RECLAMATION

Managing Water in the West

FOLSOM DAM 50th

1956-2006

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

This booklet was printed in cooperation with

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Dedication

William E. Rinne
Acting Commissioner
Bureau of Reclamation

I am pleased to offer my congratulations as Folsom Dam celebrates its 50th Anniversary.

For half a century, through drought and flood, Folsom Dam has managed American River flows for the benefit of people, farms, industry, and the environment. Since its completion in 1956, it has effectively controlled flooding. Even several months before its final completion, Folsom Dam prevented flood damage when a major tropical storm triggered rapid snowmelt. The dam impounded so much runoff that Folsom Lake filled in one week rather than the one year anticipated by engineers. It is estimated that this magnificent dam has prevented more than $5 billion in flood damage to downstream agricultural and urban areas, a testament to the foresight of the men and women who envisioned and built it.

Today, Folsom Dam provides 500,000 acre-feet of water for irrigation and urban uses annually. It plays an important role in fisheries enhancement and water quality improvement in the San Francisco Bay-Delta. The dam also provides clean, renewable electricity. In 2005, it produced more than 690 million kilowatt hours.

As a recreational facility, Folsom Lake is one of the most visited recreation areas operated by the California Department of Parks and Recreation.

I salute today's workforce of dedicated Reclamation employees who, like their predecessors long ago, work hard to keep Folsom Dam in prime operational status, ready to provide this multitude of benefits to the Sacramento metropolitan area, and to the Central Valley beyond.

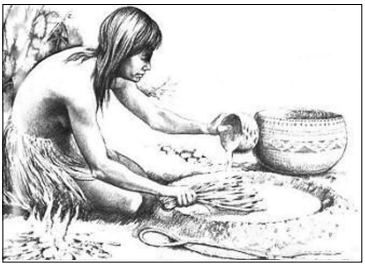
William E. Rinne
Acting Commissioner
Bureau of Reclamation

Contents

The Early Years

Folsom Dam has stood on the American River for 50 years. It has protected downstream cites from floods, and has provided year-round water for agriculture, cities, and industry. The powerplant at Folsom Dam was built at the same time to provide electrical power to the growing city of Sacramento and its suburbs. The reservoir behind the dam provides recreational opportunities for millions each year.

The dam was built in response to the settlements around the American River. People live near rivers for the clean water, transportation opportunities, and food sources. But often, they do not think that the peaceful river can turn into a raging torrent during the rainy season.



A Maidu woman prepares acorn meal.

Long before Folsom Dam or even Sacramento existed, Native Americans lived in this area. For thousands of years, the Nisenan Maidu lived a peaceful hunting and gathering existence along the Sacramento and American Rivers. They built villages on high ground to avoid floodwaters.

Evidence of their daily labor can still be seen in the grinding rocks along the shoreline of the American River near present day Folsom.

In summer 1839, John Sutter wisely selected a location for "New Helvetia," his new town. The town, which later would be called Sacramento, would be close to the American and Sacramento Rivers but built on high ground.

After gold was discovered at one of Sutter's sawmills along the American River on January 24, 1848, many towns sprung up filled with people with one purpose in mind – get to the river and seek gold.

Mormon Island was established soon after the January 1848 discovery of gold at Coloma. It took its name from the small group who started mining the site – Mormons originally employed by John Sutter as hunters for the fort.

Mormon Island was once a thriving mining town as seen in this mid-1850s drawing.

By 1853, the population of Mormon Island was about 2,500, and it had become one of the main Mother Lode communities. The later establishment of the city of Folsom marked the beginning of a gradual decline for the town of Mormon Island. By the early 1880s, the population had spiraled down to zero.

The site was submerged by the waters of the new Folsom Reservoir in 1956. By this time, only a chicken ranch was located where the town square had once been. One of the main features of Folsom Reservoir is named for the town – Mormon Island Auxiliary Dam.

The small town of Negro Bar was another early Gold Rush community along the American River. The name came from the miners of African descent that

In the 19th century, the phrase "I have seen the elephant" referred to overcoming the hardships in one's life. There was a story of a farmer who heard that the circus was coming. He headed to town with his produce to see an elephant. On the road, he saw the elephant, but his horse spooked, upset the cart, and destroyed the produce. Even so, the farmer said "I don't care, for I have seen the elephant." Gold miners often "saw the elephant" due to the difficult working conditions they faced.

Gold miners at Negro Bar hard at work with a Long Tom, a device used to separate gold from riverbed sediment.

first started mining gold there during the years 1849-1850.

In 1851, more than 700 people of all ethnicities were living and working there.

It thrived until 1856 when American River flood waters washed the town away, never to be rebuilt.

The name "Negro Bar" is used today to commemorate this community. Negro Bar Day Use and Group Campground are located near Lake Natoma close to the submerged town site.

The name of another gold rush town – Salmon Falls – came from a waterfall in the American River a mile downstream of the town site. The Maidu Indians caught the once-plentiful salmon at these falls.

The town in a short time grew from a few huts to a community of some note with a population of about 3,000, with many stores and other buildings typical of a mining town. The old Salmon Falls Bridge emerges from the depths when Folsom Reservoir levels drop in late summer.

The City of Folsom was originally to be called Granite City. In 1855, Joseph Libby Folsom hired Theodore Judah to survey a town site near the mining camp of Negro Bar. Joseph Folsom died before the town was laid out and Granite City was renamed in his honor.

Folsom Dam received its name because of its adjacent location to the City of Folsom.

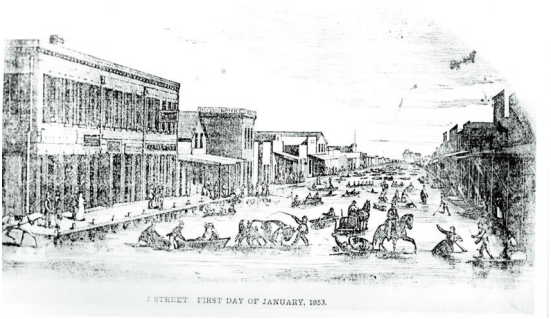
Salmon Falls got its name from a cataract in the American River where the Maidu caught salmon.

A City Under Siege

Flood or drought. Feast or famine. The cycle has repeated itself countless times throughout California's history, from unrecorded time to the present.

Sacramento's location at the confluence of two rivers, the Sacramento and the American, its proximity to the Bay-Delta, and its low elevation made it particularly susceptible to flooding. Archaeologists have found evidence of massive floods and prolonged droughts that occurred in pre-history.

Evidence has been found of a huge flood that hit the Sacramento Valley approximately 3,500 - 4,000 years ago. Additional evidence has also been found to suggest there were additional floods of this magnitude in about 400 AD. In 980 AD, the entire Central Valley flooded.



A January 1853 scene shows a flooded J Street, looking east from Fourth Street.

But it was hydraulic gold mining along the American River that began in the early 1850s that caused monumental flooding problems along the American River. Hydraulic mining had removed entire hillsides and clogged the American River with dirt and rocks, which at times caused massive flooding downstream.

Even so, in the growing city of Sacramento, building continued near the river in flood prone areas. The result was a disaster in early 1853, the year of one of Sacramento's first great floods. At the time, the area held more than 6,000 residents.

During the second week of January, water rushed in from surrounding waterways, covering the city for a mile east of the normal bank of the Sacramento River – roughly to the present-day Convention Center at 12th and J Streets.

The Sacramento flood of 1861 looking down J Street.

Much of what is known of that flood was told by Dr. John F. Morse, a historian of the time.

"People drowned in their beds, and the city hospital was inundated, the sick abandoned until one large ship came to rescue them," Morse said.

In response, Sacramentans began building miles of levees from the Sutterville area "Land Park" up the Sacramento River to the confluence where it merged with the American, and continued along the American River to high ground. That worked, but only temporarily.

Time after time, the city went under water. Again, the levees were improved. The city grew, doubling its population from the early 1850s level.

For 8 years, citizens thought they were safe from floods. But the winter of 1861-1862 found Sacramento under water again. In January, water from the American River washed through the city and spilled over levees into the Sacramento River.

"The city is one vast lake, and boats are busily engaged passing to and fro," wrote The Daily Bee in a "Flood Sheet" published while its building was under water.

Yet only a few years later, a two-year drought gripped the region in another flood and drought cycle.

After three major floods in less than 12 years, folks decided to do something. While some favored abandoning the city, or at least moving the State capitol to San Francisco, Sacramento decided to literally raise itself out of harm's way.

Fitful efforts at raising the city by filling in streets had occurred after the 1853 flood, but now Sacramentans went at it with a passion. They brought the street

Fun facts

Folsom Dam has prevented more than $5 billion in flood damage since it was built in 1956.

level up above known flood stages by dumping wagonloads of dirt and gravel on the streets, as much as 10 feet deep in front of some buildings.

The area raised eventually included I to L Streets and from Front to 11th. Skeptics suggested Sacramento would be forever waterlogged, but the height was finally secured. Subterranean businesses in Old Sacramento today testify to the original street levels.

When the next big floods came, Sacramentans were no longer victims – they were spectators.

Sacramento flooding in 1955, 5 months before Folsom Dam was completed.

The Bee described watching from the shore as houses from areas east and west of the city were washed away in flooding that the city avoided.

A plan to provide a comprehensive flood control plan for the Sacramento Valley received financial approval from the Federal government in 1917.

The plan was based on a system of levees, weirs, and bypass channels to divert excess water away from the city; however, officials continued their reliance on levees for flood protection.

This reliance was shattered in 1927 when a devastating flood struck on the Mississippi River that flooded 16 million acres, displaced more than 500,000 people, and killed more than 250.

In response to the tragedy in Mississippi, the chief of the U.S. Army Corps of Engineers (Corps) designed a new plan to disperse water through controlled outlets and floodways, in addition to levees.

Congress approved the plan in the 1928 Flood Control Act, and later passed the 1936 Flood Control Act, declaring that flood control was an appropriate activity of the Federal government.

The previous flooding led to the Federal government authorizing Folsom Dam in 1944.

Folsom – Where Water's Not Just for Fightin'

The area's first dam and hydroelectric plant are built

By Marc Maloney
Folsom Life Newspaper
February 16, 2006

Throughout Folsom's 150-year history, water has proven a valuable commodity time and time again. Some of the city's best-known landmarks are water-related: Folsom Dam, Rainbow Bridge, and the Folsom Powerhouse all trace their roots to a desire to tame or to use the water that rushes through Folsom.

Folsom's connection to water predates its settlement by Europeans. Nisenan Maidu Indians lived for centuries along the American, Sacramento, Yuba, Cosumnes, and Mokelumne rivers.

A permanent Maidu village thrived on the south shore of the American River in what is now Folsom until the beginning of the Gold Rush in 1848, when miners arrived and began mining along the river bars and surrounding hills. Some Folsom historians maintain the city would not exist today were it not for the discovery of gold in the mid-1800s, and water was a critical part of the gold mining process. The Natomas Water Company, which was organized in 1851, built and used the Natomas Ditch, an eight-foot wide, three-foot deep ditch to carry water from the American River to the parts of town where mining was taking place.

Fun facts

The annual agricultural production in California's Central Valley is worth more than all the gold mined here since 1849.

Placer gold mining on the section of American River that runs through Folsom took place continuously for more than 50 years after gold was discovered. It wasn't the possibility of finding gold, in fact, that lured to Folsom the man who would create the Folsom Powerhouse, Horatio Gates Livermore. He came to start an industrial town.

By the early 1860s, Livermore controlled the Natoma Water and Mining Company, which had built a network of dams,

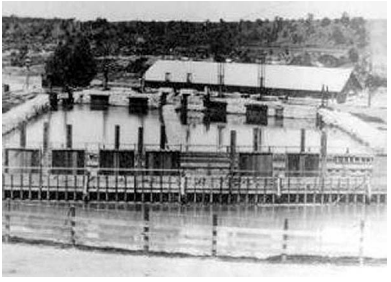
ditches, and reservoirs that supplied water to numerous area gold mines. Ever the visionary, Livermore dreamed of harnessing the power of water to operate a sawmill and other industries around Folsom.

The Livermore's dam in this circa 1890 photograph of the "first" Folsom dam.

By the mid-1860s, Livermore started building a dam to create a holding pond for the logs that were cut in the foothills and sent down the river. After Horatio Gates Livermore died, the task of finishing the dam fell to his sons, Horatio P. and Charles Livermore.

Rather than building a system to supply water for an industrial network driven by water wheels, the Livermores instead embraced a new technology, hydroelectric power, which used water turbines to power electrical generators.

The Livermore brothers and partner, Albert Gallatin formed the Folsom Water Power Company to control the dam and the canal, which supplied water to the Sacramento Electric Power and Light Company, also owned by the Livermores and their partner. On July 13, 1895, with only two generators operating, electricity generated at the Folsom Powerhouse was transmitted 22 miles via uninsulated copper wires to Sacramento.



An 1890s photograph of the Folsom Powerhouse.

The event was ground-breaking: Sacramento and San Francisco newspapers covered the affair in detail on their front pages the next day, and Sacramento celebrated the technological breakthrough with a Grand Electric Carnival on Sept. 9, 1895, the 45th anniversary of California's statehood. The carnival featured electric lights strung along downtown streets and thousands of light bulbs decorating the State Capitol.

As demand for electricity continued to grow in the area, the Livermores remained confident electrical power had a solid future. Responding to growing demand, they built a smaller powerhouse in 1897, just below the main powerhouse.

This powerplant used one 750-kilowatt generator, powered by a unique continuous rope drive from the turbine. By the early 1900s, however, the Folsom Powerhouse was nearly obsolete. The American River's unpredictable flows plagued its operation, causing occasional interruptions in power transmissions to Sacramento.

The Folsom Powerhouse as it looks today. The site is a state Historic Landmark.

The Livermores were forced to buy electricity from another hydroelectric plant on the Yuba River, which was owned by the San Francisco-based California Gas and Electric Company.

By 1903, that company had acquired the Folsom Powerhouse and several other foothill powerplants.

In 1906, this firm was reorganized to form the Pacific Gas and Electric Company, and from then on, the Folsom Powerhouse remained in the control of PG&E.

Continued demand for hydroelectric power up to World War II stimulated innovations and improvements in the technology of the electrical power industry, and operations at the Folsom plant continued through the 1930s using the same basic machinery of an earlier age.

Folsom Powerhouse operations finally ceased in 1952 when the water source was cut off by the diversion dam demolition for Folsom Dam construction.

As the Powerhouse's useful life was drawing to a close, another structure that would come to define Folsom and its relationship with the American River was being built: Folsom Dam.

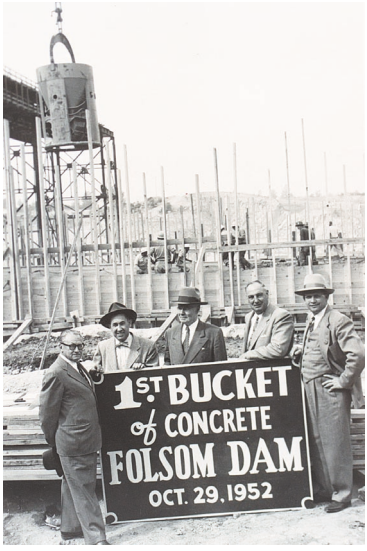
Reprinted with permission of Folsom Life Newspaper

Folsom Dam's Construction

Originally authorized in 1944 as a 355,000 acre-foot flood control unit, Folsom Dam was reauthorized in 1949 as a 1,000,000 acre-foot multiple-purpose facility. The Corps constructed Folsom Dam and transferred it to Reclamation for coordinated operation as an integral part of the Central Valley Project.

Construction of the dam began in October 1948 and was completed in 1956 at a cost of $102 million. Water was first stored in February 1955 with the permanent closure of the diversion tunnel gates.

Folsom Dam is a concrete gravity dam 340 feet high and 1,400 feet long. The main section is flanked by two earthfill wing dams. The right wing dam is 6,700 feet long and 145 feet high, and the left wing dam is 2,100 feet long and 145 feet high. In addition to the main section and wing dams, there is one auxiliary dam and eight smaller earthfill dikes.



The first bucket of concrete is lifted into place in October 1952.

In addition to these structures, a powerplant at Folsom Dam along with Nimbus Dam and powerplant were constructed beginning in 1952.

Folsom Reservoir, which was created when the dam was built, immediately became a popular recreational destination for boaters, anglers, swimmers, and sunbathers.

Fun facts

Folsom Dam is taller than the Statue of Liberty.
Folsom Dam = 340 ft.
Statue of Liberty = 306 ft.

Newspaper accounts from July 1956 reference crowded conditions on the reservoir and its shoreline.

Folsom Dam's construction forever changed the look and feel of the City of Folsom because vast pieces of agricultural land were lost when the dam began blocking the American River's flow. The small towns that had once thrived near the rivers had long since vanished. The only things left were 13 cemeteries to be relocated and 51 structures that were removed prior to inundation.

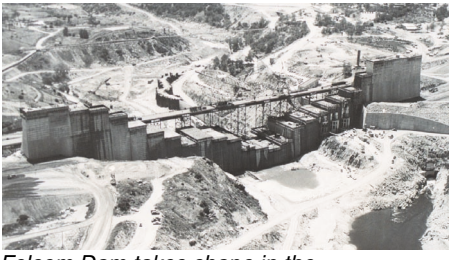
Construction Details

In October1951, the primary contractor began work on the main section of Folsom Dam. The first concrete in the main section was poured on October 29, 1952. Workers kept pouring concrete non stop day and night for almost 4 years. The final pour was May 17, 1955, making the total volume of concrete 1,170,000 cubic yards.

Massive amounts of gravel were taken from Mississippi Bar, sorted at Negro Bar, and then trucked to the construction site. A long conveyer belt (more than 1/2 mile) brought these materials into the cement plant to be mixed into concrete.

The total volume of material in the main dam, wing dams, auxiliary dam, and dikes was 13,970,000 cubic yards. This material was taken from the river bed, dredge tailings, and other local borrow sites.

The giant pipes called penstocks to operate the powerplant at Folsom took almost 2 years to complete. Tunnels were drilled through rock to house the penstocks which direct water down to turn the turbines of the hydroelectric powerplant.



Folsom Dam takes shape in the early 1950s

Installation of the turbines and generators in the powerplant was done relatively quickly, allowing the three units to be placed into service by the end of 1955. Also in 1955, Folsom Dam had reached a point where water storage was possible.

Folsom Dam's dedication in May 1956.

Throughout construction at the Folsom and Nimbus sites, high water and flooding was a frequent problem. On January 9, 1953, the coffer dam protecting work at the Folsom site washed out, sending a flood of water downstream. This flood caused the coffer dam protecting work at the Nimbus site to fail, flooding the area.

In late-April 1953, high water again caused the coffer dam at Nimbus to fail, flooding the construction site. On May 20, the coffer dam at the Folsom site again failed, sending a flood of water downstream, flooding the Nimbus site again.

In spite of all these setbacks, Folsom Dam was completed in 8 years and was dedicated in May 1956.

Nimbus Dam

About 7 miles downstream from Folsom Dam, Nimbus Dam re-regulates the water released from Folsom. The concrete dam is 1,093 feet wide and includes a powerplant and downstream fish hatchery.

It was completed in 1955, and was named for the train station and small Nimbus Company Community along Folsom Boulevard. The word Nimbus means a rain storm cloud.

The prime contractors involved in building Folsom Dam and its dikes were:

Merritt-Chapman & Scott Corporation and the Savin Construction Corporation, New York City, NY

- Main Concrete Dam
- Right and Left Wing Dams
- Dikes 5, 7, and 8.

Morrison-Knudsen Co., Inc., Los Angeles, CA

- Dikes 1, 2, 3, 4, and 6.

M.H. Hasler Construction Co. and the D.H. Construction Co., Santa Ana, CA

- Mormon Island Auxiliary Dam

Folsom Dam's Benefits

During the flood control season, Folsom Dam and Reservoir are operated to perform according to strict criteria set by the Secretary of the Army.

There are two criteria: one is a maximum release of 115,000 cubic feet per second (cfs) (a measure of water flow) from the reservoir during a flood event, and the second is 400,000 acre-feet of storage dedicated to flood control (an acre-foot is a measure of water volume equal to the amount of water that would cover an acre of land to a depth of one foot).

In the early 1950s when these criteria were developed, Folsom Dam was expected to provide the Sacramento area with a 250-year level of flood protection; however, due to more accurate data, the Corps now estimates that the dam will only provide for a 100-year level of protection.

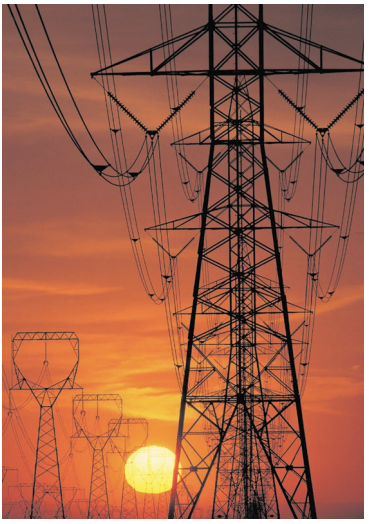
Flood control capacity could be increased if releases of greater than 115,000 cfs were allowed, but the levees on the American River are incapable of handling greater flows for an extended time period.

Although its primary purpose is flood control, Folsom Dam stores water for irrigation and urban use as well as for electrical power generation, salinity control in the Bay-Delta, ecosystem restoration, and recreation.

Agricultural irrigation is the largest use for water from Folsom Dam

The largest percentage of water demand for Folsom Reservoir is agriculture. In this region, crops include alfalfa, sugar beets, beans, rice, cotton, almonds, apricots, asparagus, grapes, melons, oranges, peaches, pears, plums, tomatoes, and walnuts. Rice accounts for more than 20 percent of the total acreage used for farming.

The four main water urban users are the City of Roseville, the San Juan Water District, the City of Folsom, and Folsom Prison.



Folsom's powerplant powers 10 percent of Sacramento's needs.

Urban water uses include residential, industrial, commercial, and government uses. Residential water use accounts for more than half of all the urban water use.

Directly below the dam is the Folsom Powerplant, which has three generators that produce 198,207 kilowatts of clean, renewable, and non-polluting electricity that provides approximately 10 percent of the power used in Sacramento each year.

Control of salt-water intrusion in the Sacramento-San Joaquin Delta is another important role played by Folsom Dam. Clean water from the reservoir is used, when required, to flush out salinity in the Delta, the source of drinking water for 22 million Californians.

Preserving the American River fishery downstream is another use of Folsom Reservoir water. Cool water is stored, then released during the hot summer months to create suitable habitat for endangered and threatened fish species in the river.

Folsom Reservoir has approximately 10,000 surface acres when full and has 75 miles of shoreline. It extends 15 miles up the North Fork and about 10.5 miles up the South Fork of the American River.

The recreation aspect of Folsom Reservoir is operated under lease with the California Department of Parks and Recreation.

Folsom Reservoir is one of the most visited State Parks in California.

Boaters enjoy Folsom Reservoir's recreational benefits.

The Future

As we acknowledge and celebrate the 50th year of this important dam, we embark on a journey toward the future that moves our community toward improved public safety.

Under way since July 2005 is an extensive partnership effort by Reclamation, the Corps, the California Department of Water Resources, the California Reclamation Board, and the Sacramento Area Flood Control Agency.

Folsom Dam in flood control mode

It involves detailed studies on alternatives to improve public safety related to possible seepage, overtopping, earthquake events, and flood damage reduction measures that have been identified in previous and ongoing programs.

Partnerships such as this one are key elements of the future. Other partnerships are under way involving critical elements associated with Folsom Dam and Reservoir.

These include design of a permanent bridge downstream of the dam, revised flow management standards for the Lower American River, a back-up water delivery system for some urban districts, an important temperature control measure, and others.

Welcome to the future of this outstanding Bureau of Reclamation facility—Folsom Dam.

Quotes on Folsom Dam's Construction from Former Corps and Contractor Employees

"Oh, I liked it (the work) very much! It was something I never thought I'd be doing. And even now, when we're somewhere and something comes up about the reservoir or dam… I'll say, "Did you know I worked there when they were building it?!"

Donna Willams, Clerk-Typist with the U.S. Army Corps of Engineers. Worked at Folsom Dam from 1953-1954.

"If anything was done wrong, I did it. If anything was done right, we did it."

Harold Huston, Euclid Scrapper Operator and Business Agent (later President) of Operating Engineers Local Union No. 3. Worked on Folsom Dam from 1951-1954.

"…all of a sudden a whistle blew and that meant they were dynamiting. They (two workers) yelled and started running. I beat both men up the hill. I had heels on but I was not staying!"

Donna Williams, Clerk-Typist with the U.S. Army Corps of Engineers. Worked at Folsom Dam from 1953-1954.

Workmen rest while working inside a tunnel.

Workers are dwarfed by one of Folsom's penstocks that carry water to the powerplant.

"The good that this project has done so far has outweighed any detriments."

Arthur Granum, Laborer with the U.S. Army Corps of Engineers. Worked on Folsom Dam from 1952-1956.

"I was about 15 or 16 years old. It (Folsom Dam) was a summer job and I remember I saved $1,100. That was a lot of money those days but pocket change for a kid today!"

Howard Davis, Laborer with Merritt-Chapman & Scott Corporation and the Savin Construction Corporation. Worked on Folsom Dam from 1951-1952.

"I said (to my children), "This is where daddy works" and so every time from then on it was known as Frank's Dam!"

Frank Cowan, Carpenter with ETS, Hokam and Galvin Company. Worked on Folsom Dam from late 1940s-1956.

"Oh, I loved it! I loved all aspects of the Folsom Project."

Keith Milliron, Equipment Operator with the U.S. Army Corps of Engineers. Worked on Folsom Dam in the early 1950s.

Chronology

Before 1830

Maidu people thrive in the Central Valley. Villages are numerous, often located on high ground near rivers. People move to foothills during flood season. Population decimated by disease brought by Europeans in 1830's.

Digging for gold at Mormon Island, near present day Folsom Dam

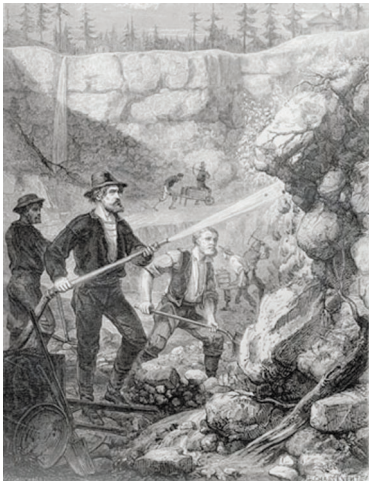
1840

John Sutter's settlement *"New Helvetia" was built c*lose to the mighty American and Sacramento Rivers but on high ground. The location for new Helvetia is wisely chosen by John Sutter.

1848

Gold discovery on the American River

Word spread worldwide, and population soared. Sam Brannon and John Sutter Jr. developed low-lying flood prone land closer to rivers for "Sacramento City,"against elder Sutter's wishes.



Hydraulic mining under way in 1862 in the American River Canyon.

1853

First flood; first levee

The new Sacramento City is nearly destroyed by flood. Voters approve assessment to build first levee.

1855

Hydraulic Mining Begins

The greatest transfer of earth in human history, some say. Hydraulic mining begins, creating massive erosion in foothills and sedimentation in Central Valley. Flooding of Sacramento worsens as river channels fill with sediment, killing fish, and raising the level of sediment in San Francisco Bay.

1861 and 1862

Sacramento flooding continues to be a periodic problem.

1862

Sacramento City raised
Sacramento streets between 12th and Sacramento River are raised 10 feet to prevent flooding. 2nd floors become 1st floors.

1863-1864

Severe drought. Loss of practically all cattle in California.

1868

American River channelized.
Last two miles of American River straightened to create faster flows to scour out mining debris. American River now joins the Sacramento River about one mile upstream from its old confluence.

1880

First Comprehensive Flood Control Plan of Sacramento Valley
In response to a major flood, a farsighted proposal for comprehensive flood control plan is developed. It eventually includes a system of levees, weirs and bypass channels to protect population centers.

1880s

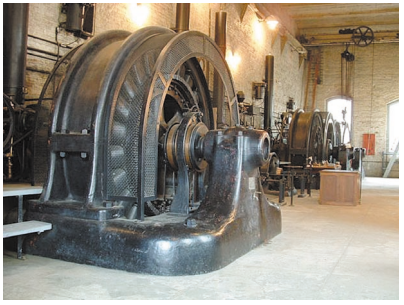
Changing Economy
Agriculture becomes Sacramento Valley's most profitable industry.

1884

End of Hydraulic Mining
Farmers vs. Hydraulic miners. Landmark court case in favor of farmers. Hydraulic mining effectively ends.

1895

Electrifying History
Horatio Livermore's power system sends current generated in Folsom 22 miles to Sacramento. Folsom Powerhouse is the first in the world to transmit high voltage, three-phase, alternating current electricity a long distance.



General Electric 3-phase alternating current generators built in the 1890s at the Folsom Historic Powerplant

1904

Long dry spell. Foothill streams and American River becomes a trickle.

1917

First federal flood control act
After devastating Mississippi River floods, Congress passes first measure to provide federal money for flood control, providing funding for Sacramento's original 1880 plan.

1929-1934
Severe drought**.**

1937
Central Valley Project
Enormous Federal project for Central Valley water begins, to provide flood control, power generation, and water for farms and cities. Eventually amended to include protection of fish, wildlife, and the San Joaquin-Sacramento River Delta.

Construction of the Contra Costa Canal started in 1937 as the first element of the CVP. The entire canal was completed in 1948.

1944
Flood Control Act of 1944
U.S. Army Corps of Engineers is authorized to build a dam on the lower American River. Designated as providing in excess of a 500 year level of flood protection, based on available information.

1945
Water demands increase dramatically
World War II ends and California's economy booms.

1949
Water storage and power generation added to plans for dam and reservoir.

1950's
Record Flows
Just after groundbreaking for Folsom Dam, the American River watershed experiences the first of **FIVE** record storms.

1956
Folsom Dam Completed
Just in Time. Record storm fills the dam in one **week**, rather than in one **year** as expected. Sacramento is saved from flooding.

1956
Folsom Dam Ownership transferred
Dam transfers from the U.S. Army Corps of engineers, who designed and built it, to the U.S. Bureau of Reclamation.

1962
Portion of floodplain saved as greenbelt.
About 5,000 acres of Sacramento Valley floodplain is designated as the "American River Parkway." Lower American River classified as a State Wild and Scenic River.

1964

Folsom Dam's designation lowers
250 year storm protection level is lowered to 120 year storm protection.

1965

Auburn Dam authorized by Congress.
Auburn Dam planned upstream of Folsom Dam to create a reservoir with twice as much water as Folsom Reservoir for flood control, recreation, water storage, and power generation.

1975

Auburn Dam construction halts.
Seismic, environmental, and economic concerns stop 8 years of construction. Concerns follow an earthquake in Oroville (on same fault line). Temporary diversion dam completed.

1976-1977

Severe drought, with driest year on record.

1986

Folsom Dam designation lowered to 100 year storm protection level. American River channels more water into Folsom Reservoir than it was designed for, during yet another record flow event. Concern grows over adequacy of existing flood control system.

1987-1992

Severe drought

Folsom Dam

1992

Levee improvements are authorized.
Congress authorizes levee improvements in North Sacramento and Natomas in lieu of a dam at Auburn.

1996

Levee improvements are authorized again.
House of Representatives authorizes more levee improvements. A dam at Auburn is again defeated.

Flows on the American River were extremely high in 1997 due to heavy rainfall and snow melt.

1997

Fifth record flow event in 46 years.
Unprecedented flows from rain and melted snow surge into the rivers. Sacramento is spared when eye of storm stayed north.

2005

Flood protection improvement plan
A Corps project is authorized to improve Sacramento flood protection. The plan is to improve levees downstream and modify Folsom Dam to increase its ability to release water.

2006

The Corps and Reclamation cooperate in Folsom Dam Combined Federal Effort to determine the best method to improve dam safety, and increase flood control.

American River Water Education Center

The American River watershed encompasses more than 1,875 square miles of land. Within that area, the three forks of the American River flow out of the mountains into the great Central Valley and eventually out to the Pacific Ocean.

The Upper American River

History has made its mark in the area beginning with a grand story of geology, botany, wildlife, Nisenan Maidu people, gold seekers, farming, water laws, damming, water diversion, and recreation.

Many glistening drops of water have traveled and returned to flow through these rivers: the North, Middle, and South Forks of the American River. Nature conserves water by recycling it over thousands of years.

Learn more about the American River watershed when you visit the Central California Area Office's American River Water Education Center at Folsom Dam.

Discover the American River watershed and learn about the water cycle, Folsom Dam, and water conservation through friendly staff and interactive exhibits.

People enjoy a rafting trip down the Upper American River during high flows in early spring due to snow melt.

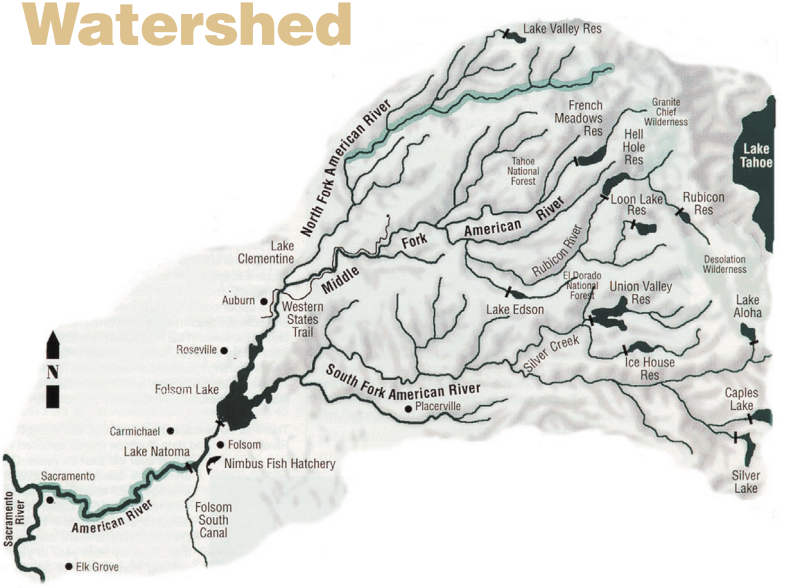
The Center offers an exciting approach to the American River watershed. The exhibits in the Center promote water education directly related to the American River watershed. Stroll through the water wise garden and see the beautiful drought tolerant plants. You can save water while keeping your garden looking beautiful.

American River Water Education Center
7794 Folsom Dam Rd.
Folsom, CA 95630-1799
916-989-7100

Hours vary, so please call ahead at 916-989-7275, or visit www.usbr.gov/mp/arwec for more information.

The mission of the American River Water Education Center is to increase the public's knowledge of the American River watershed-both the natural features and human interactions within the watershed. Emphasis is placed on increasing the public's understanding of the water cycle and watersheds, how individuals can actively participate in resource conservation, and on Folsom Dam's multiple roles in meeting the needs or urban, industrial agricultural, and natural systems.

The American River Watershed



Beginning high in the snow-covered peaks of the Sierra Nevada Mountains, and flowing into the Central Valley, the land that drains into the American River is large and varied.

The American River watershed drains about 1,900 square miles of land. The water cascades from elevations over 10,000 feet to just 23 feet where it joins the Sacramento River.

Most of northern California and part of southern Oregon are drained by the Sacramento River system. All of this combined water flows through the city of Sacramento.

Why floods happen here

- **Soil is saturated** from earlier rains
- **Warm winter storms** melt deep mountain snows
- **Urbanization**-extensive impermeable surfaces concentrate runoff into rivers
- **Wetland reduction** - filling in wetlands reduces flood absorbing capabilities
- **Storm water drainage** systems clogged with debris
- **Levees** fail to hold back the water

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