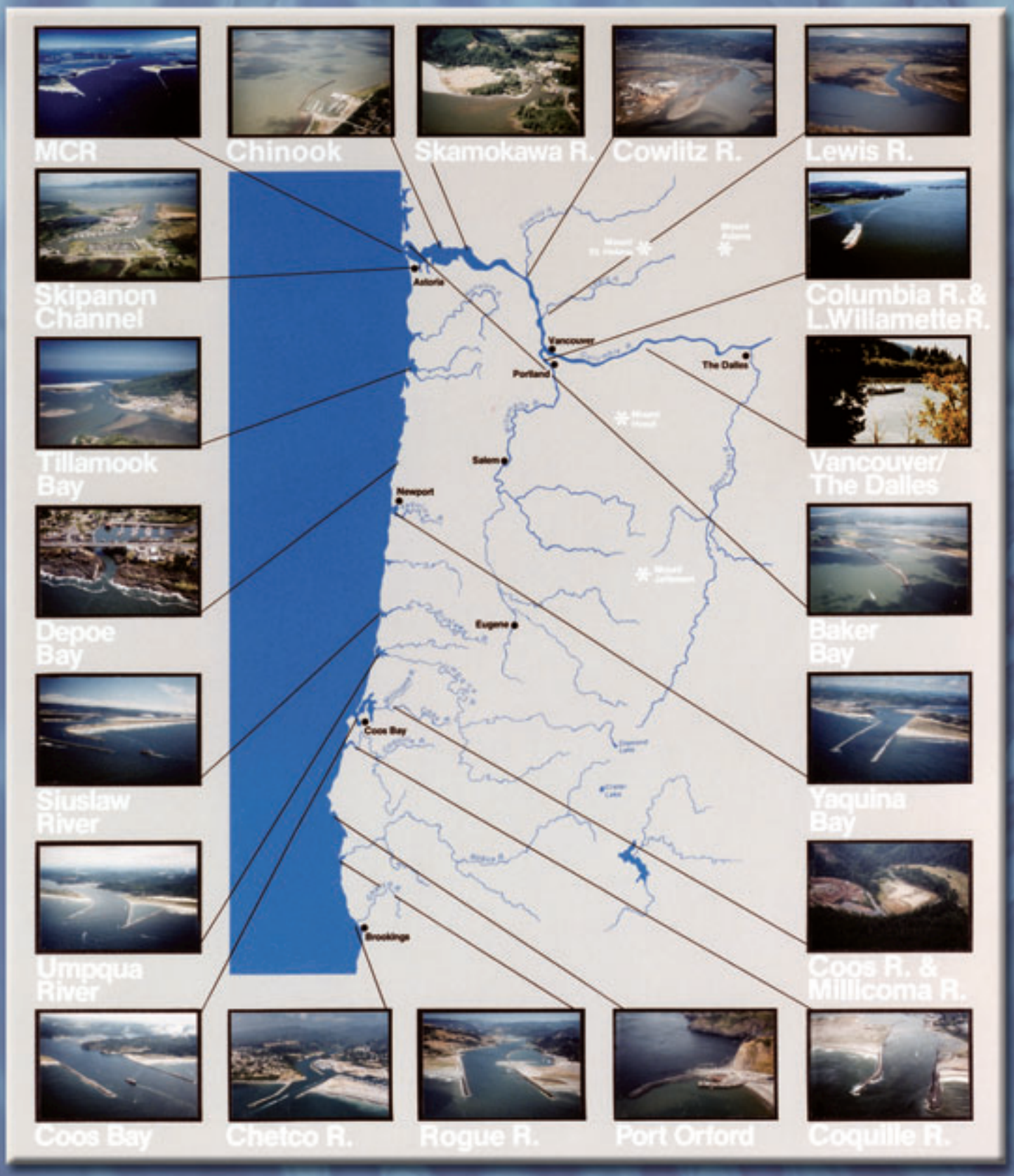
Navigation


MCR
Chinook
Skamokawa R.
Cowlitz R.
Lewis R.
Skipanon Channel
Columbia R.& L.Willamette R.
Tillamook Bay
Vancouver/ The Dalles
Depoe Bay
Baker Bay
Siuslaw River
Yaquina Bay
Umpqua River
Coos R. & Millicoma R.
Coos Bay
Chetco R.
Rogue R.
Port Orford
Coquille R.
Astoria
Portland
Vancouver
The Dalles
Salem
Newport
Eugene
Coos Bay
Brookings

Chapter Two
Navigation

"We realize that protecting fisheries and other endangered species can, and should, go hand in hand with managing and protecting our nation's infrastructure…. That includes our dredging mission."

David Beach, Chief, Navigation Branch, Operations Division, 2001

Dredging the channel at Coos Bay

Depot Bay boat basin and jetty

Coquille Lighthouse

In addition to providing for flood control and operating hydroelectric projects, the Corps also is charged with managing the nation's waterways for navigation. This is an especially important mission in the Portland District, which includes the Oregon coast, as well as the Columbia and Willamette rivers.

The Corps has a long history of navigation work on the Oregon and Washington coasts. Engineers began surveying and building jetties in the 19th century. During the late 20th century, engineers continued to meet the region's navigation needs, both undertaking new projects, as well as maintaining and operating existing ones. This work, which included channel deepening, dredging, and jetty construction, was vital to the economic health of the coastal communities. Many towns along the Oregon and Washington coasts depended on their ports, which drew both commercial and recreational users. "If you go to Newport," one employee observed, "you go there for ... the fishing boats and the waterfront and the beach." He noted that if the Corps did not maintain the jetties or dredge the channels "the towns would start drying up."[1]

The Corps' responsibilities extended throughout the Oregon Coast Basin, as well as a small section of southwestern Washington. The Oregon Coast Basin includes all streams south of the Columbia River that drain directly to the Pacific Ocean. It is comprised of three distinct sub-basins – the Rogue, Umpqua, and Coastal.[2]

In addition to managing coastal streams and harbors, the District maintains the Columbia and Willamette rivers, which are the Northwest's link to world markets, providing an essential trade corridor for the United States. Together they comprise the world's second largest grain export system, with only the Mississippi River exceeding them in size and importance. More than 40 percent of the wheat exports from the United States are shipped via ports on these Oregon rivers. Each year approximately $13 billion worth of freight is transported via oceangoing vessels on the Columbia and the

Willamette rivers. The commodities on these ships include millions of tons of mineral bulk cargoes (potash, soda ash, aluminum ore), breakbulk cargoes (steel and forest products), automobiles, and goods, ranging from clothing and groceries to animal feed and paper products. The rivers carry containerized cargo from more than 40 states, and more than 900 Oregon and southwest Washington companies ship their cargo via Portland.[3]

To operate and maintain this federal navigation channel, the District engaged in a variety of management activities, including dredging, diking, and building jetties. During the late 20th century, the agency's navigation work faced new issues. Larger ships, along with growing traffic volumes, placed additional pressure on the channel and resulted in a movement to deepen the rivers from 40 to 43 feet. As the agency dredged increasing amounts of material from the rivers, the issue of where to put this dredged material – some of which was contaminated – became a crucial question.

While the Columbia and Willamette rivers serve as corridors of commerce, they also provide habitat for fish and wildlife. Of particular significance is the fact that the Columbia River watershed is home to numerous stocks of salmon and other anadromous fish, many of which are threatened or endangered. The Endangered Species Act (ESA) and other environmental laws demanded that these rivers be managed for plants and animals, not just for cargo ships. In the period from 1980-2000, the District faced the task of balancing the river's economic and environmental role in the region.

Navigating the Pacific Coast

At Nehalem Bay, located 40 miles south of the Columbia, the Corps constructed two jetties in 1918 to stabilize the channel across the ocean bar at the bay's entrance. The purpose of a jetty is to concentrate and accelerate water flow at the

Nehalem Bay jetties

Rebuilding the north jetty at Yaquina Bay and Harbor

mouth of a river. This concentrated water flow scours out shallow sand deposits, stabilizing the river channel. As the decades passed, the jetties at Nehalem Bay began to show signs of deterioration. Strong water and wave action had removed large boulders, while underwater currents displaced smaller stones.[4]

In 1981, the Corps awarded a contract to joint venturers E.W. Eldridge, Inc. of Sandy, Oregon, and Marshal Associated Contractors of Tualatin, Oregon, to rehabilitate the aging structures. The project involved placing more than 347,000 tons of rock to extend the south jetty to 4,400 feet and the north jetty to 3,400 feet. Workers placed rocks, weighing more than 40 tons each, at the tip of both jetties – at the time the largest ever placed on an Oregon coast jetty. In November 1982, the work was completed at a cost of $12 million. A sign erected at the site read, "Dedicated to safer bar crossings and to all those who labored to obtain this restoration."[5]

A jetty restoration was also the major work done at Tillamook Bay in recent decades. The north jetty was originally built in 1914, and it was reconstructed and extended to its authorized length of 5,700 feet in 1931. Workers repaired it in 1946, 1955, and 1962, and it underwent more extensive rehabilitation from 1963-1965. Since the 1960s, however, roughly 374 feet of the jetty had receded, making it less effective. To combat the recession, the Corps awarded a $3,178,010 contract for rehabilitation to Aqua-Marine Constructors, Inc., a Portland firm. The firm completed the project in 1991.[6]

Yaquina Bay and Harbor was one of the oldest navigation projects on the Coast and included two jetties, numerous channels, turning and boat basins, and a breakwater. Yaquina's north jetty, which was severely damaged by wave action, was repaired numerous times throughout the late 20th century. In 1988 the Corps awarded contracts to rebuild the outer 450 feet and an additional 172 feet of the structure. In the process of repairing it, workers used approximately 85,000 tons of rock. The project was completed in 1989, at a cost of $6.4 million.[7] By the late 1990s the north jetty needed additional work, and the District awarded a $2.4 million contract to General Construction Company of Poulsbo, Washington. This company's work focused on removing displaced jetty stone to make the channel safer for users as they crossed the entrance bar. The rocks, some of which were the size of Volkswagen Beetles, had caused severe wave action conditions at the entrance, causing safety concerns between the U.S. Coast Guard and the local fishing community.[8]

The District also managed projects on the Yaquina and Siuslaw rivers. In 1981, the Energy and Water Development Appropriations Act authorized the extension of the Siuslaw north jetty by 1,900 feet and the south jetty by 2,300 feet, with 400-foot spur dikes to be built on the seaward side of each. Workers extended the jetties to reduce shoaling at the entrance and stabilize the river channel.[9] Contractors completed the work in 1986. On the Umpqua River the Corps extended the training jetty to join up with the south jetty, completing the work in 1980 at an estimated cost of $16 million. When contractors extended the training jetty, however, it allowed increased wave action to reach farther into the Umpqua River estuary, causing damage to existing facilities and shorelines on both sides. To mitigate the damage, workers lined portions of the affected shoreline with rock, completing the work in 1995. While this action protected the shoreline, it failed to stop the increased wave action. The Corps also responded to local interests at Umpqua who

The extended training jetty joined with the south jetty at Umpqua River. Dredging at Coos Bay to deepen the Coos-Millicoma channel for deeper draft ships allowing the Port to stay competitive.

requested that the navigation channel at Winchester Bay boat basin be deepened to 16 feet. Construction included deepening the existing access channel and turning basin, enlarging the turning basin, and establishing a new access channel. Workers finished this $1,616,400 project in 1984.[10]

At Coos Bay the Corps was involved in several different navigation projects. The north jetty, for example, was repaired in 1989. Also that year, the International Port of Coos Bay filed an application with the District to extend and deepen the navigation channel at Charleston to provide passage for the Coast Guard patrol boat, the *Orcas*, and large, commercial fishing vessels. The Port also requested that the permit include authorization for maintenance dredging of about 3,000 cubic yards per year for three years.[11] Responding to their request, workers provided deeper access and entrance channels and constructed a 180-foot by 900-foot turning basin, completing the job in 1985, with a total federal cost of $1.2 million.[12]

In the early 1990s, the Corps and the International Port of Coos Bay jointly sponsored a study at Coos Bay, which examined the feasibility of deepening 15 miles of the existing 35-mile Coos-Millicoma channel to accommodate newer, deeper draft ships and allow the Port to stay competitive in the shipping industry. In May 1996, the District and the Port signed a cost-sharing agreement for the project. The project cooperation agreement called for the Port to initially provide 25% of the cost, plus 10% more over the next 30 years, making the Port ultimately contribute 35%. Congress authorized the plan in the 1996 Energy and Water Development Appropriations Act, and work began that summer. The District awarded Manson Construction and Engineering Company of Seattle $8.9 million to deepen 15 miles of the Coos River and Bay, from 35 to 37 feet and from 45 to 47 feet at the entrance. The contract included both operation and maintenance and new construction, and it called for the removal of 2.6 million cubic yards of sand and 45,000 cubic yards of rock. The work was completed in 1998, at an estimated cost of $12 million, of which $9 million was federal and $3 million was non-federal.[13]

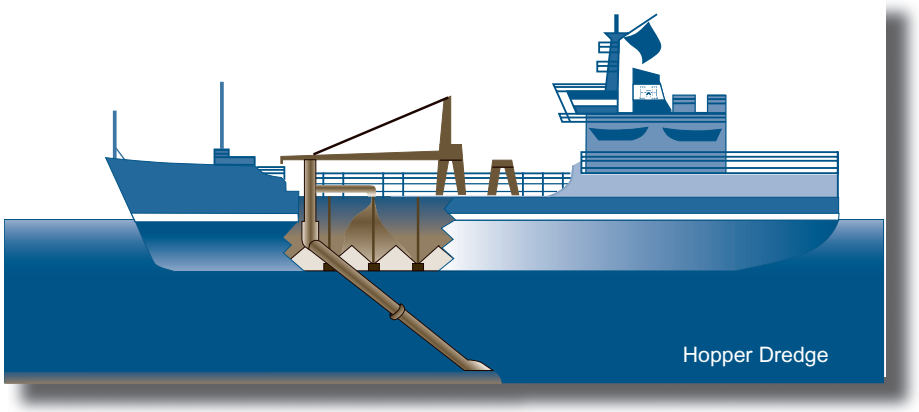
The Corps conducted other coastal projects on the Coquille River and at Astoria. On the Coquille, the Port of Bandon constructed a boat basin facility in conjunction with a

From the quarry, by truck and barge, the rocks are deposited at the jetty site. The Siuslaw north and south jetties were extended with spur dikes to reduce shoaling at the entrance and to stabalize the river channel.


Essayons


Yaquina


Sandwick

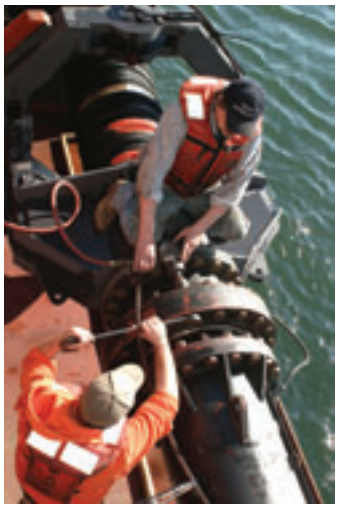


protective breakwater and entrance channel in 1985. The total federal cost of the project was $1,168,500.[14] At Astoria, the District worked on repairing the east boat basin breakwater in 1999. The agency refurbished a 400-foot section of the 2,000-foot long breakwater's eastern most end. They installed sheetpiling along the length of the section and filled in the areas between the new and outer walls with sand and gravel. The repairs cost roughly $5 million.[15]

Many of the Corps coastal projects required extensive dredging. While the District performed its own dredging operations, its dredging fleet was drastically reduced from its historic size. Beginning in the 1970s, Congress, in an effort to reduce costs and expand opportunities for the private sector, placed increasing pressure on the Corps to transfer its dredging operations to private contractors. Congress' push for private dredging was largely successful, and by the 1990s, the Corps' fleet of hopper dredges had been reduced from 22 to four. Of these four dredges, two were headquartered in Portland – the *Yaquina* and the *Essayons*.[16] These vessels worked the entire Pacific Coast, as well as the Columbia River, Hawaii, and Alaska.

The *Yaquina*, which measured 200-feet in length and had a 1,000 cubic yard holding capacity, was a hopper dredge designed to transport dredged material to open waters, where it was dumped. During a dredging operation, dragarms with dragheads were extended from the ship and lowered to the channel bottom where they worked like a massive vacuum cleaner. Pumps created suction in the dragarm, drawing up the silt or sand into hopper bins in the vessel's midsection. When the bins were full, the dredge moved to a designated relocation area and emptied the material through large hopper doors in the bottom of the hull. The District's other hopper dredge, the *Essayons*, essentially operated in the same manner. The only real difference between the two ships was size. The 350-feet long *Essayons*, with its bin capacity of 6,000 cubic yards, was often used for deeper entrances and extensive river dredging, while the *Yaquina's* smaller size made her well suited for dredging tighter, shallower coastal entrances.[17]

In addition to the two hopper dredges, the District also owned and operated the *Sandwick*, an 85-foot "sand bypasser" dredge. The *Sandwick* removed sand and silt by positioning itself over a shoal and eroding the material by



Life on board the dredge *Yaquina*

the concentrated force of propeller action. Its ability to work in water as shallow as six feet enabled it to operate in conjunction with the *Yaquina* in areas that were too shallow for the *Yaquina* to dredge.[18]

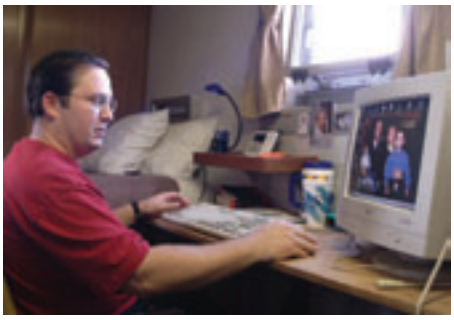
Working aboard these dredges proved to be a unique experience. The majority of dredging activity occurred between March and early November, slowing during the winter months. When operating, the two hopper dredges worked 24 hours a day, stopping only eight hours or less per week for fuel, water, supplies, and maintenance. Crewmembers of the *Essayons* worked for eight days straight, followed by six days on shore. This schedule could be difficult. "You either have the temperament for it or you don't," explained Miguel Jiminez, one of the captains of the *Yaquina*.[19] Working on a dredge also entailed regular periods of separation from families. "My wife is kind of used to this, [she's] been married into this type of system for 36 years and she's used to me being gone," commented Al Short, Chief Electrician on the *Essayons*.

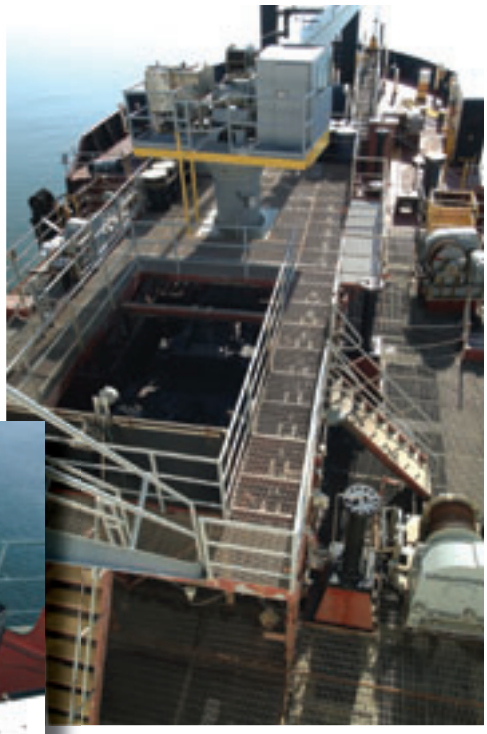
On the other hand, because they were together for eight days at a time, crewmembers formed close relationships with one another. "You find out when their birthday is and surprise them with a birthday cake," explained Ship's Steward Albert Castillo. "We have a lot of fun." Many crewmembers also found a good deal of pleasure in the work itself. Jan Bemetz, one of three women crewmembers, started as a typist and soon advanced to the position of administrative technician. "The pay is good and ... I have lots of different things I do, so it's interesting work," she remarked.[20]

For the most part, work on the ships was generally routine – and that was the preference of the crews. "There is an old saying in the shipping world that most things like shipping are 95 percent boredom and five percent terror. And that is pretty much what it is out here," explained one member of the *Essayons*' crew. "When things are going well, which is the way we like it, it's boring. And that's the way we want to keep it."[21]

Given the intense demands placed on them, the ships required regular maintenance, and they often needed extensive repairs following a working season. In 1994, for example, the Corps awarded a $744,884 contract to repair the *Yaquina*. The work included cleaning and painting the dredge's bottom to protect it against corrosion, barnacles, and other marine growth. The contractor also installed new propellers and rudders, replaced valves, changed underwater gear, pipe-fitted and welded, and performed electrical services for the boat.[22]

While dredging ensured that ships could safely navigate the coastal waterways, it came with environmental costs. Much of the marine life affected by dredging was commercially important, including clams, shrimp, crab, and salmon – and fishermen sometimes joined environmentalists in their protests against dredging.[23] According to Stewart Schultz's study, *The Northwest Coast*, the act of digging in an estuary sent billowing clouds of sediment into the water column, causing an abrupt rise in turbidity. Increased turbidity stunted the growth of estuarine plants, buried





submerged rocks and the plants and animals that lived on them, and clogged and injured the breathing and feeding mechanisms of fish and invertebrates. The physical force of digging also affected animals. Dredges in Grays Harbor, for example, consumed one to three crabs with every seven cubic yards of sediments for a total of roughly 100,000 to 300,000 every year, depending on the type of dredge. Furthermore, when dredges disposed of their material, they often buried plants and animals under tons of sediment. At one disposal site, only 70 out of 200 invertebrate species survived the dump.[24]

Due in part to pressure from the growing environmental movement and to the concerns of commercial fishers and crabbers, the Corps became increasingly aware of the tensions between ensuring safe navigation and protecting the natural environment. "We realize that protecting fisheries and other endangered species can, and should, go hand in hand with managing and protecting our nation's infrastructure," David Beach, Chief of Navigation Branch, explained. "That includes our dredging mission." As a result, the agency adjusted its dredging operations around anadromous fish runs and other biological concerns. It also prepared biological assessments for dredging work that were submitted to the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) for review and approval.[25]

Another issue concerned the chemical composition of the dredged sediments. At times the sand and silt that the Corps' dredging operations removed were laden with metals and other contaminants, creating problems in disposing of the dredged material. To address this issue, the Corps tested sediments in the federal navigation channel every five years. This testing ensured that dredge material could be safely relocated in accordance with the Clean Water Act and the Marine Protection and Sanctuaries Act. Fortunately for the District, most of the dredged material on the West Coast is comprised of coarse-grained sand, which does not hold contaminants.[26]

Corps Dredges Provide Excellent Training for Maritime Cadets

Each year, cadets from maritime academies in the U.S. look for opportunities to earn their sea-time on a variety of ocean-going vessels. The top performers get to choose from huge tankers, container cargo vessels, Military Sealift Command ships, and other opportunities to complete 60-day periods of sea duty. Many cadets choose to work on Corps dredges, including the Portland District's ***Essayons*** *and* ***Yaquina****. During the 2000 season, for example, two cadets came aboard the* ***Yaquina****, while the* ***Esssayons*** *had four.*

For these cadets, working on a dredge offered many distinct advantages. "We get a lot of hands-on experience in ship handling on the dredges," said Mary O'Brien, a midshipman 2nd class assigned to the ***Essayons****. "With a tanker, you're talking a lot of sea voyages, and very little turning and maneuvering. Working on a dredge, we are handling the ship all the time, calculating tides, currents, and all that. We might spin the ship on a dime at times. You just don't get that on a tanker." Casey O'Donnel, a midshipman 2nd class aboard the* ***Yaquina****, agreed. "We get to handle a lot of close-quarter work, and there is nothing like that experience anywhere else." James Dalske, a midshipman 2nd class, also "chose the* ***Yaquina*** *for the piloting experience."*

Many cadets appreciated the depth of knowledge that dredge crew members possessed. "There are some good teachers here and I've learned a lot from them," said Mathew Lazarski, a midshipman 1st class in the Naval Reserve. "I plan on being an officer in the Navy, and some of the valuable lessons they taught me are how to approach problems in everyday life on the ship." Brian Leet, a midshipman 2nd class on the ***Essayons****, agreed. "I've talked to a lot of other guys in the engine room and have learned a lot just from them telling me about where they worked before coming to the Corps. I was surprised at how many hawsepipers work here." [A hawsepiper is one who worked his or her way up the ranks in the maritime services, rather than graduating from an academy.] "There's just a lot of experience," Leet concluded.*

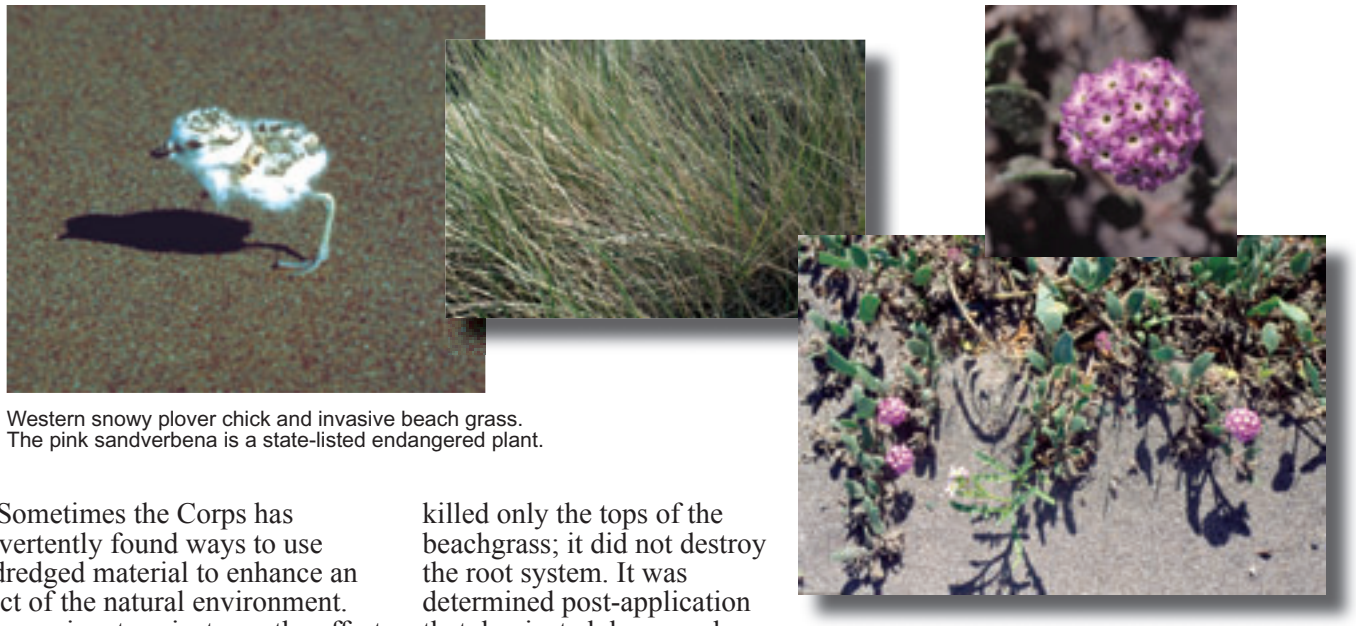
The range of work aboard a dredge also impressed cadets. "I'm a cadet, a welder, a dredge helper and a cook – and that was just today," commented Dalske. "We're constantly fabricating stuff. We made fire hose racks, repaired a bulkhead from angle iron, and I welded a hole that wore through a dredge pipe."

Corps crewmembers believed having the cadets aboard was mutually beneficial. "We love it," said Miguel Jiminez, captain of the ***Yaquina****. "They [the cadets] were like a breath of fresh air. They were full of energy and enthusiasm, and always eager to learn. ...We all benefit from their presence." Jiminez also observed that having the cadets on the ship improved the work of the permanent crewmembers. "I think one of the little realized side benefits to the program is that it makes the crew act as instructors, which in turn sharpens their skills. The constant questions and our answers to those questions make us reexamine some of the ways we do things. A cadet might ask a question and as I answer it I might say to myself, 'I don't like the way that explanation sounded.' So we may decide to re-look the way we do this."*

Neal Nyberg, captain of the ***Essayons****, felt that the advantages of the program extended beyond the Corps. "There are sound reasons why we participate. We have the chance to train new officers for the industry. Whether we (the Corps) get them or not, it's a benefit for the whole industry," he explained. "Global competition is a fact of life for the merchant marine. We forget that 95 percent of the cargo and equipment for Desert Storm was brought by ship. Right now we're training the best and brightest to be the future mates on our ships, and that's good for everyone."*[1]

Endnotes

[1] Jim Edwards, "Maritime Cadets Make Summer Voyages on Dredges," October 2000, Engineer Update.



Western snowy plover chick and invasive beach grass.
The pink sandverbena is a state-listed endangered plant.

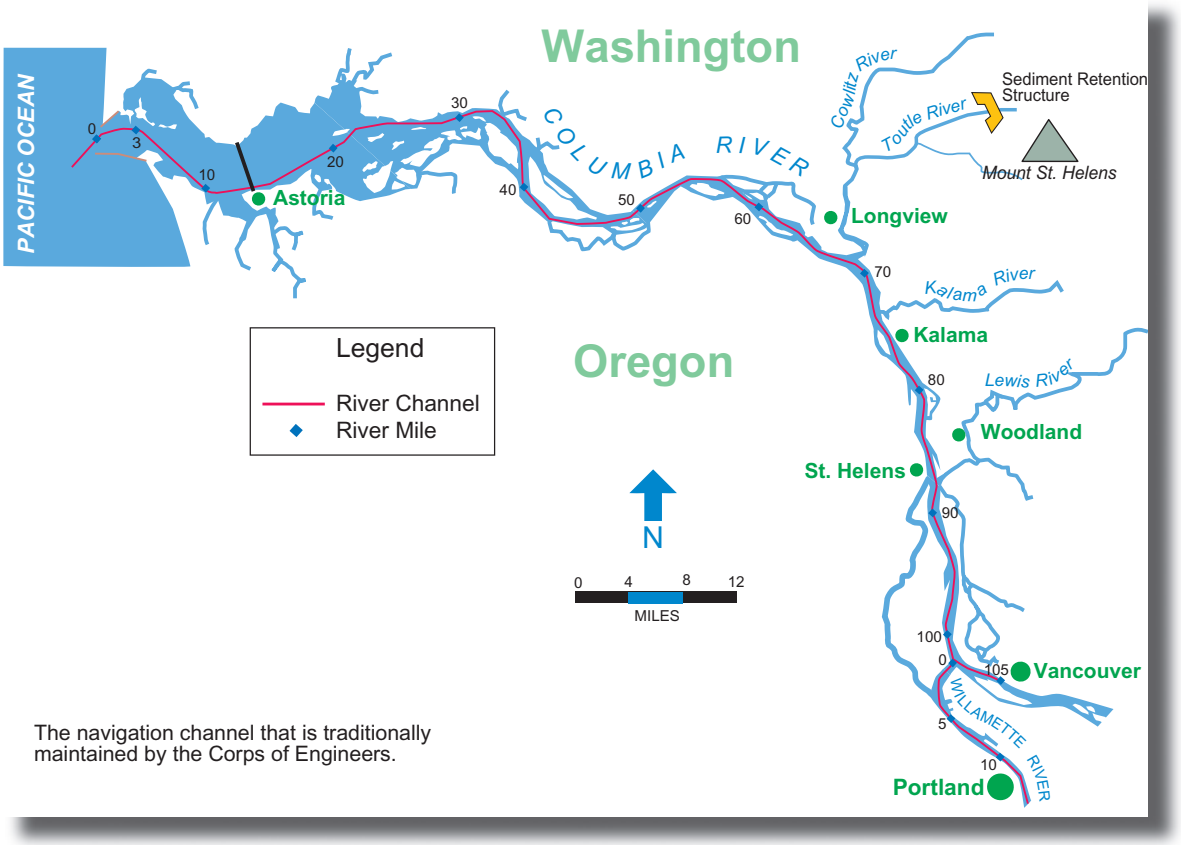
Sometimes the Corps has inadvertently found ways to use the dredged material to enhance an aspect of the natural environment. One prominent project was the effort to restore western snowy plover habitat on the north spit of Coos Bay. This project was sponsored by the International Port of Coos Bay with funding from the Corps, the Port, and the Coos County Urban Renewal Agency. The western snowy plover is a federally listed threatened species that nests in coastal areas. Habitat destruction, along with the introduction of European beachgrass that is used to stabilize sand, had substantially reduced the bird's nesting habitat to just a few areas along the entire Oregon coast.[27]

Coos Bay's North Spit contained a 26-acre section of dredged material which, due to its higher salt concentrations, remained free of European beachgrass and thus provided suitable habitat for the plover for many years. To rid the site of invasive beachgrass and restore 45 additional acres of plover nesting habitat, workers irrigated the area with salt water during the summer growing season. The salt water irrigation method was found to be a less expensive and more flexible means of creating habitat than relying on dredged material disposal, which is costly to implement and driven by the availability of material and proximity to the site. The estimated total project cost was $224,000, of which $168,000 was federal and $56,000 was non-federal.[28] The Corps' irrigation efforts, however, killed only the tops of the beachgrass; it did not destroy the root system. It was determined post-application that dessicated dune sand repels water thus precluding salt water contact with soil moisture in the root zone. Realizing that beachgrass remained on the site, workers turned the soil with a disc, which succeeded in reducing the vegetative cover and maintaining nesting habitat for plover. Discing has proven to be an effective means of keeping the beachgrass in control at the site and continues to be the primary treatment for the invasive species. However, it has not eradicated European beachgrass and annual implementation is required to maintain plover nesting habitat.[29]

In addition to working on restoring bird habitat, the District also worked to restore a native oyster species – *Ostrea luida* – whose numbers were in decline since the turn of the century due to over harvesting and water pollution. This particular type of oyster tends to inhabit areas with high concentrations of empty oyster shells. Thus to enhance its habitat in Yaquina Bay, the District dredged 2,400 cubic yards of sandy sediment and clamshells mixture from another location in the bay and deposited it over an existing oyster bed. The project was a coordinated effort between the Corps, Oregon Department of Fish and Wildlife (ODFW), and the Environmental Protection Agency (EPA). Once the project was completed, the ODFW monitored and maintained the oyster bed.[30]

Similarly, the pink sandverbena, a state-listed endangered plant, received a helping hand from the Corps at Port Orford. The plant was found thriving on an area of the Port Orford beach covered with dredged sand material. To protect the plant and expand its population, the District modified its disposal operation and deposited additional dredge material further down the beach.[31]

These projects reflected the District's changing role on the Oregon and Washington coast. While traditionally the agency's work was limited to ensuring navigation and bolstering coastal commerce, in more recent years projects have been influenced by the environmental movement and its objectives [see Chapter Three]. Projects such as dredging and repairing jetties have continued in the late 20th century, but they also have been joined by habitat restoration and protection of the region's threatened and endangered species. While their historical navigation mission has often been at odds with natural resource concerns, the period from 1980-2000 does demonstrate that providing safe passage for ships and protecting plants and wildlife were not always mutually exclusive goals.



The navigation channel that is traditionally maintained by the Corps of Engineers.

Dredging the Columbia and Willamette Rivers

The federal government first authorized the Columbia and Lower Willamette River Navigation Project in 1878, and the Corps has deepened the channel at intervals since that time. The project authorization, as modified by Congress in 1962, covers 14.6 miles of the Willamette River below Portland and 103.5 miles of the Columbia River below Vancouver, Washington. The Corps completed work on the authorized 40-foot deep channel from Portland and Vancouver to the sea in 1976.[32]

The Corps has traditionally maintained the navigation channel through a combination of dredging and hydraulic control works, such as pile dikes, inwater fills, and island creation. Pile dikes constructed of logs are used to control channel alignment for navigation, focus flow in navigation channels, provide bank protection, reduce erosion, and provide disposal areas. The Corps also used inwater fills to reduce channel cross-section and control channel alignment. This entailed placing material, such as sand or rock, along the edge of the channel to focus the water into the center of the channel, where it flowed at a higher velocity. The agency also deposited dredged material to create islands to control channel alignment. At these sites, pile dike fields were used to prevent erosion.[33]

The Corps used three types of dredges – hopper, pipeline, and clamshell – to deepen the river channel. Hopper dredges dispose inwater, clamshell dredges are used for inwater and ocean disposal, and pipeline dredges are employed primarily for shoreline disposal with some inwater and upland disposal. In addition, dredged material removed with both a clamshell dredge and hopper dredge from the Willamette River was disposed inwater in the Columbia River. The type of dredge used depended on dredge availability, size and location of the shoal, and available disposal sites.[34]

By the 1990s, hopper dredges removed four to five million cubic yards of material annually from the Columbia and Willamette rivers. Crews disposed of sediments from these dredges in deep water or alongside the navigation channel, which was generally termed flowlane disposal. Hopper dredges were most often used on small volume "sandwave" shoals in the river and on larger shoals in the estuary. Sandwave shoals are the valleys and peaks on a river bottom formed by the river's current. Pipeline dredges, on the other hand, were applied to large cutline shoals – a shoal on the edge of a channel – and areas with multiple adjacent sandwave shoals. Approximately two million cubic yards of material a year were removed by these dredges and disposed of along the shoreline or upland. One problem, however, with pipeline dredge disposal was that many of the shoreline sites eroded sand back into the navigation


Hopper dredge


Clamshell dredge


Pipeline dredge

channel. Clamshell dredging on the federal navigation channel used a bucket operated from a crane or derrick and was well suited to work in tight quarters, such as around docks and piers. Sediment removed by clamshell dredges was generally placed on a barge and disposed of at either an upland or inwater site. The District used this method of dredging for side channel projects in both the Columbia and Willamette rivers.[35]

Historically, the Corps disposed of dredged material from the navigation channel in a combination of shoreline, upland, and inwater sites. Shoreline disposal done primarily with pipeline dredges, involved pumping dredged material through a floating discharge pipe to an existing beach. The material was pumped in a sand and water slurry, allowing the sand to settle out on the beach while the water returned to the river. After sufficient sand settled out, bulldozers moved the sand to match the elevation of the "pre-eroded" beach. While between 1975 and 1995, 62 shoreline sites were used for dredged material, the ESA listing of Snake River salmonids reduced the number of sites approved by the NMFS. In its study, the Corps proposed that no more than 12 shoreline sites be used in any one alternative.[36]

Upland disposal involved both clamshell and pipeline dredges. The Corps did not need to use every upland disposal site annually. Annually, the average quantity of dredged material placed in upland areas was approximately 750,000 cubic yards. Once the material was deposited, it was completely removed from the river system and did not reenter it.[37]

The District employed all three dredge types for inwater flowlane disposal, which occurred throughout the Columbia River navigation channel, where depths ranged between 35 and 65 feet. Like all river channels, the Columbia's depth varied naturally, with pockets and holes – some as deep as 100 feet.[38] Unlike ocean disposal sites, which were designated and approved according to the Marine Protection, Research, and Sanctuaries Act, these inwater disposal sites were regulated by the National Environmental Policy Act (NEPA) and varied depending on the condition of the channel each year. As flowlane areas filled, new deep areas formed elsewhere as a result of river processes.[39]

Over the past several decades, the issue of where to place dredged materials has become increasingly important due to concerns raised by environmentalists and biologists about the impact of the material on terrestrial and aquatic ecosystems. Partly in response to mounting concerns about the toxicity of dredged material, in 1993 the Corps initiated a study of its dredging practices on the Columbia and Willamette rivers. While pollution problems in some Northwest rivers certainly existed, the problem of hazardous dredge materials was particularly acute on the eastern seaboard, where contaminated sediments had been released into rivers and ports. In fact, concern over the state of dredging in states like New York and New Jersey prompted the Corps to undertake the dredging studies, including one for the Columbia River. As David Beach explained, the District's five-year study was proposed "partly because of the East Coast experience and partly because of disposal siting problems we had out here."[40]

The authority for the District study came from a memorandum dated October 26, 1993, in which the Corps' North Pacific Division directed the District to prepare a Dredged Material Management Study (DMMS) for the navigation channel using operation and maintenance funds; the study was entirely funded by the federal government. The area encompassed in the DMMS included the 103.5 mile stretch of the channel from the mouth of the Columbia River to the

Deepening the channel of the Columbia River would allow larger ships to travel to the ports of Oregon and Washington, allowing them to stay competitive with other major shipping centers.

Port of Vancouver upper turning basin, and the 11.6 miles from the mouth of the Willamette River to the grain terminal at the Broadway Bridge. In accordance with the Water Resources Development Act of 1986 (WRDA-86), several local sponsors, including the Port of Portland in Oregon and the Ports of Vancouver, Woodland, Kalama, and Longview in Washington, shared the costs of maintaining the federal navigation channel. Specifically, they were responsible for purchasing or acquiring easements on upland disposal sites. Washington State's Department of Natural Resources and Wahkiakum County also shared in the channel's maintenance costs.[41]

The purpose of the Corps' DMMS was to develop a Dredged Material Management Plan (DMMP) that would guide navigation work on the Columbia and Willamette rivers through the first two decades of the 21st century. During this period, the Corps also examined the possibility of deepening the Columbia River from 40 to 43 feet, in its Columbia River Channel Deepening feasibility study [see following section]. The DMMS helped determine the optimum maintenance plan without the channel deepening project.[42]

As part of the DMMS, the Corps also prepared a Supplemental Environmental Impact Statement (SEIS) that considered the effects of proposed changes, such as increased upland disposal and construction of new pile dike fields. This document supplemented an Environmental Impact Statement (EIS) formulated in 1975, which addressed the environmental effects of the 40-foot channel, the impacts of dredging and disposal practices, impacts at specific upland and beach placement disposal sites, and indirect and cumulative effects. Following that original EIS, changes in maintenance practices and environmental conditions warranted additional NEPA documentation. The Corps conducted Environmental Assessments in 1983, 1989, and 1994 to address minor changes in the project and to consider environmental statues implemented after 1975, such as the Clean Water Act and the Coastal Zone Management Act. All these studies resulted in findings of no significant impact. However, a separate EIS was necessary for the DMMS because of the extensive geographic scope of the project area, the endangered salmon species that could be impacted, and the potential changes in maintenance practices.[43]

The DMMS examined numerous combinations of dredging equipment and disposal sites in an effort to more efficiently maintain the authorized channel. In particular, the study looked closely at increasing the use of upland disposal sites, which held the potential to reduce future dredging requirements and costs. As a result of these investigations, the plan identified four long-term alternatives for disposing of material dredged from the rivers. The alternatives considered included the following: alternative one, "no action," which reflected the minimum disposal site requirements to continue the normal dredging and disposal practices on the rivers; alternative two, "least cost plan," which minimized the overall cost of maintaining the channel; alternative three, "operational plan," which was a variant of the no action plan and provided additional disposal sites to create more options; and alternative four, the "proposed plan," which was a composite of alternatives two and three and expanded the least cost plan to allow for periodic pipeline dredging and upland disposal in areas traditionally maintained by hopper dredge.[44]

Alternative four included several significant differences from the Corps' usual maintenance practices on the Columbia and Willamette rivers. These included the following: eliminating most shoreline disposal, increasing disposal at existing upland disposal sites, limiting flowlane disposal to the 45-65 foot depth range, constructing new pile dike fields for beach stabilization, and disposing Columbia River sediments in the ocean, pending EPA designation of permanent ocean disposal sites. As part of its assessment of dredged material disposal, the DMMS also evaluated potential beneficial uses of the sand for non-navigation purposes. These included fish and wildlife habitat restoration, hurricane and storm reduction, industrial/commercial development, and recreation.[45]

During the review of the SEIS, the Corps received numerous comments from agencies and the general public on the document. One of their primary concerns was the impact of the project on riparian habitat and wildlife, particularly the effects on endangered salmon species. These groups and

individuals also raised questions about the practice of disposing dredged materials to enhance beaches, the impact of channel and pile dike structures on river hydraulics and fisheries, the potential for contaminants in dredged material, and the effects of ship wakes on shoreline erosion. In response to these concerns, the Corps' environmental coordinator, Steve Stevens, stated that no threatened or endangered species would likely be affected by the preferred plan.[46]

The DMMP signaled the continuing economic importance of the Columbia and Willamette rivers to the regional economy. Management of this water highway had been a Corps responsibility since the turn of the century. In the period since the agency had first dredged and altered the channel, however, new environmental concerns had arisen. Across the country there was an increased awareness of the toxic content of some dredged material; in the Northwest there was the added issue of endangered and threatened salmon species that inhabited these rivers. Throughout the DMMP and the resulting supplemental EIS, the Corps attempted to incorporate the concerns of biologists and environmentalists. It also remained committed to dredging the rivers. "When we dredge the channels ... that's what keeps the ships moving up and down the river," said David Beach. After all, he explained, "these channels are the [lifeblood] of the country."[47]

Proposed channel improvement project would go from the mouth of the Columbia River to the Willamette River ports.

Deepening the Columbia River:

The Columbia River Channel Improvement Project

The Columbia and Willamette rivers are a vital transportation corridor in the Northwest. For more than a century, boats of various shapes and sizes have traversed these water highways, carrying their products to markets. In recent years, however, ships on the Columbia and Willamette rivers have increased in size. To accommodate these new, larger ships, deeper navigation channels were needed. Recognizing this fact, in the 1980s several Northwest ports requested that the Corps study the need to deepen the channel. While deepening the channel would allow ports in Oregon and Washington to stay competitive with other major shipping centers, the project also had significant environmental impacts. Both the process of dredging, as well as the placement of dredge materials, had the potential to affect fish and wildlife populations in the watershed. Especially vulnerable were the salmon that inhabited the rivers, many of which were protected under the ESA. Congress authorized the project in 1999, with the contingency that an approved Chief of Engineers report would be needed by the end of the calendar year – which was accomplished. Thus, the Corps remains authorized for the channel deepening project, but construction has not yet begun and many issues still need to be resolved.[48]

The purpose of the proposed channel deepening project was "to improve transport of goods on the navigation channel by improving the channel's ability to handle deep-draft loads, and also to provide ecosystem restoration for fish and wildlife habitats." The Corps pointed out that the existing 40-foot channel posed many limitations to navigation and in particular prevented "many of the larger vessels from transiting the river at full capacity." The study boundaries extended from the mouth of the Columbia River upstream to the Interstate 5 Bridge between Portland and Vancouver, and from the mouth of the Willamette River upstream to the Broadway Bridge in Portland.[49]

The Corps' first step toward deepening the Columbia and Willamette rivers was taken in December 1989, with the initiation of a reconnaissance study. The study, which was completed in October 1991, indicated that deepening the channel would benefit the surrounding ports by

allowing vessels to carry greater loads. Furthermore, shipping delays would be decreased because larger shipments would no longer be required to follow the tidal cycle. In the study the Corps found that each additional foot of draft created by deepening the rivers would allow an additional 2,000 metric tons of grain to be shipped per cargo vessel.[50]

Following the reconnaissance study, the Corps initiated a five-year Columbia River Channel Deepening feasibility study in 1994. In accordance with cost sharing requirements, the study was funded in part by seven local sponsors. The non-federal sponsors included the Ports of Portland, St. Helens, and Astoria in Oregon, and the Ports of Longview, Kalama, Woodland, and Vancouver in Washington. The cost sharing agreement signed by the ports required that they pay 50 percent of the feasibility study and 25 percent of the potential construction costs.[51] By 2000, however, the Port of Astoria had pulled out of the study, no longer endorsing the project.[52]

The purpose of the study, which was part of the federal government's required EIS, was to evaluate a variety of alternatives to meet the demand for deeper draft vessels. The first phase of the channel deepening study identified the least-cost, environmentally-acceptable dredge material plans for each of the various reaches of the river. The second phase concentrated on determining which plan maximized the net benefits, due to reduced transportation costs and reduced delays.[53]

In addition to the option of deepening the channel to 41, 42, or 43 feet, the Corps also examined two other alternatives. The first option was to improve the water level reporting system that guided river pilots from Portland to Astoria. The system of computerized gauges told pilots when water was highest, allowing them to time a ship's exit downriver with the highest tides, dam releases, or storm surges. The second option was to establish one regional port for the entire lower Columbia. The Corps considered two locations for the regional port – Astoria and Longview. Creating a regional port, however, would have considerable environmental and economic impacts. At Astoria, for example, it would have impacted critical estuary habitat and required additional infrastructure, such as roads and railroad lines, to handle large container vessels. Furthermore, local sponsors would be entirely responsible for establishing any additional infrastructure – the federal government's financial involvement remained limited to work within the channel itself. In the end, no local sponsor stepped forward, and the Corps dismissed the regional port concept as a viable alternative. Apparently, some of the local sponsors of the project never seriously considered this latter choice, with one port director calling it "ridiculous."[54]

An alternative proposal was to establish one regional port at Astoria. The port would require infrastructure changes to be able to handle large container vessels. These would adversely impact critical estuary habitat.

In October 1998, with approximately six months left of the five-year long study, the Corps released its *Draft Integrated Feasibility Report for Channel Improvements and Environmental Impact Statement: Columbia and Lower Willamette River Federal Navigation Channel* for public comment. Alternatives evaluated during the study and presented in the draft report included the following: the regional port concept, non-structural alternatives, structural alternatives (41-, 42-, and 43-foot dredged channel), and no action. Each of those alternatives, as well as dredging and disposal needs that would arise as a result of construction and maintenance of the project, were evaluated on the basis of technical, economic, social, and environmental criteria. The Corps reviewed potential impacts to both natural and cultural resources in accordance with NEPA, Clean Water Act, ESA, Coastal Zone Management Act, and the Marine Protection Research and Sanctuaries Act. The draft report included two proposals – the government's proposed "Least Cost Alternative" and the "Sponsor's Preferred Alternative." Following public comment, the Corps planned to select and recommend one alternative in its final report.[55]

The plan to deepen the channel provoked a variety of responses. Those who depended on the rivers for transport generally favored the plan and its potential economic benefits. Darrel Buttice of the Port of Portland pointed out that if the federal navigation channel was not deepened "those ships are going to go elsewhere."[56] Jon Krebs, Port of Astoria, agreed that, "The last thing the states of Oregon, Washington, and Idaho want to do

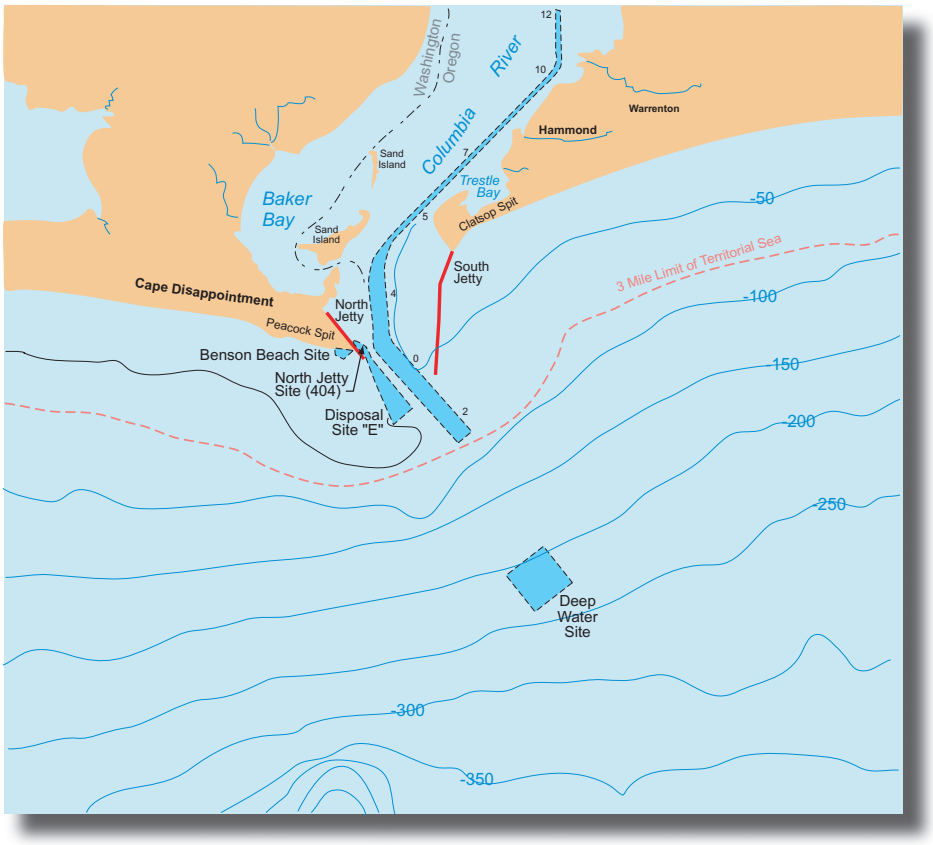
is give the shipping industry another reason to go to California or Puget Sound."[57] River bar pilot Captain Robert Johnson tried to make the case that "Having a deeper channel, making the Columbia River more competitive, will benefit all of us."[58]

Others questioned the project's impact on the environment. Dredging raised particular concern – both the process itself and the disposal of dredged material. River advocates pointed out that stirring up additional sediments in the two rivers posed problems. "Both the Willamette and the Columbia have some fairly hazardous and toxic material in them," remarked Hilary Abraham of the Oregon Environmental Council. "We're worried that the dredging is going to encourage greater sedimentation and toxicity."[59] Perhaps an even larger question was the disposal site. If the material was deposited in the water it could harm fish and other aquatic life, while disposing of it on land could force wildlife from its habitat. At a 1997 public meeting held in Astoria to discuss the project, conservationists, crab fishermen, sports fishermen, and property owners whose land would be affected by the project, all expressed reservations. According to a journalist covering the event, critics of the project warned that it could "take low-lying farmland out of production, bury fishing grounds and juvenile fish, and run counter to biologists' recommendations for salmon recovery." As frustration levels rose at the meeting, one attendee remarked that, "They [the Corps] held a meeting just to fill in the box that said they held a meeting."[60] In fact, the Port of Astoria withdrew its sponsorship from the project following the release of the feasibility study. Apparently, the Port no longer believed that the deepening of the Columbia River would benefit them.[61]

The Corps released the final report in August 1999, amidst this controversy. In the report the agency outlined its recommended alternative, which was to deepen the 40-foot channel by three feet. To accomplish this, workers would have to dredge 20 million cubic yards of sandy material, as well as remove 220,000 cubic yards of hard basalt rock and 450,000 cubic yards of cemented sand, gravel, and boulders. In terms of placement of this dredged material, the report noted that the amount of in-water disposal for the deepened channel would actually be less than the existing channel because more disposal sites would be placed on land. The plan called for a total of 20 land sites – primarily agricultural and industrial – to be used. More than 1,600 acres would be needed for disposal sites; the Corps planned to address the loss of 67 acres of riparian habitat and 20 acres of wetland habitat through compensatory mitigation actions.[62] Compensatory mitigation involves the restoration or development of wildlife habitat to replace those wildlife values lost due to project related actions. For the channel deepening project, compensatory mitigation would be addressed through the USFWS's Habitat Evaluation Procedures (HEP) process. Furthermore, representatives from the Corps, USFWS, ODFW, Washington Department of Fish and Wildlife, Washington Department of Ecology, and the ports formed an interagency wildlife mitigation team to determine compensatory levels.[63] In addition to land sites, the Corps, in conjunction with other government agencies, area fishermen, and members of the Columbia River Estuary Study Taskforce (CREST) – a council of governments representing local jurisdictions, including cities, counties, and ports, surrounding the Columbia River estuary in both Oregon and Washington – selected two ocean disposal sites to deal with the dredged material. One was a deepwater site; the other was Site E by the north jetty at the mouth of the Columbia River.[64] The Corps' idea was to use these sites for both construction material from the channel deepening and routine maintenance.[65]

The report also outlined an environmental restoration component, which was one of the stated purposes of the project. It

Some of the proposed ocean disposal sites for the dredged material at the Columbia River estuary



The EPA listed Portland Harbor on the Willamette River as a Superfund site, prohibiting the Corps from dredging the area.

included reestablishing the hydraulic connection between the Columbia River and Shillapoo Lake near Vancouver, Washington and restoring 250 acres in the Columbia estuary. The District planned to conduct additional restoration work over the next several years. Specifically, they intended to create more shallow water habitat, such as wetlands and estuaries. Part of this entailed removing dikes located along the tidal-freshwater floodplain and reconnecting backwater channels, sloughs, and oxbows to the main river. The Corps also contemplated retrofitting tide gates to open salmon spawning habitat.[66] The Corps estimated the cost of the proposed 43-foot channel, including restoration efforts, at $196 million.[67]

Environmental concerns put one aspect of the project on hold. Contaminated sediments in Portland Harbor delayed the deepening of the Willamette River portion of the channel. The material dredged from that section of the river was suitable for in-water disposal, but the additional material that would be removed for a deeper channel was potentially not suitable. Further biological tests were needed. Because of these complications, the sponsoring ports requested that the Corps delay that aspect of the project until the Oregon Department of Environmental Quality could investigate the situation and make plans for remediation.[68] In April of 2000, the EPA listed Portland Harbor on the Willamette River as a Superfund site, prohibiting the Corps from dredging the area. Furthermore, listing the site added to the controversy surrounding the channel deepening project.[69]

After the final report was released, CREST sent a letter outlining their concerns about the project. Worried about the impacts to aquatic resources, these local governments directed the council to analyze the final EIS for impacts to the estuary. Following a preliminary review of the final EIS, CREST found that the "project can not be done as proposed in the final EIS without resulting in extreme negative impacts to the natural resources and the economy of the communities surrounding the Columbia River estuary." The council argued that the plan failed to protect salmon and their habitat, that the Willamette portion of the project violated the Clean Water Act, and that the Corps did not provide mitigation for any aquatic impacts to species or habitats in the estuary or ocean. The council pointed out that many of these issues had been raised by a wide assortment of organizations and governments following the draft EIS, yet they had not been adequately addressed in the final version of the EIS.[70]

Throughout the planning process, the Corps was directed to consider potential impacts on fish and wildlife, particularly for endangered or threatened species. The agency's April 1999 biological assessment did not identify any significant habitat impacts as part of the channel improvement project. To ensure that channel deepening did not cause significant impacts and to evaluate the effectiveness of restoration efforts, the Corps planned, in conjunction with the NMFS, to do extensive monitoring both during and after construction.[71]

Initially, NMFS agreed with the Corps' biological assessment that there would be no significant impacts. In December 1999, the agency issued a non-jeopardy biological opinion, allowing the Corps to proceed with the action as proposed, as the channel project did not significantly impact the long-term survival of the twelve listed fish species.[72] A fisheries service biological opinion is required whenever any proposed federal action might adversely affect species protected under the ESA.[73] Laura Hicks, Columbia River Channel Improvement Project Manager, commented that the Fisheries Service's finding allowed the Corps "to pursue our long-term goal of ecosystem restoration in the estuary more expeditiously than we could have done without NMFS added emphasis on its importance."[74] Shortly thereafter, the final step in the five-year process was completed when Lieutenant General Joe N. Ballard signed the Chief of Engineers' Report on the Columbia River Channel Improvement Study. "We met the deadline established in congressional language which stated that this report had to be signed by December 31, 1999, to maintain congressional authorization to construct the project," said Hicks.[75]

The project received a setback, however, when in August 2000 the NMFS withdrew its biological opinion. This agency withdrew its opinion because its representatives

had not reached agreement with the Corps on needed studies. In the new consultation, the Corps and NMFS intend to identify what studies are needed and evaluate the information to assure the project will not impede the recovery of ESA-listed salmon populations. Another reason the NMFS withdrew its opinion was because of new information that had not been considered. In the interim since the first opinion, the Northwest Fisheries Science Center completed further studies on the effect of flow and the configuration of the estuary bottom as it relates to shallow water habitat. Scientists learned that shallow water habitat plays a key role in the estuary's ability to support fish. New information also suggested that salmon may be susceptible to a wider range of impacts, such as reduced growth and impaired disease resistance, from certain contaminants.[76] In September of 2000, the Oregon Department of Environmental Quality and the Washington Department of Ecology denied the Corps a water quality permit for the project, creating additional obstacles for the agency.[77]

Both the Corps and the NMFS agreed that this new information required careful consideration. "In the new consultation, we will work closely with the Corps to reach agreement on the specific details and schedule of required studies and monitoring, thoroughly assess the implications of any relevant new information, clarify expectations for the completion of restoration work and make any necessary refinements in the conservation measures," explained Brian Gorman, NMFS spokesperson. Laura Hicks also supported the consultation process. "The Corps agrees with this cautious approach and is committed to work with NMFS to assure there will not be any impact to ESA-listed stocks," she explained. Once the two agencies agree on the required studies and measures to ensure no harm to listed stocks, a biological opinion will be reissued.[78]

The movement to deepen the Columbia River illustrates the increasing tension that surrounds the Corps' work in the Pacific Northwest. On the one hand, the District is charged to manage navigation, which includes altering waterways for the passage of ships. Yet, at the same time they must consider a wide range of environmental concerns, particularly the region's rapidly diminishing salmon populations. While in recent years the District has attempted to integrate environmental restoration and mitigation into its navigation work, there is no question that at times the two goals have not been reconcilable. Perhaps this is no truer than on the coursing Columbia River – which has long been heralded as both a symbol of nature and commerce in the region.

Crafting a Minimum Dredge Fleet

The Corps has been dredging Oregon's rivers and streams since the late 19th century, as required by its navigation mission. From 1906 through the 1970s, the Corps remained the only significant owner and operator of hopper dredges in the United States. Historically, the agency owned and operated its own fleet of dredges that were distributed across the coastal United States. In the 1970s, however, the federal government came under pressure to transfer most of the dredging work to private industries. The result was the passage of Public Law 95-269 on April 26, 1978, which established the Minimum Dredge Fleet (MDF) and shifted the majority of the work to private contractors. By the late 20th century, the Corps maintained 12 dredges in the MDF, two of which were hopper dredges operated by the Portland District.

The Corps' dredge fleet evolved gradually over the early 20th century. By the 1950s, the agency owned and operated 20 hopper dredges. Six of these were located on the West Coast, eight on the East Coast, three were stationed on the Gulf Coast, and three were assigned to the Great Lakes. Hopper dredges were the primary mechanisms used in most Corps' coastal dredging operations. These vessels are usually configured with two drag arms, one on each side. During dredging, bottom sediments are sucked into the drag arm by hydraulic pumps and deposited into the dredge's hoppers. Once the hoppers are full, the drag arms are lifted, and the dredge sails to the disposal area, where the material is normally dumped through doors located at the bottom of the hoppers.[79]

Throughout the 1960s, the Corps had unsuccessfully petitioned Congress for additional funds to update its fleet, arguing that it was in need of modernization. The agency's fleet consisted of 16 hopper dredges, 14 of which had been constructed and put into service prior to 1949. Congress denied the Corps funds, aware that private dredging contractors, who had already established themselves in the field of pipeline and mechanical dredging, believed they were capable of supplying hopper dredging as well. In 1973, Congress directed the Corps to conduct an in-depth national dredging study to evaluate national dredging needs, survey the physical condition of both the Corps and private fleets, and assess the government's bidding procedures. Congress also directed that the study "must include consultation with the dredging industry, including their views and recommendations on various alternatives for meeting the national dredging requirements."[80]

After a management consulting firm completed the national dredging study, Congress initiated an industry capability program, which placed industry dredges in competition with government hopper dredges on selected projects for a "testing of the market." The Corps and private industry contractors essentially bid on the same projects from the same bid documents, plans and specifications. The Corps prepared a hired labor estimate for each project and contractors were told which hopper dredge and disposal method were being used for the estimate. One major difference was that the Corps' estimate did not allow for profit. Congress awarded the job to an industry contractor if its bid was not more than 125 percent of the hired labor estimate; if industry

bids all exceeded 125 percent of the hired labor estimate, the Corps received the jobs. When the industry capability program ended in fiscal year 1981, 149 dredging jobs had been advertised, 83 of which were awarded to industry. Of the 93 hopper-dredge jobs, 50 went to industry. During this period, private industry had acquired eight hopper dredges and another two were "on-line." These results satisfied Congress that private contractors could meet the demand for hopper dredging.[81]

Meanwhile, as the market testing program proceeded, Congress went forward with legislation to ensure industry's participation in dredging projects. The result of their efforts was the passage of Public Law (PL) 95-269. PL 95-269, the Minimum Fleet Legislation, applied to all types of dredges and remains the landmark legislation for the dredging industry. Key provisions of the law included the following:

- ❖ The Corps has dredging and related work done by contract if it is determined that private industry has the capability to do such work at reasonable prices and in a timely manner.
- ❖ The federally owned fleet is reduced in an orderly manner by retirement of plant. The Corps retains a minimum federally owned fleet required to carry out emergency and national defense work.
- ❖ Work necessary to keep the minimum fleet operational can be set aside from those projects to be bid by industry.
- ❖ The Secretary of the Army submits to Congress within 2 years a minimum fleet study that defines the minimum fleet dredges.
- ❖ The government, when estimating its dredging costs, considers depreciation, supervision, overhead expenses, interest on capital investment, and other appropriate charges.[82]

This legislation required the Corps to establish a minimum fleet of both hopper and nonhopper dredges to meet emergency and defense needs. As David Beach explained, the point of the law was "to turn over all the dredging in the country of federal channels ... to private industry. Except the U.S. wanted to retain ... a minimum number of dredges so that if contractors couldn't get the work done, the federal government would go in and do it." Beach added that having the federal government retain a certain number of its own dredges was important in case private contractors weren't available or their costs were too high.[83] The law itself mandated that the federally-owned fleet be reduced in an orderly manner, while retaining enough vessels to carry out emergency and national defense work, including wartime requirements. Furthermore, the statute allowed enough vessels to be retained by the government "to insure the capability of the Federal government and private industry together to carry out projects for improvements of rivers and harbors."[84]


Essayons


Yaquina


The *Essayons*, *Wheeler*, and *McFarland* dredge the Mississippi River in high water.

Under this legislation, Congress directed the Corps to conduct a Minimum Fleet Study, which the agency completed in 1978. In the study the Corps recommended a minimum fleet of eight hopper dredges – two each for the Gulf and Great Lakes and the east and west coasts of the United States. This recommendation received mixed responses. Industry, which was facing a smaller workload than predicted by the national dredging study, opposed the Corps' recommendation. Fearing that their new equipment would stand idle, they argued for a fleet in the range of two to five vessels. Conversely, port operators on the Oregon Coast worried that turning dredging projects over to private industry would result in increased costs and cause projects to be delayed or eliminated. The American Association of Port Authorities pushed for ten hopper dredges rather than the eight proposed by the Corps.[85] As Representative Peter DeFazio pointed out 20 years later, "Without the federal dredge fleet, smaller ports like those on the Oregon coast risk losing access to affordable and timely navigation dredging."[86]

Despite these conflicting responses, in 1979 the Corps forwarded their minimum fleet recommendations for eight hopper dredges to the Assistant Secretary of the Army for Civil Works (ASACW). The Office of Management and Budget requested that the agency provide additional information to justify the size of the minimum fleet. The Corps reassessment of the issue reaffirmed their initial findings. During this period, the agency had begun to retire its existing hopper fleet. By the end of fiscal year 1981, the Corps had retired five hopper dredges; the following year four more were taken out of service. In 1982 the Corps made a final appeal to the ASACW for maintaining


McFarland

a minimum fleet of eight hopper dredges. The political climate, however, was not conducive to this plan. Amidst intense lobbying from industry to increase their share of the dredging load and pressure to reduce costs, the ASACW decided in 1983 to allow the Corps a minimum fleet of four hopper dredges and six nonhopper dredges.[87]

To augment dredging capability for national defense and emergency purposes, the Corps initiated a Corps of Engineers' Reserve Fleet (CERF) in partnership with industry. The CERF program proposed a guaranteed response by private industry to emergency and defense situations. It called for a reserve fleet consisting of the Corps' four hopper dredges – the *Essayons*, the *Yaquina*, the *Wheeler*, and the *McFarland* with additional support from private vessels. By 1985, 15 private industry hopper dredges had joined CERF.[88]

In 1987 the U.S. Army Audit Agency recommended that the composition of the minimum fleet be reassessed to "include current defense requirements and private industry capability." In response, the Corps agreed to reassess the fleet every five years. In a related task, in 1990 the Chief of Engineers directed the U.S. Army Engineer Study Center (ESC) to assess two specific issues. First, the Corps wanted to know what type of a Corps dredge fleet was necessary to meet navigation, emergency, and military requirements. Second, the ESC was asked to examine the military need for a minimum fleet, independent of other issues. The ESC reports, which were released in 1991, concluded that the United States needed hopper-dredging capability, but it should not necessarily be the Corps' responsibility to provide it. In


Wheeler

terms of the second issue, the report found that existing military needs by themselves did not require a Corps minimum fleet.[89]

The discussions over the size and configuration of the MDF continued throughout the 1990s. As part of the process of periodic review mandated by the Minimum Fleet Legislation, in 1992 the Corps initiated a study focused on hopper dredges. Five years later, in October 1997, the Corps released information from that study for public comment. The study described eight options for the use of the four hopper dredges that constituted the government fleet. "The options range at one end of the spectrum with maximum use of the four Corps hopper dredges, to the other end, with all Corps hopper dredges being placed in a standby/support status and all hopper dredging work offered by industry to bid," announced General Ballard. The agency developed these options based on comments and concerns expressed by the ports, maritime users and the dredging industry. General Ballard explained that the Corps "attempted to focus the options on the varying degrees of risk to the viability of navigation projects and the investment and income risk to the dredging industry, and to balance those risks with costs considerations and improved competition, the long-term viability of the industry, and the ability to respond to time-sensitive and emergency dredging needs." Once comments were received, the agency planned to recommend a final configuration for the fleet.[90]

No final plans were made, however, due to new legislation included in the Water Resources Development Act of 1996 (WRDA-96). The passage of this act supplanted the Corps study and was the second major piece of legislation to affect the government's fleet of dredges.[91] In particular, the act directed the Corps to increase the use of private industry hopper dredges. Based on annual appropriations bills, beginning in 1992, the agency had allocated 7.5 million cubic yards, nationwide, to private dredging companies. WRDA-96 increased that amount by another million cubic yards. It also placed the *Wheeler* on standby and restricted the use of the MDF hopper dredges to 180 days a year. While it further reduced the Corps' direct role in dredging, the agency retained responsibility for maintaining the region's ports and harbors with either federal or private dredges.[92]

Conclusion

The issue of the Corps' role in dredging was crucial to the District, which encompassed numerous ports on the West Coast, as well as the Columbia and Willamette rivers. While it remained responsible for ensuring safe navigation, the agency's role in dredging projects evolved during the late 20th century. Historically the Corps dredge fleet participated in most dredging operations across the country. The trend over the past two decades, however, was to shift dredging work toward private industry. Given industry's general success in completing dredging projects and a political climate that favors increasing privatization, it is unlikely that this trend will be reversed. Furthermore, at the end of the 20th century, environmental issues heightened the complexity of the mix of public and private dredging by generally reducing the amount of dredge work performed by any hoppers. Despite its reduced fleet, the Corps remained the leader in managing navigation on our nation's rivers and streams.

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