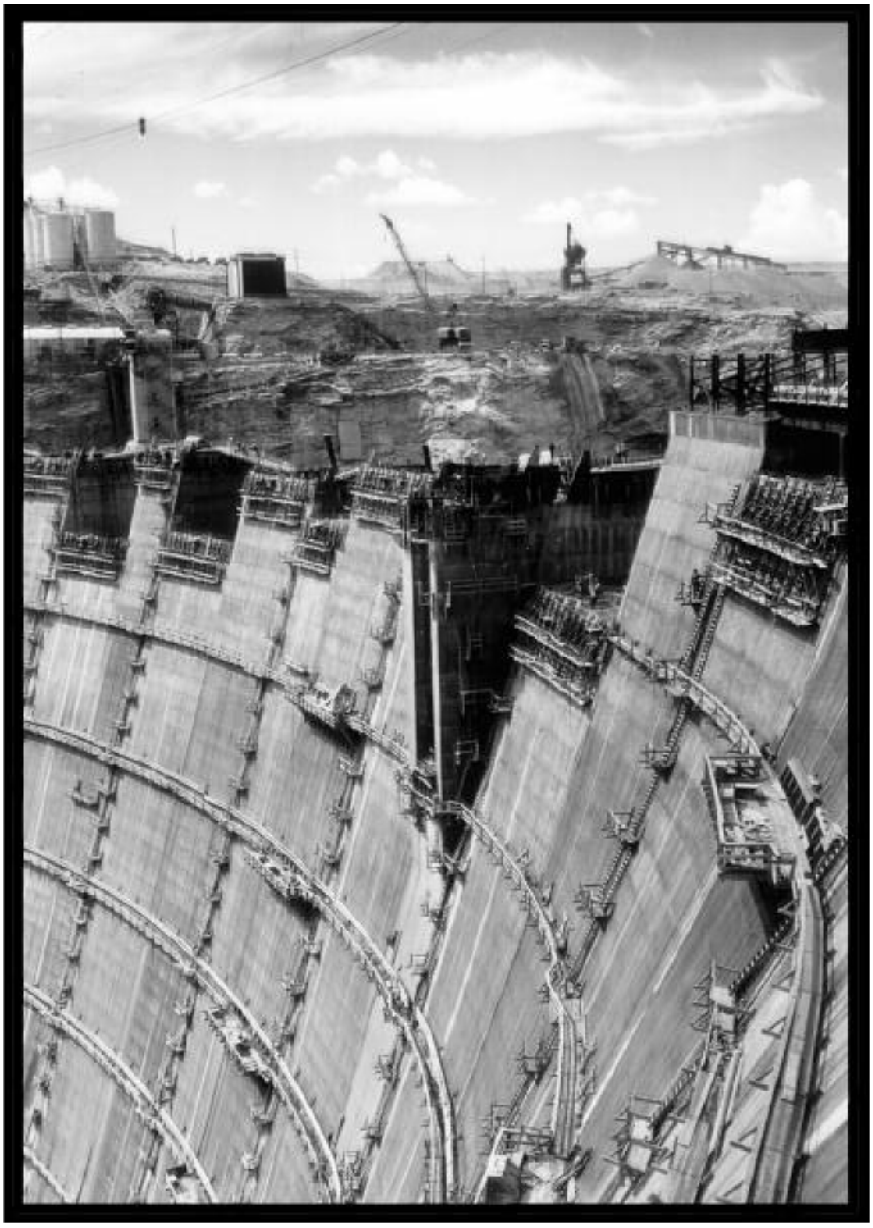
Brief History of The Bureau of Reclamation



Glen Canyon Under Construction
Colorado River Storage Project - April 9, 1965
Photographer - unknown

THE MOVEMENT FOR RECLAMATION

Only about 2.6 percent of the earth's water supply is fresh, and some two-thirds of that is frozen in icecaps and glaciers or locked up in some other form such as moisture in the atmosphere or groundwater. That leaves less than eight-tenths of 1 percent of the earth's water, about 30 percent of fresh water, available for humankind's use. The largely arid American West receives a distinctly small share of that available supply of fresh water. As a result, water is a dominating factor in the arid West's prehistory and history because it is required for occupation, settlement, agriculture, and industry.

The snowmelt and gush of spring and early summer runoff frustrated early Western settlers. They watched helplessly as water they wanted to use in the dry days of late summer disappeared down Western watercourses. Settlers responded by developing water projects and creating complicated Western water law systems, which varied in detail among the various states and territories but generally allocated property rights in available water based on the concept of prior appropriation (first in time, first in right) for beneficial use.

At first, water development projects were simple. Settlers diverted water from a stream or river and used it nearby; but, in many areas, the demand for water outstripped the supply. As demands for water increased, settlers wanted to store "wasted" runoff for later use. Storage projects would help maximize water use and make more water available for use. Unfortunately, private and state-sponsored irrigation ventures often failed because of lack of money and/or lack of engineering skill. This resulted in mounting pressure for the Federal Government to develop water resources.

In the jargon of the day, irrigation projects were known as **"reclamation"** projects. The concept was that irrigation would "reclaim" or "subjugate" arid lands for human use. John Wesley Powell's Western explorations and his published articles and reports; private pressures through publications, irrigation organizations, and irrigation "congresses"; nonpartisan Western political pressures; and Federal Government studies, conducted by the U. S. Army Corps of Engineers and U. S. Geological Survey (USGS), contributed to the discussions and cogitations that influenced American public opinion, Congress, and the executive branch in support of "reclamation."

Before 1900, the United States Congress had already invested heavily in America's infrastructure. Roads, river navigation, harbors, canals, and railroads had all received major subsidies. A tradition of government subsidization of settlement of the "West" was long-standing when the Congress in 1866 passed "An Act Granting the Right-of-Way to Ditch and Canal Owners over the Public Lands, and for other Purposes." A sampling of subsequent congressional actions promoting irrigation reveals passage of the Desert Land Act in 1877 and the Carey Act in 1894 which were intended to encourage irrigation projects in the West. In addition, beginning in 1888, Congress appropriated money to the USGS to study irrigation potential in the West. Then, in 1890 and 1891, while that irrigation study continued, the Congress passed legislation reserving rights-of-way for reservoirs, canals, and ditches on lands then in the public domain. However, Westerners wanted more; they wanted the Federal Government to invest directly in irrigation projects. The "reclamation" movement demonstrated its strength when pro-irrigation planks found their way into both Democratic and Republican platforms in 1900. In 1901, "reclamation" gained a powerful supporter in Theodore Roosevelt when he became President after the assassination of William McKinley.

RECLAMATION BECOMES A FEDERAL PROGRAM

President Roosevelt supported the "reclamation" movement because of his personal experience in the West, and because of his “conservation” ethic. At that time, “conservation” meant a movement for sustained exploitation of natural resources by man through careful management for the good of the many. Roosevelt also believed “reclamation” would permit **"homemaking"** and support the agrarian Jeffersonian Ideal. Reclamation supporters believed the program would make homes for Americans on family farms. Passed in both Houses of the Congress by wide margins, President Roosevelt signed the Reclamation Act on June 17, 1902.

In July of 1902, Secretary of the Interior Ethan Allen Hitchcock established the United States Reclamation Service (USRS) within the Division of Hydrography in the USGS. Charles D. Walcott, as director of the USGS, became the first “director”of the USRS, and Frederick Newell became the first “Chief Engineer” while continuing his responsibilities as chief of the Division of Hydrography.

The Reclamation Act required that

> Nothing in this act shall be construed as affecting or intended to affect or in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water . . . or any vested right acquired thereunder, and the Secretary of the Interior . . . shall proceed in conformity with such laws . . .

That meant implementation of the act required that Reclamation comply with numerous and often widely varying state and territorial legal codes. Development and ratification over the years of numerous interstate compacts governing the sharing of stream flows between states and of several international treaties governing the sharing of streams by the United States with Mexico or Canada made Reclamation’s efforts to comply with state or territorial water law even more complex.

In its early years, the Reclamation Service relied heavily on the USGS Division of Hydrography’s previous studies of potential projects in each Western state with Federal lands – the sale of which was the original source of reclamation funding. Between 1903 and 1906, about 25 projects were authorized throughout the West. Because Texas had no Federal lands, it was not one of the original “reclamation” states. It became a reclamation state only in 1906.

PRINCIPLES OF THE RECLAMATION PROGRAM

During its early years several basic principles, underlaid the reclamation program. The details have changed over the years, but the general principles remain: (1) Federal monies spent on reclamation water development projects which benefit water users would be repaid by the water users; (2) projects remained Federal property even when the water users repaid Federal construction costs (the Congress could, of course, choose to dispose of title to a project); (3) Reclamation generally contracted with the private sector for construction work; (4) Reclamation employees administer contracts to assure that contractors' work meets Government specifications; (5) in the absence of acceptable bids on a contact, Reclamation, especially in its early years, would complete a project by “force account”(that is, would use Reclamation employees to do the construction work); and, (6) hydroelectric power revenues could be used to repay project construction charges.

EARLY HISTORY OF RECLAMATION

In 1907, the USRS separated from the USGS to become an independent bureau within the Department of the Interior. The Congress and the Executive Branch, including USRS, were then just beginning a learning period during which the economic and technical needs of Reclamation projects became clearer. Initially, overly optimistic about the ability of water users to repay construction costs, Congress set a 10-year repayment period. Subsequently, the repayment period was increased to 20 years, then to 40 years, and ultimately to an indefinite period based on "ability to pay." Other issues that arose included: soil science problems related both to construction and to arability (ability of soils to grow good crops); economic viability of projects (repayment potential) including climatic limitations on the value of crops; waterlogging of irrigated lands on projects, resulting in the need for expensive drainage projects; and the need for practical farming experience for people successfully to take up project farms. Many projects were far behind their repayment schedules, and settlers were vocally discontented.

The learning period for Reclamation and the Congress resulted in substantial changes when the USRS was renamed the Bureau of Reclamation in 1923 and, in 1924, the Fact Finder's Act began major adjustments to the basic Reclamation program. Those adjustments were suggested by the Fact Finder's Report which resulted from an in-depth study of the economic problems and settler unrest on Reclamation's 20-plus projects. Elwood Mead, one of the members of the Fact Finder's Commission, was appointed Commissioner of Reclamation in 1924 as the reshaping of Reclamation continued. A signal of the changes came in 1928, for instance, when the Congress authorized the Boulder Canyon Project (Hoover Dam), and, for the first time, large appropriations began to flow to Reclamation from the general funds of the United States instead of from public land revenues and other specific sources.

In 1928, the Boulder Canyon Act ratified the Colorado River Compact and authorized construction of Hoover Dam, which was a key element in implementation of the Compact. Subsequently, during the Depression, Congress authorized almost 40 projects for the dual purposes of promoting infrastructure development and providing public works jobs. Among these projects were the beginnings of the Central Valley Project in California, the Colorado-Big Thompson Project in Colorado, and the Columbia Basin Project in Washington.

Ultimately, of Reclamation's more than 180 projects, about 70 were authorized before World War II. The remainder were authorized during and after World War II in small and major authorizations, such as the Pick-Sloan Missouri Basin Program (1944), the Colorado River Storage Project (1956), and the Third Powerplant at Grand Coulee Dam (1966). The last really big project construction authorization occurred in 1968 when Congress approved the Colorado River Basin Project Act which included the Central Arizona Project, the Dolores Project, the Animas-La Plata Project, the Central Utah Project, and several other projects.

LABORATORIES

One problem confronted by Reclamation was laboratory testing of special problems. Testing was carried out in various locations such as Montrose and Estes Park, Colorado, and Colorado State University until 1946 when Reclamation located its primary laboratory at the Denver Federal Center. These research laboratories study modeling and designs for hydraulic structures, concrete technology,

electrical problems, construction design innovations, groundwater, weed control in canals and reservoirs, various environmental issues, water quality, ecology, drainage, control of evaporation and other water losses, and other technical subjects.

HYDROELECTRIC GENERATION

Although the earliest hydroelectric plants on Reclamation projects went into operation in 1909, it was only during the 1930s that generation of hydroelectric power became a principal benefit of Reclamation projects. Reclamation built the major hydroelectric plant at Hoover Dam only after a hard public debate about whether the Federal Government should become involved in public power production or whether private power production should be the rule. It was the Hoover Dam precedent which ultimately allowed Reclamation to become a major hydroelectric producer. Once the issues received public airing at Hoover Dam, hydroelectric projects became a feature of many Reclamation projects. Hydroelectric revenues have subsequently proved an important source for funding repayment of Reclamation project costs. In 1993, Reclamation had 56 powerplants online and generated 34.7 billion kilowatt hours of electricity. In 1999, revenues from Grand Coulee hydroelectric generation equaled about two-thirds of Reclamation's entire appropriated budget.

RECLAMATION AND INTERSTATE WATERS

Allocation of the waters of the Colorado River was addressed in 1922 in Santa Fe when Secretary of Commerce Herbert Hoover moderated a meeting of commissioners representing Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming. The meeting developed and signed the Colorado River Compact (Compact) to divide and allocate the waters of the Colorado River. For Reclamation, this is the most complex and difficult of the interstate compacts, and it was ratified by the Congress in 1928 without the concurrence of Arizona. California and Arizona argued for years over how to calculate Arizona's share of the waters of the lower Colorado River. The Arizona legislature ratified the Compact only in 1944 and then later sued California over its interpretation of the Compact. The lawsuit lasted from 1952 until 1962. Concern over the Compact has only heightened over the years as it became increasingly apparent that there isn't consistently as much water in the Colorado River as was presumed by the signers and ratifiers. In addition, the Compact did not anticipate provision for 1.5 million acre-feet of water promised to Mexico in a 1944 treaty. Reclamation is deeply involved in these complicated Colorado River issues because Reclamation reservoirs largely store and regulate the flow of the Colorado River. Reclamation dams in the Upper Colorado River Basin deliver water to Glen Canyon Dam, which then stores the water in Lake Powell. From Lake Powell, the water is delivered in accordance with the terms of the Colorado River Compact to the Lower Colorado River Basin states. Once delivered to the Lower Colorado River Basin, Hoover Dam stores the water in Lake Mead.

The Colorado River Compact is the most complex and difficult of the interstate compacts. Reclamation is affected by other compacts all over the West where the waters of interstate streams are shared among states.

SPECIAL PROJECTS

Reclamation's traditional area of operation is the seventeen, arid, continental states of the West. Reclamation has, however, at times been assigned work outside that traditional operational area. For instance, during the late 1920s, Reclamation studied "planned group settlement"in the South in cut

over areas and swamps. This project was supposed to create new farms, but it ultimately died as impacts of the Depression on the farm economy were recognized. Other projects in the eastern United States were also undertaken, and Reclamation's photograph collection includes hundreds of photographs from areas outside the arid West. Beginning in the 1930s Reclamation studied possible projects in Hawaii, and in 1954 the Congress authorized investigations on Oahu, Hawaii, and Molokai among the Hawaiian Islands. In the 1940s and 1950s Reclamation studied water development projects in Alaska and ultimately built the Eklutna Project outside Anchorage. The Eklutna Project has since been transferred out of Reclamation management.

INDIAN TRIBES

In the early years of its history, Reclamation was actively involved, in conjunction with the Indian Service, in irrigation projects for Indian tribes including the San Carlos, Blackfeet, and Yuma. However, the majority of Reclamation project water went to non-Indians. In the early years, Reclamation's mission to develop water supplies appeared to carry the potential for injuring the rights of tribes. If non-Indians began using Reclamation-provided water, it was feared they would establish a senior right under the Appropriation Doctrine, leaving little or no water for the tribes when they were ready to develop their reservation lands. In the landmark 1908 decision, *Winters v. United States,* the Supreme Court attempted to reconcile this potential conflict through the "Winters Doctrine." This case concerned the Milk River in Montana and actually delayed development of Reclamation's Milk River Project. The Winters Doctrine established the principle of reserved rights: Indian tribes with reservations have reserved water rights in sufficient quantities to fulfill the purposes for which the reservation was established, *and* the date of the reserved right is the date of the treaty or Executive Order setting aside the land. The dates of reserved rights generally are very early in relation to non-Indian settlement and, thus, establish very high priority for Indian water rights. Further, unlike appropriative water rights, a reserved water right does not have to have been used to remain in effect. A reserved right remains in effect regardless of how many years have passed. A congressionally authorized and funded Reclamation project could not take precedence over senior water rights. Thus, if a tribe had senior reserved water rights, its right to the future development of reserved rights should not be affected legally by Reclamation project development. Nevertheless, there are situations in which tribes have encountered difficulties in attempting to develop their senior reserved water rights for various reasons – situations the United States, with Reclamation's participation, is trying to address through the Indian water rights settlement program and other initiatives.

In recent years the Government has become much more sensitive to Indian tribal water issues. Many Reclamation projects now include provisions for honoring the Secretary of the Interior's trust responsibility for Indian water rights. Among notable examples are the Central Arizona Project, the Dolores Project, and the currently proposed Animas-La Plata Project. Reclamation is also involved in water-related activities such as the Mni Wiconi water distribution system in South Dakota which provides rural culinary water supply in a large area that includes several reservations. Reclamation personnel also often serve on negotiating teams or provide technical expertise to negotiating teams working for the Secretary of the Interior to develop equitable water solutions for Native American tribes. Reclamation has also amended its procedures so that before any new actions are undertaken, Reclamation first determines if the action could adversely impact Indian trust resources. When it appears that adverse impacts are possible, Reclamation will work with the tribe to seek to avoid the impacts or, when unavoidable, to determine appropriate mitigation.

RECLAMATION PROJECTS AND THE ENVIRONMENT

Conservation and environmental issues are not as new to Reclamation as many think. The nature of conservation and environmental issues and how they have affected Reclamation, however, has changed considerably. For instance, very early in Reclamation's history between 1908 and 1912, for instance, there was a public outcry about conservation of Lake Tahoe's natural lake level and scenic beauty. Reclamation proposed to build a dam both to increase storage capacity and to occasionally lower the existing lake level to benefit the Newlands Project. In a distinctly different direction, Reclamation's Belle Fourche Project in South Dakota was specifically designed to avoid mixing hazardous industrial mining wastes in Whitewood Creek with its irrigation water.

Subsequently, proposals for Reclamation projects raised public consciousness about major dams and their impacts on various resources. by the mid-1930s, Reclamation was looking at fishery issues as it addressed construction of Grand Coulee and other dams. On another front, in the mid- to late-1930s, Coloradoans and their congressional representatives pushed Reclamation to build the Colorado-Big Thompson Project which would require construction on the fringe of and under Rocky Mountain National Park. The project was ultimately built because Rocky Mountain National Park was created with a provision in the enabling law specifically authorizing a water development project infringing on the National Park. In the 1950s, the controversy over construction of Echo Park Dam in Dinosaur National Monument heightened public awareness of issues surrounding construction of a dam in a National Park Service-managed area. Ultimately, public opinion forced cancellation of plans for Echo Park Dam and resulted in construction of the alternative, Glen Canyon Dam. By the 1960s, Marble Canyon and Bridge Canyon dams were proposed, but Secretary of the Interior Stewart Udall canceled those dams because of public pressure to preserve parts of the Grand Canyon. Ironically, opposition was based at least partly on the public's belief that nuclear power generation was a viable alternative to meet growing electric power needs in the West.

During the 1960s, Reclamation's work began to change substantially as public awareness reached new heights. Americans became concerned about the use and protection of natural resources. This change resulted, in part, from improved communication. The average American's news came not from newsreels, radio, and newspapers, but from television, with same-day information and images which visually reinforced issues. It also came, in part, from transportation because the average American could travel to the West on airliners or in automobiles on much improved highways. Americans were beginning to better understand issues about the West and to consider the West "theirs." Thus, expanded knowledge and accessibility resulted in an increasingly proprietary feeling on the part of many Americans toward public lands and public works. At the same time, communities across the country began to pay increasing attention to water and air pollution issues. This new situation combined with far more sophisticated science resulted in clearer understanding of the complex interactions of the communities of nature as well as of water and air pollution issues. Among other items, the effects of wetlands loss on fisheries and bird populations were better recognized. Improved understanding of the natural world and its issues combined with a shift of political power which moved away from the rural and agrarian population and components of the economy to the urban population and components of the economy. The change was signaled in many ways. Wide-open, little-regulated exploitation of historic and natural resources, even on private property, lost support in America as the negative effects on animals, birds, fishes, plants, water, air, archaeological sites, and historic sites were better understood and recognized.

Rachel Carson's *Silent Spring* appeared in 1962, and public support grew for more environmentally sensitive project development. While even popular music expressed growing environmental concerns, increased public consciousness and support manifested itself in political action when the Congress passed the Wilderness Act in 1964, the Fish and Wildlife Coordination Act in 1965, the National Historic Preservation Act in 1966, the Wild and Scenic Rivers Act of 1968, the National Environmental Policy Act (NEPA) of 1969, and many other subsequent laws. Accompanying and buttressing these Federal laws were presidential Executive Orders; Federal regulations; and state and local laws, orders, and regulations.

The specific effects of Reclamation projects were also better understood in this period. Dam construction affected fish populations and often altered the flow characteristics and ecology of rivers and streams. Land "reclamation" and construction projects affected plant, animal, fish, and bird populations through displacement or destruction of habitat. In addition, land development often destroyed historic or archeological resources. Destruction of non-arable wetlands was a special environmental problem. Hydroelectric production, often considered pollution-free, was recognized as causing environmental effects by altering water temperatures, effects on native fish populations, effects on migration of fish, and water fluctuations. Environmental issues that conflicted with traditional bureau missions were not unique to Reclamation. Americans identified many environmental effects caused by construction and natural resources exploitation programs in both the government and private sectors.

Because of the new laws and regulations and increasing public and political pressure, Reclamation hired new staff to deal with environmental and historic preservation issues. Reclamation now invests a great deal of time and money in issues such as: endangered species; instream flows; the preservation and enhancement of quality freshwater fisheries below dams; preserving wetlands; conserving and enhancing fish and wildlife habitat; dealing with Endangered Species Act issues; controlling water salinity and sources of pollution; ground water contamination; and the recovery of salmon populations on both the Columbia/Snake and the San Joaquin/Sacramento River systems. Reclamation implemented "reoperation" (revision of the way hydroelectric power generation is scheduled and carried out) of hydroelectric facilities at Glen Canyon Dam on the Colorado River to better achieve environmental objectives. Reclamation has made costly modifications to dams such as Shasta and Flaming Gorge to achieve environmental goals. There is a major effort underway among Federal and state agencies and other interest groups to improve environmental and water quality in the delta at the mouth of the Central Valley of California where the San Joaquin and Sacramento rivers join and flow into San Francisco Bay.

Ironically, Reclamation's attempts to use drainage water to support environmental objectives at the Kesterson National Wildlife Refuge in the Central Valley of California resulted in unexpected and difficult environmental problems. The drainage water mobilized and concentrated selenium in the water of the refuge causing death and deformity among the affected animal populations. The selenium issue was a problem neither Reclamation nor the Fish and Wildlife Service foresaw. This issue is currently being addressed.

RECREATION

Reclamation reservoirs provide flatwater recreation opportunities all over the West. While Westerners quickly identified and began to enjoy recreation opportunities on and in the water

captured behind Reclamation dams, recreation was not recognized legally as a project use until 1937. Reclamation transferred Lake Mead, behind Hoover Dam, to the National Park Service for recreation management in 1936 and initiated the still-existing pattern of seeking other agencies to manage recreation at Reclamation facilities. That pattern means that today Reclamation manages only about one-sixth of the recreation areas on its projects. From the 1930s to the early 1960s, recreation for specific projects was authorized, however, in the mid-1960s, the Congress began to give Reclamation more generalized authorities for funding recreation on all projects. Fishing, hunting, boating, picnicking, swimming, and other recreational opportunities have developed over the years.

In 1992, Reclamation had over 300 recreation areas on its projects with almost 5 million acres of land (a little less than five-eighths of Reclamation-controlled Federal lands) open to various recreational uses. In recent years, Reclamation has "reoperated" some facilities seeking to improve recreational fishing, commercial fishing, and white water recreational opportunities. Three recreation areas managed by the National Park Service – Lake Roosevelt behind Grand Coulee Dam, Lake Mead behind Hoover Dam, and Lake Powell behind Glen Canyon Dam, as well as the U. S. Forest Service's Shasta Lake behind Shasta Dam – are among the most prominent recreation areas on Reclamation projects. Other managing partners for recreation areas include other Federal agencies, state agencies, counties, and cities. These partnerships result in millions of recreation days of use on Reclamation projects annually and raise numerous issues in terms of interagency coordination, water quality, public safety, public access, cost-sharing, law enforcement, etc.. As water is converted from rural to urban uses in the West, and urban population increases, recreation visits to Reclamation projects are expected to increase.

FLOOD CONTROL/DROUGHT BENEFITS

Flood control is one of the benefits provided on many Reclamation projects. Reclamation's facilities are operated to prevent millions of dollars of flood damage. Between 1950 and 1992, Reclamation projects prevented in excess of 8.3 billion dollars in flood damage.

During periods of drought, Reclamation becomes involved in drought management activities. Reclamation projects have carryover storage which often can provide water during a few consecutive years of drought. In some areas, however, growing demand stresses the water supply even in normal water years. Water shortages, often drought-influenced, will probably increase in the West, thus forcing more effective and efficient use of water supplies. Reclamation drought activities are quite varied, e.g., assisting water users with planning for use and allocation of limited water supplies, participating in cooperative contingency planning for future droughts, water conservation, loans, cooperation in water banking, deepening wells, and water purchases are among the many possible activities.

INTERNATIONAL AND OTHER ASSISTANCE

International assistance is an important aspect of Reclamation's program. Reclamation employees have worked in more than 80 countries providing technical assistance for a wide range of water resources issues, and Reclamation has welcomed more than 10,000 visitors from nearly every country in the world to its facilities. Reclamation routinely provides training programs for foreign visitors. This activity is conducted in accordance with United States policy and in cooperation with the U. S. State Department.

Reclamation also provides technical water assistance to various public and private entities within the United States through a variety of programs.

RECLAMATION TODAY

Reclamation currently has more than 180 projects in the seventeenWestern states which are managed out of 22 area offices. The area offices are within five regions which are organized around western watersheds. Many projects are actually operated and maintained by the water users. Reclamation's projects provide agricultural, municipal, and industrial water to about one-third of the population of the West. Farmers on Reclamation projects produce about 13 percent of the value of all crops in the United States, including about 65 percent of vegetables and 24 percent of fruits and nuts. As a result of initiatives under the presidency of Bill Clinton, Reclamation's staffing level is about one-fifth smaller than it was in 1993. As Reclamation enters into additional partnerships with the beneficiaries of the water and electricity produced on its projects, Reclamation's budgets and staffing levels are expected to shrink even further in the 21 st Century.

SELECTED BIBLIOGRAPHY
BUREAU OF RECLAMATION

[A LARGER LIST OF SUGGESTED READINGS MAY BE FOUND IN ANOTHER LEAFLET: **"SELECTED READINGS IN THE HISTORY OF THE BUREAU OF RECLAMATION".]**

Armstrong, Ellis L., ed. "Irrigation," Chapter in *History of Public Works in the United States, 1776-1976.* Chicago: American Public Works Association, 1976.

Cannon, Brian Q., *Remaking the Agrarian Dream: New Deal Rural Resettlement in the Mountain West.* Albuquerque: University of New Mexico Press, 1996.

. "'We Are Now Entering a New Era'": Federal Reclamation and the Fact Finding Commission of 1923-1924." *Pacific Historical Review* 66 (May 1997): 185-211.

Dawdy, Doris Ostrander. *Congress in Its Wisdom: The Bureau of Reclamation and the Public Interest.* Boulder, San Francisco, London: Westview Press, 1989.

Dean, Robert., "'Dam Building Still Had Some Magic Then'": Stewart Udall, the Central Arizona Project, and the Evolution of the Pacific Southwest Water Plan, 1963-1968." *Pacific Historical Review* 66 (Feb 1997): 81-98.

Dunar, Andrew J. and Dennis McBride, *Building Hoover Dam: An Oral History of the Great Depression.* New York: Twayne Publishers, 1993.

Gottlieb, Robert and Margaret FitzSimmons. *Thirst for Growth: Water Agencies as Hidden Government in California.* Tucson: University of Arizona Press, 1991.

Gressley, Gene M. "Arthur Powell Davis, Reclamation, and the West." *Agricultural History* 42 (July 1968): 241-57.

Harvey, Mark W.T. *A Symbol of Wilderness: Echo Park and the American Conservation Movement.* Albuquerque: University of New Mexico Press, 1994.

Hess, Jeffrey A. "A Mile High in the Mountains: The Planning, Design, and Construction of Deadwood Dam." *Idaho Yesterdays* 36 (Fall 1993): 2-17.

. "Inventions and Patents for the Public Good: The Needle-Valve Program of the Bureau of Reclamation." *Journal of the Society For Industrial Archeology* 22 (1996): 35-51.

Hundley, Norris, Jr.. *Dividing the Waters: A Century of Controversy between the United States and Mexico.* Berkeley and Los Angeles: University of California Press, 1966.

. *The Great Thirst: Californians and Water, 1770s-1990s.* Berkeley, Los Angeles, Oxford: University of California Press, 1992.

Jackson, Donald C. "Engineering in the Progressive Era: A New Look at Frederick Haynes Newell and the U. S. Reclamation Service." *Technology and Culture* 34 (July 1993): 539-74.

Johnson, Rich. *The Central Arizona Project, 1918-1968.* Tucson: The University of Arizona Press, 1977.

Kluger, James R. *Turning Water with a Shovel: The Career of Elwood Mead.* Albuquerque: University of New Mexico Press, 1992.

Kollgaard, Eric B., and Wallace L. Chadwick, eds. *Development of Dam Engineering in the United States.* New York: Pergamon Press, 1988.

Martin, Russell. *A Story that Stands Like a Dam: Glen Canyon and the Struggle for the Soul of the West.* New York: Henry Holt and Company, 1989.

McCool, Daniel. *Command of the Waters: Iron Triangles, Federal Water Development, and Indian Water.* Berkeley: University of California Press, 1987.

Miller, M. Catherine. *Flooding the Courtrooms: Law and Water in the Far West.* Lincoln, London: University of Nebraska Press, 1993.

Morgan, Robert M. *Water and the Land: A History of American Irrigation.* Fairfax, VA: The Irrigation Association, 1993.

Pisani, Donald J. "Conflict Over Conservation: The Reclamation Service and the Tahoe Contract." *Western Historical Quarterly* 10 (April 1979): 167-190.

. *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931.* Berkeley, Los Angeles, London: University of California Press, 1984.

. *To Reclaim a Divided West: Water, Law, and Public Policy, 1848-1902.* Albuquerque: University of New Mexico Press, 1992.

. *Water, Land, and Law in the West.* Lawrence: University of Kansas Press, 1996.

Pitzer, Paul C. *Grand Coulee: Harnessing a Dream.* Pullman: Washington State University Press, 1994. Reisner,

Marc P. *Cadillac Desert: The American West and Its Disappearing Water.* New York: Viking, 1986.

. and Sarah Bates. *Overtapped Oasis: Reform or Revolution for Western Waters.* Washington, D.C.: Island Press, 1990.

Robinson, Michael C. *Water for the West: The Bureau of Reclamation, 1902-1977.* Chicago: Public Works Historical Society, 1979.

Rowley, William D. *Reclaiming the Arid West: The Career of Francis G. Newlands.* Bloomington, Indianapolis: Indiana University Press, 1996.

Smith, Karen L. *The Magnificent Experiment: Building the Salt River Reclamation Project, 1890-1917.* Tucson: The University of Arizona Press, 1986.

Terrell, John Upton. *War for the Colorado River: The California-Arizona Controversy.* 2 volumes. Glendale, California: The Arthur H. Clark Company, 1965.

Tyler, Daniel. *The Last Water Hole in the West: The Colorado-Big Thompson Project and the Northern Colorado Water Conservancy District.* Niwot: University Press of Colorado, 1992.

Walton, John. *Western Times and Western Wars: State, Culture, and Rebellion in California.* Berkeley, Los Angeles, Oxford: University of California Press, 1992.

Warne, William E. *The Bureau of Reclamation.* Praeger Publishers, Inc., 1973; reprint, Boulder, Colorado, and London: Westview Press, 1985.

Wilkinson, Charles F. *Crossing the Next Meridian: Land, Water, and the Future of the West.* Washington, D.C.: Island Press, 1992.

Worster, Donald. *Rivers of Empire: Water, Aridity, and the Growth of the American West.* New York: Pantheon Books, 1985.

Revised July 2000

For additional information, contact:

Brit Storey, Senior Historian
Telephone: (303) 445-2918 or e-mail: bstorey@do.usbr.gov

History Program, (D-5300)
Bureau of Reclamation
P.O. Box 25007,
Denver, Colorado 80225-0007
FAX: (303) 445-6690

Learn more about Reclamation's history and history program at:
http://www.usbr.gov/history

Learn more about Reclamation's current programs and activities at:
http://www.usbr.gov

Learn more about Reclamation's projects at:
http://dataweb. usbr.gov