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FRONT COVER: The "Osprey", by Dan Metz is reprinted from the Summer 1977, *Journal of Freshwater* published by the Freshwater Society, Navarre, Minnesota. During the 1980's ornithologists discovered that osprey populations were decreasing, even in remote areas, despite growing protection by law. With the major part of the osprey's diet coming from freshwater sources, it soon became apparent that a decline in osprey populations was related to the conditions of the surrounding water and the plants, animals and fish that existed in that water world.

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EDITORIAL



Donald Winne

DEFENDING OUR LAKES & STREAMS

It is quite evident that if our lakes and streams are going to be protected from degradation, pollution and mis-use, riparian property owners must form the front line of defense. The plight of Michigan's economy and consequent squeeze on budgets of regulatory agencies means less help from the State to protect our water resources. The present attitude of many legislators in Lansing means that environmental needs will take a back seat to the demands for oil and energy. Who is left to fight for lakes and streams? It is

the individual waterfront property owner working with other property owners through an active and determined lake or stream association.

What are the weapons of successful associations? They will vary in detail from one association to another and from one watershed to another, but adhering to the following guidelines will put associations in a position to forge ahead and at the same time prevent an adversary from finding an achilles heel to bring about defeat.

1. Seek all facts relevant to any decision that must be made concerning your lake or stream and its watershed.
2. Consider negative facts when reaching a decision.
3. Avoid any tricks which might give a temporary advantage.
4. Expose the position of adversaries without reservation.
5. State your position and goal firmly and without equivocation.
6. Stand firmly for what is good for the lake, stream or water resource when personal gain is in conflict.

An informed and dedicated membership whose goal is to protect the water resource are bound to succeed. (See the editorial comment about who is City Hall from Pine Lake Association, Oakland County, in ML&SA News in this issue.)

PUBLICATION DATES: Winter issue, February 1; Spring, May 1; Summer, August 1; and Fall, November 1.

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Water Resources Commission Maintains Constant Surveillance Of Michigan Water Resources



(Left to Right): Patricia M. Cayemberg; Samuel A. Milstein; Joyce P. Van Keulen (Vice Chairman); Thomas Hoogerhyde (Chairman); Robert J. Courchaine (Executive Secretary); Max N. Clyde; F. Gene Burch (Dean Pridgeon, not pictured).

The Commission's primary responsibilities are to regulate and control water pollution and uses of the waters of the State, both groundwaters and surface water which affect the quality of such waters; to issue (or deny) permits and make Orders regulating waste water discharges and storage of polluting materials; to adopt and implement State water quality standards; and, to act in an advisory capacity to the Director of the Department of Natural Resources and the Natural Resources Commission in the enforcement of these permits, orders, and standards.

BIOGRAPHICAL SKETCHES OF PRESENT MEMBERS

THOMAS C. HOOGERHYDE, P.E., Chairman of the Commission

Thomas was born in Grand Rapids and earned a bachelor's degree in civil engineering at the University of Detroit in 1963. Two years later he was issued a Master of Science degree in Sanitary Engineering at Michigan State University.

He worked as a technician and civil engineer in bridge and road construction for the Michigan State Highway Department (1960-63). For the next 8 years he worked as a basin engineer, regional engineer and assistant division chief in the Municipal Wastewater Division of the Michigan Department of Public Health. From 1973-76 he worked as Chief of Wastewater and Municipal Wastewater Division of the Department of Natural Resources. He is now

Chief of the Community Environmental Health Division of the Michigan Department of Public Health. His work includes the licensing and inspection of mobile home parks, campgrounds and agricultural labor camps; housing and marina inspections; insect and rodent control; subdivision review; and the review of plans and specification for new or modified facilities.

JOYCE VAN KEULEN, Vice-Chairman of the Commission

Joyce was appointed to the Water Resources Commission in 1978 by Governor Milliken to represent Organized Conservation Groups. She is married to Mark Van Keulen, President of a wholesale hardwood lumber company, and is the mother of two high school aged children.

She has earned degrees from Kendall School of Design and Aquinas College both of Grand Rapids, Michigan.

Her first experience in conservation matters came from serving on the Sunny Creek Drain Committee, a committee comprised of citizens and local commissioners seeking a solution to the drainage problems within the watershed. She served on a number of Civic Committees for the City of Kentwood and Kent County in 1977 & 1978. In 1979 she was the first woman to be elected to the Kentwood City Commission. She was elected a Director of the Michigan United Conservation Clubs in 1978 for a three year term from District 12. She received the WATER CONSERVATIONIST OF THE YEAR award from MUCC in 1977. She is a member of WMEAC, Michigan Audubon Society, National Wildlife Federation and other state and national conservation organizations.

PATRICIA M. CAYEMBERG, Immediate past Chairman of the Commission.

Patricia was born in Manistique and has a degree in Communications and Political Science from Western Michigan University. She is continuing work for a masters degree in Public Administration.

She has a varied work experience background which includes a news correspondent for WMUK FM and WUHQ TV 41, Associate Director for Western Michigan University Herald, and Schoolcraft Memorial Hospital. She has also worked at Peterson Springs, Inc., and Shakespeare, Inc.

She is a member of the Kalamazoo City Commission having been elected to the Commission in 1973. She serves on the Kalamazoo Economic Development Corporation, the Kalamazoo Energy Committee and is a member of the Executive Board of the Kalamazoo County Criminal Justice Committee.

She served as a trustee of the Michigan Municipal League beginning in 1977 and was elected President for the year 1979-80.

She was appointed to the Water Resources Commission in 1977 and was elected chairman for the year 1979-80.

Patricia is a member of the League of Women Voters, Association of University

Women, Women in Municipal Government and MUCC. She is interested in law enforcement and criminal justice system problems, public information processes and the transfer of technology for municipal use.

SAMUEL A. MILSTEIN

Sam was born in East Jordan, Charlevoix county, Michigan. He graduated with honors from East Jordan High School and was a three year veteran of all major high school sports.

He was awarded the Degree of Bachelor of Science at Michigan State University in 1960 in Urban Planning and Landscape Architecture.

Sam has been with the Department of Natural Resources for the past 18 years having started his career in the Recreation and Parks Division in 1962. In 1968-69 he served as Executive Secretary to the Natural Resources Commission and legislative liaison for the Department. From 1970-79 he served as Chief of the Bureau of Recreation and is now Deputy Director of the DNR. His present job is "To manage and supervise the Bureau of Management Services including all Department level service divisions which are Administrative Services, Environmental Enforcement, Law Enforcement, Personnel, Information and Education, and the Offices of Budget and Federal Aid, Policy Development, Manpower, Administrative Hearings, Internal Audit, and the Department programs of Safety and Equal Employment Opportunity." The position is responsible for the overall Department budget, policies and procedures in relation to the operational programs in the other line Bureaus.

GENE BURCH

Gene is a Certified Public Accountant and is the latest appointee to the Commission. He was born in Rockford, Michigan and completed his elementary and secondary education there. He attended the United States Merchant Marine Academy (1945-46) and graduated from Michigan State University in 1952 with a Bachelor of Science Degree in Mechanical Engineering.

He was plant engineer for Kelvinator from 1955 to 1958, and worked as a consultant for Williams & Works Consultants of Grand Rapids in 1958-59. Since 1959 and to the present he has been Director of Engineering for Wolverine World Wide. He is a member of a number of professional societies which include the American Institute of Plant Engineers, American Society of Heating and Air Conditioning Engineers Inc., American Society for Testing Materials and Michigan

Water Pollution Control Federation. Gene was appointed to the Commission in 1979 as the "Industrial Management Representative".

MAX N. CLYDE

Max and wife Connie have a son John and two daughters Kathryn and Julia. They live in Meridian Township, Ingham County.

Max has a B.S. degree in Civil Engineering from the University of Michigan. He has served the Department of State Highways in the Traffic and Safety Division in many capacities during the past 17 years. He has been involved in the design work of various intersections and interchanges. He is also involved in and is responsible for engineering in traffic signalization, traffic signing, pavement marking and regulations. He is responsible for analysis of accidents and the surveying of problem areas on the highway system. He is Assistant Deputy Director for Highways, an office which he has held for the past five years.

He has served as a Planning Commissioner for Meridian Township for 3 years and as a member of the Meridian Township Board of Appeals for 3 years.

His outside interests include other methods of transportation including railroading and air travel. His hobbies include pleasure boating, snow skiing, water skiing, bird watching, photography, music and art.

DEAN M. PRIDGEON

Dean was born in California Township, Branch County, where he farms 2,000 acres in partnership with two sons, Michael and William, specializing in corn and hogs. His sons are the sixth generation to operate the original farm family. Mr. Pridgeon and his wife also have two daughters, Rebecca Proctor of Austin, Texas, and Barbara Miller of Novi.

Dean was appointed to the Natural Resources Commission in 1974 and was serving as its chairman in 1978 when he was appointed Director of the Michigan Department of Agriculture on December 15, 1978.

He received the Michigan Outstanding Young Farmer award from the Michigan Jaycees in 1956 and was honored with the Distinguished Service to the Agriculture award from Michigan State University in 1970.

Dean served as supervisor of the California Township Board for 12 years and was active on the Branch County Planning Board and Zoning Board for several years.

(Continued On Next Page)

WATER RESOURCES COMMISSION...

(Continued From Page 5)

ROBERT J. COURCHAINE, Executive Secretary of the Commission

Robert was born in Chassel township Houghton county, Michigan, and completed his high school education at Chassel Township High School. He entered Michigan Technological University at Houghton and graduated in 1948 with a

degree in Chemical Engineering. He attended the University of Michigan and received a degree in Public Health Engineering in 1955. He is a Registered Professional Engineer in Michigan. Robert worked as Assistant Director of Sanitation for the Washtenaw County Health Department for 4 years (1951-55) and as Sanitary Engineer for the Michigan Water Resources Commission for 6 years (1956-62). He was regional engineer for the Commission for the next 7 years and for the Bureau of Water Management for the next 4 years.

Since 1974 he has been Chief of the Water Quality Division of the Department of Natural Resources. He has served as Executive Secretary for the Commission since May 1977. His membership in professional and conservation organizations include Michigan Water Pollution Control Association, Great Lakes Commission, Water Pollution Control Federation and the Water Quality Board of the International Joint Commission.

POROX TREATMENT

A New Solution For Failed Septic Systems

By Raymond F. Fix P.E.

Many lake communities, homes, and businesses use septic systems for treatment of wastewater and sewage. The septic system usually consists of a septic tank followed by either a tile field or drywell. In a properly functioning septic system, the bulk of the solids in the wastewater settle out and decompose in the septic tank. The partially treated wastewater then passes to the tile field or drywell where further treatment occurs as the wastewater filters through the soil before finally merging into the groundwater. Studies have shown that properly functioning septic systems provide a highly efficient treatment of wastewater. Unfortunately, even the best designed and installed system can fail after 10 to 15 years of use, due to a buildup of partially treated solids passing from the septic tank to the tile field or drywell. When these solids eventually clog the soils, the system will not operate properly. Probably the most common indicator that this has occurred is backed-up plumbing, or wastewater rising to the surface in the area of the tile field or drywell.

The typical solution to the problem has been to replace the tile field. This solution is not always practical due to several factors. The lot may not be big enough to accommodate a new field; or even if there is enough room, current stricter health codes may call for more isolation between the new field and surrounding wells than is available. Add to this the prohibitive cost of new construction and the damage to mature landscaping, and this solution becomes unattractive. Consequently, many failing systems are not repaired, or the problems are only partially corrected. This results in a continued threat to public health; and in lake communities, pollution of the nearby lakes and streams.

In recent years, extensive research has been done on how septic systems function and why they fail. The University of Wisconsin has been a leader in this research. As part of their research, the University ran a series of tests to determine if some products currently on the market could effectively break down the clogging mat and return a failed system to operation. The results were that **none** of the products tested worked as successfully as the POROX Treatment; and, in some cases, some products further aggravated the problem by killing the bacteria in the septic tank and tile field which are essential to the process of neutralizing the pollutants in wastewater.

Professor John M. Harkin of the University of Wisconsin set out to find an acceptable method of destroying the clogging mat. Professor Harkin discovered that a solution of hydrogen peroxide was extremely effective in breaking down the clogging mat without disrupting the bacterial balance in the septic system. Exhaustive field tests were performed on numerous clogged septic systems. It was found that the hydrogen peroxide treatment restored the soil beneath the tile fields to almost its original permeability.

Following the success of the laboratory and field experiments, a patent on the process was obtained and assigned to the Wisconsin Alumni Research Foundation (WARF). WARF also obtained the registered service mark "POROX" to identify the Treatment.

POROX Treatment can restore a clogged drainfield in a matter of days. To avoid any unnecessary inconvenience to the property owner, the septic tank and tile field or drywell are pumped out at the time of the POROX Treatment. Draining the field insures that the peroxide solution can seep down to the clogged soil beneath. Pumping the septic tank makes it possible for the property owner to continue using his system throughout the treatment since the tank will generally hold a few days' accumulation of wastewater before filling and spilling over to the tile field.

In many cases, the cost of a POROX Treatment will be substantially less than the cost of building a new system. Only a minimal amount of digging is required so valuable landscaping is not destroyed.

WARF has established a licensing program under its patent to make this Treatment available to the public. Licensee's representatives are trained to inspect the septic system to determine if the POROX treatment is an appropriate solution. POROX is not a cure-all for all failed systems. If the failure is caused by high water tables, poor design, improper installation, or overuse, POROX Treatment will not solve the problem. The POROX representatives are trained in the proper use of the hydrogen peroxide solution which, in addition to being an extremely strong oxidizing agent, must be properly applied to be effective. The licensed agent for POROX Treatment in the State of Michigan is New Life Septic Services, which is a division of Progressive Engineering Consultants of Grand Rapids, Inc. Progressive Engineering is a well-established consulting engineering firm with a highly qualified staff of registered civil engineers with in-depth experience in sewage and wastewater treatment.

LOCATING SOURCES OF SEPTIC POLLUTION

By Donald Kraege

An increasing number of Michigan lake residents are becoming concerned about changes in water quality such as loss of clarity, algae growth, or odor problems in their lakes. Frequently these problems can be traced to failing or poorly placed septic systems which often cause or contribute to deteriorating water quality. Once identified, a failed septic system can be repaired or replaced, resulting in a cleaner lake for everyone.

Until recently, locating sources of septic pollution has involved expensive and time consuming dye marking tests as well as collection of water samples at suspected septic system leaks. A recent technological breakthrough, the "Septic Snooper TM", offers lake residents a more accurate, rapid, and inexpensive way to determine septic pollution problems. This device, along with a groundwater flow meter to measure direction and rate of subsurface flow and a well point sampler to enable sampling of groundwater, is being used on several inland Midwestern lakes, streams, and rivers to locate and determine the source(s) of septic pollution entering shorelines.

Septic pollution surveys, or "septic leachate surveys", identify and describe the following types of sources contributing to poor water quality:

1. Underground septic leaks
2. Surface septic leaks
3. Sewer leaks
4. Septic inflow from streams
5. Nutrient inflow from bays or marshes

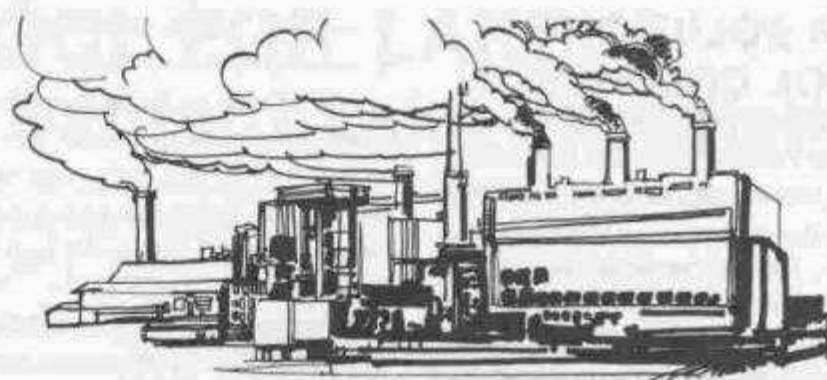
The main reason for the speed and accuracy of septic leachate surveys is that they are performed using a scanning technique along shorelines, enabling a survey team to sample surface and groundwater, determine groundwater flow, and locate septic inflow points at a rate of 3 to 5 miles a day. Surveys employing dye markers and other techniques may take weeks or months to produce equivalent results.

A complete septic leachate survey provides the following information:

1. A map showing locations of septic inflow points, including indications of active (currently polluting) and dormant (not currently polluting) septic pollution sources. The "Septic Snooper" can detect septic leachate up to six months after discharge.
2. Laboratory analysis of water samples at inflow points, including bacteriological analysis.
3. Groundwater flow patterns in the vicinity.
4. An analysis and discussion of current contributors to water quality.

Once major contributors to septic pollution are identified, residents may then take

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The Air Pollution Control Commission

By Dr. Edward J. Klopp Jr., M.D.

In response to the increasing number of air pollutants secondary to industrial growth the United States government adopted the first Federal Clean Air Act in 1963. The awareness of air pollution became a public problem because of the increasing medical evidence relating to the effects of inhalants to disease. Cancer of the lung has been associated with the inhalation of tobacco smoke. Prior to that observation the association of cancer of the lung with the exposure in uranium mines in Germany established the fact that the disease could be caused by extraneous physical and chemical agents. Studies indicated that children going to school where there was a high sulphur content in the air had a higher absentee rate due to illness than students not exposed to this atmosphere. The time was right to establish controls of air pollutants.

The State of Michigan responded quickly to the Federal Act. In 1965 Act 348 was adopted by the state legislature. This act created what is known today as the Air Pollution Control Commission. The original commission was established within the State Department of Public Health.

The Director of the Department of Public Health served as chairman of the Commission. The remainder of the commission consisted of the Director of the Department of Natural Resources, the Director of the Department of Agriculture, and eight citizens of the State to be appointed by the Governor by and with the consent of the Senate. The legislature went on to stipulate that these citizens should consist of the following: 2 representatives of industry, industrial management, one of whom should be a registered professional engineer trained and experienced in matters of air pollution measurement control; 2 representatives of local governing bodies, 1 of whom should be a full time Air Pollution control officer; 1

licensed doctor of medicine, who should be experienced and competent in the toxicology of air contaminants; 1 representative of labor; 2 representatives of the general public. The governor has been faithful to his charge in the appointments that have been made. The law has provided that the directors of the various bureaucracies (Departments of Health, Agriculture and Natural Resources) may be represented by their deputies. The provision has been necessary because of the tremendous demands that these directors have placed upon them. Nevertheless these men have often been present in place of their deputies. At present time one director attends all of the meetings and actively participates in the deliberations of the commission.

By now the reader probably wonders why there is all this discussion of the make up of the Air Pollution Control Commission. It is apparent that the majority of the commission represents the public. This assures citizen input into the decisions as well as citizen involvement with a government bureau. In keeping with the awareness of the public in relation to air pollution the commission has welcomed comments from the public at each of its meetings. Although the comments may be very time consuming, the commission realizes that such a practice is entirely in the intent of the legislature.

The members of the Air Pollution Control Commission serve without financial remunerations. The meetings are monthly and the agenda is full.

As with any commission formed in a vacuum, as this one was, there is much to learn. In the case of the Air Pollution Control Commission individuals came forward with wisdom and guidance. The first director, who was really the assistant chief in the Division of Occupational Medicine in the

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THE AIR POLLUTION CONTROL COMMISSION

(Continued From Page 7)

Department of Public Health was Bernard D. Bloomfield. This man came at the right time in history. He was honest, knowledgeable and visionary. He was respected by industry and by the general public as well as his co-workers. Bernie established the attitude of cooperation and gave direction to the whole program of control, abatement, research and understanding of air pollution.

The spirit of cooperation has persisted on a much larger scale to this day. In 1967 there were approximately 25 permit applications. In 1970 there were 300, in 1975 there were 600 applications. In 1980 there will be approximately 1,400 applications. Most of these applications will be processed so as to meet federal and state regulations and guidelines. In some instances consent orders will be entered into after much discussion. Few - very few cases will enter the courts. Therefore there has been a great deal of bargaining and "give-and-take" between the staff of the DNR and the various companies. Yet compliance with the law is mandatory. It should be mentioned also that once a consent order has been entered into there have been very, very few cases of violation of that order. The fact that few cases are brought to either an administrative hearing or into a court of law also means a great financial savings for the companies and for the State of Michigan.

Under Bernie Bloomfield's direction the first rules of the commission were hammered out and adopted in 1967. Then in 1973 the authority and responsibility of the Air Pollution Control Commission was transferred to the Department of Natural Resources by executive order of the governor. However the commission has continued to be chaired by the Director of the Department of Public Health or his deputy.

Time has molded the commission in other ways. Among the many powers of the Commission was the enforcement of rules promulgated by the act. In order to make this enforcement more efficient the governor in 1973 by executive order gave this power to the Department of Natural Resources. Enforcement is initiated by recommendations of the commission. In practice this arrangement has been satisfactory.

There have been some amendments to the original Clean Air Act. The last amendment was in August of 1977. By now the whole problem has become much more complex, and technology more sophisticated.

In 1969 Bernie Bloomfield was able to commend industry for its willingness to spend money to control particular emissions from foundry cupola. At that time the cost was about one half to one million dollars per cupola. Today that cost is eight to twelve times as much. Surely the cost of such control is born eventually by the consumer. The cost of air pollution control devices is reflected in increasing prices not only in our automobiles but our roads, our energy, our chemical products and even our food.

Every citizen is involved in the matter of pollution. Hopefully the control of pollution whether it be air or water will reap the benefits of a more healthy and productive society. Perhaps, medical costs can be reduced to offset the cost of these controls. Absenteeism can be reduced also.

This brief report has not gotten into the technical aspects of air pollution because of the complex scientific data that would have to be presented. However let me share with you something that has become a nationwide problem and a very particular one for Michigan.

Today there are chemicals from the chemical industries of Michigan which have been and are being released in the atmosphere. The toxicological studies that have been performed in industrial laboratories defy the imagination. Millions of dollars have been spent to determine whether or not these chemicals have a short term effect or a long term one, or both. These studies are conducted by capable and well trained scientists. Yet we can only predict roughly the effects of certain chemicals. Small animals such as a rat or a mouse are used because of the shorter life expectancy of these animals. Carcinogens can be discovered in a short time. Small animals are used to study the effects of chemicals on genetic make up because of a rapid breeding and gestation of these animals. Therefore one can ascertain whether an effect can be passed on from one generation to another very quickly.

However no one can predict a 100% that the changes produced in a rat or a mouse or a rabbit will be the same in man. There is little information that the commission has available as to what chemicals and what concentrations of such chemicals are safe in the air effluent from such a factory.

Therefore the commission has established an ad hoc committee, the Air Advisory Committee to look into the problem. These members were selected by Commission Chairman, Dr. Reizen. The members of this committee are illustrious scientists who

represent the academic and industrial fields as well as the scientist in the Department of Natural Resources. At the present time the conclusions and recommendations of this committee have not been made public, nor have they been officially adopted by the commission. However, the report is in the hands of the commission for study.

At this point one can say that this report is going to be, I think, a guideline for all future work in this area. Indeed the EPA is extremely interested in what this committee will produce. Once this report has been adopted by the Air Pollution Commission it will probably be modified by public comment both from industry and the general public so that the guidelines will represent the input of many diverse groups of people.

The activities of this committee represent the input from the scientific community and the formulation of guidelines for the making of decisions by governmental bodies. These guidelines take into account the use of science as it is known today and where it will lead us tomorrow. The economical, political, and health factors will mold the final regulations so that people will benefit.

No plans, rules, guidelines or controls are perfect. Life itself represents a chance. Some people will take a bigger gamble with their lives than others. Some people smoke and have a chance of 1 in 220 of dying as a result of their smoking. Some people ride airplanes and take a chance of meeting death in an airplane which is far less than this. Then again there are others who ride motorcycles whose chance of dying as a result of a motorcycle accident is 1 in 50. This does not mean to say that we should be crass about our chances of living in a polluted world. But it does point out the fact that for society to grow and develop, industry is necessary to provide that growth. It is our duty to lessen the hazards of such industrial expansion to the least possible amount. Checks and balances are constantly employed. Advancing technology should and will give us a cleaner and more beautiful world in which to live.

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DRAWDOWN AS A TOOL FOR LAKE RESTORATION: The Sanford Lake Experience!

by Brian L. Kroll, Aquatic Biologist, Edmands Engineering, Inc., Bay City, Michigan

INTRODUCTION

Water level fluctuation has long been used to help propagate and harvest certain plants. Two examples, the rice paddies of the Orient and the cranberry harvest here in the States, are familiar to most of us. It is also known that water level fluctuations can be detrimental to certain plants. Intentional water level changes have been successful in controlling obnoxious aquatic weed growths in various portions of the country (Beard, 1973; Dunst et al, 1974). Submergent macrophytes seem to be the most susceptible with results dependent on extent of drawdown, time of year, weather conditions, and target species.

In addition to macrophyte control, drawdown often results in the consolidation of lake bottom sediments. Compaction of up to 100 percent has been reported (Dunst, et al, 1974) and seems dependent on the nature of the sediments and the weather conditions during drawdown. Upon refill, the sediments do not rebound to any great extent and thus lake deepening is accomplished. The physical and, to some degree, the chemical nature of the sediments also changes making the substrate less suitable for certain rooted plants. In addition, a sediment "drift" sometimes takes place moving the less dense organic matter to deeper waters. Certain beaches have been noticeably improved by this action.

Drawdown is now becoming a common tool in lake management strategies. Fourteen of the 73 lakes in the U.S. Environmental Protection Agency's Clean Lakes Program are using drawdown as a part of their restorative technique. Drawdown had been used for several years as a part of the Tennessee Valley Authority weed control program. Drawdown has even been used to destratify a water supply reservoir, thus preventing a severe odor problem previously caused by anaerobic decomposition of algae in the hypolimnion (Beer, 1979). Drawdown is particularly amenable to impounded lakes. The mechanism for discharge is usually readily available and sufficient waters are generally available for timely refill. Sanford Lake, a 550 hectare impoundment in central Lower Michigan (Figure 1), underwent its first substantial drawdown in over 50 years during the fall and winter of 1978-79.

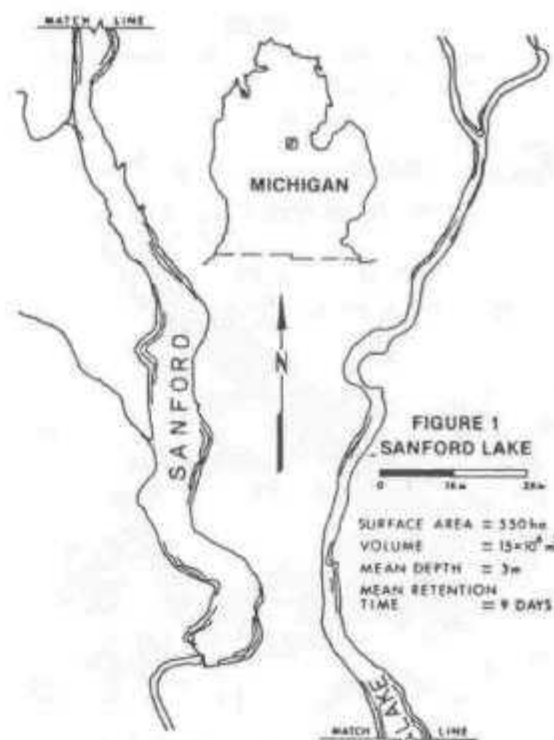
THE PROBLEM

Sanford Lake was created in the 1920's for power generation and flood control. Its recreational and aesthetic value was quickly realized and development of the shoreline is now virtually complete. The Lake is presently used for limited power generation, flood control, industrial cooling water storage, and general recreation.

During the mid 1970's, the exotic and prolific aquatic plant Eurasian Milfoil, *Myriophyllum spicatum*, reached recreation limiting growth in several areas of the Lake. The local daily newspaper ran pictures in 1976 showing large masses of floating weeds entangling motor and row boats alike, the residents spoke in terms of "a continuous green span, unable to determine where the lawn ends and the Lake begins". Aerial photographs showed large offshore areas of dense growth with corridors cut through the mass by continuous boat traffic, the only access for many residents to the open waters of the Lake.

The excessive weed growth was found to be the result of two essentially uncontrollable conditions. Sanford Lake is the downstreammost impoundment of four impoundments on the Tittabawassee River. Sometime prior to 1975, Eurasian Milfoil found its way into the upper impoundments and quickly spread throughout the drainage basin. Reinfestation by seeding and fragmentation from upstream sources make the eradication of the plant virtually impossible.

Feeding the Sanford impoundment is the runoff from over 260,000 ha (1,000 square



miles). The nutrient content of this flow (18.5 m³/sec average) is high and continuous. The Milfoil growth is apparently limited by the availability of light and suitable substrate. Reducing the nutrient input would take massive land use changes in the three county drainage basin and even then the loading may not be below critical levels. The Lake would likely be eutrophic even under the best of watershed conditions.

An additional problem to the lake use was the large number of stumps found in the Lake. The original flooding to create the Lake was accomplished without removal of the forest. The trees were cut at lake level or a little below during the 1930's resulting in a sub-surface "forest" (Figure 2) incompatible



Fig. 2; The subsurface forest, a result of the original flooding, became apparent after drawdown.

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DRAWDOWN AS A TOOL FOR LAKE RESTORATION

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Fig. 3: Floating log boom protected the earthen dam from wave and ice erosion during drawdown.

with the present highspeed boating use on the Lake. Dented boats and broken motor propellers were the rule rather than the exception.

THE SOLUTION

Decreasing recreational value stimulated the formation of the Sanford Lake Improvement Board under Michigan Act 345 of 1966. The Act provides for the improvement of inland lakes through the use of the Lake Board's jurisdictional power and taxing ability. The necessary studies were completed in the two years following the creation of the Lake Board in 1975 and a special assessment tax roll was approved for the 1978 tax roll.

The studies identified a drawdown as the most feasible and cost efficient method of temporary weed control. Due to a high natural turbidity, the weed growth was found to be confined to the upper two meters of the Lake. A winter drawdown of two vertical meters would dry, freeze, and consolidate the exposed sediments, thus limiting the regrowth of the Milfoil.

To protect the earthen dam against wave and ice erosion, a floating log boom was installed near the face of the 490 meter long structure (Figure 3). Drawdown was then in-

itiated and low water level was reached in mid-November, 1978.

Shortly after drawdown was completed, the stump areas were located and tallied. Over 21,000 stumps were counted. The stump areas were mapped and assigned a cutting priority based on their height, location, and potential interference with lake use. Two contracts were let for the removal of over 4,000 priority 1 stumps.

RESULTS

The 3-1/2 month drawdown (mid-November to March) resulted in a weed growth biomass reduction of 68.5 percent from the previous summer (Table I). A change in species was also noted in certain areas. Wild Celery (*Vallisneria*) was found to be the dominant plant in areas where previously Eurasian Milfoil had been a problem. The wild celery stands were not reported to be a recreation problem during the summer of 1979.

(For more information write to the author Brian Kroll, 1501 West Thomas, P.O.Box 580, Bay City, MI. 48707. [Phone 517-686-3100]).

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By Cecile Harbour

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Leo Styer, President

Membership now stands at 153.

If your association is an ML&SA member and its name does not appear in this column, it is because your writer does not receive your newsletters. Every item in this column is taken from newsletters or special items sent to us. Send your newsletters to ML&SA, 9620 E. Shore Dr. Portage MI 49002.

ALGONQUIN LAKE COMMUNITY ASSOCIATION, Barry County. The annual draw-down of the lake is expected to begin Nov. 15. It is proposed to keep the level 18' below normal summer level to prevent shore damage, but to leave plenty of ice area for winter activities. Full draw-down to 9' will be done between Feb. 15 and Mar. 8 so that maintenance work can be done on the dam. Draw-down is also an effective weed control measure.

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ML&SA NEWS...

(Continued From Page 11)

AUSTIN LAKE IMPROVEMENT ASSOCIATION, Kalamazoo County. As a result of the ice damage to shorelines due to high water last winter, the Tri-Lakes Council has been established. The Council includes Austin, West, and Long Lakes which are interconnected. (All are ML&SA members) Austin receives supplementary water from the Upjohn Company to maintain legal level. The Council will work with the City of Portage and the Upjohn Company to determine when the flow should be started in the Spring and when it is to be shut off in the Fall. The Council can address other matters of mutual concern.

BARLOW LAKE ASSOCIATION, Barry County. The area is expected to hook up to the Gun Lake Area Sewage Disposal System in 1981. This project includes several lakes in western Barry County. Early entries in the fish contest included a 20" 4 pound bass, a 33½" 7 pound pike and a 9" bluegill.

BEAVER LAKE ASSOCIATION, Alpena County. 30,000 pike fry were released from the rearing pond June 7 as 4" fingerlings. Tiger muskies are being caught and released because a "keeper" must be 30". Two board members will be attending the ML&SA Annual Meeting.

BIRCH LAKE ASSOCIATION, Cass County. The newsletter editor attended the July 12 Inland Lake Eutrophication conference in Kalamazoo and from the discussions and materials handed out, has pulled together a page of "do's & don'ts" for the Birch Lakers. She prefaced the article with these words--"If we can control the human factor which controls the phosphorous, which controls the weed growth, we can simply return Birch Lake to its potential oligotrophic (best) stage."

BLACK LAKE ASSOCIATION, Cheboygan County. The annual meeting was held Aug. 20 at the St. Paul's Hall in Onaway. A delicious buffet supper was enjoyed by 223 persons. President Lind introduced Ruth O'Gawa of Petoskey whose address was entitled "This is Your Water, Take Care of It". Judge Phillip Tschirhart of the 89th District Court provided information about the operation of the Court. Robert Shaw and J.V. Nogel were recognized for their work in organizing the association over 50 years ago.

BLUE LAKE TOWNSHIP CIVIC ASSOCIATION, Kalkaska County. The volunteer firemen brought the Blue Lake Township fire equipment to an association meeting and demonstrated the piece of equipment that had been purchased with the association's contribution. Representatives are sent to all ML&SA meetings and other regional meetings that provide information and assistance to riparians.

CHEBOYGAN TWIN LAKES ASSOCIATION, Cheboygan County. The association has requested a later opening date for large and small mouth bass and bluegills because the fish in these small spring-fed lakes are at their peak spawning time when the season opens. Fishermen are taking the fish off the beds during spawning time. It is feared that the fish population will diminish. They are asking for a public hearing to designate a later opening date.

COREY LAKE IMPROVEMENT ASSOCIATION, St. Joseph County. The 3 summer issues of the Courier were produced with a great deal of help from teenagers. They assisted with the editorial, art and circulation work. The Courier contains reports of the Self-Help Program, keeps members informed of newcomers to the area with interesting introductions, reports from the Yacht Club, some nostalgia about the area with pictures, information about septic system maintenance and water conservation. A feature story about a family of Canada geese that grew up in the area was carried in 2 parts. It is a good newsletter with considerable comment about the members and their families and community activities.

EAST LAKE PROPERTY OWNERS ASSOCIATION, Kalkaska County. The July newsletter included a copy of the ML&SA Annual Meeting program. Many thanks. Car pooling was suggested for transportation to the meeting. Neighbors are asked to help protect each other from vandalism by recording the license numbers of unfamiliar cars seen in the area. Members are reminded to maintain a buffer zone between the lawn and shoreline that is not fertilized and to make sure their septic systems are operating efficiently.

INDIANWOOD LAKE IMPROVEMENT ASSOCIATION, Oakland County. An engineering feasibility study of the lake to determine the weed problem has been completed, and accepted by the Lake Board. Recommendations are to harvest about 40

acres twice a summer and another 5 acres only once. The Lake Board must now establish an assessment district and a public hearing on this matter was held Sept. 11.

KEARSLEY LAKE ASSOCIATION, Genesee County. Water samples taken the week of June 16 indicated that the lake is "very, very clean". Repair work on the dam will be done this fall. The association will decide if it needs some watercraft control and will work with the DNR on the matter.

LAKE FENTON PROPERTY OWNERS ASSOCIATION, Genesee County. Seven members of the association have been certified by the DNR as Marine Safety Instructors and 5 of them are also Snowmobile Safety Instructors. Two marine safety classes were conducted and 100 students certified. The position of Environmental Agent has been created. This person is to handle inquiries and investigations into questions concerning wetlands, erosion control, etc. The association has cooperated with the City of Fenton and Fenton Township in the improvement of a park at the south end of the lake. The association will be clearing and seeding the area.

LAKE LAPEER ASSOCIATION, Genesee County. Preliminary reports from the Self-Help Program indicate that the lake is healthy. The Hadley Township Planning Commission is working on a complete revision of the zoning code. A clause that may protect the lakes from overuse stemming from unrestricted access is being considered.

LAKE CHARLEVOIX PROPERTY OWNERS ASSOCIATION, Charlevoix County. The Annual Meeting was held August 7 at the Charlevoix City Hall community room. On the agenda was a report on the cladophora survey project.

LAKES PRESERVATION LEAGUE (Devils & Round Lks.), Lenawee County. The association is looking for suitable pond areas to raise walleye "fry". The lakes have suitable spawning areas for adult walleye. The Marine Patrol has had a boat on the lakes every day this summer. In June, 2 boats were stopped in violation of the noise limits. The July Newsletter published a long list of accomplishments of the League.

LAKEVILLE LAKE PROPERTY OWNERS ASSOCIATION, Oakland. The following article was submitted by Robert J. Swift. The

Weed Harvesting Project for our lake finally got under way on July 25, 1980 after a few delays and has been a huge success. This year, due to the late start, only about 2 months of harvesting will be done but it is now estimated that by the end of September over 1000 tons of weed will have been removed.

A brand new Altosar Harvester was purchased from Mudcat Inc. and along with a land conveyor the operation has worked out very well. Volunteer and hourly paid workers have handled the project and with the help of some of our talented local members, we have begun to see some real good results for our labors. The weeds are in great demand from our surrounding farmers due to their high nutritional value.

In coming years we plan to operate a minimum of 600 hours per year over a period of 4 months. The costs of the project are being paid for through a special assessment to all riparians on the lake.

NORTH LAKE LAND OWNERS ASSOCIATION, VanBuren County. At the annual meeting, Aug. 24, the members expressed opposition to the use of chemicals for weed control. The association owns a weed cutter and has used it for a number of years. Help is needed to rake and haul the weeds. Four members will represent the lake at the ML&SA Annual Meeting.

PINE LAKE PROPERTY OWNERS ASSOCIATION, Oakland County. Editorial comment from the Aug. newsletter. "According to the American Heritage Dictionary of the English Language, a democracy is a government by the people, exercised either directly or through elected representatives. Too many Americans complain about the government as if it is some kind of remote power totally separated from their daily lives. Their is a rumor still going around that you can't fight City Hall. My friends--you have forgotten--**WE ARE CITY HALL!** We don't need to fight City Hall. We need to **join** in and **work** with our elected officials to accomplish our mutual goal--government **for the people**. Have you ever attended a Township Board meeting?? or even your (own association) meeting?? It's an interesting experience and might renew your faith in our democratic process--try it."

PROPERTY OWNERS ASSOCIATION OF LINCOLN LAKE, Kent County. This new association reported in the Sept. newsletter, 84 members in 4 months, close to its 100 membership goal for 1980. The association

is investigating the placement of permanent signs for notices of meetings and activities. Several members expect to attend the ML&SA Annual Meeting.

WATKINS LAKE OWNERS ASSOCIATION, Oakland County. Some weed harvesting was done during June, but depending upon contributions, it was not known whether the program would be continued after mid-July. An amendment to PA345 of 1967, the Inland Lake Improvement Act, will enable homeowner associations to be paid by a Lake Board for local lake improvement work without competing on a bid basis.

THREE LAKES ASSOCIATION, (Bellaire, Clam, Torch) Antrim County. The Annual Report for the 1980 contained much of interest to the membership. The President's message saluted the many volunteers who worked year round for TLA. It appears that TLA is the only association in the State to operate its own water quality testing lab. Perhaps an article for the Riparian?

To: ML&SA & Individual Members of Lake Associations

If Michigan Lake & Stream Associations is to continue to expand its services to members and individuals, to promote the purposes of ML&SA before the Legislature and regulatory boards and agencies of State government, to seek new members for the organization and to support riparian property owners in their efforts to protect their investments, the annual budget of ML&SA must be substantially increased. The current budget for this 20,000 member organization is approximately \$6500.00.

The opportunity to increase the budget through contributions is now possible because the Internal Revenue Service has granted tax exempt status under section 501(c)(3). Individual contributions made during this calendar year to ML&SA are fully tax deductible from the 1980 Federal Income Tax return.

ML&SA NEEDS HELP TO GROW: WILL YOU MAKE A CONTRIBUTION TODAY?

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Dues for membership in ML&SA for 1980 includes a base amount of \$25.00 for associations with less than 150 members or \$35.00 for associations with 150 or more members plus 18 cents per member. Associations who join after the first of the year will pay a pro-rated amount for the remaining months of the year. (i.e., An association with 80 members joining in February would pay 10/12 of \$25.00 plus \$8.40 or \$27.87).

A check to cover dues should be made payable to Michigan Lake and Stream Associations, Inc., and sent along with the completed application to: Michigan Lake and Stream Associations, Inc., 9620 East Shore Drive, Portage, MI 49002.

Air Pollution in Southern Lower Michigan

by Eugene Ochsner

Sour Gas Treatment Facilities In Northern Michigan.

All lake and river front property owners experience ecological problems of greater or less magnitude, but in most cases the problems are purely a local matter. Starting the last half of the year 1978 a potential problem concerning ecology made its appearance in the northern part of Michigan's lower peninsula which could have far-reaching consequences. I refer to the method of treating natural gas being recovered in subject area of the type known as "sour gas" to the petroleum engineers.

Evidence is accumulating that more and more gas wells, particularly in the southern part of Otsego County and northern Crawford County, are of the "Sour Gas" variety. To clarify terminology, "Sour Gas" means the natural gas being drawn from the well contains hydrogen sulfide, a poisonous gas, in varying amounts. This hydrogen sulfide must be removed before the natural gas can be transported in the usual steel pipelines for the reasons that: 1, It is a corrosive gas, and; 2, A leak in the pipeline could release poisonous hydrogen sulfide to the atmosphere.

Separation of Hydrogen Sulphide

The separation of hydrogen sulfide from natural gas is accomplished in several ways: 1, It can be converted to elemental sulfur of a high purity which is readily salable. This method is currently in use in several areas of the United States and Canada. And, 2, after separation from natural gas it can be burned producing sulfur dioxide and the resultant sulfur dioxide is absorbed in a suitable media to produce sulfite salts or: 3, It can also be burned and the resultant sulfur dioxide can be conducted up through a ceramic tower packed with chunks of limestone rock with a counter-current of water trickling down to packing. 4, Lastly, after burning the hydrogen sulfide, producing sulfur dioxide, the sulfur dioxide is simply discharged to the atmosphere.

The Method Used in Otsego and Crawford Counties

It is this last method I wish to discuss here as it is the current practice being used in Otsego and Crawford counties. At the present time four "Sweetening" plants in this area are in operation. More units are in the planning stage, the exact final number to be installed is unknown. In the November 16,

1978 issue of the Otsego County *Herald Times* it was stated by Arthur Toland, district engineer for the DNR's Air Quality Control Division that one Shell Oil company gas sweetening plant had permission to discharge 725 pounds of sulfur dioxide per day into the atmosphere. Subsequently, upon application by the Michigan Oil Company for another gas sweetening facility, the permit allowed 1,350 pounds of sulfur dioxide to be discharged into the atmosphere each day of operation. On January 16, 1979 a public hearing was held by the air quality division of the DNR. The purpose was to hear testimony, both oral and written, on the application of Michigan Oil Company to build a gas sweetening facility in Section 27, Otsego Lake Township, Otsego County. Not being able to appear in person at the hearing I prepared a statement, receipt of which was acknowledged by Gerald L. Avery, Chief, Permit Unit, Air Quality Division, Michigan DNR. To cover the subject of my statement adequately and to illustrate the potential of burning hydrogen sulfide with the discharge of resultant sulfur dioxide to the atmosphere I quote here my complete statement of December 26, 1978.

ABSTRACT: Sulfur dioxide gas is very detrimental to vegetation, wildlife and humans. Historically, the effects of continued emission of the gas are documented in the Ducktown, Tennessee area, completely denuded after years of roasting sulfur-bearing ores. The same condition existed in the area of Trail, British Columbia until the air pollution created an international incident, drifting south to the U.S. The Hardy Desert vegetation around Jerome, Arizona was completely destroyed. Since the shutting down of the smelter which produced the sulfur dioxide, in 1948, the vegetation is only now making a comeback. It is generally recognized that all sulfur dioxide discharged into the atmosphere will be returned to the earth via rain, or direct absorption in the form of sulfites or sulfates, depending on oxidation conditions. Rainfall can contain sulfurous or sulfuric acid which will acidify lakes and streams. The effect of one or two gas sweetening operations may be minimal, but with the additional units the pollution problem will be magnified. The art exists for the prevention of pollution by sulfur dioxide, ranging all the way from the recovery of elemental sulfur, to the simple scrubbing of the sulfur dioxide in a

limestone packed tower having a counter-current of water.

Hazards Not Known in Early America

In the early years of this century very little thought was given by industry, government, or the general population to the subject of pollution, there was always a stream or lake to discharge effluents into, the winds would carry away any airborne gases or particulate matter, holes could always be dug to dispose of any disagreeable and dangerous solid wastes. More recently though, as the result of continuing study, the scientific community has come to recognize the hazards involved in the indiscriminate discharge of harmful waste materials into the environment. One of the results of these studies has been to set maximum standards for pollutants being discharged into the atmosphere. This has also been applied to waters. In some cases, none are permitted. DDT is a prime example of this. We are concerned here today with one of these recognized pollutants - sulfur dioxide. Ideally, the goal should be no discharge of sulfur dioxide, but, understandably, this would be next to impossible. However, curbs are being proposed in the field of coal-fired power generation, I.E. - no scrubbers to remove oxides of sulfur and particulate matter - no permit to build the plant.

New York Faces Acid Rain Problem

(1) On a long-range basis the state of New York has intensively studied the effects of sulfur dioxide on the flora and fauna of the Adirondack Region. They have determined the effects of sulfur dioxide emissions from power plants many miles away has caused an increase in the acidity of scores of lakes in the Adirondack Region. The result of this acidity has been the elimination of most game fish, small-mouth bass being the most susceptible. New York's counterpart of our Department of Natural Resources is currently experimenting, attempting to develop an acid resistant strain of trout. Another study is being made to develop the feasibility of neutralizing the contaminated lakes with lime.

Sulphur Dioxide Damage in Tennessee British Columbia & Arizona

(2) To observe the effects of sulfur dioxide on vegetation one need only study the records of three pollution affected areas: Ducktown, Tennessee, where a copper smelter produced a "Moonscape" for miles around. And Trail, British Columbia, where the discharge of sulfur dioxide to the atmosphere drifted across the United States Boundary and created an international incident. After this, the discharge was stopped and facilities were installed to recover the

gas. I have personally observed a situation occurring around Jerome, Arizona, where, as of the year 1948 when a copper smelter shut down, all the tough desert vegetation in the surrounding area had been destroyed by the discharge of sulfur dioxide gas over the years. In the year 1978 the vegetation is just making a comeback. The contrasts between the Adirondack Lakes, Ducktown, Trail and Jerome are great as far as quantities of sulfur dioxide being emitted are concerned. But it can be seen that even small concentrations of the gas over a long period of time is detrimental. It must be remembered that all sulfur dioxide being emitted will return to earth, either as sulfurous acid, sulfuric acid, sulfites or sulfates. Sulfur dioxide, when exposed to the ozone or oxidizing agents will be converted to sulfur trioxide, this, combined with water will produce sulfuric acid, the major source of trouble in New York State.

How Many Sweetening Facilities Does Michigan Need?

I have been concentrating on past occurrences. But how can these affect us here in Michigan? If only one gas sweetening facility were proposed, the pollution effects would be minimal. According to the air quality division's staff activity report dated January 16, 1979, three such facilities are already approved, or are in operation in the general area of the facility up for approval. Should this be approved it follows there would be a total of four gas sweetening facilities. The main question then arises; how many more? Using the published figure of 249 tons of sulfur dioxide being discharged, or permitted per year for the nearby Shell Otsego Lake 34 sweetening facility as an average figure it can be readily determined what four facilities could conceivably discharge. Then - eight facilities? Sixteen facilities? A commitment should be received from all concerned producers limiting the number of facilities to be built. Steps should also be taken **now** by the Department of Natural Resources to limit the total number of sweetening facilities to be established in Northern Michigan. I also urge that installation, at least initially, of an adequate scrubbing - neutralizing system (limestone packed tower with counter-current water flow) for each facility until such time as the volume of sour gas to be processed reaches the point where it would be economical to recover the valuable sulfur content, a natural resource that should not be wasted.

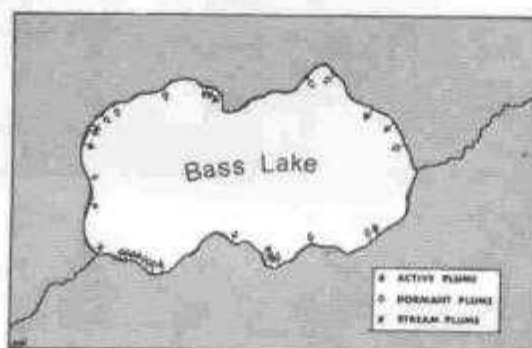
The current trend of various anti-pollution agencies, EPA, etc. is to reduce pollutants being discharged and to veto any new construction which would produce pollution.

Why should the Michigan air pollution control commission disregard these goals?

Update: (October, 1980). The problem in Michigan is not a severe one at the present time, but the situation should be carefully watched. The process of "Sour Gas" in southern Otsego County and northern Crawford Counties is a fairly new operation for the area. Undoubtedly more gas coming from wells in the area will have to be "sweetened" which will mean a proliferation of facilities such as those already in existence. Should this become a fact and ever larger quantities of sulfur dioxide be discharged to the atmosphere from the burning of the "Sour gas" (hydrogen sulfide), we can only look forward to eventual damage to our lakes, streams, and vegetation.

LOCATING SOURCES OF SEPTIC POLLUTION....

(Continued From Page 7)

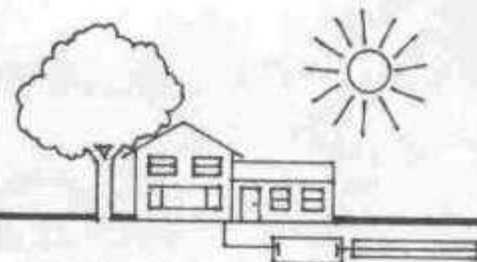


Typical septic leachate survey map showing locations of septic inflow points.

steps to control septic inflow into their lake. Such steps may involve repair, replacement, or relocation of certain septic systems to insure that leachate does not reach the lakeshore.

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CALENDAR OF COMING EVENTS

- | | |
|------|--|
| Nov. | Natural Resources Commis- 6, 7, |
| | sion; Law Building; Lansing. |
| Nov. | Water Resources Commis- 13, |
| | sion; Delta Township Hall; Lansing. |
| Nov. | Michigan Environmental 24, |
| | Review Board; Main Conference Room; 1-B Baker-Olin West. |
| Dec. | Natural Resources Commis- 4, 5 |
| | sion; Law Building; Lansing. |
| Dec. | Water Resources Commis- 18, |
| | sion; Delta Township Hall; Lansing. |
| Dec. | Mich. Environmental Review 22, |
| | Board; Main Conf. Room 1-C; Baker-Olin West, Lansing. |



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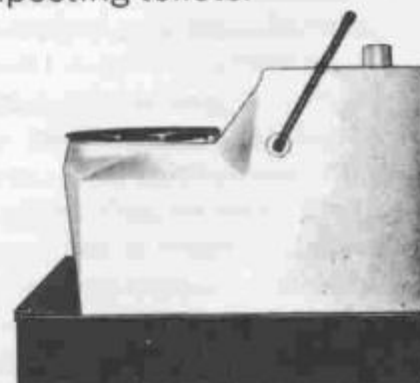
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