

accentuating large portions of topography. Glaciers are comparable to large conveyor belts and often transport materials far away from the zone of accumulation. Glacial erosion and deposition in the United States have created a variety of landforms: V-shaped valleys, U-shaped valleys, hanging valleys, cirques, tarns, arêtes, and horns. Glaciers, for example, helped form the GREAT LAKES. When the ice sheet receded at the end of the last ice age, it carved out large basins. These basins filled with melted water and became the Great Lakes.

At the end of the 20th century and beginning of the 21st century, scientific observation of glaciers significantly expanded. To a large extent, the heightened interest in glaciers is due to the link between glacier retreat and global CLIMATE CHANGE. As the priority of glacier monitoring increases, improved funding and new techniques have permitted more detailed and efficient data collection and analysis. Several organizations, such as the World Glacier Monitoring Service (WGMS), the UNITED NATIONS Educational, Scientific, and Cultural Organization (UNESCO), and the International Geosphere-Biosphere Program (IGBP), have consistently produced systematized data sets that demonstrate the relationship between climate change and glacier retreat. In 2007, these data sets composed a major part of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC). Glacial changes involve many variables. Variation in precipitation, also related to climate change, can affect glacial change. Furthermore, because of the gigantic size of many glaciers, the corresponding response to shifts in temperature can be somewhat delayed. However, scientists increasingly recognize glacial changes (length, area, or volume) as a phenomenon of global change in climate and living conditions on Earth.

The identification of the role that glaciers play has inspired geologists and hydrologists alike to understand the environmental processes that affect these slow-moving rivers of ice. Although individual glaciers present differing response and retreat times, depending on topography and orientation, by the simplest account, rising temperatures and the accelerated pace of glacial retreat are inextricably linked. This understanding bestows on the inhabitants of this planet the responsibility of allowing glaciation, and the dynamic processes it involves, to proceed on a natural and unchanged course.

See also CANADA AND THE UNITED STATES; GLOBAL WARMING; OCEANS; UNITED STATES—ALASKA.

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### Glen Canyon Dam

The Glen Canyon Dam on the COLORADO RIVER in northern Arizona is perhaps the most disputed dam in U.S. history, though the dispute largely postdates the damming. The late writer and environmental activist EDWARD ABBEY spoke for many when he said, "Surely no man-made structure in modern American history has been hated so much, by so many, for so long, with such good reason."

The rationale for the dam goes back to the Colorado River Compact of 1922. According to this interstate agreement, the Upper Basin (Utah, Wyoming, Colorado, New Mexico) could retain up to 7.5 million acre-feet of the river per year provided that it first supplied the Lower Basin (California, Nevada, Arizona) with the same amount. The Lower Basin—especially California—moved quickly to develop its share of the river. California found a willing partner in the BUREAU OF RECLAMATION. After WORLD WAR II (1941–45), the Upper Basin appealed to the bureau for its own comprehensive project. It believed it had to start using its allotment or effectively lose the water to the faster-growing Lower Basin.

As designed by the bureau, the Colorado River Storage Project (CRSP) called for a handful of large storage projects—notably Echo Park and Glen Canyon—and 11 participating projects that would actually deliver water. The role of the storage dam was crucial. By regulating the flow of the river, the proposed dams at Echo Park and Glen Canyon would permit the Upper Basin to draw water without fear of preventing its delivery to the Lower Basin. In other words, the Upper Basin had to build big dams so that it could build small dams. This was true both politically and fiscally. Using "river-basin accounting," the bureau offset the cost of the participating projects—most of which were blatantly uneconomical—against the projected revenue from hydroelectric generation from the storage dams.

Until the 1950s, everyone took the bureau at its word: Dams meant progress. But with the CRSP, the agency crossed a line. The proposed Echo Park Dam fell within Dinosaur National Monument. Conservationists organized in opposition; with unprecedented zeal and organization, they worked to prevent a latter-day HETCH HETCHY VALLEY fiasco (a controversy in the early 1990s that had led to the construction of a dam in California that many people had opposed). To their own surprise, they won the battle in CONGRESS. Minus the one offensive dam, the legislation for the CRSP passed easily in 1956. Construction soon began on Glen Canyon Dam. At the time, the preservation of a national monument (and, by implication, the sanctity of the entire national park system) overshadowed the loss of the Glen Canyon.

By the time that Lake Powell—the reservoir behind the dam and the second-largest human-made reservoir in the United States—starting filling in 1963, however, the perspective changed. Out of curiosity, then urgency, thousands of conservationists went to see the condemned canyon. They could not believe their eyes. The 170-mile-long Glen Canyon was a place of heartbreaking beauty, a place that deserved to be a national park. In 1963, the executive director of the SIERRA CLUB, DAVID R. BROWER, produced a famous book of regret and nostalgia about Glen Canyon, *The Place No One Knew*. To drain “Lake Foul” and restore the glen remains a quixotic dream of American environmentalists, who likewise hoped to return a wild river to the downstream GRAND CANYON. Edward Abbey fantasized about blowing up the dam in his 1975 comic novel about ecoterrorists, *The Monkey Wrench Gang*, and the radical environmental organization Earth First! chose the dam as the stage for its inaugural protest in 1981. But Lake Powell has also attracted vocal defenders, who, tellingly, tended to confound the obvious recreational and aesthetic merits of the reservoir with the abstruse political and fiscal purposes of the dam.

Located near the Utah-Arizona border, the structure itself rises 587 feet above the river and contains 4.9 million cubic yards of concrete. At full capacity, it holds back 27 million acre-feet of water, or about two years’ flow of the Colorado. The Upper Colorado River Basin, however, experienced DROUGHT in seven of the first nine years in the 21st century, leaving the reservoir at approximately half-capacity and diminishing its OUTDOOR RECREATION facilities. Today, the Glen Canyon Dam remains a grand symbol of the conflict between progressive river development schemes and WILDERNESS preservation initiatives in the West.

See also CONSERVATION; DAMS, RESERVOIRS, AND ARTIFICIAL LAKES; ENVIRONMENTALISM, MAINSTREAM; ENVIRONMENTALISM, RADICAL; IRRIGATION; MEXICO AND THE UNITED STATES; NATIONAL PARK SERVICE; NONGOVERNMENTAL ORGANIZATIONS; PORTER, ELIOT; UNITED STATES—SOUTHWEST.

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## global financial institutions

Global financial institutions are made up of a variety of different commerce and regulatory organizations that operate within the economic sphere of international trade, investment, and development. Unlike local, national, or regional financial institutions, global financial institutions work across borders, operating in most cases independently of governmental involvement. Critics of these institutions argue that they have worked to the benefit of more developed nations, such as the United States, while undermining the people and ECOSYSTEMS of less developed nations.

Modern global financial institutions are largely associated with the United Nations Monetary and Financial Conference of 1944, where representatives from 44 Allied nations met during WORLD WAR II (1941–45) to restructure international financial systems. Popularly known as the “Bretton Woods” conference in reference to Bretton Woods, New Hampshire, where the event took place, the meetings resulted in the formation of two multilateral organizations known as the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD)—now one of two organizations within the World Bank. Subsequent negotiations on the topic of trade regulation led to the creation of the 1947 General Agreement on Tariffs and Trade (GATT)—now known as the World Trade Organization. In general, these multilateral instruments were formed to oversee international finance, redevelopment, and trade in a post-World War II era.

### INTERNATIONAL MONETARY FUND

The International Monetary Fund was established to remedy balance-of-payment discrepancies among nations that have a significant impact upon exchange rates. As a lending agent, the IMF also provides short-term loans to nations that seek assistance.

The IMF is made up of 185 nations that seek to cooperate within a broader international economy. These nations are represented by the Board of Governors, which convenes annually to steer IMF policy. In addition to the yearly duties of the Board of Governors, a 24-member Executive Board that represents the interests of all 185 member nations meets regularly to negotiate policies for IMF members. Legislative operations are based upon a system where nations receive voting rights in general proportion to their size within the international economy. Thus, nations with larger economies hold more voting power than nations with smaller economies.