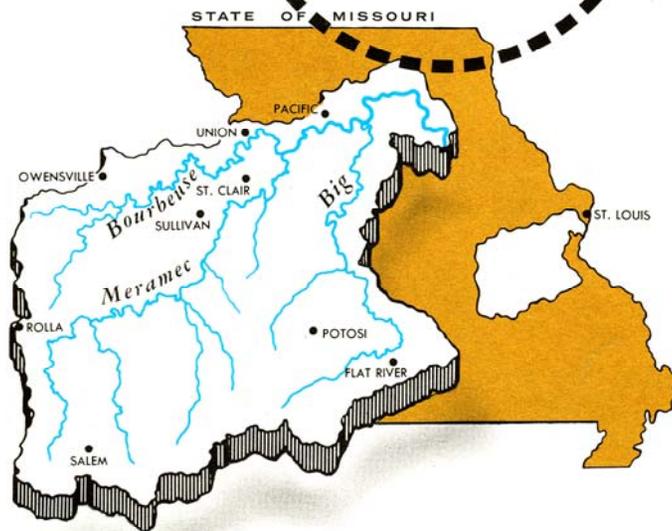




to the people interested in . . .

THE MERAMEC RIVER BASIN



AN INFORMATION BULLETIN

PREPARED BY THE U. S. ARMY ENGINEER DISTRICT
ST. LOUIS, MISSOURI

SEPTEMBER 1962

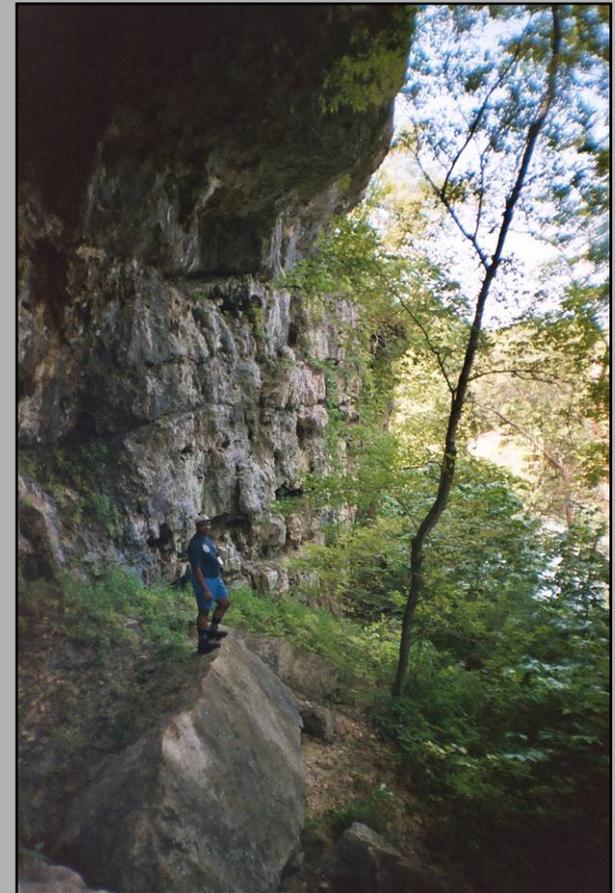
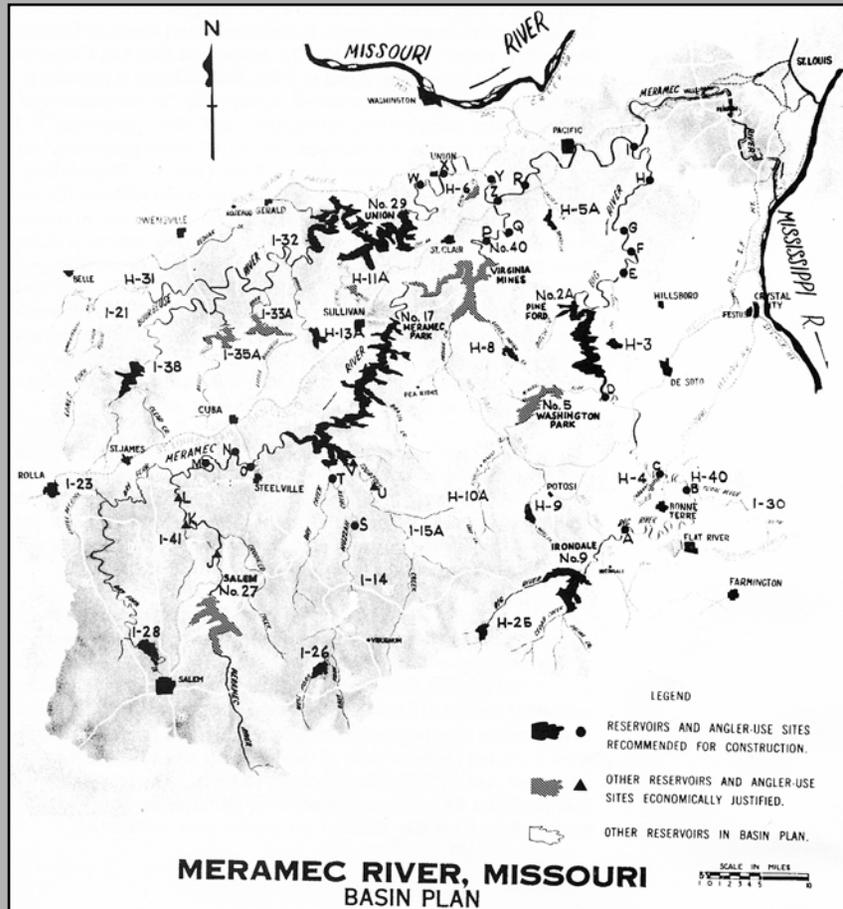
The Meramec Basin Project – A Look Back

AEG September 22, 2005 – Las Vegas, NV

Conor Watkins, Greg Hempen, & J. David Rogers

Inside photos of Moore's Cave courtesy of Jim Vandike, Missouri

DNR-GSRD



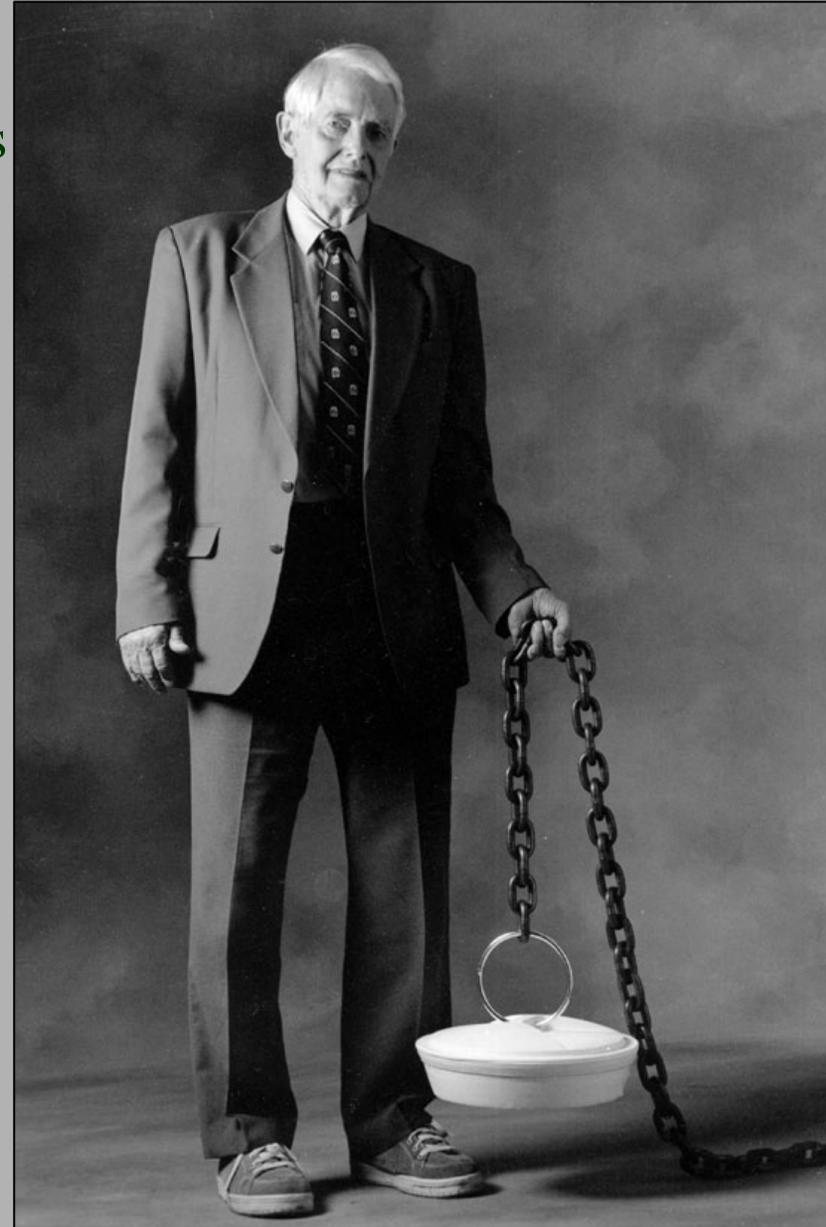
- With maybe the exception of genetic engineering and nuclear weapons, dams are one of the more controversial engineered projects produced by society.
- No large government projects had ever been questioned to a large degree before the 1960's but that was changing amid an era of protests. Before this time, large projects were looked at as a form of progress that would provide a source of jobs, electrical power, water, etc.
- Multiple large dams during the 1960's-70's were cancelled around the country due to protests. The catastrophic failure of the Teton Dam in 1976 shifted public opinion largely against dams, ending the era of building large dams in the U.S.
- Two dams, one being the Meramec Dam, were actually stopped once construction had started.

Echo Park Dam

- Echo Park Dam was proposed by the USBR in the early 1950's near the junction of the Yampa and Green Rivers in Colorado within the Dinosaur National Monument.
- Environmentalists headed by David Brower of the Sierra Club fought the project and accepted enlarging the proposed Glen Canyon Dam downstream on the Colorado River to hold additional water as a compromise.



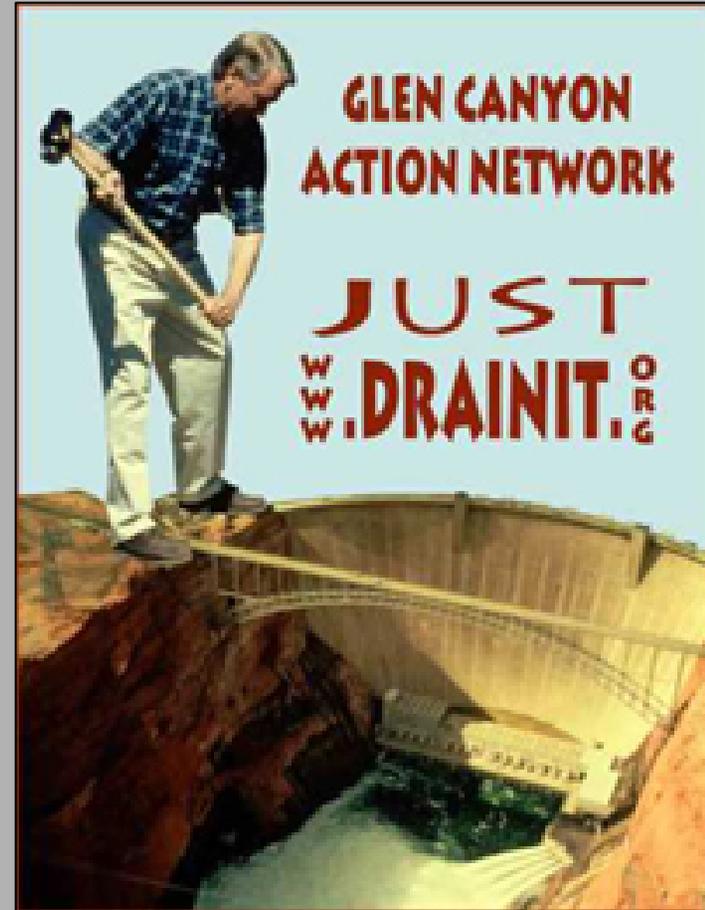
**Echo
Park
Dam
Site**



David Brower

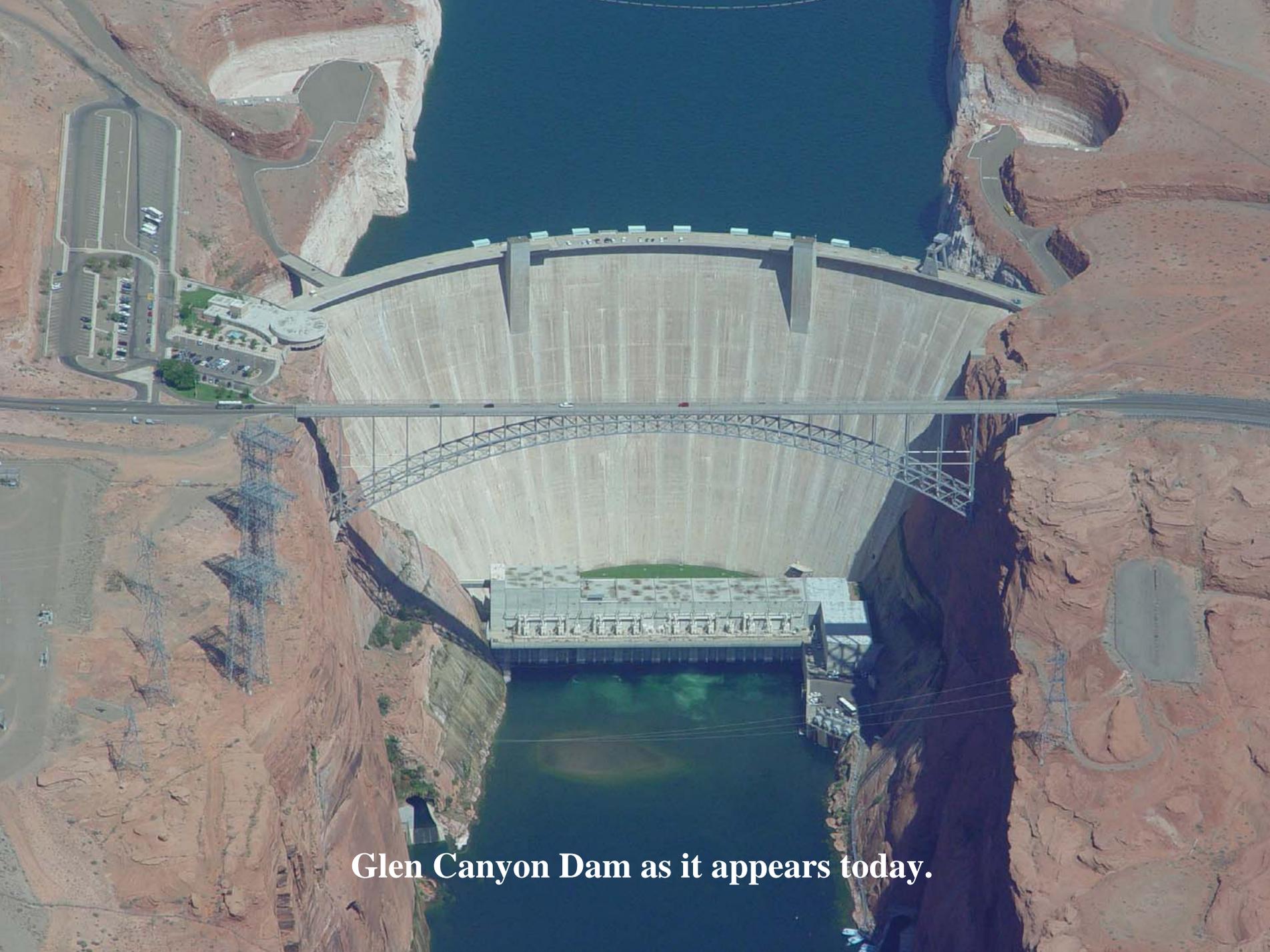
Glen Canyon Dam

- Many in the Sierra Club had never seen Glen Canyon and didn't realize this area was just as scenic as Dinosaur National Monument.
- Once the beauty of Glen Canyon was realized, a fight began, but after final approval of the dam. Opponents of the Glen Canyon Dam continue to fight for its decommissioning.
- The Echo Park and Glen Canyon Dam fights represent the beginning of the modern environmentalist movement.



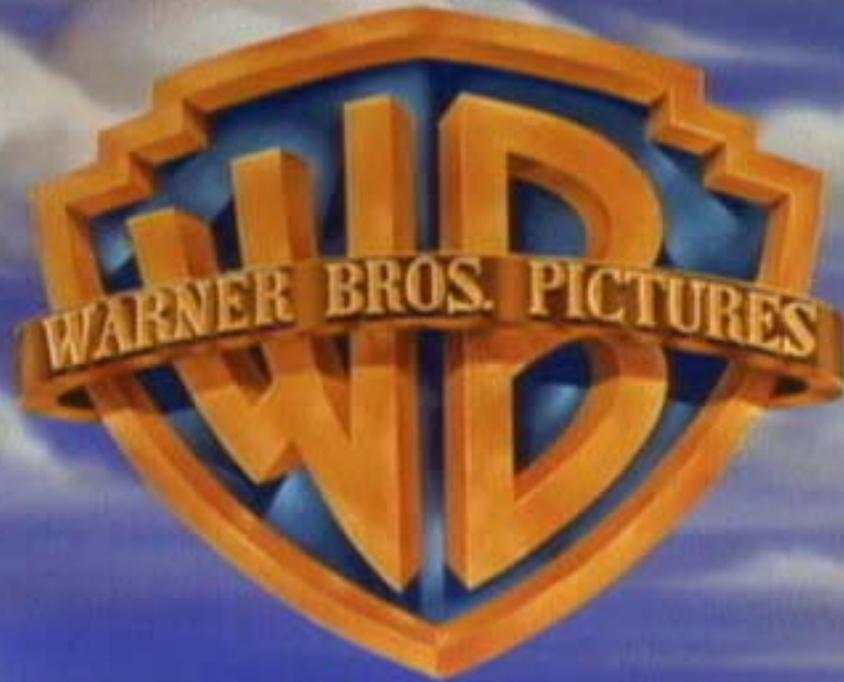


Scenic Rainbow Bridge is in an area influenced by Glen Canyon Dam



Glen Canyon Dam as it appears today.





A TIME WARNER ENTERTAINMENT COMPANY

The pros and cons of dams are argued in the opening scene of the 1972 movie “Deliverance.” (Please click anywhere on Warner Bros. image to play clip.)

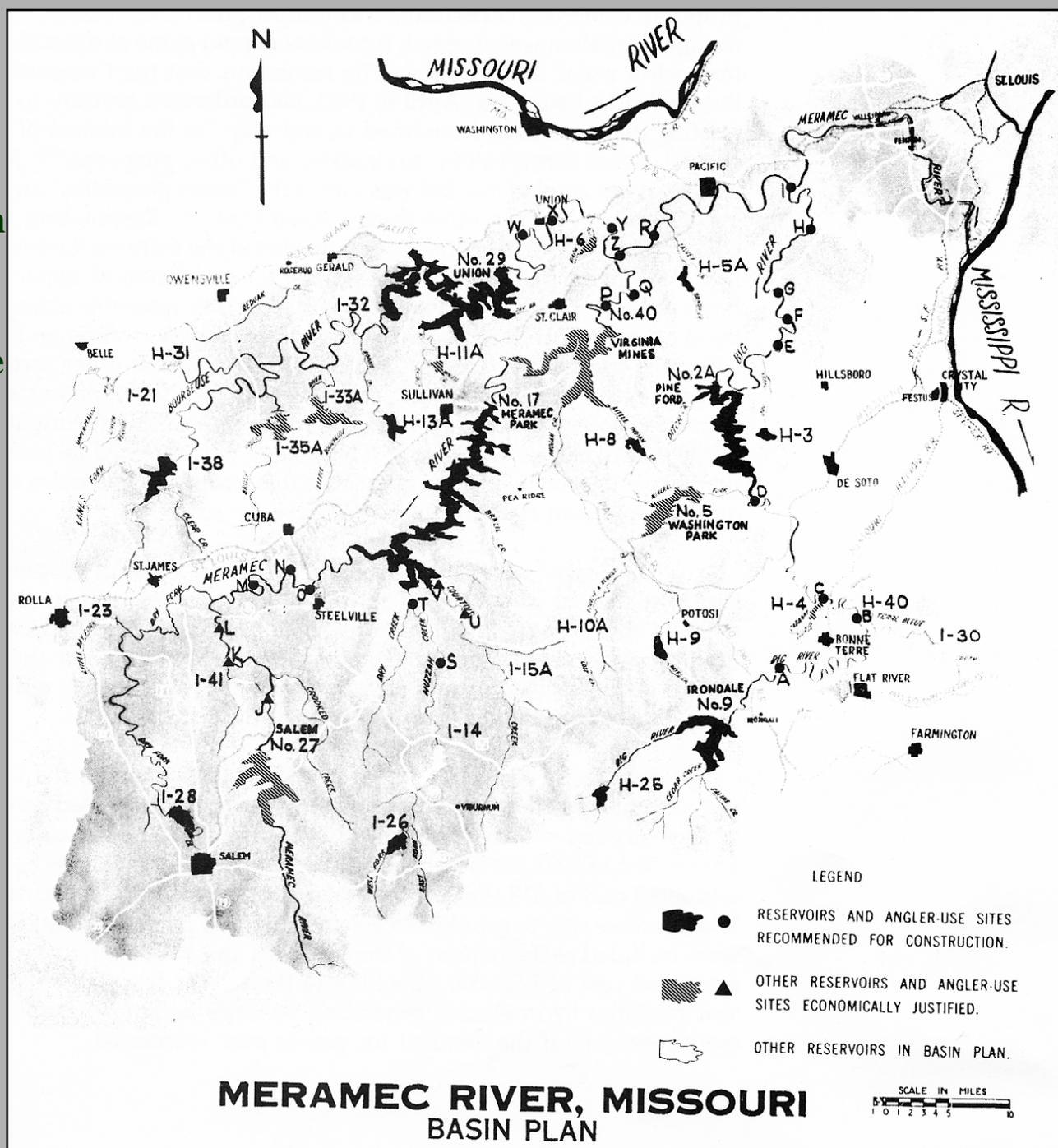
The Meramec River

- **Flows ~220 miles from its source near Salem, MO to the Mississippi just south of St. Louis**
- **Has two forks in its upstream reaches**
- **The (Wet Fork of The) Upper Meramec drains about 343 square miles**
- **The Dry Fork (of The Upper Meramec) drains about 383 square miles of similar terrain with similar precipitation and climate yet holds very little water**
- **The Dry Fork is a losing stream and most of its water flows into caves except during heavy rainfall events when this natural drain is overwhelmed - This water reappears at Maramec Spring where it more than doubles the flow of the river**



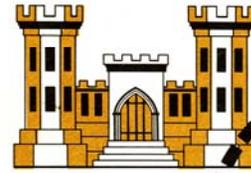
- **The Big River, Bourbeuse River, and Huzzah Creeks are three other significant tributaries of the Meramec River. The Courtois Creek joins the Huzzah near its confluence with the Meramec. All these streams were to be affected by the main Meramec Dam or others in the Meramec Basin Plan.**

Dams were suggested on the Meramec as long ago as the 1830's to help the Meramec Iron works near St. James ship its product to market in St. Louis. Two disastrous floods on the Mississippi in 1927 and 1937 prompted the Corps of Engineers to authorize several large dams in the Mississippi watershed. Although suspect, estimates from the time suggested that the Ozarks provided over 38% of the floodwaters while making up only 4% of the watershed.



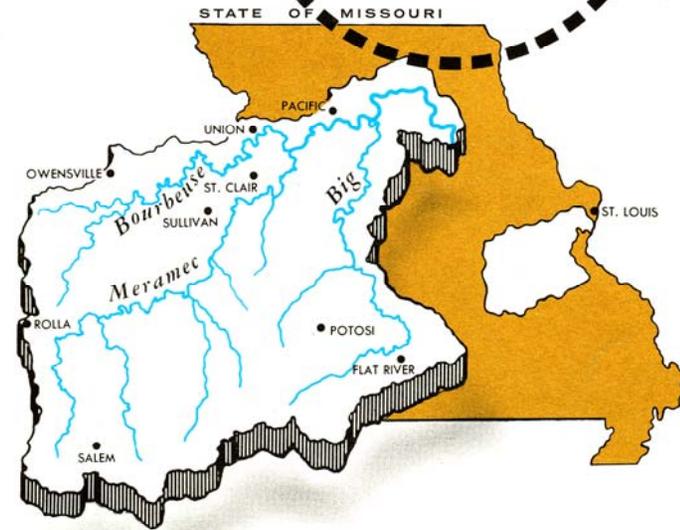
Proposals to dam the Meramec came and went during the years but remained stagnant until the late 1950's when the Meramec Basin Association was formed. This organization of business owners and local leaders lobbied the U.S. Army Corps of Engineers to construct dams within the Meramec Basin. Their efforts resulted in congressional approval of funding to buy private land and continue planning in 1966 although some plans were laid out well before this time.

The project as proposed in 1965 included 31 reservoirs, many of these small, in the Meramec Basin and was to be constructed by the U.S. Army Corps of Engineers St. Louis District.



to the people interested in . . .

THE MERAMEC RIVER BASIN

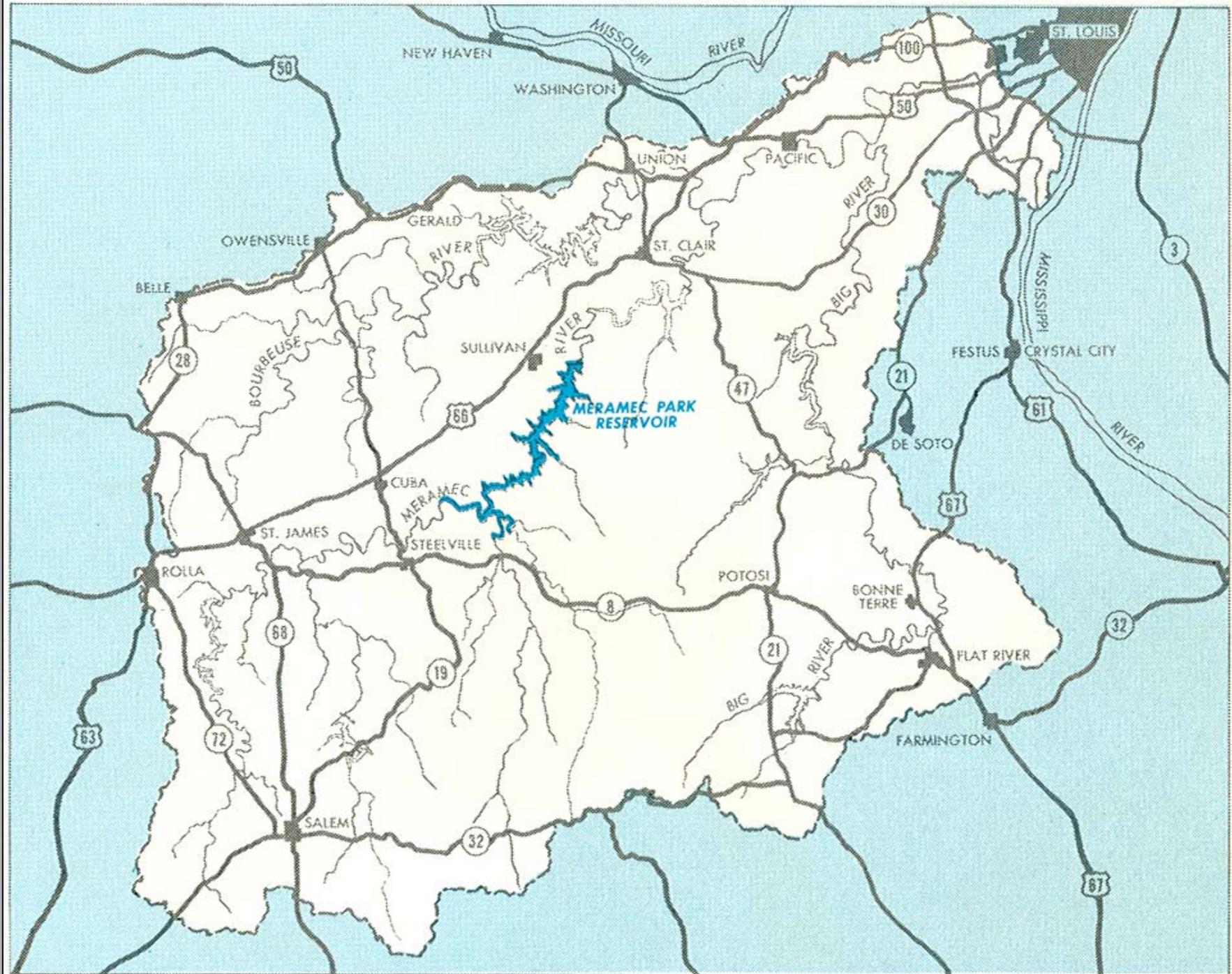


AN INFORMATION BULLETIN

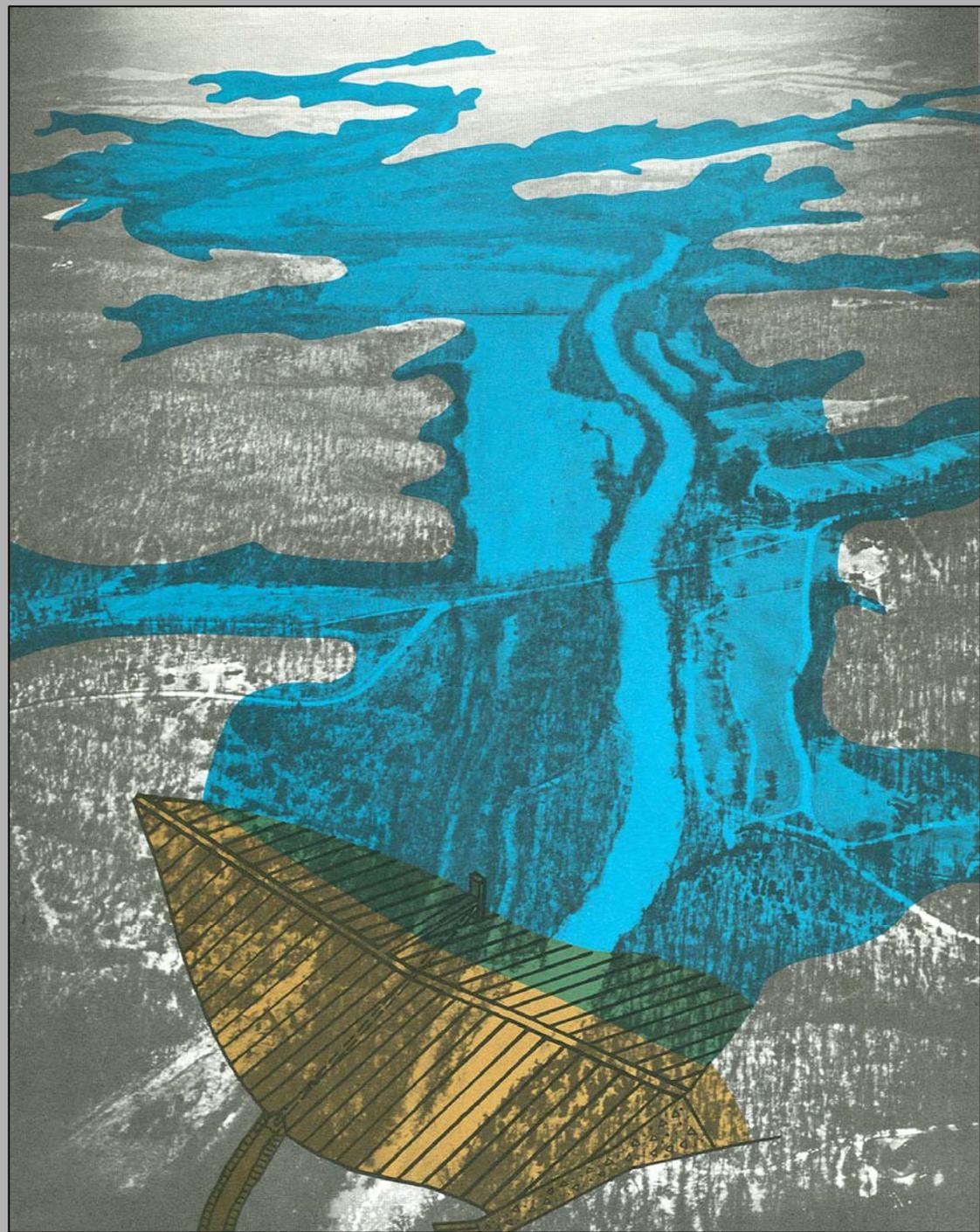
PREPARED BY THE U. S. ARMY ENGINEER DISTRICT
ST. LOUIS, MISSOURI

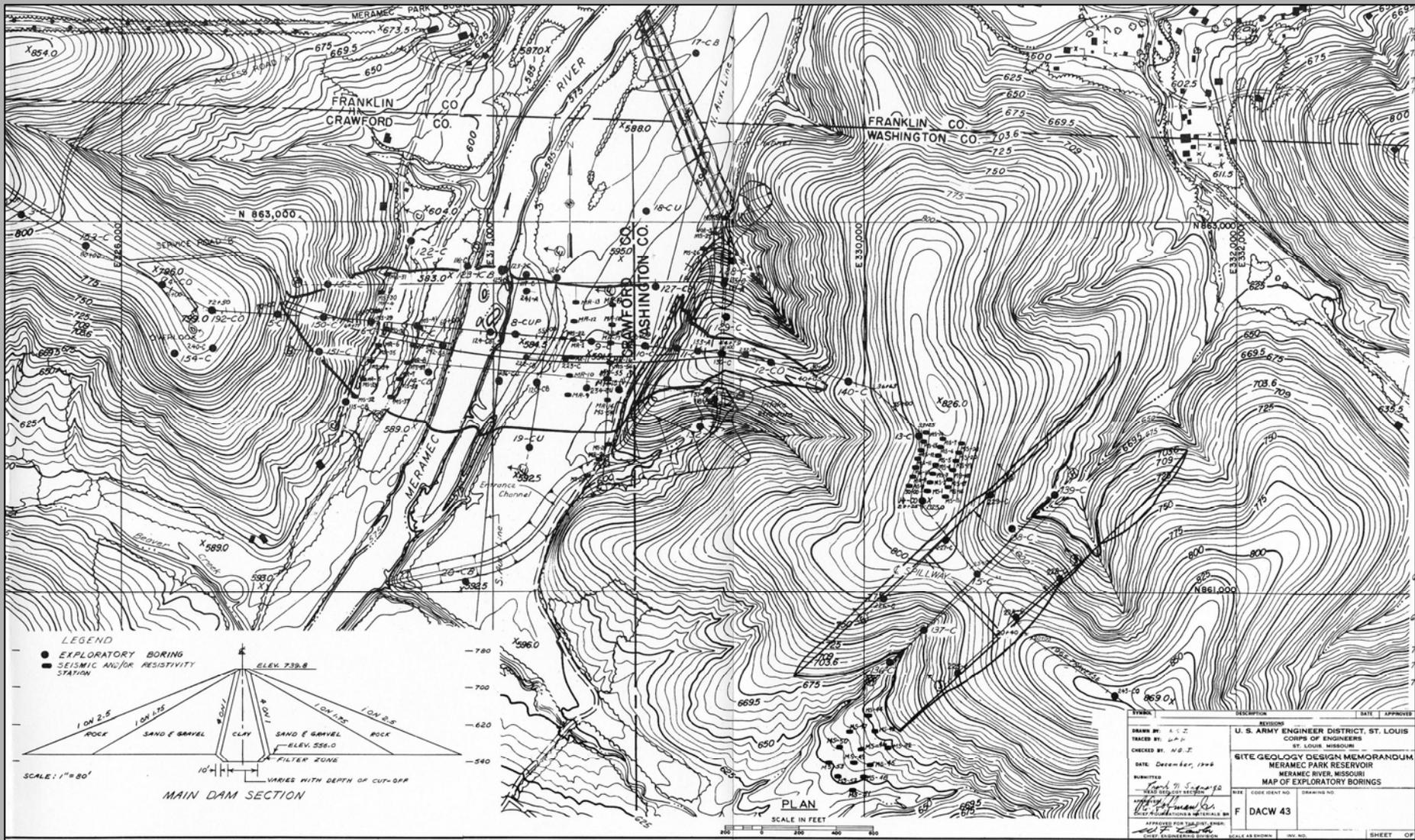
SEPTEMBER 1962

- In the 1960's dams were proposed with the rationale that they would improve water quality by capturing suspended sediments, control flooding, aid in navigation, and provide recreational waters. Navigation would not have been helped on the Meramec River, but would have been enhanced on the Mississippi River due to a more consistent flow from the Meramec.
- The project became included in the Flood Control/Pick-Sloan Act of 1944 when it was approved in 1965. This also called for the generation of some hydroelectric power.
- The first and largest dam (Meramec Dam) was to be constructed just upstream from the 1965 boundaries of Meramec State Park.
- It was to be a zoned earthfill embankment dam used for flood control and recreation purposes.
- The spillway was to be excavated across an adjacent topographic saddle.
- Meramec Dam, was to impound 42 miles of the Meramec River, 9 miles of the Courtois Creek, and 12 miles of the Huzzah Creek to form Meramec Park Lake.
- The lake was to be approximately 24,000 acres. For comparison, Lake of The Ozarks is around 59,520 acres.



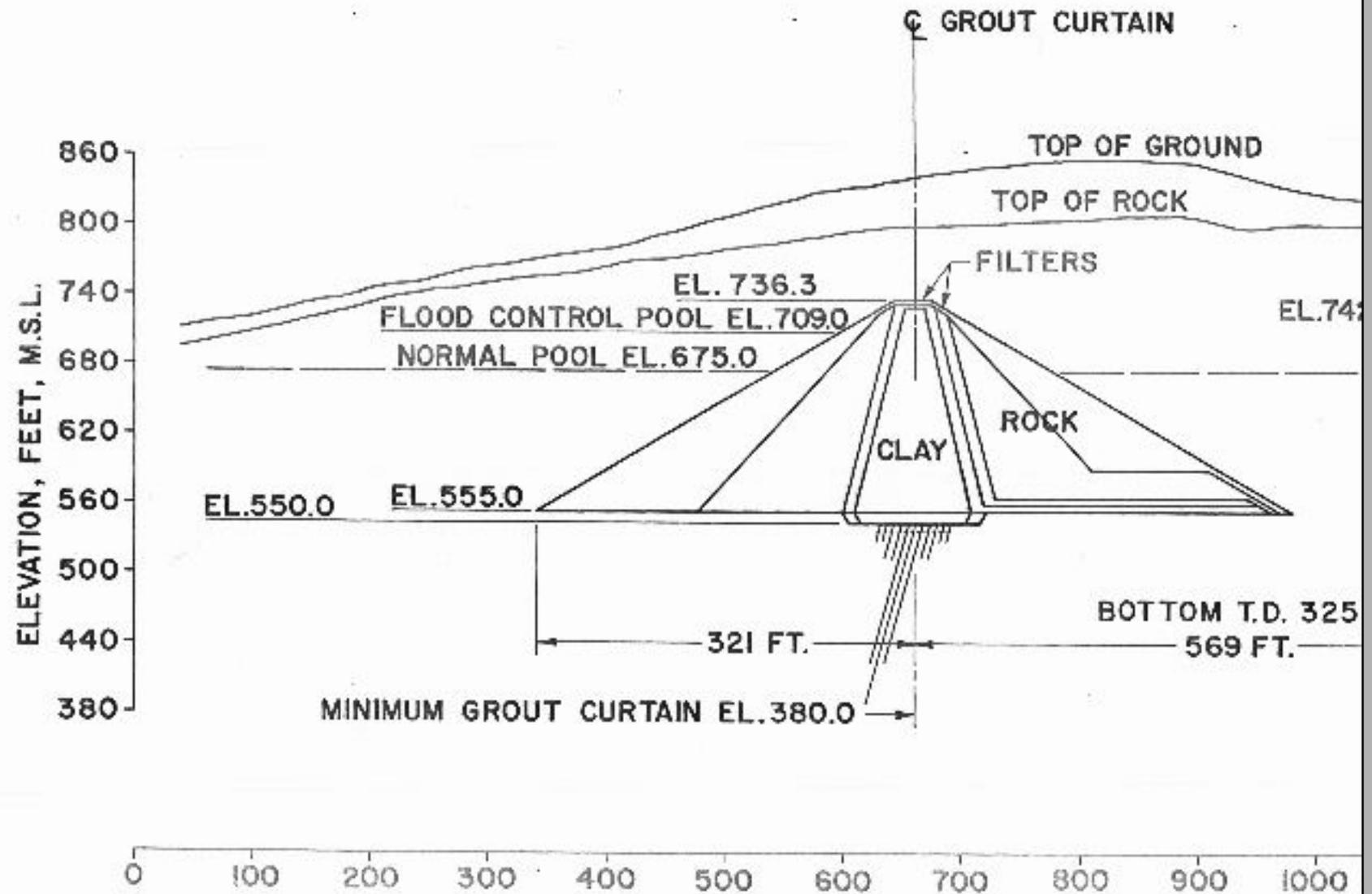
Oblique view including one proposed plan for the main Meramec Dam (Meramec Park Lake) near the town of Sullivan, MO in 1965. The final plans for the dam moved it slightly upstream of the Hwy 185 bridge shown near the center of the picture.





Plan view of the Meramec Dam and adjacent saddle spillway

MERAMEC DAM



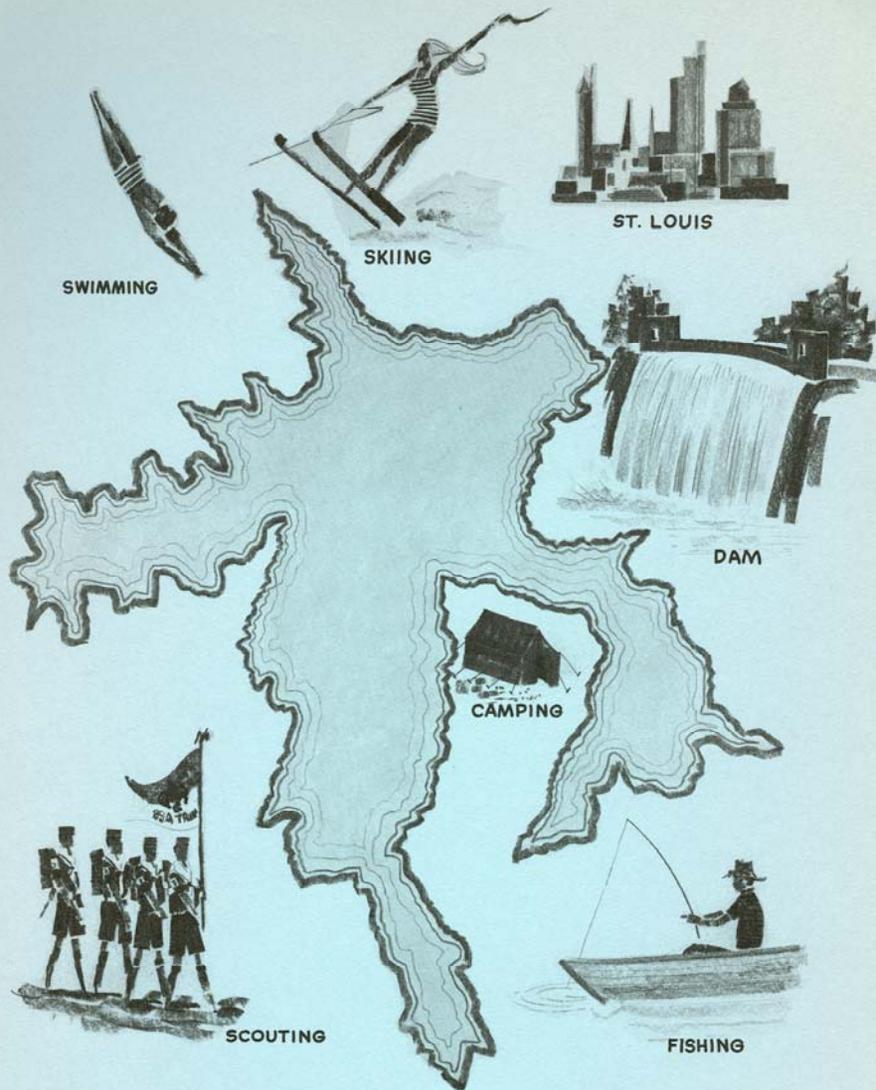
Simplified cross section of the proposed dam



Truman Dam is an earth embankment dam similar to the proposed Meramec Dam.

The Controversy Starts

- The project was sold to those living in the St. Louis Metro area as a huge recreation area.
- Those seeking flat water recreation and potential tourism dollars were highly in favor of the dam. The city of Sullivan, MO and surrounding area sees a huge economic benefit from the project and some begin constructing businesses near the future lakeshore.
- The original damsite was to be located at a geologically stable site near St. Clair but was moved upstream to the site near Sullivan after lobbying by the Sullivan Chamber of Commerce even though this site was riddled with caves.
- Environmentalists, landowners, and those wanting to preserve the culture of the area opposed the dam. Other agencies fought the USACE over the environmental impact statement.
- Propaganda arose from both sides.
- This eventually became a highly politicized project. Emotions ran high and death threats were exchanged.
- Marlin Perkins of Mutual of Omaha's "Wild Kingdom" and the St. Louis Zoo came out against the project 30 days before the vote. He was well respected nationally and a local icon in Missouri, helping to sway opinion.
- Those living in the Meramec Basin today continue to feel strongly whether they were for or against the project.



**MAJOR BODIES OF WATER TO PROVIDE
THE FINEST QUALITY OF RECREATIONAL
FACILITIES *WITHIN ONE HOUR FROM ST. LOUIS!***

Economic figures generated to justify the project

A quality and comprehensive development will give the Basin and St. Louis economy a substantial increase in commerce and industry. The figures below are on the conservative side, are not final and are subject to adjustment. However, the totals appear to be quite reasonably attainable, and are based on careful assessment of the facts gathered by the research project staff.

MERCHANDISING

DEPARTMENT STORES, new annual sales..\$5,000,000 to \$10,000,000
GROCERY STORES, new annual sales.....\$15,000,000 to \$20,000,000
HARDWARE STORES, new annual sales....\$2,000,000 to \$3,000,000
MARINE SUPPLY STORES (Following the initial peak when the lake is opened)\$1,000,000 to \$2,000,000

PROCESSING AND MANUFACTURING

BOTTLING, new annual sales.....\$5,000,000 to \$10,000,000
FOOD PROCESSING, new annual sales....\$1,000,000 to \$5,000,000
MANUFACTURING, new annual sales.....\$5,000,000 to \$50,000,000
INDUSTRIAL RESEARCH.....Up to \$3,000,000 annually

CONSUMER SERVICES

HOTELS AND RESTAURANTS.....\$10,000,000 annually
SERVICE STATIONS.....\$5,000,000 annually
PROFESSIONAL SERVICES.....\$2,400,000
INSURANCE (All types).....(in proportion to other gains)

CONSTRUCTION (10 year period - not including water development construction)

INDUSTRY.....\$20,000,000 to \$150,000,000
(not including mining)
RESIDENTIAL.....\$10,000,000 to \$50,000,000
(10,000 houses around the new lake alone might be expected by 1981)
HIGHWAYS.....\$20,000,000 to \$50,000,000

UTILITY SERVICES (10 year medium capital investment)

TELEPHONES.....\$5,000,000 to \$20,000,000
ELECTRICITY.....\$10,000,000 to \$25,000,000
GAS.....\$4,000,000 to \$10,000,000
TRANSPORTATION.....\$5,000,000 to \$10,000,000

FINANCIAL SERVICES

BANK DEPOSITS.....\$50,000,000 to \$150,000,000 increase
SECURITY ISSUES.....\$150 to \$250 million (public & private)
SAVINGS DEPOSITS.....\$50 to \$75 million increase
REAL ESTATE SALES.....\$150 to \$200 million

The MEREMAC RIVER

M is for the Men who love to float her

E is for the Ease with which she flows

R is for the Riffles small mouths play in

E is for the Evenings spent on shore

M is for the Many Bluffs to look at

A is for the Air so fresh and pure

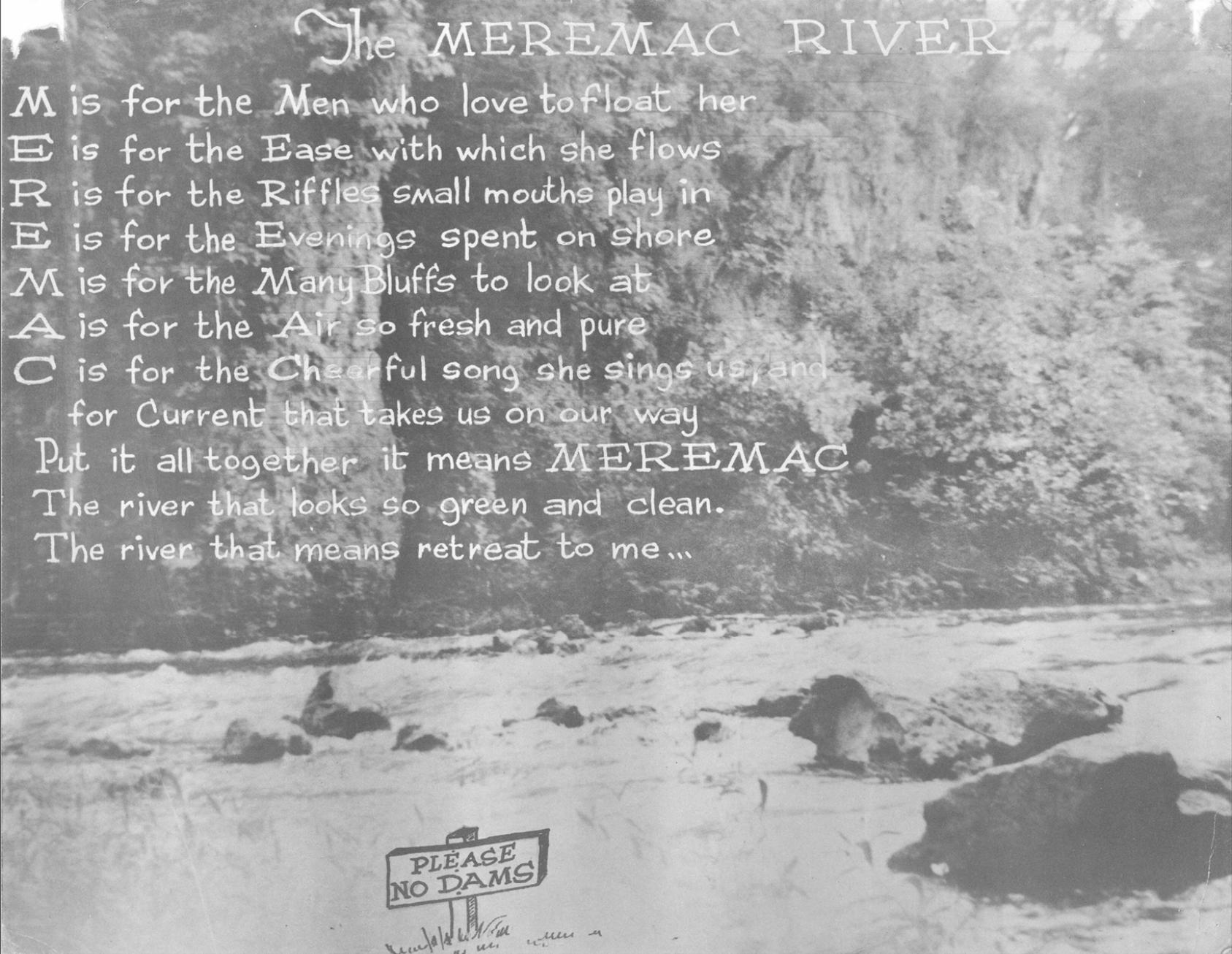
C is for the Cheerful song she sings us, and

for Current that takes us on our way

Put it all together it means MEREMAC

The river that looks so green and clean.

The river that means retreat to me...

A black and white photograph of a river with a sign that says "PLEASE NO DAMS". The river is in the foreground, with large rocks scattered throughout. The background shows a steep, rocky bank. The sign is a rectangular board on a post, with the words "PLEASE" and "NO DAMS" written in capital letters. There is some faint, illegible handwriting below the sign.

PLEASE
NO DAMS

Some anti-dam literature Note phonetic spelling “Meremac”

Cavers Were Against The Dam

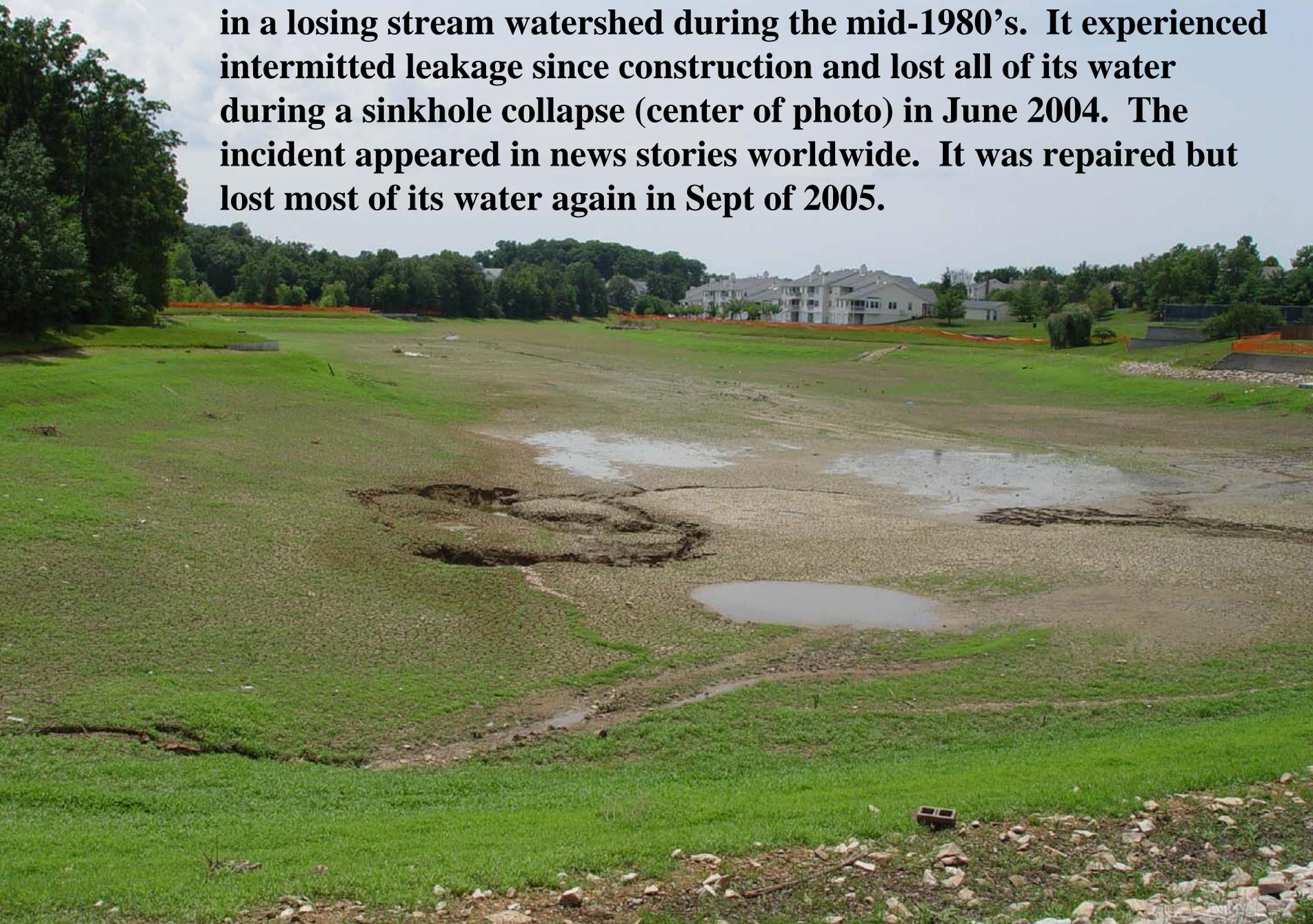
- Meramec State Park is home to over 44 caves and 100 or more total caves were to be flooded by the dam. Some of these caves are home to Indiana and gray bats, two highly endangered species. The revised EIS stated that the construction of the dam would have likely have harmed bat populations although they would likely be extinct in 15-20 years anyways. NOTE: They are still living today.
- A 1977 Myotine Bat Study recommended against construction due to loss of bat habitat.
- There is a major concern about the geology of the damsite as caves and dams do not mix.
- The Corps of Engineers did a poor job of explaining geologic concerns to the public and had a differing definition as to what was a considered a cave.

Geology

- Most of the reservoirs in the Meramec Basin Plan were sited in areas of karstic geologic conditions. Siting was more influenced by politics.



Lake Chesterfield, a subdivision lake near St. Louis, was also sited in a losing stream watershed during the mid-1980's. It experienced intermitted leakage since construction and lost all of its water during a sinkhole collapse (center of photo) in June 2004. The incident appeared in news stories worldwide. It was repaired but lost most of its water again in Sept of 2005.



Lake Chesterfield is again empty as of Sept 2005



Construction Started In The 1970's And Ran Over Budget

- The initial completion cost was estimated to be \$38 million in 1966 but had risen to \$124 million by 1977 (not adjusted for inflation).
- These overruns were caused both by surprises encountered during geotechnical investigations and delaying tactics/legal battles with anti-dam activists.
- Other governmental agencies such as the Missouri Department of Conservation fight the USACE over their environmental impact statement. The Endangered Species Act had just been passed at this time.



Excavations preparing dam abutments as they appeared in Feb 1977

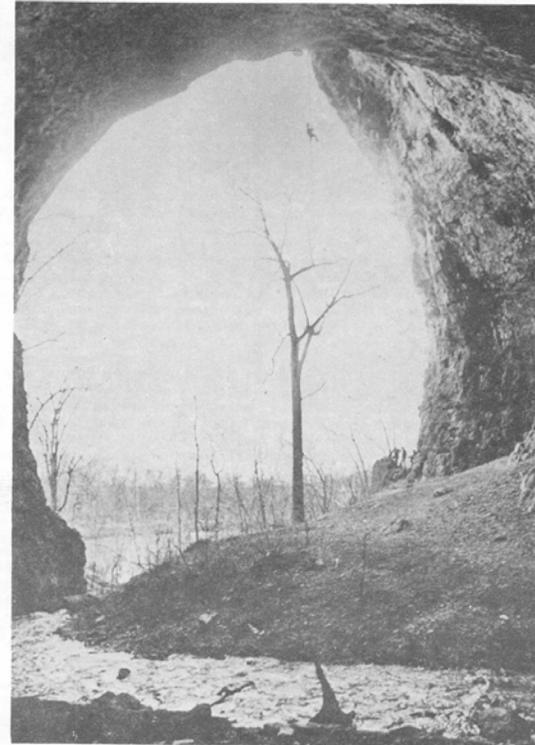


Excavations preparing dam abutments as they appeared in Feb 1977

Lester Dill, the owner of Onondaga, Cathedral, and Meramec Caverns was set to lose most of Onondaga and Cathedral caves to the lake. He hires a geology student by the name of Don Rimbach to fight the dam. This book compares the geologic setting at Teton with that at Meramec. The book makes some questionable claims such as the fact that both sites are “unbuildable” when it comes to dams but the message is heard by the public. Several caves are known to be in the abutments of the proposed Meramec Dam and explorations indicated that others may exist.

STOP MERAMEC DAM - ITS A DAMSITE WORSE THAN TETON

BY DON RIMBACH



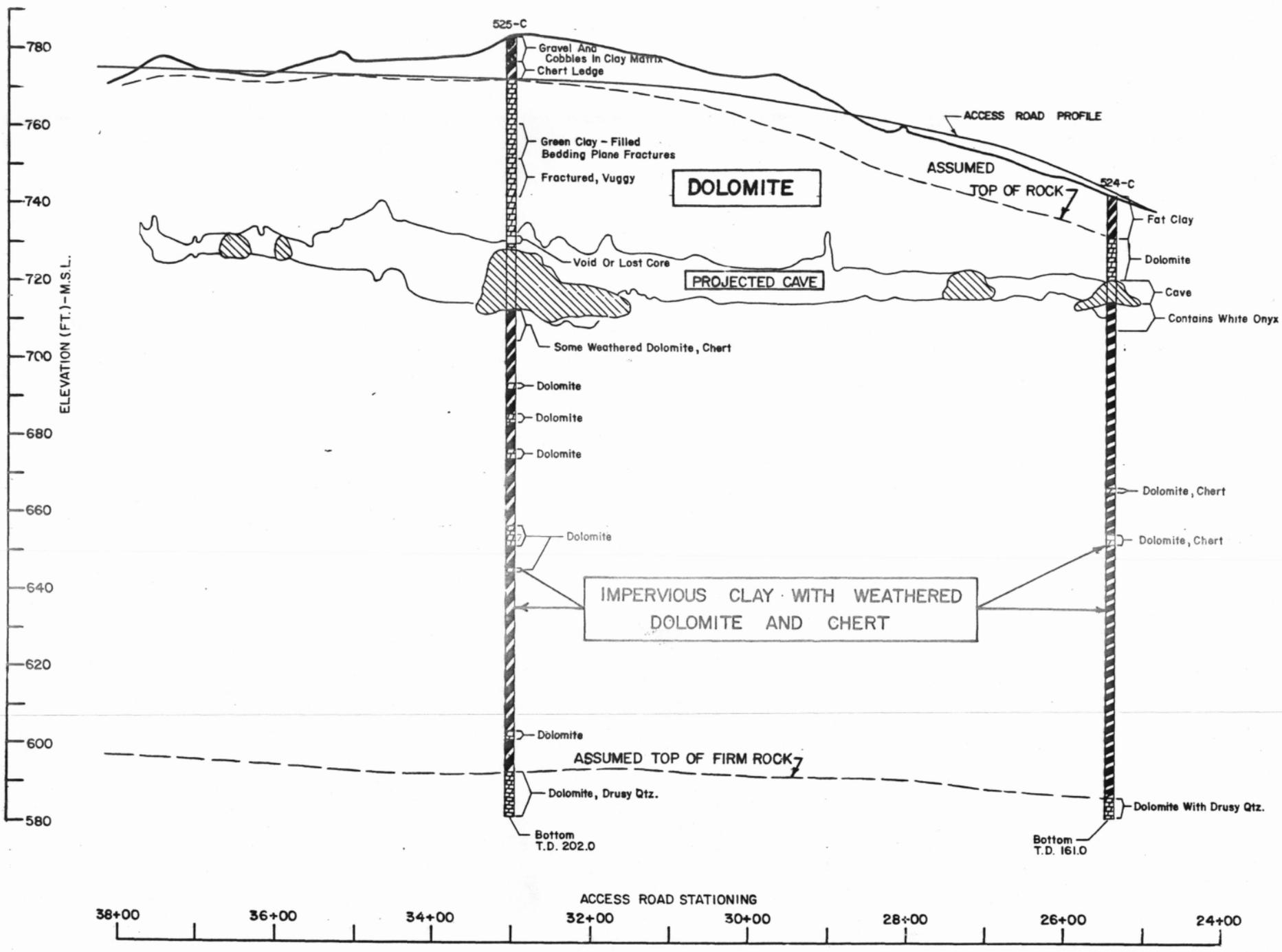
GREEN'S CAVE ENTRANCE- 93' HIGH, 110' WIDE. NOTE THE MAN RAPPELING NEAR THE CEILING, AND 3 MEN STANDING BY THE RIGHT WALL. THIS IS THE NATION'S LARGEST RIVERBANK CAVE ENTRANCE. IT WILL COMPLETELY FLOODED BY MERAMEC DAM, IF IT IS BUILT. IT IS ALSO THE THIRD LARGEST CAVE IN THE ABUTMENT RIDGES TO WHICH THE DAM WOULD CONNECT AND WITH IT WOULD HAVE TO HOLD BACK THE LAKE AT THIS, THE NATION'S MOST CAVERNIGUS DAMSITE. THE CORPS HAS NO IDEA WHERE THE UNDERGROUND RIVER IN THE FOREGROUND IS COMING FROM, THOUGH REGULATIONS REQUIRE SUCH STUDIES. GREEN'S CAVE IS THE MOST LIKELY LEAK IN THE RIGHT ABUTMENT OF THE 8 SITES WHERE THE AUTHOR PREDICTS A POSSIBLE FAILURE OF THE LAKE.

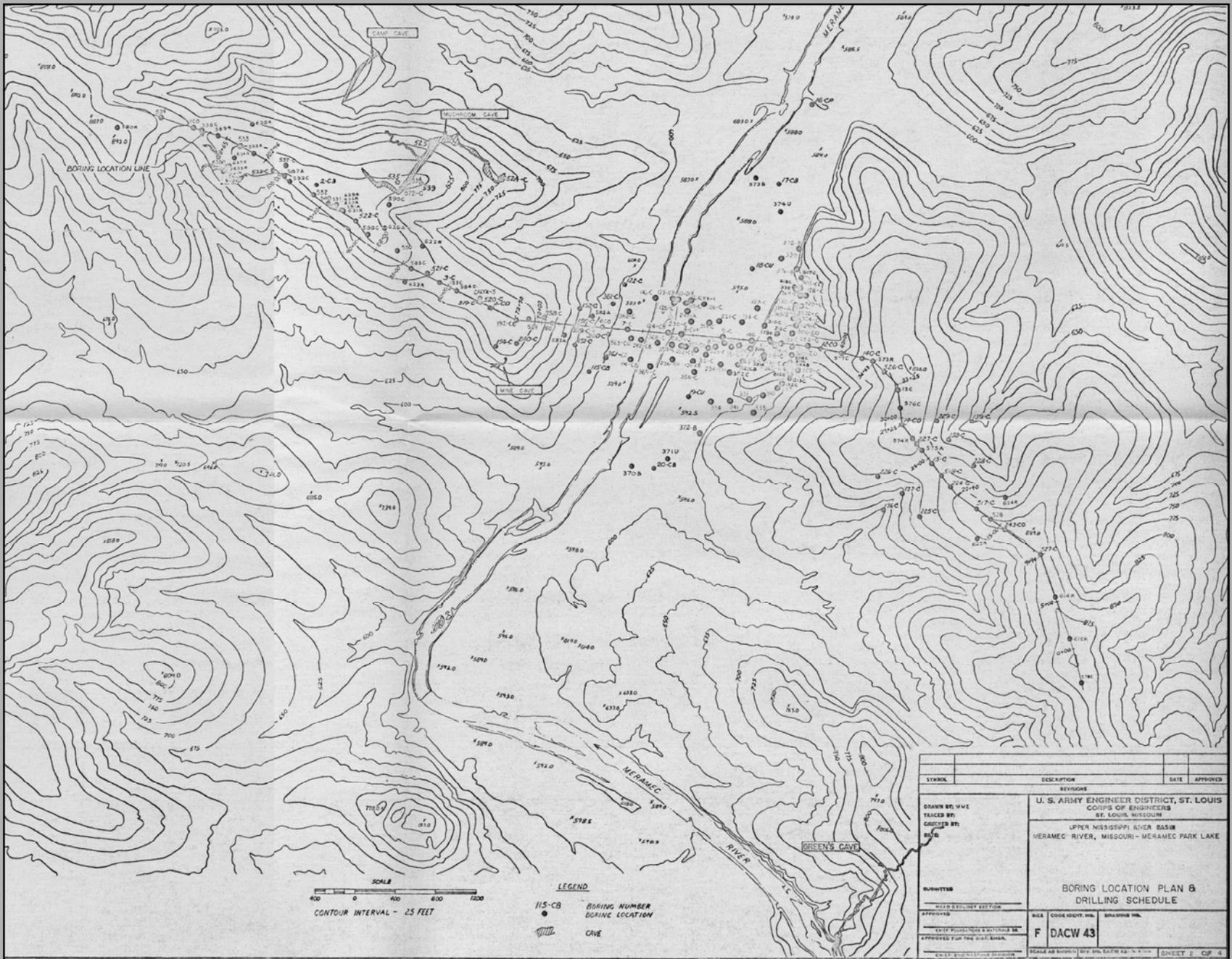


The catastrophic failure of the 350' high Teton Dam in 1976 was partly due to a poor design and construction where the abutments (sides) of the dam met the heavily fractured surrounding rock.

Two Cores Samples Are Drilled Through The Top of Mushroom Cave

- Mushroom Cave, located in present day Meramec State Park, was near the damsite and thus of interest to the engineers.
- Cores were recovered to see how much clay filling lay below the 15' air filled space.
- The cave's cross section turned out to be much larger than expected as 120 feet of clay filling was found before encountering what was assumed to be a solid bedrock floor.





| SYMBOL | DESCRIPTION | DATE | APPROVED |
|--|-------------|----------------|----------|
| BORINGS | | | |
| U. S. ARMY ENGINEER DISTRICT, ST. LOUIS CORPS OF ENGINEERS ST. LOUIS, MISSOURI | | | |
| UPPER MISSISSIPPI RIVER BASIN MERAMEC RIVER, MISSOURI-MERAMEC PARK LAKE | | | |
| BORING LOCATION PLAN & DRILLING SCHEDULE | | | |
| DRAWN BY: VME TRACED BY: CHECKED BY: | | DATE: 11/15/54 | |
| APPROVED: | | DATE: 11/15/54 | |
| BY: F DACW 43 | | DRAWING NO.: | |
| SHEET 2 OF 4 | | SHEET 2 OF 4 | |

Borings for the Meramec Dam

Moore's Cave

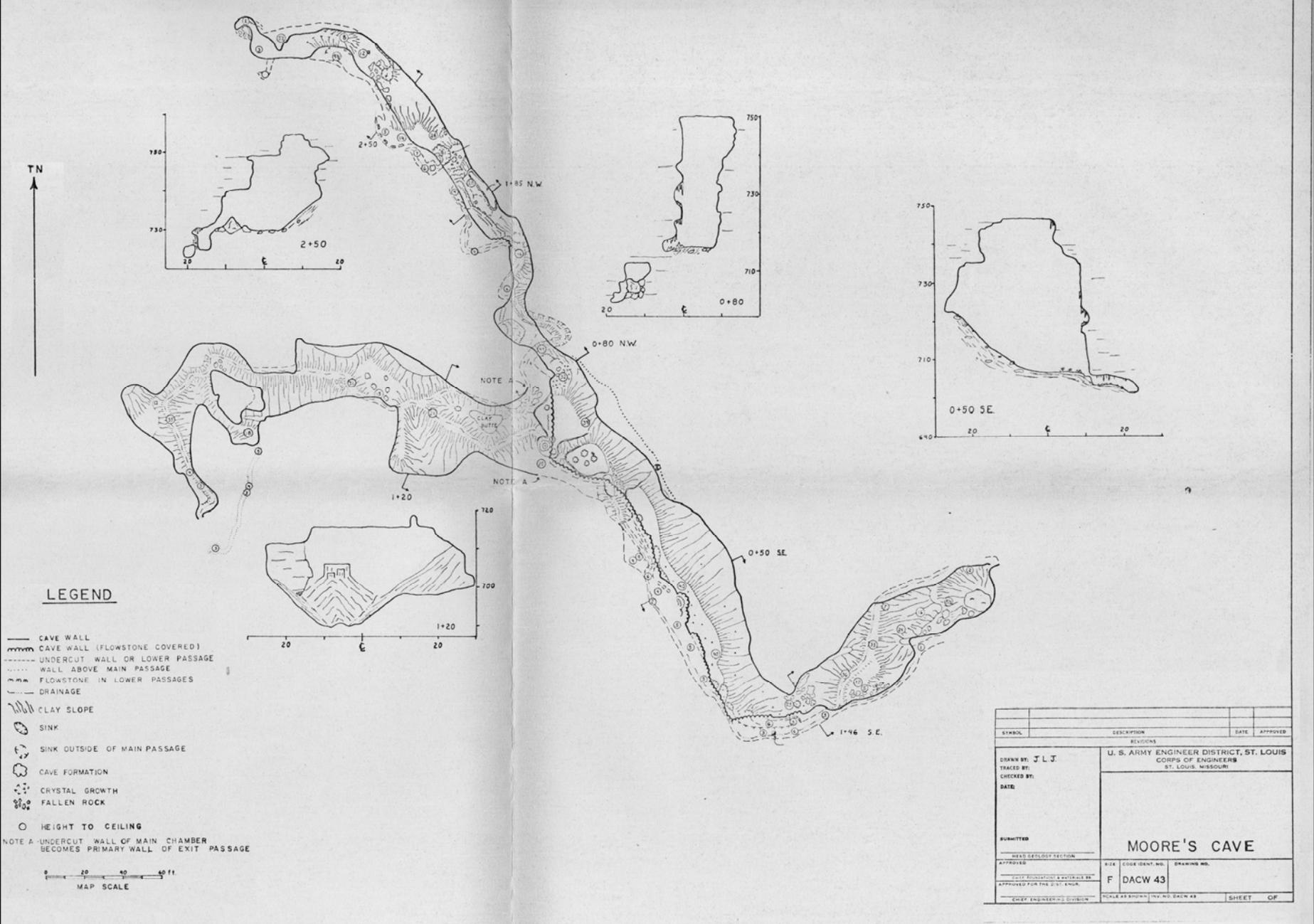
- During exploration, geophysical exploration indicated that there might be a large void under the left abutment of the dam.
- A 6" borehole was drilled in the area of interest and a void was encountered. Cameras lowered down showed that a large and previously unknown cave with no natural entrances was present.
- A calyx rig was brought in to drill a 36" diameter hole so that people could be lowered into the cave.



Moore's Cave was found to be about 30 feet tall and filled with beautiful formations. Plans called for the filling of the cave with grout, a concrete like substance, just to be safe even though it was above the high water line and thought to pose little threat to the dam.

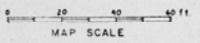


Example calyx borings on display today at Truman Dam



LEGEND

- CAVE WALL
 - CAVE WALL (FLOWSTONE COVERED)
 - - - UNDERCUT WALL OR LOWER PASSAGE
 - WALL ABOVE MAIN PASSAGE
 - ~ ~ ~ FLOWSTONE IN LOWER PASSAGES
 - DRAINAGE
 - /// CLAY SLOPE
 - SINK
 - SINK OUTSIDE OF MAIN PASSAGE
 - CAVE FORMATION
 - CRYSTAL GROWTH
 - FALLEN ROCK
 - HEIGHT TO CEILING
- NOTE A UNDERCUT WALL OF MAIN CHAMBER BECOMES PRIMARY WALL OF EXIT PASSAGE



| SYMBOL | DESCRIPTION | DATE | APPROVED |
|------------------------------|-------------|---|----------------------------|
| REVISIONS | | | |
| DRAWN BY: J. L. J. | | U. S. ARMY ENGINEER DISTRICT, ST. LOUIS | |
| TRACED BY: | | CORPS OF ENGINEERS | |
| CHECKED BY: | | ST. LOUIS, MISSOURI | |
| DATE: | | | |
| SUBMITTED | | MOORE'S CAVE | |
| HEAD GEOLOGY SECTION | | R/S | CODE DIST. NO. DRAWING NO. |
| APPROVED | | F | DACW 43 |
| APPROVED FOR THE DIST. ENGR. | | SCALE AS SHOWN (INV. NO. DACW 43) | |
| CHIEF ENGINEER-IN-CHARGE | | SHEET OF | |

Map of Moore's Cave – The cave is Y-shaped and around 900 feet long.



UMR Geological Engineering Professor Emeritus John Rockaway being lowered into Moore's Cave



Previously unseen formations inside Moore's Cave.

The newly discovered cave is named Moore's Cave. There are conflicting reports as to who the cave is named for but the Corps of Engineers District Chief in St. Louis at the time was named Bruce Moore so it is commonly believed he named the cave.



Many from St. Louis begin to canoe the Meramec to see what all the fuss is all about and people start thinking that they like the river better left alone. Residents of the St. Louis metro area appear increasingly anti-dam and Senator Tom Eagleton decides he can't support the dam without a public vote. A non-binding referendum is set for August 8, 1978 in St. Louis and 12 counties effected by the project. 64% voting say no to the project.

Those living in rural areas were originally highly against the project as they saw increased tourism as a threat to their relaxed way of life. In the end, the rural areas supported the project by about 80% as they saw the tourism as an economic benefit.

The St. Louis metro area originally heavily supported the project on the basis of increased recreational opportunities nearby but voted largely against the dam during the vote. People began canoeing the river and decided they liked it as is. Environmental concerns and the Marlin Perkins advertisement also played a large role.

The votes from the densely populated St. Louis area overwhelmed the opposing votes from the surrounding rural counties. To this day, hordes of people from St. Louis overtake the Meramec on summer weekends, a trend that began during the Meramec Basin Project controversy..

The Dam Is Decommissioned

- Although the referendum was non-binding, it forced congress to re-evaluate the project. Ronald Reagan officially signed papers decommissioning the project on Dec 29, 1981.
- Some land acquired during the project is given to the state, doubling the size of the size of Meramec State Park and adding new conservation areas nearby.
- Moore's Cave is investigated soon after the end of the project and sealed with a large metal lid after the study is complete.
- Jim Vandike and others from the Missouri DNR photograph the inside of the cave during two trips soon after the dam is decommissioned.



The only entrance to Moore's Cave is this 36" diameter shaft that was excavated by a calyx rig during construction for Meramec Dam.

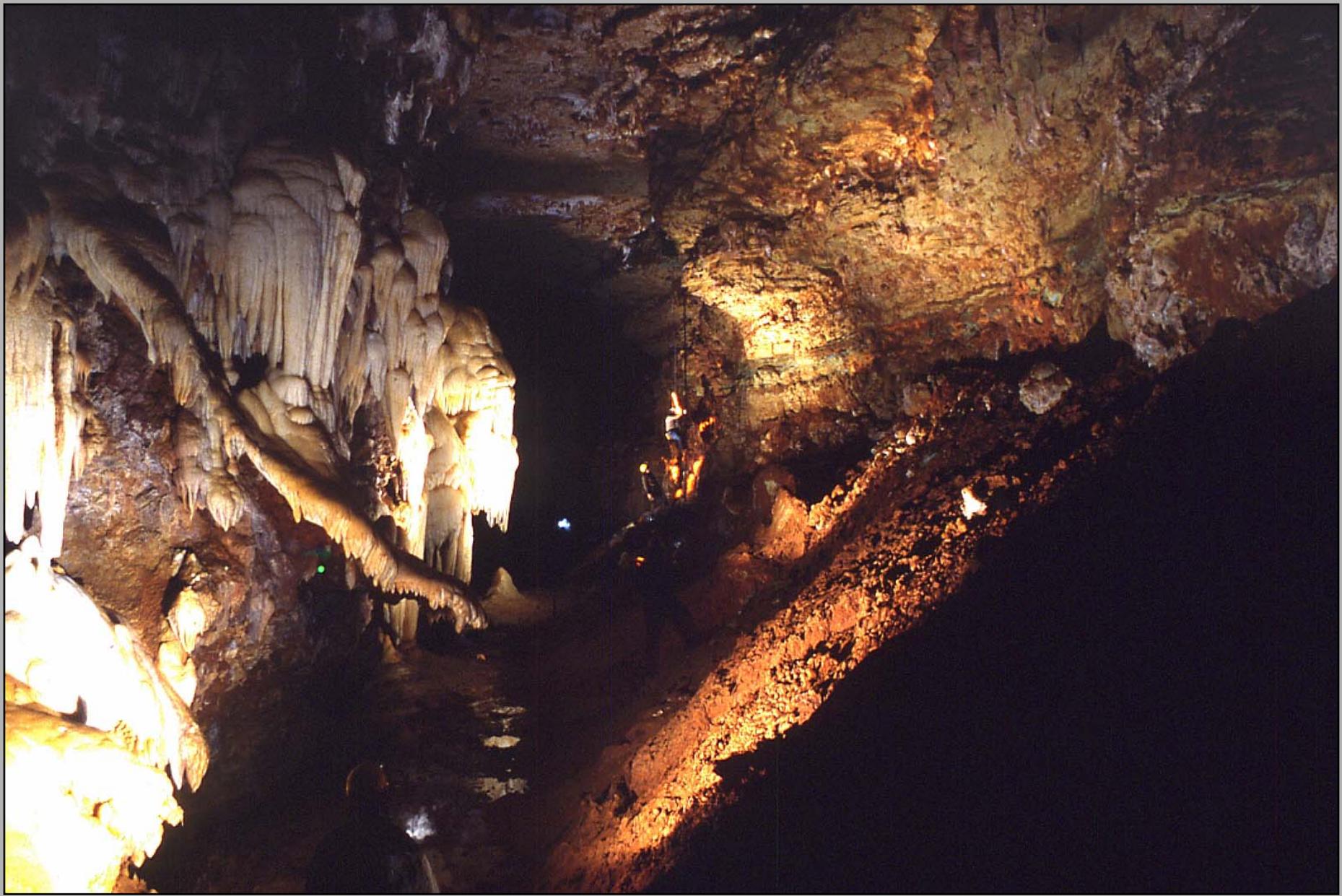


A makeshift boom truck was hired to remove the lid for the expedition into the cave.



Investigator being lowered into the cave

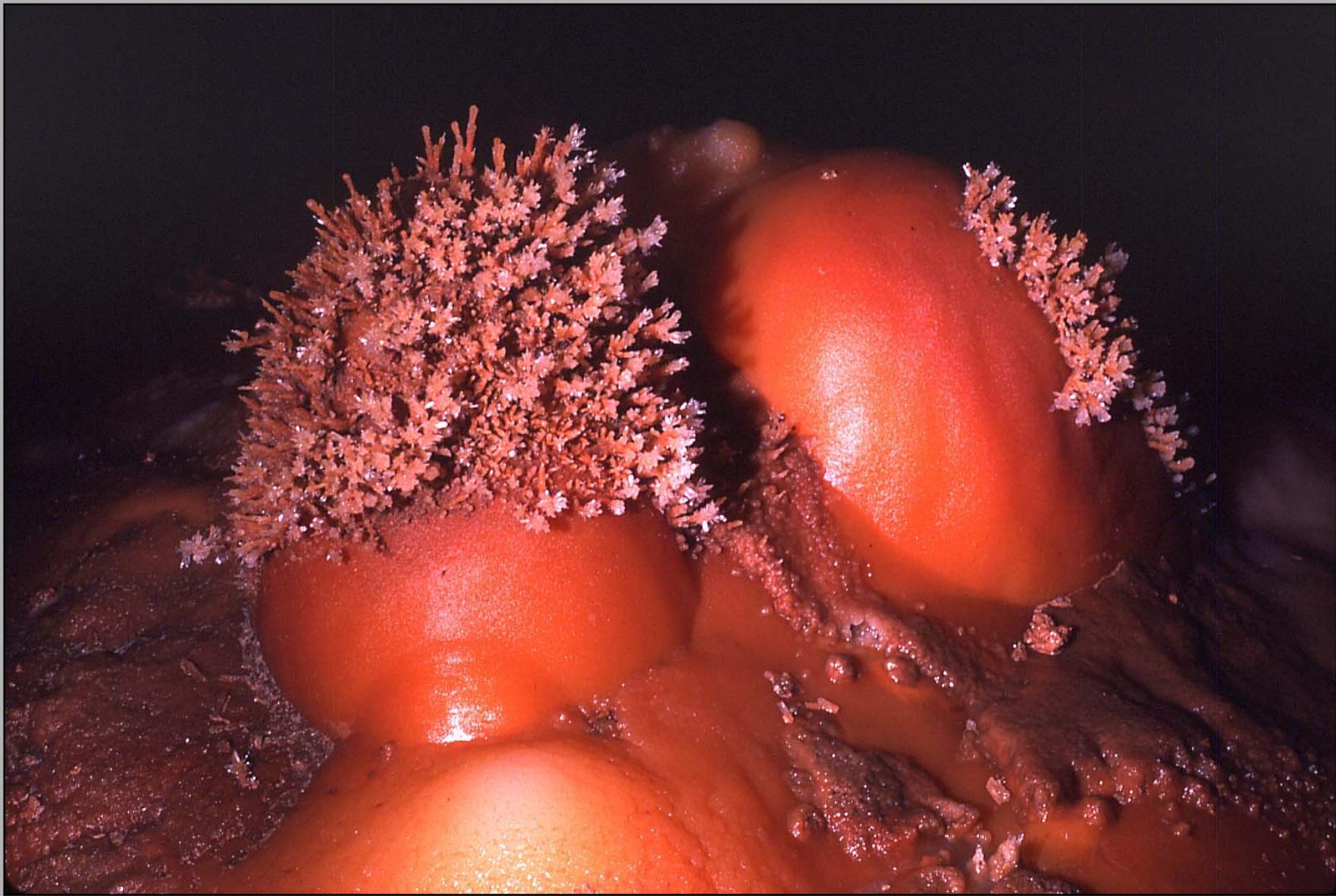






Formations in the cave





The Area Today

- Meramec State Park was doubled in size with land given to the state from the USACE – This section includes undeveloped portions of the park including Hamilton Valley, which are upstream from the main portion of the park.
- Remaining land was first offered to the prior owners – land not sold this way went up for sale in a series of public auctions
- The Dam visitor's center became Hickory Ridge Conference Center
- The overlook meant to view the dam provides a scenic view of the Meramec Valley
- The Meramec Motel is built nearby to provide lodging to visitors
- Moore's Cave and another calyx boring remain sealed in the vicinity
- Two small ponds now fill old excavations for the dam
- The stripped damsite is now overgrown and most evidence of the project is gone



Before the dam was to be built, the Army Corps of Engineers constructed a visitor center and overlook to view the dam. This is now the Hickory Ridge Conference Center at Meramec State Park.



USACE overlook built to provide viewing area above the dam



Overview of the dam site today from the USACE overlook



Overview of the dam site today from the USACE overlook



Turtle Pond – One of the few remnants visible from the dam construction 25 years after the end of the project



Greg Hempen, an engineer from the project stands near a sealed calyx boring at the Meramec Motel 25 years later.

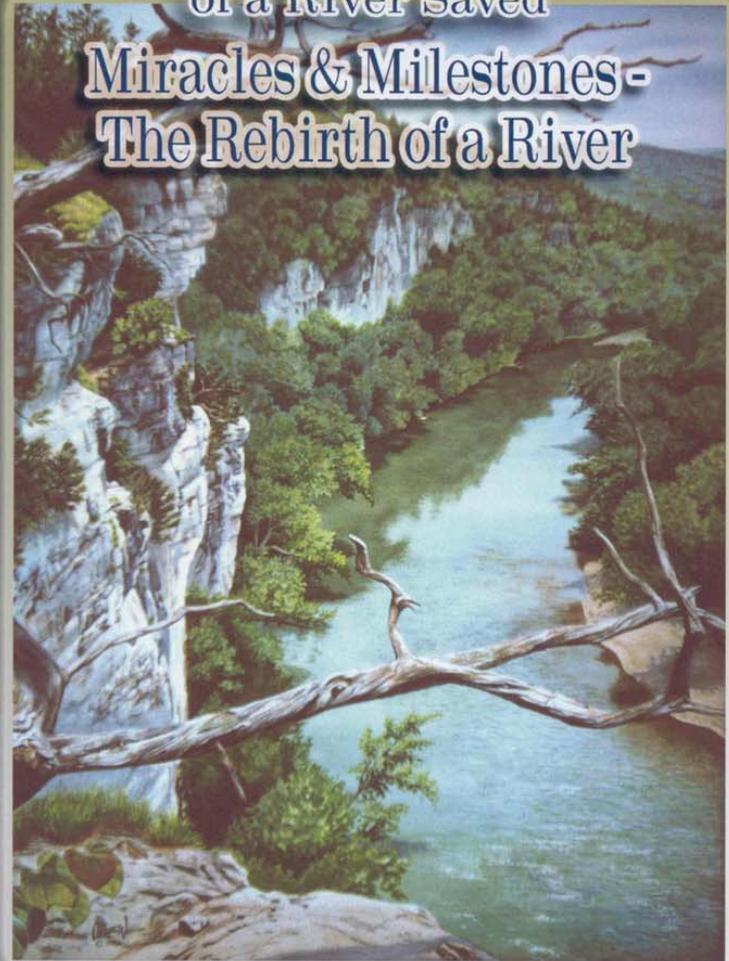
A small cave along the river is visible just upstream from Onondaga Cave State Park. Notice the canoeists framed by the cave.



MIRAMIEC 25TH

Anniversary Celebration
of a River Saved

Miracles & Milestones -
The Rebirth of a River

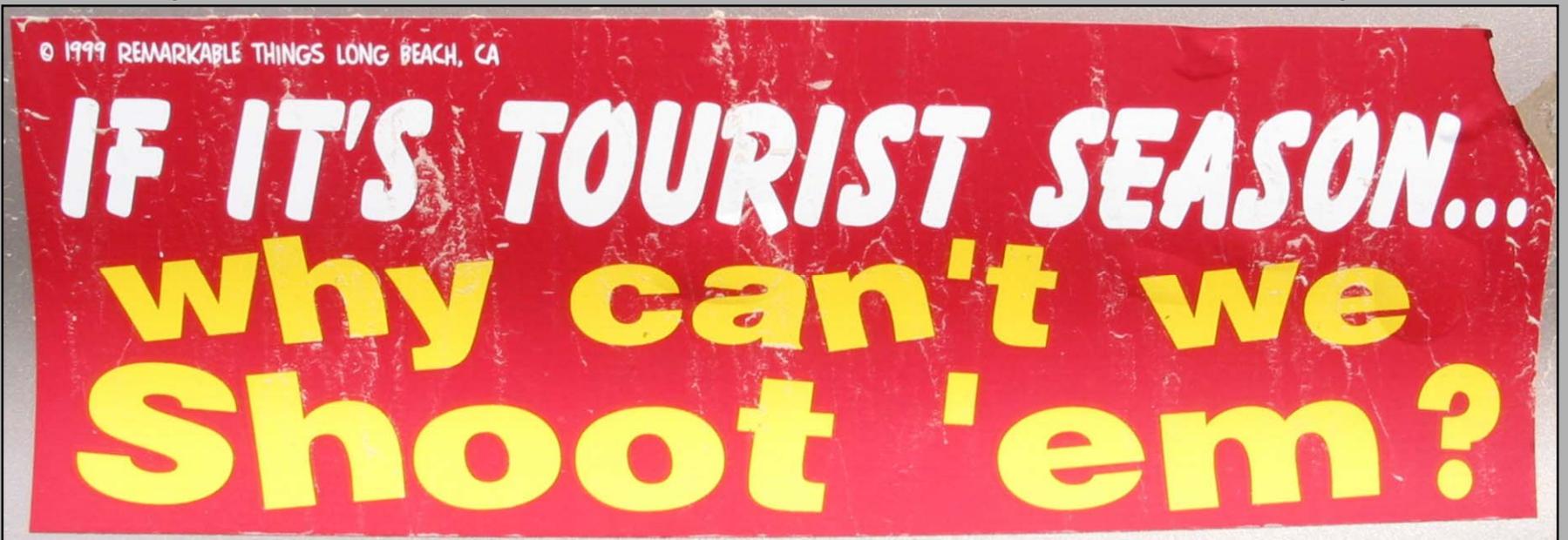


Artwork courtesy of Al and Mary Agnew

**The Open Space Council of Missouri
held a 25th anniversary celebration
on Aug 8th, 2003 to commemorate the
vote ending the project.**



Bumper To Bumper on the Meramec! The river has remained immensely popular with tourists 25 years after the dam was defeated and can be crowded and rowdy at times.



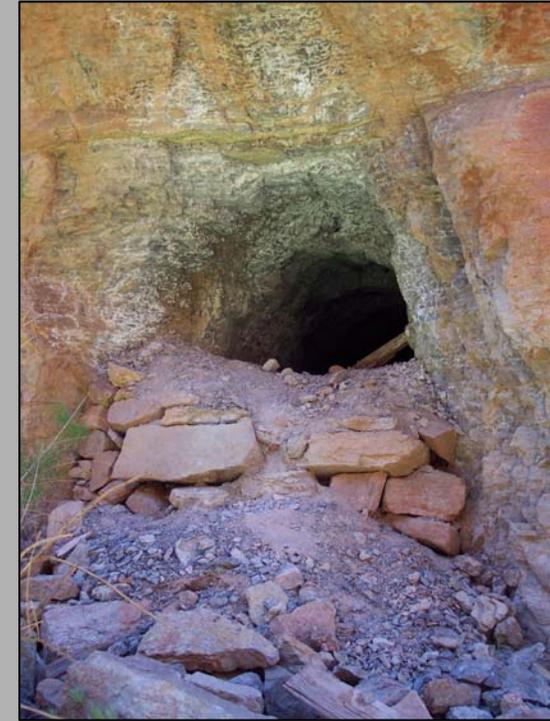
Maybe there is a solution to the crowding on the river!

Other Dam Projects Are Shot Down During The Same Period

- In a case very similar to the Meramec controversy, the La Farge Dam in Minnesota was cancelled amid protests in 1975. This dam project was over halfway complete when decommissioned.
- The USBR proposed other dams in the West besides Echo Park including two serious sites within the Grand Canyon during the 1960's.
- Environmentalists led by the Sierra Club fought the USBR plan and the two controversial Grand Canyon dams were eventually cancelled.

Marble Canyon Dam

- Marble Canyon Dam was to be built on the Colorado River between river miles 39 & 40
- The dam was to be around 400 feet tall with a lake extending upstream 53 miles, flooding Lee's Ferry and coming within 4 miles of Glen Canyon Dam.
- Plans included generating power by bypassing much of the water through a powerhouse 12 miles downstream and 76 mile tunnel terminating at a powerhouse in Kanab Canyon



Exploratory work had been conducted at the Marble Canyon Dam Site and several adits and boreholes are present at the site.



Marble Canyon Dam Site

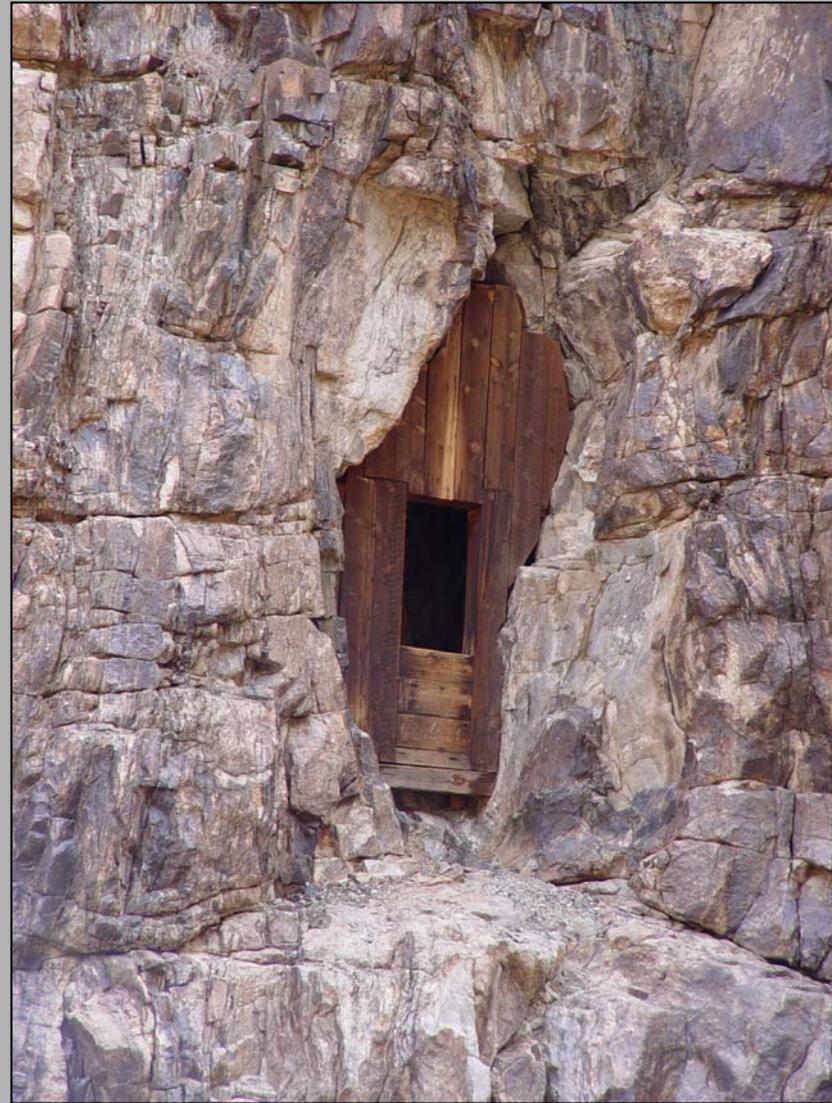


**Equipment left Marble Canyon
Dam work camp – March 2005**



Bridge Canyon Dam

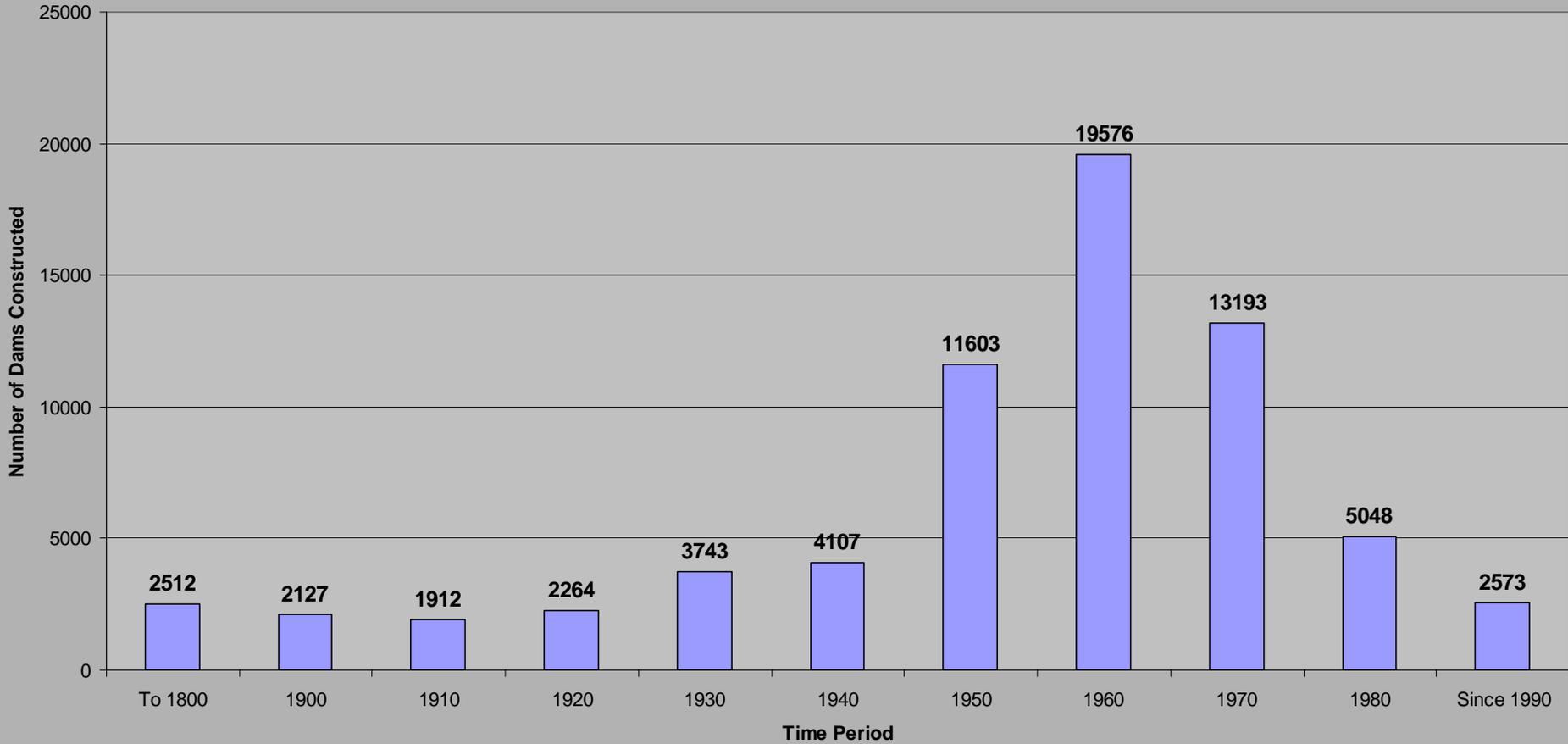
- **Bridge Canyon Dam was to be built on the Colorado River at river mile 236.4 and was to be a 677 foot tall concrete arch dam similar to Glen Canyon Dam.**
- **This dam was also to generate power and would have created a 93 mile long reservoir extending close to Kanab Canyon.**



**Explosives magazine at former
Bridge Canyon Dam Site**

Dams Constructed In The U.S. By Decade

(Modified From Charlwood, 2004)





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