



Oregon Coast Basin

The Oregon Coast Basin includes all streams south of the Columbia River which drain directly to the Pacific Ocean. It has three distinct sub-basins: Rogue, Umpqua, and Coastal. The Rogue and Umpqua rivers, both in southern Oregon, rise in the Cascade Range 100 or more miles east of the coastline and breach the coastal mountain ranges before discharging into the Pacific. The Coastal sub-basin is made up of numerous small streams draining only the western slope of the coastal mountain ranges, rising 20 or 30 miles east of the coastline. In the lower reaches of the estuaries, the Rogue and Umpqua rivers appear the same as the coastal streams, except that they are wider. The inland areas of the Rogue and Umpqua basins experience heavy precipitation and high streamflows in winter and prolonged dry periods and low streamflows in the summer. For the Coastal sub-basin, the summer dry season is shorter and less intense than inland. In the reaches along the estuaries, flood problems on all streams are caused as much by high tides as by storm runoff. Harbors require continual maintenance because the estuaries are constantly filling with sediment, especially during winter floods. Jetties must be rebuilt periodically because of wave damage. The entire basin lies within the Corps' Portland District.

Mainstays of the economy are wood products

and tourism. Mills ship much of their production via oceangoing freighters. The scenic Oregon coast attracts vacationers from all over the world.

The Oregon Coast Basin encompasses about 17,300 square miles. The Rogue and Umpqua rivers each drain about 5,000 square miles, and discharge an average of about six million acre-feet of water annually to the Pacific Ocean. Flows in the lower reaches of both streams run as low as 1,000 cubic feet per second (cfs) during the dry summer, but have reached nearly 300,000 cfs during floods. The coastal streams drain considerably smaller areas. The Nehalem, Trask, Wilson, Nestucca, Siletz, Yaquina, Alsea, Siuslaw, Coos, Coquille, and Chetco rivers are the main streams. Many smaller streams also drain directly to the ocean.

The Army Corps of Engineers has constructed many projects in the basin and others are authorized or under study. Thirteen harbor projects and two inland waterways have been constructed to provide improved navigation.

Three multipurpose reservoirs have been authorized for construction in the Rogue River Basin: Lost Creek Lake, Applegate Lake, and Elk Creek Lake. These Rogue River Basin projects are the first in Oregon to have fish and wildlife enhancement, municipal and

industrial water supply, water quality control, and recreation as authorized primary purposes. Lost Creek Lake on the Rogue River began operating in 1977. Construction of Applegate Lake on the Applegate River was completed in 1981. Construction of a third project, Elk Creek Lake on Elk Creek, was stopped by a legal injunction. Several single-purpose flood control projects have been constructed in the coast basin and numerous improvements and repairs have been made under continuing authorities for flood damage reduction.

Multipurpose Development

Existing Projects

Lost Creek Lake

Lost Creek Lake on the Rogue River is one of three multiple-purpose storage projects authorized by Congress in 1962 to provide flood control and water resource development in the Rogue River Basin. Construction started in 1967, the dam was essentially completed in 1976, and the lake began filling in February 1977. The authorized primary project purposes are flood control, power generation, recreation, and irrigation. The project, located about 27 miles northeast of Medford, also is operated for municipal and industrial water supply, fish and wildlife enhancement, and water quality control. In 1996, the dam and intake structure were renamed for William L. Jess, who was instrumental in getting the original project completed.

The William L. Jess Dam and Intake Structure is a 327-foot-high rockfill embankment structure. A regu-



lating outlet tunnel, power penstock, and intake tower with multi-level intakes are located in the dam's right abutment; a gate-controlled concrete chute spillway is located in the left abutment. The powerhouse has a generating capacity of 49,000 kilowatts.

Runoff from a drainage area of 674 square miles pools into Lost Creek Lake. The lake provides 465,000 acre-feet of total storage. It has an area of 3,430 acres when full.



Through September 1999, Lost Creek Lake project costs totaled \$196,584,400 (\$136,408,200 for construction and \$60,176,200 for operation and maintenance. During 1999, the William L. Jess powerhouse generated 320,461,000 kilowatt-hours of electricity of which 316,405,000 was delivered to the Bonneville Power Administration. Through September 1999, the project had prevented an estimated \$31 million (unadjusted) in flood damages. During the same period, power generation totaled 6.4 billion kilowatt-hours. Of the gross income from sale of this power by Bonneville Power Administration, \$ 36.3 million was reimbursed to the U.S. Treasury to recover Corps of Engineers project investment and operating costs.

Three recreation areas and a trail system along 30 miles of shoreline have been developed by the Corps. Stewart State Park, operated by Oregon State Parks, provides camping, picnicking, boating, and swimming facilities. River's Edge and McGregor parks, operated by the Corps just downstream from the dam, are day-use areas with a visitor center and riverside access. The Takelma boat ramp on the north shore of the lake is operated by the Corps. In 1999, about 502,500 recreation visits were made to Lost Creek Lake project recreation areas.

As mitigation for project-caused loss of spawning and rearing areas, the Corps built Cole M. Rivers Fish Hatchery, one of the largest in Oregon. It was designed with sufficient capacity to compensate for fishery losses caused by all three authorized Rogue Basin dams.

The hatchery is operated by the Oregon Department of Fish and Wildlife with federal funds. To enhance salmon and steelhead fishery in the Rogue River downstream, stored water is released from Lost Creek Lake at controlled temperatures. Temperature control is achieved by withdrawing water from various levels of the reservoir using the project's multiple-level intake tower.

Applegate Lake

The Applegate project also was authorized in 1962 as an element of the plan for flood control and water resource development in the Rogue River Basin. Authorized primary project purposes are flood control, fish and wildlife enhancement, municipal and industrial water supply, irrigation, water quality control, and recreation. The project is on the Applegate River about 24 miles southwest of Medford. Work on the main dam started in 1978. The project began providing flood control in the fall of 1980.



The project consists of a 242-foot-high rockfill embankment dam, a gate-controlled concrete-chute spillway, a regulating outlet conduit, and an intake tower with multi-level intakes capable of withdrawing water from several levels of the reservoir for downstream temperature control. The reservoir provides 82,200 acre-feet of total storage for flood control and water conservation use, and controls runoff from a drainage area of 220 square miles. No fish-passage facilities are provided, but Cole M. Rivers Fish Hatchery near William L. Jess Dam provides compensation for loss of salmon and steelhead spawning and rearing areas. Fishery enhancement is provided by release of stored water to control downstream temperatures and increase streamflows during annual low-water periods.

Eight recreation sites with picnicking, camping, trails, and boating are an integral part of the project. They were developed by the Corps in coordination with the U.S. Forest Service, which administers surrounding lands in the Rogue River National Forest.

Through September 1999, project costs totaled \$ 101,964,000— \$91,642,500 for construction and \$10,321,500 for operation and maintenance. Through September 1999, Applegate project had prevented nearly \$19.3 million in flood damages since flood storage began in December 1980.

Authorized Project

Elk Creek Lake

Elk Creek Lake is the remaining element of the Rogue River Basin project which would complete the plan as authorized in 1962 for flood control and water resource development in the basin. The project is located on Elk Creek in Jackson County about 1.7 miles from its confluence with the Rogue and about 26 miles northeast of Medford. Upon completion, the Elk Creek project would consist of a 249-foot-high, 2,600-foot-long roller-compacted concrete gravity dam, a gate-controlled concrete chute spillway, and a multi-purpose intake tower with multi-level intakes to control lake releases. The lake would provide 101,000 acre-feet of total storage for flood control and water conservation uses, and would control runoff from a drainage area of 135 square miles. The project would be operated to provide flood control, recreation, irrigation, municipal and industrial water supply, fish and wildlife enhancement, and water quality control. Elk Creek would be operated with Lost Creek Lake as a two-dam system to provide project benefits. The estimated federal cost of the project is \$174 million (1999).



Construction began in January 1986. The structure was scheduled to be completed by fall of 1989. However, lawsuits were filed to stop construction of the dam. After the initial hearing, the U.S. District Court ruled that the Corps could proceed with construction. In response to an environmental group's appeal of the initial court decision, the Ninth Circuit Court of Appeals directed the District Court to issue an injunction to stop construction. The roller-compacted concrete placement was completed to the court-permitted height of 83 feet on January 5, 1988. The Department of Justice petitioned the U.S. Supreme Court for a review of the Ninth Circuit Court's decision. In May 1989, the U.S. Supreme Court repealed the District Court decision, except for the issue of a cumulative impacts analysis of the three dams in the basin.

To respond to the court order, additional studies of

water temperature and turbidity, and fish and wildlife were conducted. A Supplemental Environmental Impact Statement (EISS) was prepared to address cumulative effects. Through this environmental review, the Corps selected an alternative which, if completed, would operate the project for flood control purposes only, without a permanent reservoir. In July 1992, the Department of Justice petitioned the U.S. District Court for removal of the injunction.

In fiscal year 1993, Congress added \$2.5 million for design necessary to complete the project, pending removal of the injunction. No additional construction has been done, due to ongoing legal challenges. In April 1995, a Ninth Circuit Court of Appeals opinion left in place an injunction against completing the Elk Creek Lake project and required a comprehensive review of a wide range of issues under the National Environmental Policy Act (NEPA). Since significant work and money would be required to address these issues with no assurance that the Court's injunction against development of the project would be lifted, the Corps did not complete the NEPA review. Instead, the Corps began considering options for managing Elk Creek Dam over the long term without completing the structure.

In September 1996, President Clinton signed the Energy and Water Development Appropriations Act for the fiscal year 1997 budget, granting authorization to use previously appropriated funds to plan and implement long-term management of the Elk Creek project. The long-term management plan will be implemented in two phases. The goal of the first phase is to develop a passive fish passage system through modification or partial removal of the dam's spillway to reduce annual costs and improve biological conditions for anadromous fish. The second phase will include evaluation of land management actions, disposition of stockpiled gravel and equipment, and the restoration of the streambed and surrounding areas.

In 1998, a plan for improving anadromous fish passage at Elk Creek Dam was completed. Further activity was postponed due to lack of funds. However, the plan calls for recreating the pre-project stream alignment by removing a section of the dam's spillway and left abutment, placing features in the stream and streambank to maintain adequate flow velocities for fish passage, and realigning the stream above and below the dam. The cut through the dam will be about 150 feet wide at the base of the dam and 225 feet wide at the top. The size of the cut was designed to meet fish passage velocity criteria at a flow of 10 cubic feet per second (cfs) to 5,000 cfs (a range of flows coordinated with and recommended by state and federal fishery resource agencies). The modification would eliminate the trap and haul system which required the fish to be physically handled while not precluding completion of the project in the future, should that decision be made. Estimated cost for the work is about \$7 million.

Flood Damage Reduction Projects

Completed Projects

Nehalem River near Nehalem

This original federal project, which protects 904 acres of farmland, was authorized by the Flood Control Act of 1944. Construction was completed in 1951 at a cost of \$46,000. The Sunset Drainage District operates and maintains the levees and interior drainage system. The drainage district is on the left bank of the Nehalem River, between river miles one and seven. The district includes seven dairy farms, a sewage treatment plant, and a cable television facility. Since completion, the project has prevented an estimated \$1,900,000 in flood damages.

Yaquina River, Mill Four Drainage District

This project is about six miles southeast of Newport on the north bank of the Yaquina River, along Boone and Nute sloughs. It consists of two levees, about 1,100 and 960 feet long, with tide gates and pile bulkheads. The project was completed in 1948 at a federal cost of \$118,000; in addition, \$6,000 was contributed by local interests. Since completion, the project has prevented an estimated \$1,365,000 in flood damages.

Umpqua River and Tributaries

The 1941 Flood Control Act project authorization allowed for constructing revetments and rebuilding levees along critical sections of a downstream reach of the Smith River, rehabilitating about a mile of levee at Gardiner Flats, strengthening about one mile of levee at Leeds Island, constructing two dikes at Reedsport, widening the outlet at Loon Lake, clearing the channel and placing 900 linear feet of revetment in the Melrose area, and clearing the channel and removing a gravel bar at Conn Ford. The project was completed in 1951 at a total cost of \$429,000. Since completion, it has prevented an estimated \$10,800,000 in flood damages.

Improvement of project levees at Reedsport, under provisions of Section 205 of the 1948 Flood Control Act, as amended, was completed in 1969.

Continuing Authorities for Flood Control Rogue River at Grants Pass

Under the continuing authority contained in Section 14 of the Flood Control Act of 1946, a project was completed to stop erosion along approximately 40 linear feet of bankline adjacent to the Grants Pass water treatment plant. The site is within the city limits, on the right bank of the Rogue River at river mile 101.8, immediately downstream of the State Highway 199 bridge. Completed in 1995, the project provides support for the riverbank through placement of a concrete plug in an

erosion pocket, located in the face of the nearly vertical 40-foot-high bank. Included in the project is a drainage layer to relieve groundwater seepage from the slope. Total federal project cost through fiscal year 1999 was \$148,700, of which \$121,500 was federal and \$27,200 was non-federal.

Navigation Development

The Army Corps of Engineers has been involved in maintaining Pacific Coast harbors since 1866. The work includes improving and maintaining channels, and building, improving, and maintaining jetties and breakwaters. The Portland District is responsible for 15 projects along the Oregon Coast and for the channel in the lower Columbia River linking the Portland-Vancouver area to the ocean and to upper Columbia River ports (see chapter for Lower Columbia Basin). Four potential projects also are under study. The existing projects described below are listed in north-to-south order beginning just south of the Columbia River mouth.

Existing and Authorized Projects

Nehalem Bay

Nehalem Bay is about 40 miles south of the Columbia River. The project provides a stabilized channel of unspecified width and depth across the ocean bar at the bay entrance. The channel, completed in 1918, is secured by two rubblemound jetties. The shore end of the south jetty was constructed by the Port of Nehalem. The federal cost of the project was \$330,000 and \$305,000 was contributed by local interests. Rehabilitation of the jetties was completed in 1982, at a cost of \$12,088,000.



Tillamook Bay

Tillamook Bay is about 50 miles south of the mouth of the Columbia River. The project provides an 18-foot-deep channel over the ocean bar at the entrance, secured by two jetties; an 18-foot-deep, 200-foot-wide, three-mile-long channel to Miami Cove; a turning basin at Miami Cove; and a 12-foot-deep access channel to the

Garibaldi small-boat basin. The project also includes protection of Bayocean Peninsula to preserve the present entrance channel to the bay. For that purpose, a 1.4-mile-long dike was constructed to close a breach in the peninsula between Pitcher Point and the abandoned town of Bayocean. The channel to Miami Cove was completed in 1927, the Bayocean dike in 1956, and the small-boat basin of Garibaldi in 1958. The 18-foot channel to Miami Cove is inactive due to a mill closure.



The 5,700-foot-long north jetty was constructed in 1933, rehabilitated in 1965, and again in 1991. In 1965, construction of a south jetty 8,000 feet long was authorized. Work began in 1969 and the first segment was finished in 1971. Construction of the second segment was completed in 1974. Construction of the third segment— 1,500 feet to complete the 8,000-foot jetty— started in 1978 and was completed in 1979.

The federal cost of the project through September 1999 was \$ 32,080,100— \$22,434,800 for construction, \$2,839,800 for major rehabilitation, and \$6,805,500 for maintenance. In addition, \$593,000 for construction and \$6,000 for maintenance have been contributed by non-federal interests.

Salmon River

The Salmon River, a small stream, enters the Pacific Ocean 84 miles south of the mouth of the Columbia River. The project provided for removal of rocks from the river just downstream from the settlement of Three Rocks and was completed in 1948 at a cost of \$2,000.

Depoe Bay

This small-boat harbor is about 100 miles south of the mouth of the Columbia River. The project provides two breakwaters north of the entrance, an eight-foot-deep, 50-foot-wide entrance channel, an inner basin with a retaining wall on the east side of the bay, and a sediment basin near the mouth of Depoe Bay Creek. The most recent improvements to the project were completed in 1966. Facilities in the inner basin consist of landings and floats to accommodate operators of excursion



and commercial fishing boats. Facilities are considered adequate for existing commerce.

The total cost through September 1999 was \$2,124,600, of which \$367,400 was for construction and \$1,757,200 was for maintenance.

Yaquina Bay and Harbor

Yaquina Bay is located on the coast 113 miles south of the mouth of the Columbia River. It is one of the oldest navigation projects on the Oregon coast. Work on the Yaquina jetties started in the 1880s. The project authorization was last modified in 1958 by Congress to provide for extension of the jetties; a 40-foot-deep, 400-foot-wide entrance channel; a 30-foot-deep, 300-foot-wide bay channel leading to a turning basin at Newport; an 18-foot-deep, 200-foot-wide, 4.5-mile-long channel from Newport to Yaquina; two small-boat basins at Newport; two small-boat turning basins at Newport; and a 1,300-foot-long breakwater to protect the Newport South Beach Marina. A breakwater for a small-boat basin on the north shore was authorized in 1946 to protect commercial fishing boats. The timber structure is 2,650 feet long. The marina, which provides shelter for 232 boats, is maintained by the Port of Newport to a depth of 10 feet.

The north jetty, completed in 1896, was extended



in 1966 and repaired in 1978 and 1988. The south jetty, also completed in 1896, was extended in 1971. The small-boat basin was completed in 1949. In 1998, sand was removed from approximately 1,000 feet of the south jetty, the jetty was sealed with rock and filter fabric, and the sand was replaced to protect public safety and prevent sand migration through the structure. In 1999, 41,217 tons of displaced jetty stone were removed from the entrance channel to alleviate dangerous navigation conditions.

Through September 1999, total federal cost of the project was \$69,834,700—\$19,242,000 for construction, \$12,000 for rehabilitation, and \$50,580,700 for operation and maintenance. In addition, \$729,000 was expended from contributed funds.

Yaquina River

The Yaquina River flows into Yaquina Bay at the town of Yaquina. The project provides a 10-foot-deep, 150-foot-wide, 10-mile-long channel in the river from Yaquina to Toledo and a 200-foot-wide channel in Depoe Slough at Toledo. In addition, two dikes were constructed by local interests. The project was completed in 1914. A study completed in 1974 showed that deepening the channel from Yaquina to Toledo was not economically feasible.

Improvement of about 7,300 feet of the Yaquina River upstream from Toledo was made under provisions of Section 107 of the 1960 Rivers and Harbors Act. The improvement included a 10-foot-deep, 150-foot-wide channel and a 10-foot-deep turning basin near Olalla Creek. The project was completed in 1968.

Total federal costs through September 1999 were \$1,491,600—\$28,800 for construction and \$1,462,800 for maintenance. In addition, \$3,000 was contributed by local interests.

Yaquina Bay Small-Boat Basin

The project, completed in 1978, provides for 2,500 lineal feet of stone breakwaters and an access channel 100 feet wide, 10 feet deep, and 1,960 feet long. Total federal cost was \$833,839. Contributed funds by Port of Newport toward general navigation facilities were \$306,843.

Siuslaw River

The Siuslaw River enters the Pacific Ocean about 160 miles south of the mouth of the Columbia River. The project, as originally authorized, provided for an 18-foot-deep, 300-foot-wide channel across the bar, secured by two jetties; a 16-foot-deep, 200-foot-wide, five-mile-long channel to Florence, and a 12-foot-deep, 150-foot-wide, 2.5-mile-long channel to Cushman. The jetties were completed in 1917, and the channel was completed in 1930. The north jetty was rehabilitated in 1958 and the south jetty in 1962.

The project authorization, as modified in 1958,

provided for an 18-foot-deep entrance channel; a 16-foot-deep river channel to Florence; a turning basin 400 feet wide and 600 feet long at Florence; and a 600-foot extension of the north jetty. Dredging of the river channel was completed in 1968 and of the entrance channel in 1969. Extension of a 12-foot-deep channel from Cushman to near Mapleton was approved under authority of Section 107 of the 1960 Rivers and Harbors Act. This work, completed in 1975, cost \$329,000. The fiscal year 1981 Energy and Water Development Appropriations Act authorized the extension of the north jetty by 1,900 feet and south jetty by 2,300 feet, with 400-foot spur dikes on the seaward side of each. The work was completed in 1986.



The total federal cost of the project through September 1999 was \$ 47,643,800 , of which \$29,502,200 was for construction, \$879,300 for jetty restoration, and \$17,262,300 for maintenance. Local interests contributed \$323,000.

Umpqua River

The Umpqua River flows into the Pacific Ocean about 180 miles south of the mouth of the Columbia River. The project authorization provided for two jetties at the entrance; a 26-foot-deep entrance channel; a 22-foot-deep, 11-mile-long river channel to Reedsport, with a turning basin at Reedsport; two side channels to the docks in Winchester Bay, with mooring and turning basins at the inner end; and a 22-foot-deep side channel from the main channel to Gardiner, with a turning basin at Gardiner.

Extension of the original south jetty was completed in 1938 and the north jetty was completed in 1940. Construction of a new training jetty on the south side of the entrance to the Umpqua River was completed in 1951. The south jetty was rehabilitated in 1963, and the north jetty rehabilitation was completed in 1978. Work to connect the Umpqua River training jetty to the tip of the south jetty started in 1979. The 2,600-foot training jetty extension is designed to control the dangerous cross currents caused by the angle between the north and



south jetties. The training jetty extension was completed in late 1980 at an estimated cost of \$16 million.

Extension of the training jetty allowed increased wave energy to reach farther into the Umpqua River Estuary, causing damage to existing facilities and shoreline on both sides. Damage on the north shore was relatively minor; more severe damage occurred along the west spit which protects the Salmon Harbor small-boat basin. Work to mitigate the damage was completed in 1995 under the special continuing authority in Section 111 of the Rivers and Harbors Acts and Flood Control Act of 1968, which allow mitigation of shoreline damage caused by federal navigation projects. The project consists of 2,760 feet of stone revetment along the west face of the spit. Project costs totaled \$644,300.

Local interests requested the navigation channel at Winchester Bay Boat Basin, near the mouth of the Umpqua River, be deepened to 16 feet. Construction included deepening the existing access channel and turning basin to 16 feet, enlarging the turning basin, and establishing a new access channel to a new, locally-contracted basin. Deepening of the Winchester Bay east channel and construction of the new west channel were completed in 1984 under Section 107 authority. The total federal cost was \$1,616,400.

In fiscal year 1994, the U.S. hopper dredge Yaquina removed 229,039 cubic yards of material and the contract pipeline dredge Nehalem removed 29,588 cubic yards of material from the entrance channels of Winchester Bay. This material was pumped to the north spit of the Umpqua River to create about eight acres of nesting habitat for the western snowy plover and two acres of wetland habitat. This project was a cooperative effort with the U.S. Forest Service, Oregon Dunes National Recreation Area, Oregon Department of Fish and Wildlife, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and Port of Umpqua under the Coastal America program.

Total federal cost of work through September 1999 was \$ 54,869,100 , of which \$17,718,900 was for construction, \$2,500,700 for major rehabilitation, and \$34,649,500 for maintenance. Local interests contributed \$227,000.

Coos Bay

This project is located about 200 miles south of the mouth of the Columbia River. The project authorization, modified by the Rivers and Harbors Act of 1970, provides for two jetties at the entrance; an entrance channel 45 feet deep and 700 feet wide; a channel 35 feet deep and 300 feet wide to river mile nine and from there 35 feet deep and 400 feet wide to river mile 15; and turning basins and anchorage areas along the channel. Deepening of the channel from the entrance to river mile 15 was completed in 1979.

The Coos Bay project also includes a 22-foot-deep, 150-foot-wide channel from the mouth of Isthmus Slough to Millington; a 17-foot-deep, 150-foot-wide, 3,200-foot-long connecting channel from deep water in Coos Bay; a channel extension in South Slough, 16 feet deep and 150 feet wide, to the highway bridge at Charleston; and a mooring basin, breakwater, and bulkhead at Charleston.

The jetties at the main entrance were completed in 1928-29. The south jetty was rehabilitated in 1963 and the north jetty was repaired in 1989. The main channel was dredged to 24 feet in 1937 and excavated to 30 feet in 1951. Construction of the Charleston channel and small-boat basin was completed in 1956. Breakwater rehabilitation and extension of the small-boat basin



were completed in 1979 at a cost of \$1.9 million. Local interests requested the boat basin entrance channel be deepened to 15 feet and extended to serve a new moorage area. Deepening of the Charleston channel and turning basin was completed in 1985 under Section 107 of the Rivers and Harbors Act of 1960. The total federal cost was \$1.2 million.

A modification to the existing project was authorized in the fiscal year 1996 Energy and Water Development Appropriations Act, PL 104-46, to deepen the Coos Bay channel by two feet to 47 feet at the bar and 37 feet up the 15-mile channel. The turning basin at river mile 12 was also deepened by two feet and expanded by 100 feet, from 800 by 1,000 feet to 900 by 1,000 feet. The project was completed in 1998, except



for post-construction monitoring, which will continue through fiscal year 2000. The cost of the project was \$11,616,000, of which \$8,116,000 was federal and \$3,500,000 was non-federal. In addition, the sponsor, the International Port of Coos Bay, paid 100 percent of the estimated cost for dredging the berth areas.

The total federal cost of the project through September 1999 was \$158,637,020— \$37,866,092 for construction; \$2,335,966 for major rehabilitation, and \$114,572,905 for maintenance. Local interests contributed \$3,862,057.

Coos and Millicoma Rivers

The South Fork Coos River and the Millicoma River join to form the Coos River five miles upstream from the mouth of the Coos River on Coos Bay. The channel provides a five-foot-deep, 50-foot-wide channel from the mouth of Coos Bay to Allegany (river mile 13.8) on the Millicoma River; a channel with the same dimensions to Dellwood (river mile 14) on the South Fork; and from there, a channel three feet deep and 50 feet wide to river mile 14.7 on the South Fork. Channel improvement was completed in 1966. The total cost through September 1999 was \$2,503,100— \$350,200 for construction and \$2,152,900 for maintenance.

Coquille River

The Coquille River project is about 225 miles south of the mouth of the Columbia River. There are two jetties at the river mouth. The south jetty is 2,700 feet long and the north 3,450 feet long. There is a channel 13 feet deep from the sea to a point one mile upstream from the old Coquille River lighthouse. Project authorization also calls for removing snags from the channel up to the highway bridge at Coquille. The jetties were completed in 1908 and the entrance channel in 1933. The north jetty was rebuilt in 1942, extended in 1951, and repaired in 1956. The south jetty was repaired in 1954. Restoration of the historic Coquille lighthouse was completed in 1976.

The Port of Bandon constructed a boat basin facility in conjunction with protective breakwater and 300-foot-



long entrance channel construction, under Section 107 authorization in 1985. Also under authority of Section 107 of the Rivers and Harbors Act of 1960, a study was completed in 1987 to deepen the entrance channel at the mouth of the Coquille River. The existing project provides a 13-foot-deep channel. A plan to deepen the entrance channel of the Coquille River from 13 feet to 18 feet was approved in May 1988. The economics were reevaluated in fiscal year 1993. The project is not economically feasible at this time. Terminal facilities at Bandon include a publicly owned wharf and a small-boat basin.



Total federal cost of the project through September 1999 was \$9,648,300— \$693,400 for construction and \$8,954,900 for maintenance. Local interests contributed \$73,000.

Port Orford

Port Orford is about 250 miles south of the mouth of the Columbia River. The project consists of a 550-foot extension of a locally-constructed breakwater and a 16-foot-deep mooring basin. Construction of the extension was completed in 1968 and of the mooring basin in 1971. The project authorization was modified by the Water

Resources Development Act of 1992 to allow the Corps to maintain the authorized navigation channel within 50 feet of the port facility.

Federal project costs through September 1999 were \$ 7,937,400 (\$758,700 for construction and \$7,178,700 for maintenance. Local interests contributed \$10,000.



Rogue River

This project is at Gold Beach, 264 miles south of the mouth of the Columbia River. The project provides two jetties at the river entrance and a 13-foot-deep, 300-foot-wide channel from the ocean to a turning basin about one-quarter mile downstream of the state highway bridge. Construction of both jetties was completed in 1960. The north jetty was damaged in the 1964 flood and repaired in 1966. In 1998, in cooperation with Port of Gold Beach, the boat basin channel was relocated approximately 1,000 feet upstream to a new opening in the breakwater provided by the Port of Gold Beach.

The total federal cost of the project through September 1999 was \$24,070,400, of which \$4,156,300 was for construction, \$635,800 for major rehabilitation, and \$19,278,300 for maintenance.



Chetco River

The Chetco River rises in the Siskiyou Mountains of the Coast Range and flows 51 miles before emptying into the Pacific Ocean. The Chetco River project is located at Brookings, about 300 miles south of the

mouth of the Columbia River. The project authorization provides for stabilization of a channel through the bar at the mouth of the Chetco River by constructing jetties and dredging. The jetties were completed in 1957. Rock pinnacles and an abandoned bridge were removed in 1959. A small-boat basin and barge slip downstream from the town of Harbor have been constructed with private funds. Modifications to the project, authorized in 1965, include an entrance channel 14 feet deep and 120 feet wide, increasing the elevation of the north jetty and extending it 450 feet, a 14-foot-deep barge-turning basin, a protective dike about 1,800 feet long, and a small-boat access channel 12 feet deep and 100 feet wide. Those improvements were completed in 1970.



In addition to a public boat launching ramp, the Port of Brookings has developed two large-boat basins, one for commercial fishing boats and the other for sport boats. There are four fish-receiving docks and a sea-going barge dock for lumber loading and storage. There is also a privately owned marina and a Coast Guard station. The maintenance authorization for the Chetco River navigation project was modified by the Water Resources Development Act of 1992, which directed the Corps to assume maintenance of the access channel to the south commercial boat basin in lieu of maintenance of the previously authorized small-boat access channel.

The total federal cost of the project through September 1999 was \$12,283,800— \$2,043,700 for construction and \$10,240,100 for maintenance. Local interests contributed \$17,700.

Continuing Authority Projects

Coos Bay Western Snowy Plover Habitat Restoration

This project, authorized under Section 1135 of the Water Resources Development Act, restores Western Snowy Plover habitat on the North Spit of Coos Bay by reintroducing pink sandverbena, a native plant species, as a replacement for European beachgrass and constructing a fence to limit predation and restrict human and vehicular access to the project area. Construction of the project began in 1996 and was completed in 1998.

The estimated total project cost is \$224,000, of which \$168,000 is federal and \$56,000 is non-federal. The project sponsor is the International Port of Coos Bay.

Current and Recent Studies

Newport North Marina Breakwater

A reconnaissance study of the Newport north marina breakwater, completed in fiscal year 1994 under Section 107 of the Rivers and Harbors Act of 1960, evaluated the potential for providing additional protection to the docks and vessels against waves and tidal surge. A feasibility study was initiated in fiscal year 1994 and completed in May 1996. Findings indicate that an extension to the existing breakwater is economically justified. A 180-foot-long rubblemound would reduce waves from entering the western end of the marina. The project was completed in 1998 at a cost of \$1,421,740 of which \$1,299,500 was federal and \$122,240 non-federal money. The structure extends the existing breakwater to the northwest and provides a 125-foot entrance into the marina.



Rogue River at Gold Beach

A survey report was authorized by Congress in 1964 to determine the advisability of modifying the existing navigation project, with particular reference to providing an extension of the north jetty. Model studies to identify



means of alleviating shoaling problems near the river's mouth have been completed. A technical report presenting study findings to date was completed in 1984. The document identified three potential project options: intensive maintenance dredging; jetty extension and maintenance dredging; and a new entrance and maintenance dredging.

Three timber-pile groins were constructed in 1984 as a five-year test of their ability to reduce shoaling of the small-boat basin access channel. In 1989, the test period was extended for five more years for two of the three test groins. The report concluded that relocation of the boat basin channel approximately 1,000 feet upstream to a new opening in the breakwater provided by the Port of Gold Beach was more cost-effective.

Chetco River

A feasibility report recommending extension of the north and south jetties and deepening of the entrance channel and turning basin has been forwarded to Congress. Public Law 97-88 authorized design and construction of the project in accordance with Chief of Engineers Report dated May 2, 1977. A General Design Memorandum has been completed.



Tillamook County



A 30-month feasibility study to analyze flood damage reduction and ecosystem alternatives for the Tillamook Bay watershed was begun in August 1999 at the request of the Tillamook County Soil and Water Conservation District. The study will evaluate a full range of alternatives to reduce flood damages, while emphasizing environmentally sensitive and non-structural measures, such as permanent floodplain evacuation. A key component of the study is the creation of a hydrodynamic model of the lower watershed. The model will capture the current condition of the area's five rivers including tidal fluctuations. The model might serve as a basis for a flood warning system in the future. Total cost of the study is estimated at \$3.5 million.

Oregon Coast Basin

WASHINGTON
OREGON

OREGON
CALIFORNIA

