ships engaged in coastwide trading. Below the deepwater terminals the improvement is served by 42 wharves. Richmond terminals and wharves together with wharves between Richmond and the river's mouth are adequate for river's commerce.

Operations during fiscal year. Maintenance dredging of the Richmond Deepwater Terminal was completed Sept 1985. There were 105,351 cubic yards of credited material removed at a total cost of $966,000. Dredging the Shoals to Hopewell was in progress at the end of the fiscal year.

Engineering and design and supervision and inspection to include condition surveys, was accomplished.

11. LITTLE MACHIPONGO RIVER, VA

Location. This river, locally known as Parting Creek, has its source in the marsh of Bell Neck, Northampton County Va., flows in a southerly and easterly direction about 5 miles, and empties into Great Machipongo River, about 12 miles by water from Great Machipongo inlet, and about 28 miles by water from Cape Charles, Va. The drainage area is about 11 square miles. No information is available as to the discharge of this stream. The length of the tidal reach is about 2 miles. The Great Machipongo Inlet and the Great Machipongo River are the waterways connecting with the Atlantic Ocean, and have a controlling depth of 16 feet. Willis Wharf, a town with a population of about 500, is located on the west bank about 1 mile above its junction with the Great Machipongo River. The high-water width varies from about 450 feet at the mouth to 350 feet at Willis Wharf. (See U.S. Coast and Geodetic Survey Chart No. 1221.)

Existing project. This project provides for a channel 8 feet deep at mean low water and 80 feet wide from the town

of Willis Wharf to deep water in the river below. The mean range of tide is about 0.7 foot below mean low water to about 2 feet above mean high water. (See Table 5-B for Authorizing Legislation)

Local cooperation: None required.

Terminal facilities. at the town of Willis Wharf, there are three wharves with a total wharfage space of about 300 feet, five bulkheads with a total wharfage space of about 1,140 feet, and two marine railways which will accommodate vessels up to 50 feet in length. All facilities are privately owned, being used for packing seafoods and servicing fishing vessels. The wharves have no railroad connections, but are served by local roads connecting with the country and State highway system. The facilities are considered adequate for existing commerce.

Operations during fiscal year. Ordinary operation and maintenance, including engineering and design, continued.

12. LYNNHAVEN INLET, VA

Location. On south shore of Chesapeake Bay, 5 miles west of Cape Henry, and 10 miles east of Norfolk, VA. Inlet connects Lynnhaven Roads, a part of Chesapeake Bay, with a network of inland waters in northern half of city of VA Beach. (See National Ocean Survey Chart 1222).

Existing project. An entrance channel from Chesapeake Bay through Lynnhaven Inlet, 10 feet deep and 150 feet wide; a mooring and turning basin inside of Lynnhaven Inlet, 10 feet deep, 1,100 feet long, and 750 feet wide; a channel 9 feet deep and 90 feet wide to extend from the mooring and turning basin into Broad Bay via Long Creek-Broad Bay Canal and a channel through the Narrows connecting Broad and Linkhorn Bays, 6 feet deep and 90 feet wide. Depths are referred to mean low water. Mean ranges of tide in Lynnhaven Inlet is about 2 feet with extreme fluctuations of 1.5 feet below and 9.5 feet above mean low water. Range in Lynnhaven Bay is a little more than 2 feet, in Broad and Linkhorn Bays, fluctuations in water level are caused by local winds. (See Table 5-B for Authorizing Legislation.)

Local cooperation. Complied with, except local interests must furnish spoil-disposal areas as needed for future maintenance. For details see page 308 of Annual Report for 1965.

Terminal facilities. Existing facilities are considered adequate. For details, see Annual Report for 1970.

Operations during fiscal year. Maintenance dredging the Entrance Channel Basin and Long Creek was performed during Sep - Oct, 1985. A total of 198,423 cubic yards of credited material were removed at a total cost of $480,373. Ordinary operation and maintenance of the project, to include engineering and design, was performed.

13. NORFOLK HARBOR, VA

Location. Norfolk, Virginia is 187 miles south of Baltimore, Maryland and 30m iles from entrance to Chesapeake Bay at Cape Charles and Cape Henry. Harbor extends 18.3 miles from 45-foot contour at Hampton Roads to a point 2,500 feet above Norfolk and Western Railway Bridge over Southern Branch of the Elizabeth River. (See National Ocean Survey Charts Nos. 12245 and 12253.)

Existing projects. A main channel 45 feet deep, 1,500 feet wide from that depth in Hampton Roads near Fort Wool to a point just south of Norfolk International Terminal Piers; at the same depth 800 feet wide to mouth of Southern Branch of Elizabeth River; and 450 fet wide up this branch to the Belt Line Railroad bridge, including an approach in turning area to same depth and a maximum width of 830 feet opposite Norfolk Naval Shipyard, extending downstream 3,250 feet from Belt Line Railroad bridge 40 feet deep, 375 feet wide and 1 mile long to Norfolk and Western (formerly Virginia Railway bridge); 35 feet deep, 250 feet wide and 3.1 miles long to a point 1,900 feet above Norfolk and Western Railway (Gilmerton's Bridge); 35 feet deep, 250 feet to 500 feet wide to a point 1.6 miles above Interstate 64 high level bridge.

A turning basin at the mouth of St. Julian's Creek, 35 feet deep and 400-600 feet square, and a turning basin at the mouth of Main's Creek 35 feet deep and 600 feet square, the upstream end of the project. A channel in Eastern Branch, 25 feet deep, 500f eet wide and 1.09 miles long from 40-foot channel to Norfolk and Western Railway bridge; 25 feet deep, 300 feet wide, 0.55 mile long to Campostella Bridge; 25 feet deep, 200 feet wide and 1.2 mile to Norfolk and Western Railway bridge (formerly Virginia Railway bridge); and for maintenance at a depth of 25 feet of existing turning basin and 5.5 acres in extent at head of existing project just below the Norfolk and Western (formerly Virginian) Railway bridge; a channel in Western Branch, 40 foot channel in Elizabeth River, 24 feet deep, 300 feet wide and 0.78 mile long; 24 feet deep and 200 feet wide for 0.37 mile to West Norfolk Highway bridge; 18 feet deep, 150 feet wide, 0.57 mile long. A channel in Scotts Creek between 40-foot channel at mouth and a point 100 feet above former location of Atlantic Coast Line Railroad bridge (about 0.73 miles upstream), 12 feet deep and 100 feet wide. Anchorage areas on west side of 40-foot channel opposite Lamberts Point and south of Craney Island aggregating 173 acres, consisting of 1 anchorage space 1,500 feet square and 38 feet deep; 1 anchorage space 1,500 feet square and 35 feet deep; and 1 anchorage 1,000 feet wide, 3,000 feet long and 20 feet deep. Another anchorage of 45 acres and 12 feet deep near Pinner Point. Two anchorages opposite Sewells Point 45 feet deep over a swinging radius of 1,200 feet and a trapezoidal shaped disposal area of about 2,500 acres of flats adjacent to the north of Craney Island,enclosed by stonefaced levees, 3 sluiceways in west levee, and an access road.

Facilities for unloading of hopper dredged material consisting of mooring dolphins; a mooring barge anchorage 100 by 600 feet, 21 feet deep, with approach channel 300 to 3,600 feet; 30-feet deep connecting anchorage with Norfolk Harbor 45-foot channel; and a 28-inch discharge pipe line to the leveed area. Facilities for contract rehandling of bucket dredged material consisting of a rehandling basin 1,000 by 1,200 feet, 40 feet deep, protected by a spur levee extending 2,350 feet from main levee and provided with approach exit channels, 200 feet wide by 18 feet deep to Norfolk Harbor 45 foot channel and a pipe line trestle from rehandling basin to leveed area. All depths are referred to mean low water. Mean tidal range is 2.7 feet, and extreme is 3.4 feet. Extremes of irregular fluctuations, due to combined effect of tides and winds referred to mean low water on -3.5 feet and +9.6 feet. Eastern Branch, 30-foot channel portion is considered inactive. For details of previous projects see Annual Report for 1938. (See Table 5-B for Authorizing Legislation.)

Local cooperation. Fully complied with.

Terminal facilities. Latest published description of terminal facilities is in Port Series No. 11 (revised 1971, part II) on Ports of Hampton Roads, prepared by Board of Engineers for River and Harbors.

Operations during fiscal year. Maintenance dredging the 45-foot Channel was performed Oct - Dec, 1984. A total of 386,846 cubic yards of material were removed at a total cost of $445,370. In addition, maintenance dredging was also performed on the 45-foot anchorage opposite Newport News during Jul - Aug, 1985. There were 176,267 cubic yards of credited material removed at a total cost of $96,749.

Operation and maintenance of the Craney Island portion of the project continued this fiscal year. Work accomplished consisted of continuing raising of division dikes and associated engineering and design and supervision and inspection. Maintenance dredging the Rehandling Basin was completed May 1985. A total of 2,203,1909 cubic yards of credited material were removed. Total Contractor's earnings amounted to $2,644,000 financed from tolls paid by users of the facility.

Operation of the Norfolk Harbor portion of the project continued this fiscal year. Condition surveys, report preparation, budgeting and scheduling, engineering and design and supervision and inspection was performed using government plant and hired labor.

A bulkhead replacement contract, awarded late FY 1984, was completed. Total contractor's earnings this fiscal year totalled $1,068,170.

Maintenance dredging, initiated late FY 1984, was completed on the 45-foot Channel. There were a total of 386,846 cubic yards of credited material removed at a total cost of $445,370.

14. PARKER CREEK, VA

Location. Parker Creek empties into the western side of Metompkin Bay in Accomack County, Virginia. It is on the ocean side of Virginia's Eastern Shore, about 20 miles south of Maryland-Virginia State line.

Existing project. The existing project, authorized under Section 107 of the 1960 River and Harbor Act, provides for establishment and maintenance of a channel 40 feet wide and 5 feet deep at mean low water from the same depth in Metompkin Bay into the mouth of the creek, a distance of about 2,200 feet or 0.5 mile. The existing project was completed in 1964 at a cost of $15,530 to the Federal Government and $1,350 to local interest.

Terminal facilities. There are 9 small privately owned boat landings and two small public landings on the creek.

Local cooperation. Fully complied with. Non-Federal contributions amounted to $1,350.

Terminal facilities. There are 9 small privately owned boat landings and two small public landings on the creek. Local interests have also constructed a 50-foot public dock with adequate shore facilities. These facilities are deemed adequate for existing and prospective commerce.

Operations during fiscal year. Ordinary operation and maintenance of the project, including engineering and design, was accomplished.

15. SUPERVISION OF THE HARBOR OF HAMPTON ROADS (PREVENTION OF OBSTRUCTIVE AND INJURIOUS DEPOSITS)

Laws enacted for the preservation of the Harbor of Hampton Roads, VA, is adjacent to the Chesapeake Bay and its tributaries as lies within the State of Virginia and so much of the Atlantic Ocean and its tributaries as lies within the jurisdiction of the United States, within or to the east of the State of Virginia, are administered by the Supervisor of the Harbor of Hampton Roads. Laws relating to the super- of waters are the New York Harbor Act of 1888, as amended, the River and Harbor Act of 1899, the Clean Water Act, the Marine Protection, Research and Sanctuary Act of 1972, the Coastal Zone Management Act of 1972, the National Environmental Policy Act of 1969, the Fish and Wildlife Act of 1956, the Federal Power Act of 1966, the Endangered Species Act of 1973, the Deepwater Port Act of 1974, and the Marine Mammal Protection Act of 1972, the Wild and Scenic Rivers Act, the Land and Water Conservation Fund Act.

Direct supervision of the harbor was exercised by means of two patrol vessels (376 patrols, 3,008 man-hours) involving debris removal, maintenance of bouys and fish stake limits, investigating reports of sunken vessels and navigational hazards, and providing support for Federal dredging projects. Surveillance of the harbor, the Chesapeake Bay

and its tributaries with respect to the regulatory permit program was conducted by means of three outboard boats, 7-9 motor vehicles and commercial aircraft for aerial surveys. The outboards were involved in 15 patrols (120 man-hours) involving primarily compliance surveys of permitted dredging projects and evaluating navigational access to proposed pier projects. The motor vehicles were used to conduct environmental evaluations of proposed permit actions, conduct permit compliance inspections, perform jurisdictional determinations, and investigate unauthorized activities. There were unauthorized activities brought to our attention. There were 38 aerial surveys (114 man-hours) for the purpose of photographing proposed project sites, scoping for pre-application meetings and analyzing confirmed violations.

An educational program continued in an effort to inform the public of the need and requirements for Department of the Army permits. This program was effected through press releases, public notes , public talks and personal interviews with interested agencies, committees and private industry representatives.

Agreements and the monthly joint interagency meeting continued with various Federal, State, and local agencies having related or similar responsibilities and functions to obtain maximum results with minimum costs by eliminating duplication of effort. The joint permit application and the joint public notice adopted between the Norfolk District and the State of Virginia have continued to result in decreases in the numerous forms of paperwork required to process a permit appliction.

The Norfolk District's Regulatory Branch continued to maintain the Northern Neck Project, the Eastern Shore Project Office, and established an office in Southwest Virginia. Each of the project offices provide readily available Corps personnel to assist waterfront owners, contractors, and the general public with their questions and problems on waterfront construction and the permit requirements of the Corps Regulatory program.

Disposition of leagal actions during the fiscal year:

There were 197 complaints of unauthorized activities. Of these, 61 were determined to be valid violations of Federal law. When combined with the remaining 66 carried over from last fiscal year, 263 unauthorized actions were investigated or monitored. Resolution of these violations were as follows: 44 through voluntary restoration; 40 through either the issurance of modified permits or after-the-fact permits; 13 were referred for legal action; 136 alleged activities were determined not to be violations of Federal law. The remaining 43 are in various stages of resolution or investigation.

16. TANGIER CHANNEL, VA

Location. A tidal channel about 2 miles long extending from Tangier Island, Virginia, northeasterly to deepwater in Tangier Sound, Chesapeake Bay and northwesterly to deepwater on Chesapeake Bay. (See Coast and Geodetic Chart No. 12228.)

Existing project. A channel 8 feet deep at mean low water and 100 feet wide from 8-foot contour to Tangier Sound to day marker No. 4, and thence 8 feet deep and 60 feet wide to the town of Tangier, with an anchorage basin adjacent of town 400 feet square and 7 feet deep. A channel 7 feet deep and 60 feet wide for about 4,000 feet from the anchorage basin northwesterly across Tangier Island to Chesapeake Bay. Mean range of tide is 1.7 feet and extreme tidal range 4.7 feet. (See Table 5-B for Authorizing Legislation.)

Local cooperation. Complied with except that interests must furnish spoil disposal area as needed for future maintenance.

Terminal facilities. Accomack County constructed a public dock in 1961. There are four privately owned docks adjacent to existing project and two marine railways.

Operations during fiscal year. Maintenance: dredging, by contract, was accomplished during Aug - Sep, 1985. There were 104,841 cubic yards of credited material removed at a total cost of $469,039. Ordinary operation and maintenance of the project to include engineering and design continued using government plant and hired labor.

17. THIMBLE SHOAL CHANNEL, VA

Location. In lower portion of Chesapeake Bay between Hampton Roads and the ocean, 20 miles northeast of center of Norfolk Harbor, extending southeasterly 12 miles from a point 1.25 miles east of Thimble Shoal Lighthouse toward entrance to Chesapeake Bay. (See National Ocean Survey Chart 1222.)

Existing project. Provides for dredging a channel 12 miles long, 1,000 feet wide, and 45 feet deep at mean low water with auxiliary channels 450 feet wide and 32 feet deep at mean low water adjoining each side of 1,000-foot channel. Under ordinary conditions mean tidal range is 2.5 feet and extreme 3 feet. Extremes of irregular fluctuation, due to combined wind and tides referred to mean low water, and minus 3 feet and plus 7 feet. For details of previous projects see Annual Report for 1932. (See Table 5-B for Authorizing Legislation.)

Local cooperation. None required.

Terminal facilities. Project serves as an entrance channel to Hampton Roads. See "Norfolk Harbor, VA", "Channel to Newport News, VA", etc.

Operations during fiscal year. Ordinary operation and maintenance of the project was accomplished. Engineering and design was accomplished and condition studies were conducted using government plant and hired labor.

18. WATERWAY ON THE COAST OF VIRGINIA

Location. Between barrier beach along Atlantic Ocean on the east and Virginia portion of mainland peninsula on the west. It extends for 83.7 miles from south end of Chincoteague Bay through a number of creeks, throughfares, and bays to enter Chesapeake Bay in the vicinity of Fisherman Island, just south of Cape Charles on the southern tip of the peninsula. (See National Ocean Survey Chart Nos. 12211, 12210, and 12221.)

Existing projects. An inland waterway 6 feet deep at mean low water and 60 feet wide from Chesapeake Bay to Chincoteague Bay, VA. Mean range of tide is about 3 feet. Greater fluctuations in water level are caused by high winds and storms. A modification of the project approved during 1970 under Section 201 of the Flood Control Act of 1965 authorizes relocation of portions of the waterway and widening of 100 feet. (See Table 5-B for Authorizing Legislation.)

Local cooperation. Complied with except that local interests are to furnish spoil disposal areas for future maintenance.

Terminal facilities. Existing facilities are considered adequate. For details see Annual Report for 1969.

Operations during fiscal year. Ordinary operation and maintenance of the project was accomplished. Engineering and design was accomplished and condition studies were conducted using government plant and hired labor.

19. YORK RIVER, VA

Location. This river is formed at West Point, VA, by the confluence of the Mattaponi and Pamunkey Rivers, and flows southeasterly about 41 miles into Chesapeake Bay, which it enters about 20 miles in a northerly direction from Norfolk, VA, and 20 miles in a northwesterly direction from the Atlantic Ocean at Cape Henry. (See National Ocean Survey Chart Nos. 494 and 495.)

Existing project. This provides for dredging a channel 22 feet deep at mean low water and 400 feet wide through the bars, and a basin of the same depth at the wharves at West Point, and the construction of a dike on the right bank at West Point to assist in maintaining the channel. The plane of reference is mean low water. Tidal ranges are: Mean 2.2 feet at mouth and 2.9 feet at West Point; and the extreme 3.9 feet at mouth and at West Point; irregular 6 feet at West Point.

The existing project was adopted by the River and Harbor Act of June 14, 1880 (Annual Report for 1880, p. 897). It was modified in 1884 and 1887. The latest published map is in the Annual Report for 1894, p. 964.

Terminal facilities. There are 18 wharves on the York River of open-pile construction. The facilities are considered adequate for the existing commerce.

Operations during fiscal year. Ordinary operation and maintenance of the project was accomplished. Engineering and design was accomplished and condition studies were conducted using government plant and hired labor.

20. NAVIGATION WORK UNDER SPECIAL AUTHORIZATION

STUDY/REPORT	FY 1985 EXPENDITURE
Navigation activities, section 107, Public Law 86-645	
There were four Detailed Project Studies in progress at the end of the fiscal year:	
Bennette Creek, Suffolk, VA	$48,501
Jordan Bridge Park, Chesapeake VA	55,066
Kings Creek Northampton Co., VA	83,016
Little Machipongo River, Northampton Co., VA	28,579
There were five favorable Appraisal Reports completed during the fiscal year:	
Nansemond River at Constance Wharf, Suffolk, VA	$7,500
Scotts Creek, Portsmouth, VA	7,500
Wachapreague Channel, Accomack Co., VA	7,500
Hunting Creek, Accomack Co., VA	7,500
Guilford Creek, Accomack Co., VA	7,500
There were two negative Appraisal Reports completed during the fiscal year:	
Swift Creek, Colonial Heights, VA	$7,500
Eastern Branch of Elizabeth River, VA	7,500

Beach Erosion Control
21. VIRGINIA BEACH, VA

Location. On the Atlantic Seaboard, 22 miles north of Virginia-North Carolina State line, 3.5 miles south of Cape Henry, and 19 miles east of Norfolk, VA. (See National Ocean Survey Chart 12207.)

Existing project. Federal participation in restoration and protection of shore of Virginia Beach between Rudee Inlet and 49th Street by artificial placement of sand to provide a minimum beach width of 100 feet at elevation 7 feet above mean low water, and maintenance of such beach by periodic replenishment of losses to insure continuous protection; including construction of a groin system to be undertaken at such times as estimated annual charges therewith would be less than the annual cost of beach replenishment alone. The United States shall participate in the first cost of the project to the full extent of its proportionate share of cost as a landowner, plus one third total first cost of restoring and protecting all publicly-owned sections of the shore. The 1962 modification provided that the United States shall further participate in periodic beach nourishment of the beach in the amount of one third the cost for 25 years from date of commencement of operations in placing an initial quantity of nourishment material equal to

deficiency in the design beach at that time. Section 103 of the 1962 River and Harbor Act increased Federal participation to one-half of the cost incurred after October 23, 1962. Estimated Federal cost (1984) is $5,500,000. Estimated cost to local interests is $5,500,000. Construction of the groin system is not included in the above estimate. The 1962 estimate for this work was $549,000 Federal cost and $531,000 cost to local interests. The 1974 modification provides for structural and nonstructural improvements. Structural measures would be provided for the 6 mile reach of shoreline between Rudee Inlet and 89th street. This would include raising the beach to elevation 10 feet and a width of 100 feet, driving a sheet pile wall just seaward of the existing bulkhead from Rudee Inlet to 57th Street; and raising and strengthening sand dunes from 57th to 89th Streets. The estimated cost (1984) of the structural improvements are Federal $28,900,000 and non-Federal $12,800,000. (See Table 5-B for Authorizing Legislation.)

Local cooperation. Requirements are described in full on page 5-11 of FY 81 Annual Report. Necessary changes in requirements will be made if the 1974 modification is constructed.

Operations during fiscal year. There were 146,200 cubic yards of material deposited on the project beach. Supervision and administration cost of $16,555 was partially offset by $6,808 received from the cooperating agency for an overpayment in a prior year. Local interests will be reimbursed for the Federal share of fiscal year 1985 costs in fiscal year 1986.

22. BEACH EROSION CONTROL WORK UNDER SPECIAL AUTHORIZATION

None this fiscal year.

Flood Control

23. GATHRIGHT DAM AND LAKE MOOMAW, VA

Location. Gathright Dam is on the Jackson River 43.4 miles upstream of the headwaters of the James River in Allegheny County. The Gathright Dam site is in the reach of the Jackson River known as the Gorge, which is 19 miles upstream of Covington, VA. The Gathright Reservoir extends 12 miles with a full conservation pool (See Falling Spring and Mountain Grove, VA - West VA quadrangles by United States Geological Survey).

Existing project. Gathright Dam is a rolled, rock-filled embankment about 1,172 feet in length with a maximum height fo 257 feet. The outlet works consist of a 1,075-foot-long tunnel with an inside diameter of 17.5 feet which discharges into a stilling basin 60 feet wide and 144 feet long. A 272-foot-high concrete intake tower is located at the upstream end of the tunnel near the right abutment. An ungated emergency spillway consisting of a chute about 2450 feet long and 100 feet wide is located in a low saddle in the divide at Fortney Branch, about 2.5 miles south of the dam. Discharges through the conservation pool provide water quality. There are 79,900 acre-feet available for flood control located above the conservation pool. (See Table 5-B for Authorizing Legislation.)

Local cooperation. None required.

Operations during the fiscal year. Ordinary operation and maintenance of the project continued, which included maintenance of buildings, grounds, service facilities and roads, engineering and design and supervision and administration.

24. RICHMOND FILTRATION PLANT, VA

Location. The city of Richmond's Water Filtration Plant lies on the north side of the James River. The plant is separated on the south from the river by the Chesapeake and Ohio Railway embankment. The Old James River and Kanawha Canal forms the plant's northern boundary. The canal is owned by the C & O Railroad Company; however, the city of Richmond has acquired all water rights. (See Richmond and Bon Air, VA quadrangles of geological survey.)

Previous projects. None.

Existing project. The project will provide for protection of the filtration plant proper. The basic plan provides for enclosing three sides of the plant tying into high ground. The walls will have an average height of about 9 feet with a top elevation of 117.0 m.s.l. The degree of protection provided is equivalent to the Standard Project Flood. A total of 11.5 acres will be protected from the design flood having a recurrence of 360 years over the project economic life of 50 years.

Local cooperation. Requirements are described in full on page 5-13 of FY 81 Annual Report. Requirements may change if legislation is enacted regarding new cost-sharing proposals.

Operations during fiscal year. Advance engineering and design, in preparation for project construction, was completed.

25. SCOTTSVILLE, VA

Location. The town of Scottsville, VA is located in Albemarle and Fluvanna Counties, on the north bank of the James River, 185 miles above its mouth.

Previous project. None.

Existing Project. The town encompasses 130 acres and the 1980 population was 250. It includes small commercial establishments and dwellings including many of historical value. A relatively large tire manufacturing plant is adjacent to the town in Albemarle County and is the largest employer in the area with about 270 employees.

Local cooperation. The Town of Scottsville would provide the following:

1. Provide without cost to the United States all lands, easements, rights-of-way, utility relocations and alterations, and highway or highway bridge construction and alterations necessary for project construction.

2. Hold and save the United States free from damages due to the construction works and adjust all claims concerning water rights.

3. Maintain and operate the project after completion without cost to the United States in accordance with regulations prescribed by the Secretary of the Army.

4. Assume full responsibility for all project costs in excess of the Federal cost limitation of $4 million.

5. Prevent future encroachment which might interfere with proper functioning of the project for flood control. This would include the assurances that encroachment on ponding areas inside the wall, or decrease in their storage capacity, will not be permitted.

6. Control future flood damages and exposure to flood hazards by enforcement of ordinances which will permit only uses of the flood plain which are consistent with the flood hazard. This will include areas outside of the proposed protection to be sure other flood problems are not allowed to develop.

7. Establish an ordinance which insures preservation and protection of historic and cultural interests within the town including a responsible local committee interested and knowledgeable in the historic and cultural aspects of Scottsville both within and without the floodplain, which committee will to the best of its powers:

a. Arrest deterioration in structures of historic value.
b. Assist and encourage future building in the historic district to be of design compatible with the historic structures.
c. Assist in the restoration, as occasion exists, some or all of the existing historic structures.

Operations during fiscal year. Approval for construction was granted this fiscal year. Engineering and design to include relocation studies, design reviews, and budgeting and scheduling was accomplished. Total contractor's earnings totalled $101,793 by years end.

26. VIRGINIA BEACH STREAMS CANAL NUMBER 2, VA

Location. The canal number 2 watershed with a drainage area of about 37 square miles lies within the city of Virginia Beach. The city consists of 255 square miles of primarily low, flat terrain with about 75 percent of the area below elevation 15 feet, mean sea level. The existing canal, from the Eastern Branch of the Lynnhaven River to the North Landing River is about 12 miles long and follows a north-south alignment. (See National Ocean Survey Chart No. 12205.)

Existing project. The project will provide for construction of a new canal for a length of 2.6 miles and channelization of an existing canal fro a lenght of 1.1 miles. The canal botom width will range from 45 feet to 80 feet and a depth from -4feet mean sea level to -8 feet mean sea level with a flow capacity great enough to carry a 100 year flood. Its construction will require dredging 741,000 cubic yards of material.

Local cooperation. Requirements are described in full on page 5-14 of FY 81 Annual Report. Requirements may change if legislation is enacted regarding new cost-sharing proposals.

Operations during fiscal year. Work on plans and specifications, real estate studies and budgeting and scheduling was performed in preparation for construction.

27. FLOOD CONTROL WORK UNDER SPECIAL AUTHORIZATION

None this year.

28. EMERGENCY FLOOD CONTROL ACTIVITIES

During FY 85, $75,302 was spent on the National Emergency Preparedness Program. In addition, $726,556 was spent for repairs to the Jamestown Island Seawall.

General Investigations
29. SURVEYS

Total cost of surveys during the fiscal year amounted to $594,684. Work performed consisted of $216,192 for Navigation Studies; $90,589 for Flood Control Studies; $196,554 for Review of Completed Projects; $7,893 for Deauthorization Review; $35,767 for Projects Authorized for Phase I AE&D; and $47,689 for Coordination Studies with other Agencies.

30. COLLECTION AND STUDY OF BASIC DATA

During the fiscal year cost of collection and study of Basic Data was $150,019, consisting of $59,441 for Management Service Unit; $67,513 for Technical Services, and $23,065 for Hurricane Evacuation Study.

31. CONTINUATION OF PLANNING AND ENGINEERING

During FY 1985 work continued on the Norfolk Harbor Deepening project. Total project costs amounted to $1,927,525 for this fiscal year. Work continued on the 55-foot channel and anchorage plan. Other work performed included environmental and economic studies, preparation of reports, project management, soils exploration and surveys. Work was accomplished by contract and government plant and hired labor. Completion is scheduled for FY 1986.

Work also progressed on the Richmond (Local Protection) Flood Control project. Total project costs amounted to $875,216 for this fiscal year. Work performed included structural and civil engineering, utilities search, hydraulics and hydrology, and geotechnical investigations.

TABLE 5-A COST AND FINANCIAL STATEMENT

See Sect. in Tect	Project	Funding	FY 82	FY 83	FY 84	FY 85	Total Cost To 30 Sep 1985
1.	Atlantic Intracoastal Waterway, between Norfolk, VA and the St. John's River, FL (Norfolk Dist) (Regular Funds)	New Work					
		Approp	-	-	-	-	3,688,372[1]
		Cost	-	-	-	-	3,688,372[1]
		Maint					
		Approp	2,025,000	2,077,000	1,213,817	2,570,649	43,204,961[2]
		Cost	1,598,261	1,415,832	2,343,728	2,521,787	43,152,022[2]
		Major Rehab					
		Approp	-	-	-	-	479,947
		Cost	-	-	-	-	479,947
		Recreation					
		Approp	-	-	-	-	59,871
		Cost	-	-	-	-	59,871
2.	Baltimore Harbor and Channels (Norfolk Dist) (Regular Funds)	New Work					
		Approp	-	-	-	-	8,015,073[3]
		Cost	-	-	-	-	8,015,073[3]
		Maint					
		Approp	1,663,300	1,079,000	40,000	88,000	8,664,486[3]
		Cost	696,090	1,885,518	200,690	88,001	8,677,486[3]
3.	Broad Creek, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	27,888
		Cost	-	-	-	-	27,888
		Maint					
		Approp	8,198	46,945	353,314	12,250	494,279
		Cost	8,198	24,945	375,313	12,251	494,279
	(Contributed Funds)	New Work					
		Approp	-	-	-	-	500
		Cost	-	-	-	-	500
4.	Channel to Newport News, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	8,955,974
		Cost	-	-	-	-	8,955,974
		Maint					
		Approp	838,964	-	-	1,400,715	5,721,349
		Cost	838,964	-	-	1,400,335	5,720,969
5.	Chincoteague Harbor of Refuge, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	49,396
		Cost	-	-	-	-	49,396
		Maint					
		Approp	-	-	-	120,377	133,072
		Cost	-	-	-	120,345	132,327
6.	Chincoteague Inlet, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	227,000
		Cost	-	-	-	-	227,000
		Maint					
		Approp	639,131	708,366	1,381,182	918,015	5,379,407
		Cost	620,913	625,959	1,484,896	917,618	5,379,006
	(Contributed Funds)	New Work					
		Approp	-	-	-	-	3,850
		Cost	-	-	-	-	3,850

TABLE 5-A (Cont.) COST AND FINANCIAL STATEMENT

See Sect. in Text	Project	Funding	FY 82	FY 83	FY 84	FY 85	Total Cost to 30 Sep 1985
7.	Cranes Creek, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	6,274
		Cost	-	-	-	-	6,274
		Maint					
		Approp	-	-	-	187,000	194,325
		Cost	-	-	-	175,130	182,455
8.	Hampton Roads and Harbors of Norfolk and Newport News, VA Collection and Removal of Drift (Regular Funds)	Maint					
		Approp	105,493	155,000	169,526	178,241	2,755,879
		Cost	117,604	120,910	221,568	178,209	2,755,821
9.	Hoskins Creek, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	44,100
		Cost	-	-	-	-	44,100
		Maint					
		Approp	-	-	34,226	59,762	671,303
		Cost	-	-	34,225	59,763	671,303
10.	James River, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	7,639,904[4]
		Cost	-	-	-	-	7,639,904[4]
		Maint					
		Approp	2,811,254	1,440,000	814,658	1,538,877	26,211,586
		Cost	2,823,448	1,689,700	1,076,147	1,430,155	26,102,608
	(Contributed Funds)	New Work					
		Approp	50,000	-	56,000	-	350,456
		Cost	-	50,000	19,755	31,512	345,723
11.	Little Machipongo River, VA (Regular Funds)	New Work					
		Approp.	-	-	-	-	15,000
		Cost	-	-	-	-	15,000
		Maint					
		Approp	-	-	-	62,596	110,870
		Cost	-	-	-	62,594	110,868
12.	Lynnhaven Invet, VA (Regular Funds)	New Work					
		Approp	24,629	-	-	-	445,354
		Cost	28,501	-	-	-	445,354
		Maint					
		Approp	472,034	28,592	83,414	510,456	2,098,035
		Cost	472,033	28,593	83,372	510,498	2,098,035
	(Contributed Funds)	New Work					
		Approp	7,017	-	-	-	98,664
		Cost	2,620	4,313	-	-	98,580
		Maint					
		Approp	112,358	-	94,000	-	233,158
		Cost	102,900	9,458	84,000	10,000	233,158

TABLE 5-A (Cont.) COST AND FINANCIAL STATEMENT

See Sect. in Text	Project	Funding	FY 82	FY 83	FY 84	FY 85	Total Cost to 30 Sep 1985
13.	Norfolk Harbor, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	36,399,115[5]
		Cost	60,811	(-)2,548	6,013	-	36,399,115[5]
		Maint					
		Approp	6,310,744	7,305,699	4,627,375	3,816,880	69,528,256[6]
		Cost	4,777,927	4,648,737	9,369,636	3,739,813	69,448,187[6]
	(Contributed Funds)	New Work					
		Approp	-	-	-	-	179,480
		Cost	-	-	-	-	179,480
14.	Parker Creek, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	34,000
		Cost	-	-	-	-	15,530
		Maint					
		Approp	-	-	-	21,000	118,644
		Cost	-	-	-	20,999	118,643
15.	Supervision of Harbor of Hampton Roads, VA (Regular Funds)	Maint					
		Approp	192,000	212,000	230,912	247,759	4,843,599
		Cost	190,547	176,835	274,501	247,229	4,842,788
16.	Tangier Channel, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	116,550
		Cost	-	-	-	-	116,550
		Maint					
		Approp	434,918	(-)7,881	-	536,348	2,338,430
		Cost	360,094	66,945	-	536,346	2,338,428
17.	Thimble Shoal Channel, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	13,534,967
		Cost	-	-	-	-	13,534,967
		Maint.					
		Approp	4,211,000	58,731	39,979	65,729	11,025,733
		Cost	4,791,677	252,826	69,860	65,729	11,025,732
18.	Waterway on the Coast of VA (Regular Funds)	New Work					
		Approp	-	-	-	-	850,498
		Cost	-	-	-	-	850,498
		Maint					
		Approp	1,696,000	1,354,300	175,000	212,000	9,862,632
		Cost	1,678,264	1,001,236	547,251	211,272	9,861,823
19.	York River, VA (Regular Funds)	New Work					
		Approp	-	-	-	-	180,904
		Cost	-	-	-	-	180,904
		Maint					
		Approp	-	-	-	16,500	194,671
		Cost	-	-	-	16,350	194,521
20.	Virginia Beach, VA (Regular Funds)	New Work					
		Approp	364,000	380,000	430,000	-	3,940,195
		Cost	352,585	363,513	384,330	9,747	3,876,013
	(Contributed Funds)	New Work					
		Approp	-	-	-	-	204,683
		Cost	-	-	-	-	204,683

TABLE 5-A (Cont.) COST AND FINANCIAL STATEMENT

See Sect. in Text	Project	Funding	FY 82	FY 83	FY 84	FY 85	Total Cost to 30 Sep 1985
21.	Gathright Dam and Lake Moomaw, VA	New Work					
		Approp	(-)14,000	-	-	-	80,670,527
		Maint	527,222	193,721	-	-	80,670,527
		Approp	729,000	833,000	820,000	870,000	6,377,000
		Cost	683,273	838,172	914,128	852,484	6,351,544
22.	Richmond Filtration Plant, VA (Regular Funds)	New Work					
		Approp	7,000	-	-	-	478,224
		Cost	50,329	-	-	1,404	478,224
23.	Scottsville, VA (Regular Funds)	New Work					
		Approp	-	-	213,500	3,090,000	3,303,500
		Cost	-	-	47,345	151,884	199,229
24.	Virginia Beach Streams, Canal Number 2, VA	New Work					
		Approp	85,000	33,000	-	15,000	435,000
		Cost	139,577	57,446	10,864	7,088	420,000

[1] Includes $292,096 for previous projects.
[2] Includes $52,804 for previous projects.
[3] Costs prior to 1942 are included in the project "Baltimore Harbor and Channels, MD (Baltimore District). Costs listed are for York Spit Channel, VA and Cape Henry Channel, VA.
[4] Includes $763,000 for previous projects.
[5] Includes $2,561,704 for previous projects and new work.
[6] Includes $72,039 for previous projects.

TABLE 5-B AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	ATLANTIC INTRACOASTAL WATERWAY BETWEEN NORFOLK, VA. AND ST. JOHNS RIVER, FLA. (NORFOLK DISTRICT) (See Section 1 of Text)	
Mar. 3, 1899	Existing project dimensions and original route, waterway from Norfolk, Va. to sounds of North Carolina	H. Doc. 317, 54th Cong., 1st sess. AR 1896 H. Doc. 131, 55th Congs., 3d sess. AR 1899
July 25, 1912	Original route to Norfolk-Beaufort Inlet section	H. Doc. 391, 62d Congs., 2d sess.
July 25, 1912	Purchase of Albemarle & Chesapeake Co. Canal	H. Doc. 589, 62d Cong., 2d sess.
Mar. 3, 1925	Purchase of Lake Drummond Canal (Dismal Swamp Canal)	Rivers & Harbors Comm. Doc. 67th Cong., 2d sess.
July 3, 1930	Construct a tidal lock at Great Bridge at a cost not to exceed $500,000	S. Doc. 23. 71st Cong., 1st sess.[1]
June 26, 1934	Operating and care of works of improvement provided for with funds from War Department appropriations for rivers and harbors	Not available
Mar. 2, 1945	Construct dikes for protection of canal property against floodtides	H. Doc. 117, 76th Cong., 1st sess.
	BALTIMORE HARBOR AND CHANNELS (NORFOLK DISTRICT) (See Section 2 of Text)	
	CAPE HENRY CHANNEL, VA. (See Section 2 of Text)	
July 3, 1958	A channel 42 feet deep, 1,000 feet wide	H. Doc. 86, 85th Cong., 1st sess.
Dec. 31, 1970	Channel depth increased to 50 feet	Chief of Engineers Report Sept. 21, 1970
	RAPPAHANNOCK SHOAL CHANNEL, VA. (See Section 2 of Text)	
July 3, 1958	Channel 42 feet deep and 800 feet wide	H. Doc. 86, 85th Cong., 1st sess.
Dec. 31, 1970	Channel width increased to 1,000 feet and depth increased to 50 feet.	Chief of Engineers Report, Sept. 21, 1970
	YORK SPIT CHANNEL, VA. (See Section 2 of Text)	
Mar. 3, 1905	Channel 35 feet deep, 600 feet wide	H. Doc. 186, 57th Cong., 2d sess.
Mar. 4, 1913	Channel width increased to 1,000 feet	H. Doc. 190, 62d Cong., 3d sess.
July 3, 1930	Channel depth increased to 37 feet	H. Doc. 29, 71st Cong., 1st sess.
Mar. 2, 1945	Channel depth increased to 39 feet	H. Doc. 741, 79th Cong., 2d sess.
July 3, 1958	Channel depth increased to 42 feet	H. Doc. 86, 85th Cong., 1st sess.
Dec. 31, 1970	Channel depth increased to 50 feet	Chief of Engineers Report Sept. 21, 1970
	BROAD CREEK, VA. (See Section 3 of Text)	
Mar. 2, 1945	Channel 7 feet deep, 100 feet wide	H. Doc. 381, 76th Cong., 1st sess.
	CHANNEL TO NEWPORT NEWS, VA. (See Section 4 of Text)	
June 25, 1910	Channel 35 feet deep, 400 feet wide	H. Doc. 550, 61st Cong., 2d sess.
Aug 8, 1917	Channel 35 feet deep, 600 feet wide	H. Doc. 486, 67th Cong., 4th ses.
Jan 21, 1927	Channel 40 feet deep, 600 feet wide	H. Doc. 143, 89th cong., 1st sess.
Oct 27th 1965	Channel 40 feet deep, 800 feet wide, two deep-draft anchorage	
	CHINCOTEAGUE HARBOR OF REFUGE, VA (See Section 5 of Text)	
July 14, 1969 (Sec. 107)	Existing Project	Approved in 1962

TABLE 5-B (Cont.) AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	CHINCOTEAGUE INLET, VA (See Section 6 of Text)	
July 14, 1960 (Sec. 107)	Existing Project	Approved in 1972
	CRANES CREEK, VA (See Section 7 of Text)	
Mar. 2, 1945	Entrance Channel 6 fet dep, 80 feet wide	H. Doc. 687, 76th Cong., 3d sess.
	HAMPTON ROADS AND HARBORS OF NORFOLK AND NEWPORT NEWS, VA. COLLECTION AND REMOVAL OF DRIFT (See Section 8 of Text)	
May 17, 1950	Collection and removal of floating debris in Hampton roads and its tributary waters	Specified in Act
	HOSKINS CREEK, VA. (See Section 9 of Text)	
Mar. 2, 1945	A channel 8 feet deep and 100 feet wide in Rappahannock River, 80 feet wide in creek with turning basin 250 feet long and 200 feet wide.	Rivers & Harbors Committee Doc. 3, 75th Cong., 1st sess.
	A channel depth increased to 10 feet and width in creet to 80 feet.	H. Doc. 129, 77th Cong., 1st sess.
	JAMES RIVER, VA. (See Section 10 of Text)	
July 5, 1884	Channel 22 feet deep from mouth of Richmond and construct spur and training dikes	S. Ex. Doc. 714, 47th Cong., 1st sess.
June 13, 1902	Extension of improvement to Richmond lock gate	H. Doc. 234, 56th Cong., 1st sess.
Mar. 3, 1905	Form a turning basin by widening channel at Richmond	H. Doc. 234, 56th Cong., 1st sess.
July 3, 1930	Channel 25 feet deep mouth to Richmond Deepwater Terminal	H. Doc. 314, 71st Cong., 2d sess.
Aug. 26, 1937	Removal of Trigg cofferdam	Rivers & Harbors Comm. Doc. 68 74th Cong., 1st sess.[2]
Mar. 2, 1945	Turning basin at Richmond Harbor	H. Doc. 738, 77th Cong., 2d sess.
May 17, 1950	Maintaining turning basin at Richmond Deepwater Terminal	H. Doc. 191, 81st Cong., 1st sess.
Oct. 23, 1962	Channel depth increased to 35 feet to Richmond Deepwater Terminal	H. Doc. 586, 87th Cong.,2d sess.
	LITTLE MACHIPONGO RIVER, VA (See Section 11 of Text)	
Jul. 3, 1930	Existing Project.	H. Doc. 260, 71st Cong., 2d sess.
	LYNNHAVEN INLET, VA. (See Section 12 of Text)	
Oct. 23, 1962	Existing project.	H. Doc. 580, 87th Cong., 2d sess.
July 14, 1960 (Sec. 107)	Long Creek, Lynnhaven Inlet modification	Approved in 1982
	NORFOLK HARBOR, VA. (See Section 13 of Text)	
	Hampton Roads and Elizabeth River	
Mar. 2, 1907	Channel 30 feet deep to Navy Yard	H. Doc. 381, 59th Cong., 1st sess.
June 25, 1910	Depth of 35 feet to Navy Yard.	H. Doc. 551, 61st Cong., 2d sess.
Aug. 8, 1917	Depth of 40 feet and width of 750 feet to mouth of Southern Branch.	H. Doc. 140, 65th Cong., 1st sess.
Sept. 3, 1954	Widen 40-foot channel to 1,500 feet from 40-foot contour in Hampton Roads to a point just south of Norfolk International Terminal.	S. Doc. 122, 83rd Cong., 2d sess.
Oct. 27, 1965	45 feet deep Ft. Wool to Lambert Point, 800 feet wide Norfolk International Terminal to Lambert Point.	H. Doc. 187, 89th Cong., 1st sess.

TABLE 5-B (Cont.) AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	SOUTHERN BRANCH	
June 25, 1910	Channel with a depth of 22 and 25 feet.	H. Doc. 551, 61st Cong., 2d sess.
Aug. 8, 1917	Depth of 40 feet and width of 450 feet from mouth to Belt Line RR Bridge.	H. Doc. 140, 65th Cong., 1st sess.
Mar. 30, 1925	Channel 30 feet deep and 375 feet wide to Virginia Ry. bridge: thence 25 feet deep and generally 200 feet wide to Norfolk & Western RR Bridge.	H. Doc. 226, 68th Cong., 1st sess.
Aug. 30, 1935	Depth of 25 feet and width of 200 feet from Norfolk & Western RR bridge to a point 2,500 feet above with a turning basin 500 feet square.	H. Doc. 182, 73d Cong., 2d sess.[2]
June 30, 1948	Approach and turning area 40 feet deep and a maximum width of 830 feet opposite Norfolk Naval Shipyard: thence a channel 35 feet deep and 375 and 250 feet wide to a point 1900 feet above Norfolk & Western RR bridge and a turning basin 35 feet deep and 600 feet at upstream end.	H. Doc. 545, 80th Cong., 2d sess.
Oct. 27, 1965	45 feet deep Belt Line bridge to Old Virginia bridge, 35-foot deep turning basin opposite St. Julians Creek.	H. Doc. 187, 89th Cong., 1st sess.
Oct. 22, 1976	Extend existing 35-foot project to a channel 35 feet deep and 250 feet wide upstream 1.5 miles to the Norfolk and Portsmouth Belt Line RR bridge and a turning basin at the mouth of Mains Creek 35 feet deep and 800 feet square.	H. Doc. 355, 94th Cong., 2d sess.
	EASTERN BRANCH	
Mar. 2, 1907	Width of 500 feet and depth of 25 and 22 feet.	H. Doc. 373, 59th Cong., 1st sess.
	Removel of shoals at mouth.	Specified in act
Mar. 3, 1925	Depth of 25 feet and width of 200 feet from Norfolk & Western RR bridge to Virginia RR bridge.	H. Doc. 226, 68th Cong., 1st sess.
July 3, 1930	30-foot channel to a point opposite terminal of Imperial Tobacco Co. in Berkley.	H. Doc. 37, 71st Cong., 1st sess.[3]
Mar. 2, 1945	Depth of 25 feet and width of 300 feet from Norfolk & Western RR bridge to Campostella bridge.	H. Doc. 224, 76th Cong., 1st sess.
	WESTERN BRANCH	
Mar. 4, 1913	Channel 24 feet deep and 300 & 400 feet wide to West Norfolk highway bridge.	H. Doc. 556, 62nd Cong., 2d sess.
July 3, 1930	For 18-foot channel to a point about 3,000 feet above West Norfolk highway bridge.	H. Doc. 265, 70th Cong., 1st sess.
	SCOTTS CREEK	
July 3, 1930	Channel 12 feet deep and 100 feet wide to a point 100 feet above the Atlantic Coast Line RR bridge.	H. Doc. 189, 70th Cong., 1st sess.
	ANCHORAGES	
June 25, 1910	30-foot anchorage at Lambert Point	H. Doc. 551, 61st Cong., 2d sess.
Aug. 8, 1917	12-foot anchorage at Pinner Point	H. Doc. 605, 63rd Cong., 2d sess.[1]
Sept. 3, 1954	An anchorage 38 feet deep and 1,500 feet square: anchorage 35 feet deep and 1,500 feet square: and an anchorage 20 feet deep, 1,000 feet wide and 3,000 feet long.	S. Doc. 122, 83rd Cong., 2d sess.[1]
Oct. 27, 1965	Two anchorages opposite Sewells Point 45 feet deep with 1,200-foot swinging radius.	H. Docs. 187 & 143, 89th Cong., 1st sess.

TABLE 5-B (Cont.) AUTHORIZING LEGISLATION

Acts	Work Authorized	Documents
	PARKER CREEK, VA (See Section 14 of Text)	
Jul. 14, 1960 (Sec. 107)	Existing Project	Approved in 1964.
	TANGIER CHANNEL, VA (See Section 16 of Text)	
Mar. 2, 1919	Channel from Tangier Sound and anchorage	H. Doc. 107, 63rd Cong., 1st Sess.
Jan. 3, 1934 (P.W.A. Act) & Aug. 30, 1935		Rivers and Harbors Comm. Doc. 51, 72nd Cong., 2d sess.
Mar 2, 1945	Modified project dimensions	H. Doc. 141, 77th Cong., 1st sess.
Jul. 14, 1960 (Sec. 107)	Channel across Tangier Island	Approved in 1964
	THIMBLE SHOAL CHANNEL, VA. (See Section 17 of Text)	
Aug. 8, 1917	A channel 40 feet deep and 750 feet wide.	H. Doc. 140, 65th Cong., 1st sess.
Sept. 3, 1954	Channel width increased to 1,000 feet with side channels on either side 32 feet deep and 450 feet wide.	S. Doc. 122, 83d Cong., 2d sess.[1]
Oct. 27, 1965	Channel 45 feet deep and 1,000 feet wide.	H. Doc. 187, 89th Cong., 1st sess.
	WATERWAY ON THE COAST OF VIRGINIA (See Section 18 of the Text)	
June 25, 1910	Existing project adopted.	H. Doc. 957, 60th Cong., 1st sess.
Mar. 2, 1945	Project modified.	H. Doc. 268, 76th Cong., 1st sess.
Oct. 27, 1965 (Sec. 107)	Project widened to 100 feet, partially relocated, and incorporated in Delaware Bay-Chesapeake Bay Waterway in Delaware-Maryland-Virginia.	Approved in 1970.
	YORK RIVER, VA (See Section 19 of Text)	
June 14, 1880	Project Authorized	
1884	Project Modified	
1887	Project Modified	
	VIRGINIA BEACH, VA (See Section 21 of Text)	
Sept. 3, 1954	Project authorized.	H. Doc. 186, 83rd Cong., 1st sess.
Oct. 23, 1962	Project modified.	H. Doc. 382, 87th Cong., 2d sess.
Mar. 7, 1974	Project modification authorized for Phase I Advanced Engineering and Design.	H. Doc. 365, 92nd Cong., 2d sess.
	GATHRIGHT DAM AND LAKE MOOMAW, VA (See Section 23 of Text)	
July 24, 1946	Project authorized.	H. Doc. 325, 61st Cong., 2d sess.
	RICHMOND FILTRATION PLANT (See Section 24 of Text)	
Oct. 22, 1976	Project Authorized	H. Doc. 543, 94th Cong., 2d sess.
	SCOTTSVILLE, VA (See Section 25 of Text)	
1948 (Sec. 205)	Project Approved	H. Doc. 551, 84th Cong., 1st sess.
	VA. BEACH STREAMS, CANAL NO. 2, VA. BEACH, VA. (See Section 26 of Text)	
Oct. 27, 1965 (Sec. 201)	Project authorized.	H. Doc. 640, 94th Cong., 2d sess.

[1] Contains latest published map.
[2] Included in Emergency Relief Administration Program May 23, 1935.
[3] For latest published map. See H. Doc. 1246. 62d Cong., 3d Sess.

TABLE 5-C

ATLANTIC INTRACOASTAL WATERWAY BETWEEN NORFOLK VA. AND ST. JOHNS RIVER, FLORIDA: DATA RELATIVE TO THE COMPLETED LOCKS (See Section 1 of Text)

Miles from Norfolk, Va.	Location	Width of Chamber feet	Dimensions Greatest Length Available for Full Width (feet)	Lift (feet)	Depth on Miter Sills: Upper (feet)	Depth on Miter Sills: Lower (feet)	Character of Foundation	Year Opened to Navigation	Cost
12.4	Albemarle and Chesapeake Canal (Great Bridge, Va.)	75	600	2.7	[1]	[1]	Piles in sand and shells	1932	$499,913
10.7	Dismal Swamp Canal (Deep Creek)	52	300	12	12	12	Natural earth with cutoff walls	1940	$348,879
33.1	Dismal Swamp Canal (South Mills, N.C.)	52	300	12	12	13	Natural earth with cutoff walls	1941	$372,556

[1] 16 feet at mean low water.

TABLE 5-D OTHER AUTHORIZED NAVIGATION PROJECTS

Project	For Last Full Report, See Annual Report For	Cost to Sept. 30, 1985		Additional Expenditure For New Work Expended From Contributed Funds
		Construction	Maintenance	
Appomattox River, Va.[1]	1980	$870,341	$863,140	-
Aberdeen Creek, Va.[2]	1975	109,643	200,893	-
Blackwater River, Va.				
Active portion[2 11]	1975	342,118	151,735	19,300
Cape Charles City Harbor, VA[2]	1984	622,644	493,708	
Carters Creek, Va.				
Active portion[2 3]	1951	28,398	3,277	-
Channel from Phoebus, Va.				
to deepwater in Hampton Roads[2]	1944	11,500	32,442	1,200
Channel connecting York River, Va.				
Back Creek to Slaights Wharf[2]	1950	14,855	36,874	2,500
Chesconessex Creek, Va.[2]	1968	25,516	31,889	-
Chincoteague Bay, VA	1984	25,126	371,984	-
Chowan River, N.C.[2]	1975	107,220	-	5,700
Cockrells Creek, Va.[4]	1949	-	-	-
Davis Creek, Va.[2]	1971	97,612	158,323	4,000
Deep Creek, Accomack Co., Va.	1974	83,000	39,675	-
Deep Creek, Newport News, Va.[2]	1980	288,278	2,054,201	-
Dymers Creek, Va.[2]	1953	5,582	4,610	-
Greenvale Creek, Va.[2]	1980	20,003	198,420	2,910
Hampton Creek, Va.	1981	186,237	1,116,952	62,969
Horn Harbor, Va.[2]	1964	13,987	88,488	-
Hoskins Creek, Va.[2]	1977	44,100	622,801	500
Jackson Creek, Va.[2]	1971	8,500	34,437	-
Jarvis Creek, Va.[4]	1979	39,259	-	-
Kings Creek, Va.[4]	1957	5,593	-	-
Lafayette River, Va.[2]	1982	242,047	153,598	188,962
Little River (Creek), Va.[2 13]	1966	168,623	442,033	16,955
Locklies Creek, Va.[2]	1928	11,581	9,560	-
Meherrin River, N.C.[2]	1950	47,734	49,591	-
Milford Haven, Va.[2]	1950	24,568	32,322	-
Mill Creek, Va.[2]	1937	5,445	4,346	-
Mulberry Creek, Va.[2]	1950	2,393	2,458	-
Nandua Creek, Va.[2]	1950	6,988	39,804	-
Nansemond River, Va.[8]	1978	167,477	426,777	-
Newport News Creek, Va.[2]	1962	135,600	147,570	-
Nottoway River, Va.[2]	1981	44,295	-	43,000
Occohannock Creek, Va.				
Active portion[2]	1951	13,859	78,283	-
Onancock River, Va.[2 5]	1963	187,914	427,233	-
Oyster Channel, VA[2]	1984	119,117	630,353	-
Pagan River, Va.[2 6]	1950	51,425	284,381	-
Pamunkey River, Va.				
Active portion[2]	1964	31,376	161,183	-
Parrotts Creek, Va.[2]	1957	37,045	37,771	-
Portsmouth Harbor, Va. Channel to				
Nansemond Ordnance Depot[2]	1947	165,566	66,162	-

Queens Creek[2]	1979	26,949	101,803	-
Quinby Creek, Va.	1983	104,176	731,207	-
Rappahannock River, Va.[9 10 12]	1983	414,633	1,958,360	-
Rappahannock River at Bowlers Wharf, Va.[4]	1950	-		
Starlings Creek, Va.[2]	1981	66,242	603,632	-
Taskinas Creek, Va.	1975	7,479	135	-
Totuskey Creek, Va.	1970	167,869	450,693	2,000
Tylers Beach, Va.[2]	1982	261,201	404,943	-
Urbanna Creek, Va.[2 7]	1963	55,724	106,868	-
Whitings Creek, Va.	1971	21,630	112,333	500
Winter Harbor, Va.[2]	1981	171,334	291,048	2,973
Willoughby Channel, Va.[2]	1953	8,500	42,485	-
Wishart Point Channel, Va.[2]	1975	118,762	102,244	30,625

[1]Includes $22,500 for previous projects.
[2]Completed.
[3]In addition, $700 for maintenance was expended from contributed funds.
[4]Inactive.
[5]Includes $33,549 for new work and $24,754 for maintenance for previous projects.
[6]Includes $20,671 for new work for previous projects.
[7]In addition, $61,087 was expended for rehabilitation.
[8]Includes $30,000 for new work and $7,000 for maintenance for previous projects.
[9]In addition, $168,091 was expended for rehabilitation.
[10]Includes $197,146 for previous new work projects.
[11]Includes $15,000 for new work for previous projects.
[12]Includes $113,500 for previous maintenance projects.
[13]Federal funds expended by the U.S. Navy for new work.

TABLE 5-E OTHER AUTHORIZED BEACH EROSION

Project	For Last Full Report, See Annual Report For	Cost to Sept. 30, 1985		Additional Expenditure For New Work Expended From Contributed Funds
		Construction	Maintenance	
Anderson Park, Newport News, Va.	1979	$471,474	-	$176,671
Hampton Institute	1976	$156,906	-	$175,845

TABLE 5-F OTHER AUTHORIZED FLOOD CONTROL PROJECTS

Project	For Last Full Report, See Annual Report For	Cost to Sept. 30, 1985		Additional Expenditure For New Work Expended From Contributed Funds
		Construction	Maintenance	
Buena Vista, Va.	1977	$ 417,900[1]		-
Newmarket Creek, Va.	1970	1,000,000	12,283	$550,097
Norfolk Floodwall, Va.	1973	1,851,933	32,877	516,256
Salem Church Lake, Va.	1976	1,896,716[1 2]	-	-

[1]Preconstruction planning terminated.
[2]Includes $144,785 for previous projects.

TABLE 5-G RECONNAISSANCE AND CONDITION SURVEYS

Name of Project	Date Survey Conducted
CONDITION SURVEYS	
Chincoteague Inlet	Oct 1984
Dam Neck Disposal Area	Feb 1985
Davis Creek	Oct 1984
Deep Creek - Newport News	Feb 1985
Hampton Creek	Jan - Feb 1985
James River	
Richmond Harbor	Jul 1985
Jordan Point - Harrison Bar - Windmill Point	Apr 1985
Rocklanding Shoal	Apr 1985
Weyanoke Point Channel	Mar 1985
Goose Hill Channel	Feb 1985
Lafayette River	
Knitting Mill Creek	May 1985
Appomatox River	Apr - Jun 1985
Little River (Creek)	Jan - Feb 1985
York River - Back Creek to Slaights Wharf	Jun 1985
Nandua Creek	Mar 1985
Little Machipongo River	Aug 1985
Norfolk Harbor	
Southern Branch of Elizabeth River 35' Channel	Aug 1985
Eastern Branch of Elizabeth River	Feb 1985
Sewells Point Anchorage	May 1985
Oyster Channel	Apr 1985
Whiting Creek	May 1985
RECONNAISSANCE SURVEYS	
None this fiscal year.	