

LAKE NEWS

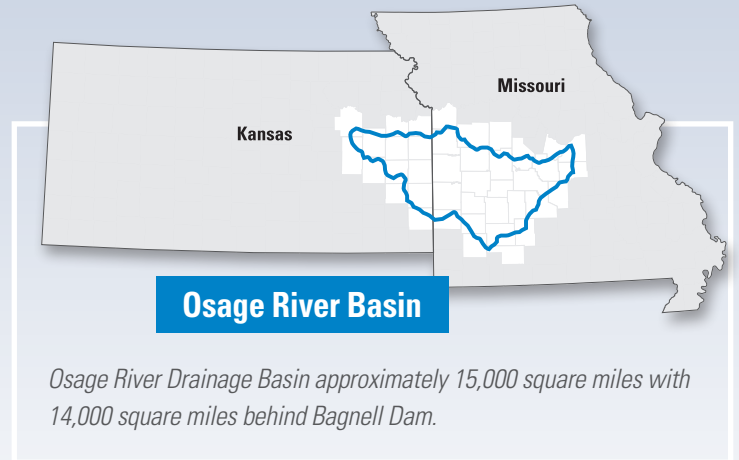
and **Shoreline Views**

Teamwork Required for Flood Water Management of Osage River Drainage Basin

Most folks around the Lake of the Ozarks are aware that 2019 was a year of historic flooding in the Missouri River system. It was historic for the Osage River Basin also. Harry S. Truman Dam, upstream of Lake of the Ozarks, reached the highest level in its history. Ameren Missouri received a lot of questions asking why Truman and Bagnell Dams weren't discharging more water as the level at Truman raised. Let's take a minute to look at how the US Army Corps of Engineers (USACE) and Ameren Missouri work together to manage the runoff of the entire Osage Basin.

The Harry S. Truman Dam was built about 93 river miles upstream of Bagnell in the late 1970's. This dam was built by the USACE for flood control, to alleviate flooding concerns because Bagnell was not designed for any significant flood control, but rather energy production. The Osage River Basin covers about 15,000 square miles and extends out into Kansas. Approximately 14,000 square miles of the basin lies upstream of Bagnell Dam. About 80% of that drains into Truman Lake with the remaining 20% draining directly to the Lake of the Ozarks. All of that water has to be routed through Truman, then Bagnell, then down the Missouri River to the Mississippi and finally down to the Gulf of Mexico.

Ameren Missouri and the USACE entered into an agreement to provide coordination of operation of Bagnell and Truman for the benefit of the general public. If Lake Ozark is experiencing a large inflow event, Bagnell operators can request the USACE to "shut off" Truman, effectively taking 80% of the Osage River Basin runoff out of the equation. This helps minimize the potential flooding on the Lake of the Ozarks and downstream in the Lower Osage and Missouri River valleys.



That same agreement allows the USACE to request Bagnell operators to only pass the amount of water that drains directly into the lake, commonly referred to as local inflows. This request is made to try to minimize the amount of water running into the Missouri River to alleviate flooding downstream of the Osage. The first major river gauging station below the confluence of the Osage and Missouri Rivers is at Hermann, MO and is used to determine the criteria to curtail releases. If the Missouri River gauge at Hermann rises above 260,000 cubic feet per second (cfs), Truman will completely stop discharges and request Bagnell to only discharge local inflows, effectively keeping the Lake of the Ozarks level.

In 2019, the Missouri River rose above this point several times. This was one of the main causes of Truman's level rising as high as it did. The good news is that the system worked. Truman stored enough water to fill the Lake of the Ozarks twice. Truman held several rains that would have added a substantial amount of water on top of already flooded lower Osage and Missouri Rivers. An added benefit for the lake area was that the storage and controlled release of water prevented major flooding along the lake.



Protecting Fish in the Osage River

We all know the lake and the river are teeming with fish, but few people recognize the positive environmental impacts that the Lake of the Ozarks and the operation of the Osage Energy Center at Bagnell Dam have on aquatic environment. Two important parameters that impact the aquatic life and habitat on the Osage River are dissolved oxygen concentration and the total dissolved gas concentration. Ameren Missouri spends considerable resources each year to ensure these two important parameters are maintained within required levels to protect aquatic life.

Like other animals, fish need oxygen to survive and thrive. Fish get their oxygen from the water; therefore, the water must contain a sufficient amount of oxygen to sustain the fish and their habitat. The measure used to ensure sufficient oxygen is present in the water is called dissolved oxygen (DO). Per Missouri state standards, warm water fishery streams must have a minimum of 5 parts per million (ppm) of DO. Natural flowing streams have adequate DO, but when you create a lake, especially as large as Lake of the Ozarks, the natural process of DO is impacted.

The Lake of the Ozarks, like other Midwestern temperate lakes and reservoirs, undergoes thermal stratification during the summer, which results in a warm water layer at the surface (epilimnion) isolated from the colder, denser water at depth (hypolimnion). Within Missouri, the seasonal sequence that creates this stratification begins in late winter with isolation into two separate water layers occurring initially in April and becoming firmly established in May. Meteorological conditions and falling water temperatures in the fall disrupt this separation. Missouri reservoirs typically undergo complete mixing (turnover) in October or early November.

During the summer period, natural physical, chemical and biological conditions result in the top 15-20 feet of the lake's water

remaining oxygenated well above 5 ppm while concentrations in the lower levels are gradually reduced until this layer has no oxygen. At Lake of the Ozarks, this typically occurs in July or August. The turbine intakes for the Osage Plant are located deep within the Lake, approximately 64 feet below the water surface. Consequently, water to operate the turbines is taken from the low DO waters, which can result in low DO in the Osage River.

A conflicting occurrence parameter to low DO is high total dissolved gas (TDG). If water has too much gas dissolved in it, the condition can be immediately fatal to fish. When too much gas is introduced into water, such as the turbulence below a waterfall or spill gate or by artificially injecting air to raise the DO content, the water becomes saturated with so much gas (oxygen, nitrogen, etc.) that it becomes deadly to fish. The Missouri state standard for the maximum amount of TDG is 110%.

From 2003 through 2009, Ameren Missouri replaced eight turbines. The replacements also utilized new technologies for injecting air into the water. This ensures that even with very low oxygenated water coming into the plant, the discharge to the Osage River would meet minimum standards. In addition, a very sophisticated control system was installed to control the turbines and vents to also limit the injection of air so that the TDG limit was not exceeded. Ameren Missouri's \$50 million investment in turbines and control systems not only helped wildlife but increased generation efficiency by 20%, making the upgrades a win-win.

Protecting fish and generating important renewable energy is something we should all be proud of, and it happens every day at Bagnell Dam and the Osage Energy Center.



INFORMATION

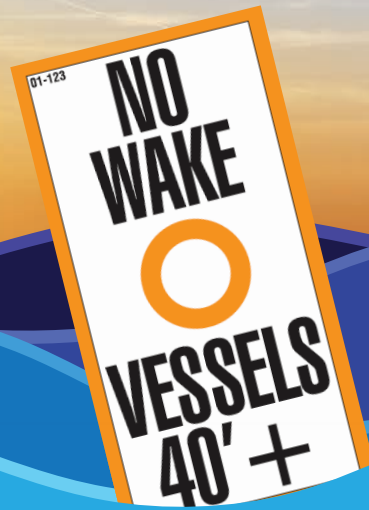
Shoreline Management Office Hours

9:00 a.m. to 4:00 p.m.

Monday, Tuesday, Thursday, and Friday. Closed Wednesday.

Our new mailing address is now the same as our physical address. Please send all requests and correspondence to:

**Ameren Missouri
Shoreline Management Office
3 Willmore Lane
Lake Ozark, MO 65049**



Limited No Wake Rule for Vessels 40' and Longer

In 2018, Missouri's legislature passed a law which allows for coves under 800 feet in width to be restricted to no wake for vessels 40' and longer. The law required a regulation, or rule, to be created by the Department of Public Safety to indicate how this limited no wake restriction would be implemented.

The Water Patrol Division of the Missouri State Highway Patrol was tasked with creating the rule to administer the restriction. The Water Patrol Division is granted the authority to create a uniform marking system for our waterways per state statute (RSMo 306.124).

In order to keep the new restriction uniform with the Water Patrol Division's current marking system, the newly created rule allows for the no wake restriction to be approved similarly to the current full no wake cove permits that apply to all boats. The new restriction that is limited to vessels 40' and greater is referred to as a "limited no wake cove."

For the purpose of no wake cove restrictions, cove width is measured between docks located on each side of the cove, if docks are present. If no docks are present, the measurement would be from shoreline to shoreline. By measuring in this manner, the Water Patrol Division is able to determine the width of the actual navigational path available to boaters.

The new limited no wake coves for vessels 40' and longer will generally only be issued for coves narrowing to 800' in width or less. The traditional full no wake coves are limited to coves 400' in width or less. There are exceptions to the width limits, including if the boating traffic in the cove is disproportionate to coves of similar size, or if boating accident data supports the need for such restrictions. Examples of exceptions to the width limitation would be if a cove contains a busy commercial establishment in the back of the cove, or if a cove receives heavier boat traffic due to a significant number of anchored boats that frequent the cove. The limited no wake restriction may be applied to a main channel area, but only if the channel area has narrowed to 800' in width or less.

There are some slight differences in the application process for the limited no wake coves compared to the traditional full no wake coves. Unlike the full no wake cove application, the limited no wake cove application does not require a petition from each lakefront property owner to determine whether 75% of the owners are in favor of the proposal. The limited no wake restriction proposals will simply be considered based on the application, the Water Patrol Division's investigation of the application and testimony provided at the public buoy hearing.

Limited no wake areas will be marked differently than the full no wake coves since no floating buoy markers will be used. A permitted sign will be approved for display on each side of the cove or channel where the limited no wake restriction begins. The applicant must have permission from the property owner(s) where the signs are proposed to be installed. Proof of ownership for those properties, such as a dock permit or property tax receipt is required as well. Enforcement will start at the line created between those two signs. The two signs may be displayed on docks and/or the shoreline in a conspicuous location visible to boaters. Standard uniform sign specifications have been distributed to several sign shops in the lake area, and the Water Patrol Division will maintain a list of those participating sign shops. The signs will be a minimum two feet wide by four feet high. The applicant is responsible for obtaining, installing and maintaining the signs. The uniformly marked signs approved by the Water Patrol Division should be limited to the two signs marking the beginning of the restricted area to avoid confusion for boaters and enforcement.

An interactive map showing the location of the limited no wake coves can be found on the Water Patrol Division webpage at mshp.dps.missouri.gov/MSHPWeb/WaterPatrol

Captain Matt Walz, Director, Water Patrol Division
Division Phone Number: **573.751.5071**
Division Email: Buoy@mshp.dps.mo.gov



Dock Electrical Safety

Ameren Missouri strongly recommends having your docks electrical system

inspected and tested by a qualified

electrician. In order to ensure proper understanding of the unique situations a dock's electrical system can present to electricians, Ameren Missouri is working with the Lake of the Ozarks Association of Electrical Contractors on specific training for boat docks. Recently, 28 individuals completed a Dock Electrical Technician course hosted by Ameren Missouri. Specific training included code knowledge, wiring techniques, workmanship and proper understanding of connection between the dock, house and utility system. If you would like to find out more about the Association, please visit their website at lozaec.org.



Adopt the Shoreline

The 29th Annual Spring Cleanup will be limited due to the current COVID-19 restrictions on travel and gathering of groups of people. Our volunteers will resume cleanup activities this fall or when those restrictions are lifted. Adopt-the-Shoreline cleanups are performed entirely by volunteers who work in 12 geographic zones around the lake. Since the organization formed, more than 15,000 volunteers have removed over 5.5 million pounds of trash and debris from 500+ miles of shoreline. Those who are interested in "adopting" a section of shoreline can call the Adopt-the-Shoreline office at **1.573.365.9206** or visit AmerenMissouri.com/ATS.

Adopt • the • Shoreline

SNAKES at Lake of the Ozarks

The emotional reaction that an encounter with a snake can elicit in a person ranges from fascination to absolute horror. Most snakes are not only harmless but beneficial to the ecology of the lake area.

I've been bitten by snakes many times, but with only one exception, I was either handling or trying to catch them. So, my fault. The exception was an encounter I had with a copperhead on a trail at night with no flashlight. I stepped on him before he bit me, so once again, my bad. Most snakes will stand their ground if cornered, but if you leave them alone, they will return the favor. In reality, the business end of most snakes is not the head. All of the species I've handled, and I've handled a lot, will usually emit a foul-smelling mixture from their vent when threatened.

We have 44 species of snakes in Missouri. Of these, approximately 24 are found at Lake of the Ozarks. Most of these are small, less than a foot in length, and very secretive. Unless you are flipping over rocks, boards, and logs looking for them, you are only likely to see about nine or 10 species. There are three species of venomous snakes native to the area but only one, the Osage copperhead, is common. Both the timber rattlesnake and western cottonmouth (water moccasin) are extremely rare.



Northern Water Snake

Western Cottonmouth

Northern Water Snake

The snake that you are most likely to see while on the water is the Northern water snake. This is a medium-to-large snake that commonly reaches a length of 24 to 36 inches. Northern water snakes are often seen basking on logs and rocks, or swimming in the water. Water snakes feed primarily on fish, toads, and frogs. Even though they feed on fish, they tend to target those that are sick or injured. As a result, they improve the health of a fishery by helping to limit the spread of disease. Although harmless, this snake will flatten its head and body and bite aggressively if cornered.

This snakes' aggressive behavior, affinity for the water, and coloration cause it to be confused with the venomous western cottonmouth. Cottonmouths are extremely rare this far north in Missouri. In fact, I've never seen one in the 30+ years and thousands of hours I've spent on Lake of the Ozarks and other local lakes and streams as a fishery biologist with the Missouri Department of Conservation.



Osage Copperhead

The one venomous snake that is common to the area is the Osage copperhead. The markings on this snake consist of dark hour-glass shaped bands which are often bordered in white. Like all of the venomous snakes in Missouri, the copperhead is a pit viper. The 'pit' is an opening located between the eye and the nostril. This pit is a heat-sensitive organ that allows the snake to locate warm-blooded prey, such as a mouse, in total darkness. Another characteristic that sets the pit vipers apart from the harmless species is the shape of the pupil. Pit vipers have vertical pupils, like a cat. All of the non-venomous species in Missouri have round pupils.



Eastern Hognose Snake

The hognose is the clown of the snake community. When cornered, this snake will put on quite a show. And that's all it is – a show. It will flatten its head and body, hiss loudly and strike aggressively (with its mouth closed). If this fails to discourage an attacker, the next trick is to play dead by rolling on its back and opening its mouth. If turned right-side-up, they will immediately flip upside down again. Adult hognose snakes average 2' to 3' in length. They feed primarily on toads and frogs.



Black Rat Snake climbing down the underside of a leaning tree

Black Rat Snake

The black rat snake is one of our most common and largest snakes, reaching a length of up to 7'. As the name implies, this snake feeds on rats and other rodents. If you have a barn and rat issues, a couple of these snakes will solve your problem. Rat snakes are as at home in the trees as they are on the ground. While the cross-sectional body shape of most snakes is round, the rat snake has a rounded back and a flattened belly, like a loaf of bread. This flat belly and oversized belly scales allow the snake to get a grip on the bark of trees.

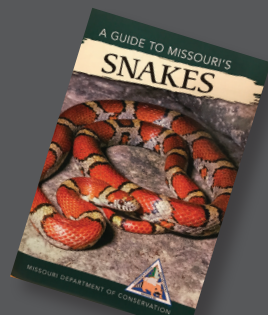


Prairie Ring-necked Snake

The prairie ring-necked snake is one of our smallest species, averaging less than a foot in length. It is also one of our most colorful with a shiny gray upper body, yellowish-orange ring around the neck, and a black-spotted yellow belly that changes to bright red under the tail. Although fairly secretive, this snake is often encountered in yards under leaf litter, boards, or in mulched areas. When threatened, they have a habit of coiling their tail and exposing the brightly colored underside.

Other snake species you are likely to encounter around Lake of the Ozarks include the eastern yellow-bellied racer, speckled kingsnake, prairie kingsnake, western ribbon snake, rough green snake, eastern coachwhip, and eastern garter snake.

For more detailed information regarding the snakes of Missouri, you can request a copy of *A Guide to Missouri's Snakes* from the Missouri Department of Conservation or visit mdc.mo.gov.



Permits

All structures within the project boundary must be authorized in accordance with our FERC license. This authorization has been a requirement since 1931 and is accomplished by the issuance of a permit. Permit review and approval was originally handled by the Corps of Engineers and now is administered by Ameren Missouri. Each individual structure that is installed or has been installed within the project boundary must have its own permit number that is issued to the current owner of the facility. Permit numbers are

MESSAGE TO TRANSFERS

If you buy a lakeside house, it is your responsibility to transfer all the permits into your name. This can be done with a single transfer request and \$35 processing fee. This will cover all the permits (dock, pump, seawall, etc.) on your new property.

For more information call the Shoreline Management Office at 1.573.365.9212 or 1.573.365.9208.

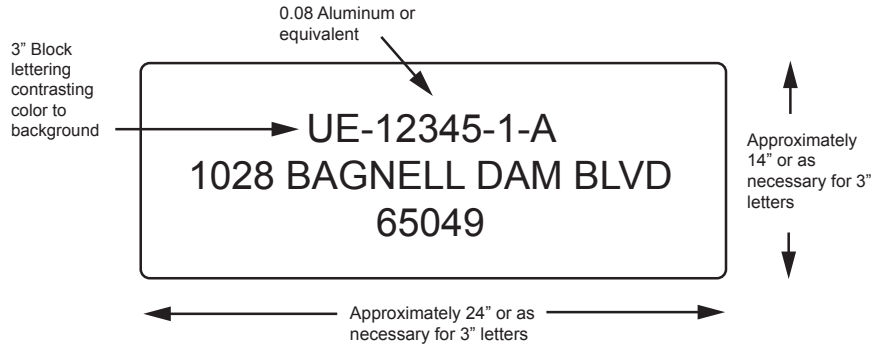
Turning Foam Into Jobs

If you have old dock foam, and you don't know what to do with it, you are in luck! Lake Area Industries (LAI), the extended employment sheltered workshop in Camden County, can recycle your foam and turn it into jobs for people with disabilities.

In 2013, LAI partnered with the Missouri Department of Natural Resources to process old dock foam with a foam densifier. The goal was to clean up the wooded areas that had become overrun with the non-encapsulated foam after it had been removed from docks as mandated in 2008. This endeavor was successful and now LAI has the equipment to recycle all of the unwanted foam in the lake area.

Recycling your foam with LAI is easy and affordable. LAI charges \$10 per cubic yard which is less than \$18 for a standard encapsulated dock float (4'x8'x1.5').

Ameren Missouri Permit Number & Address Posting Requirement



The sign shall be mounted on the lake side of the dock in a location most visible from the cove or the main channel

Missouri State law requires all docks located at the Lake of the Ozarks to display their permit number and the nearest land-based 911 address, including the zip code.

unique to each parcel of land, much like a 911 address, they do not move with a facility such as a boat dock. If you are unsure if one of your lakeside improvements is properly permitted or don't have copies of your permits, contact the Shoreline Management Office at **1.573.365.9212** or **1.573.365.9208**.



Taking the same piece of foam to the landfill would cost approximately \$85. Recycling also saves precious space in the landfills and provides meaningful jobs for adults with disabilities here at the lake.

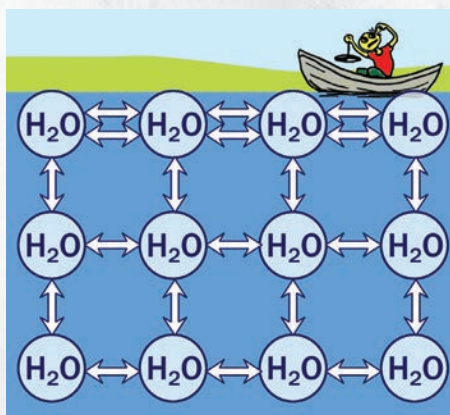
LAI is located at 1720 N Business Rt. 5 in Camdenton. In addition to dock foam, they accept packaging foam but no peanuts or food trays and cups. Their hours are Monday through Friday, 8 a.m.- 4 p.m. Cash, check, or credit card are all accepted. Please call **1.573.346.7934** with questions.



Foam On the Lake

When looking out on a lake or stream, sometimes we can see a brown, funky foam in eddies or at a lake's edge. The sight of this foam immediately makes one think of soaps, detergents, and pollution in general. These associations understandably lead us to assume that some manner of human-induced problems are responsible. While it is possible that humans are to blame for the foam you see, it is more likely just a natural phenomenon.

A quick test is to smell the foam. If it smells like flowers or perfume, it is most likely a detergent. If the foam smells fishy or earthy, it's probably natural. If the foam feels slimy to the touch, it's more likely to be from a pollution source. Also, natural foam is usually, but not always, darker in color than the foam of detergents.



Surface Tension: Water molecules at the surface form stronger bonds than those below.

Here's how foam forms. Water molecules want to cling to each other. They cling to those above, below, and to the side of them. Water molecules at the surface have nothing above them to cling to, so they cling tighter to the molecules around them. This results in a surface layer of strongly bonded water molecules known as surface tension. This creates a considerable barrier between the atmosphere and the water. In fact, other than mercury, water has the greatest surface tension of any liquid.

When surface tension is low, air can become trapped inside water, forming bubbles. In this case there is enough attraction between the molecules on the bubble's surface to maintain a bubble shape but not enough to pull the molecules completely together and force the air out of the bubble. When the surface tension is high, the attraction between surface water molecules can easily pull themselves together, and the bubble pops.

The surface tension of water varies depending upon the dissolved materials in the water and the temperature. Organic compounds from decomposing plant or animal matter or from actively photosynthesizing plants can reduce the surface tension of lake or stream water. Both detergent and heat reduce water's surface tension, allowing the water to enter smaller pores and fissures, which is great for forcing dirt out of your clothes. Hard water increases surface tension. Water softeners reverse this effect, reduce the surface tension, and ultimately result in cleaner clothes and sudsier baths.

On lakes, in bathtubs, and in mugs of beer, the cause for foam is the same. Agitation at the surface causes air to get under the surface film of the water. Weakened surface tension is unable to force the air out, keeping a layer of water wrapped around a volume of air, creating a bubble. If this happens for long enough, foam is created. On lakes, the agitation is usually due to wind, and the resulting foam will collect on the downwind side of the lake. In streams you will see the foam in eddies or floating downstream, and it is created by the flow of the water disturbing the surface film.

The Lakes of Missouri Volunteer Program is a statewide group of citizen scientists who monitor water quality on Missouri's lakes. To participate or for more information, call **1.573.882.5430** or email **info@LMVP.org**.



3 Willmore Lane
Lake Ozark, MO 65049

Website:
AmerenMissouri.com/lake

Important Phone Numbers:

Lake Protection Hotline
1.573.365.9203

Lake Level
1.573.365.9205

Adopt-the-Shoreline
1.573.365.9206

Water Patrol Division (Buoy)
1.573.751.5071

Benton County (Emergency Management)
1.660.438.8412

Camden County (Planning & Zoning)
1.573.346.4440

Miller County (County Commission)
1.573.369.1900

Morgan County (County Commission)
1.573.378.4643

Shoreline Management Staff is here to assist you with your next Lakeside project and to help answer your questions about Ameren Missouri's role at the Lake:

Osage Arm – Bagnell Dam to 16-mile marker and Gravois Arm

Josh Friedrich — 1.573.365.9247

Osage Arm – 16 to 26-mile marker, Glaize Arm, commercial docks, and docks 3,000 square feet or larger

Heidi Shewmaker — 1.573.365.9216

Osage Arm – 26 to 32-mile marker and the Niangua Arms

Chuck Van Bebber — 1.573.365.9215

Osage Arm – 32-mile marker to Truman Dam

Joe Daly — 1.573.365.9207

Dredging, wetlands, shoreline vegetation or other environmental questions

Greg Stoner — 1.573.365.9206

Brian Spencer — 1.573.365.9217



EVERY STRUCTURE ALONG THE LAKE SHORELINE MUST BE COVERED BY A VALID PERMIT. DO YOU HAVE COPIES OF YOURS?

To obtain copies of your permits, you will be asked to submit a permit request form. The permit request form can be downloaded from our website or by contacting the shoreline management office at **1.573.365.9208** or **1.573.365.9212**.