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# Pollution Prevention and Compliance Guide for Sand and Gravel Removal

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## **Guide on Sand and Gravel Removal for Landowners, Governmental Agencies and Commercial Operators in Missouri**

The information in this publication is intended as general guidance only. For specific requirements, the reader should consult the appropriate federal and state laws and rules.

### **Agencies contributing information for this publication:**

- Department of Natural Resources' Land Reclamation Program
- Department of Natural Resources' Water Protection Program
- Missouri Department of Conservation
- U.S. Army Corps of Engineers

### **As environmental protection becomes more and more important across the nation, individuals are faced with some legal questions**

- Will environmental regulations apply to me if I want to remove sand and gravel from a stream on my property?
- Will I need a permit to remove sand and gravel from my stream?
- What are the correct procedures for sand and gravel removal that minimize negative impacts to water quality and aquatic life?
- How does the removal of sand and gravel effect the stability of a stream?
- How do I protect workers and myself from environmental hazards at my business?
- Who do I contact that can help answer these questions?

This publication can help landowners, government agencies and commercial operators, that want to remove sand and gravel from streams in Missouri, answer some of those questions. Each section provides basic information about how to properly remove material, permitting and regulatory requirements and suggestions for protecting yourself, your workers and the environment through pollution prevention.

This fact sheet will not answer every question you have. After reviewing this fact sheet you should be able to decide if you need more information or assistance, call the Land Reclamation Program at (573) 751-4041 or any of the other agencies listed in Section III.

# Contents

## Section I

Describes how a stream is affected by sand and gravel removal and lists approved best management practices to minimize negative impacts to the water quality and aquatic life.

## Section II:

Consists of pollution prevention guide sheets that may help keep you from contaminating a sensitive area and also inform you of certain activities that may be regulated:

Pollution Prevention	Scrap Tires
404 Permits and Wetlands	Storage Tanks
Antifreeze	Used Oil Disposal and Recycling
Endangered Species	Used Oil Storage
Hazardous Wastes	Wastewater
Lead-Acid Batteries	

## Section III:

Describes the agencies that offer assistance, have regulatory authority or delegated interest to protect Missouri streams.

# **SECTION I - Mining Sand and Gravel in Missouri**

Many Missouri streams contain abundant quantities of sand and gravel that are being mined conveniently and economically for a variety of uses. Unfortunately, when these minerals are extracted, water quality can be affected and the streambed and banks could become unstable. When this happens, aquatic habitats become reduced or eliminated from the stream and property located adjacent to the stream may also be physically damaged.

The stability of sand-bed and gravel-bed streams depends on a delicate balance between stream flow, sediment supply from the watershed and stream channel form. Sand and gravel removal disrupts sediment supply and channel form that can result in a deepening of the channel over great distances upstream and downstream of the mine site as well as sedimentation of habitats downstream.

There are presently three primary methods for mining sand and gravel in Missouri:

- Bar skimming, in-stream (bucket loader)
- Floodplain pit mining (pit operation-dredge or backhoe)
- Dredging, in-stream (rivers and larger streams)

Three of these methods, if done on a commercial basis, would require a permit from a regulatory agency. An in-stream pit operation is not an approvable practice and could be in violation of the Clean Water Laws of the State of Missouri. The regulatory agencies responsible for mining related activity are listed in Section III.

## **Bar skimming operation**

This is the type of operation that many landowners, small commercial operators and government agencies use. The gravel is used for personal use, to sell, or use for county road construction in areas of the state where this type of gravel is available. Landowners may remove gravel for their own use without requesting a permit, but should follow the approved practices listed at the end of this section. Local governments are not regulated by the State unless a 404/401 permit is issued. They also need to follow the approved practices described at the end of this section to minimize negative impacts to water quality and aquatic life.

A bar skimming operation if done improperly increases flow width (figure 2 on page 8), produces slower stream flow velocities and lower flow energies, causing sediments arriving from upstream to deposit at the mine site. The bar skimming practice would lessen the risk of mining-induced headcuts. However, this could cause a condition called “hungry water” and associated channel incision down stream of mine sites.

Hungry Water is created when a bar-skimming operation creates a wider channel that results in a more shallow water flow (figure 2). This produces a braided flow or subsurface intergravel flow in riffle areas that restricts movement of fish between pools. As stream flow moves beyond the site and flow energies increase in response to the normal channel form downstream, the amount of transported sediment is now less than the sediment carrying capacity of the flow. This sediment-deficient flow or hungry water picks up more sediment from the stream reach below the site where the gravel was removed, furthering the bed degradation process. This condition exists until the balance between input and output of sediments at the site is re-established.

The bar skimming method could also cause other problems such as elimination of side channels, abrupt relocation of the low-flow channel and higher mobility of loosened sediments. Gravel-rich streams would be less susceptible to disturbance from this form of mining than would gravel-poor streams.

The department recommends using the bar skimming method to remove sand and gravel from a stream. The recommended practices are described at the end of this section. This practice when used in a responsible manner will help minimize the negative impacts to a stream while maintaining an important and viable industry.

### **Flood plain / open pit operations**

Open pit operations are typically located in the flood plains close to larger streams and rivers. This type of operation is found in low-lying areas that have accumulated a large deposit of sand and gravel over a long period of time. A dredge, backhoe or dragline are the primary machines used to mine the material. These are generally large commercial operations that require a permit and bonding from the Missouri Department of Natural Resources' Land Reclamation Program. If the material is being washed and the water returned to the stream, a permit from the Missouri Department of Natural Resources' Water Protection Program would also be required under Section 402 of the Clean Water Act. If material is re-deposited into waters of the U.S. or a defined wetland, then a permit is required from the U.S. Army Corp of Engineers under Section 404 of the clean water act.

Open pit mining operators should also limit their operations to terrace locations that have an unmined, forested buffer between the site and the channel. It is recommended that this be a minimum of 100 feet in width to reduce the risk of channel capture by the pit during flood flows. The regulatory minimum is 25 feet, but is much safer at 100 feet.

**Pit Operations.** Pit mining in an active stream channel is not an approved practice and has a profound negative effect on the physical and biological character of the stream. A pit operation if conducted by a commercial permitted or private unpermitted operation may result in the issuance of enforcement actions and liability for monetary penalties by the Missouri Department of Natural Resources' Land Reclamation Program and the Water Protection Program.

A pit operation locally increases flow depth (Figure 1 on page 7), sedimentation is increased and the stream channel becomes unstable and inhospitable to most aquatic species. A pit created within an active channel lowers the streambed creating a "nick point" that locally steepens channel slope and increases flow energy. During high flows, a nick point becomes a location of bed erosion that gradually moves upstream in a process called "headcutting." A pit operation creates factors that increase or decrease sediment supply, often destabilize the streambed and banks and result in dramatic channel readjustments (Figure 1). Loss of aquatic resources may result from head cutting, hungry water and increased sediment relocation. Costs to society (damage to public and private property) are the greatest in this type of removal as well.

### **Dredging**

This type of operation is normally used on large streams and rivers such as the Missouri and Mississippi or a flood plain/open pit operation. A barge is used to auger the sand or use a large vacuum pump to remove the sand from the bottom of the river or pit and deposit it on an adjoining barge for transport to shore. In some cases the sand/water slurry may be pumped to shore through a floating pipeline, where the water is separated from the sand and returned to the stream or the pit.

The river operation would require a permit from the U.S. Army Corps of Engineers. If a permit is needed, then it will also need a water quality certification permit under Section 401 of the Clean Water Act from the department's Water Protection Program.

### **How mining affects a stream's character**

Stream channels transport sediments and water from headwaters to mouth, systematically depositing and eroding, abrading (wearing down by friction) and breaking sediment particles during the transport process. In gravel-rich streams, effects downstream of mining sites may be short-lived when mining ends, because the balance between sediment input and transport at a site can re-establish relatively quickly.

Activities that artificially lower streambed elevation cause bed instabilities that result in a net release of sediment in the local vicinity. The most widespread effects of in-stream sand and gravel removal on aquatic habitats are bed degradation and sedimentation.

A pit operation locally increases flow depth (Figure 1) and a bar skimming operation increases flow width (Figure 2). Both methods produce slower stream flow velocities and lower flow energies, causing sediments arriving from upstream to deposit at the mine site. As stream flow moves beyond the site and flow energies increase in response to the normal channel form downstream, the amount of transported sediment leaving the site is now less than the sediment carrying capacity of the flow.

Effects of a gravel-poor stream may develop rapidly and persist for many years after mining has concluded. Regardless of downstream effects, headcutting in both gravel-rich and gravel-poor streams remains a major concern. Of the two forms of bed degradation, headcutting is more recognizable in the field and represents the greater risk to aquatic resources, stream bank instability and property destruction.

### **Sand and gravel removal regulations that help minimize negative impacts to water quality and aquatic life**

- Excavation of sand or gravel deposits shall be limited to deposits in unconsolidated areas containing primarily smaller material (at least 85 percent of the material is less than 3 inches in diameter) that is loosely packed and contains no woody perennial vegetation greater than 1.5 inches in diameter, measured at breast height 4.5 feet.
- An undisturbed buffer of 10 foot width shall be left between the excavation area and the water's edge of the flowing stream at the time of excavation. A buffer zone of adequate width to protect bank integrity should be left between the excavation area and the base of the high bank.
- An undisturbed buffer of 25 feet wide shall be maintained in an undisturbed condition landward of the highbank for the length of the gravel removal site. Disturbed areas in this riparian zone shall be limited to maintained access road(s) for entry and exit only. No clearing within this riparian area is authorized in association with work authorized by this permit.
- Sand or gravel shall not be excavated below water elevation at the time of removal, except
  - If the stream is dry at the time of excavation, excavation shall not occur deeper than the lowest undisturbed elevation of the stream bottom adjacent to the site. Upon request of the applicant, excavation depth restriction may be modified if the staff director determines that a variance would not significantly impact the stream resource.

- For wet stream reaches, excavation depth restriction may be modified if it is determined by the staff director that a variance would not significantly impact the stream resource based on the presence of bedrock to prevent head cutting, excessive bedload, gravel rich areas or any other appropriate reason.
- Stream channels shall not be relocated, straightened, cut off, shortened, widened, or otherwise modified. A stream channel is defined as that area between the high banks of the creek where water is flowing, or in the case of a dry stream, where water would flow after a rain event.
- Within 30 days of the removal of excavation equipment from the site, streambank areas disturbed by the removal operation shall be revegetated or otherwise protected from erosion. For long-term operations (longer than 30 days) or for sites that will be periodically revisited as gravel is deposited, access points shall be appropriately constructed and maintained such that stream banks and access roads are designed and constructed to minimize erosion.
- Any aggregate, fines, or oversized material removed from the site shall be placed beyond the high bank, on a non-wetland site that has been approved by the landowner. No material, including oversized material, that results from excavation activity may be stockpiled or otherwise placed into flowing water or placed against stream banks as bank stabilization unless specifically authorized by a state or federal permit.
- All sand or gravel washing, gravel crushing, and gravel sorting shall be conducted beyond the high bank, in a non-wetland area and away from areas that frequently flood, such that gravel, silt, and wash water that is warm, stagnant or contains silty material cannot enter the stream or any wetland.
- Vehicles and other equipment shall be limited to removal sites and existing crossings. Water shall be crossed as perpendicular to the direction of the stream flow as possible.
- Fuel, oil and other wastes and equipment containing such wastes shall not be stored or released at any location between the high banks or in a manner that would enter the stream channel. Such materials shall be disposed of at authorized locations.
- Outstanding Resource Waters (10 CSR 20-7.031).
  - In-stream sand and gravel operations are prohibited from those waters listed as Outstanding National Resource Waters.
  - In-stream sand and gravel operations are prohibited from those segments of Outstanding State Resource Waters that are owned or managed by a state or federal agency.
  - All other applications for in-stream sand and gravel operations on Outstanding State Resource Waters shall be reviewed individually to determine if specific conditions are necessary to preserve these stream reaches during mining activity. These individual reviews would assist the applicant in focusing on issues of specific concern. The individual review shall include a site visit by Department of Natural Resources staff prior to permit issuance, and annual site inspections by department staff during the life of the permit.
- The Land Reclamation Program shall consult with the appropriate agencies as to the presence of state and federal threatened and endangered species in the stream reach in order to avoid jeopardizing the species continued existence or destroying or adversely modifying the habitat of such species.

If assistance is needed to help locate areas where sand and gravel may be removed with minimal impact to water quality and aquatic life of the stream, contact the agencies listed in Section III of this fact sheet.

Figure 1:

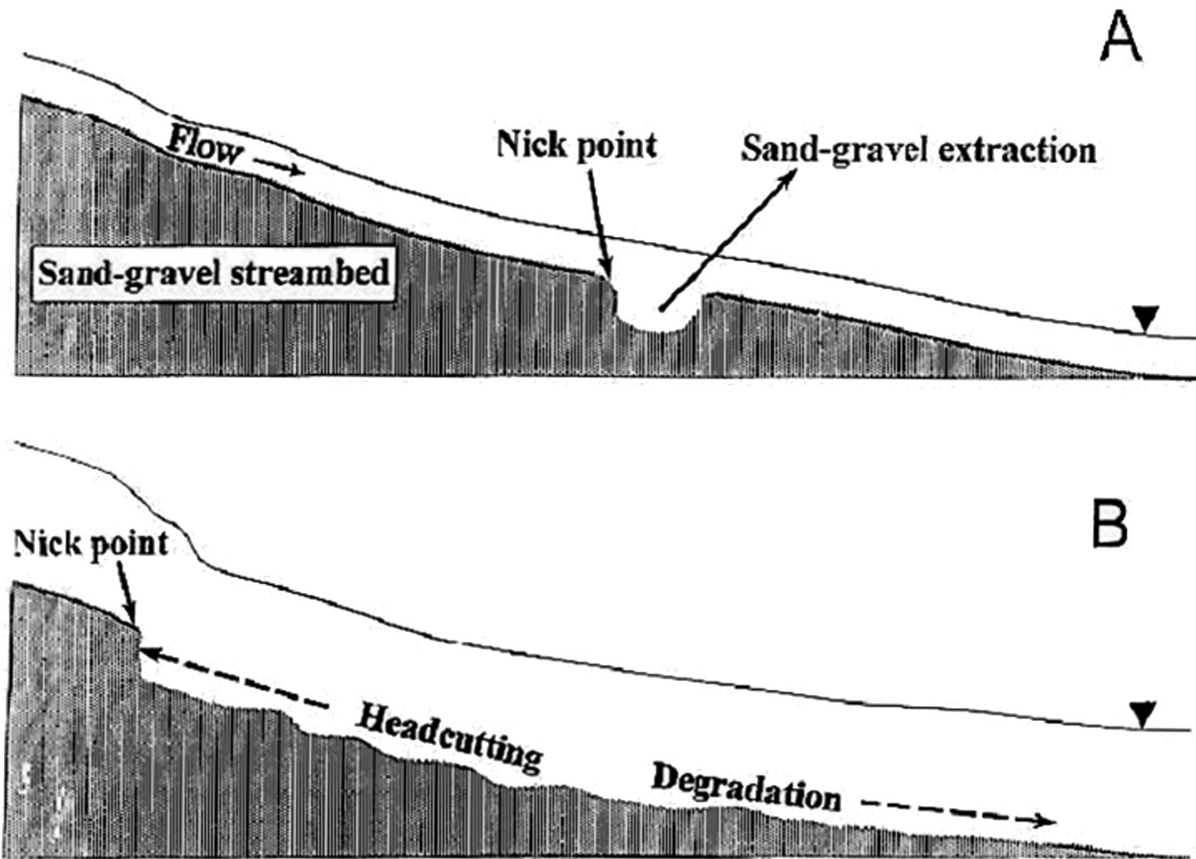


Figure 1 Diagram of a sand-gravel streambed showing (A) the nick point, that develops when pit excavation is used to mine sand and gravel from the channel during low flows, and (B) the upstream headcutting and downstream bed degradation that develop during high flows. Inverted triangle denotes the water surface.

Figure 2:

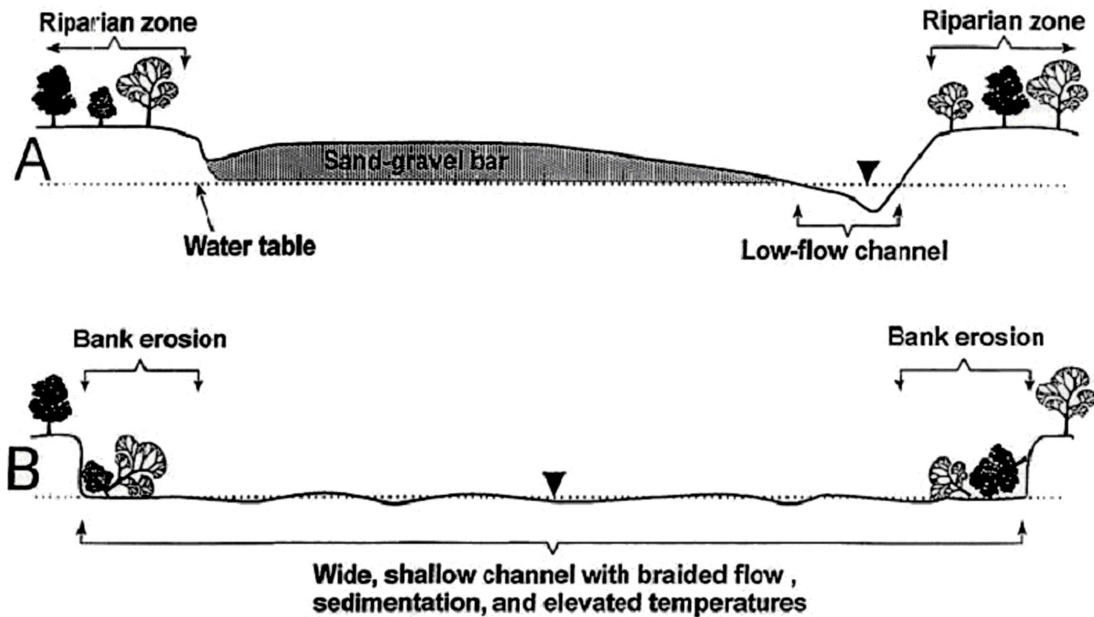


Figure 2: Diagram of channel cross section showing (A) a typical sand-gravel bar in relation to the low-flow channel, riparian zone and water table, and (B) the wide, shallow channel that results from unrestricted mining and that is characterized by bank erosion, braided flow, sedimentation and elevated water temperatures. Inverted triangle denotes the water surface.

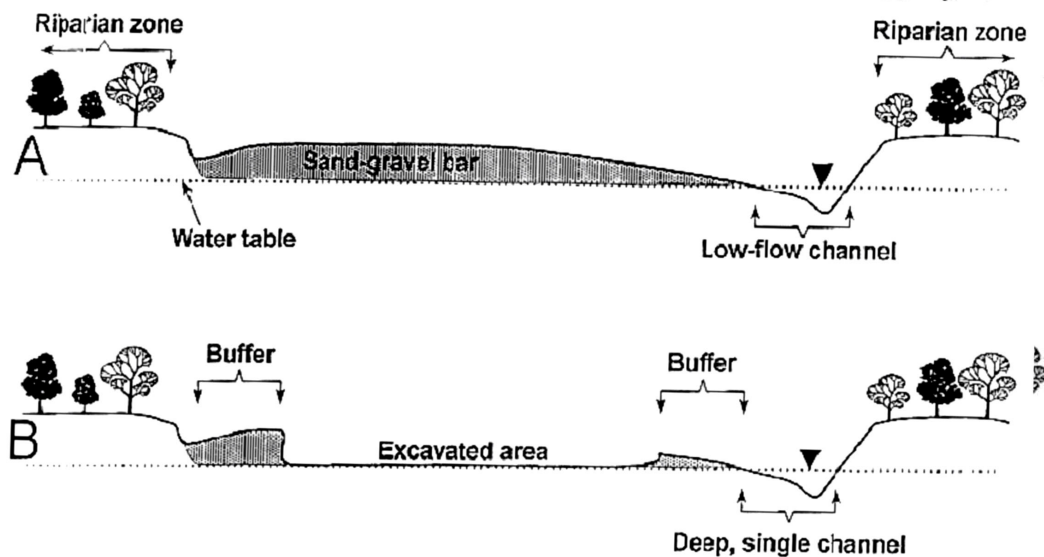


Figure 3 Diagram of channel cross sections showing (A) a typical sand-gravel bar in relation to the low-flow channel, riparian zone and water table, and (B) the protected deep, single channel and channel banks when mining is restricted within a buffer of designated width and above the water table. Inverted triangle denotes the water surface.

Figure 4:

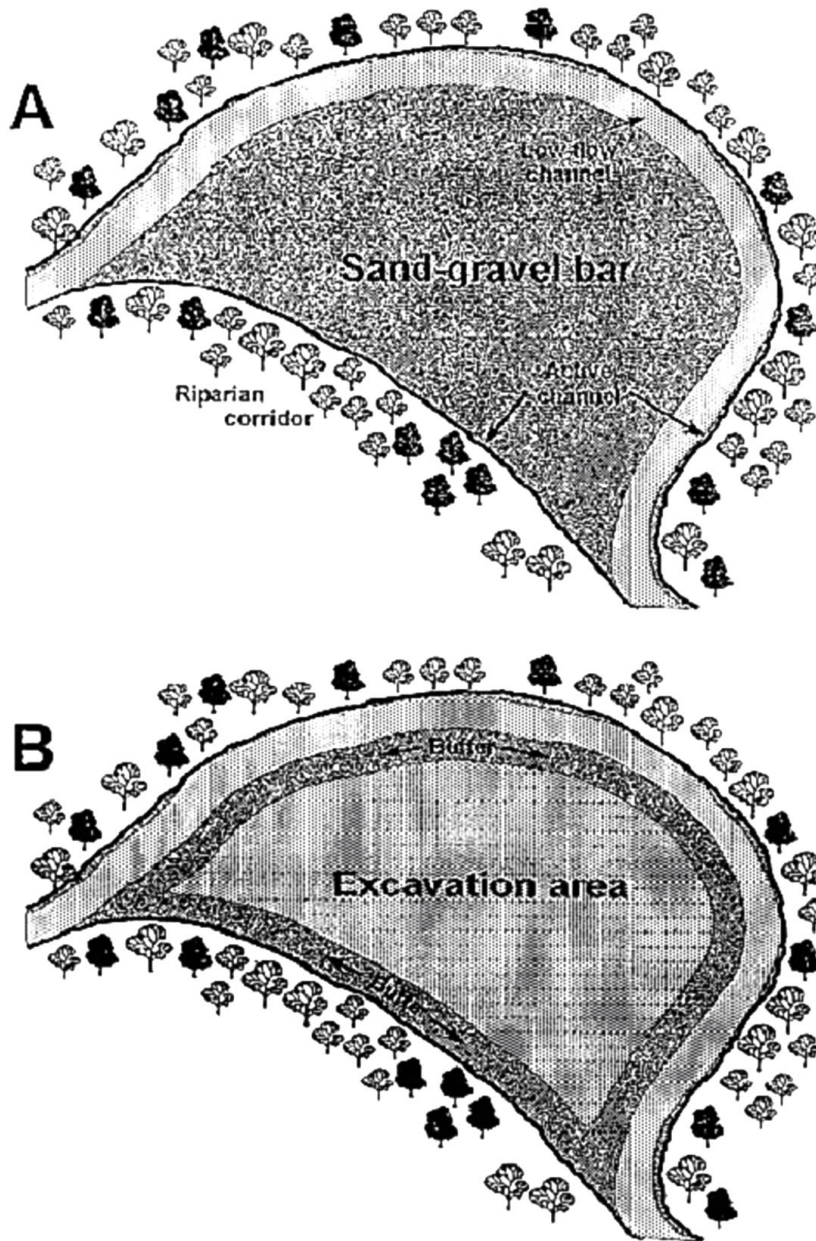


Figure 4 Diagram of a typical sand-gravel bar showing (A) the relative positions of the bar, the riparian corridor the active (or bankfull) channel, and the low-flow channel, and (B) the area of excavation defined by a no-disturbance buffer of designated width.

## **SECTION II - Preventing Pollution at Sand and Gravel Operations**

### **Pollution Prevention**

Sand and gravel operations deal with many things that can affect the environment. Materials such as dust, contaminated stream water and used oil can harm the environment and people if they are not properly managed. State and federal environmental regulations explain what legally can and cannot be done with these materials. The regulations describe how pollution should be controlled, stored, treated or disposed. A better solution is to prevent the waste or pollution.

#### **What Is Pollution Prevention?**

Pollution prevention is simply not making the waste or pollutant in the first place. It means doing what we can to reduce the amount and toxicity of the pollution we generate. Preventing pollution may be something as simple as using a catch-basin to prevent spills, or something as complex as redesigning your operation to increase efficiency and reduce waste. Simple things like choosing non-hazardous solvents can protect the environment and reduce the number of environmental regulations you face. Pollution prevention means thinking about the environmental impact of your actions, and trying to limit that impact.

#### **Why Prevent Pollution?**

When we generate waste or pollution, we must safely and legally manage that waste or pollution. Whether it is household trash or waste from a business, managing wastes costs money. Usually the things we discard are materials we paid for when we got them. A good example is paper towels. We buy them, use them once, then pay again to have them disposed. If we reduce the amount of waste we generate, we save money. It's as simple as that. Reducing costs is a major reason to prevent pollution. Here are a few others:

- Improved work environment and worker safety.
- Reduced liability.
- Increased efficiency.
- Fewer regulatory requirements.
- Better environmental protection.
- Enhanced marketing and public relations opportunities.

#### **What can be Done at Sand and Gravel Operations?**

There are many ways to prevent pollution in your operation. In addition to the mining activities, maintenance and repair of vehicles and machinery can create wastes as can office operations.

##### **General tips:**

- Keep work areas clean and well organized to help prevent accidents.
- Use drip pans and splash guards where spills frequently occur.
- Fix leaks immediately.
- Purchase the largest practical container (containers usually end up as waste), but don't purchase more than you need.

- Purchase the least toxic or hazardous product available. Check the material safety data sheets for products you purchase. If the product is toxic or hazardous, ask your supplier for alternatives.
- Use the oldest items first (first-in, first-out).
- If you do have excess or unneeded materials, see if your supplier can take them back
- Include the cost of disposal when you make purchasing decisions. What looks like the cheapest option may cost more because of disposal or other management costs.
- Store materials in a way that keeps them from being damaged.
- Inspect storage areas regularly for leaks.
- Make sure all items are clearly labeled. Store products in original containers.
- Store wastes separately and be sure they are properly labeled to make it easier to reuse or recycle them.
- Store items that could leak in a place where leaks will be contained and easily spotted.
- Make a list of your wastes. Then try to find a way to eliminate each of them. For example, if you throw away paper towels, consider using washable shop rags.

## **404 Permits and Wetlands**

Under Section 404(a) of the Clean Water Act, you must get a permit from the U.S. Army Corps of Engineers before putting dredged or fill materials into any “waters of the United States” or wetlands. This includes waters used (or usable) as habitat by certain birds or endangered species or used to irrigate crops sold in interstate commerce.

The following are not generally considered “waters of the U.S.”:

- Non-tidal drainage and irrigation ditches
- Artificially irrigated areas
- Some small agricultural ponds
- Artificial reflecting or swimming pools
- Water-filled depressions except that water-filled depressions such as those formed from quarrying can be “waters of the U.S.” if the construction or excavation operation is abandoned or completed and the body of water meets the definition of “water of the U.S.” or the site has become a wetland.

The Corps and the U.S. Environmental Protection Agency can designate a particular waterbody as a “water of the U.S.” on a case by case basis.

The Corps and EPA define wetlands as

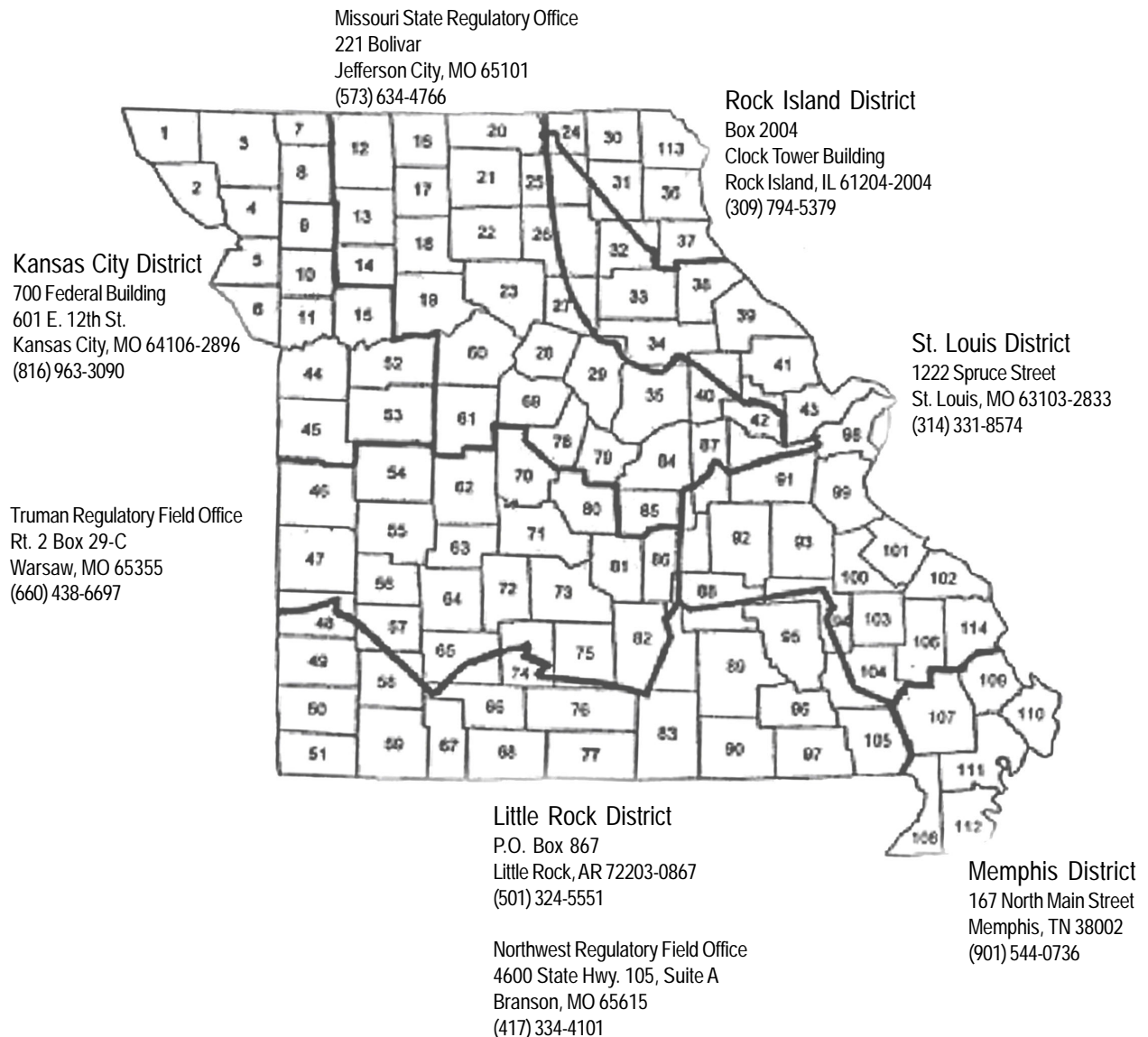
“Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.”

The Corps determines whether an area is a wetland and if an activity requires a permit. The determination of a wetland is based on vegetation, soil and hydrology. River and stream jurisdiction is determined by the presence of a defined bed and bank presence or the normal high water mark. Before issuing a 404 permit, the Corps will work with the Missouri Department of Natural Resources to get a water quality certification called a 401. This certification is required under Section 401 of the Clean Water Act and state law, and it's purpose is to review the federal permit for water quality and aquatic life impacts.

There are five U.S. Army Corps of Engineers Districts in Missouri. Use the map to find out which office to contact for more assistance.

Note: If you plan to excavate or fill in waters of the U.S., including wetlands, you must contact the U.S. Army Corps of Engineers and get any necessary permits before you begin.

### U.S. Army Corps of Engineers District Boundaries (approximate)



## Antifreeze

Antifreeze is usually made of ethylene glycol, corrosion inhibitors and foam controllers. Ethylene glycol is toxic if ingested. It can be particularly hazardous because animals and children may be attracted to its sweet flavor. If they drink the ethylene glycol it could cause coma or death. Some antifreeze is made of propylene glycol. This material is less hazardous to humans and animals than ethylene glycol.

The used antifreeze from a vehicle can hold contaminants that it has picked up from the vehicle engine. For example, used antifreeze may contain lead because the antifreeze has dissolved some of the lead solder in the radiator. Waste antifreeze is not a listed hazardous waste under the federal hazardous waste regulations, but it may be a hazardous waste depending on the contaminants it has picked up. The test used to find out if used antifreeze is a hazardous waste is called the Toxicity Characteristic Leaching Procedure.

Recent studies have shown that antifreeze from cars and trucks manufactured after 1995 is not hazardous waste. This is primarily because less lead is used in radiator construction. Used antifreeze is more likely to be hazardous if it was used in heavy equipment such as bulldozers.

This means that the antifreeze from late-model cars and trucks at your operation that has not been mixed with other antifreeze or with other hazardous wastes does not need to be tested. You can assume that it is not hazardous and need not test it to prove that. However, the used antifreeze from heavy equipment or industrial sources will need to be tested to see if it is hazardous waste unless you have some other way of knowing that it is or is not hazardous. If you wish, you can assume the antifreeze from your heavy equipment is hazardous without testing it and dispose of it as hazardous waste.

### **There are several ways to safely and legally manage your used antifreeze:**

- Recycle the antifreeze at your facility (on-site recycling).
- Send the antifreeze to someone else to either recycle or dispose of it (off-site recycling or disposal).
- Discharge to a public wastewater treatment plant if the plant has approved the discharge.

## Recycling

The Missouri Department of Natural Resources encourages antifreeze recycling. You can purchase or lease several types of antifreeze recycling equipment.

Recycling hazardous wastes on-site requires a type of approval from the department called resource recovery certification. If you recycle antifreeze only from late-model cars and trucks, you do not need a resource recovery certification to recycle antifreeze on-site. If you want to recycle antifreeze from heavy equipment, you must get a resource recovery certification. Call the department at 1-800-361-4827 for more information.

Your recycling unit will create waste such as distillation residues and used filters. You must determine if these wastes are hazardous before disposal. If the residue is nonhazardous, it can be sent to the landfill with your regular trash. However, liquids cannot go to the landfill.

There may be businesses that will bring equipment to your facility and recycle your antifreeze on-site. Again, if the antifreeze is from late model cars and trucks, these companies do not need resource recovery certification. If it is from heavy equipment, these companies will need resource recovery certification to recycle your antifreeze.

## **Pollution Prevention**

- Make sure hoses, gaskets and seals are in good condition.
- Replace antifreeze only when necessary
- When good antifreeze must be removed for repairs, save it and reuse it in the system.

## **Off-site Recycling or Disposal**

There are companies that pick up used antifreeze for off-site recycling or disposal. If your used antifreeze is a hazardous waste, the transporter must have a Missouri license to transport hazardous waste and the waste must have a hazardous waste manifest with it. Make sure the facility you send it to has a resource recovery certification or a hazardous waste treatment, storage and disposal permit.

## **Discharge to wastewater treatment plant (pouring it down the drain)**

If the drains at your facility go to a wastewater treatment plant (not a septic system), you may be able to pour antifreeze down the drain if you have permission from the plant. Pouring something down the drain is called a discharge. Some plants will not allow discharges of used antifreeze. Large quantities can harm the treatment plant. Also, the wastewater treatment plant may not be able to remove all the contaminants from the used antifreeze. The contaminants then enter lakes, streams and rivers.

- Do not discharge antifreeze to a wastewater plant without permission.
- Do not discharge any hazardous waste, including antifreeze, to a septic system.
- Do not dispose of antifreeze in or on the ground, down storm drains or into streams or lakes.

## **Endangered Species**

Endangered species are plants or animals for which the prospect for survival of the species is in immediate jeopardy. There are laws to protect these species and, in some cases, their habitat. This means that some activities may not be allowed in areas where endangered species live. This may affect you if you are planning to expand operations or select a new site on a different stream.

The Missouri Department of Conservation is the agency responsible for collecting and managing information about the location and status of endangered species in the state. There are currently 306 species of plants and animals that are listed as State Endangered. The federal list includes 20 species found in Missouri.

The restrictions affecting you depend on whether the species is a plant or animal, whether the land is private property and whether you receive any federal funds. To contact Missouri Department of Conservation's Policy Coordination Section for general information, call (573) 751-4115.

When contacting Missouri Department of Conservation, it is important to clearly identify the location of the property. The information should include as many of the following as possible: county, topographic quadrangle map designation (if known), legal description (section, township, range), acreage, permanent landmarks such as rivers and roads, and a copy of a map of suitable scale with the location of the property drawn in and labeled.

The request should be sent to

Policy Coordination Section  
Attn: Policy Coordinator  
Missouri Department of Conservation  
P.O. Box 180  
Jefferson City, MO 65102-0180

Note: The state regulation dealing with endangered species is located in the *Missouri Code of Regulations* Title 3, Division 10, Section 4.111 (3 CSR 10- 4.111).

### **Remember**

- It is illegal to harm federally-listed endangered species or their habitat.
- It is illegal to harm species that are listed in Section 4.111 of Missouri's Wildlife Code.
- Contact the Missouri Department of Conservation for information about endangered species in Missouri.

### **Pollution Prevention**

Preventing pollution instead of treating or disposing of it can help to protect habitats. Here are some suggestions:

- Learn more about rare and endangered species in your area of the state. Find out how you can improve their habitat.
- Properly design, construct and maintain detention basins to capture sediment. Sediment is a major pollutant of aquatic environments.
- Revegetate disturbed areas as soon as possible and in accordance with your permit. Use native plants from a reputable source and provide food and cover for wildlife.
- Avoid spilling oil, grease and gasoline during vehicle and equipment maintenance activities.
- Maintain appropriate spill containment equipment and train employees on proper usage.

## **Hazardous Wastes**

Some activities at your operation may result in the generation of hazardous waste. It is very important that you determine if your wastes are hazardous and that you carefully follow the law when managing the wastes.

### **What is a Hazardous Waste?**

A waste is a material you no longer use and will discard. It can be a solid, liquid or gas.

A waste is hazardous if it has certain properties that could pose a danger to human health and the environment. Solvents and degreasers are examples of wastes that could be hazardous.

It is your responsibility to determine if your waste is hazardous.

### **A waste is hazardous if**

- It is listed as a hazardous waste in the federal regulations.
- It exhibits a hazardous characteristic.

- It is a hazardous waste by Missouri law or
- It is a mixture of a listed hazardous waste and any other waste.

**Listed Hazardous Waste** - The federal government publishes lists of hazardous wastes. There are four different lists: The F list, the K list, the P list and the U list. Wastes that are on the P list are called “acutely hazardous” and are regulated more strictly than the others.

**Characteristic Hazardous Waste** - Some wastes that are not on the lists may still be regulated hazardous wastes because they have characteristics that make them hazardous.

#### **The four characteristics are**

- **Ignitable** - A waste with a flashpoint of less than 140 F, or solids that catch fire easily and burn so rapidly they create a hazard. Some solvents are ignitable.
- **Corrosive** - A waste with a pH less than or equal to 2.0 or greater than or equal to 12.5. An example is battery acid.
- **Reactive** - Wastes that are normally unstable, react violently with water, can explode or release poisonous gases.
- **Toxic** - Wastes with high concentrations of volatile organic chemicals, heavy metals or pesticides when tested by the Toxicity Characteristic Leaching Procedure.

**Missouri-specific Hazardous Waste** - An individual state can regulate wastes as hazardous even if they are not on the federal list. For example, in Missouri certain dioxin wastes are regulated at smaller quantities than in the federal rules.

**Mixed Waste** - If you mix any waste with a waste that is on the F-, P-, K- or U- lists, all of it is hazardous, even if there is a very small amount of listed waste.

#### **Is Your Waste Hazardous?**

The Material Safety Data Sheet will often tell you whether your chemicals are regulated as hazardous waste. Your supplier should also be able to give you the information.

You need to find out if the waste is on one of the lists of hazardous wastes or if it is a hazardous waste in Missouri. If it is not, you need to find out if it exhibits one or more of the hazardous characteristics. If you don't know if your waste is hazardous, you will need to have it tested in a laboratory. Contact the Missouri Department of Natural Resources' Hazardous Waste Program at (573) 751-3176 for help with this.

#### **Managing Hazardous Wastes**

There are very specific requirements for managing the hazardous waste from your business. The requirements you must meet depend on what and how much waste you generate. You need to know how much acutely hazardous waste (P-listed) and non-acute hazardous waste you generate each month. You also need to know how much of each of these types of waste you accumulate at any one time.

Use the following information to figure out what type of generator you are. Then contact the department or another environmental professional to learn the specific requirements for managing your waste.

## **What Type of Generator Are You?**

There are three types of generators: Large Quantity Generator, Small Quantity Generator and Conditionally Exempt Generator. Here are some general guidelines to help you decide what type of generator you are.

### **If you generate in one month or accumulate at any one time:**

- More than 1 kg (2.2 pounds) of acutely hazardous waste you are a large quantity generator.
- 1,000 kg (2,200 pounds) or more of non-acute hazardous waste you are a large quantity generator.
- More than 100 kg (about 220 pounds), but less than 1,000 kg (2,200 pounds) of non-acute hazardous waste and less than 1 kg of acutely hazardous waste you are a small quantity generator.
- No more than 100 kg (220 pounds) of non-acute hazardous waste and less than 1 kg of acutely hazardous waste you are a conditionally exempt generator.
- In Missouri, anyone generating 1 gram or more of dioxin waste (2,3,7,8-tetrachlorodibenzo-p-dioxin) is a large quantity generator.

The federal requirements for hazardous waste can be found in the Code of Federal Regulations, Title 40, Part 260 through Part 280 (40 CFR 260-280). The Missouri Hazardous Waste Law is in the Revised Statutes of Missouri (RSMo), Sections 260.350-260.552. The hazardous waste rules are in the Code of State Regulations, Title 10, Division 25 (10 CSR 25).

## **Lead-Acid Batteries**

### **In this document the term *ibattery* means lead-acid battery**

Lead-acid batteries from motor vehicles contain materials that can pose a risk to people and the environment. These batteries contain sulfuric acid, lead and other materials that can be hazardous. Missouri's Solid and Hazardous Waste Management Laws have requirements for managing waste batteries.

It is against the law for anyone to dispose of lead-acid batteries in Missouri. You must send the batteries to a recycling facility, a resource recovery facility or a permitted lead smelter. Never put batteries in your trash or dumpster. Lead-acid batteries cannot go to a landfill and they cannot be burned.

If you store batteries, it must be in a way that protects human health and the environment. It is important to store batteries so that they do not crack or leak. Store the batteries indoors or under cover to keep them dry and prevent damage to the casings. Never store batteries near combustibles such as gasoline because of the risk of sparks caused by electrical discharge of the batteries.

Store batteries so that any leaking liquid will be caught. The liquid inside batteries is sulfuric acid and it may contain dissolved lead and cadmium. Be sure you have procedures for handling spills or leaking batteries. Anyone handling batteries or spilled material should wear protective clothing and eyewear. If acid leaks out of the batteries, collect it and handle it as a hazardous waste.

If you store large quantities of batteries you may have more regulations to follow. If you store over 200 batteries, you may be subject to Emergency planning and Community Right to Know Act requirements.

Note: The part of the law dealing with lead-acid batteries is 260.260-260.266 *Revised Statutes of Missouri*.

### **Remember**

- Don't put batteries in the trash. Batteries must go to a recycling facility, a resource recovery facility or a permitted lead smelter. They cannot go to the landfill.
- Battery acid may be a hazardous waste.

### **Pollution Prevention**

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- Store batteries where they will not be damaged or frozen.
- Store batteries so that leaks will be caught and contained.
- Anchor batteries when transporting.
- Use long-life batteries.
- Inspect stored batteries regularly so you can find cracks or leaks before they become a problem.

## **Scrap Tires**

Tires that are too damaged or worn for use as vehicle tires are scrap tires. Since 1990, the storage, hauling and disposal of scrap tires have been regulated under Missouri's Solid Waste Management Law.

### **Storage**

Scrap tires must be stored in a way that does not cause pollution, health or nuisance problems. Since tires can collect water and create breeding grounds for mosquitoes, you should protect your storage area from rainwater or provide some other way to control mosquitoes. Tires may also pose a fire hazard, so they should always be stored away from ignition sources.

Store any tires intended for resale or retreading separately from scrap tires. Tires intended for resale or retreading are not regulated as scrap tires.

Anyone storing 25 to 499 tires is regulated as a scrap tire collection center and must meet certain requirements. Anyone who stores 500 or more tires must have a permit from the Missouri Department of Natural Resources as a scrap tire site. Contact the department for more information about these two activities.

### **Hauling**

If you pay someone to haul away your scrap tires, that person needs a permit from the department. However, you or other employees from your business do not need a permit to haul tires generated from your business. The tires may be hauled to a scrap tire processor, site or end user or to a landfill (if they are cut, chipped or shredded).

A tire hauler's permit is good for one year and only applies to the business or person to whom it is issued. Check the expiration date and name on the permit to be sure it is valid. To get the list of permitted scrap tire haulers or check the permit status of a hauler who picks up tires at your quarry, contact the department.

### **Recordkeeping**

You should keep a record of how many tires are taken in and removed from your facility each month. Include the name of the hauler and the date the tires were removed. Recordkeeping forms are available from the department.

### **Beneficial use**

Sometimes a person wants a few scrap tires for a home project. Individuals can haul their own scrap tires for their own use. If someone wants to use over 100 tires, they need to get the department's approval. Using tires for erosion control is not a good idea. In Missouri, you are not allowed to place tires in waters of the state. This includes streams, rivers, gullies and wet-weather creeks (among other areas).

### **Processing**

Anyone who processes scrap tires for a fee must have a processing permit from the department if more than 25 tires are on-site at any time. You do not need a permit to process tires generated from your own business. Processing includes shredding, cutting, chipping or otherwise altering the tires.

### **Disposal**

Never burn tires in Missouri. Even in areas where home waste burning is allowed, burning tires is prohibited.

You cannot dispose of tires in a landfill unless the tire is cut up in three or more pieces or in half circumferentially (forming two circles). There are places to legally take your scrap tires in Missouri. They usually charge a fee per tire and can accept whole tires. Contact the department for a list of sites.

The department presently allows tires from large earth-moving equipment to be buried on-site in limestone quarries provided it does not cause pollution, a health hazard or a public nuisance. However, this practice is not encouraged. You should try to find alternative ways to manage these tires. There are facilities in Missouri who can process these tires. Contact the department for a list.

### **Uses for scrap tires**

There are options for using scrap tires rather than disposing of them. Scrap tire chips can be used for many things such as mulch on playgrounds or as fuel in electrical power plants or cement kilns. Contact the department for information about reuse and recycling options.

The legal requirements for scrap tires can be found in *260.270-278, Revised Statutes of Missouri (RSMo)* and in *10 CSR 80, Chapter 8* of the Code of State Regulations.

### **Remember**

- Do not burn waste tires.
- Waste tires cannot go to the landfill unless they are cut into three or more pieces or in half circumferentially (in two circles).

- If you wish to store 25 or more waste tires, you must follow requirements for waste tire collection centers. Contact the department for more information.
- If you pay someone (other than an employee) to haul away your waste tires, that person needs a waste tire hauler permit from the department.

## **Storage Tanks**

Some sand and gravel operations have storage tanks containing oil or fuel. These tanks have the potential for leaking and spilling oil or fuel, causing harm to the environment. Storage tanks, depending on size, usage or type, are regulated by several agencies.

### **Aboveground Storage Tanks**

Federal law requires you to have a Spill Prevention Control and Countermeasure Plan if you have an oil or used oil storage tank located where it could contaminate water with spilled oil, for example on or near a stream, lake or river.

#### **You also need a SPCC plan if you have**

- Any single aboveground storage container with a capacity over 660 gallons.
- Aboveground aggregate storage capacity over 1,320 gallons or
- Total underground storage capacity over 42,000 gallons.

The basic requirements of an Spill Prevention Control and Countermeasure Plan include what you do to prevent spills, how you plan to contain any spills and how to remove and dispose of the oil or fuel if you have a spill. Also, the storage tanks must be in a containment area.

Aboveground petroleum product storage tanks at a service station or a bulk terminal are regulated by the Missouri Department of Agriculture. If your business includes these operations contact them at (573) 751-4278 or mail to

Missouri Department of Agriculture  
 Division of Weights and Measures  
 P.O. Box 630  
 Jefferson City, MO 65102

### **Underground Storage Tanks**

If you have an underground storage tank larger than 110 gallons, you must register that tank with the Missouri Department of Natural Resources whether or not the tank is in use, unless the tank was taken out of service before Jan. 1, 1974. There are requirements in Missouri for the way new tanks are to be constructed and installed. Existing tanks were required to meet these requirements or be properly closed by Dec. 22, 1998. If you are planning to install a new underground storage tank, you must notify the department at least 30 days before you use the tank. All underground storage tanks must have an approved method of release detection.

You must notify the department by calling (573) 634-2436 as soon as possible within 24 hours of a suspected release from your underground storage tank. Spills and overfills must be immediately contained and cleaned up.

## **Remember**

- You cannot send used oil to the landfill or pour it out onto the ground.
- If you are not recycling your used oil, it is hazardous waste.
- If someone else is hauling your used oil, they must have an EPA identification number and be registered with the department.
- You may burn your own used oil in a used oil burner no larger than 500,000 BTU/hour that is properly vented.

## **Pollution Prevention**

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- Keep used oil separate from other wastes.
- If you remove oil-laden parts, place them on a drip pan rather than the floor or ground.
- Do not use the oil drip pan to collect antifreeze or solvent.

## **Used Oil Storage**

Improper storage of used oil can increase the risk of spills and leaks that could harm the environment and prove costly to clean up. In Missouri, there are some legal requirements for storing used oil from your business.

If you store used oil, you must

- Label or mark the storage container(s) with the words “Used Oil.”
- Keep containers in good condition.
- Store used oil collected from do-it-yourselfers no longer than 12 months.
- Keep containers closed if they are exposed to rain or snow (except when removing or adding used oil).
- Inspect storage areas regularly for leaks or spills.
- Fix leaking containers immediately or move the oil to another container.

Although you aren't required to, you may wish to put your used oil containers in a "secondary containment" structure to prevent spills and contamination. Secondary containment is the name used to describe a structure or container that holds the storage tank and can hold the liquid if the storage tank leaks. The secondary containment should have a volume at least 10 percent greater than the volume of the largest container inside of it.

If you are storing a large amount of oil (one tank over 660 gallons or a total of over 1,320 gallons) you are required to have spill prevention measures. Your community or county may have specific requirements for storing oil. Check with local authorities, particularly your fire department.

The Missouri Department of Natural Resources recommends not storing used oil in underground tanks.

Storing containers on an impervious surface such as sealed or treated concrete helps contain spills and makes cleanup easier. Some shops store their used oil containers on pallets or slightly elevated in some way to make it easier to spot spills or leaks.

Clean up any spills immediately. Petroleum spills, including oil, over 25 gallons from storage tank must be reported to the department. Petroleum spills from other sources must be reported if they are over 50 gallons. However, a petroleum spill into a waterway such as a river, stream, lake or creek must be reported to the department no matter how small the spill.

The legal requirements for used oil storage sources can be found in *10 CSR 25, Chapter 11 of the Missouri Code of State Regulation* and in the federal regulations, *40 CFR Part 279*.

### **Remember**

- Label or mark storage containers with the words “Used Oil” and keep them in good condition
- Inspect storage areas regularly. Fix leaks immediately or move the oil to another container.
- If containers are exposed to rain, keep them closed except when adding or removing used oil.
- Check with local authorities to learn if there are local requirements.
- Oil spills of 25 gallons or more must be reported to the department by calling the 24-hour environmental emergency response phone at (573) 634-2436.

### **Pollution Prevention**

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- Keep used oil separate from other wastes.
- Have separate storage containers for antifreeze, solvents or other fluids that could accidentally be mixed with used oil.
- Use large drum funnels or fill tubes when filling used oil drums. Store funnels on a drip pan to collect dripping oil.
- Clean spills on a floor with a rag or mop that can be wrung-out and reused. A biodegradable soap and water solution may be used to clean up oil sheens.

## **Wastewater**

Rainwater that falls in and around mining operations can become contaminated with sediments, oil, grease and other materials. Runoff from gravel piles may also be caustic. If not properly managed, this contaminated water can harm the environment, pollute creeks and lakes, and even contaminate drinking water.

To prevent environmental and human health problems, the federal Clean Water Act requires that you have a permit if you wish to discharge water that has contamination in it. This permit is called a National Pollutant Discharge Elimination System permit. The Missouri Department of Natural Resources issues these permits in Missouri where they are called Missouri State Operating Permits.

If you own or operate a sand and gravel operation, you may need to apply for and obtain a Missouri State Operating Permit for storm water discharge. The requirements of the discharge permit are intended to minimize or prevent water pollution. You will need to sample and test water discharges from your operation as your permit requires.

The storm water permitting requirements are being handled in either general or site specific permits.

### **General Permit**

General permits are written to cover a group of facilities with similar discharges or processes. Individual facility operators must apply for a coverage under the general permit for their facilities. A general discharge permit has been issued for rock quarries. The general permit authorizes discharges of stormwater, wash water and water from dewatering pumping from quarries. It does not authorize the use of soap or detergents in truck washing. If you want to discharge any wastewater not authorized in the general permit, you must apply for a site specific permit.

If you do other types of mining, or produce concrete or asphalt, you will need to apply for other permits.

### **Site Specific Permit**

A site specific permit takes into account the individual characteristics of the site and the storm water runoff. Even if you are eligible to apply for a general permit, you can apply for a site specific permit if you prefer. In some cases, the department may require a site specific permit to better protect water quality.

Sand and gravel quarries are required to have a permit. A general permit is available that may cover your facility. To apply for that Missouri State Operating Permit you will need to complete an application Form E and submit a location map and a fee to the department. Permits are good for a period of five years. If an individual permit or other information is needed, the department will contact you.

### **Remember**

- If you wash your sand and gravel, you must have a Missouri State Operating permit for your storm water discharge.
- Discharge only the types of wastewater your permit allows.

### **Pollution Prevention**

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Your permit may require certain pollution prevention practices or even a pollution prevention plan. Here are some suggestions:

- Design, construct and maintain a detention basins to capture sediment.
- Use interceptor dikes, swales or berms to direct storm water away from areas that are prone to erosion or to convey runoff to the detention basin.
- Inspect and maintain the erosion prevention and sediment control structures to ensure their effectiveness.
- Revegetate disturbed areas as soon as possible.
- Prevent spills of oil, grease and gasoline in vehicle and equipment maintenance activities.
- Maintain appropriate spill containment equipment and train employees how to use it.
- Use mulches, geotextiles and other measures to prevent erosion.

## **SECTION III: Regulatory and Assistance Agencies for Sand and Gravel Operations in Missouri.**

The most prevalent type of mining in Missouri, as far as the number of sites, is the in-stream removal of sand and gravel. Numerous operators across the state use sand and gravel deposits, (gravel bars) as a source of aggregate material. Local landowners use sand and gravel for personal use and a number of county governmental agencies use it as surfacing material for county and township roads.

There are five agencies that offer assistance or have various regulatory responsibilities for the in-stream sand and gravel removal activity.

- Missouri Department of Natural Resources, Land Reclamation Program.
- Missouri Department of Natural Resources, Water Protection Program.
- The Missouri Department of Conservation has a Landowners Assistance Program.
- The U.S. Army Corps of Engineers has regulatory oversight in certain situations.

Please refer to the Corps maps in the attachment section for phone numbers of district offices where you may contact them.

If an individual intends to mine sand and gravel for sale on a commercial basis a permit will be required. You will need to contact the Missouri Department of Natural Resources' Land Reclamation Program and Water Protection Program and the U.S Army Corps of Engineers.

### **Missouri Department of Natural Resources' Land Reclamation Program - (573) 751-4041**

Operates under the authority of the 1972 Land Reclamation Act and regulates commercial in-stream mining operations. Incorporated into the Land Reclamation Act are rules that allow an operator to obtain a waiver from permitting through the Department of Natural Resources if the operator has obtained a permit from another agency whose permitting requirements are at least as stringent as those required by the department.

The Land Reclamation Program conducts field inspections of active operations and has the authority to issue enforcement actions against operators that have not obtained the necessary environmental permits or permitted operators who may be in violation of their stream protection plan that is incorporated into the permit.

Entities that are not required to obtain a permit from the Land Reclamation Program are

- Individuals for personal use only, and;
- Political subdivisions including county, city, state or branch of the military that uses its own personnel and equipment to obtain materials.
- A commercial operator is exempt from permitting with the Land Reclamation Program if they are covered by a section 404 permit, which is more strict than the Land Reclamation Program permit.

### **Missouri Department of Natural Resources' Water Protection Program - (573) 751-1300**

Carries out section 401 of Public Law 95-217, the Clean Water Act of 1977. Under this authority, the Water Protection Program reviews applications for Section 404 permits issued by the U.S. Army Corps of Engineers for impacts to water quality and aquatic life and issues water quality certifications with conditions that ensure water quality is protected. The Water Protection Program participated in the development of guidelines to protect water quality for the sand and gravel industry, and these guidelines are noted earlier in the document. In most cases, adherence to these guidelines would ensure a favorable water quality review. A copy of information sent to the U.S. Army Corps of Engineers as application for the Section 404 permit should be sent to the department's Water Protection Program, for the Section 401 review. If no Section 404 is required for the sand and gravel activity, then no Section 401 certification is required.

In addition, the Water Protection Program is responsible for ensuring compliance with state Water Quality Standards, (10 CSR 20-7.031). This rule applies to in-stream mining and basically states that it is unlawful to discharge any contaminants into waters of the state, including those that violate the narrative criteria of the standards. If designated beneficial uses under the Clean Water Law are impaired or precluded by discharged materials, then the water quality standards have been violated.

The narrative criteria prohibit discharges that

- Form putrescent, unsightly, or harmful bottom deposits.
- Create oil, scum and floating debris.
- Cause unsightly color or turbidity, or offensive odor.
- Have a harmful effect on human, animal, or aquatic life.
- Create a health hazard to humans from incidental contact.
- Cause acute toxicity to livestock or wildlife watering.
- Create physical, chemical or hydrologic changes that impair the natural biological community.
- Deposit used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste (unless deposit of the material is waived as a beneficial reuse).

Also, if your sand and gravel removal activity incorporates a gravel washing process, you are required to apply for a storm water discharge permit from the Water Pollution Protection Program, Permits Section.

### **Missouri Department of Conservation - (573) 751-4115**

Has no legal jurisdiction over in-stream mining activities, with the exception of using the Public Trust Doctrine. The doctrine states that human activities that negatively affect resources held in trust by government agencies for the public can be challenged legally. Missouri Department of Conservation and other Missouri agencies have not used the Doctrine at this time to compel public or private entities to use conservation minded resource practices. They have instead elected to work with the private landowners to implement approved conservation measures. Missouri Department of Conservation also assists operators in finding locations where gravel could be removed that would cause the least amount of damage to the stream resources.

Operators should consult with Missouri Department of Conservation and the U.S. Fish and Wildlife Service as to the presence of state and federal threatened and Endangered Species in the stream reach in order to avoid jeopardizing the species' continued existence or destroying or adversely modifying the habitat of such species.

### **U.S. Army Corps of Engineers**

The Corps is responsible for regulating certain activities in Waters of the United States. U.S. Army Corps of Engineers jurisdiction applies laterally over the entire surface of a water body to the ordinary high water mark. The ordinary high water mark for inland fresh waters is the line on the shores established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris or other appropriate means that consider the characteristics of the surrounding areas. Section 10 or section 10/404 permits are required for construction activities in these waters.

The Corps also enforces Section 10 of the Rivers and Harbors Act of 1899 that extends over "navigable waters of the United States." These waters are administratively defined to mean waters that have been used in the past, are now used, or are susceptible to use as a means to transport interstate or foreign commerce, up to the head of navigation.

A section 10 permit would be required if navigational capacity is impacted by structures or work from small recreational docks to commercial docks and includes any dredging or excavation, as well as bank protection.

Section 404 of the Clean Water Act regulates activities in surface waters such as in-stream stockpiling, stream crossings, bank stabilization activities and select removal methods. Section 404 establishes a permit program to ensure that dredged and fill discharges comply with other state and federal environmental regulations.

Currently, in nonnavigable waters (waters of the United States not under Section 10 of the Rivers and Harbors Act), excavation activities where the only discharge is incidental fallback of the excavated material into the hole from where it was taken, does not require Department of the Army Authorization.

The following activities are likely to result in a regulated discharge and do require a Department of the Army permit:

- Instream (riverward of the ordinary high water mark) stockpiling for any amount of time, regardless how temporary.
- Use of equipment that pushes gravel rather than lifting it.
- Sloppy excavation that results in more than incidental fallback.
- Instream processing/sorting where fines or oversized material is returned to the water body, is temporarily stockpiled in the channel, or is applied to river bank or bed for any purpose.
- Construction of access ramps or crossings that require fill placement.

If there is a question that the U.S. Army Corps of Engineers may have regulatory authority where you intend to remove sand and gravel, refer to the regional map in the attachments section for phone numbers and contact that office for assistance.

## **For More Information**

Missouri Department of Natural Resources  
Land Reclamation Program

P.O. Box 176

Jefferson City, MO 65102-0176

1-800-361-4827

(573) 751-4041

[www.dnr.mo.gov/env/lrp/index.html](http://www.dnr.mo.gov/env/lrp/index.html)





