



LAKE NEWS

and Shoreline Views



Shoreline Management Opens New Office Building

The new Ameren Missouri shoreline management office at 3 Willmore Lane is open. Standing across from historic Willmore Lodge in Lake Ozark, our new 5,000-square-foot office includes a public foyer, staff offices, substantial storage and immediate access to the Lake of the Ozarks for management activities. The building is architecturally compatible with Willmore Lodge. The Lodge served as the original administration building for Union Electric Co. during the construction years of Bagnell Dam. It now houses the Lake Area Chamber of Commerce as well as a museum and visitor's center with information about Bagnell Dam and its history.

Ameren Missouri is committed to sustainability. We put that dedication to work in our new shoreline office by building it according to Leadership in Energy and Environmental Design (LEED) standards. The voluntary LEED program evaluates and assigns points for all aspects of building design and construction to promote "green" construction practices.

The new office is the third building the staff has utilized during the past couple of years. Ameren Missouri's last building on Bagnell Dam Boulevard lost its roof during a severe storm in June 2013, forcing employees to move to temporary quarters at Lake Ozark's Cliffside Center.



Shoreline management staff from left to right: Supervisor Jeff Green, Georganne Bowman, Chris Korsmeyer, Bryan Vance, Josh Friedrich, Teresa Mahoney, Heidi Shewmaker, Chuck Van Bebber, Joe Daly and Shawn Roark

Managing the Lake Level Is a Piece of Cake...Right?

By Alan Sullivan
Consulting Engineer, Ameren Missouri—Bagnell Dam

One of the most frequently asked questions that Ameren Missouri receives, either at the shoreline office or at Bagnell Dam is, “Why isn’t the Lake _____?” You can fill in the blank with the words higher, lower, going up, going down or holding steady...to name just a few. So, let’s take a moment to talk about how and why the Lake level changes and the many regulatory requirements that factor into our daily decision-making process.

Most people know that Bagnell Dam is regulated by the Federal Energy Regulatory Commission (FERC). Most people also know the dam is not owned by the government; it is owned by Ameren Missouri. FERC grants Ameren Missouri an operating license to run the dam, just like the state of Missouri grants licenses for people to drive cars. As with a driver’s license, a FERC license has rules.

FERC rules call on Ameren Missouri to balance these four priorities in its operation of Bagnell Dam:

- 1. Power generation**
- 2. Flood control**
- 3. Environmental resource protection**
- 4. Recreation**

To generate power at the dam, Ameren Missouri runs water through turbines. This affects the Lake’s water level, particularly during hot, dry periods when power is needed most. Lower summertime Lake levels affect recreation, so Ameren Missouri attempts to keep Lake levels higher during the recreation season. However, higher Lake levels increase the risk of flooding during heavy rains. On top of these sometimes conflicting priorities are a multitude of environmental requirements. For example, we have installed a net in front of the dam to keep fish from swimming into the turbine intakes; we inject air into the discharged water so it contains the right amount of dissolved oxygen for aquatic life; and we meet prescribed minimum flows that are calculated every day and vary with the time of year.

Ultimately, area residents want good Lake levels that are not too high and not too low, a clean, environmentally-friendly Lake and good fishing and boating. As you can see, there are many factors that affect Lake levels and the dam’s operation. Balancing them all to maximize the use of our beautiful water resource is a complex daily task.



Photo credit: Lake Shots Photography

Common Questions About the Lake of the Ozarks Water Level

Why does the Lake level vary so much from winter to summer?

The FERC license for the dam contains a “guide curve” that shows Lake levels throughout the year. Per the guide curve, we typically draw the Lake down in the winter. By early spring, depending upon weather conditions, the water level is targeted for about 654 feet above sea level—or six feet below the full reservoir level of 660 feet. We do this to make room for the typical spring rains, which create higher than normal inflows. This reduces the possibility of flooding—both on the Lake and on the Osage River below the dam—since we are better able to absorb spring rain inflows.

Why does the Lake sometimes rise above 660 feet?

Some of us remember the 1986 flood, when the Lake peaked at a 664.3-foot elevation. The FERC license requires Ameren Missouri to discharge water during a flood so as to not make flooding downstream of the dam more severe than it would have been if the dam were not here. We’re required to calculate a “natural flow,” which defines how much water we can release during a flood. Based on this natural flow calculation, we store some of the flood water in the Lake and release some of the water downstream through our floodgates. The Lake in many of these events will exceed 660 feet to accommodate the calculated natural flow during flood events.

The black line in the guide curve shows target elevations for the Lake of the Ozarks and the seasonal fluctuations that occur each year.

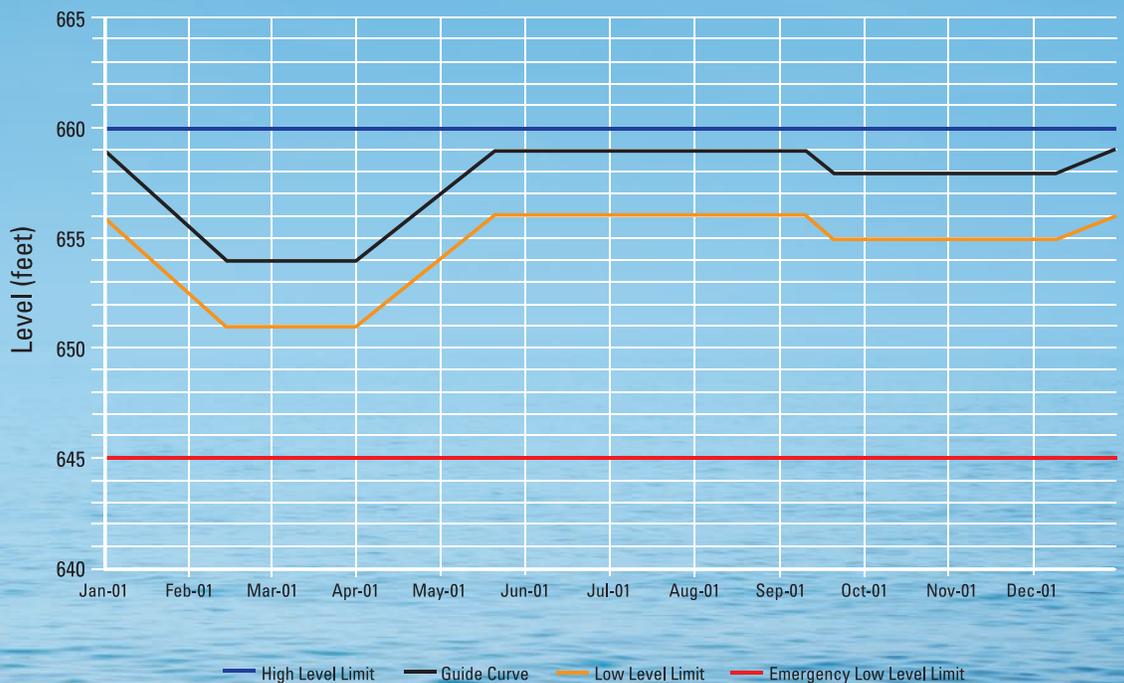
Ameren Missouri is committed to balancing various interests to ensure that the priorities of power generation, flood control, environmental enhancements and recreation are met now and in the future. Feel free to call the Ameren Missouri Lake Level Hotline at 1.573.365.9205 for daily Lake level information. You also may access the daily generation and Lake level page at AmerenMissouri.com/Lake.

Why doesn't the U.S. Army Corps of Engineers regulate our Lake levels?

The Kansas City Corps office communicates with Ameren Missouri every day regarding flow releases from the Harry S. Truman (HST) dam. Since the water discharged from the HST dam flows directly into the Lake of the Ozarks, we must decide either to store that water or release it by generating power. If we store the water, the Lake probably will rise. If we release the water, the Lake level may fall, depending on how much water is coming in. During flood times we may ask the HST dam operators to cut water flow until other local inflows slow down enough for Bagnell Dam to handle them. Once the inflow abates, the Corps begins releasing water from the HST dam again. Truman Lake has a significant amount of flood storage capacity, so it has been a great help in reducing or eliminating floods since it went into operation in 1979.

Where does all the water come from?

The Lake of the Ozarks covers more than 55,000 acres in surface area and contains more than 600 billion gallons of water. Where does all of that water come from? It comes from the Osage River Watershed, which comprises all of the land that collects rainfall and runoff draining into the Osage River. The basin is vast, stretching north to near Kansas City; south to near Springfield, Mo.; and west to near Topeka, Kansas. The Lake of the Ozarks is the last in a series of seven major reservoirs that uses the water within this watershed before the Osage River enters the Missouri River just south of Jefferson City. The entire watershed encompasses more than 15,000 square miles, with 14,000 square miles of the watershed located west of Bagnell Dam. By working in conjunction with the U.S. Army Corps of Engineers, Ameren Missouri helps manage this water for many uses beneficial to residents both upstream and downstream from the Lake of the Ozarks.





Dock Inspection: An Ongoing Responsibility

The transition from a severe winter with ice and reduced water levels to a busy summer season can be difficult for many docks and breakwaters. Winter ice and wave action from storms can significantly damage docks. This type of damage also impacts dock electrical systems. Even docks without apparent structural damage may have damaged or faulty wiring. Docks should be inspected throughout the year by owners and annually by professionals. Any repair work or modifications to a dock's electrical system must meet Ameren Missouri and fire district guidelines. The following entities have permit programs that must be followed any time electrical work is completed within their jurisdictions.

City of Camdenton
1.573.346.3600

Lake Ozark Fire Protection District
1.573.365.3380

Mid-County Fire Protection District
1.573.346.2049

Northwest Fire Protection District
1.573.347.3110

Osage Beach Fire Protection District
1.573.348.1221

Rocky Mount Fire Protection District
1.573.392.4301

Sunrise Beach Fire Protection District
1.573.374.4411

Village of Four Seasons
1.573.365.3833

Don't Build Something You Will Have to Tear Out Later

In 2007, Ameren Missouri received a new license for the Osage Hydro Electric Project that includes the Lake of the Ozarks. The license, and the Shoreline Management Plan that subsequently was approved, does not allow for the installation of new Lakeside accessory structures below the 662-foot elevation. This is a vast change from previous practice, which allowed accessory structures below that elevation. Ameren Missouri shoreline management staff members are inspecting the entire Lake's shoreline each year and monitoring construction very closely. Here is what we have found:

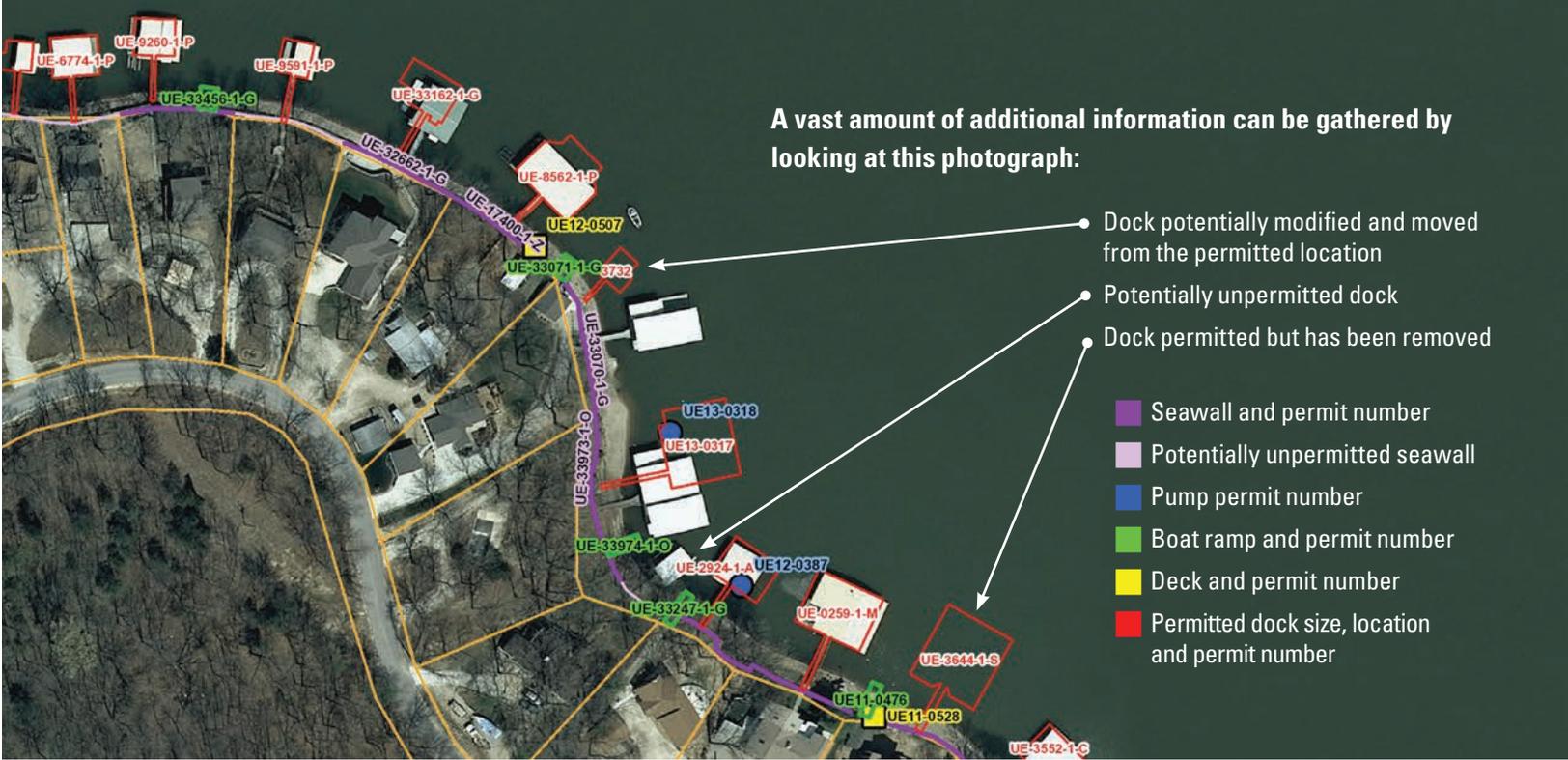
Permitting structures below the 662-foot elevation. Beginning in 2007 and ending in 2011, shoreline management staff surveyed and inventoried many unpermitted structures below the project boundary of 662 feet. The majority of these can be permitted, if they were built according to requirements at the time of construction. Last summer, our staff completed a Lakewide inspection that measured and photographed lakeside patios, decks, gazebos and sidewalks. If you're the owner of one of these structures, we'll be mailing you information that will allow you to officially obtain a permit for it. Once you have that, you can keep and maintain the permitted structure at its current size and location. Please keep in mind this does not include new decks, patios, walkways or gazebos! Any new construction of these structures must be placed above Ameren Missouri's project boundary or they will have to be removed.

Nonconforming and new structures. About 215 structures built prior to 2008 were not constructed according to the requirements of the time. These must be registered with FERC as nonconforming in accordance with our Shoreline Management Plan. Our inventory of the shoreline also has uncovered new construction projects, such as decks and sidewalks, built below the 662-foot elevation after 2008. Shoreline management staff members typically notify owners of these structures that they should stop construction if it still is under way and remove all constructed improvements below the 662-foot elevation or within 3 feet behind constructed seawalls.

Shoreline monitoring. Since the completion of our initial survey work in 2011, shoreline management staff members have completed three additional inventories. We intend to visually inspect all 1,150 miles of shoreline each year to ensure no new structures are placed in violation of our new shoreline policies. If you have questions about your construction project, or if you see someone else building a deck, patio or gazebo on the shoreline, please contact us at 1.573.365.9203.



New sidewalks along the seawall or below the 662-foot contour elevation are not allowed. If the 662-foot contour elevation is located on the face of the seawall, the sidewalks must be three feet behind the landward side of the wall. Access paths to the dock can still be constructed. If you have any questions about the location of the project boundary or how it might impact your next building project, please contact the shoreline management office. We can help ensure that your project is in compliance with the Lake's approved Shoreline Management Plan.



A vast amount of additional information can be gathered by looking at this photograph:

- Dock potentially modified and moved from the permitted location
- Potentially unpermitted dock
- Dock permitted but has been removed

- Seawall and permit number
- Potentially unpermitted seawall
- Pump permit number
- Boat ramp and permit number
- Deck and permit number
- Permitted dock size, location and permit number

Shoreline Permitting and GIS

Construction equipment and techniques certainly have changed in 83 years, but the desire to build near this great body of water has always been strong. Just as the construction equipment has changed, so has the management of the Lake’s shoreline. In 1931, the U.S. Army Corps of Engineers was responsible for administering the permit program for shoreline improvements. Beginning in 1983, Union Electric—now Ameren Missouri—replaced the Corps as the permitting agency for private docks.

DID YOU KNOW

that a dock permit is issued to a specific parcel of land, much like an address point? The permit does not move with a dock if its location changes.

In order to keep pace with the thousands of permits that are issued each year, Ameren Missouri has a dedicated shoreline management staff responsible for ensuring that each facility located along the Lake’s shoreline is properly permitted. This is certainly no small challenge, considering there are 1,150 miles of Lake shoreline and literally tens of thousands of shoreline improvements. There are two main tools used to help keep track of these facilities. The first is our shoreline permitting system, which keeps track of all permits and documents

associated with each individual Lake property. The information contained in the permit system is then displayed in our geographic information system (GIS) as easily recognizable symbols and permit numbers. By graphically displaying the information in the GIS, vast amounts of information can be easily viewed without sorting through mountains of paper files or traveling thousands of miles on the water. Additionally, it uses aerial photography as a base map that allows us to see changes occurring over time. By frequently updating the aerial photography, we can see when improvements are made, installed or changed.

In short, the GIS gives us the ability to inventory the Lake’s shoreline by comparing the underlying aerial photography with the permitted facilities.

The GIS also allows us to easily complete an annual field survey of the shoreline. By displaying the GIS on a laptop computer that has been enhanced with a global positioning system (GPS), shoreline staff members can travel along the shoreline

comparing the information they see on the computer screen with what they see in real life. In fact, we have completed a visual inspection of all 1,150 miles of the Lake’s shoreline every year since 2007, photographing and documenting existing facilities, inspecting recently permitted structures and verifying that no new structures are being built without approval.

Managing a geographic area as large and busy as the Lake of the Ozarks certainly can be challenging, but it is becoming more manageable as we continue to improve our permitting and monitoring tools.

Check Your Permit Status Online



Access our website at AmerenMissouri.com and select the Online Permits & Payments tool under the Lake of the Ozarks link. You can monitor the progress of your permit, whether it has been submitted through our online system, mailed or dropped off at our office. To search by an owner’s name and/or a ZIP code, simply enter a portion of the name and/or a ZIP code. Results will be sorted alphabetically by the owner’s name. Review and processing time is four to six weeks once the application has been entered into our system.



Dock Storage and Enclosures

Are you considering a new storage shed or other improvement to your dock? It is important to remember that a permit is issued for a specific dock size, slip size and location. Additionally, all enclosures or other improvements must be specified on the dock permit. Modifications cannot be made to your dock without modifying your dock permit. Please remember that the maximum amount of enclosed storage on any single dock is limited to 80 square feet. Storage structures are prohibited from housing living quarters, dishwashers, garbage disposals, showers or restrooms.

What's Going On With Zebra Mussels?

*By Greg Stoner
Fisheries Management Biologist—Lake of the Ozarks, Missouri Department of Conservation*

Zebra mussels were first found in Lake of the Ozarks in June 2006 near the eight-mile mark. Sighting reports from anglers and landowners poured in steadily for the next few years. By the end of 2009, zebra mussels were well established in the Gravois Arm and the Osage Arm from Bagnell Dam to the mouth of the Glaize Arm. They also thrived in the Osage River, from Bagnell all the way to Jefferson City. It appeared the entire Lake would soon be overrun with zebra mussels, an invasive species that can crowd out other aquatic life and clog water intake systems.

Then something unexpected happened. In 2010, the local MDC Fisheries Biologist received only one zebra mussel report. No reports were received in 2011 or 2012. As it turns out, zebra mussels cannot tolerate water temperatures much higher than 85 degrees for extended periods of time. At the Lake, we routinely have summer water temperatures which approach or even exceed 90 degrees. This trend has been observed in other reservoirs throughout the southern half of the country where zebra mussels have been introduced.

So did we get rid of all the zebra mussels in the Lake? Apparently not. Starting in 2013, reports of zebra mussels started to come in again. The summer of 2013 was unusually cool, and water temperatures barely made it above 80 degrees. The few surviving zebra mussels left in the Lake were able to take advantage of these cooler temperatures and started to rebuild the population. But a month of hot water temperatures in August of 2014 kept the population from exploding last year.

We have seen that zebra mussels can do quite well in the Lake given the right conditions, but also that a good, hot summer will knock the

population down. In the future, we expect to see the population cycle up and down in response to summer water temperatures. Even though there is no feasible way to completely eliminate them from the Lake, it does not appear they are going to cause the environmental and recreational problems we once feared would occur.



A zebra mussel monitor removed in 2008 from the nine-mile marker is covered with the mollusks. The same monitor had no zebra mussels in 2013.

Large Wake on the Lake

Large boats and the waves they create account for a high percentage of our summertime complaints. With Lake use on the increase, it seems boat sizes also are increasing. Large boat owners need to be aware of the wake they produce. Those who operate large watercraft are ultimately responsible for the wake that their boat creates. Poor operating skills, even in small watercraft, can create wakes that can be damaging to docks and other boats. Large boat owners need to take extra care when they venture to the upper Osage (above the 40MM) and other tributaries like the Niangua and Gravois. Docks in these areas are not built to withstand large waves, and there are miles of unprotected shoreline easily eroded in these conditions. To minimize damaging wakes, large boat owners should maintain idle speed in areas outside of the main channel and strive to keep their craft in the center of the channel while on plane. Also avoid speeds which tend to plow or displace more water, producing larger wakes. Ameren Missouri encourages all boaters, big and small, to boat safely and be mindful of the wakes boats can produce.



Wearing your life jacket is the best way to avoid drowning. More than 80 percent of all boating accidents in which someone drowns

involve people not wearing a life jacket. The Lake of the Ozarks Water Safety Council is a not-for-profit public service organization that promotes boating and water safety at Lake of the Ozarks, with a primary focus on ensuring that Lake residents and visitors understand the importance of life jackets and designating a sober captain. To learn more about their programs, visit them on the web at lakeoftheozarkswatersafetycouncil.com.



Photo credit: Lake Shots Photography

Adopt the Shoreline

Are you interested in becoming one of the more than 13,000 people who have volunteered and kept the Lake of the Ozarks clean over the past 23 years? Do you have a section of shoreline that you would like to adopt and keep free of trash and litter? If so, contact the Adopt-the-Shoreline program at **1.573.365.9212** to see how you can become involved with making the Lake of the Ozarks more enjoyable for everyone.





P.O. Box 993
Lake Ozark, MO 65049

Website:
AmerenMissouri.com/Lake

Important Phone Numbers:

Lake Protection Hot Line
1.573.365.9203

Lake Level
1.573.365.9205

Adopt-the-Shoreline
1.573.365.9252

Missouri State Highway Patrol
1.573.751.3313

Water Patrol Division (Non-Emergency)
1.573.751.3313

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
Chris Korsmeyer 1.573.365.9209

Osage Arm – 16-mile marker to 32-mile marker, and the Niangua's and Glaize Arms

Chuck Van Bebber 1.573.365.9215

Osage Arm – 32-mile marker to Truman Dam

Joe Daly 1.573.365.9207

Commercial docks and docks larger than 3,000 square feet

Heidi Shewmaker 1.573.365.9216

Dredging, wetlands, shoreline vegetation or other environmental questions

Bryan Vance 1.573.365.9252
Georganne Bowman 1.573.365.9217



EVERY STRUCTURE ALONG THE LAKE SHORELINE MUST BE COVERED BY A VALID PERMIT. Do you have copies of yours?

The shoreline management office can help you get copies if you need them. Permit records are cataloged by name and county parcel identification numbers (PID) rather than street addresses. Contact our office with name and county parcel information and we will help you.