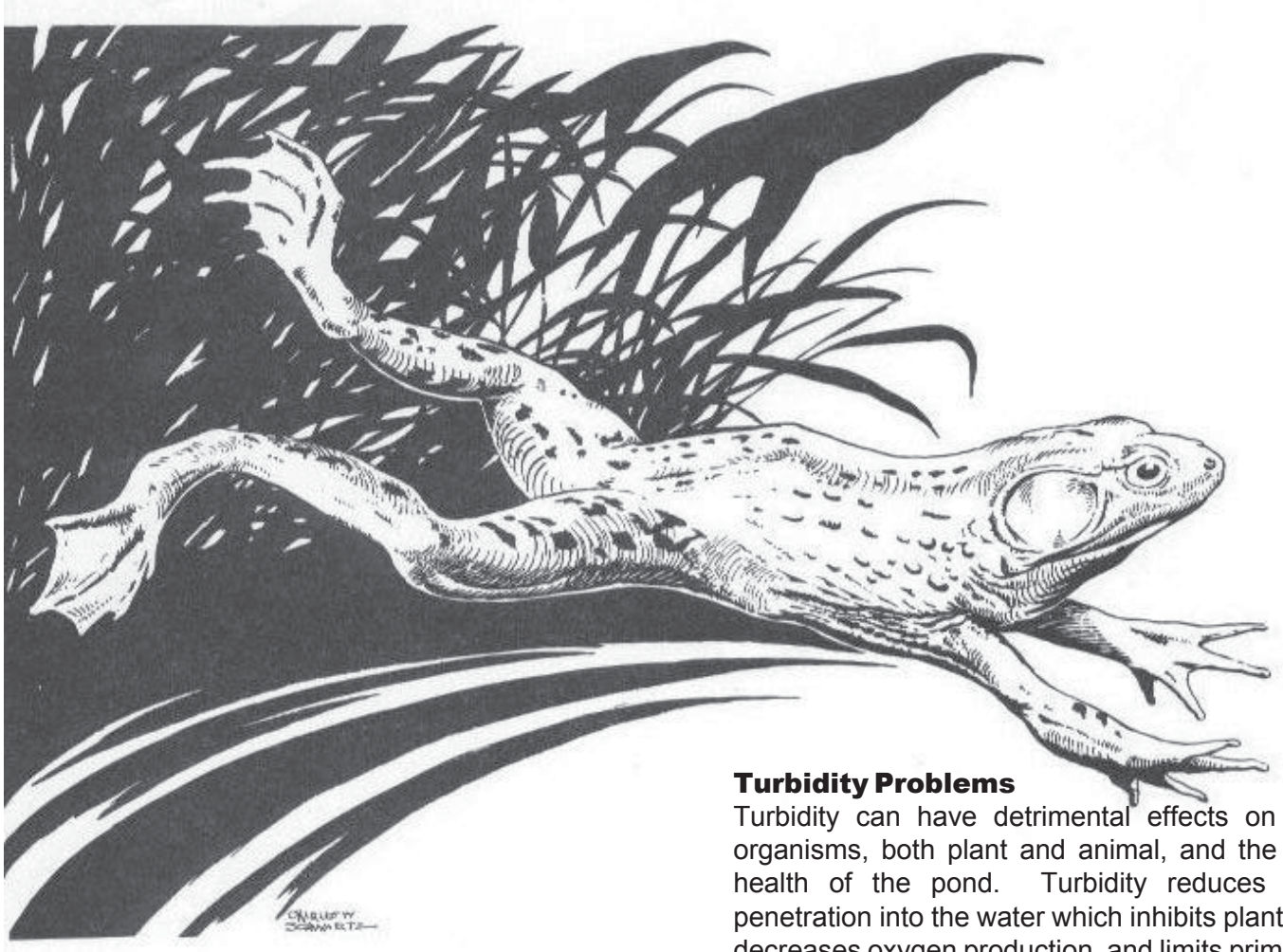
AQUAGUIDE

MISSOURI DEPARTMENT OF CONSERVATION

Clearing Ponds that have Turbid (Muddy) Water



Do you like turbid water in your pond? If you're like most people, the answer is "NO"! Turbid water is what biologists call water that is muddy or cloudy. Whatever term used, it is unsightly, and reduces the productivity of the pond. Turbidity can be a temporary or continual problem. It is normal to have a period of turbid water after a heavy rain; however, if the water never clears, your pond is not offering the best environment for a healthy fish population. A pond is considered turbid if you can't see the bottom of the pond in about two feet of water. Not every instance of dark colored water is turbidity, if the water appears to have a green coloration, it could be an algae bloom.

Turbidity Problems

Turbidity can have detrimental effects on aquatic organisms, both plant and animal, and the general health of the pond. Turbidity reduces sunlight penetration into the water which inhibits plant growth, decreases oxygen production, and limits primary food production. Aquatic organisms still demand the same amount of oxygen, but less oxygen is being produced.

If the water becomes too muddy, sight feeding fish like largemouth bass and bluegill will have a difficult time finding and capturing food. This could result in poor growth rates and a reduction in the numbers and sizes of these fish. Excessive silt can irritate fish gills, smother fish eggs, and suffocate bottom dwelling aquatic insect communities. In addition, aquatic herbicides used to control excessive aquatic vegetation may be ineffective when applied to turbid water.

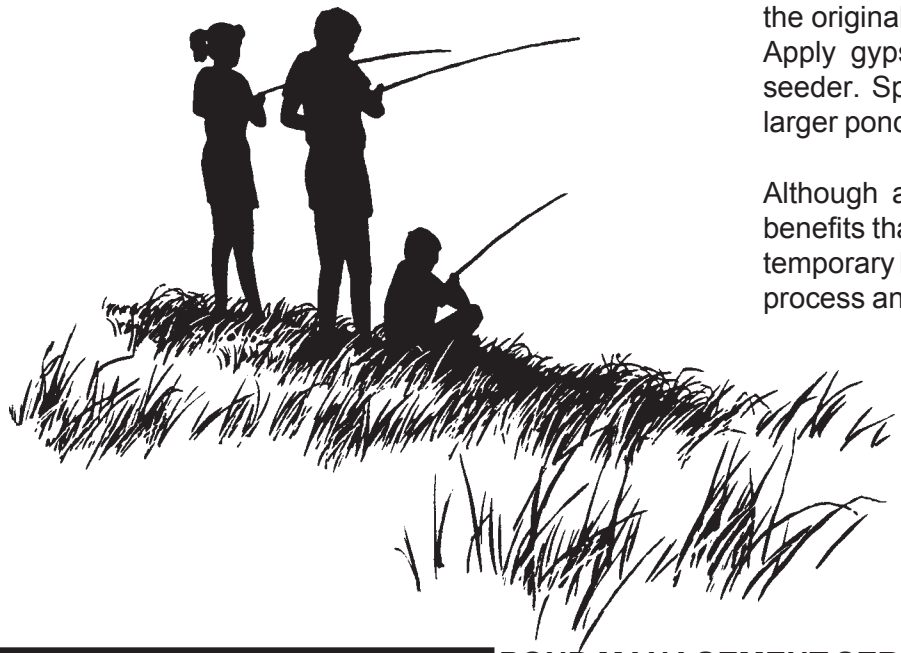
Turbidity Sources

Turbidity can result from several different sources. One cause of turbidity is suspended clay particles. Clay particles found in many soil types are small and repel each other because they carry the same electrical charge. When these particles enter a pond; they do not settle out, and the water stays turbid.

Another cause of muddy water is due to mechanical activities. Feeding activities of fish such as carp, bullhead, and buffalo cause bottom sediment to become suspended. When stocked solely (or in excessive numbers), channel catfish can be a source of turbidity. Bottom sediment can also be disturbed by crayfish and aquatic insects such as burrowing mayflies; as well as mammals such as muskrats and livestock. Another mechanical cause of muddy water is shoreline erosion by wind and wave action against shorelines lacking vegetation or other soil holding cover.

Testing for Turbidity Source

To successfully clear a turbid pond, one must identify the cause of turbidity. A simple test can be done by obtaining a sample of the pond water in a clear quart sized jar. Set the jar on a shelf, undisturbed, and observe how fast the particles settle to the bottom. If the water clears in about a week or less, the muddiness is from a mechanical disturbance. If the particles do not settle after a couple of weeks, the problem is likely clay turbidity.



METHODS FOR CORRECTING TURBIDITY

CLAY TURBIDITY

Clay turbidity is a product of water chemistry and soil type and is the most difficult to permanently correct. It can be temporarily corrected by adding cured hay, preferably legume hay such as alfalfa or red clover. Spread two square bales of hay per surface acre at fourteen day intervals throughout the spring and summer for up to four applications per year. The bales should be pulled apart and scattered in the shallow water around the pond. This will stimulate bacterial growth and cause clay particles to clump together and settle to the bottom. If the pond does not clear up in two weeks, this process can be repeated. **Be cautious because multiple applications can cause an oxygen depletion in the pond and may result in a fish kill**. In addition to clearing turbidity, this method can be beneficial by providing food to small animals and insects in the pond.

Agricultural-grade gypsum (hydrated calcium sulfate) can also be used to correct clay turbidity. An application dose of 500 pounds per acre foot of water is recommended. Acre feet can be calculated using the Pond Area Estimator (FIS #400) which is available at most Missouri Department of Conservation offices. Gypsum will attract clay particles and cause them to settle. If this treatment doesn't clear the pond in four weeks, and there is no wave action, erosion, or other source of muddiness, apply a second treatment at 1/4 the original application dose (125 pounds/acre foot). Apply gypsum using a small shovel or broadcast seeder. Spread the gypsum evenly over the pond. In larger pond situations this may not be cost effective.

Although applying gypsum provides longer lasting benefits than the "hay treatment," it too provides only temporary benefits. It may be necessary to repeat the process annually if water clarity is not satisfactory.

MECHANICAL TURBIDITY

Animal Activity:

Turbidity caused by aquatic organisms and animal activity in and around the pond is easier to remedy. Often, problems of this nature can be corrected permanently. Livestock having access to a pond will trample shoreline vegetation and wade in the water. Livestock should be fenced out of the pond if fish production is a high priority. If livestock must be watered, a pipe through the dam, or a siphon over the top, to a tank provides a desirable alternative. If this is not feasible, fence off all but a small corner of the pond for livestock watering.

Crayfish, aquatic insects, and some fish species can cause turbidity due to their bottom feeding habits or burrowing activity. Dense crayfish and immature insect populations can be controlled by the introduction of a predator species such as largemouth bass or channel catfish. Carp, bullhead, buffalo or even excessive numbers of channel catfish should be removed if they are the cause of turbidity. If channel catfish are stocked alone, a turbidity problem may continue if numbers become extensive. The establishment of an alternative fish community such as, largemouth bass and bluegill may be more suitable for your needs and result in a less turbid pond. If you want to keep a small population of bottom feeding fish in your pond, a population of largemouth bass will help keep the numbers in check.

Wind, Wave and Soil Erosion and Watershed run-off:

Soil erosion in the watershed contributes to turbid water. Proper watershed management practices and erosion prevention will eliminate these potential problems. Plant a sod producing grass on any bare ground and maintain at least a 100' wide buffer strip of thick vegetation around the pond.

Some impoundments with a heavy sediment load can be turbid all year. The more sediment in a pond the less mechanical activity it takes to muddy the water. Ponds located within the watersheds of cultivated crop fields are candidates for heavy sediment loads. In such ponds, the water will rarely be clear enough for ideal fish production. We recommend the landowner correct the problem in the watershed before removing the silt from the basin. If a pond owner doesn't consider the source of sedimentation first, the other prescriptions could fail and a desirable fish population may never develop. A preventive measure may be to install sediment traps or settlement basins upstream from the pond. The sediment in the pond should be dug out on an as needed basis to prolong the life of the pond. Silt should not be removed until the volume of the pond has been greatly reduced.

Windbreaks and shoreline protection will enhance the pond's appearance as well as improve the watershed. Plant trees and shrubs on the upwind side of the pond to dissipate prevailing winds. Plant aquatic vegetation, such as water willow or arrowhead, on the downwind side of the pond to help prevent wave erosion. If the shoreline is eroding, some protective measures should be taken such as rip-rapping, seeding grass, or planting trees on the problem areas. Never plant trees on a dam. Tree roots may threaten the structural integrity of the dam causing it to leak. Switch grass is a warm season, sod forming grass that tolerates wetter soil conditions and once established is able to withstand flooded conditions for up to 45 days. Application rate of switch grass seed should be 8 pounds per acre.

In most cases, turbidity can be corrected. Proper watershed management practices as well as vegetating exposed or eroding banks, and the stocking of proper fish species, are all good practices in any pond. Contact your local Missouri Department of Conservation Regional Office for additional information on clearing turbid (muddy) ponds and other related problems. You may do this by calling 573/751-4115, e-mailing www.conservation.state.mo.us or writing:

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MP 02/01
FIS - 116