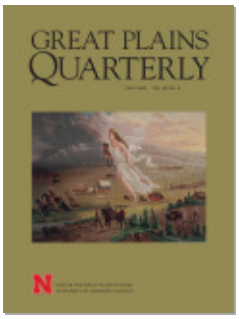
Transformative Consequences of Garrison Dam: Land, People, and the Practice of Archaeology



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Transformative Consequences of Garrison Dam

Land, People, and the Practice of Archaeology

LOTTE E. GOVAERTS

Dam building is a major human endeavor. The World Register of Dams currently lists 58,266 "large dams," defined as those measuring over fifteen meters in height.[1] Smaller dams are not included in the register, but in aggregate, small reservoirs are estimated to have three or four times as much total surface area as large dam reservoirs. Global estimates for reservoir area vary, ranging between 400,000 km2 (estimated in 1993) and 1,500,000 km2 (estimated in 2000).[2] The United States, with 9,265 large dams, is the second most dammed country in the world (after China's 23,842 and followed by India's 5,102).[3] Including smaller dams, the total for the United States adds up to some 75,000 dams. All US watersheds larger than 2,000 square kilometers have one or more dams altering their flow.[4]

Garrison Dam in North Dakota (Fig. 1) is one of many large dams built in the United States during the mid-twentieth century. This essay examines the history and impact of Garrison Dam and its reservoir, Lake Sakakawea. The focus is historical issues related to dam construction, as well as the environmental and social impacts of large dams in general and of Garrison Dam in particular. Most importantly, included is an investigation as to how archaeology in North America was influenced by the construction of Garrison Dam and the other large dams on the Upper Missouri River.

Key Words: Missouri River, North Dakota, population displacement, River Basin Surveys, Sacagawea, Three Affiliated Tribes of the Fort Berthold Reservation

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The Construction of Garrison Dam—A Federal Affair

Garrison Dam, built between 1946 and 1952, is an example of a modern dam. Dam building, irrigation, and hydropower have been practiced for thousands of years. The extensively researched Jawa dams in present-day Jordan date to approximately 3000 BCE and are of-

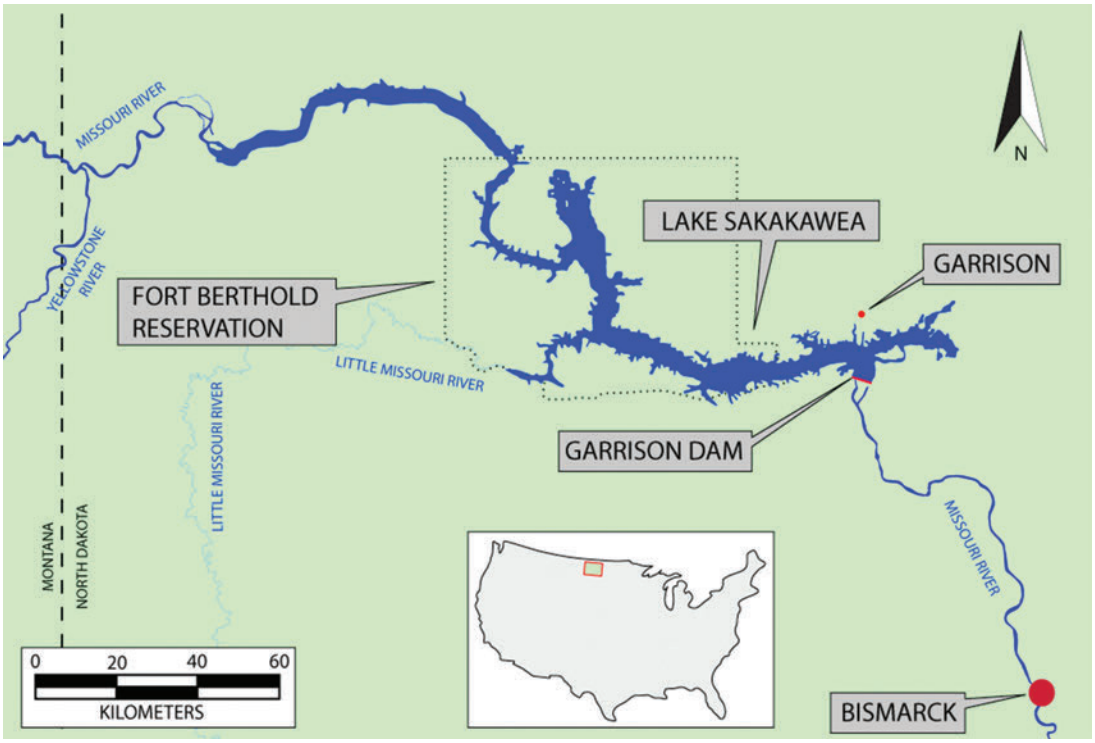

Fig. 1. Map of Garrison Dam and Lake Sakakawea on the Missouri River in North Dakota (based on data from Google).

ten cited as the oldest known dams, although archaeological evidence of irrigation canals in the foothills of the Zagros Mountains in Iran is potentially associated with even earlier dam-building activities.[5] Structures built to divert rivers for irrigation or water storage existed throughout the Middle East and Egypt in the second and third millennium BCE, and spread throughout the Mediterranean and Europe during the Greek and Roman periods.[6] Technologies for converting flowing water into mechanical energy date back almost equally far.[7]

Archaeological evidence of dam building also exists in the Far East as well as the Americas.[8] Dams in the Americas long preceded the arrival of Europeans. The Chimu Empire of the Andean highlands (in present-day Peru) constructed dams, as did the Maya in the northern part of the Yucatan Peninsula.[9] The Hohokam constructed elaborate irrigation networks in what is now the state of Arizona.[10]

Modern-era dam construction proliferated with the industrial revolution as bigger industries needed more water power, and growing urban areas needed a larger water supply. Dams grew ever larger, but until the twentieth century there was little scientific understanding of dam engineering and thus there were frequent collapses and other failures.[11]

In the nineteenth-century United States, there were many dams built for municipal use, industrial power, and irrigation by local governments or collectives of water users.

This changed in the twentieth century, when the federal government became the dominant dam builder.[12] Two agencies were primarily in charge of building the large dams of the twentieth century: the US Army Corps of Engineers and the Bureau of Reclamation.

The US Army Corps of Engineers was established shortly after US independence. From the beginning there was a push for the Corps to do "works of a civil nature" in addition to military construction. In 1816, mobilization studies based on data from the War of 1812 concluded that national defense would benefit from improved rivers, harbors, and transportation systems, allowing for faster troop movement and logistics. John C. Calhoun, secretary of war in 1819, recommended such improvements for the noted reasons, as well as for economic development, recognizing the benefits of peacetime prosperity to national security.[13]

Five years later, in April 1824, Congress passed the General Survey Act, authorizing the president to have surveys made of routes for roads and canals "of national importance, in a commercial or military point of view, or necessary for the transportation of public mail." The president assigned responsibility for the surveys to the Corps of Engineers. Also in 1824 the Rivers and Harbors Act provided funds for navigation improvements on the Ohio and Mississippi Rivers, later amended to include other rivers. This task was also assigned to the Corps.[14]

Whereas the original Rivers and Harbors Act was primarily concerned with removing sandbars, snags, and other navigation obstacles, in 1871 the program expanded to include the construction of dams and locks. Over the decades, the Corps of Engineers built several navigation-related dams on inland waterways. In terms of flood control, they adhered to a "levees only" policy until the Great Mississippi Flood in 1927. After that date the Corps started constructing dams whose main purpose was flood control. The 1936 Flood Control Act gave the Corps of Engineers the responsibility for federal flood control projects.

The Bureau of Reclamation was founded over a century after the Army Corps of Engineers. The Bureau was created in response to the water needs of growing populations in arid western states. When the Spanish originally colonized the West, they practiced small-scale irrigation. Major water projects did not start until the nineteenth century, when Mormons built small diversion dams at Salt Lake City.[15] Private individuals, businesses, and communities had some success with small-scale irrigation by diverting water, but it was clear that a larger water storage effort would be required. As many private ventures failed, there was increasing demand for government-funded projects.

Congress passed the Reclamation Act on June 17, 1902, and the United States Reclamation Service was created inside the US Geological Survey. In 1907 the Reclamation Service was separated from the Geological Survey, and in 1923 it was renamed the Bureau of Reclamation. The "reclamation" in the name refers to the idea that irrigation would "reclaim" arid lands for agricultural use.[16]

As populations in western states continued to grow, so also did their demand for water and electricity. In addition, there was a call for public works projects to create employment during the Great Depression. A combination of these factors drove a period of extensive construction projects for the Bureau of Reclamation between the 1930s and the 1960s.

Thus, up until the 1940s the Bureau of Rec-

lamation mostly dealt with irrigation issues in the seventeen western "Reclamation states," whereas the water projects of the US Army Corps of Engineers were mostly limited to the eastern states and dealt with navigation issues and flood control. In the Missouri Basin, however, the missions of these two agencies would collide.

The Missouri Basin is the largest river watershed in the United States, but its average discharge is relatively low with unpredictable spring flooding. The upper part of the Missouri Basin was in Reclamation territory, and the population there was largely concerned about irrigation. In contrast, the lower part of the river was more troubled by frequent flooding. The Missouri was also notoriously problematic for navigation; in the early days of steamship transportation it was referred to as a "graveyard of steamboats."[17]

Reclamation built a number of smaller irrigation projects in the Upper Missouri Basin in the first few decades of the twentieth century.[18] In the meantime, the Corps of Engineers was occupied with improving navigation on the Missouri River between its confluence with the Mississippi and Sioux City, Iowa.

In 1927, after a series of floods, Congress used the Rivers and Harbors Act to authorize the Corps to undertake detailed river basin studies nationwide. The results of these studies became known as the "308 reports," after House Document 308. The 308 report for the Missouri Basin was completed in 1934. It was a 1,200-page document detailing navigation, flood control, irrigation, and hydropower projects for the basin. Among other things, the report concluded that Fort Peck, in Montana, was the best location for a reservoir.[19] Under the National Industrial Recovery Act of 1933, before the 308 report was even complete, the Corps started construction of the Fort Peck Dam on the Missouri main stem. In addition to stimulating economic recovery, the dam's main purpose was to address the previously mentioned navigation issues, as well as offer flood control.[20]

After a particularly devastating flood in 1943, Congress called upon the Corps to revisit and prioritize the proposals outlined in the Missouri Basin 308 report. The result was a twelve-page document that became known as the "Pick Plan," after Colonel Lewis A. Pick, Missouri Basin division engineer in Omaha. The plan detailed the construction of several smaller dams on tributaries and a series of levees plus five major multipurpose dams along the main Missouri stem.

In response to the Pick Plan's overlap with their mission, the Bureau of Reclamation submitted "Senate Document 191." This document would eventually become known as the "Sloan Plan," after its author, William Glen Sloan, assistant director at the Billings office in 1944. The Sloan Plan was more detailed than the Pick Plan and included ninety different projects, mostly focused on irrigation and hydropower rather than navigation and flood control.[21]

President Roosevelt, on the other hand, proposed a "Missouri Valley Authority" modeled after the Tennessee Valley Authority. News of this proposal spurred the Corps and Bureau to come to an agreement. A conference held in 1944 between the two organizations resulted in a joint engineering agreement: a one-page document that merged the two plans.

The Flood Control Act passed on December 22, 1944, authorizing what would be known as the Pick-Sloan Plan for eight purposes: flood control, navigation, irrigation, power, water

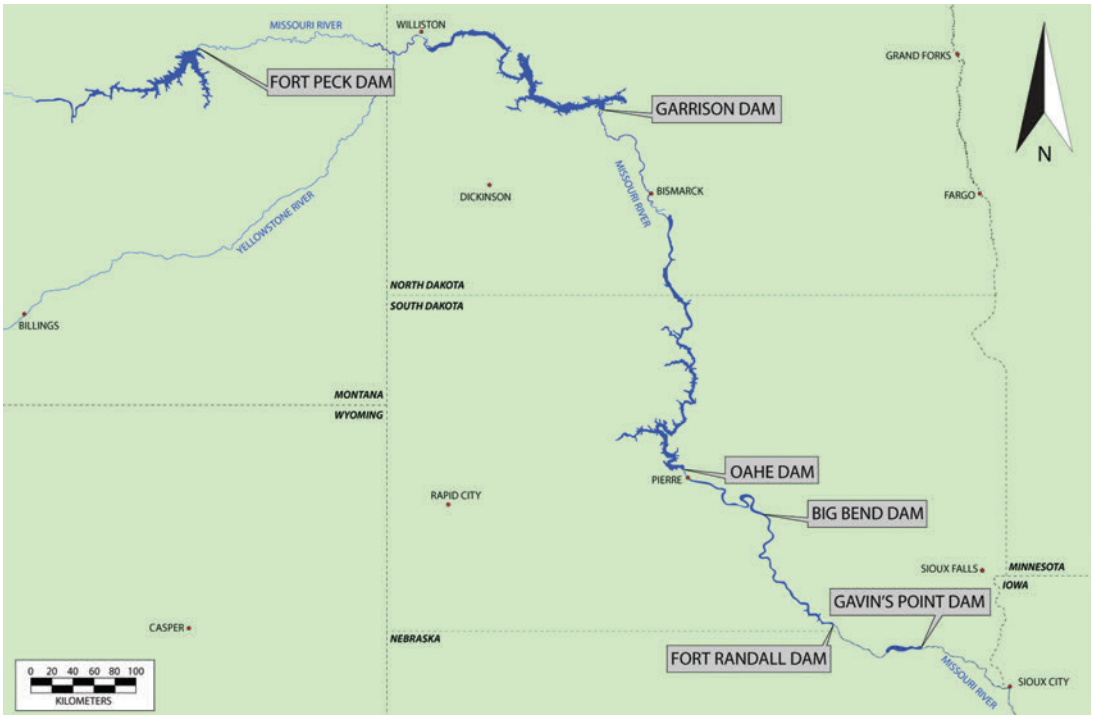

Fig. 2. Map showing the locations of the Fort Peck, Garrison, Oahe, Big Bend, Fort Randall, and Gavins Point Dams on the Missouri River (based on data from Google).

supply, recreation, fish and wildlife, and water quality. The construction of Garrison Dam was the first major construction project of the Pick-Sloan Plan. It was followed by construction of Oahe, Big Bend, Fort Randall, and Gavins Point Dams farther downstream (see Fig. 2). These five large main-stem dams, along with the Fort Peck Dam, are operated by the United States Army Corps of Engineers. A main stem is the term used to describe the primary downstream segment of a river, as opposed to river tributaries. The Bureau of Reclamation mainly operates smaller dams on tributaries. However, the Bureau also manages the Canyon Ferry Dam, located near the headwaters of the Upper Missouri River.

Construction of Garrison Dam started in 1946 and continued through 1952. The reservoir first reached its minimum operating pool in 1955, creating what is now known as Lake Sakakawea. The finished dam measures 11,300 feet (3,440 m) long and 210 feet (64 m) high, and contains 66,500,000 cubic yards (50,842,898 m3) of rolled earth fill and 1,500,000 cubic yards (1,146,832 m3) of concrete. The shoreline at 1,837.5 feet (560.1 m) above sea level is 1,340 miles (2165.5 km) long and encloses 382,000 surface acres (1546 km2). That makes the reservoir the largest in the United States in terms of surface area. In terms of volume, Lake Sakakawea is the third largest reservoir in the United States, with just over thirty cubic kilometers, after Lake Meade (37 km3) and Lake Powell (35 km3).[22]

Naming Garrison Dam's Reservoir—A Tribute to Sacagawea

Garrison Dam is named after the nearby town of Garrison, North Dakota. The town of Garrison was founded in 1905 and took its name from Garrison Creek, which in turn derived its name from the military garrison stationed at nearby Fort Stevenson in the mid- to late nineteenth century. The fort was named for Brigadier General Thomas G. Stevenson, a Union general killed in the Civil War.[23]

The lake created by the construction of Garrison Dam was originally referred to as Garrison Reservoir. Its name was eventually changed to Lake Sakakawea, after the Native woman who served as a translator on the famous expedition of Lewis and Clark. Sakakawea is the official spelling of her name in North Dakota, but other variations are used elsewhere, including Sacagawea and Sacajawea. The Three Affiliated Tribes of Fort Berthold Reservation also use Sakakawea as the official spelling. Their tourism board voted to change the spelling to Sacagawea in 2002, but reversed their decision after protest from tribal elders.[24] There is some debate on the correct spelling, pronunciation, and etymology of the name.[25] Sacagawea is the most common spelling, and thus will be used here.

Sacagawea was a Shoshone[26] woman, born in the late 1780s in what is now northern Idaho. When she was around twelve years old, she was captured by a group of Hidatsa in a raid, and came to live in a Hidatsa village on the Upper Missouri. Sacagawea was later "married" to a fur trapper from Quebec named Toussaint Charbonneau, who lived among the Missouri River Indians.

Meriwether Lewis and William Clark, charged with exploring and establishing travel routes across the western lands acquired in the Louisiana Purchase, spent the winter of 1804–5 at Fort Mandan, near the Hidatsa village where Sacagawea lived. The Corps of Discovery (the specially created unit of the US Army led by Lewis and Clark on their expedition) employed Charbonneau as a guide for the expedition. Upon finding out that his wives were Shoshone, they suggested he bring one of them as an interpreter.[27] Thus Sacagawea and her newborn baby came to accompany the expedition. She is mentioned only intermittently in the Corps of Discovery's journals, usually on occasions where her actions directly impacted the progress of the expedition.[28] Early on, she saved some precious supplies, including Clark's journal and notes when a boat turned over on the river.[29] Shortly thereafter, Lewis and Clark named a tributary of the river for her.[30] When the expedition reached the area where Sacagawea grew up, she was familiar with the landscape.[31] Sacagawea's family ties to the Shoshone they met there allowed for the purchase and trade of much-needed horses for the expedition.[32] The anticipated need for horses to cross the mountains was the primary reason a Shoshone translator was included on the expedition. Lewis and Clark also opine in their journals that the presence of Sacagawea and her baby had a "calming" effect on various Native peoples they encountered, who might otherwise have been hostile.[33] From letters and other documents we know a little of her life after the expedition, and that she probably died at Fort Manuel in 1812.[34]

Although very little is known about Sacagawea's life, she has become a popular figure in American history. The Lewis and Clark expedition is seen as an iconic event in US history, but during the nineteenth century,

Sacagawea's participation in it was rarely mentioned. This changed around the time of the expedition's centennial celebration. The persona of a Native teenage girl who carried her infant along the perilous journey captured the public's imagination. Early twentieth-century white feminists were among the first groups to celebrate Sacagawea's story, which they appropriated in their fight for the vote. They put forth Sacagawea's service to the country (for which she did not receive compensation) as a reason why every American woman deserved the vote. From its beginning, the myth of Sacagawea outshone what was known about the actual person. Sacagawea continued to be popular with women's groups, as well as with the general public, throughout the twentieth century. Her story, or some embellished version of it, was frequently the topic of books and movies. Over time, Sacagawea came to symbolize various ideas and concepts in dominant American culture such as manifest destiny or Native people's innate ability to become "model citizens" as defined by white Americans.[35]

Although no contemporary portraits exist of her, there are more statues of Sacagawea in the United States than of any other woman, including one in the US Capitol.[36] In recognition of Sacagawea's role in US history, the United States Postal Service issued a Sacagawea stamp in 1994. The United States Mint issued a Sacagawea dollar coin in 2000. Garrison Dam's Lake Sakakawea is far from the only landscape feature to be named after her. It is not even the only lake named after her; there is also Lake Sacajawea on the Snake River in Washington State.

The idea of changing the name of the Garrison Dam reservoir to commemorate Sacagawea was discussed as early as May 1955 at the North Dakota Federation of Women's Clubs meeting in Bismarck.[37] Other groups and associations were also in favor of the name change, and the name was commonly used long before it became official. In 1958 the Greater Lake Sakakawea Association was organized by community leaders in the area. The official purpose of the group was "to encourage and promote the development of Lake Sakakawea for recreation, industry, tourists, and navigation." The *Billings County Pioneer* reported that this group favored adopting Lake Sakakawea as the official name of the reservoir.[38]

The lake's new name was still not official in 1962, as North Dakota senator Quentin N. Burdick asked for suggestions for a "possible romantic and historical name" from the people of North Dakota.[39] Burdick introduced several bills in his attempt to make the name official. The hearings relating to his 1967 Senate Bill 988 ("A bill to officially designate as Garrison Dam the dam on the Missouri River in North Dakota commonly referred to by that name, and to change the name of the reservoir above such dam to Lake Sakakawea") included many testimonies in favor of the change.[40] The single dissension came from the Garrison Civic Club, who objected to the change based mostly on the fact that "Sakakawea" was hard to spell and pronounce.[41] The Lake Sakakawea name change became official later that year, when incorporated into Senate Bill 1647, signed on July 4, 1967, as Public Law 90–46, "An Act authorizing the change in name of certain water resource projects under jurisdiction of the Department of the Army." The law proclaimed that "the dam, commonly referred to as Garrison Dam, located on the Missouri River in North Dakota, is hereby officially designated as 'Garrison Dam'; the reservoir, known as Garrison Reservoir or Garrison Lake, located above Garrison Dam to 'Lake Sakakawea.'"[42]

While the lake's name was meant to honor Sacagawea's memory, it is somewhat ironic that the reservoir flooded the place where she lived and died, and displaced the descendants of that village and most of the tribe.

Impacts of Garrison Dam—Changing More than Riverbanks

A large dam like Garrison Dam has many impacts, both local and far-reaching. The effects are both complicated and interrelated. The consequences of a dam can include the results that were intended (e.g., hydropower, navigation, flood control, irrigation, recreation), along with expected but unavoidable collateral effects (displacement of people, changes to ecosystems), as well as entirely unanticipated outcomes. Several unanticipated effects occurred when Pick-Sloan dams were built on the Upper Missouri River, mainly because large dams were a new technology in the mid-twentieth century, and thus studies on social and environmental consequences were lacking. However, experience and study of big dams built around the world in the late twentieth and early twenty-first century have since illuminated some of their effects. Nonetheless, a full understanding of the aftereffects of large dams has yet to be achieved, and unanticipated consequences still occur in the twenty-first century.

When planning a large dam, calculating the cost versus benefit ratio is difficult. The relationships between the various factors are complex. Some costs and benefits cannot be precisely measured, and some costs are borne by groups who do not necessarily derive all or any of the benefits.

A recent economic analysis concluded that, in terms of hydropower economy, large dams are generally not worth the cost. Benefits tend to be overestimated, while costs are consistently underestimated. Ansar and colleagues used data from existing dams to build a model that predicts cost overrun for potential dams, and found that "in most countries large hydropower dams will be too costly in absolute terms and take too long to build to deliver a positive risk-adjusted return unless suitable risk management measures outlined in this paper can be affordably provided."[43] Economic returns aside, there are other costs and consequences associated with big dams that should be considered.

Environmental Costs of Dams

The environmental impact of a large dam is enormous.[44] The construction of a single dam has immediate and drastic effects on the dammed river and local ecology. At the same time, the cumulative effects of multiple dams on multiple rivers add up to affect continental and global environments. Dams fragment riverine ecosystems, isolating upstream and downstream aquatic populations. Migration routes are cut off for riverine species, and terrestrial species who can no longer traverse the river valleys. Dams trap sediments and alter downstream river flows, with impacts on the maintenance of floodplains, river deltas, and coastal wetlands. Most dams significantly reduce or even eliminate all natural flooding downstream of the dam, catastrophically altering floodplains by eliminating their cyclical nutrient source. The construction of reservoirs creates new habitats and ecosystems while old ones are destroyed. These changes generally result in a significant loss to plant and animal species diversity. The deliberate introduction of sport fish species into reservoirs creates further imbalances. Reservoir

construction is frequently followed by shoreline development. Moreover, people displaced by the dam need to rebuild communities, businesses, and infrastructure. These types of construction projects in previously undeveloped areas spread the environmental impacts of a dam, threatening more habitats and species further from the reservoir.

Some less obvious environmental impacts include earthquakes and greenhouse gas emissions. A clear link has been established between reservoir construction and earthquakes, although the precise mechanisms of this seismicity are not yet fully understood. The most commonly accepted theory posits that these earthquakes are caused by increased water pressure in microcracks and fissures under and near reservoirs.[45] Hydroelectric power via dam construction is not a carbon-free form of energy. Reservoirs release greenhouse gases into the atmosphere. This happens because flooding of landscapes kills terrestrial plants. This takes away those plants' contribution to carbon dioxide assimilation. At the same time, the decomposition of submerged organic material releases carbon dioxide and methane into the atmosphere. Because different landscapes contain different amounts of stored organic carbon, these effects differ widely. Research on carbon dioxide and methane emissions from reservoirs is still ongoing, but in aggregate, greenhouse gases released from reservoirs are not insignificant.[46]

Quantifying the environmental impacts of dams is difficult because there are few unaltered river systems left in the world to compare to. Furthermore, non-dam-related environmental factors interact with dam-related changes in complicated ways. Not all dam impacts described above accompany the construction of every dam. For example, dam-induced seismicity has yet to be a problem in the Missouri Basin.

The impacts of Garrison Dam cannot be assessed in isolation because it is part of the larger Pick-Sloan system. Moreover, human intervention in the natural flow of the Missouri River predates the Pick-Sloan dams. Even so, some of the overall effects of the Pick-Sloan Plan have been studied. Not surprisingly, replacing large segments of flowing floodplain river with vast slack-water reservoirs has myriad and complex environmental impacts. One apparent change is that the river formerly known as "Big Muddy" does not carry as much sediment as it once did.

Although some animal and plant species thrive in the reservoirs, wetland, and riparian areas created by the dams, many others rapidly declined in numbers due to habitat loss and the blocking of migration routes after completion of the Pick-Sloan reservoirs. Three species native to the Missouri have been federally listed as endangered: the pallid sturgeon, the piping plover, and the least tern.[47]

Between 1987 and 1993, the Upper Missouri basin experienced its first major drought since the Pick-Sloan dams were constructed. This prompted the Corps of Engineers to update its "Master Water Control Manual." In compliance with the National Environmental Policy Act of 1969, this update included an "Environmental Impact Statement" (EIS). Review and revision of the update took fourteen years, and in 2004 the final EIS and master manual were published.[48]

The EIS resulted in a proposed "Missouri River Recovery Implementation Program" (MRRIP), directed toward recovery of Missouri River species protected under the Endangered Species Act of 1973 and the ecosystem on which they depend. The MRRIP included

plans to create, enhance, and maintain habitats for the pallid sturgeon, piping plover, and least tern. It also included plans for hatchery support, population assessments, research, monitoring, and evaluation. The MRRIP was the precursor of the current Missouri River Recovery Program, which is still monitoring the pallid sturgeon, piping plover, least tern, and their habitats.[49]

In 2012 the United States Geological Survey published a study on the impacts of river engineering on the Mississippi River system. They concluded, among other things, that river engineering on the Missouri and Arkansas Rivers caused a reduction of over 60 percent in overall sediment yield of the Mississippi River basin,[50] notably reducing nutrient delivery. Another recent study examined vegetation changes over the last forty years on the Missouri River floodplains. The study's authors examined dam-related as well as other factors involved in vegetation changes. They conclude that a major and unexpected dam-related factor is a "secondary wave of impacts" that affects surviving forests between reservoirs. The formation of deltas between reservoirs and rivers alters local ecosystems by causing forests to die due to rising groundwater.[51]

Irrigation programs associated with Garrison Dam have their own environmental impacts as well. The Pick-Sloan Missouri Basin program had promised the State of North Dakota over a million acres of irrigation as compensation for the 300,000 acres of fertile bottomlands lost to reservoir construction. Original plans called for this irrigation system to be constructed in northwestern North Dakota, using water diverted from Fort Peck Dam in Montana. However, studies conducted between 1944 and 1965 found the soil in northwestern North Dakota unsuitable for irrigation according to federal standards. Plans were then changed to irrigate lands farther to the east using water diverted from Garrison Dam. Construction of the "Garrison Diversion Unit" advanced in the 1970s and 1980s but encountered many problems involving land acquisition and environmental concerns, including those expressed by Canadians, about water from the Missouri being transplanted to the Hudson Bay watershed. These concerns were related to water quality, introduction of fish species and diseases, changes in duck habitat, and increased flooding.[52] As a consequence, the project was halted and further revised. New plans included construction of a water treatment facility for water that would be transferred to the Hudson Bay watershed, as well as irrigation of lands that do not drain into the Hudson Bay watershed, along with detailed plans to mitigate wildlife impacts.[53]

Other indirect impacts of Garrison Dam are still ongoing. Recent drought and heavy rain cycles, linked to climate change, are altering the way the dams on the Upper Missouri are used, and are creating additional demands for water for navigation downstream, including on the Lower Mississippi.[54] Unprecedentedly heavy snowfall in the mountains of Montana and Wyoming, combined with extremely heavy spring rains, caused extensive flooding on the Missouri in 2011. The emergency spillway on Garrison Dam was used for the first time in its fifty-seven years of existence, adding more floodwater to an already waterlogged river and flooded areas downstream.[55]

Also, in recent years, there has been a significant increase in oil and gas production in western North Dakota. Hydraulic fracturing, or "fracking," is commonly used in the area. This technique is water-intensive, and demands for water from Lake Sakakawea com-

pete with other interests, which is likely to create conflict in the near future.[56] Hydraulic fracturing, in turn, is associated with its own set of potential environmental impacts, including groundwater contamination, air pollution, and earthquakes.

Social Costs of Dams

Social effects of dams are intertwined with their environmental impacts, as people live within the ecosystem. Dam building affects all populations living along rivers, but most of the available data concern those populations displaced by the constructed dam and resulting reservoir.

The construction of Garrison Dam predates the formalization of an anthropological theory of displacement and resettlement. Such a theory was first conceived of in the early 1960s by David Brokensha.[57] Since then, a substantial body of work has emerged and the field has many practitioners. Development-induced displacement, and specifically dam-related displacement, has been extensively studied.[58] There is consensus in the field that, although every dam project, every displaced population, and every individual within such a population is naturally unique, development-induced displacement has predictable effects, and displaced populations generally behave in predictable ways.

All displaced populations experience trauma. Even voluntary resettlement of highly educated and well-traveled people is traumatic.[59] The impact of displacement is especially profound for those people whose sense of community and identity is closely tied to "home" as a physical location. Similarly, populations whose culture is only found in geographically restricted areas are also highly susceptible to the disruptive effects of displacement. Indigenous people and other ethnic minorities who fit these susceptibility criteria are disproportionally affected by dam building worldwide.[60]

Displaced populations, according to Scudder (20–30), experience "multidimensional stress," consisting of three related components: physiological stress, psychological stress, and sociocultural stress. Physiological stress refers to the various health-related impacts associated with displacement. Psychological stress consists of a combination of grief and anxiety. Grief is related to the loss of "home," where home is interpreted in a wide sense, encompassing the community and surrounding landscape. This is especially true in cases where the landscape is incorporated in origin myths, oral histories, or religion. The anxiety described here is an uncertainty about the future. Sociocultural stress has to do with threats to a community's cultural identity. Removal also results in temporary or permanent loss of livelihood support patterns (possibly with long traditions), customs, institutions, and symbols.

Due to these multiple factors, displaced populations experience impoverishment at the time of displacement. Populations can and do recover from this impoverishment if they are given opportunities to do so. Recovery often requires at least one generation. Dam builders frequently do not plan recovery opportunities for displaced populations, or fail to implement plans, leaving displaced communities to fend for themselves. Dam projects also do not generally account for unexpected events such as changes in government, droughts, or wars, which often occur because large dam projects take a long time to complete (48–50).

To study the effects of dam-related displacement on groups of people across the

globe, Scudder (44–50) combined his "four stage model" with Cernea's "impoverishment risk model."[61] Based on forty-four cases with sufficient longitudinal data, he concluded that for thirty-six dams (82 percent), displaced people failed to regain their former standard of living through the programmed recovery plans. However, in five cases subsequent legal efforts on the part of the displaced peoples did allow them to ultimately improve their standard of living. Only three of the examined populations (7 percent) ultimately exceeded their former standard of living through means included in the dam project alone. Five more (11 percent) regained their former standard of living (61–64).

Implementation of the Pick-Sloan Plan disproportionately affected Native tribes in the region. Over 202,000 acres of Lakota and Dakota Sioux lands were flooded by construction of the Fort Randall, Oahe, and Big Bend Dams. The construction of Garrison Dam claimed over 150,000 acres of Fort Berthold Reservation land inhabited by the Three Affiliated Tribes (Mandan, Hidatsa, and Arikara/Sahnish). This loss of Native lands must be considered in the context of a long history of tribes losing land to non-Native interests.

With the Louisiana Purchase in 1803 a large expanse of land, including the Northern Plains and Pacific Northwest, became part of the United States, completely unbeknownst to the Native people living there. At that time, the Siouan-speaking Mandan and Hidatsa (also referred to as Minnetaree, or Gros Ventres [of the River]) lived along the Upper Missouri in what is now North Dakota, and the Caddoan-speaking Arikara in what is now South Dakota. (The Arikara, as they are called in the literature, also "Ricarees" or "Rees," call themselves Sahnish.) These were semi-sedentary tribes who lived in earth-lodge villages along the river where they grew crops and engaged in trade, while also engaging in hunting farther afield. Native territories shifted their ranges over the course of the early nineteenth century. This was partly due to Native populations declining steeply after several epidemics of European-introduced diseases, especially the smallpox epidemic of 1837, which was brought into the area by fur-trade steamboat traffic.

Shortly after this smallpox outbreak, a group of Mandan and Hidatsa banded together at Like-A-Fishhook village, sharing the location with a fur-trade establishment by the name of Fort Berthold. They were later joined there by the Arikara/Sahnish.

During the early to mid-nineteenth century, tensions were growing between US peoples and various Native peoples of the Northern Plains. US settlers did not move to the Northern Plains in large numbers until later, but during the early nineteenth century Northern Plains tribes were feeling pressures from population shifts in the lands to their east, encounters with overland US travelers heading west, as well as corporate interests intruding on their lands (e.g., steamboat crews cutting timber and fur traders). In efforts to avoid conflicts over competing interests with Native peoples, the United States established Native land rights. However, the rights and protections conferred early on were systematically reduced over time.

In order to establish boundaries and safe westward passage for US settlers and interests, the United States signed treaties with Native peoples. In 1851, the US Commissioner of Indian Affairs organized a Grand Council with the Plains tribes (Sioux, Cheyenne, Arapaho, Crow, Assiniboine, Hidatsa, Mandan, Arika-

ra/Sahnish). This council would result in the first Treaty of Fort Laramie.[62] The treaty defined territories for the various tribes. Each tribe was to stay within their own territory and not hunt or raid in another tribe's lands. The tribes were guaranteed sovereignty within their assigned territory. The treaty allowed for the construction of roads through the territories by the United States, but also stated that no land could be taken from the tribes without both the tribes' and Congress's specific agreement. The treaty, as signed by the various Native peoples, entitled each group to $50,000 a year for a period of fifty years. However, when the treaty was ratified, this time period was changed to a mere ten years.

The Three Affiliated Tribes' territory was described thusly in the treaty:

> The territory of the Gros Ventre, Mandans, and Arrickaras Nations, commencing at the mouth of Heart River; thence up the Missouri River to the mouth of the Yellowstone River; thence up the Yellowstone River to the mouth of Powder River in a southeasterly direction, to the head-waters of the Little Missouri River; thence along the Black Hills to the head of Heart River, and thence down Heart River to the place of beginning.

Meyer identifies some problems with this boundary. The area did not include Like-A-Fishhook village, where most members of the Three Tribes were living at the time, and some of the area between the Powder and Heart Rivers was not used by the Three Tribes.[63] In reality, these discrepancies were moot, since the treaty would soon be disregarded and boundaries would be reduced several times in the decades after the treaty (Fig. 3).

After the Civil War the government decided to obtain more right-of-ways for wagon roads, railroads, and telegraph lines across the country. To this end, commissioners met with various tribes, including the Sahnish/Arikara, who signed an agreement on July 27, 1866, granting right-of-ways in exchange for $10,000 in annuities. Later on, an addendum was tacked on that included the Mandan and Hidatsa, and the cession of a 40-by-25-mile tract on the east bank of the Missouri which the commissioners wanted for US settlement and resources.[64]

Captain S. A. Wainwright, commanding officer at Fort Stevenson in the late 1860s, conferred with the Three Tribes regarding their complaints about steamboat crews cutting wood on their lands. He proposed a reservation for the Three Tribes. The territory of this reservation was to be somewhat smaller than the territory agreed to in the Fort Laramie Treaty, as another group had a conflicting claim to land north of the Heart River. A strip of land east of the Missouri was included in order to make sure that Like-A-Fishhook village was included in the reservation boundaries.[65] Wainwright's proposal was accepted and an executive order issued by President Grant on April 12, 1870, officially created a reservation for the Three Affiliated Tribes (Fig. 3).[66]

Ten years later, another executive order would take an even larger portion of land from the Three Tribes. This land cession was related to the construction of the North Pacific Railroad. When chartered in 1864, that railroad—like other railroads constructed in the mid- to late nineteenth century—had been given large land grants, including forty miles on either side of a right of way that cut through the Three Affiliated Tribes' reservation. Actual construction of the railroad did not reach this territory until the very late 1870s. The rail-

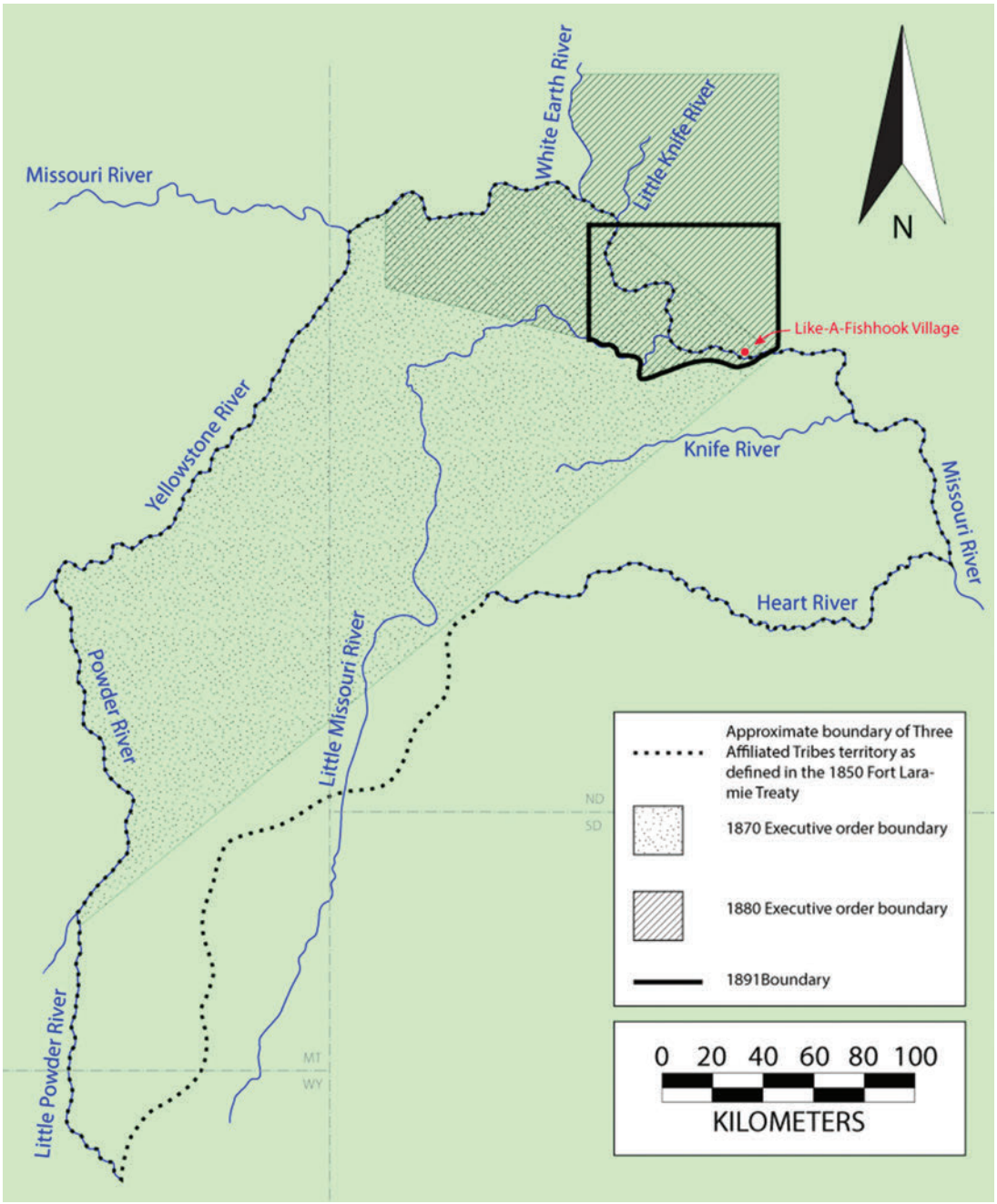

Fig. 3. Land cessions at Fort Berthold Reservation, 1870–1891. Adapted from Roy W. Meyer, *The Village Indians of the Upper Missouri* (Lincoln: University of Nebraska Press, 1977), 112–13.

road board of directors then drew up a plan to reduce the boundaries of the reservation. Despite some contrary advice from certain military commanders and a commissioner from the Bureau of Indian Affairs, the railroad was able to convince the government of their plan, and President Hayes signed the executive order on July 13, 1880, depriving the Three Tribes of a majority of their land. As compensation they were granted some additional land to the north (Fig. 3). This land was not only less desirable in terms of farming and timber, but this compensation also failed to account for the strong ties the Three Tribes had to the land that was ceded.[67]

In 1887 Congress passed the General Allotment Act, also known as the Dawes Act, after Massachusetts senator Henry Dawes, the lead proponent of the act. The act authorized the president to divide tribal lands into allotments for Native individuals and families, and to purchase any "surplus" lands for sale to non-Indian settlers. This act was intended to push Native peoples into individual landownership and farming, which were considered "civilized" as opposed to traditional tribal landholding, which was considered "backwards." Further, many believed that the reservations had too much land that wasn't being properly used, and they were eager to see it opened up to US settlement or corporate and industrial interests who would make more "proper" use of the land. Allotment ended nationwide in 1934 with the Indian Reorganization Act. By this time tribal lands had become fractioned, with large percentages of prior reservation lands held by non-Natives. A total of ninety million acres of tribal lands was lost between 1887 and 1934.[68]

For the Three Tribes, allotment officially started in 1894, following the ratification of an agreement in 1891 in which the tribes agreed to cede land in exchange for $80,000 in annuities for a period of ten years, to be used "for their civilization and education, and to establish them in comfortable homes" (see Fig. 3). The allotments were not formally approved until 1900, but most people were settled on their farms by 1895. A total of 949 allotments were assigned at that time. The remaining land was held in trust for the tribe by the federal government. However, in 1910, Congress passed a law providing for sale of the "surplus" lands to non-Indians.

The Three Tribes never reconciled themselves to these serial land losses. They were left with approximately 290,000 acres after the executive orders of 1870 and 1880, roughly 10 percent of their territory as described in the 1851 Fort Laramie treaty. Their first petition to the president for compensation was sent in 1898. They undertook several more attempts at getting compensated before finally being successful in 1930, when they were awarded $2,169,168.58 as compensation for the loss of 9,846,186 acres.[69]

This was not the last time the Three Tribes would mount legal challenges against the US government. When the 1944 Flood Control Act was signed into law, the Three Affiliated Tribes were not consulted regarding the plans to construct Garrison Dam. While Scudder, in his fifty-dam study, found no evidence to suggest that dam projects were deliberately planned to affect indigenous people and other ethnic minorities, research has found that this is undeniably the case for Garrison Dam and the other Pick-Sloan dams on the Missouri. The location of the main-stem Missouri River dams was deliberately chosen so that the reservoirs would spare US towns and instead flood Native lands.[70] After the Army

Corps of Engineers was already working in the area, Fort Berthold Indians were able to halt expenditures on the Garrison Dam project while they negotiated a settlement. Their claim was based on the aforementioned 1851 Fort Laramie treaty, in which the United States had agreed that land could not be taken from tribes without their consent as well as that of Congress. After several years of negotiations, the Three Affiliated Tribes agreed to sell the 152,360 acres required for the dam project for $12,605,625 in compensation. That amount was nine million dollars less than a third-party estimate. Furthermore, claims for additional benefits, such as exclusive rights to a small portion of Garrison's hydroelectric power production at a reduced rate; fishing, hunting, and grazing rights along the shore; irrigation development; and royalty rights for subsurface minerals within the reservoir area, were all denied.[71] Testimonies about the settlement suggest the tribe agreed to the sale because they saw the dam as inevitable, and feared further negotiations would only result in additional dwindling of what they would receive in compensation.[72]

Although the acreage lost was somewhat smaller than what was lost by the various Sioux tribes, the overall effect was devastating, owing to the specific circumstances of Fort Berthold Reservation. The population was concentrated in the bottomlands along the river, resulting in the forced relocation of 325 families (approximately 80 percent of the tribal membership), and the division of the reservation into five disparate segments, separated from each other by water. The tribes also lost 94 percent of their agricultural lands, impacting their ability to be agriculturally independent.[73]

Tribal Efforts for Compensation

For several decades Fort Berthold Indians made attempts to recover additional compensation for their losses, but were unsuccessful. In 1985, in response to ongoing efforts of the Three Affiliated Tribes, the Secretary of the Interior established the Garrison Unit Joint Tribal Advisory Committee (JTAC). The committee was charged with investigating the effects of the Pick-Sloan Plan dams, specifically the impacts of the Garrison and Oahe Dams on Fort Berthold and Standing Rock Reservations, with the goal of compensating the tribes for what they had lost. The JTAC's final report recommended a range of $178.4 million to $411.8 million as just compensation. After more hearings, referrals, and analysis,[74] an agreement was eventually reached for compensation, which became the Equitable Compensation Act, Public Law 102-575, passed by Congress in 1992. Receipts from hydropower were to be added to a treasury account for the tribes until a principal amount of $149.5 million was reached. The tribes had to provide an economic and social recovery plan for the expenditure of the interest.

The Three Tribes were among the populations studied by Scudder in his fifty-dam study. Although they were able to regain their pre-dam standard of living at the time of the last measurement in 2004, their success was due to their own legal efforts rather than any planning on the part of the dam project. Thus the Three Tribes were included in a separate category, and not counted as one of the few populations who recovered by means included in their respective dam projects.[75] Although successful in some of their more recent pursuits, the legal battles of the Three Tribes are ongoing.[76]

Native peoples' water usage battles add to the conflicts between the competing interests of the Bureau of Reclamation and the Corps of Engineers or between communities and corporations along the Missouri, which did not end when the Pick and Sloan plans were merged. Native interests typically involve the local use of reservoir water for irrigation and other purposes, whereas downstream there is demand for water to facilitate navigation. Following legal disputes over water use, in 1988 the court ruled that the dominant function of the Upper Missouri reservoirs was flood control and navigation, and thus these projects (and the decision-making authority to enter into contracts allowing water use) were under the jurisdiction of the US Army Corps of Engineers, and not the Bureau of Reclamation. This decision was cited and upheld in a different case in 2003.[77]

Despite the ruling favoring navigation over irrigation, some Native tribes have established legal claims to water rights that can supersede competing interests. A 1908 US Supreme Court decision resulted in the *Winters* Doctrine, establishing that many western tribes have implied water rights related to the establishment of their reservations.[78] However, the particular details of those rights have been enacted differently by various courts over the years. Reserved water rights also depend on the originally described purpose or purposes of the reservations. Some western tribes have their water rights quantified by decree or compact, but this has yet to happen for the Three Affiliated Tribes of Fort Berthold Reservation, or for the various Sioux tribes living in the reservations downstream along the Missouri. These tribes have *Winters* rights to the Missouri River that are likely to interfere with non-Native uses of reservoir water, especially now that increased periods of drought are making conflict over water use more intense.[79]

The Impact on Archaeology

Another unforeseen consequence of mid-twentieth-century dam building in the United States was its impact on US archaeology. The 1944 Flood Control Act mobilized archaeologists and paleontologists across the country as they sought to investigate sites of interest in the areas threatened by the dam-building projects. Several institutions and organizations banded together to salvage as much as they could. Thus, the Inter-Agency Salvage Project (IASP) came into being—a collaboration between the Bureau of Reclamation, the Army Corps of Engineers, and the Smithsonian Institution.[80]

The Smithsonian Institution created the River Basin Surveys (RBS) unit as part of its Bureau of American Ethnology, and under that banner conducted archaeological research as part of the IASP. The IASP was the largest and longest-lasting salvage program ever implemented in the United States. The Smithsonian's RBS operated from 1946 to 1969 in various areas across the country, but mainly in the Upper Missouri River Basin.

As a survey project of this unprecedented magnitude, the RBS laid the basis for many of the current practices in salvage archaeology. The survey crews made efforts to standardize their field methods and modes of documentation across the project. One example of this standardization is the development of the so-called trinomial system for assigning a unique site number to each archaeological site in the country. Furthermore, the RBS pioneered zooarchaeology and the use of mechanical equipment in excavations, and made innovations in aerial photography and remote sens-

ing. They were also responsible for training a new generation of archaeologists. The large scale of the project promoted public interest in heritage, which would eventually lead to the National Historic Preservation Act.[81]

RBS investigations in the Upper Missouri region contributed significantly to the archaeology of the Northern Plains. Hundreds of sites were recorded in the various dam areas, over 150 of them in the Garrison Dam survey area.[82] Because there was such limited time before dam completion, only a handful of those were excavated more extensively. Even so, these excavations, along with those in the other dam locations, were important to the archaeology of Plains Village Culture and so-called historical archaeology of the Northern Plains.

Plains Village peoples were living in the Central and Northern Plains throughout the second millennium of the current era. They resided in permanent earth-lodge villages near rivers and practiced horticulture as well as bison hunting. In the introduction to their edited volume, *Plains Village Archaeology*, Ahler and Kay referred to the River Basin Surveys as "the heyday of Plains Village archaeology."[83] The chronology of the Middle Missouri region of Plains Village tradition was constructed based on the finds of the RBS excavations associated with the main-stem Missouri dams. The Middle Missouri geographic region is traditionally defined as "the Missouri Valley from just below the mouth of the White River in South Dakota to just above the mouth of the Yellowstone in North Dakota." That definition is based on results from the RBS salvage operations. The southern limit, in particular, was decided in large part due to absence of evidence related to the very limited salvage work associated with construction of the Gavins Point Dam in southeastern South Dakota. For that reason, the southern limit has been expanded somewhat more recently.[84]

RBS investigations prioritized the excavation of Plains Village sites over sites associated with earlier hunter-gatherer groups because researchers considered the village sites more unique. Such sites existed only along the river and thus a large percentage of them would be lost in the dam project, while hunter-gatherer sites can also be found elsewhere. Further, Plains Village sites and historic-period villages were easier to locate than deeply buried older sites, as they are more recognizable at the surface. Some of these older sites were discovered buried underneath village sites during excavation, and it is safe to assume there would have been many others in the survey area.[85]

Among the Plains Village sites investigated in the Garrison Dam area was "Grandmother's Lodge" (32ME59), which probably dates to the earliest Plains Village occupation of the area.[86] The site is associated with the "Grandmother" or "Old Woman Who Never Dies," a mythological figure held in reverence by the Hidatsa, Mandan, and Crow. The Grandmother's Lodge site probably dates to AD 1200–1300.[87] The site consists of a single rectangular structure, making it a northern outpost of the "rectangular house tradition," a building tradition associated with the earliest Plains Village occupations farther south.

Nightwalker's Butte-in-the-Bullpasture (32ML39) was given such a specific name to distinguish it from two other nearby butte sites associated with Nightwalker. "Nightwalker" is a mistranslation of a Hidatsa leader's name that means something like "He Who Walks in Twilight" and should more accurately be referred to as "Duskwalker." The site consists of an isolated bluff-top village in a badlands area

of McLean County. The village is associated with a breakaway band of Hidatsa. It was palisaded and contained twenty-seven circular earth lodges.[88] Analysis of some of the recovered material dates associated the site with the Knife River phase (1675–1862) of the "Disorganized Coalescent Variant."[89] Further analysis of recovered materials later narrowed the village occupation date down to 1700–1750.[90]

Later earth-lodge villages examined during the RBS in the Garrison Dam area include Rock Village, a Hidatsa village established in the late eighteenth century and occupied through the mid-nineteenth century; and Star Village, the last independent Arikara village, established in 1861 and abandoned one year later when the occupants joined the Mandan and Hidatsa at Like-A-Fishhook village across the river.[91] A still more recent Native site excavated by RBS crews was 32MZ1, also known as Crow-Flies-High.[92] This was the site where another breakaway band of Hidatsa established a village away from the main Three Tribes villages at Like-A-Fishhook around 1870. This band of Hidatsa, led by and named after a man named Crow-Flies-High, resisted reservation life and allotment. They established a village near Fort Buford at the mouth of the Yellowstone and remained independent from the reservation for almost twenty-five years.[93]

In terms of the historic archaeology of the Great Plains, the RBS ushered in a transitional period. "Historical archaeology" can mean different things,[94] but in the Northern Plains in the mid-twentieth century, RBS researchers used it to describe the archaeology of sites associated with US institutions and settlement. It was during the RBS that archaeologists first investigated non-Native sites in this area. The historical archaeology of the Great Plains prior to the RBS used the so-called direct historic approach to study Native American sites. This approach works backward from documented periods (historic Native American sites) to investigate the proto- or prehistoric Native American sites. This method was employed in order to answer specific questions, and this type of archaeology was decidedly anthropological in nature. The historical archaeology of the RBS, on the other hand, was based on history rather than anthropology.[95]

RBS archaeologists employed a specific method for prioritizing historic sites for excavation, different from the survey methods used for Native sites. Even before budgets were allocated for the excavation of historical sites, historians conducted detailed document searches and made lists of "historic places" within the reservoir areas behind each dam that was planned along the Upper Missouri. Historic sites from the list were prioritized for excavation, based on three criteria: the degree of historical significance, the extent of available documentation, and whether or not the documented site could be located in the field.[96] Although some known prehistoric sites were investigated during the RBS, researchers did not employ such lists for their study of Native sites. Instead, they undertook archaeological surveys in the field.

Among the earliest historic sites investigated by RBS crews is 32MN1, an early fur-trade post on the Upper Missouri, near the mouth of the White Earth River. James Kipp built a trading post in 1826 that was intended to function for only one winter. The location was near the traditional home of the "Gens des Canots" band of Assiniboine, allowing for easy trade with them and other bands who frequented the area. The fort was then occupied by the American Fur Company's Upper Missouri Outfit (UMO) in 1827. The company operated

the post for approximately two years, until Fort Union became operational at the mouth of the Yellowstone.[97]

Site 32ML2 is somewhat unique among RBS-investigated sites in that the one site number includes both Like-A-Fishhook village and the US fur-trade establishments Fort Berthold I and II. Located near the mouth of the Knife River, the village and first trading post were established around 1845. The village takes its name from a nearby hairpin bend in the river. The original trading post belonged to the UMO. Later on, an opposition company built and briefly occupied a trading post in the same village named Fort Atkinson. When the original Fort Berthold burned down after a Dakota raid, the UMO took over the abandoned Fort Atkinson and renamed it Fort Berthold II. Military troops were stationed at the fort in 1864–65. Although they stayed at the site through 1867 (when they moved to the newly constructed nearby Fort Stevenson), they were relocated to buildings outside the actual fort in April 1865. An Indian agency was established at the location in 1868. Blacksmith and carpenter shops were built at this time as well as a sawmill and gristmill. The agency moved in 1875 to a new site a mile and a half away because the original buildings were "vermin-infected" and "tumble-down."[98] The Three Affiliated Tribes started to abandon the village in 1885, encouraged to do so by the Indian agent who wanted them to settle on individual farms. By 1888, only a few elderly Mandan were left.[99]

Excavations at 32ML2 took place during several seasons in the early 1950s. Investigations focused on twenty Native houses as well as both trading posts. Data gathered during those excavations still provide new information on the various peoples who lived at this site and the interactions they had.[100]

Fort Stevenson (32ML1) was established in 1867 as part of the military expansion across the Northern Plains in the mid-nineteenth century. As already mentioned above, the post was named after Brigadier General Thomas G. Stevenson, who died in the Civil War. The fort remained in operation as a military establishment through 1883, when the site was repurposed as an Indian school. The school closed in 1894 and the lands and buildings were sold and used for farming purposes. Excavations here took place in the summer of 1951. A total of 6,099 artifacts were recovered from the site, dating to all the different occupations.[101]

Beyond the RBS, the construction of Garrison Dam and Lake Sakakawea continues to impact the archaeology of the area because shoreline erosion prompts regular archaeological surveys and mitigation along the shores of the reservoir. Wave action and erosion have destroyed many archaeological sites, even as the associated investigations contribute to the body of knowledge about the area's prehistory and history.[102]

Conclusions

Garrison Dam was one of many large dams built during the height of the US dam-building period between the 1930s and the late 1960s. By the end of this period, dam building in the United States came to an end because there were few appropriate locations left for large dams, and because environmental concerns and population displacement had turned public opinion against the idea of dam building. In other parts of the world, dam building is ongoing. Unlike Garrison Dam, contemporary projects can benefit from a large body of work investigating the effects of dams on the environment and people. Study of these im-

pacts is ongoing, and even decades after the construction of large dams, unanticipated effects are still discovered.

The two main agencies involved with twentieth-century dam building in the United States were the US Army Corps of Engineers and the Bureau of Reclamation. Both were building dams for their own purposes, and the territories in which they operated generally did not overlap. In the Missouri Basin, however, the two had conflicting plans. Those plans were merged into the Pick-Sloan Plan, but the conflicting needs of the populations along the Upper and Lower Missouri continue to spawn legal battles, which will likely increase as climate change alters water demands.

The environmental impact of any dam is enormous. Garrison Dam, in tandem with the other Pick-Sloan dams, has completely changed the ecosystems of the Missouri Basin from Montana to the confluence with the Mississippi, as well as the Lower Mississippi and its delta. Research continues to discover the far-reaching ecological impacts of this dam project. Moreover, as one dam among many thousands in the world, Garrison Dam also contributes to changes on a global scale.

The impact of Garrison Dam on local populations was also significant. Fitting a pattern seen elsewhere in the world, the construction of Garrison Dam disproportionally affected Native people. The Three Affiliated Tribes of Fort Berthold Reservation lost a majority of their prime agricultural land to Lake Sakakawea, and over 80 percent of the tribe was forced to relocate. The Three Tribes suffered the typical effects of forced displacement, but were eventually able to recover their former standard of living due to their own legal efforts rather than any recovery efforts implemented by the Pick-Sloan Plan. The targeting of Native lands for flooding in order to spare US towns was but one in a list of huge land losses incurred by Natives when the US government claimed tribal lands. Although the Three Affiliated Tribes have succeeded in getting some legal relief for their lost lands, more conflict is on the horizon as their water rights under the *Winters* Doctrine have not yet been quantified, and issues surrounding conflicting needs for water are expected to increase due to climate change.

Although large dams have huge economic, environmental, and social costs, they also facilitate water management, mitigate flooding, and create recreational and power resources. Dams can also shape and reflect local heritage and community. In naming Garrison Dam and its reservoir, the people of North Dakota looked to local history, which the project simultaneously destroyed and indirectly helped to document.

An unanticipated consequence of the major dam-building projects of the mid-twentieth century, and the Pick-Sloan Plan in particular, was the growth of American archaeology. As various institutions joined forces to save archaeological sites threatened by major construction and flooding, modern archaeological practices were born out of necessity. More than 150 sites were recorded in the Garrison Dam area. This was a mere fraction of the total number of sites recorded by crews of the River Basin Surveys during this period. The survey and excavation of these sites contributed hugely to the body of knowledge about the area's (and the country's) prehistory and history. At the same time, methods and theory used in the field of archaeology were developed and formalized.

Garrison Dam is but one of many dams. Its history and the history of the Upper Missouri

River and the Northern Plains are inextricably tied together. Its story is also part of the larger narrative of dam building across the world, and lessons learned from Garrison Dam are relevant to large dam construction worldwide.

Notes

1. International Commission on Large Dams, "World Register of Dams—General Synthesis," http://www.icold-cigb.org/gb/World_register/general_synthesis.asp.

2. David M. Rosenberg, Patrick McCully, and Catherine M. Pringle, "Global-Scale Environmental Effects of Hydrological Alterations: Introduction," *BioScience* 50, no. 9 (September 1, 2000): 748–49.

3. International Commission on Large Dams, "World Register of Dams—Number of Dams by Country Members," http://www.icold-cigb.org/gb/World_register/general_synthesis.asp?ida=206.

4. W. Carter Johnson, Mark D. Dixon, Michael L. Scott, Lisa Rabbe, Gary Larson, Malia Volke, and Brett Werner, "Forty Years of Vegetation Change on the Missouri River Floodplain," *BioScience* 62, no. 2 (February 1, 2012): 123–35.

5. Patrick McCully, *Silenced Rivers: The Ecology and Politics of Large Dams* (London: Zed Books, 2001), 13.

6. See Larry W. Mays, *Ancient Water Technologies* (Dordrecht: Springer, 2010); and Unal Ozis, "Water Works through Four Millennia in Turkey," *Environmental Processes* 2 (2015): 559–73.

7. See John Peter Oleson, *Greek and Roman Mechanical Water-Lifting Devices: The History of a Technology* (Toronto: University of Toronto Press, 1984); and Örjan Wikander, *Handbook of Ancient Water Technology* (Leiden: Brill, 2000).

8. See McCully, *Silenced Rivers*, 13.

9. Alan Roe, "Riverine Environments," in *Companion to Global Environmental History*, ed. John Robert McNeill and Erin Stewart Mauldin, 297–318 (Hoboken, NJ: Wiley, 2012), 306.

10. W. Bruce Masse, "Prehistoric Irrigation Systems in the Salt River Valley, Arizona" *Science* 214, no. 4519 (October 23, 1981): 408–15.

11. McCully, *Silenced Rivers*, 14.

12. David P. Billington and Donald C. Jackson, *Big Dams of the New Deal Era—A Confluence of Engineering and Politics* (Norman: University of Oklahoma Press, 2006), 71.

13. US Army Corps of Engineers, *The US Army Corps of Engineers: A History*, EP 870-1-68 (8/7/2013), 41.

14. US Army Corps of Engineers, *A History*, 41.

15. Billington and Jackson, *Big Dams*, 14.

16. See Billington and Jackson, *Big Dams*, 22–26; and Roger R. Otstot, *Reclamation: Managing Water in the West—An Overview of the Pick-Sloan Missouri River Basin Program* (Billings, MT: US Department of the Interior, Bureau of Reclamation, Great Plains Region, n.d.), 1–2.

17. See US Senate, 46th Congress, "Report 43 to Accompany Bill S. 1069," in *Reports of Committees of the Senate of the United States for the First and Second Sessions of the Forty-Sixth Congress, 1879–'80*, (Washington, DC: US Government Printing Office, 1880), 4. The report involves a claim by officers of the Fifth Infantry "praying to be reimbursed for losses sustained by the sinking of the government steamer Don. Cameron." The claim is based in part on the fact "[t]hat the navigation of the Missouri River between Omaha, Nebr., and Sioux City, Iowa, is so dangerous, so much so that it has been styled 'the graveyard of steamboats.'"

18. Otstot, *Reclamation*, 6.

19. See Toni Rae Linenberger, *Overview Pick-Sloan Missouri Basin Program* (Colorado: Bureau of Reclamation, 1998), 4; and Otstot, *Reclamation*, 6.

20. John R. Ferrell, *Big Dam Era: A Legislative and Institutional History of the Pick-Sloan Missouri Basin Program* (Omaha: US Army Corps of Engineers, Missouri River Division, 1993), 5–6.

21. See Linenberger, *Overview Pick-Sloan*, 8; and Otstot, *Reclamation*, 7.

22. US Army Corps of Engineers, "Summary of Engineering Data—Missouri River Main Stem System," http://www.nwd-mr.usace.army.mil/rcc/projdata/summaryengdat.pdf.

23. Ray H. Mattison, "Old Fort Stevenson, a Typical Missouri River Military Post," *North Dakota History* 18, no. 2–3 (1951): 2–40.

24. Associated Press, "Tribe Weighs Name Change: Sakakawea or Sacagawea?," *Kentucky New Era*, August 23, 2002.

25. Irving W. Anderson, "History Commentary—The Sacagawea Mystique: Her Age, Name, Role, and Final Destiny," *Columbia Magazine* 13, no. 3 (1999).

26. Sacagawea was born to a band of northern Shoshone called the Agaideka or "Salmon-eaters." Later in the nineteenth century this band, along with the Tukudeka (Sheep-eaters) and Kusundica (Buffalo-eaters), would become the Lemhi Shoshone. See Gregory R. Campbell, "The Lemhi Shoshoni: Ethnogenesis, Sociological Transformations, and the Construction of a Tribal Nation," *American Indian Quarterly* 25, no. 4 (2001): 539–78.

27. See Clark's journal entry for November 4, 1804: "a french man by Name Chabonah, who Speaks the Big Belley language visit us, he wished to hire & informed us his 2 Squars were Snake Indians, we engau him to go on with us and take one of his wives to interpet the Snake language." Meriwether Lewis, William Clark, et al., November 4, 1804 entry in *The Journals of the Lewis and Clark Expedition*, ed. Gary Moulton (Lincoln: University of Nebraska Press/University of Nebraska–Lincoln Libraries Electronic Text Center, 2005), http://lewisandclarkjournals.unl.edu/read/?_xmlsrc=1804-11-04.

28. For an overview of what is known about Sacagawea's (and Toussaint Charbonneau's) life, see Dale W. Nelson, *Interpreters with Lewis and Clark: The Story of Sacagawea and Toussaint Charbonneau* (Denton: University of North Texas Press, 2003).

29. See Clark's journal entry for May 14, 1805: "about 6 oClock a Squawl of wind Struck our Sale broad Side and turned the perogue nearly over . . . the articles which floated out was nearly all caught by the Squar . . . This accident had like to have cost us deerly," and Lewis's entry dated May 16, 1805: "the Indian woman to whom I ascribe equal fortitude and resolution, with any person onboard at the time of the accedent, caught and preserved most of the light articles which were washed overboard." Lewis et al., *Journals*, http://lewisandclarkjournals.unl.edu/read/?_xmlsrc=1805-05-14 and http://lewisandclarkjournals.unl.edu/read/?_xmlsrc=1805-05-16.

30. See Lewis's journal entry for May 20, 1805: "this stream we called Sâh-câ-gar me-âh or bird woman's River, after our interpreter the Snake woman." Lewis et al., *Journals*, http://lewisandclarkjournals.unl.edu/read/?_xmlsrc=1805-05-20.

31. See Lewis's journal entry for August 8, 1805: "the Indian woman recognized the point of a high plain to our right which she informed us was not very distant from the summer retreat of her nation on a river beyond the mountains which runs to the west. . . . she assures us that we shall either find her people on this river or on the river immediately west of it's source." Lewis et al. *Journals*, http://lewisandclarkjournals.unl.edu/read/?_xmlsrc=1805-08-08.

32. See Clark's journal entry for August 17, 1805: "The Great Chief of this nation proved to be the brother of the Woman with us and is a man of Influence Sence & easey & reserved manners, appears to possess a great deel of Cincerity." Lewis et al., *Journals*, http://lewisandclarkjournals.unl.edu/read/?_xmlsrc=1805-08-17.

33. See Clark's journal entry for October 13, 1805: "The wife of Shabono our interpetr we find reconsiles all the Indians, as to our friendly intentions a woman with a party of men is a token of peace." Lewis et al., *Journals*, http://lewisandclarkjournals.unl.edu/read/?_xmlsrc=1805-10-13.

34. See Irving W. Anderson, "Fort Manuel, Its Historical Significance," *South Dakota History* 6, no. 2 (1976): 131–51.

35. For a detailed study of the Sacagawea myth, its genesis and evolution, see Donna J. Kessler, *The Making of Sacagawea: A Euro-American Legend* (Tuscaloosa: University of Alabama Press, 1996).

36. See April R. Summitt, *Sacagawea: A Biography* (Westport, CT: Greenwood Press, 2008).

37. Harry O'Brien, "Short Stops," *Walsh County Press* (Park River, ND), May 19, 1955, http://wal.stparchive.com/Archive/wal/wal05191955p08.php.

38. *Billings County Pioneer*, "Garrison Area Communities Form Development Group," February 27, 1958, https://news.google.com/newspapers?nid=2132&dat=19580227&id=opnkaaaaibaj&sjid=zoqnaaaaibaj&pg=1512,854942&hl=en.

39. "The naming of the lake at Garrison Dam can be very important to North Dakota. At the beginning of the session, I have received requests to have it named Lake Garrison. Accordingly, I introduced legislation to that effect. Since then, suggestions have been made that a more romantic and historical name would be appropriate. Elk Horn has been suggested because the lake is shaped like an elk horn and that is the name of Teddy Roosevelt's ranch. Others suggested lake Sakajawea, in honor of the heroic Indian woman who guided Lewis and Clark over the Rocky Mountains. You may have a suggestion of your own. It is argued that since the dam is named Garrison, that the name Garrison would be perpetuated and the lake should bear some other appropriate name. I

ask that you let me have your suggestion as to a name because many agree that a historical name will be important to our future tourist trade." *Billings County Pioneer*, October 25, 1962, https://news.google.com/newspapers?nid=2132&dat=19621025&id=fhzlaaaaibaj&sjid=Upqnaaaaibaj&pg=1632,19067&hl=en.

40. Subcommittee on Flood Control—Rivers and Harbors of the Committee on Public Works, US Senate, Ninetieth Congress, First Session, *Hearing before the Subcommittee on Flood Control—Rivers and Harbors of the Committee on Public Works, United States Senate, Ninetieth Congress, First Session on S. 78, S. 423, S. 601, S. 831, S. 988, S. 1340, H.R. 8363 Neshaminy Creek, PA, Watershed Project, Mississippi River Commission Nominations California Debris Commission Nomination* (Washington, DC: US Government Printing Office, 1967), 18–35.

41. Subcommittee on Flood Control, US Senate, Ninetieth Congress, First Session, *Hearing before the Subcommittee on Flood Control*, 24.

42. United States, *United States Statutes at Large Containing the Laws and Concurrent Resolutions Enacted During the First Session of the Ninetieth Congress of the United States of America 1967 and Reorganization Plans, Twenty-Fifth Amendment to the Constitution, and Proclamations*, vol. 81 in one part (Washington, DC: US Government Printing Office, 1968), 112.

43. Atif Ansar, Bent Flyvbjerg, Alexander Budzier, and Daniel Lunn, "Should We Build More Large Dams? The Actual Costs of Hydropower Megaproject Development," *Energy Policy*, March 2014, 1–14.

44. See McCully, *Silenced Rivers*, 29–64; and Rosenberg et al., "Environmental Effects," 746–51.

45. See Harsh K. Gupta, *Reservoir Induced Earthquakes* (Amsterdam: Elsevier, 1992); Harsh K. Gupta, "A Review of Recent Studies of Triggered Earthquakes by Artificial Water Reservoirs with Special Emphasis on Earthquakes in Koyna, India," *Earth-Science Reviews* 58, no. 3–4 (October 2002): 279–310; and McCully, *Silenced Rivers*, 112–15.

46. Vincent L. St. Louis, Carol A. Kelly, Éric Duchemin, John W. M. Rudd, and David M. Rosenberg, "Reservoir Surfaces as Sources of Greenhouse Gases to the Atmosphere: A Global Estimate," *BioScience* 50, no. 9 (September 1, 2000): 766–75.

47. All populations of pallid sturgeon and least tern are endangered. Populations of piping plover along the Missouri are threatened. The piping plover is only endangered in the Great Lakes watershed. See United States Fish and Wildlife Service, "Endangered Species," http://www.fws.gov/endangered/species/us-species.html.

48. See US Army Corps of Engineers, Northwestern Division, "Missouri River Final Environmental Impact Statement: Master Control Manual Review and Update" (US Army Corps of Engineers, Northwestern Division, March 2004); and US Army Corps of Engineers, "Missouri River Mainstem Reservoir System: Master Water Control Manual—Missouri River Basin" (US Army Corps of Engineers, March 2006).

49. See US Army Corps of Engineers, "Missouri River Recovery Program," http://moriverrecovery.usace.army.mil/.

50. Jason S. Alexander, Richard C. Wilson, and W. Reed Green, *A Brief History and Summary of the Effects of River Engineering and Dams on the Mississippi River System and Delta* (Reston, VA: US Geological Survey, 2012).

51. Johnson et al., "Forty Years of Vegetation Change."

52. Joan Cohen, "Garrison Dam—A Long List of Woes for Canada," *Ottawa Citizen*, January 17, 1977, https://news.google.com/newspapers?nid=2194&dat=19770117&id=m9czaaaaibaj&sjid=ue0faaaaibaj&pg=1169,2387002&hl=en.

53. Garrison Diversion Conservancy District, "History & Federal Legislation," http://www.garrisondiv.org/about_us/history_federal_legislation.

54. Peter Capossela, "Impacts of the Army Corps of Engineers' Pick-Sloan Program on the Indian Tribes of the Missouri River Basin," *Journal of Environmental Law and Litigation* 30, no. 1 (2015): 143–217, 206–14.

55. Lauren Donovan, "History and Heartbreak: A Sad Day at Garrison Dam as Spillway Gates Open," *Bismarck Tribune*, June 1, 2011, http://bismarcktribune.com/news/state-and-regional/history-and-heartbreak-a-sad-day-at-garrison-dam-as/article_9d90644e-8c97-11e0-aa6f-001cc4c03286.html.

56. Caposella, "Impacts," 208.

57. David W. Brokensha, "Volta Resettlement and Anthropological Research," *Human Organization* 22 (1963), 286–90, 286, as cited in Thayer Scudder, *The Future of Large Dams: Dealing with Social, Environmental, Institutional and Political Costs* (Sterling, VA: Earthscan, 2005), 31.

58. See Scudder, *Large Dams*; Michael M. Cernea and Scott E Guggenheim, *Anthropological Approaches to Resettlement: Policy, Practice, and Theory* (Boulder, CO: Westview Press, 1993); and Joy Ann Bilharz, *The Allegany Senecas and Kinzua Dam: Forced Relocation through Two Generations* (Lincoln: University of Nebraska Press, 1998).

59. See Bilharz, *Allegany Senecas*, 32–33; and Scudder, *Large Dams*, 49–50.

60. Scudder, *Large Dams*, 135. Further citations to *Large Dams* are given in parentheses in the text.

61. Michael M. Cernea, "Why Economic Analysis Is Essential to Resettlement: A Sociologist's View," in *The Economics of Involuntary Resettlement: Questions and Challenges*, ed. Michael M. Cernea, 5–49 (Washington, DC: World Bank, 1999), summarized in Scudder, *Large Dams*, 44–47.

62. Charles J. Kappler, comp. and ed., *Indian Affairs: Laws and Treaties*, vol. 2: *Treaties* (Washington, DC: US Government Printing Office, 1904), 594–96, via Oklahoma State University Digital Library: http://digital.library.okstate.edu/kappler/vol2/treaties/sio0594.htm.

63. Roy W. Meyer, *The Village Indians of the Upper Missouri: The Mandans, Hidatsas, and Arikaras* (Lincoln: University of Nebraska Press, 1977), 103.

64. See Charles J. Kappler, comp. and ed., *Indian Affairs*: *Laws and Treaties*, vol. 1: *Laws, Compiled to Dec. 1, 1902* (Washington, DC: US Government Printing Office, 1904), 1052–56; and Meyer, *Village Indians*, 111.

65. Meyer, *Village Indians*, 112.

66. Kappler, *Indian Affairs*, 1:883.

67. See Meyer, *Village Indians*, 112–13, for a more detailed description of the events leading up to the executive order of 1880; for a transcript of the executive order, see Kappler, *Indian Affairs*, 1:883, http://digital.library.okstate.edu/kappler/Vol1/Images/v1p0883.jpg.

68. Indian Land Tenure Foundation, *History of Allotment,* https://www.iltf.org/resources/land-tenure-history/allotment.

69. Because there was no exact number for the Three Tribes' acreage under the Fort Laramie Treaty, the Court started with the round number of 13,000,000. A total of 11,424,512.76 acres of that had been taken without compensation. The addition of 1,578,325.83 acres of land to the reservation left them with 846,186.93 acres to be compensated for. The Three Tribes were to receive compensation at a rate of fifty cents per acre, adding up to $4,923,093.47. From this sum was deducted an offset of $2,753,924.82. This money was appropriated by Congress over the years expended on the "support and civilization" of the Tribes. The Tribes soon discovered that $400,000 that would have been paid to them in fulfillment of the 1866 treaty had been counted in the offsets. Several bills were introduced in Congress during the 1930s and 1940s trying to seek restitution, which was finally granted in 1946. Meyer, *Village Indians*, 188–89.

70. Robert Kelley Schneiders, "Flooding the Missouri Valley: The Politics of Dam Site Selection and Design," *Great Plains Quarterly* 17 (1997): 237–49.

71. Meyer, *Village Indians*, 211–34.

72. United States, *Final Report and Recommendations of the Garrison Unit Joint Tribal Advisory Committee: Joint Hearing before the Select Committee on Indian Affairs, United States Senate and the Committee on Energy and Natural Resources, United States Senate and the Committee on Interior and Insular Affairs, House of Representatives, One Hundredth Congress, First Session on Oversight Hearing on the Final Report and Recommendations of the Garrison Unit Joint Tribal Advisory Committee* (Washington, DC: US Government Printing Office, March 30, 1987).

73. See Michael L. Lawson, *Dammed Indians: The Pick-Sloan Plan and the Missouri River Sioux, 1944–1980* (Norman: University of Oklahoma Press, 1982), 59; and Meyer, *Village Indians*, 219.

74. Raymond Cross, "Twice-Born from the Waters: The Two-Hundred-Year Journey of the Mandan, Hidatsa, and Arikara Indians," in *Lewis & Clark: Legacies, Memories, and New Perspectives* (Berkeley: University of California Press, 2004), 133–34.

75. Scudder, *Large Dams*, 60.

76. For an overview of environmental justice issues relating to indigenous peoples and sacred lands, see Roxanne T. Ornelas, "Managing the Sacred Lands of America," *International Indigenous Policy Journal* 2, no. 4 (October 2011): Article 6. For research into the impact of Garrison Dam on the Three Tribes and their right to express spiritual beliefs, see Roxanne T. Ornelas, "Understanding Sacred Lands," *Great Plains Research* 17 (2007): 165–71.

77. *ETSI Pipeline Project v. Missouri*, 484 US 495, 499 (1988), in which the states of Missouri, Iowa, and Nebraska challenged a contract between the Bureau

of Reclamation and an energy company over the use of water from Lake Oahe for a coal slurry project; and *South Dakota v. Ubbelohde*, 330 F.3d 1014, 1020 (8th Cir. 2003), in which the state of South Dakota argued that continued release of reservoir water for navigation uses during drought conditions violated the Flood Control Act. See Caposella, "Impacts," 180–85.

78. Based on *Winters v. United States*, 207 US 564, 575–77 (1908), in which the Supreme Court decided that Fort Belknap Reservation had reserved water rights and ruled against a non-Native irrigator upstream, even though the non-Native irrigation project predated the Fort Belknap irrigation system. This decision was based on the fact that the reservation was created in 1888, and thus predated any other settlement in the area, and on the fact that the purpose of the reservation was to transform a "nomadic and uncivilized" people into a "civilized and pastoral" people, by providing them with lands to develop for such a purpose. The court ruled that without irrigation the lands were practically valueless and could not be used for that purpose. See Cynthia Brougher, "Indian Reserved Water Rights under the Winters Doctrine: An Overview," CRS Report for Congress. Congressional Research Service, June 8, 2011.

79. See Caposella, "Impacts," 189–99.

80. See Kimball M. Banks and Jon S. Czaplicki, eds., *Dam Projects and the Growth of American Archaeology: The River Basin Surveys and the Interagency Archeological Salvage Program* (Walnut Creek, CA: Left Coast Press, 2014); Jesse D. Jennings, "River Basin Surveys: Origins, Operations, and Results, 1945–1969," *American Antiquity* 50, no. 2 (April 1, 1985): 281–96; Donald J. Lehmer, *Introduction to Middle Missouri Archaeology*, Anthropological Papers 1 (Washington, DC: National Park Service, 1971); Lynn M. Snyder, Deborah Hull-Walski, Thomas D. Thiessen, and Myra J. Giesen, "Postwar Partners in Archaeology: The Bureau of Reclamation, the National Park Service, and the River Basin Surveys in the Missouri River Basin (1945–1969)," *CRM* 1 (2000): 17–20; Thomas D. Thiessen, *Emergency Archeology in the Missouri River Basin: The Role of the Missouri Basin Project and the Midwest Archeological Center in the Interagency Archeological Salvage Program, 1946–1975* (Lincoln, NE: US Department of the Interior, National Park Service, Midwest Archeological Center, 1999); Thomas D. Thiessen and Karin M. Roberts, "The River Basin Survey Collections: A Legacy for American Archaeology," *Plains Anthropologist* 54, no. 210 (2009): 121–36; Waldo R. Wedel, "Salvage Archaeology in the Missouri River Basin," *Science* 156, no. 3775 (1967): 589–97.

81. W. Raymond Wood, "The Lincoln Office and the Upper Missouri River Basin," in Banks and Czaplicki, *Dam Projects and the Growth of American Archaeology*, 48–51.

82. Warren W. Caldwell and G. Hubert Smith, *Garrison Reservoir: Geology, Paleontology, Archeology, History* (Omaha: US Army Corps of Engineers, 1952).

83. Stanley A. Ahler and Marvin Kay, eds., *Plains Village Archaeology: Bison-Hunting Farmers in the Central and Northern Plains* (Salt Lake City: University of Utah Press, 2007), xviii.

84. Douglas B. Bamford and Curtis Nepstad-Thornberry, "The Shifting Social Landscape of the Fifteenth-Century Middle Missouri Region," in Ahler and Kay, *Plains Village Archaeology*, 139–54.

85. Banks and Czaplicki, *Dam Projects*, 43.

86. Alan R. Woolworth, "Archeological Investigations at Site 32ME59 (Grandmother's Lodge)," *North Dakota History* 23, no. 2 (1956).

87. Grandmother's Lodge has been categorized as belonging to the Clark's Creek Phase of the Extended variant of the Middle Missouri Tradition. See Lehmer, *Middle Missouri*; and Craig M. Johnson, *A Chronology of Middle Missouri Plains Village Sites*, Smithsonian Contributions to Anthropology 47 (Washington, DC: Smithsonian Institution Scholarly Press, 2007), 15, 174.

88. Kerry Lippincott, "Nightwalker's Buttes: A Study in the Closing of an Archaeological Tradition and an Example of Hidatsa Oral History," in Ahler and Kay, *Plains Village Archaeology*, 259–69.

89. Lehmer, *Middle Missouri Archaeology*, 172–77, 194.

90. Johnson, *Chronology*, 194.

91. Caldwell and Smith, *Garrison Reservoir*.

92. Carling I. Malouf, "Crow-Flies-High (32MZ1), a Historic Hidatsa Village in the Garrison Reservoir Area, North Dakota-River Basin Surveys Papers, No. 29," *Smithsonian Institution Bureau of American Ethnology Bulletin 185* (Washington, DC: US Government Printing Office, 1963).

93. Meyer, *Village Indians*, 138–42.

94. Lotte Govaerts, "What Is Historical Archaeology?," Rogers Archaeology Lab, May 23, 2014, http://nmnh.typepad.com/rogers_archaeology_lab/2014/05/historicalarchaeology.html.

95. See William B. Lees, "Missouri Basin Projects and the Emergence of Historical Archaeology on the Great Plains," in Banks and Czaplicki, *Dam Projects and the Growth of American Archaeology*, 151–66; and Douglas D. Scott, "Euro-American Archaeology," in *Archaeology on the Great Plains*, ed. W. Raymond Wood, 481–519 (Lawrence: University of Kansas Press, 1998).

96. The list for Garrison Reservoir was published in *North Dakota History*: Ray H. Mattison, "Report on Historic Sites in the Garrison Reservoir Area, Missouri River [North Dakota]," *North Dakota History* 22, no. 1–2 (1955): 5–73.

97. See William J. Hunt, "Fort Floyd: History and Archaeology of an Enigmatic 19th Century Trading Post," *North Dakota History* 61, no. 3 (1994): 7–20; and Alan R. Woolworth and W. Raymond Wood, "The Archaeology of a Small Trading Post (Kipp's Post, 31MN1) in the Garrison Reservoir, North Dakota," in *River Basin Survey Papers 15–20*, *Bureau of American Ethnology Bulletin 176* (Washington, DC: US Government Printing Office, 1960).

98. "Those now in use for that purpose are old, vermin-infected, tumble-down log buildings erected many years ago by the North American Fur Company." US Office of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs for the Year 1874* (Washington, DC: US Government Printing Office, 1874).

99. Meyer, *Village Indians*, 134–35.

100. G. Hubert Smith, *Like-A-Fishhook Village and Fort Berthold, Garrison Reservoir, North Dakota*, Anthropological Papers 2 (Washington, DC: National Park Service, 1972).

101. For a general historical background on Fort Stevenson, see Mattison, "Old Fort Stevenson." For the RBS report on the excavation of Fort Stevenson, see G. Hubert Smith, "Archaeological Investigations at the Site of Fort Stevenson (32ML1), Garrison Reservoir, North Dakota" in *River Basin Survey Papers 15–20*, *Bureau of American Ethnology Bulletin 176* (Washington, DC: US Government Printing Office, 1960).

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