

DIRTY WORDS

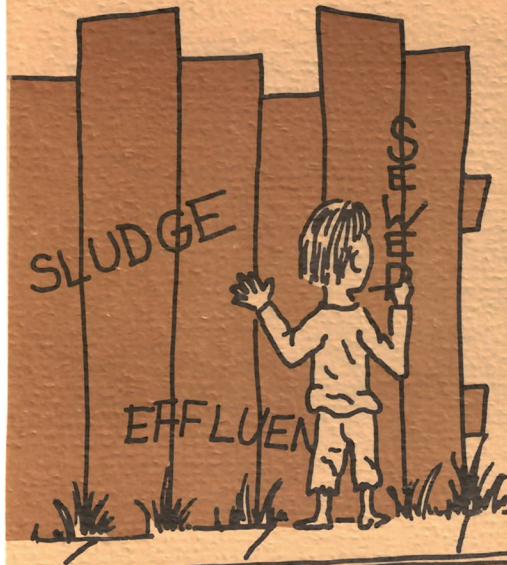
A GLOSSARY OF WATER QUALITY TERMS

Volumes 1 - 15

A series of publications designed to acquaint citizens with terms and concepts in dealing with water quality problems.

January 1976 - March 1977

This glossary of water quality terms was made possible by a grant from the U.S. Environmental Protection Agency and co-sponsored by the Southwestern Illinois Metropolitan and Regional Planning Commission and the East-West Gateway Coordinating Council.



DIRTY Words

A GLOSSARY OF
WATER QUALITY TERMS

JANUARY 1976

VOL. 1

This is the first in a series of publications designed to acquaint citizens with terms and concepts in dealing with water quality problems.



Doc, we started an I.V. of 201. Now we need 208 and 303. We've got to stop the pollution.

DIAGNOSIS — WATER POLLUTION: Anything in a lake, river, stream, pond or puddle that isn't water. Can come from natural or manmade sources. Caused by discharge from sewage treatment plants, industrial wastes, erosion, urban stormwater runoff, and many others. Warning: may be hazardous to the health of rivers, lakes, streams, man and wildlife.

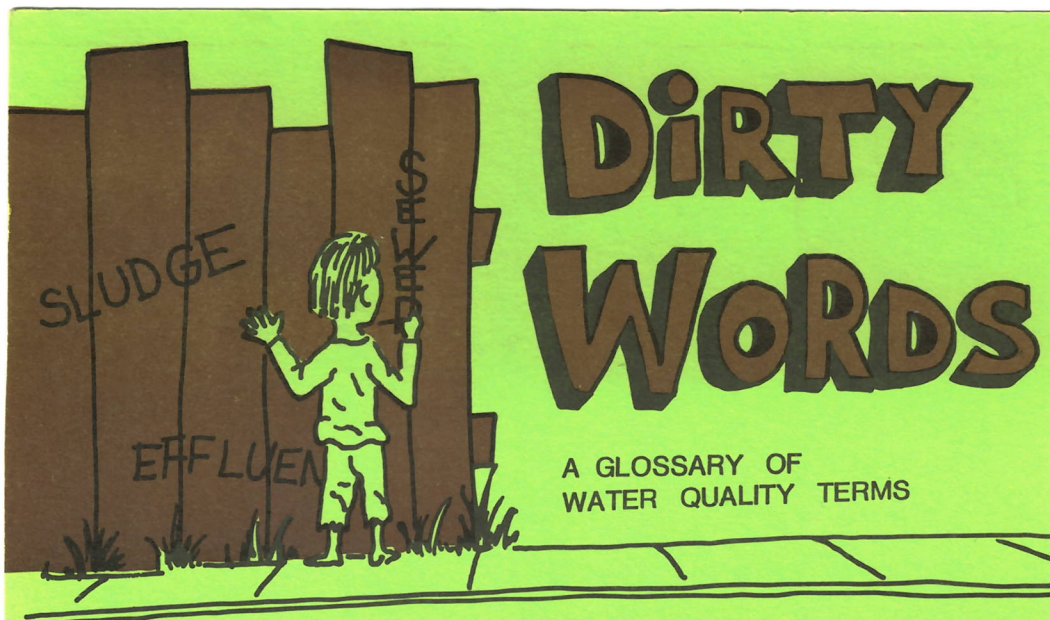
TREATMENT — PUBLIC LAW 92-500: The Federal Water Pollution Control Act Amendments of 1972. Provides money to the Environmental Protection Agency to administer various programs; sets standards for water quality. The law has 518 sections, each dealing with a phase of water quality. Citizens will be most directly affected by three of these sections:

- Section 201: Provides funds to municipalities to build sewage treatment plants.
- Section 208: Provides money to agencies (called "208" agencies) in areas with severe and complex pollution problems. In the St. Louis area there are two agencies attempting to find solutions to our problems through grants under this program. In Illinois (Madison, Monroe and St. Clair Counties) the agency is the Southwestern Illinois Metropolitan and Regional Planning Commission (Phone (618) 344-4250). In Missouri (City of St. Louis, Jefferson, Franklin, St. Charles and St. Louis Counties) the agency is the East-West Gateway Coordinating Council (Phone (314) 421-4220). If you have any questions or wish to participate, call the agency in your area. Ask for Water Quality Citizen Participation.
- Section 303: Provides money to states to study and solve water quality problems in river basin areas. Will incorporate and/or reinforce 208 and 201.



THIS GLOSSARY OF WATER QUALITY TERMS WAS MADE POSSIBLE BY A GRANT FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND CO-SPONSORED BY THE SOUTHWESTERN ILLINOIS METROPOLITAN AND REGIONAL PLANNING COMMISSION AND THE EAST-WEST GATEWAY COORDINATING COUNCIL.





DIRTY Words

A GLOSSARY OF
WATER QUALITY TERMS

FEBRUARY 1976

VOL. 2

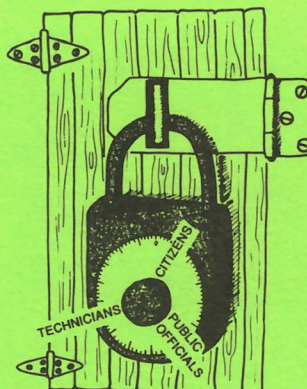
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AREAWIDE PLANNING: A process for solving problems and potential problems in an area.

An area is a defined space of land, water, and air which is tied together by common bonds. The parts of an area are dependent upon each other. If something happens to one part, other parts are affected.

In areawide planning, we — citizens, officials, and planners, working together — try to look at the total area and how the parts can interact to solve common problems. We try to anticipate what will happen in the near future and to plan ahead to avoid problems. As the adage says, "A stitch in time saves nine." If we can stop a problem instead of trying to solve it later, we can save time and money.

Cooperation and coordination eliminate duplication, which costs money. If four people work on a single problem at the same time and cooperate in the effort, it costs each one 1/4 of what it would cost if each individual tried to solve the problem all by himself.



"The only combination which opens the door to water quality is cooperation."

This kind of cooperation is particularly important when dealing with water pollution because many locations use water in many ways. We can solve the area's problems only through cooperation of all the area's jurisdictions. This job of cleaning up our water and preventing future contamination is too large for one city or one county. Only if we all join together to work on it, will we be successful.

To find out how you can become involved:

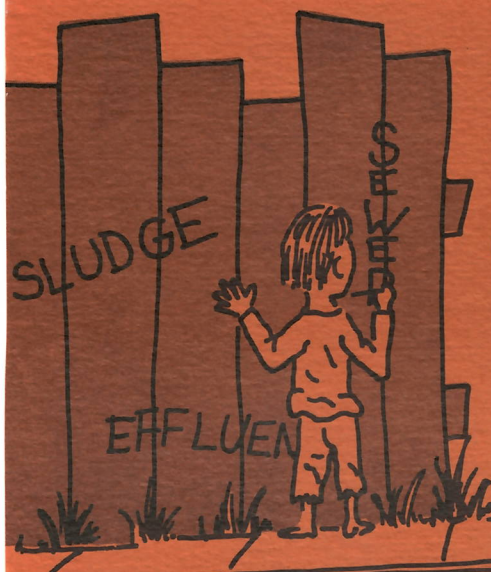
Illinois residents call: 344-4250
Missouri residents call: 421-4220

Ask for Water Quality Citizen Participation.



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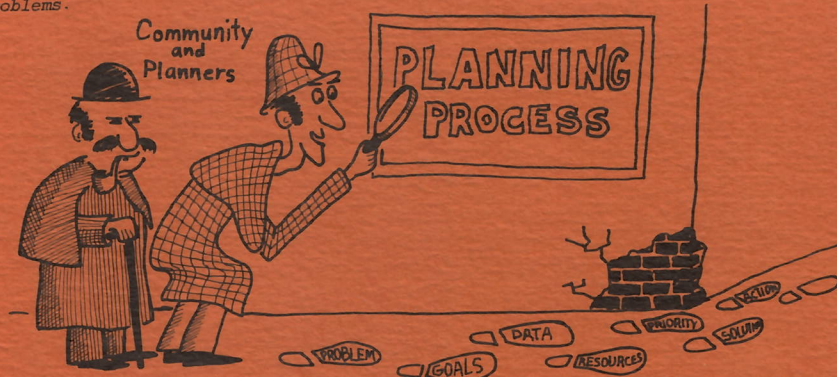
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WATER QUALITY TERMS

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VOLUME 3

MARCH 1976



"By golly, Watson, I think we've found it--THE PLANNING PROCESS!"

PLANNING PROCESS: Strategy for the community and planners to solve problems. Steps taken are: **IDENTIFY PROBLEMS**--Finding out what gaps exist in the system. You can help. // **ESTABLISH GOALS AND OBJECTIVES**--Outlining what the plan will accomplish and what actions must be taken to accomplish it. Let your agencies know what you want. // **GATHER DATA**--Finding out information about the area, such as growth patterns and information about soils, rocks, water, terrain, etc. // **IDENTIFY RESOURCES**--Finding out how much \$\$ is available to solve problems. Includes taxes, revenue sharing, federal and state grant programs. // **ESTABLISH PRIORITIES**--Making decisions about where the most money will be spent and what things will be done first. // **DEVELOP ALTERNATIVES**--Developing all possible strategies for solving the problems. One of these must be selected for action, based on community input. // **SCHEDULE ACTIONS**--Setting up a timetable for getting things done. // **IMPLEMENTATION**--Carrying out the plan. This is the most important part of planning, but sometimes plans are not implemented. YOU must get involved to be sure that the plans address your needs! YOU must let your officials know that YOU want action on the plans. // **MONITOR**--Seeing if things are being done according to the timetable. If not, it is necessary to realign the course of action. New information also sometimes necessitates re-evaluation.

Once all these steps have been completed, new information is fed into the system and the process starts over. This must happen to keep the plans up to date.



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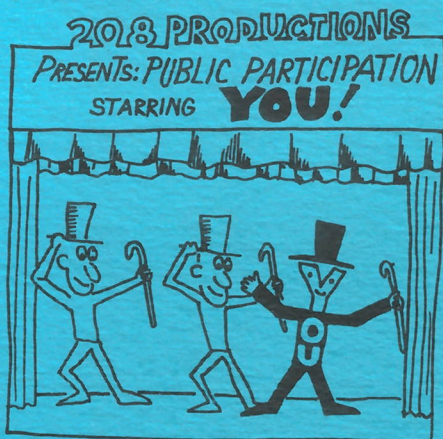
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VOL. 4

APRIL 1976



PUBLIC PARTICIPATION: YOU are on stage! YOU are the star of this show! All segments of the community have a chance to become involved in making decisions. The community has people with many different viewpoints and includes such categories as public officials, environmental groups, conservationists, business interests, civic organizations, labor, ethnic groups, special interest groups such as anglers or boaters, operators of sewage treatment facilities and the largest segment—unaffiliated individuals.

Citizen participation has several facets. A complete program includes all of these:

Information: Letting people know what is happening, what the program is doing,

how they can be involved. This is done through brochures, newsletters, educational materials, technical reports, exhibits, newspaper articles, TV and radio spots, personal appearances at organization meetings. If you want to receive information, have your name put on the mailing list! Tell your friends! If they want to be added to the mailing list, have them write or call their appropriate agency.

Involvement: Usually this means serving on a committee or task force. Much of the work in water quality planning will be done in such groups. By being a member or by attending meetings you will have an opportunity to have your say before the plan is formulated.

Feedback: If you cannot or do not want to be directly involved in the process, you should let your agencies know your concerns. You can call or write at any time to express your opinions. You can complete surveys or questionnaires. You can attend public meetings and hearings which will be held periodically.

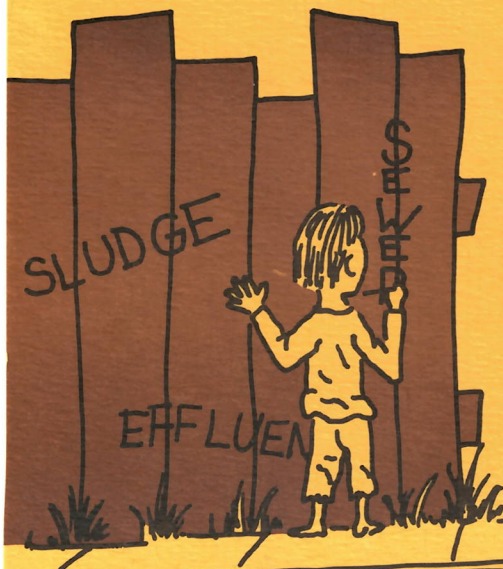
YOU CAN HAVE AN IMPACT! BE INVOLVED!

For Illinois residents: contact the Southwestern Illinois Metropolitan and Regional Planning Commission, 203 West Main Street, Collinsville, Illinois 62234. Telephone: 618-344-4250.

For Missouri residents: contact East-West Gateway Coordinating Council, 112 North Fourth Street, Suite 1200, St. Louis, Missouri 63102. Telephone: 314-421-4220 or 618-274-2750.

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DIRTY WORDS

A GLOSSARY OF
WATER QUALITY TERMS

VOL. 5

MAY 1976

This is one in a series of publications designed to acquaint citizens with terms and concepts dealing with water quality problems.

POINT SOURCE POLLUTION: Pollution from a source that you can point to--that can be identified. Usually a pipe that carries wastewater from a factory, a sewage treatment plant, or from a residence. Most of the efforts to clean up our waters have been through treatment of point sources, particularly from industrial sites. It may be that intense treatment of this kind of pollution is the most expensive way to deal with water quality problems. The "208" Water Quality Program will be evaluating the cost effectiveness of concentrating our clean-up efforts on this one aspect of the problem.

NONPOINT SOURCE POLLUTION: This type of contamination comes from a variety of sources spread over a wide area. But the actual source of the problem cannot be readily identified. Nonpoint pollution

includes such things as soil erosion; stormwater runoff; chemicals left on roads and driveways by automobiles; pesticides and herbicides used in agriculture and in lawns and gardens; and rain which falls through polluted air.

Official estimates say that fully one-half of water pollution comes from such sources. While these types of sources are difficult or impossible to identify specifically, it is possible to control most of them by changing some of the things we do or the way we do them. This is much cheaper than building big treatment plants. What it amounts to is the ounce of prevention which is better than the pound of cure. Management of nonpoint pollution is another of the things that "208" Programs will be examining.

NON-POINT
SOURCE



POINT
SOURCE



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VOL. 6

JUNE 1976

STORMWATER RUNOFF: Most people do not think of rainwater as being a source of water pollution. During a heavy rain, however, here's what happens:

Rain often falls through polluted air--so it is polluted even before it hits the ground. In agricultural areas the rain falls on fields which have been cultivated, fertilized, "insecticized," and "herbicized" and on pastures and feedlots that contain a high level of animal waste. The drops of water either are absorbed by the soil or run off into a ditch or a stream. As the water passes over the soil (or drips from trees, grasses, crops, etc.), it picks up some of the chemicals and bacteria which are there. The water that is absorbed through the soil is "filtered" by the lower layers of soil and rock so it usually is clean when it gets to underground water supplies. The water that runs off, however, is flushed into rivers and streams, carrying with it eroded soil and a variety of toxic and nontoxic substances, such as animal waste and decaying matter from forests.

In developed areas, the water rushes off the pavement into sewer systems which carry it to a discharge point--usually a river or stream--where it runs untreated into the waterway. This water carries with it all of the wastes and chemicals from the buildings and streets--oils, gasoline, and other chemicals from automobiles, particles from tires, insecticides, herbicides, paints, fertilizers from lawns, particles of dust and soot from rooftops, leaves, and other debris and litter.

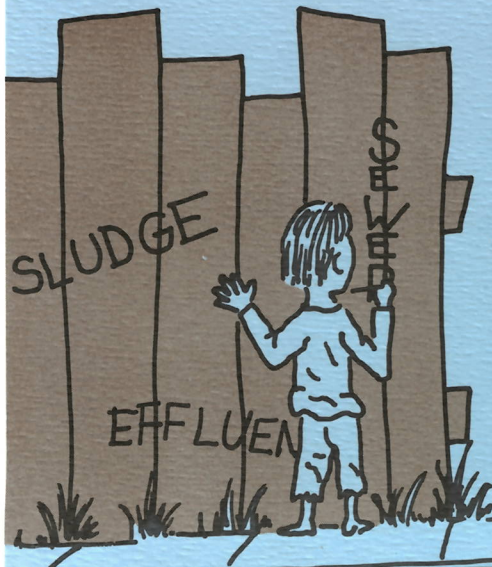
Runoff from stormwater is, at times, so toxic that it causes massive fish kills in the rivers and streams into which it is discharged.

COMBINED SEWERS: In many older cities, sanitary sewers and storm sewers are together in one system. Under ordinary circumstances, this isn't a problem. During periods of heavy rainfall, however, when the sewage treatment facility cannot handle the increased flow, the untreated wastewater from both sanitary sewers and storm sewers bypasses the treatment facility and is discharged directly into a river or stream. This can cause a serious health hazard.



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A GLOSSARY OF
WATER QUALITY TERMS

This is one in a series of publications designed to acquaint citizens with terms and concepts dealing with water quality. The next several issues will deal with the treatment of wastewater (sewage) from both homes (domestic) and other sources.

WASTEWATER (SEWAGE) TREATMENT SYSTEM: A system for the collection, transport, and treatment of wastewater. Size ranges from single-family treatment facilities to systems which serve entire metropolitan areas.

SEPTIC TANK: A treatment facility usually used for one residence only. The sewage is collected in an underground tank, where bacteria decompose the wastes. Solid particles settle to the bottom, leaving partially purified water above. The water is allowed to drain from the tank into surrounding soil, where further natural purification action takes place. This type of system should be used only under correct soil conditions. Severe pollution problems can occur if soil conditions are not right because the water from the tank, which is not completely purified, can filter through

VOL. 7

JULY 1976

rocky or sandy soils into underground water supplies and permanently contaminate them.

LAGOON: A shallow pond scientifically constructed to allow sunlight, bacteria, and oxygen to interact and purify wastewater. Useful for a single residence, a subdivision, part of a more elaborate system, and in treating stormwater runoff. Can also provide aesthetic value.

PACKAGE PLANT: A prebuilt treatment plant ordinarily designed to serve a small cluster of residences.

PRETREATMENT: Process of purification often required of industries to remove the special types of pollutants created during industrial processes. Before the wastewater can be discharged into a municipal treatment system, it must meet certain standards.

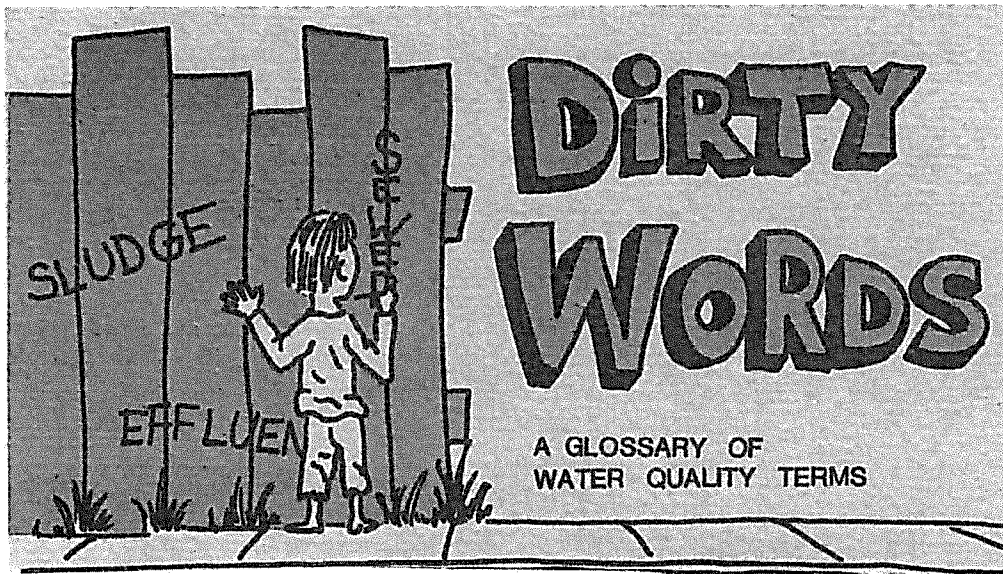


"I Still Think There Must Be A Better Wastewater Treatment System."



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AUG. 1976

VOL. 8

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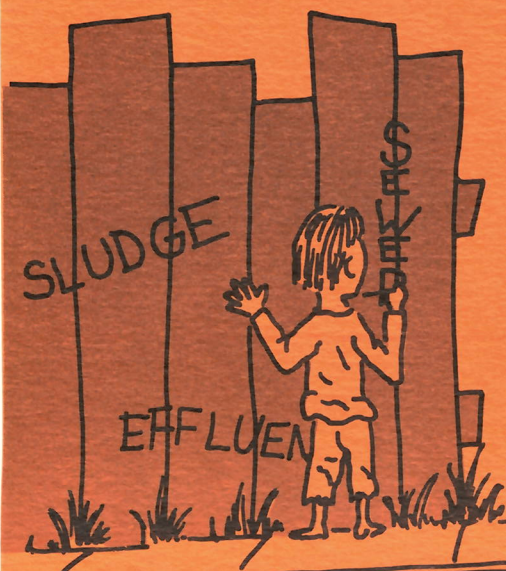
LEVELS OF WASTEWATER (SEWAGE) TREATMENT:

Primary: The most elementary form of wastewater treatment, primary treatment uses mechanical processes to remove solid particles from the water. The wastewater flows through cutters and screens which reduce large solid items to small pieces and filters them from the flowing water. The water is then directed to a holding tank where it is kept while heavy solid particles are allowed to sink to the bottom of the tank and some of the lighter solids float to the top. The light particles are then skimmed and the water is pumped from the tank, leaving the heavy particles behind. This process removes from 30 to 60% of the solid particles from wastewater.

Secondary: By 1977 this will be the minimum level of treatment required by federal law of all municipalities. The process begins with water that has gone through the primary process. Secondary treatment usually relies on natural processes to further break down the solid particles in wastewater. A two-cell lagoon (see July issue) is one example. In another treatment process bacteria and air are mixed with the sewage in an aeration tank. The sewage particles are consumed by the bacteria and the water is then pumped into another settling tank where large masses of solid particles form and are allowed to settle. At this stage 85 to 95% of solids have been removed from the wastewater.

More next month

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VOL. 9

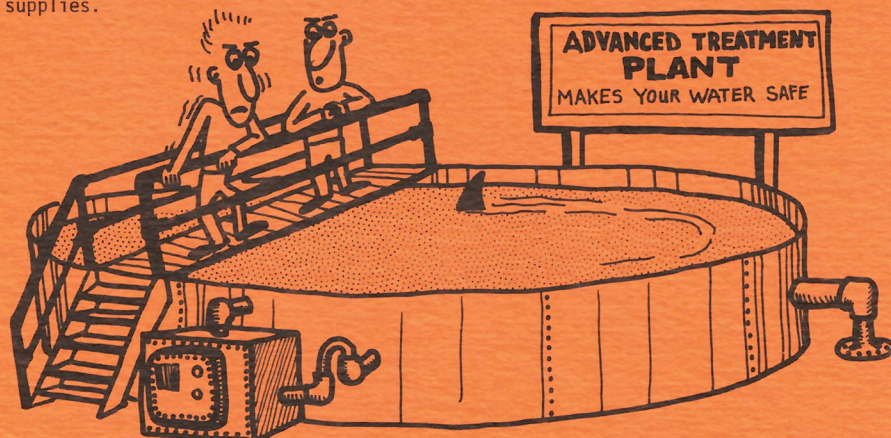
SEPT. 1976

LEVELS OF WASTEWATER (SEWAGE) TREATMENT (continued from last month):

ADVANCED (TERTIARY) TREATMENT: An additional phase of treatment used in areas where an especially high quality of water is necessary. The process may involve one or more steps to remove additional solid particles or specific harmful substances, such as phosphorus or nitrate, from wastewater.

Advanced treatment removes an additional 5 to 10% of solids from wastewater. Additional costs associated with advanced treatment can be 1 to 2 times that of secondary treatment. However, substances removed may be critical for aquatic and human health and safety and for the maintenance of high quality water.

At the conclusion of the treatment process--be it primary, secondary, or advanced--a disinfectant, usually chlorine, is added to the water to kill bacteria before it is pumped out of the treatment facility. After treatment the water is usually discharged into a river or stream where it could greatly affect the quality of the receiving water, particularly in small streams. In some areas, where water supply is critical, treated wastewater is recycled into recreational and domestic water supplies.



"There's just one last thing we'd like to have removed to make our water safe!"



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VOL. 10

OCT. 1976

EFFLUENT: Water that leaves a treatment plant, a house, or an industry and is discharged to the environment. The term applies to either treated or untreated wastewater. In some cases, then, effluent may actually be raw sewage; in other cases, it could be pure, pristine water--or any condition between these two extremes.

SEWAGE: Wastewater from sources such as homes, restaurants, hotels. Sewage contains a high level of food and human waste. When allowed to flow untreated, or not properly treated, into other water sources, sewage causes serious health hazards by introducing bacteria and food for bacterial growth.

SLUDGE: A thick, muddy-looking substance composed of the solid matter removed from wastewater during the treatment process. Disposal of sludge from large treatment works is a problem. In some areas, it is burned (incineration) and the "ashes" are sent to a landfill; in some areas, the sludge is used as fertilizer for gardens and croplands. There is some question, however, at this point in time about the long-term safety of this practice because of high concentrations of heavy metals.

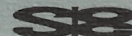
HEAVY METALS: Elements, such as mercury and lead, contained in urban runoff and industrial wastes. Such metals have been found to be extremely toxic to humans and animals, even in low concentrations. Some heavy metals are not removed during the sewage treatment process.

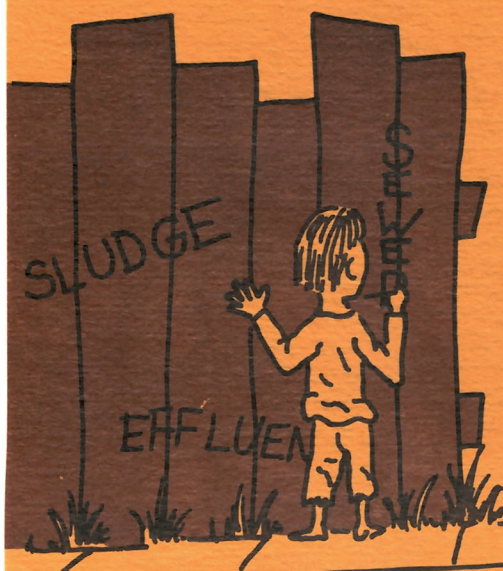


"Don't get TRICKED! TREAT your wastes properly!"



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A GLOSSARY OF
WATER QUALITY TERMS

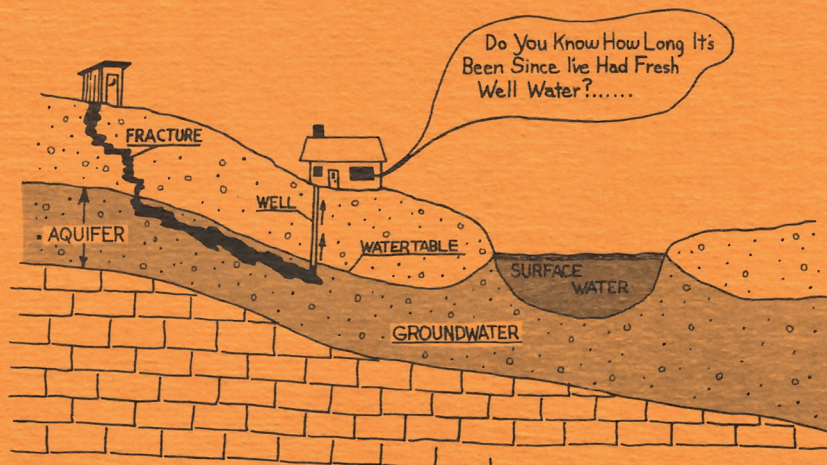
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VOL. 11 NOV. 1976

WATER TABLE: The level below which the Earth's crust is saturated with water.

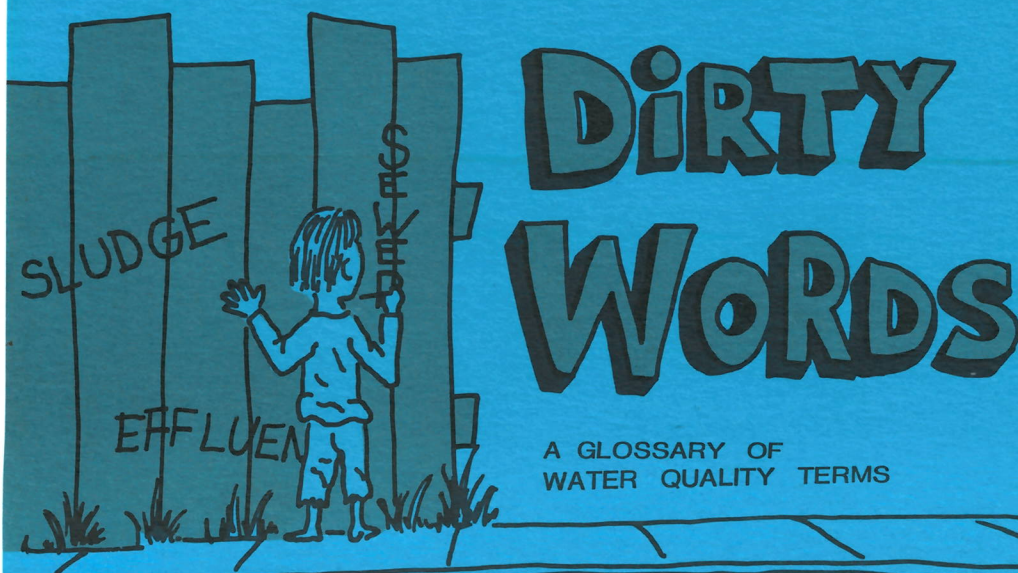
GROUNDWATER: All water contained in the soil formations below the earth's surface (Surface water includes lakes, streams, oceans, etc.) Many lakes and streams, however, are fed from groundwater supplies; springs flow from groundwater; and wells are supplied from groundwater. About one-third of public water supplies and almost 80% of rural supplies come from groundwater sources. Obviously, groundwater is as important a resource as surface water but differs from surface water because of its vulnerability to pollution. Groundwater contamination is long-lasting; recovery is extremely slow; and water supplies in a large area can be affected by pollution from a relatively small source.

AQUIFER: An underground formation of rock, sand, gravel, etc. which, because of its unique qualities, is able to store and carry water. Sometimes soil and rock formations above an aquifer allow water from the surface to penetrate into the aquifer making it vulnerable to contamination from surface pollution and seepage from septic tanks. Protecting aquifers from sources of contamination is an important aspect of planning.



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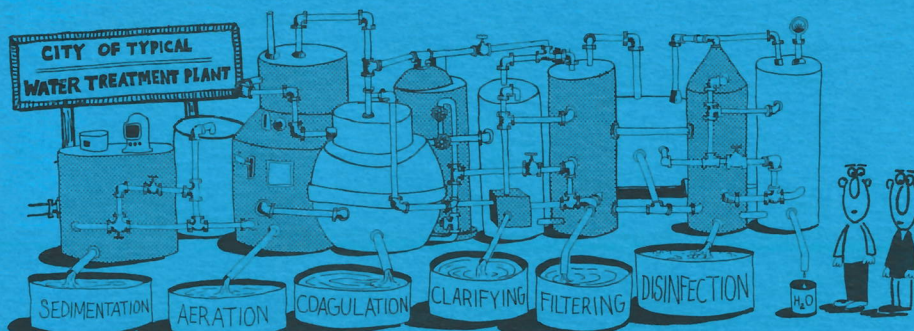
VOL. 12

DEC. 1976

Water Treatment: Pure water is rarely found in nature. Rain gathers gases, dust, and other particles as it falls to the Earth's surface. Once there, water is exposed to a variety of pollutants--human and animal wastes, decomposing organic matter, gases, chemicals, fertilizers, pesticides, radioactivity, and heat. Some impurities are not dangerous and can be consumed by humans without harmful effects. However, many chemicals and bacteria can cause illness and must be removed before water is safe for human use.

The process used for water treatment may vary, depending on the equipment manufacturer, state standards, and the quality of the water being treated. The largest municipal water supplies in the St. Louis area are taken from surface water sources such as the Mississippi River and must be treated extensively prior to use. A typical treatment process involves several steps: (1) Sedimentation: The water is stored to allow heavy particles to settle. (2) Aeration: Air is mixed with the water to speed natural chemical processes. This reduces tastes, odors, gases, and heat. (3) Coagulation: Chemicals are mixed with the water to get impurities to separate. (4) Clarifying: Large masses of materials separated in Step 3 are allowed to settle out. (5) Filtering: The water is pumped through sand, which removes smaller particles separated during the coagulation process. (6) Disinfection: Chemicals (usually chlorine) are added to kill bacteria. Water is usually chlorinated several times during the treatment process.

The treatment process does not routinely remove all chemicals, heavy metals, radioactivity, or other unique pollutants.



"After the water goes through Sedimentation, Aeration, Coagulation, Clarifying, Filtering, and Disinfection treatments, there just ain't much WATER left."



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VOL. 13

JAN. 1977

Drainage Basin (also known as a watershed, a river basin, a lake basin, or a catchment area):

The entire surface area that contributes water to a river or lake--includes land area as well as streams and springs. The watershed area can be broken down into smaller areas to show the movement of water within a large basin. For instance, the Meramec Basin area can be studied as a watershed in itself or as part of the Mississippi River Basin. Smaller streams that flow into the Meramec have their own watershed area and are also part of the Meramec Basin and ultimately of the Mississippi Basin.

Land uses, even if they are not located near the body of water in a watershed, can affect the quality and quantity of water in the receiving stream or lake. Wash-off from mined areas, agricultural areas, and urbanized areas can enter the groundwater system carrying pollutants to groundwater supplies and to surface waters.

Land uses that take water from the system (industry, residential, irrigation of agricultural land) deplete the amount of water that flows to the receiving area. Land uses also affect water quality. Consideration of drainage patterns is extremely important in order to avoid needless pollution of lakes and streams.



"I don't see what's so complicated about drainage patterns. You pull the plug and the stuff goes right down the drain."



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VOL 14

FEBRUARY, 1977

DO: Dissolved oxygen.

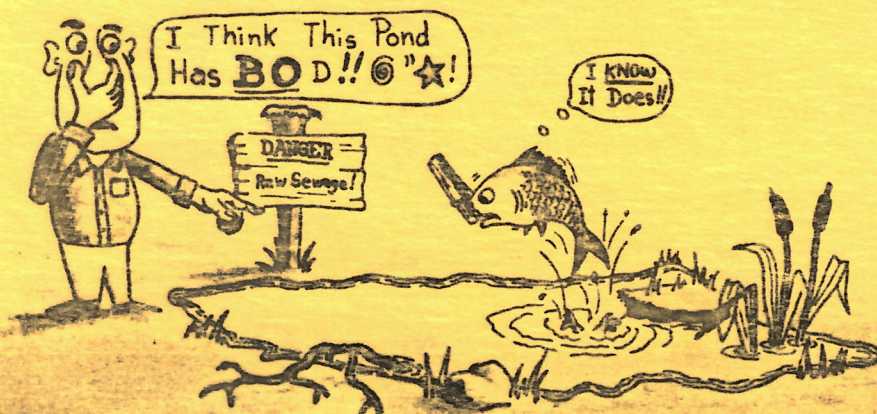
The amount of oxygen available in water. DO is a critical factor for fish and wildlife support and can be adversely affected by wastewater effluents and other pollutants.

BOD:

Unrelated to the human form, BOD stands for Biochemical Oxygen Demand. It is a scientific measure of the amount of oxygen required by microorganisms during the decomposition of organic matter. As microorganisms multiply during the decomposition process, the level of dissolved oxygen decreases, which can adversely affect fish life.

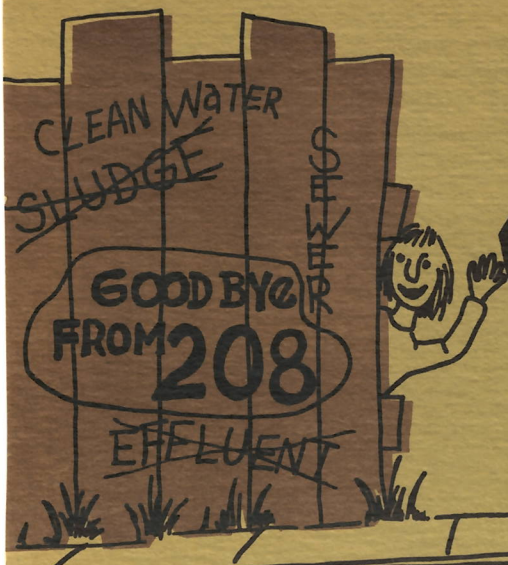
Fecal Coliform:

A type of microorganism found in human and animal digestive tracts. Although fecal coliforms are not thought to be harmful themselves, they can serve as an indicator of contamination.



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A GLOSSARY OF
WATER QUALITY TERMS

This is one in a series of publications designed to acquaint citizens with water quality terms and concepts.

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WATER QUALITY STANDARDS are yardsticks to measure substances in water that could be harmful to users. Through research and experience, scientists can determine precise limitations for some substances when harmful effects would result. When limitations cannot accurately be determined for pollutants, an extra measure is included for safety. This occurs especially when health is involved.

Also, determining limitations is often complicated by the interaction of various materials in a stream.

Standards must be relevant to the particular environment where they are applied, thus various areas and states have differing standards.

Standards must be attainable, realizing that some pollutants occur naturally and cannot be effectively controlled. They must be measurable, understood, and acceptable to the public.

With this issue, we end publication of "Dirty Words." We hope you have found the publication interesting and informative.



"I don't care what it tastes like!
I don't care about that bad smell!
I don't even care about that thing
swimming around in it!
That water meets the STANDARDS!"



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