AQUAGUIDE

Missouri Department of Conservation

A Landowner Guide to Sand and Gravel

Sand and gravel are important natural features in Missouri streams. These sediments, along with flowing water, form the stream channels where aquatic life flourishes and humans love to fish, paddle, and splash! In some places, however, *excess* sand and gravel have created a problem for landowners.

A stream channel filled with sand or gravel is a common sight in Missouri, the result of historical and modern-day disturbances.

Streams naturally migrate as they erode streambanks and carry sediments, like sand, gravel, clay, and silt, downstream to be deposited. This creates meanders (bends in the river), sand or gravel bars, islands, backwaters, wetlands, and all types of stream habitat. A stream is the result of many processes working together to form a stable, balanced ecosystem. When something changes that balance, the result can be a stream that is overwide, shallow, and filled with sand and gravel. These changes create challenging circumstances for animals and plants that use streams, but also for streamside landowners!

With any stream issue, it is critical that you understand the cause, rather than only the symptoms you see, excess sand and gravel! Understanding the cause can help you make informed decisions to manage your stream.

What Causes Excess Sand and Gravel?

Sand and gravel are often thought of as a *stream* problem because that is where we see it. However, much of the sand and gravel we see in Missouri streams came from elsewhere on the landscape. History reveals that as we began to alter the native grasslands, prairies, and forests, vast amounts of land, and soil, were left unprotected. In the 1800s, large tracts of Ozark hardwood timber were harvested for lumber and railroad ties. In northern and western Missouri, prairie sod was plowed to feed a growing nation.

Farming efforts that followed were characterized by poor soil conservation and left the ground vulnerable to erosion. Burning, plowing, and overgrazing hillsides removed vegetation which held soil in place. Channels were straightened and streamside trees were frequently cleared for more farmland, contributing to unstable stream channels and rapidly eroding banks. Sand and gravel washed from the landscape into Missouri streams, where we continue to see it erode, deposit, and accumulate in excess in streams, fields, or other undesirable places during floods.

What Can Landowners Do?

Our streams are still adjusting to both historical changes and modern-day disturbances. By understanding the cause of your stream issue, you can be part of the solution - protecting Missouri streams for future generations to enjoy!

Below are practices you can use to protect stream stability, and protect valuable land and soil:

Practice good soil conservation.

Good soil conservation keeps valuable topsoil on agricultural fields and out of streams! Reduced or no-till practices, cover crops, and filter strips are just some of the methods that reduce soil erosion. Excluding livestock from streams reduces erosion, damage to vegetation caused by trampling, and direct inputs of animal waste. Landowners can also demonstrate good conservation management by addressing gully, sheet, or rill erosion, and using native vegetation to slow runoff. Consult your local Soil and Water Conservation District (SWCD), Natural Resources Conservation Service (NRCS) office, or MDC Private Land Conservationist, for assistance in soil conservation planning.

Maintain timbered buffer strips along streams.

A strip of trees along a stream, called a riparian buffer, is a natural way to improve stream stability and provide long-term protection. Streamside trees stabilize banks by slowing flood waters, helping sand and gravel to drop out in this buffer strip rather than on bottomland fields. Contact your local MDC office for information on planting and managing streamside trees.

Use appropriate streambank stabilization methods.

Not all eroding streambanks require stabilization; however, stabilization can be an appropriate solution. All stabilization methods require careful consideration. Dozing and packing loose sand and gravel on streambanks will not stop bank erosion and can have unintended consequences for neighbors as this material is easily carried away by flood waters. Planting and maintaining streamside vegetation should be part of any stabilization method. Contact your local MDC office for assistance with many common streambank erosion problems.

Vegetation in the channel, and elsewhere on the landscape, has the power to slow water, trap sediment and debris, and increase stream stability.

Remove sand and gravel properly.

Many landowners choose to remove excess sand and gravel that is an eyesore. While removal will not address the causes of excess sand and gravel in a stream, proper removal allows you to benefit from this natural resource with minimal harm to the stream. It is important to remember that sand and gravel removal can have unintended physical and economic impacts to landowners both up and downstream.

The following guidelines will help you minimize potential impacts to property and the environment:

Guidelines for Sand and Gravel Removal:

- Apply for a permit (if needed)! Most stream work, including sand and gravel removal, may require permits from the U.S. Army Corps of Engineers and/or the Missouri Department of Natural Resources. Contact these agencies for more information (see below). Permits help ensure that impacts to stream habitat, floodplains, and water quality are minimized, and the work does not cause additional flooding or erosion on adjacent properties.

- Remove sand and gravel only from bars that are loosely packed (unconsolidated). Bars covered with larger-sized materials that are well-packed or vegetated are usually stable and should not be disturbed. MDC staff can help you find locations well-suited to gravel removal. Firmly packed gravel bars covered by larger-sized material trap smaller-sized material. Protecting these areas helps improve water quality in our streams.

- Remove sand and gravel only from above the water. This maintains stream stability and keeps machinery out of the water. Machinery can negatively impact water quality and inadvertently harm fish and other aquatic life.

- Leave a minimum 10-foot buffer of undisturbed material between the excavation area and the normal water's edge of the flowing stream. Protect streambank stability by also maintaining the buffer between the excavation area and the base of streambanks.

- A minimum 25-foot undisturbed buffer should be maintained from the top of the streambank into the riparian area next to the stream. Limit disturbance by minimizing access points and revegetate any disturbed areas when excavation is done.

Gravel is best removed from loosely packed bars above the water. Leaving undisturbed buffers helps minimize impacts to stream stability, water quality, and aquatic health.

- Remove sand and gravel during approved times, generally before March 15 and after June 15. Doing so protects spawning fish and their habitat by minimizing disturbance. Other seasonal restrictions may apply in some rivers and streams. Contacting the U.S. Army Corps of Engineers and/or the Missouri Department of Natural Resources before conducting any stream work will ensure your planned work will have minimal impacts.

- After removal, smooth the excavation area to minimize potential for stream bed erosion and other stream channel problems.

- Use native vegetation to revegetate disturbed streambank areas (such as access points) within 30 days of operations ending. Vegetated banks are less vulnerable to erosion and protect overall stream health. Contact MDC for assistance managing streamside vegetation.

Activities to avoid:

- Avoid using vehicles and heavy equipment in the water. If you must cross the stream, drive vehicles perpendicular (at right angles) to stream flow, take the shortest path possible through the water, and cross as few times as possible. Limiting machinery contact with the stream protects water quality and prevents inadvertent injury to fish and other aquatic life.

- Do not remove gravel from riffles (shoals). Riffles are important to stream stability because they prevent erosion of the stream bed. Additionally, they are a major source of food and oxygen for aquatic life. Riffles are often the best location to cross streams if needed. Follow the guidance above to limit impacts.

- Do not push sand, gravel, or other material (except to lift and remove it during proper mining activity). Attempting to stabilize banks or modify the stream by pushing material in the channel can cause significant damage. Contact MDC to learn about effective methods for controlling streambank erosion.

- Do not stockpile material within the stream channel. If you must stockpile, place it outside the stream in an upland area. Stockpiles stored in the channel can alter flow patterns, degrade water quality, and are vulnerable to washing away during floods.

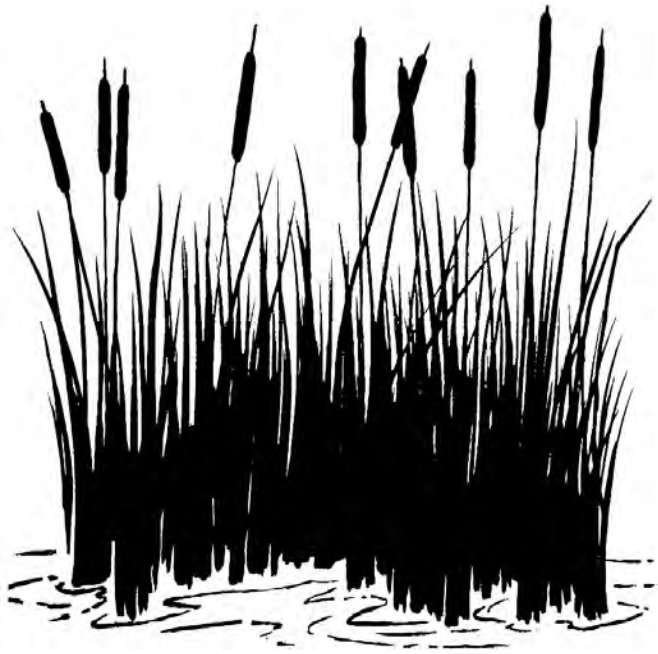
- Do not wash, crush, or sort material in the stream channel. If you must wash sand or gravel, use a settling basin and wash material outside the stream to avoid polluting the water with sediment.

- Do not store, release, or dispose of fuel, oil, or other waste in the stream. Storing vehicles and equipment in the channel increases the risk of these materials entering the water.

Improperly removing gravel from below the water decreases stream stability and destroys aquatic habitat.

For more information about sand and gravel removal contact your local MDC office or visit **mdc.mo.gov**.

Missouri Department of Natural Resources – Land Reclamation Program
Contact: mining@dnr.mo.gov, 573-751-4041
U.S. Army Corps of Engineers
Find a USACE office: usace.army.mil/Locations



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FIS196 3/2026