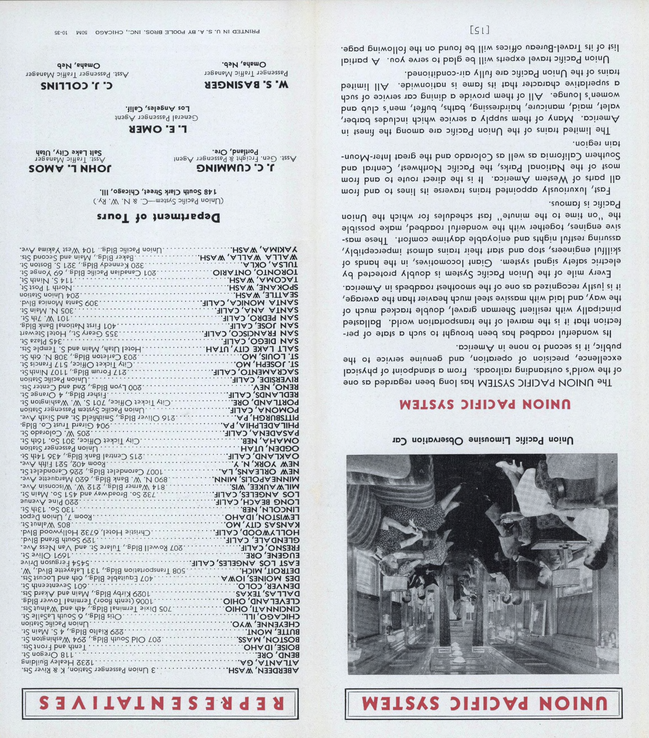


FACTS CONCERNING BOULDER DAM

DOWN in the rock-walled recesses of the Black Canyon of the Colorado River, an army of men and a vast array of titan machinery are now completing the construction of the greatest engineering project of its kind the world has ever known—THE BOULDER DAM.

Great, not only in its own magnitude as a structure, but in the far-reaching results that will accrue from its completion. By holding the waters of the Colorado in leash during the flood period, it has stopped forever the periodical flood ravish which has already cost millions. At the same time it is storing the excess waters for distribution during the dry season, making available an increased supply that will irrigate over 2,000,000 acres of land in the Pacific Southwest.

It will do this and still provide a supply of domestic water sufficient for a population of more than 10,000,000 in Southern California. And lastly it will, while serving these other major purposes, generate more than three times as much electric energy as is produced on the American side of Niagara Falls.

When, on June 25, 1929, President Hoover, by proclamation issued the final word of authority to proceed with the project, he brought to a triumphant conclusion ten years of unremitting effort on the part of far-sighted, courageous leaders of the West. Time and again the enterprise seemed hopelessly complex and impossible of achievement, yet the struggle was carried forward indomitably, because in a large measure, the well-being of the Pacific Southwest hung in the balance. Notable as the project is from an engineering standpoint, it is still more notable as a monument to patriotic zeal and lofty vision.

A VAST PROJECT

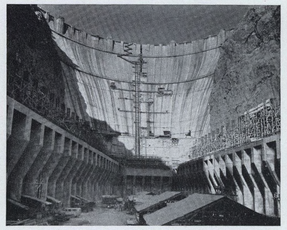
The Boulder Dam project has three major divisions. The dam in Black Canyon and reservoir; the huge power plant at the base of the dam and the All-American Canal—a great water-way that will irrigate a vast new area in Imperial Valley, California.

The reservoir created by the building of Boulder Dam has now become the largest artificial lake in the world. Eventually it will be 115 miles in length with a maximum width of eight miles and will have a shore-line of 550 miles.

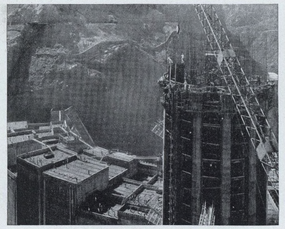
Preliminary to the building of Boulder Dam it was necessary to build a railroad and to erect a complete new city to provide living facilities for the large force of men engaged in the construction of the Boulder Dam project.

The city which it was necessary to build is probably the most unique in America—Boulder City. It is unique in that its site was transformed within a few months from a raw desert into a model city, complete to the last detail for housing a population of six thousand, with every convenience and facility for the comfort of its population,

Boulder Dam as It Appeared in March, 1935


Boulder Dam with Uncompleted Power House in Foreground

UNION PACIFIC SYSTEM


Close-up View of Construction Work Early in 1935

including mercantile establishments, churches, school, theatre, water works, electric lights and other modern improvements enjoyed by up-to-date cities of similar size.

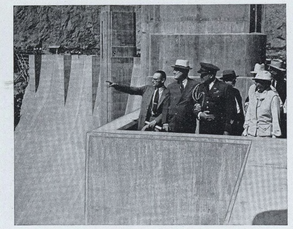
The nearest railroad point to the dam-site is Las Vegas, Nevada, a division point on the main line of the Union Pacific between Salt Lake City and Los Angeles. To transport the vast amount of supplies and materials required in the construction of the dam and power house, the Union Pacific constructed a branch line railroad from Las Vegas to Boulder City, a distance of 22.7 miles, and the Government constructed a railroad from Boulder City to the dam-site, a distance of 10.25 miles.

The Boulder Dam project required about four years to build and will cost $165,000,000, including $38,500,000 for the All-American Canal and $2,000,000 for the construction of Boulder City. Construction work was started in April, 1931.

This expenditure, great as it is, represents less than one-half the total outlay, when the huge auxiliary project, the Los Angeles Aqueduct, is included. The communities of Southern California have voted bond issues of $222,000,000 to construct a giant conduit that will convey water for domestic purposes over mountains and desert, a distance of approximately 265 miles—by far the most stupendous enterprise of its kind in history. Work on this great project is well under way.

The magnitude of the project as an engineering feat and the vast influence it will exert on the progress of the Pacific Southwest have made the Boulder Dam one of the outstanding features of interest in western travel. It adds one more intensely interesting point to the many served exclusively by the Union Pacific between Salt Lake City and Los Angeles, among which is the near-by galaxy of scenic wonders comprised of Zion National Park, Grand Canyon National

BOULDER DAM ROUTE


President Roosevelt Inspected and Dedicated the Dam on September 30, 1935

Park, Bryce Canyon National Park, Kaibab Forest, Cedar Breaks National Monument and fascinating, mysterious Death Valley a short distance away.

LOCATION OF BOULDER DAM

Boulder Dam is located in the upper Black Canyon of the Colorado River, about 30 miles southeast of Las Vegas, Nevada, where the river is the Nevada-Arizona State boundary.

Las Vegas is the County Seat of Clark County, Nevada, and is located on the Union Pacific System 334 miles northeast from Los Angeles and 450 miles southwest from Salt Lake City, Utah.

WORLD'S LARGEST DAM

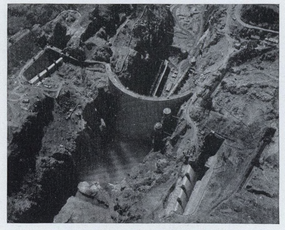
Boulder Dam is the largest dam, by far, in the world. Its height is 727 feet above bedrock, which will raise the water level of the river 587 feet.

The thickness of the dam is 45 feet at the top and 660 feet at the base. Its width at the crest is 1,180 feet.

The dam is of the arch-gravity type, in which the water load is carried by both gravity and horizontal arch action.

There has been used in the construction of the dam, power house and apputenant works, approximately 4,450,000 cubic yards of concrete—slightly more than the total amount used by the Bureau of Reclamation in all the dams and structures it had built preceding the commencement of construction on this great project. This required 5,000,000 barrels of cement. The Bureau had used 4,926,000 barrels in its 99 years of gigantic construction work preceding the building of Boulder Dam.

UNION PACIFIC SYSTEM


Looking Downstream toward Boulder Dam from the Air

Some of the other principal items of work in the building of the project include: Excavation of diversion tunnels and portal cuts, 2,000,000 cubic yards; excavation for foundation of dam, power house and cofferdams, 1,900,000 cubic yards; excavation for spillways, 600,000 cubic yards; excavation of penstock and spillway tunnels, 350,000 cubic yards; excavation of canyon walls for intake towers, valve houses, etc., 550,000 cubic yards; and earth and rockfill for cofferdams, 1,000,000 cubic yards.

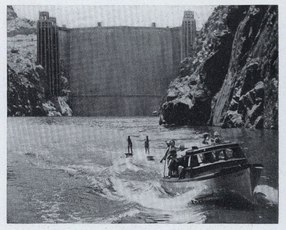
The construction of the dam and apputenant works required the almost unbelievable total of over 203,000,000 pounds of metal of which the following are among the principal items: 52,000,000 pounds of bars and rails; 32,300,000 pounds of gates and valves; 88,700,000 pounds of plate steel penstock and outlet pipes; 1,000,000 pounds of conduit lining castings; 6,400,000 pounds of pipe and fittings; 12,200,000 pounds of structural steel; 7,600,000 pounds of trashrack metal; 2,800,000 pounds of miscellaneous metal fittings. These figures do not include any of the hydraulic and electrical machinery in the power house, weighing 40,000,000 pounds.

BOULDER DAM RESERVOIR

Boulder Dam forms a reservoir, or lake, about 115 miles in length and varying in width from a few hundred feet in the canyons to a maximum of eight miles. It covers an area of 145,000 acres or 227 square miles.

This vast reservoir will hold, when filled, 30,500,000 acre-feet of water. An acre-foot of water is the amount which will cover one acre of land to a depth of one foot. The water in the reservoir would cover a flat area as large as the entire State of Connecticut to a depth of 10 feet.

BOULDER DAM ROUTE


A Fleet of Pleasure Craft Plies Boulder Reservoir, World's Largest Artificial Lake

The elevation of the high water line of the reservoir is 1,227 feet above sea-level. The river bed at the dam-site is at elevation 640.

The capacity of the reservoir will be used as follows: 9,500,000 acre-feet for flood regulation; 5,000,000 to 8,000,000 acre-feet for silt pocket; 12,000,000 to 15,000,000 acre-feet for active or regulation storage.

ELECTRIC POWER

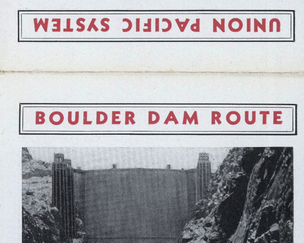
The gigantic power plant just below the falls will have a rated capacity of over 1,800,000 horsepower of energy. This is approximately twice as much as the total combined energy developed at Niagara Falls (United States) and Muscle Shoals.

Upon completion of the plant there will be available an annual output of constant electric energy amounting to 4,330,000,000 kilowatt-hours. A kilowatt-hour is the energy resulting from 1,000 watts for one hour and as one horsepower equals 746 watts, the 663,000 constant or firm horsepower developed at the dam will produce the above tremendous total kilowatt-hours of energy, which will be transmitted to various parts of Arizona, Nevada and California and possibly other states.

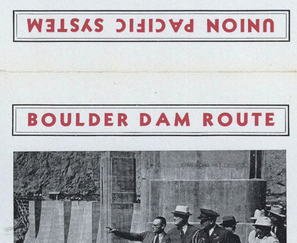
The estimated cost of the power development at the dam is $38,500,000. The power plant is located just below the dam, one-half on the Arizona side of the river and one-half on the Nevada side, forming a U-shaped structure.

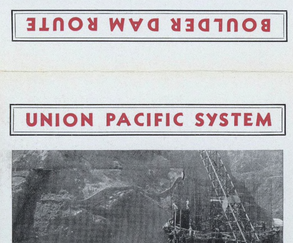
The installation of equipment for the development of 1,835,000 horsepower of energy includes fifteen 115,000 horsepower hydraulic turbines, two smaller units of 55,000 horsepower each, fifteen 82,500 kilovolt-ampere generators, two 40,000 kilovolt-ampere generators, transformers, cranes, switchboards and completely equipped machine shop.

UNION PACIFIC SYSTEM


A Sketch of the Excellent Government Highway to Boulder Dam

BOULDER DAM ROUTE


A View of the Business Section of Boulder City, Nevada


A Street Scene in Las Vegas, Nevada, the Gateway to Boulder Dam

UNION PACIFIC SYSTEM

"Observation Point"—Overlooking Reservoir Site. Facilities for Boulder Dam

One of the principal objects of the Boulder Dam project was the protection of the rich areas of agricultural lands below the dam-site which were constantly menaced by flood waters from the Colorado River. Draining a great watershed covering portions of seven begging states, the usually mild and gentle prairie river sometimes becomes a raging monster when millions of acres of winter snows are melting under a warm spring wind.

The greatest measured discharge of the river in the dam-site was 300,000 cubic feet per second. However, it is thought that in 1884 the discharge was possibly in excess of 300,000 cubic feet per second.

FLOOD CONTROL

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According to preliminary governmental estimates, there are about 2,100,000 acres of irrigable land in the United States below the dam's proposed reservoir, 44,000 acres in Arizona, 1,300,000 in California and 1,500,000 in Nevada. These great areas may be materially changed when actual surveys are made.

One of the major reasons for the building of the Boulder Dam project is the building of the All-American Canal at a cost of $38,500,000. This canal will carry the waters of the Colorado River to the Imperial and Coachella Valleys in California.

The cost of building the All-American canal will be learned in the years, with the Government retaining ownership and supervisory control.

The town of building Boulder City was approximately $1,700,000 for which it has planned for permanent use as it is expected that after the dam is completed the town, exclusive of the concessions, area, will be occupied by those connected with industrial and tourist projects which will follow the creation of this great inland body of water, with the Government retaining ownership of that part.

Boulder City, Nevada, is located on the Union Pacific System 24 miles southeast from Las Vegas and 450 miles southwest from Salt Lake City, Utah.

BOULDER CITY

The new town of Boulder City, Nevada, which it was necessary to build to house the 4,000 workmen engaged on the Boulder Dam project, is located about six miles west of the dam-site, at the junction of the Union Pacific and Nevada Southern railroad.

This model town was planned on the best detail before construction began. It has a population in a large and rapidly developing agricultural and mining territory it will probably enjoy a rapid growth.

Las Vegas is the largest point in the Nevada portion of Lower Nevada, with a population of 2,500 but, because of its proximity to Boulder City and its central location in a large and rapidly developing agricultural and mining territory it will probably enjoy a rapid growth.

Las Vegas is located on the main line of the Union Pacific, in the main-line of the Union Pacific System between Salt Lake City and Los Angeles.

Las Vegas is the County Seat of Clark County, Nevada, and is located on the Union Pacific System 334 miles northeast from Los Angeles and 450 miles southwest from Salt Lake City, Utah.

LAS VEGAS

Las Vegas is the largest town in Southern Nevada. Among these are the physicians, hospital, excellent hotel, churches, school, a hospital, tourist camps, sewerage, water and electric systems, etc.

The land is owned by the Government and is open to obtain a lot or ground in "Las Vegas" which is equipped with trees, telephone, sewerage, water and electric systems, etc.

Las Vegas has excellent churches, parks, golf links, tennis courts and modern civic improvements. It is a division point of the Union Pacific, Las Vegas sport being maintained at that point.

Las Vegas has excellent climate and desert environment.

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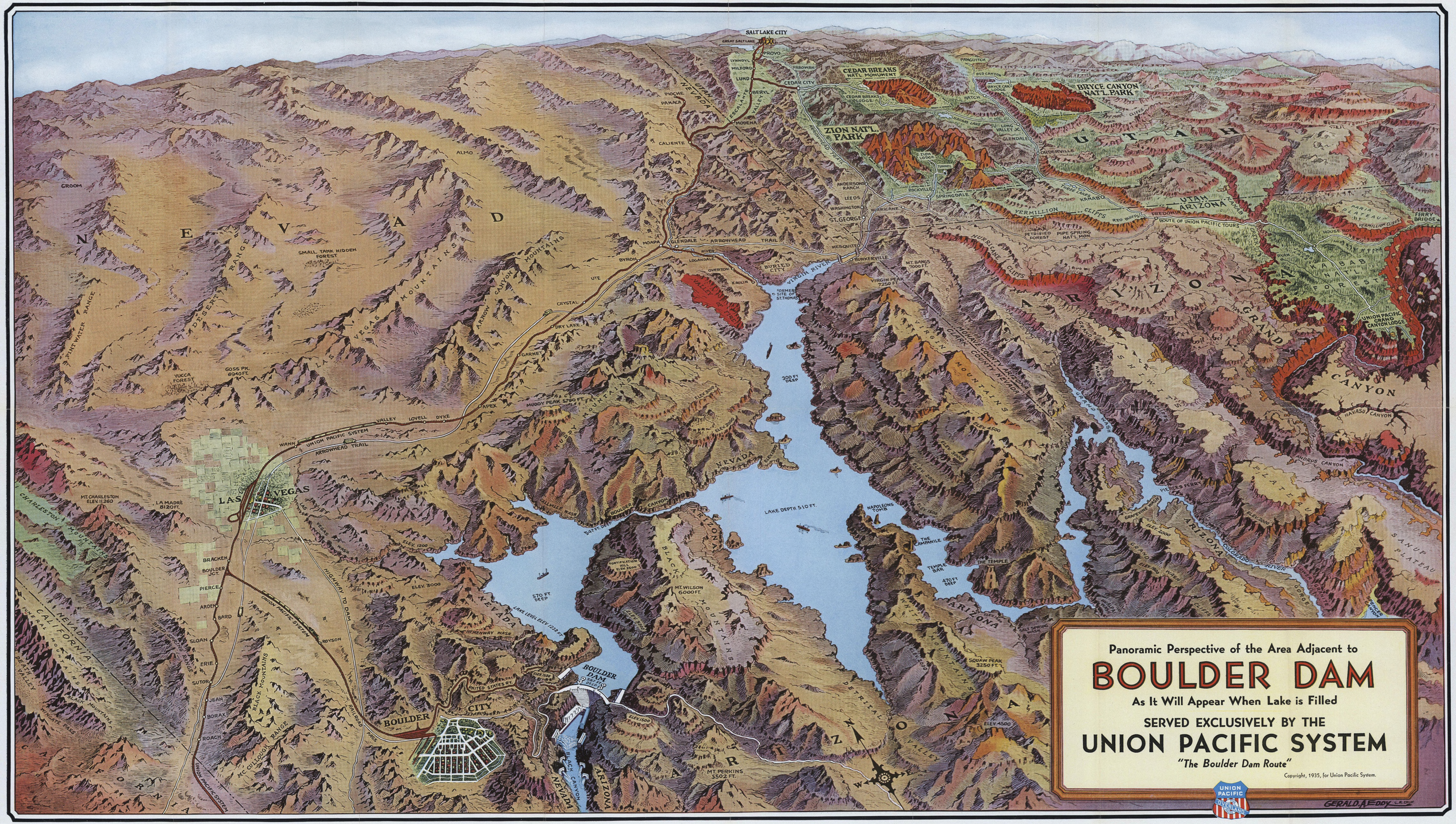
CLIMATE

While the climate of Southern Nevada is semi-tropical, it experiences a temperature range of 100 degrees. The hottest months are usually delightful summer months, with the temperature varying from 20 degrees to 120 degrees. The hottest, winter and spring months are usually delightful summer months, with the temperature varying from 20 degrees to 120 degrees. The hottest, winter and spring months are usually delightful summer months, with the temperature during daytime ranging as high as


Panoramic Perspective of the Area Adjacent to
BOULDER DAM
As It Will Appear When Lake is Filled
SERVED EXCLUSIVELY BY THE
UNION PACIFIC SYSTEM
"The Boulder Dam Route"
Copyright, 1935, for Union Pacific System.
GERALD A. EDDY
SALT LAKE CITY
GREAT SALT LAKE
PROVO
LYNDYL
MILFORD
LUND
CEDAR CITY
PAROWAN
BERYL
MODENA
PIOCHE
PANACA
CALIENTE
ALMO
GROOM
NEVADA
UTAH
CEDAR BREAKS NAT'L. MONUMENT
CEDAR BREAKS LODGE
BRYCE CANYON NAT'L. PARK
BRYCE CAN. LODGE
PANGUITCH
HATCH
ZION NAT'L. PARK
ZION LODGE
TUNNEL
ORDERVILLE
GLENDALE
LONG VALLEY JC.
ANDERSON RANCH
LEEDS
WASHINGTON
ST. GEORGE
HURRICANE
RIVERSIDE
ROCKVILLE
SPRINGDALE
KANAB
VERMILLION CLIFFS
RED BUTTE
FREDONIA
UTAH
ARIZONA
ROUTE OF UNION PACIFIC TOURS
PETRIFIED FOREST
PIPE SPRING NAT'L. MON.
LEES FERRY BRIDGE
KAIBAB NAT'L. FOREST
HOUSE ROCK
VERMILLION CLIFFS
UNION PACIFIC GRAND CANYON LODGE
GRAND CANYON
HAVASU CANYON
MADBUS CANYON
PIERCE FERRY
COLORADO RIVER
SANUP PLATEAU
MOAPA
GLENDALE
ARROWHEAD TRAIL
BYRON
LOGANDALE
OVERTON
KAOLIN
BURIED CITY
VIRGIN RIVER
MESQUITE
BUNKERVILLE
MT. BANKS 7000 FT.
VIRGIN PEAK 7250 FT.
FORMER SITE OF ST. THOMAS
300 FT. DEEP
HURRICANE CLIFFS
VIRGIN MOUNTAINS
CLARK COUNTY, NEVADA
MOHAVE COUNTY, ARIZONA
ARIZONA
UTE
CRYSTAL
DRY LAKE
GARNET
APEX
MUDDY PEAK 5700 FT.
VALLEY
LOVELL
DYKE
WANN
UNION PACIFIC SYSTEM
ARROWHEAD TRAIL
LAS VEGAS
LAS VEGAS MOUNTAINS
ARROW CANYON MOUNTAINS
DESERT RANGE
SMALL TANK HIDDEN FOREST
PINT WATER RANGE
YUCCA FOREST
GOSS PK. 6940 FT.
MT. CHARLESTON ELEV. 11,260
LA MADRE 8120 FT.
CHARLESTON MOUNTAINS
BRACKEN
BOULDER JCT.
PIERCE
ARDEN
BARD
SLOAN
ERIE
SUTOR
JEAN
BORAX
ROACH
ROYSON
BLACK MOUNTAINS
MC CULLOUGH RANGE
HIGHWAY TO DAM
UNION PACIFIC SYSTEM
RAILROAD
BOULDER CITY
UNITED STATES RY.
HENDERSON
ELEV. 3000
ELEV. 1200
LAKE LEVEL ELEV. 1229 FT.
570 FT. DEEP
BOULDER DAM
1,282 FT. DEEP
BLACK CANYON
NEVADA
ARIZONA
CALIFORNIA
DEATH VALLEY
TONOPAH
BOULDER CANYON
LAKE DEPTH 510 FT.
NAPOLEONS TOMB
THE CAMPANILE
TEMPLE BAR
THE TEMPLE
470 FT. DEEP
FORTIFICATION HILL ELEV. 2500
MT. WILSON 6000 FT.
BLACK MOUNTAINS
DETRITAL VALLEY
SQUAW PEAK 3250 FT.
ELEV. 4500
MT. PERKINS 5502 FT.
ELEV. 1500
GRAPEVINE WASH
COLORADO RIVER
UNION PACIFIC
BOULDER DAM
UNION PACIFIC SYSTEM
"The Boulder Dam Route"