CHAPTER 1
THE CORPS CARES—AND ALWAYS HAS

Engineering for the Environment: Canalizing the Upper Mississippi

The years of the Great Depression found the Corps at work on the upper Mississippi, opening the river to modern barge traffic by transforming it into an "aquatic staircase" of navigation pools behind dams. By means of the dams, training works, and dredging, the Engineers planned to create a 9-foot navigation channel—but the effect on the natural and human environment remained to be seen.

Recreation was first to benefit as Engineers agreed to improve the navigation pools for enjoyment as well as commerce. Assuring a local leader that "I still enjoy seeing dogwood, redbud, and hawthorne blossoms (even though I am an Army Engineer)," Colonel Paul S. Reinecke of the St. Louis District secured Works Progress Administration (WPA) funds and hired 1,800 unemployed to build a scenic drive along the pool created by recently-built Dam No. 26. Important to the region's ecology was the Corps' decision to redesign two large dams near Winona, Minnesota, in the St. Paul District. Aiming at stabilized water levels to avoid injury to birds during the nesting season, the Engineers created "a fine example of how large dams may help wildlife resources." In the words of Ira N. Gabrielson, Franklin D. Roosevelt's director of the Biological Survey: "These dams, which might easily have been so designed as to destroy most of the wildlife value of this great area, are actually increasing these values." No conservation organization, Gabrielson later declared, could have helped wildlife in the area as much as the Corps did by building the 9-foot channel.

Many other benefits accrued. Before the project was undertaken, it was not uncommon for millions of fish to be caught in sloughs by low water and die. Completion of the channel helped to reclaim 194,000 acres of sloughs and backwater, which the Engineers turned over to state and federal wildlife services for use as refuges. Dam gates were designed to permit migration of fish. Seeds and berries of the dogwood, redbud, and hawthorne named by Colonel Reinecke

fed wintering birds. Bargemen saw the region as a new water highway; but it was also part of the Mississippi flyway for migratory flocks, a waterway for fish, and along parts of its banks were parkways for human recreation.

To Americans of the Depression-harried Thirties, the main story of canalization no doubt lay in new economic opportunities and employment of the jobless on all the major building projects involved. Sensitive handling by Engineers working with conservation agencies insured that a later generation would see the project as a contribution to the total regional environment.

Albert E. Cowdrey

Source: (1) St. Louis and Rock Island District histories. (2) Ira N. Gabrielson, *Wildlife Refuges* (New York, 1943), 193. (3) "Floods and Wildlife," *Scientific American*, 156 (Feb., 1937), 101.

Partners in Conservation: Sturgis on the Environment

Lieutenant General Samuel D. Sturgis, Jr., Chief of Engineers from 1953 to 1956, presented the Corps as a partner in the fight for conservation long before "environment" became a household word. He traced his own love of nature to his boyhood, recalling fishing trips in the "Wisconsin white pine forest with a cold clear tinkling trout stream meandering through the dark green, stalwart pines and moss-covered windfalls." As Chief of Engineers, he declared in 1953: "We must obey the laws of nature and work in harmony with natural forces rather than against them. Man cannot dominate these forces," he added, "but, by working in harmony with them, he can preserve the heritage of future generations."

All forms of conservation interested him, from soil to wildlife. The destruction of forests filled him with "real pain", and he regretted that in the march "of what we often inaccurately term 'civilization', some values are likely to be lost."

The Corps, he believed, could help the cause of conservation. On coastal and inland waters it could provide shelter for wildlife. Already its projects furnished "more than 3.5 million acres of land for some form of wildlife management and recreation." And he hoped to see "resting grounds for migratory game, refuges, managed public hunting, fish culture, game management, research, laboratories, field headquarters for wildlife research and administration, arboretums" —all aimed at "public use and enjoyment of wildlife resources." He concluded an address to an audience of conservation commissioners by declaring: "The Corps stands ready and willing to join with each

of you and give you every possible assistance which our authorized functions permit to obtain the greatest practicable benefits for wildlife from our projects."

Albert E. Cowdrey

Source: Remarks by Major General S. D. Sturgis, Jr., before the International Association of Game, Fish and Conservation Commissioners, Milwaukee, Wisconsin, 14 September 1953.

Concern for an Endangered Species: the Buffalo

Lumbering, shaggy masses of broad-shouldered, spindly legged buffalo covered the western grasslands in the years before the Civil War. A mobile commissary that provided the plains Indians with food, clothing, and shelter, the vast herds seemed limitless to astounded travelers. Yet, even then, voices warned of their impending destruction. Frequently these voices belonged to Army Engineers.

In 1845, two Topographical Engineers, Lieutenant William B. Franklin on the Platte River and Lieutenant James W. Abert on the Arkansas, heard Indians tell of the decline of the buffalo. Franklin recorded the views of the Cheyenne chief Old Soldier: "He was convinced that something must be done . . . as the buffalo were getting scarce, and unless [the Western Indians] found some other way of living, they must starve." Both Franklin and Abert wrote at length in their reports of the serious effects the demise of the buffalo would have on tribal life.

Four years later, as the western migration swelled with gold-seeking Forty-Niners, Captain Howard Stansbury saw fewer buffalo than Franklin and Abert had reported. The herds, Stansbury noted, "have fled before the advancing tide of emigration. Driven from their ancient and long-loved haunts, these aborginal herds, confined within still narrowing bounds, seem destined to final extirpation at the hands of men."

Captain William F. Raynolds, on his way to the upper Yellowstone in 1859, was appalled by the wholesale slaughter of buffalo cows for their skins. "Another generation," he predicted, "will witness almost the entire extinction of this noble animal." Regrettably, Raynolds' prophesy came true.

In the early years of the 1870's the herds almost vanished in a blaze of fire from Sharps and Remington forty-fours. When the smoke from the buffalo-hunters' rifles cleared, little remained but mounds of rotting meat and piles of hides and bones. The warnings of the Engineer explorers—Abert, Franklin, Stansbury, and Ray-

nolds—went unheeded, and the buffalo came within a hair's breadth of extinction.

Frank N. Schubert

Source: (1) Tom McHugh, *The Time of the Buffalo* (New York: 1972. (2) James W. Abert, *Report of His Examination of New Mexico*, Ex. Doc. 41, 30th Cong., 1st sess. (3) William B. Franklin, *Report, Expedition to the South Pass of the Rocky Mountains.* (4) Howard Stansbury, *Exploration and Survey of the Valley of the Great Salt Lake of Utah*, S. Ex. Doc. 3, 31st Cong., spec. sess. (5) William F. Raynolds, *Report on the Exploration of the Yellowstone River* (Washington: Government Printing Office, 1868).

The Corps and Fish Conservation During the 1870's and 1880's

Cooperation between Army Engineers and environmentalists is by no means new. A century ago, the Corps assisted the fledgling United States Commission of Fish and Fisheries in its efforts to preserve marine life. Engineer involvement in the Commission's work took many forms, from the construction of fish ladders on the Potomac to dredging ponds for the St. Jerome's Creek oyster hatchery on the eastern shore of Chesapeake Bay.

Perhaps the most significant assistance was rendered at Wood's Hole, Massachusetts, where Spencer F. Baird, the first Commissioner of Fish and Fisheries, laid the groundwork for the complex and sophisticated oceanographic laboratories currently in operation. Engineer officers surveyed the harbor, planned and built the pier and breakwater that protected the Commission's hatcheries and ships, and supervised construction of buildings for the first laboratory.

Throughout the formative years of the Fish and Fisheries Commission, the Corps contributed its experience and expertise to the preservation of aquatic animal life.

Frank N. Schubert

Source: *Annual Reports of the U.S. Commissioner of Fish and Fisheries, 1879 - 1885.*

Saving a Fishery in the 1880's

In the 1880's the Corps of Engineers helped to build a fishery at Havre de Grace, Maryland, and also saved it from destruction. Beginning in 1881, in conjunction with navigation improvements on the Susquehanna River, the Corps built facilities for the United States Commission of Fish and Fisheries. The Baltimore District dredged portions of the channel to aid boats traveling to the fishery, built landing docks, and laid foundations for the hatchery. Upstream, Baltimore District Engineer Colonel William P. Craighill constructed a wooden breakwater of crib design to protect the fishery from ice-flows on the Susquehanna.

During December, 1887, a blizzard struck the Susquehanna basin and the river froze. Craighill realized that unless steps were taken promptly to fill the crib with stone, it would be totally destroyed. In the emergency he sent a tug to break up the ice in the river and keep the channel open. He also hired men to remove ice around the breakwater. The workers toiled in bitter cold, hauling stone by hand through icy water to fill the crib. Such arduous labor required, what Craighill termed, "extraordinary inducements"—the then handsome wage of $2.50 per day. To avoid delays he kept the workmen at the site around the clock for three days, supplying them with food from country stores in Havre de Grace. On the last day of December Craighill reported that the "crib was saved, sunk in place, and is now in position." The fishery suffered no damage.

Harold K. Kanarek

Source: Harold K. Kanarek, *The Mid-Atlantic Engineers: A History of the Baltimore District of the U.S. Army Corps of Engineers, 1794 - 1974.*

Captain Pope's Vision: The Greening of the Llano Estacado

Exploratory well-digging by Corps personnel, begun recently to increase the water supply of metropolitan Washington, calls to mind an Engineer's efforts to find underground sources of water on the Llano Estacado of western Texas 120 years ago. When Captain John Pope, a Topographical Engineer making a survey for a railroad route to the Pacific, crossed the arid tableland in 1854, he predicted a great future for the region in cotton culture. The water for such a transformation, he believed, would come from artesian wells.

Supported by few and derided by many, Captain Pope bored numerous holes in the dry crust of the plateau. His vision was keen-

er than his drills. Bit after bit broke before penetrating deep enough to strike water.

After the development of machinery to fit the dream, vast underground reservoirs of water made Texas cotton for a time even more valuable than Texas oil. And around Lubbock, on the once forbidding Llano Estacado, the cotton plants wave in the wind, monuments to the vision of an Engineer who was ahead of his time.

Frank N. Schubert

Source: (1) Martin L. Crimmins, "Captain John Pope's Route to the Pacific," *The Military Engineer*, 23 (March - April 1931). (2) W. Eugene Hollon, *The Southwest: Old and New* (New York: Alfred A. Knopf, 1961).

Engineers and Public Health

Selection of the Corps by the Environmental Protection Agency (EPA) to oversee construction of $24.5 billion in water-cleanup projects recalls past Engineer work in water purification, sewage disposal, and the general field of public health.

In the work of providing pure water to drink, the Engineers began at the top—by providing it to the President and the First Family. In 1824, Engineers piped water from a spring on K Street to supply the White House, previously dependent on shallow wells. Engineer work then expanded to the rest of the nation's capital. In the 1840's, future Chief of Engineers, Lieutenant Andrew A. Humphreys, assisted in work that included installation of the first sanitary sewer in Washington, on 15th Street. Climax of Corps efforts was, of course, the building in the next decade of the Washington Aqueduct by Captain Montgomery C. Meigs—the foundation of the capital's water system, most of it still functioning today. In a growing urban area plagued by a host of filth-borne diseases, Engineer work laid an indispensable foundation for the future eradication of typhoid and cholera.

After the Civil War, Engineer work expanded. The raising of the Potomac and Anacostia flats saved thousands of lives, especially among the city's poor, who lived in malaria-scourged riverside neighborhoods. In the twentieth century, working with top civil consultants, the Engineers directed the building of a system to pump the city's sewage under the Anacostia by means of an inverted siphon and constructed the sewage treatment plant at Blue Plains. Meanwhile, the late nineteenth century had seen other American cities call for Engineer assistance to solve their own water problems. Detailed by the Chief of Engineers, Colonel George H. Mendell served dur-

ing the 1870's as consultant engineer to the Water Commissioners of San Francisco and the State of California. In the 1880's, Captain William Ludlow helped to give Philadelphia its modern water system against the opposition of some ignorant and spoils-minded local politicians.

And, as the end of the century approached, Engineers carried their cleanup work to U.S. possessions and administered areas overseas. Now a brigadier general, Ludlow as Governor of Havana (1898 - 1900) directed a full-scale sanitary reform of this disease-ridden tropical port. Work included plans for sewers, pumping stations, and an improved water system. Lieutenant Lytle Brown, a future Chief of Engineers, helped to carry out similar improvements in Manila, the Philippine Islands.

The record of the engineering profession as a whole is a distinguished one in the field of public health. Long before the true causes of epidemic disease were understood, engineers moved out ahead of medical researchers to provide practical solutions to pressing public problems. In that record of service, Corps members have shared fully. Today, human health remains an important aspect of efforts to preserve the total web of life through environmental engineering. It is fitting that the Corps should shoulder new responsibilities in a field in which it has long excelled.

Albert E. Cowdrey

Source: (1) Albert E. Cowdrey, *A City for the Nation.* (2) Richard H. Shryock, *The Development of Modern Medicine.*

Ending Past Abuses: The Corps of Engineers and Lake Harwell

One of the major benefits of Corps flood control work has been the water recreation facilities created by dams and their reservoirs. Although the Federal government generally owns the land bordering the lake, private possession of the remainder is the general rule. Under Federal authority, the Corps of Engineers grants permits for the construction of docks, piers, boathouses, and other water related structures. Such facilities inevitably enhance the resale value of private dwellings built on Corps lakes.

At Lake Harwell, Georgia, a major protest arose when the Corps attempted in 1974 to control building and burgeoning development that threatened possible despoliation of the lake. Largely due to the easy access to the water, value of land along the reservoir had risen from $35 an acre to as much as $25,000 for one-third of an acre.

New Corps regulations that ended the *pro forma* reapplication and transfer of permits from one property owner to another were aimed at concentrating development in one or two areas, leaving most of the lake in its natural condition. Major General Ernest R. Graves, Director of Civil Works, Office of the Chief of Engineers, (OCE), observed that anything less would mean conveying interest in public land to private individuals.

Despite Congressional hearings and criticism, as well as indignant public protest, the new lakeshore management regulations went into effect. Reaction was harsh. One attorney asserted that the Army has treated its "fellow Americans with a callousness that we have not experienced since General Sherman made his infamous march through Georgia." Such was the price the Corps of Engineers had to pay for increased environmental responsibilities.

Dennis S. Lavery

Source: U.S. Congress, House of Representatives, Committee on Public Works. *Lakeshore Management Policies and Practices at Lakes under the Jurisdiction of the U.S. Army Corps of Engineers.* Hearings. 94th Cong., 2d sess., 1976.

The Impact of the 1936 Flood on the Susquehanna River Basin.

During calamities such as floods, earthquakes, and fires, the Corps of Engineers is often the first organization on the scene dispensing relief to disaster victims. The flood of March 1936 in the Susquehanna River Basin in New York and Pennsylvania was no exception. For almost two weeks rain fell on melting snow, and the resultant violent waters devastated the central Atlantic region. Property damage in the basin amounted to over $67 million. But in the aftermath of the disaster, the Corps' contribution to the improvement of the quality of life in the basin went far beyond rescue and clean up operations. As a result of the flood, Congress adopted a comprehensive program of federal flood protection for the communities along the Susquehanna to be carried out by the Army Corps of Engineers.

Since 1936, the Corps has built dams, levees, flood walls, and pumping stations that have meant more to the Susquehanna Valley than simple flood control. Through these projects, the Corps has implemented a conservation policy which has improved water quality, fostered aquatic life, stopped soil erosion, and provided vast recreation areas. For example, the Pennsylvania Game Commission uses the land of the Indian Rock Dam at York, Pennsylvania, for wildlife

conservation and management. Three major Corps dams on the Susquehanna's West Branch all have large picnic, camping, beach, and boating facilities serving hundreds of thousands of people annually. Before the construction of the Curwensville Dam in Clearfield County, Pennsylvania, acidic mine wastes polluted the water in the West Branch and killed all fish upstream from Lock Haven. Since then, the Engineers have been able to use the dam to control the flow of the acid water downstream. This, combined with increased state efforts to curb mine waste, has restored fish to the river. All three of the West Branch reservoirs are aesthetic triumphs covering ugly scars left by strip mining.

In New York, the Corps has transformed reservoirs at Whitney Point, East Sidney, and Almond into scenic lakes with swimming, boating, fishing, and picnic areas. Most recently, at Raystown on the Juniata River in Pennsylvania, the Corps has built a flood control and recreation dam large enough to supply future electric power. Finally, the Corps is an important member of the Susquehanna River Commission. This agency is responsible for preparing an economic plan for the basin, taking into consideration environmental quality, regional development, and economic efficiency.

Thus, the 1936 Flood Control Act marked a turning point for Corps operations in civil works. It signaled a change from the improvement of navigation to the multi-purpose development of the nation's waterways. In the Susquehanna River Basin, the change has meant an increase in the size and number of projects and a strong role in planning the region's landscape and environment.

Harold Kanarek

Source: Harold Kanarek, *The Mid-Atlantic Engineers: A History of the Baltimore District of the U.S. Army Corps of Engineers, 1794-1974.*

Early Engineer Concern Over the Depletion of the Columbia River Fisheries: Major William A. Jones's Report, 1888

Long before the construction of Bonneville Dam and its famous fish ladders, Major William A. Jones of the Corps of Engineers warned that the Columbia River salmon required protection. An experienced Engineer and explorer, known for the discovery of Togwotee Pass through the Wind River Mountains, Jones wrote his *Report on the Salmon Fisheries of the Columbia River* while serving as Portland District Engineer. Gazing at the maze of nets, traps, and fish wheels that clogged the Columbia near Astoria, he concluded

that it was "a sort of miracle that any [large] fish escape to go up the river. . . ."

Major Jones also proposed means for mitigation of the threat to the fisheries. Along with continuation of the practice of closing the river to fishing at regular intervals, he recommended an increase in the number of hatcheries and uniformity between the fish laws of Oregon and Washington. Although his suggestions were not adopted until well into the twentieth century, Jones recognized the threat to the survival of the salmon fisheries many years before the general public became aware of the problem.

Frank N. Schubert

Source: Major William A. Jones, *Report on the Salmon Fisheries of the Columbia River*, Senate Executive Document 123, 50th Cong., 1st sess., 1888, 15-62.