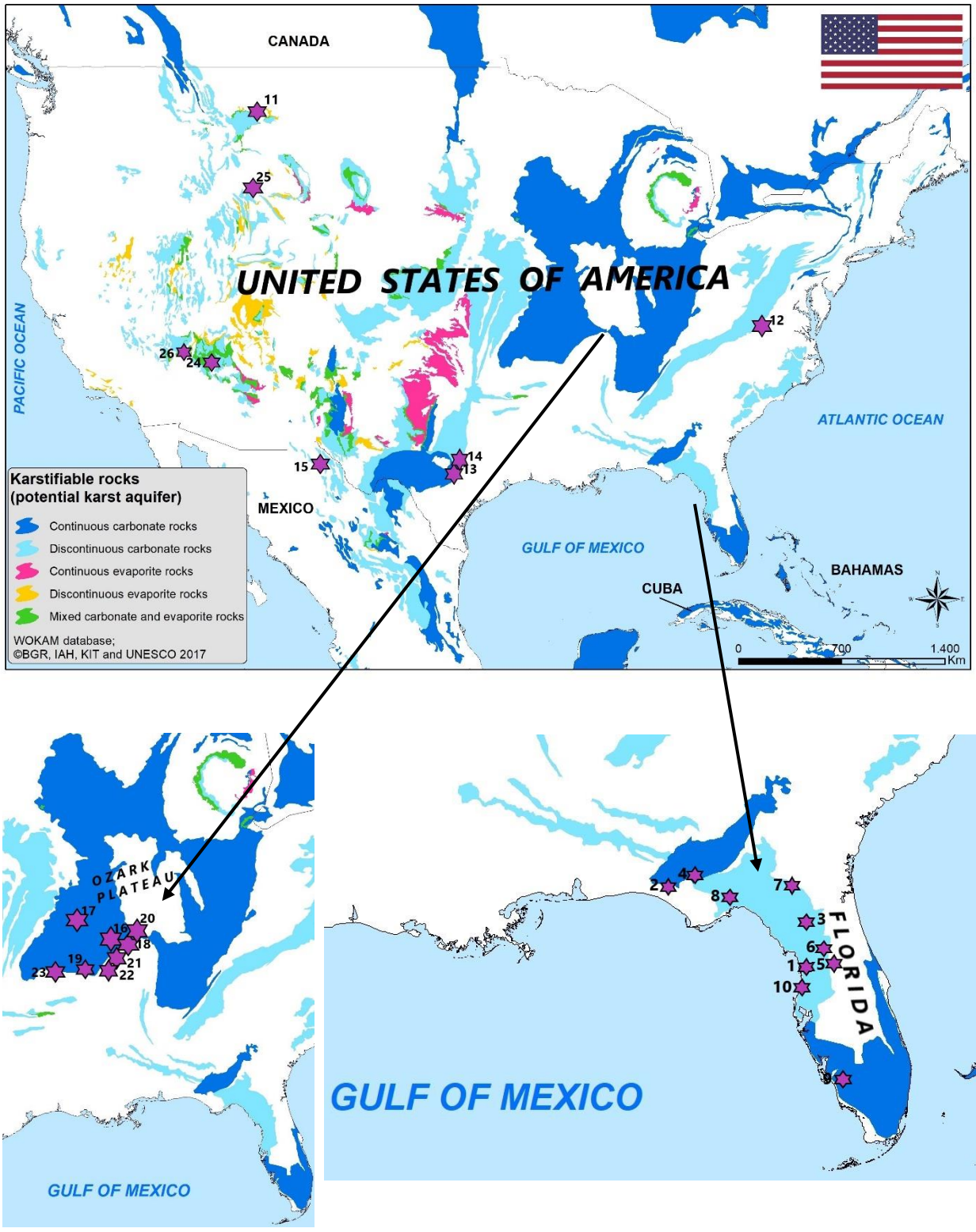
CANADA
UNITED STATES OF AMERICA
PACIFIC OCEAN
ATLANTIC OCEAN
MEXICO
GULF OF MEXICO
CUBA
BAHAMAS
11
25
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24
12
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13
Karstifiable rocks
(potential karst aquifer)
Continuous carbonate rocks
Discontinuous carbonate rocks
Continuous evaporite rocks
Discontinuous evaporite rocks
Mixed carbonate and evaporite rocks
WOKAM database;
©BGR, IAH, KIT and UNESCO 2017
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700
1.400
Km
OZARK PLATEAU
17
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GULF OF MEXICO
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10
FLORIDA
GULF OF MEXICO

Country	MIKAS springs	Coordinates / Nearby City	Spring discharge (Q in l/s,min/av/max) / tapped or not	Criteria* in order / Main justification */ H-historic, A-aesthetic, S-scientific, E-Economic, Ec-ecologic	Data collected by
USA 	1**."Chassahowitzka No. 1 (7 Sisters Springs)"**	N 28°42'55.87" W 82°34' 34.33" Z = 2.4 m asl Chassahowitzka FL	900/3922/5578 Not tapped	***H, A, Ec*** *H: Thousands of years before Europeans arrived, Native Americans thrived along Florida's Gulf coast. Evidence of several Native American campsites has been found within Chassahowitzka. Within Chassahowitzka is Indian Bend, a Weeden Island (A.D. 300 - A.D. 1300) burial mound excavated at the turn of the century by C.B. Moore. Indian Bend yielded primary and secondary burials as well as check-stamped pottery. Although no encampments or other sites have been found, the Seminole Indians were known to have been in the area during the Second Seminole War (1835-42). They gave the region the name Chassahowitzka, meaning "pumpkin hanging place." The pumpkin referred to was a small climbing variety that is now rare and perhaps extinct. A: The solution holes and caverns in the Ocala Limestone at these springs are spectacular to look at and snorkel through. Es: The Chassahowtizka Springs form the headwaters for the Chassahowitzka River that is inhabited by Florida Manatees which are listed as a threatened species under the Endangered Species Act.*	Jade W. Greene
	2. **Gainer Springs**	N 30°25' 39.6" W 85°32 45.83" Z = 5 m asl Youngstown FL	3630/4530/5465 Econfina Creek feeds Deerpoint Lake which is source for municipal water supply of Panama City	***H, S, E, A*** *Thousands of years ago, Native American tribes such as the Creek, Cherokee and Seminole utilized this spring for fresh drinking water. These Indians called it "Econfina" or "Natural Bridge" for the natural limestone arch once crossing the creek mouth. Hundreds of years later, General Andrew Jackson encountered the spring as his army crossed Econfina Creek on their way to Pensacola, FL. As the Florida Territory was opened for settlement, William Gainer, one of Jackson's surveyors, returned to the spring and built his home there, thus the name "Gainer Springs". Gainer Spring vents 1A, 1B and 1C create a first magnitude spring, one of only 75 first magnitude springs, producing 1,400 million gallons of water per day in the United States. Econfina Creek flows into Deerpoint Lake, which is a public water supply utilized by Panama City, FL. Water issues from large vertical conduit, karst windows, dissolution – enlarged fractures and other karst features can be observed near the spring.*	Jade W. Greene

	3. **Ichetucknee**	N 29°59’ 03.10” W 82°45’42.73” Z = 20 m asl Fort White FL	5266/5425/5584 Not tapped	***E, H, A, S, Ec*** *Mission de San Martin de Timucua, built in 1608, was a Spanish and Native American village which was one of the major interior missions serving the Spanish settlement of St. Augustine. Before this, the river and springs were used by earlier cultures of Native Americans, dating back thousands of years. Ichetucknee Springs State Park is now a 2,669-acre wildlife haven where tourists come to enjoy many activities including: swimming, tubing, scuba diving, paddling, and hiking. It is an important recreational site for residents and tourists, entertaining over 200,000 visitors a year, bringing millions of dollars into the local economy. Phosphate mining also played a part in Ichetucknee’s history, with exploration mining beginning prior to the turn of the 20th century. Within Ichetucknee Springs State Park there are nine major crystal-clear springs that join to create the six-mile Icketucknee River. The upper portion of the river is a National Natural Landmark, being one of the most pristine spring runs in the state. The Ichetucknee Springs Group runs through a beautiful, lush forest of longleaf pines. Ichetucknee Springs Group creates a first magnitude spring, one of only 75 in the United States, producing 1,400 million gallons of water per day. One of the springs in this group is home to an aquatic snail that is endangered - this is the only place it lives. It is called the Ichetucknee siltsnail (Floridobia mica).*	Ericka McMahan
	4. **Jackson Blue Spring**	N 30°47’ 25.85” W 85°08’24.31” Z = 25 m asl Marianna FL	1585/4697/8126 Not tapped	***Ec,S, H, E, A*** *Jackson Blue Spring supplies water to a 202-acre reservoir known as Merritt’s Millpond, a nationally known fishing site. The Jackson Blue Springs cave system is home to two rare aquatic cave dwelling animals, the Georgia Blind Salamander and Dougherty Plain Crayfish. Jackson Blue Spring is a first magnitude spring, one of only 75 in the United States, producing 5,300 million liters of water per day. Jackson Blue and six smaller springs feed the artificially impounded, 270-acre Merritt’s Mill Pond. Jackson Blue Spring is a part of recreational park and has been used as a swimming area by locals since the 1800's. There are historic quarries along the banks of the mill pond that date back to the 1800s when Marianna Limestone was hand cut and used as dimension stone primarily for chimneys. There is also a large prehistoric component at Jackson Blue dating back to Paleoindian time. For the past 40 years has been*	Ericka McMahan

				leased to Jackson County. Jackson Blue Spring is a beautiful place to swim, picnic, or SCUBA dive with breath-taking clear bluish water issuing from the vent. The southern shore of the spring pool meets a lush, lowland cypress-gum forest.	
	5. **Rock Springs and Wekiwa Springs**	Rock: N 28°45'22.78" W 81°30'5.26" Wekiwa: N 28°42'43.33" W 81°27'37.60" Z = 20-27 m asl Apopka FL	Rock: 1472/1829/2350 Wekiwa: 1755/1925/2605	***A ,S, E c, H, E*** *Rock and Wekiwa Springs are closely associated much of their history and significance overlap and complement each other. Located within Dr. Howard A. Kelly County Park. Rock Springs Run State Reserve, associated with Wekiwa Springs State Park. The vent at Rock Spring is unique and noteworthy with respect to Florida's numerous springs. Rock Springs vents from a limestone outcrop exposed at the surface. Wekiwa is also picturesque, venting primarily from a fissure submerged in the main spring pool. Together these springs create miles of crystal-clear spring-fed river habitat. The most recent Native American tribes to inhabit the area surrounding Rock and Wekiwa Springs are the Creek (later called Seminoles) peoples. These landmarks are named in the Creek language Wekiwa meaning 'spring of water' and Wekiva meaning 'flowing water'. Early accounts advertise these springs as medicinal waters. Rock Springs Run State Reserve is nearly 14,000 acres of a wide variety of plant communities typically found throughout Central Florida's landscape. The Florida black bear, Florida scrub jay, sandhill crane, indigo snake, gopher tortoise and a variety of more common species often are seen throughout the Reserve. Land conservation is managed by several agencies on both the state and county level. Rock and Wekiwa are the headwaters to the upper Wekiva River. The ecological significance is far reaching as these waters create habitat for many of Florida's native plant and animal species. The site is designated as a Florida Heritage Site. All three associated areas have a history of being economically relevant from an Ecotourism standpoint. In 2019 Wekiwa Springs State Park had an annual attendance of more than 430,000 people.*	Mary E. Lupo
	6. **Silver Springs Group**	N29°12'57.55" W 82°3'10.50" Z = 10 m asl Ocala FL	15262/23219/36528 Not tapped	***S, H, A, Ec, E*** *Located within State Park of Florida. It is the largest artesian spring in the world with a cumulative discharge of more than 2,080,000 m^3/day. The park offers several natural and heritage attractions. For thousands of years, dating back to the Paleoindian period Florida, Silver*	Mary E. Lupo

				Springs has drawn humans to their waters. These natural attractions have and still serve as watering holes and feed entire ecosystems for aquatic and terrestrial life. Silver Springs has been an attraction for tourists since at least the 1820s. In the 1870s the first glass bottom boat was launched at Silver Springs. Silver Springs has starred in over 20 Hollywood films. It is the site of the oldest commercial tourist attraction in Florida and was designated a National Natural Landmark in 1971. More than 30 springs have been documented along the upper part of Silver River. Mammoth Spring is the largest spring in the park and exhibits a rocky ledge above a vast cavern. Ecotourism, natural resource, protected waterway. On site museum, village, glass bottom boat tours, camping, trails, wildlife and birding, underwater statues left over from filming. In 2019 Silver Springs State Park had 400,000 visitors. Remains of mastodons, manatees, and extinct elephants have been found	
	7. **Suwannee Springs**	N 30°23’ 40.12" W 82°56’ 04.34" Z = 18 m asl Live Oak FL	67/663/2025 Not tapped	***H, S, A*** *Suwannee sulphur Springs was first purchased from the United States in 1831 by Francis J. Ross, by 1835. After 2nd Seminole War (1835-1842) along with the nationwide financial panic of 1837 encouraged Ross to sell the resort in 1838. After the Civil War, the proprietors of Suwannee Springs gradually expanded the resort. The first postwar hotel at Suwannee Springs was a massive five story wooden structure with 125 rooms but unfortunately, the hotel burned down on 1884. This spring is unique because it discharges water enriched in sulphur. The source of sulphur in some of Florida’s springs has been identified as connate water from the Lower Floridan Aquifer. This water seeps up to the surface through fractures in the confining unit between the Upper Floridan Aquifer and the Lower Floridan Aquifer. The remnants of the old Suwannee Springs resort give this spring a historical and eerie feeling upon first observation. The view from the high bank at this spring provides a great overlook of the Suwannee River.*	Jade W. Greene
	8. **Wakulla Springs**	N 30°14’06.64” W 84°18’09.21” Z = 4 m asl Crawfordville, FL	713/11043/ 54085 Not tapped	***H, S, E, Ec, A*** *Wakulla spring is used as a recreational and wildlife viewing area, this spring is in the Edward Ball Wakulla Springs State Park. As an important resource for early Native Americans, the history of Wakulla Springs stretches back thousands of years. A mastodon skeleton referred to as “Herman” was recovered from the*	Ericka McMahan

				depths of Wakulla Springs in 1930 by FGS staff. Wakulla Springs, possibly one of the most studied springs in Florida, is at the terminus of one of the largest and deepest cave systems in the world. Research divers have extensively explored and mapped the underwater cave system connected to the spring. Currently there are more than 56 km of mapped cave passage with 35 of them at a depth of 58 meters or more. This is a first magnitude spring, one of only 75 in the United States, producing 5,300 million liters of water per day. Wakulla Springs is recognized as a nature reserve. It is an important recreational site for residents and tourists, entertaining over 200,000 visitors a year, bringing millions of dollars into the local economy. Alligators, manatees and an abundance of bird life can be seen at Wakulla Springs. As one of the largest and deepest freshwater springs in the world, It provides abundant freshwater for a complex and highly productive ecosystem of wild plants and animals. This crystal clear, freshwater spring in the Florida panhandle has been a popular place to swim and watch the wildlife for residents and tourists for many years. The picturesque scenery at Wakulla Springs inspired filmmakers in the 40's and 50's to choose this spring as the location of their films.	
	9. **Warm Mineral Springs**	N 27°3'35.56" W 82°15'37.21" Z = 0 m asl North Point Fl	?/274/? Tapped for local spa	***S, H, E*** *Warmer temperatures than most springs in Florida. Deeper groundwater source. Saline and is chemically unique with more than 51 different minerals. Evidence of prehistoric human utilization of springs is apparent at Warm Mineral Springs. It is believed to have served as a prehistoric burial site due to recovered human remains from a ledge located 13 m below the current water level. Cockrell found an 11,000-year-old human skeleton in a fetal position, apparently placed in a crevice with broken stalactites holding it in place, suggesting one of the earliest intentional burials in North America. Archaeologists have also discovered bones of several Pleistocene animals, including a giant ground sloth, a saber-toothed cat, a horse, and a camelid. The area surrounding the spring was developed into a spa complete with a bathhouse in 1946. The site is managed by the city of North Point and county of Sarasota and is advertised as a Natural Wellness Experience.*	Mary E. Lupo

	10. **Weeki Wachee**	N 28°31'01.89" W 82°34 23.40" Z = 4 m asl North Weeki Wachee	2860/4984/7787 Not tapped	***E, S, H, A*** *Weeki Wachee Springs belong to State Park of Florida and has an annual park attendance of more than 200,000 people. Weeki Wachee Spring discharges from the bottom of a conical depression with gentle slide slopes, the large spring pool is crystal clear to blueish green and contains native aquatic grasses, most people consider this spring beautiful. The cave system beneath Weeki Wachee Spring is an area of continued exploration, the total passage of this cave system is c. 10 km. On a recent survey of the cave system, Karst Underwater Research divers reached a depth of 126 m, setting a new depth record for Florida caves. Like most springs in Florida, Weeki Wachee Spring was first inhabited and named by American Indians. In 1946, Newton Perry, a former U.S. Navy man began scouting Weeki Wachee Spring as a potential business site, cleaning up the spring and preparing it for underwater entertainment. On October, 1947, the first show at Weeki Wachee Spring underwater theatre began, the performances at the springs gained national recognition when the American Broadcasting Company purchased the spring and began promoting the shows.*	Jade W. Greene
	11. **Giant Springs**	N 47^0 32' 03" W 111^0 13' 48" Z = 988 m asl City of Great Falls	?/6800/? The spring is partially used for a trout hatchery and for botting water	***H, S, E, A*** *First recorded by the Lewis and Clark Expedition in 1805, it is one of the largest freshwater springs in the United States. Giant Springs is a High Potential Historic Site on the Lewis and Clark National Historic Trail. The nearby City of Great Falls was founded in 1883, and Giant Springs soon developed into a popular place for recreation. Giant Springs State Park, established during the 1970s, includes a trout hatchery. It is a unique karst spring draining deeply seated karst aquifer developed in Madison Limestone. The flow that is visible at Giant Springs is just a portion of its entirety. Looking slightly upstream, a bubble or slight rise in the river surface can be seen, which is evidence of the rest of the spring's subterranean flow. Part of the Giant Springs State Park in Montana located just outside of Great Falls and encompassing nearly 14 miles of Missouri River shoreline. The park provides opportunities for hiking, biking, picnicking, photography, fishing, hunting, boating, and bird watching*	Neven Kresic
	12. **Warm Springs**	N 38°2'43.35" W 79°47'17.89"	_/75/_ Uniform discharge,	***H, S, E, A*** *The original octagonal stone basin that held the water for bathing was built in 1761, establishing it as the first spa*	Neven Kresic

		Z = 710 m asl Warm Springs	The springs are captured for use in two covered thermal spa pools	*structure in America. A second structure, the Ladies' Bath House, was built in the mid-1870s. Local legends say that Native Americans journeying through the valley discovered these magnificent crystal springs hundreds of years ago, and archaeological evidence seems to confirm that this area has been used by humans for at least 9,000 years. The heat at the thermal springs is derived from rocks at depth in a region of normal geothermal heat flow. The springs' warm water has deep origin, circulating down to approximately 1 mile (1,600 m) based on measured local natural geothermal gradient, and emerging in the valley quickly enough to retain some of its geothermal heat acquired at depth. The thermal spa pools were completely renovated in 2022 Warm Springs Pools, also referred to as Gentlemen's Pool (or historically Jeferson's Pool) and Ladies's Pool are listed on the National Register of Historic Places. This is the oldest thermal spa in the United States and is still in active use.*	
	13. **Comal Springs**	N 29°42'47.06" W 98° 8'15.23" Z = 190 m asl New Braunfels	0/9000/15000 Not directly tapped. Water used downstream	***H, S, E, A, Ec*** *Comal Springs is the largest discharge point for the Edwards Aquifer and is located within Landa Park owned by the City of New Braunfels, TX. Comal is considered one of the largest springs in the SW USA. It has been known to native Americans for approximately 10,000 years. Comal Springs was described by early European settlers in the late 1600's. In 1890, the spring was used to power a hydroelectric plant until about 1950. Comal Springs is a spring complex that discharges along the Comal Springs Fault with a displacement of over 200m. Water discharges under artesian conditions from the confined Edwards Aquifer to emerge along a 1,300m trace of the fault. The Edwards Aquifer, which is the source of Comal Springs is also an important water source for agricultural, municipal and industrial users and was the first sole source aquifer designated in the USA. Comal Springs is also home to 10 threatened and endangered federally listed species. In 2013, the Edwards Aquifer Habitat Conservation Plan (EAHCP) was approved by the U.S. Fish and Wildlife Service and issued an Incidental Take Permit to the permittees. Comal Springs is also the source for both recreational and industry on the Comal and Guadalupe River.*	Geary Schindel

	14. **San Marcos springs**	N 29°53'30.7" W 97° 55' 59.52" Z = 190 m asl New Braunfels	1300/4300/8900 Not directly tapped. Water used downstream	***H, S, E, A, Ec*** *San Marcos Springs is the second largest discharge point for the Edwards Aquifer and 2nd in the SW USA. Springs was described by early European settlers in the late 1600's. The springs were an important stop on the Spanish Camino Real or Kings Highway, from Nacogdoches, Mississippi to Mexico. In 1807, Mexico established the settlement of San Marcos de Neve approximately 6 km downstream of the springs. 1835, the area was settled by European immigrants which developed the springs for cotton gins, corn, saw and grist mills, an ice plant and power plant. San Marcos Springs is a spring complex that discharges ascendingly from the confined Edwards Aquifer with a displacement of approximately 150 m. The Edwards Aquifer, which is the source of San Marcos Springs is also an important water source for agricultural, municipal and industrial users and was the first sole source aquifer designated in the United States. San Marcos Springs is also home to 10 threatened and endangered federally listed species. In 2013, the Edwards Aquifer Habitat Conservation Plan (EAHCP) was approved by the U.S. Fish and Wildlife Service and issued an Incidental Take Permit to the permittees. San Marcos Springs is also the source for both recreational and industry on the San Marcos River.*	Geary Schindel
	15. **San Solomon Springs**	N 30°56'39.52" W 103°47'18.72" Z = 1020 m as l Toyahvale/Balmorhea	560/ ? /850 (earlier data 2500 to 4800) Not directly tapped. Water used downstream for irrigation	***A, H, S, Ec, E*** *San Solomon Springs is considered the 9th largest spring in Texas. The spring has been used by native Americans dating back more than 11,000 years before discovery by early Hispanic and Anglo explorers and settlers. The spring provides an important habitat for two freshwater spring snails, an amphipod, and two species of fish. In the 1870s, the springs were developed for irrigation and were acquired by the state of Texas in 1930 and developed as a park Balmorhea State Park has become an important recreational resource for the region in 1968. The spring is slightly brackish. It is also the home to four endangered species including two small desert fish: the Pecos Gamusia and the Comanche Springs Pupfish. The source is also listed for protection for four threatened or endangered species by U.S. Fish and Wildlife Service. The springs are an important prehistoric, historic and recreational importance. Potential impacts to the spring including groundwater pumping for irrigation*	Geary Schindel, George Veni

				purposes and for potential frack water in support of petroleum production in the region.	
	16. **Alley Spring**	N 37°9'16.23" W 91°26'29.93" Z = 200 m asl Eminence, MO	2200/3500/77000 Not tapped	***H, S, E, A, Ec*** *Alley Spring is one of the major springs providing base flow to the Ozark National Scenic Riverways which is operated by the National Park Service. Ozark National Scenic Riverways is the first national park area to protect a river system. Historically, Alley Spring occupies a high rank based on having a large discharge and having a hundred-year-old mill that is one of the most recognized in the Ozark National Scenic Riverways. The economic value of Alley Spring is important in that it provides major base flow to the Current River, which is an engine of tourism for the State. There is lovely karst landscape with the distinct red mill. They provide an aesthetic photographic setting, as does the karstified landforms of the surrounding areas. Alley Spring is critically important to the hydrology of the Eleven Point River, a National Wild and Scenic River.*	John Van Brahana
	17. **Bennett Spring**	N 37°43'01.73" W 92°51'27.26" Z = 274 m asl Lebanon, MO	2120/4020/11600 Not tapped	***H, S, E, A, Ec*** *Historically, Bennett Spring occupies a very high rank based on having one of the ten greatest discharges (typically 6th) of all Ozark Plateaus big springs, and a long history of utilization by local population for grist mills and related water driven features. The spring? catchment has experienced dolomiti-zation and tectonic uplift, and have been karstified for long periods of time. The economic value of Bennett Spring is important in that it provides a large component of base flow to the Jacks Fork River, which is a major engine of tourism for the region. Although the aesthetic criterion tend to be a qualitative personal numerous commercial caves associate with springs and underground rivers are judged as a natural wonders. The State Fish Hachery and natural flora and fauna associated with Bennett Spring serve as a regional attraction from an ecological standpoint.*	John Van Brahana
	18. **Big Spring**	N 36°57' 08.22" W 90°59' 38.48" Z = 131 m asl Town of Van Buren	9300/10000/33100 Not tapped	***H, S, E, A, Ec*** *The area surrounding the spring was one of Missouri's first State Parks; Big Spring now is one of three large springs in the area of a natural reservation (Ozark Scenic River Waterways operated by the National Park Service). The spring provides significant base flow to the Current River. Big Spring being ranked as one of the top ten largest spring discharges in the USA. The Big Spring is a*	John Van Brahana

				major engine of tourism for the region. Coupled with the National Park Service control of the Ozark National Scenic Riverways and the karst landforms and State Parks highlighting the springs in much of the Ozark Plateaus, big springs strengthen the economy here. Presence of protected and endangered species in Big Spring State Park are of interest to the biology, ecology, hydrogeology.	
	19. **Blanchard Spring**	N 35°57'31.64" W92°10'38.44" Z = 163 m asl Town of Fifty Six, AR	?/3800/? Not tapped	***S, A, E_C, H, E*** *The cave stream that resurges as Blanchard Spring is on property of the Sylamore Ranger District of the Ozark National Forest (U.S. Forest Service). Historically, Blanchard Springs Cavern was known by local residents by the 1930s and had exploration that began in the 1950s; cavers explored sporadically from the 1960s onward. The caverns were opened to the public in 1973. The economic value of Blanchard Springs Caverns is important in that it provides a economic engine to the southern Ozark region of Arkansas where tourism is vitally important. Numerous commercial caves associate with springs and underground channels are judged as a natural wonders. Presence of protected and endangered species in Big Spring State Park are of interest to the biology, ecology, hydrogeology.*	John Van Brahana
	20. **Blue Spring (MO)**	N 37°09'58.01" W 91°09'43.53" Z = 263 m asl Shannon County	?/2300/? Not tapped	***S, E, A, H, E_C*** *Blue Spring is a permanent, ascending, high-discharge fresh-water spring (. It has one of the deepest documented openings which provides the blue color for which it is named. Blue Spring occupies a high rank based on having one of the ten greatest discharges (typically from 6th to 9th) of all Ozark Plateaus big springs. It is isolated from human inhabitants, with the nearest town about 20 km away. The economic value of Blue Spring is important in that it provides a large component of base flow to the Current River, which is a major engine of tourism for the region. The State Fish Hatchery and natural flora and fauna associated with Bennett Spring serve as a regional attraction from an ecological standpoint.*	John Van Brahana
	21. **Greer Spring**	N 36°47'11.86" W 91°20'56.50" Z = 172 m asl Greer MO	7600/10100/13000 Not tapped	***H, S, E, A, Ec*** *One of Missouri's first State Parks, Greer Spring now is part of a natural reservation area, (Ozark Scenic River Waterway). It consistently has the second or third greatest discharge of the big Missouri springs in the Ozarks. The economic value of Greer Spring is important in that it provides major base flow to the Eleven Point River, which is an engine of tourism for the State. Coupled*	John Van Brahana

				with the State Park highlighting the springs strengthen the economy here. The lovely karst landscape with caves and bluffs associate with springs and underground rivers are judged as a natural wonders is a significant aquatic natural community supporting a diverse assemblage of native fish species and aquatic invertebrates, including some species of conservation concern such as the coldwater crayfish.	
	22. **Mammoth Spring**	N 36°29'51.93" W 91°32'09.34" Z = 154 m asl Town of Mammoth Springs, AR	5920/9900/12800 Not tapped	***H, S, E, A, Ec*** *Mammoth Spring is the source of the Spring River. Historically dammed to produce electricity in the 1880s, it had previously served as a gristmill. It currently serves as a regional tourist attraction. and being ranked as one of the top ten largest discharges in the USA. Coupled with the State Park highlighting the springs strengthen the economy here.Numerous commercial caves associate with springs and underground rivers are judged as a natural wonders Presence of protected and endangered species in Big Spring State Park are of interest to the biology, ecology, hydrogeology.*	John Van Brahana
	23. **Blue Spring (AR)**	N 36^{O}27'52" W 93^{O}48'45" Z = 277 m asl Eureka Springs	? / 2000 / ? Tapped, intake structure	***H, S, A, E*** *Permanent, ascending spring with a network of vertical and subvertical submerged passages descendent by cave divers to a depth of 70 m. Crystal clear water pours from the centre of Blue Spring into its trout-filled lagoon. The lagoon overflows into the White River. It is noted that American Indian tribes put their differences aside when they entered the spring area as it was considered sacred ground. American Indian elders have told stories of visits to Blue Spring as a sacred place for ritual. Osage Indians claimed the Blue Spring as their trading post. Early settlers nicknamed them "Strongboat Indians" and used their boats to float furs, bear oil, and beeswax down the old trade route of the White River to New Orleans. In March 1839, Blue Spring became a respite and renewal site for the Cherokee people during their forced march from Echota, Georgia. In the American Indian oral tradition, stories were long told about the Spring so many on that route knew to stop at Blue Spring for hope and healing on a journey with impossible odds. University of Arkansas conducted an archaeological excavation and found prehistoric artifacts, shellfish and the bones of deer, turtle, and other fauna. Some date back as far as 8000 BC. The Bluff Shelter at Blue Spring is listed on the National Register of Historic Places.*	Neven Kresic

	24. **Blue Spring (AZ)**	N 36^{O}07'02" W 111^{O}41'36" Z = c.1040 m asl Grand Canyon village	_/2690/_ Constant flow, not tapped	***H, A, Ec, S*** *Located on the Navajo Nation land, adjacent to the Grand Canyon National Park where the Little Colorado and Colorado Rivers cut through thick sedimentary rocks. The Blue Spring groundwater system is the largest groundwater system that drains to the Grand Canyon, encompassing 27,000 square miles. Blue Spring is also the largest spring in the state of Arizona. Blue Spring is a collective description of at least 36 individual springs on the floor of the Little Colorado River canyon within about 13 river miles of its confluence with the Colorado River. There are two important characteristics common among springs discharging to the Grand Canyon: (1) the water discharges from the lower Paleozoic carbonates, and (2) faults are the dominant geologic factor on the locations of springs. The Spring, the Little Colorado River, and the travertine deposits (pools) in the river provide for exceptional natural beaty. The flow of the springs sustains diverse and unique natural environment and biota, some of which is endemic (only found here and nowhere else on Earth). Groundwater residence time, estimated by using radiocarbon dating techniques, is 11300 years which reflects deep, ancient percolation through thousands of feet of overlying sediments.*	Neven Kresic
	25. **Boiling River (Hot River) Spring**	N 44^{O}59'06" W 110^{O}41'21" Z = 1732 m asl Gardiner	550/-/700 Relatively constant flow, not tapped	***S, A, E*** *Largest high-temperature thermal karst spring in the United States and possibly in the world. Karst aquifer extends below thick deposits of volcanic origin over unknown but large drainage area based on the spring flow rate. Mammoth Springs area is situated inside Yellowstone National Park in Montana, the first national park in the world with exceptional natural beauty and 3-4 million visitors each year. The spring discharge channel is about 2.7 m wide and 0.6 m deep, and the stream flows for about 130 m before emptying into the Gardiner River. Its underground route can be followed upstream for an additional 140 m through a series of collapse features. This spring has the greatest discharge of any hot spring in Yellowstone National Park. The waters of Boiling River springs are meteoric origin, that are heated by contact with hot rocks at depth to temperatures of about 100°C And ascend along active faults. In discharge zone hot water is cooled and diluted by mixing with water similar to that coming from Soda Spring, and the mixed water reaches a new chemical*	Neven Kresic

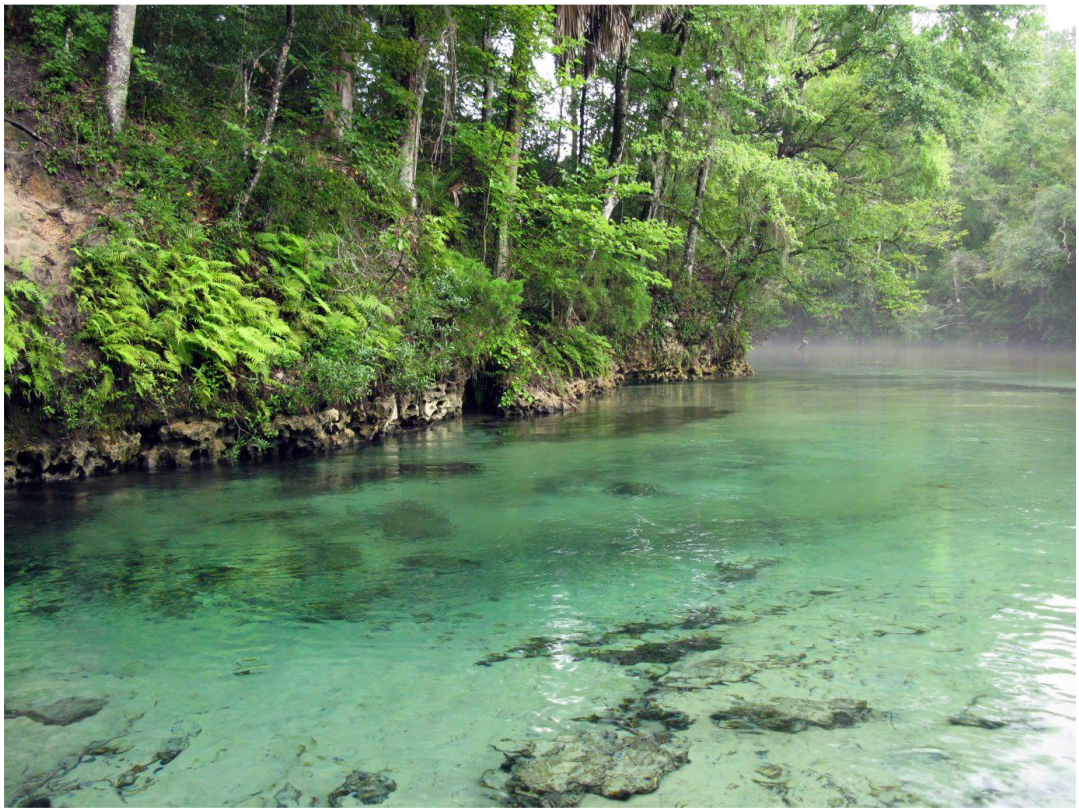
				equilibrium with the surrounding rock in an aquifer at about 73°C. The source of heat that gives rise to the Yellowstone Park hot springs is partly molten rock in a gigantic magma chamber situated beneath the Yellowstone caldera with its top about 5-10 km below the surface of the ground.	
	26. **Havasu Springs**	N 36^{O}12'60" W 112^{O} 41' 14" Z = c.1050 m asl Supai Village	_/1700/_ Relatively constant flow, tapped for village	***A, E, Ec, H, S*** *The Spring, the spectacular waterfalls, and the travertine deposits (pools) in the Havasu Creek provide for exceptional natural beaty and draw visitors of the Grand Canyon National Park thus contributing to the overall local, state, and national economy. The spring is used for water supply of the Supai village and sustains diverse and unique natural environment and biota in otherwise desert region. The water from Havasu Springs is turquoise in colour from the spontaneous precipitation of dissolved calcium carbonate, and has created world famous travertine dams and falls between the springs and the Colorado River. The temperature of the water at the spring is about 70 °F. The steady discharge and warm temperature attest to the large size of the groundwater system and generally lengthy residence time for the groundwater (estimated by using radiocarbon dating techniques, to 12400 years). The water of the springs sustains a pristine natural environment and biota, some of which are endemic. The spring is on the Havasupai Indian reservation, surrounded by the Grand Canyon National Park. In order to maintain the pristine beauty of this isolated desert paradise, the Havasupai tribe limits the number of visitors allowed to visit the reservation.*	Neven Kresic

MIKAS – Chassahowitzka no. 1 / 7 Sister Springs

Chassahowitzka/7 Sister Springs (FGS)

Inside view of cavern at Chassahowitzka/7 Sister Springs (FGS)

MIKAS – Gainer spring



Gainer spring (FGS Photo)

MIKAS – Ichetucknee

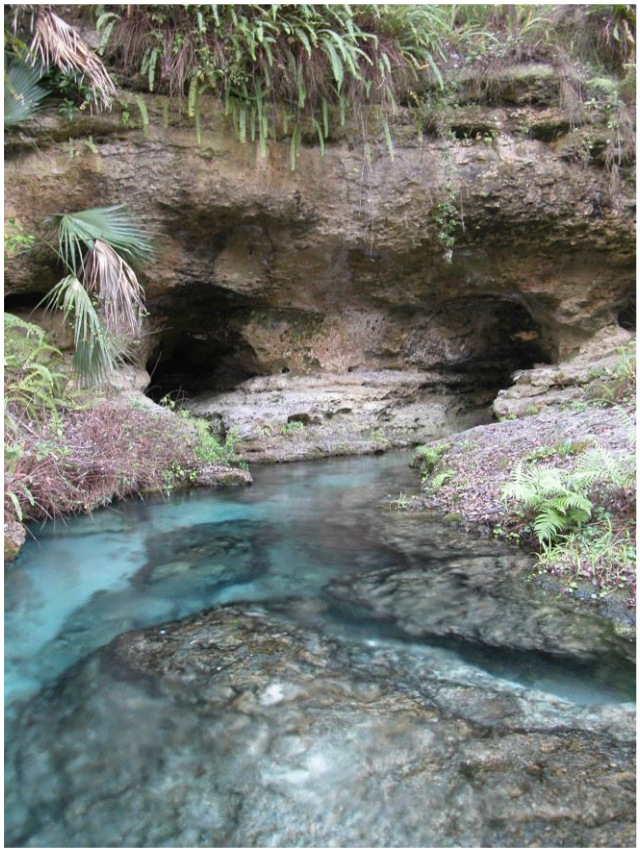
Ichetucknee Head Spring (Photo by Tom Scott)

MIKAS - Jackson Blue Spring

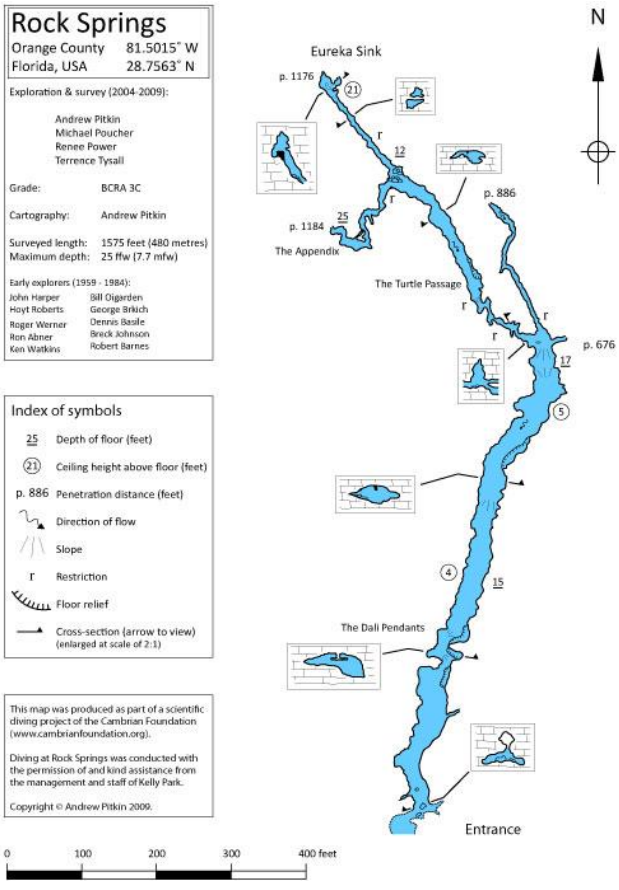
Aerial view of Jackson Blue Spring (Photo by Tom Scott)

Jackson Blue looking towards Merrits Mill Pond (FGS Photo)

MIKAS – Rock Springs and Wekiwa Springs



Rock Spring vent (Photo by FGS staff)



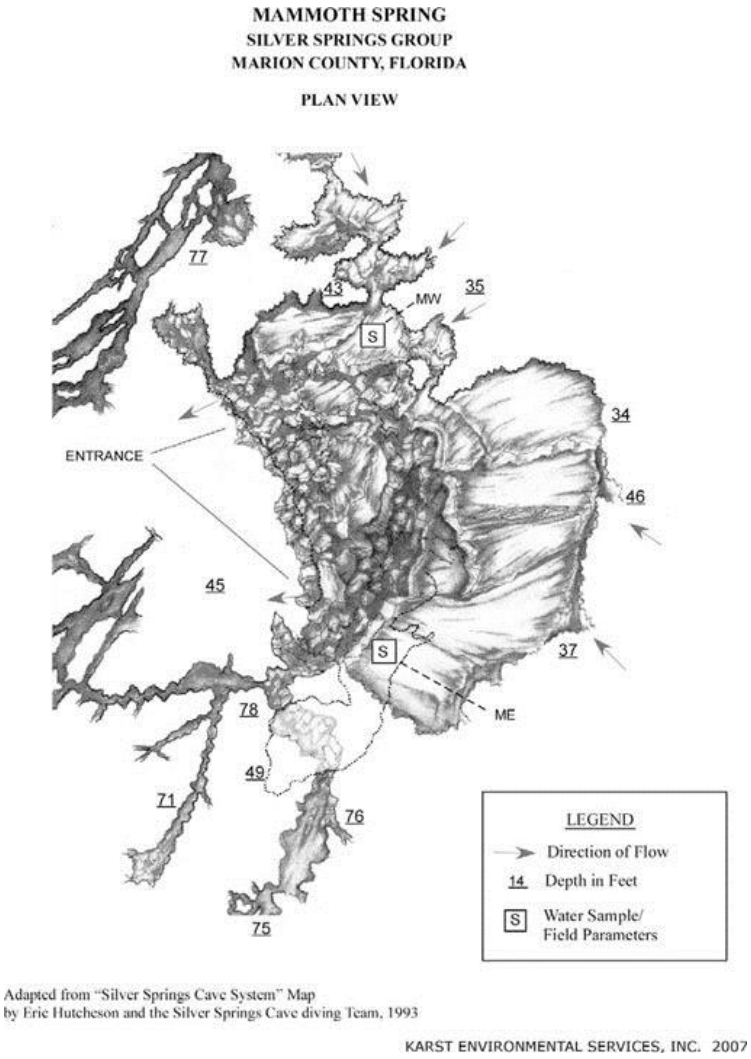
Cave map of Rock Springs (after Pitkin, 2009)

Wekiwa Spring Boil (Photo by FGS Staff)

MIKAS – Silver Springs Group

Silver Springs run (Photo by H. Means, FGS)

Silver Springs (Photo by FGS)



Mammoth Spring cave map (Karst Env. Services, Inc., 2007)

MIKAS – Suwannee Springs

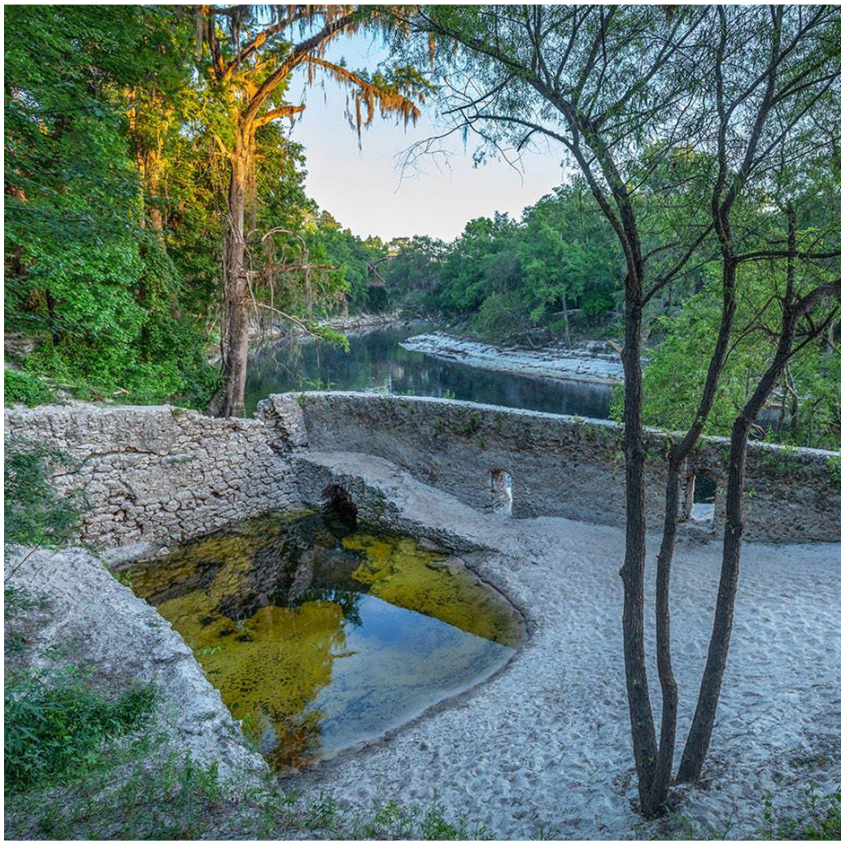
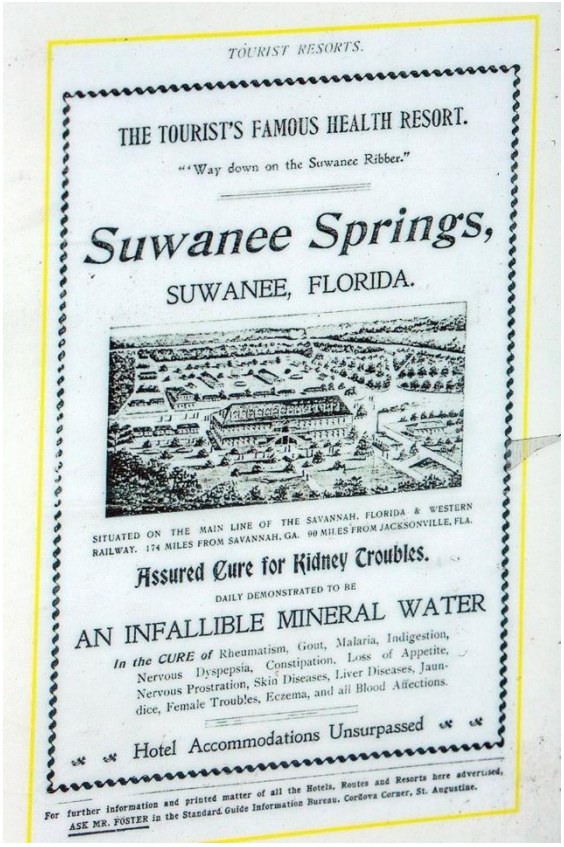
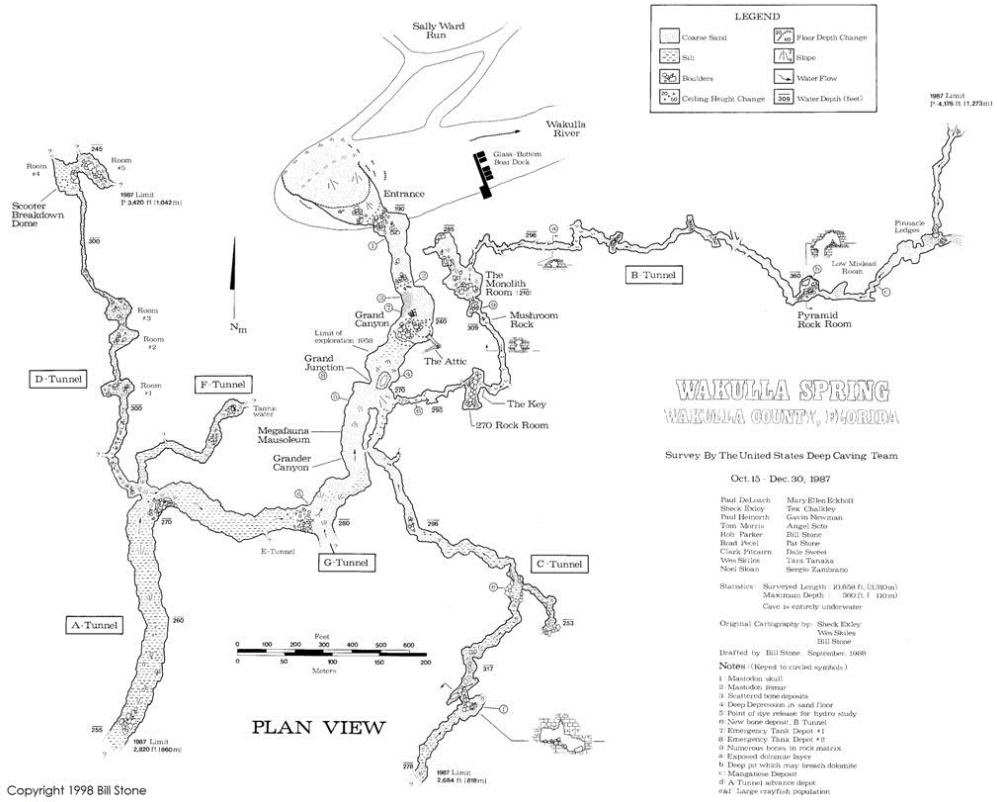


Image of Suwannee Springs by John Moran



1800s advertisement of Suwannee Springs Resort

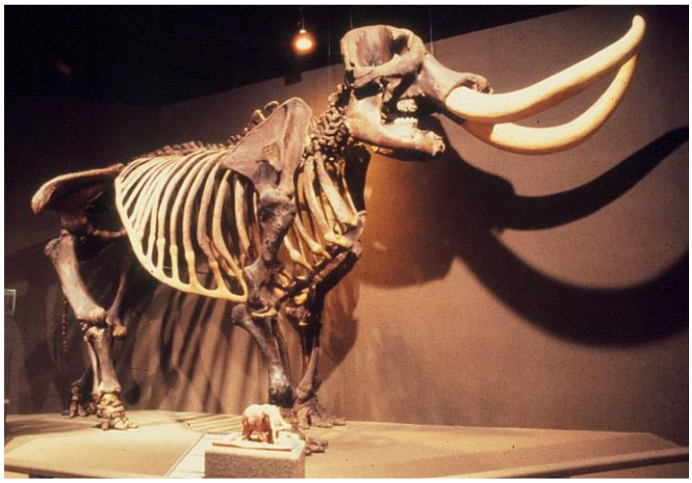
MIKAS – Wakulla Spring



Wakulla Springs cave system map (Bill Stone, 1988) http://www.caveatlas.com/systems/system.asp?ID=84

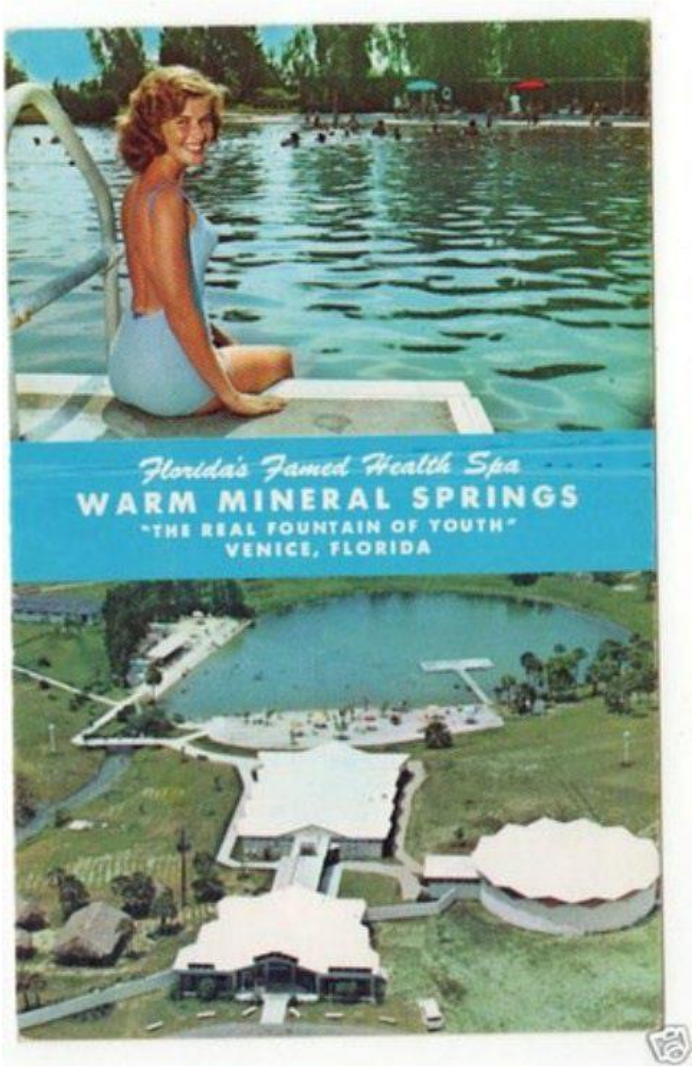
Pictured are George Christie, geologist Herman Gunter, Gerald M. Ponton and diving team member J. Clarence Simpson (FGS Photo)

Aerial photo of Wakulla Springs main vent

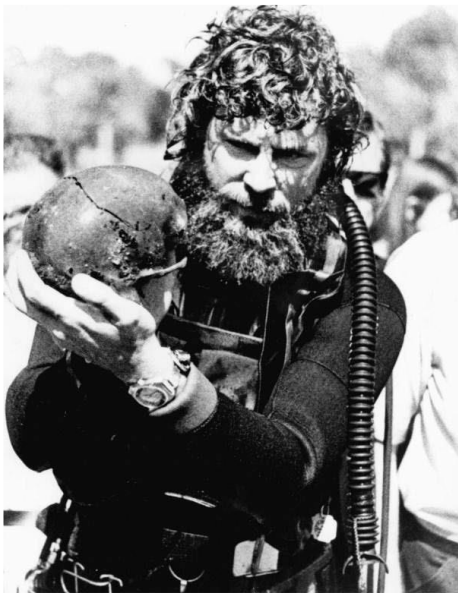


Divers preparing to recover mastodon remains from Wakulla Springs and its recovered skeleton

MIKAS – Warm Mineral Springs



Historic Poster of Warm Mineral Springs



Marine archaeologist W.A. "Sonny" Cockrell with skull found at Warm Mineral Springs in Sarasota County (photo by Jim Purks 1973)

MIKAS – Giant Springs

Left: Giant Springs, Montana (Photo courtesy of Geary Schindel). Right: Drone photograph of Giant Springs. Courtesy of fwp.mt.gov

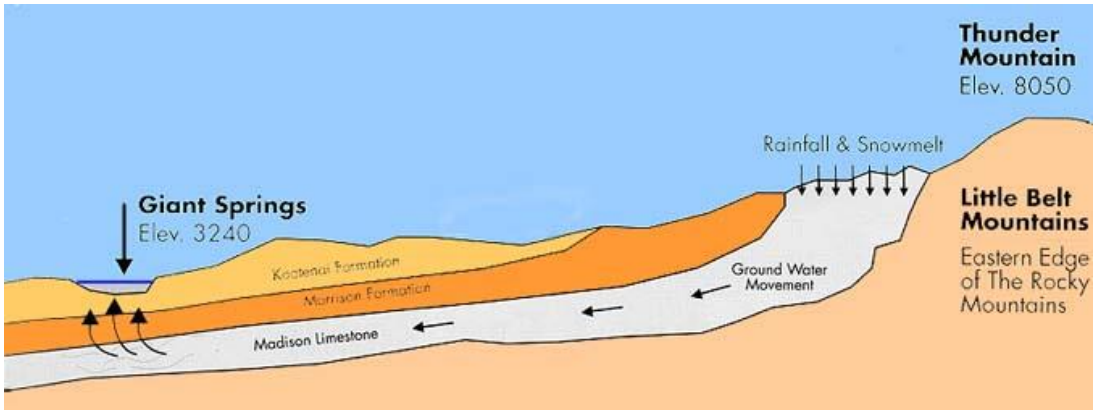
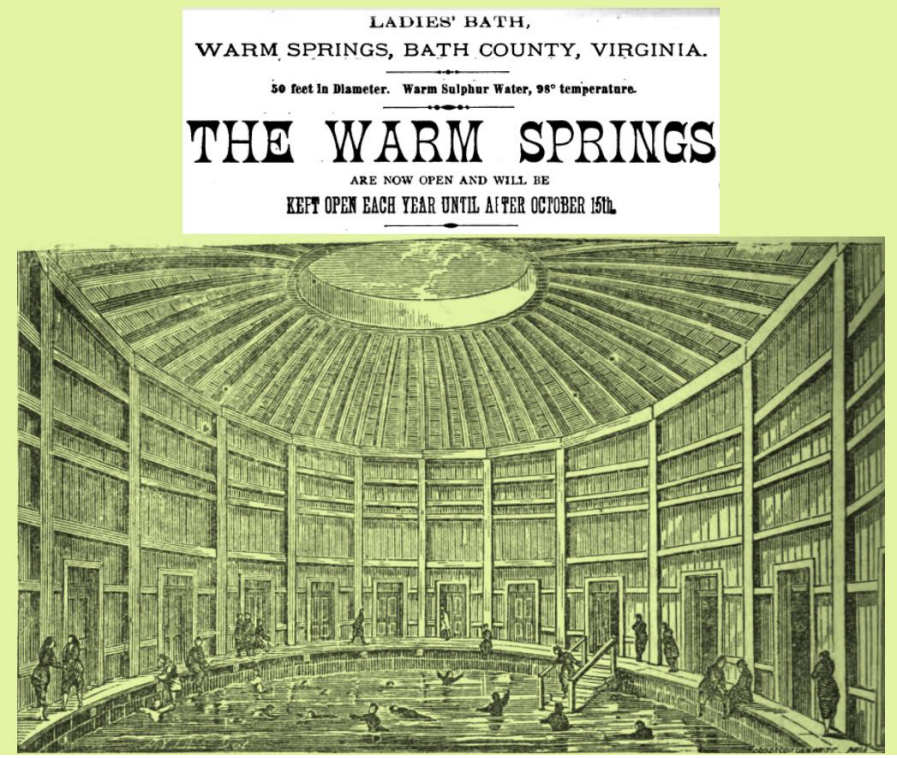


Diagram courtesy of Giant Springs Bottled Water Company

MIKAS – Warm Springs VA

Ladies' (left) and Gentlemen's (right) Pools of the Warm Springs (Courtesy of the Omni Homestead Resort)

Thermal water outflow from the Gentlemen's Pool

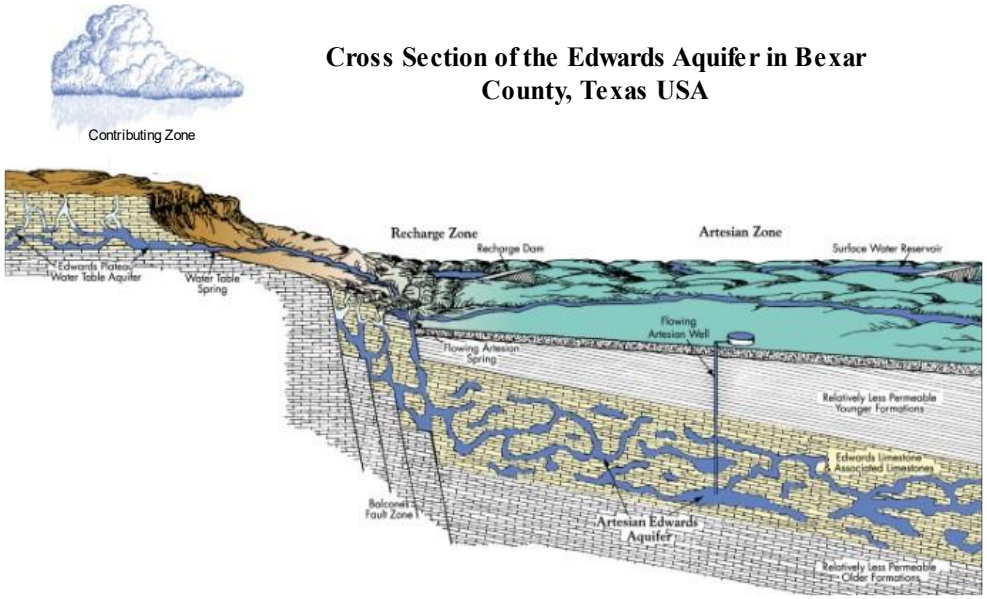


The Ladies' Bath at Warm Springs Pool advertised 98 °F water source in: "The Chesapeake & Ohio Railway Directory, Containing an Illustrated History and Description of the Road," Ladies' Bath, Warm Springs, Bath County, Virginia (p.331)

MIKAS – Comal Springs

Comal spring and information plate at the spring site (Photo by Zoran Stevanovic)

Comal Springs - Spring Run 3 (Schindel)



Scheme of Edwards Aquifer functioning (Courtesy of Edwards Aquifer Authority)

MIKAS – San Marcos springs

San Marcos ascending spring and formed stream (Photo by Zoran Stevanović)

Google Earth View of San Marcos Springs

MIKAS – San Solomon spring

San Solomon main spring pool (San Solomon Springs from Texas Parks and Wildlife Webpage)

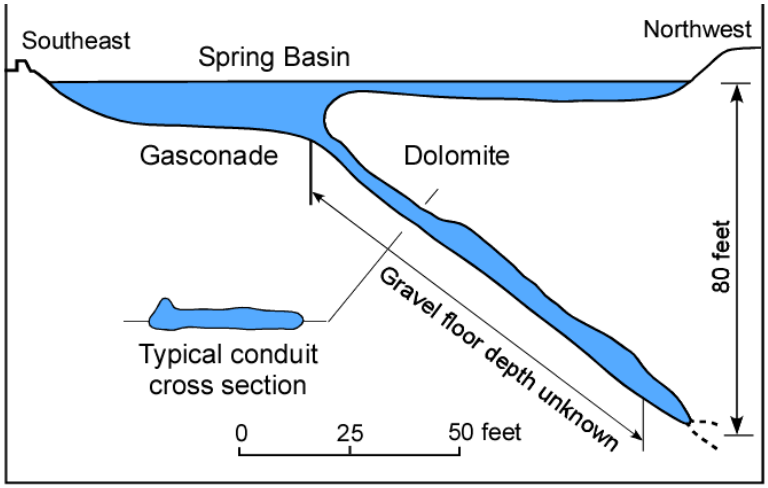
Enlarged view on Solomon Springs (from Google Earth)

MIKAS – Alley spring

Close up Google Earth image of Alley Spring rise pool and mill in the big springs area of the Missouri Ozarks

Image of Alley Spring, Missouri, and the mill that are part of the Ozark National Scenic Riverways. Visual estimate of intermediate spring discharge is provided by flow over dam on right side of mill (Photo credit: Lucas Bremer. https://www.theoutbound.com/missouri/photography/explore-alley-spring-and-mill-within-the-ozark-national-scenic-riverways/photos#photo-308145)

MIKAS – Bennett spring



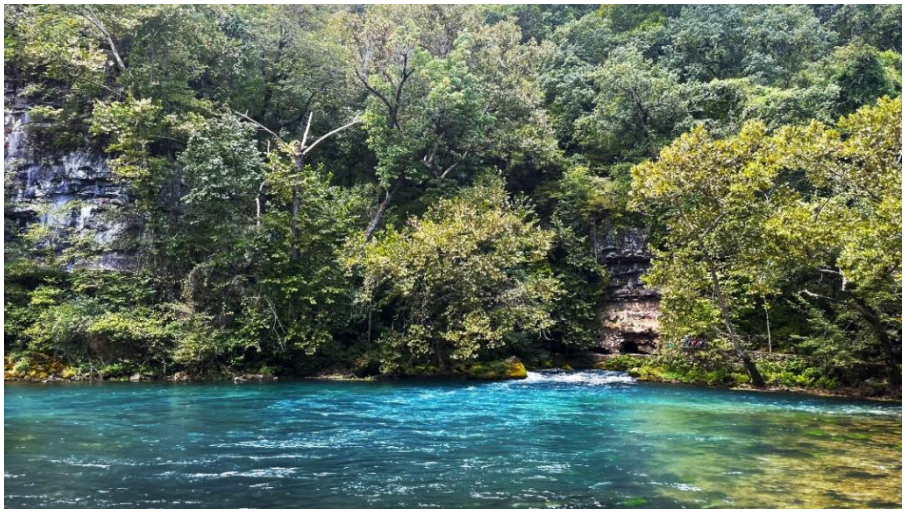
Top: Bennet Spring in Dallas County, Missouri; photo courtesy of Missouri Department of Natural Resources, in public domain. Bottom: Longitudinal cross-section through Bennet Spring. Data supplied by D. Rimbach, M. Tatalovich, and M. Grussemeyer. Modified from Vineyard and Feder, 1974/1982.

Historic image from a 1914 post card shows a crude wood structure seen here blocking the spring run from Brice Springs – now called Bennett Spring. Bennett Spring is now a Missouri state park.. Photo credit: http://www.dammingtheosage.com/brice-spring-now-bennett-spring-state-park-on-the-niangua-river/

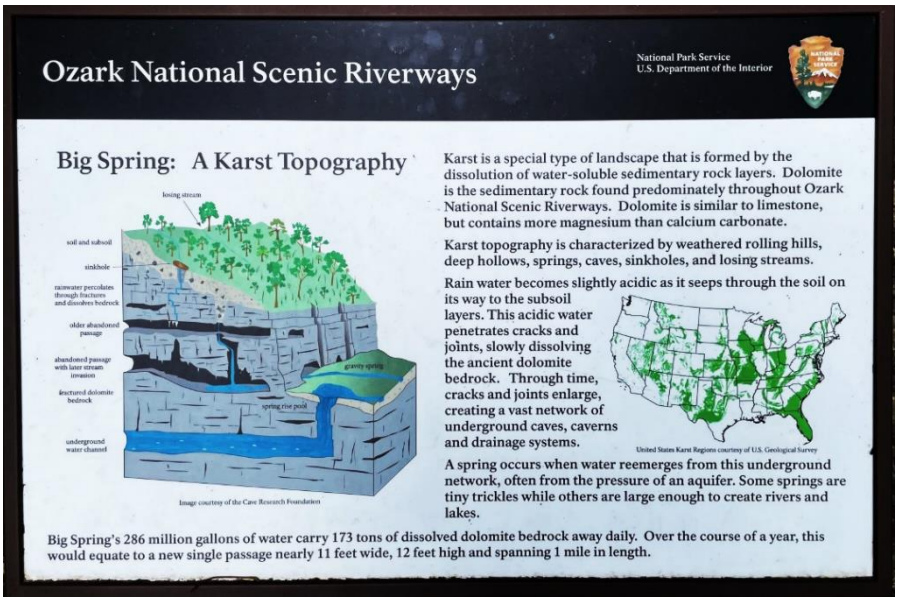
Image of Bennett Spring in the summer at Bennett Spring State Park, Missouri. Photo credit: https://2.bp.blogspot.com/bAwd3Js2q0w/WQZIqKSF_qI/AAAAAAAAHeU/FZxGAD7ao6AuY2R8quDi16Rcz5XDSwDCQCLcB/s1600/bennett-spring-state.jpg

Fishermen line the bridge cheek to jowl across the outflow from Bennett Spring State Park to test their luck during a winter day. Bennett Spring State Park was previously known as Brice State Park. Image credit: https://mostateparks.com/park/bennett-spring-state-park

MIKAS – Big Spring (MO)



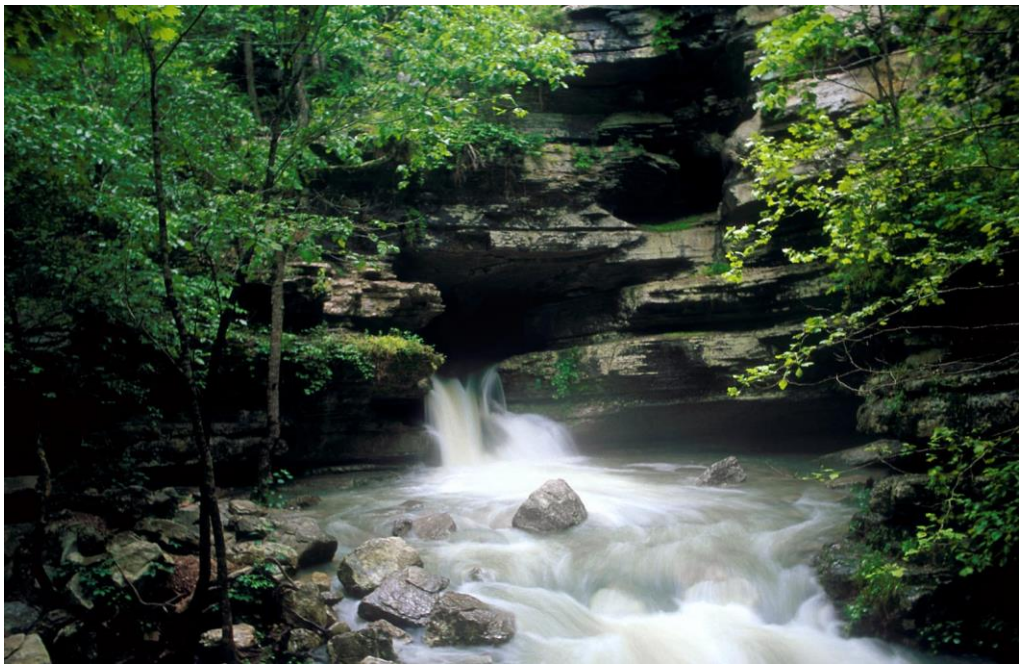
Two views of Big Spring (Photos by Neven Kresic)



Ozark National Park Service plate at the Big Spring

Big Spring, Carter County, Missouri. Ascending flow resurging from the base of a bluff in the Eminence Dolomite, where flow is into spring run to the Current River. Photo source: Patti Wheatley-Bishop in National Park Service [accessed 13.08.2023]

MIKAS – Blanchard Spring



Blanchard Spring at intermediate flow resurging as a cave stream in Blanchard Spring Caverns. An historic conduit currently dry is visible above and to the right of the existing cave stream (Photo credit: modified from Eric White)

Speleothems provide visual documentation of downward flowing recharge moving from impermeable chert layers near the roof of the cavern in the Boone Formation to a lower level in the cave (Photo credit: https://arkansaslivingmagazine.com/article/underground-arkansas-discover-blanchard-springs-caverns/#prettyPhoto/3/)

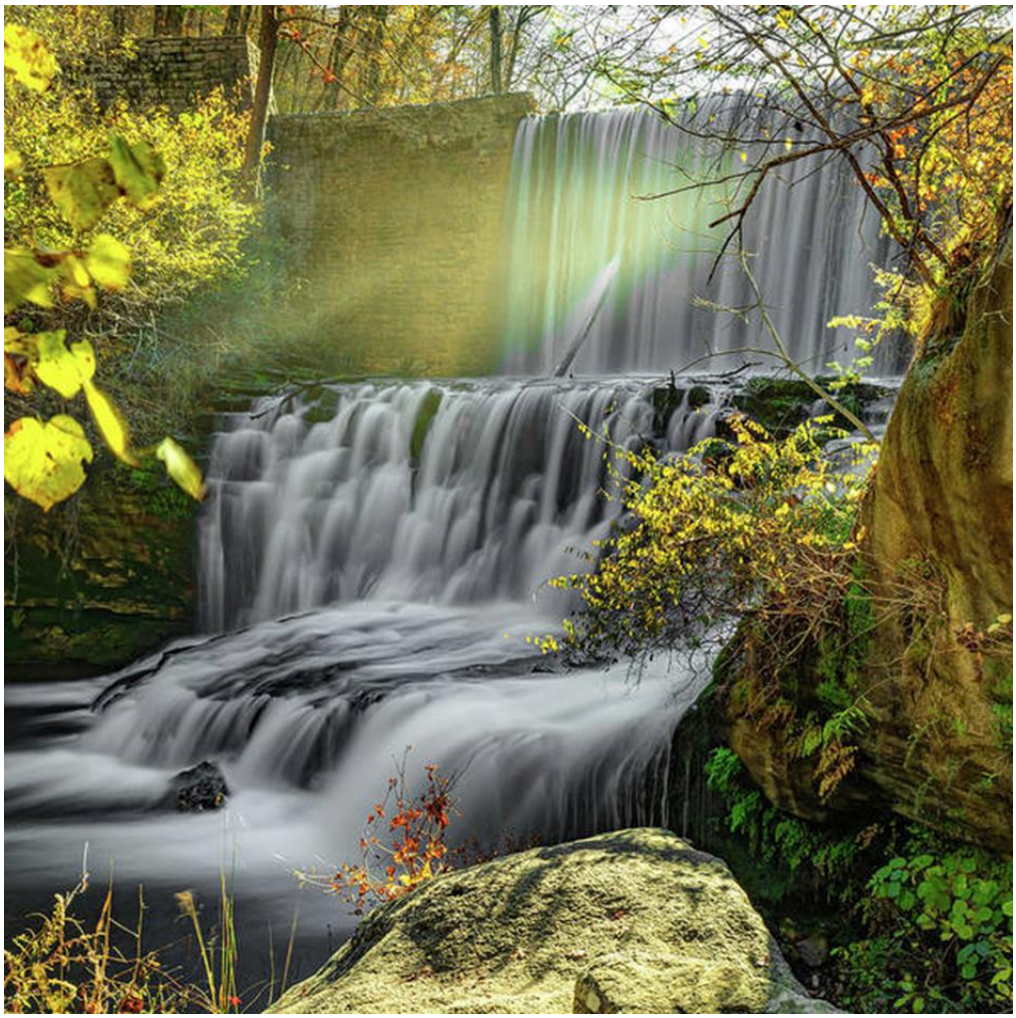


Image of overflow of dam at Mirror Lake downstream from Blanchard Spring along the spring run

MIKAS – Blue Spring (MO)

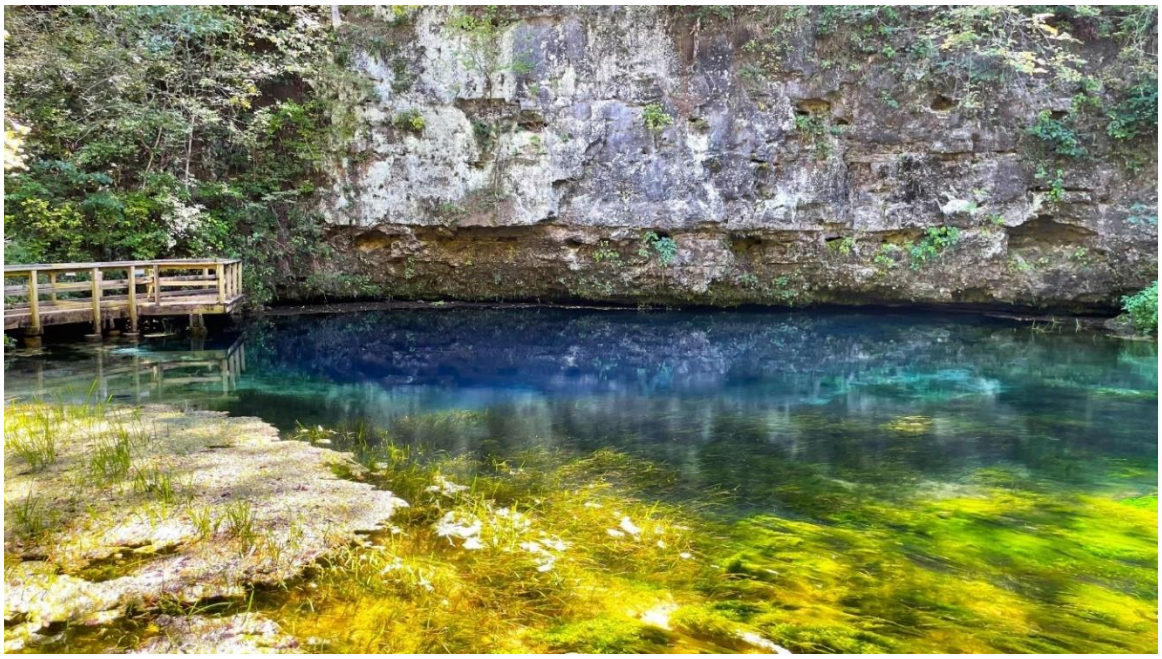


Image of Blue Spring (Shannon County) Missouri, during low-flow. Blue Spring has the reported deepest formation of an Ozark spring in the Missouri Ozarks (Photo by Neven Kresic)

Whereas the sign leading to Blue Spring boasts that it's the eighth-largest spring in Missouri, the Missouri Department of Conservation asserts it's now the sixth-largest (Photo by Neven Kresic)

Photo looking upward toward the surface resurgence showing a cave diver moving vertically downward along the spring bore, a distance of about 85meters. Diving in this spring requires a research permit, and dive times greater than 17 hours to reach the full extent of the mapped cave (Photo credit: https://www.ocda.org/exploration/projects/photo-of-the-month/)

MIKAS – Greer Spring

Image of Greer Spring resurging in its rise pool (two hundred yards down gradient of the bluff cave resurgence) at greater discharge in the big springs area of the Missouri Ozarks (Photo by Neven Kresic)

Ground level image of Greer Spring resurgence from a bluff in the Gasconade Formation during low flow (Photo by John Van Brahana)

MIKAS – Mammoth Spring

Southern outlet from Mammoth Spring rise pool showing intermediate discharge (Photo by Neven Kresic)

Hydroelectric dam at the distal end of the spring run of Mammoth Spring, Arkansas, where the spring water flows over the dam and creates the headwaters of the Spring River. The hydroelectric aspects of the structure are no longer operational (Photo by Neven Kresic)

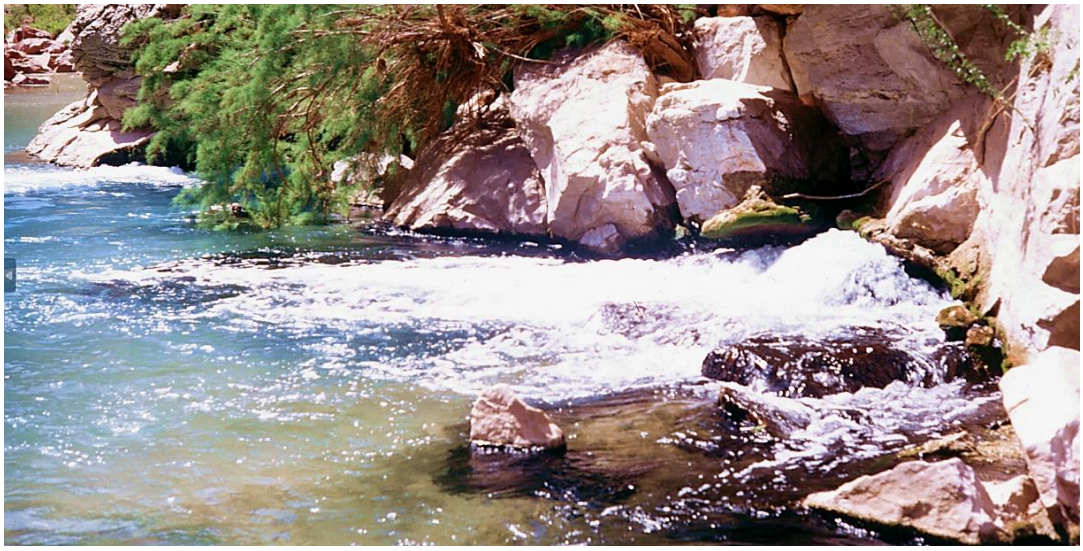
MIKAS – Blue Spring (AR)

Enlarged Google Earth View of Blue Spring in Arkansas

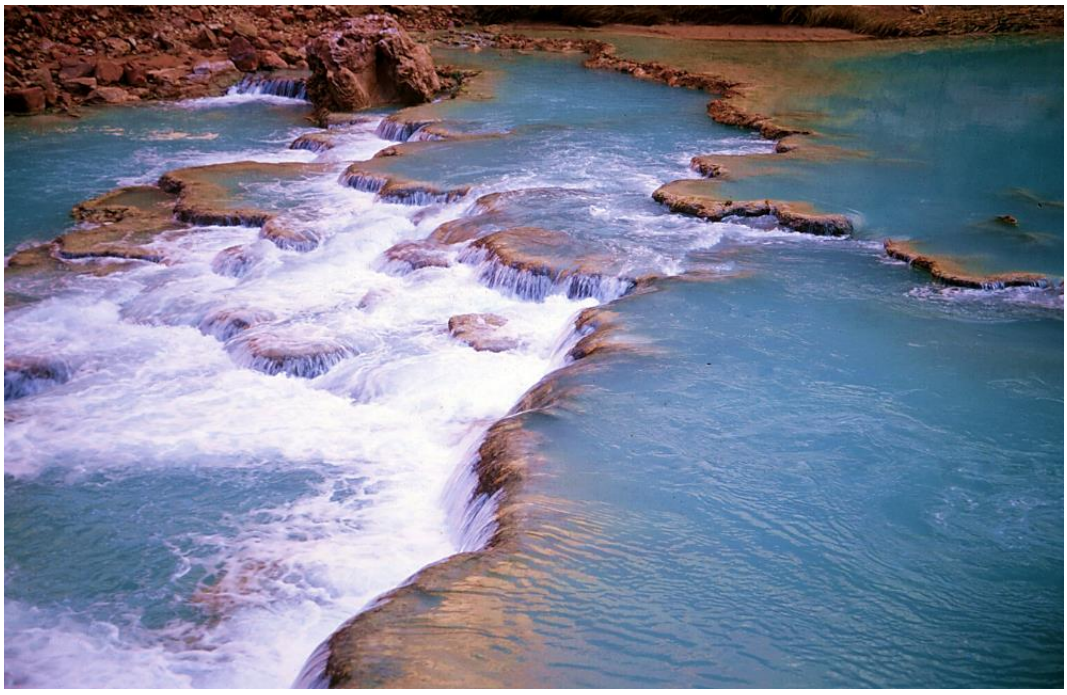
Blue Spring basin with the overflow to the trout lagoon (Photo by Neven Kresic)

The Bluff Shelter at Blue Spring with Native American pictographs is listed on the National Register of Historic Places (Photo by Neven Kresic)

MIKAS – Blue Spring (AZ)



View southeast toward upper and middle spring of Blue Spring, Little Colorado River (Courtesy of USGS, collection by George Billingsle)

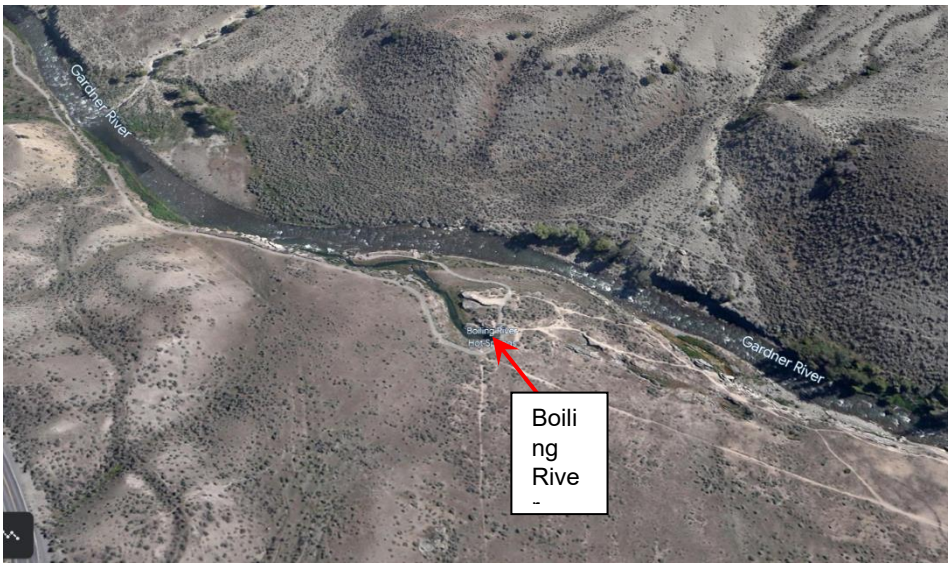


View east toward normal blue Little Colorado River spring water flowing over travertine dam deposits, just upstream of Big Canyon. Courtesy of USGS, collection by George Billingsle.

Confluence of the Little Colorado River (blue color) and the Colorado River (green color). Screenshot from a video Virtual Tour—Grand Canyon, AZ Dams Threaten the Little Colorado River, produced by EcoFlight in cooperation with Grand Canyon Trust. Available at https://www.grandcanyontrust.org/little-colorado-river-dam-proposals

MIKAS – Boiling River Springs (Yellowstone)

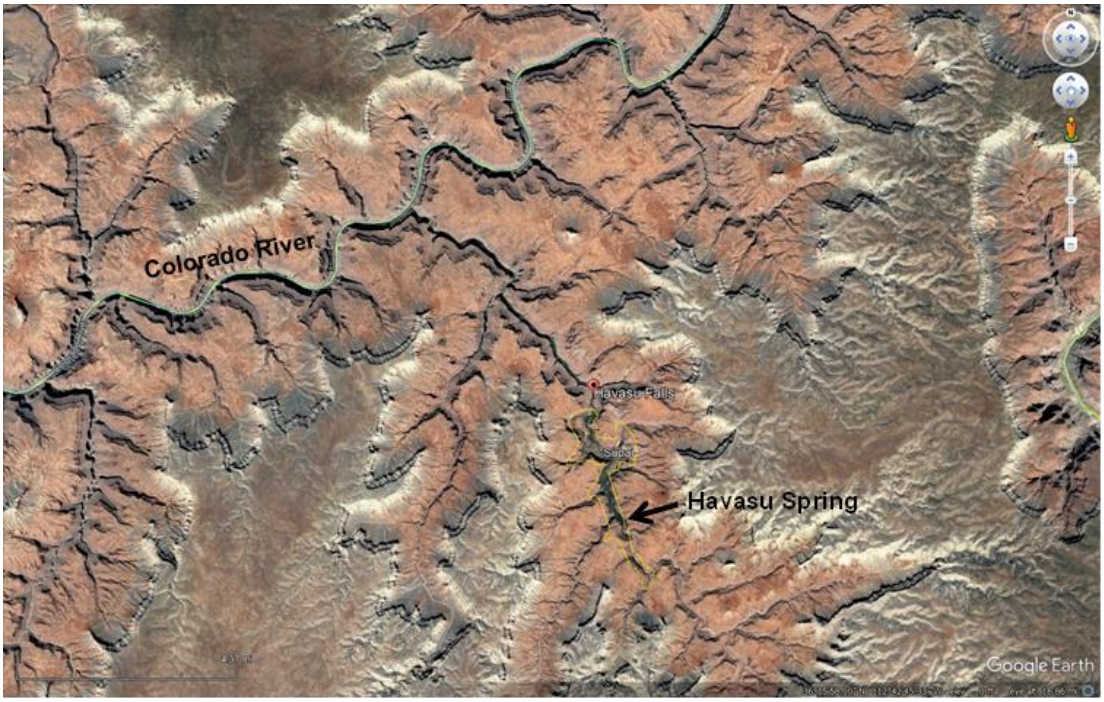
Left: Spring of the Boiling (Hot) River. Right: Boling River (seen in the left of the photo) cascading into the Gardiner River with bathers enjoying in the mixing zone of two rivers (71^{O}C temperature of the Boiling River is too high for bathing)



Google Satellite Images of the Boiling River Spring, Yellowstone National Park

MIKAS - Havasu Spring

View southeast toward Havasu Falls from trail in Cataract Canyon (Courtesy of USGS, collection by George Billingsle)



Google Earth satellite image of the Havasu Springs near Supai Village, Grand Canyon, Arizona

Travertine pools below Havasu Falls, Havasu Creek, Cataract Canyon (Courtesy of USGS, collection by George Billingsle)