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MELDING TECHNICAL INFORMATION WITH COMMUNITY EFFORT—A WATERSHED COUNCIL'S ROLE IN WATER QUALITY PROTECTION

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ABSTRACT

Lakes in northern Michigan were showing subtle signs of cultural eutrophication in the 1970's. An opportunity existed to implement lake protection measures, thereby avoiding more costly lake restoration procedures later on, but lakes with relatively good water quality do not often arouse much public concern. We maintain that if there is a need for a lake protection program, the local community must take the leading role. We describe here a cooperative effort between a technical information source (The University of Michigan Biological Station, later succeeded by the Tip of the Mitt Watershed Council) and a local user community (a group of lake associations), whereby a limnological research program melded with a grassroots community effort. Five key areas of concern vital to water quality protection were identified: wastewater management, lakeshore population density control, riparian wetlands protection, creation of lakeside greenbelts, and water quality monitoring. Some successes were achieved in all areas and, in addition, local watchdogging of development permits was effective. The information source (Biological Station) was important in identifying and documenting problems in the 1970's, but problemsolving was achieved primarily through community effort (Watershed Council and associated lake associations) in the 1980's. The Watershed Council gradually assumed the role of principal information source, strengthening communication links and assuring long-term local involvement in lake protection programs. Based on our experiences we propose an environmental communications model that may be useful in implementing water quality activities elsewhere.

INTRODUCTION

North Americans' increased leisure time and mobility have created intense and widespread recreational pressure on inland lakes and their watersheds. Unfortunately, these human activities near lakeshores have often destroyed the very resource people come to enjoy.

Many lakes in the densely populated southern Great Lakes region have declined severely in water quality from overdevelopment (Kettle and Uttormark, 1971; Duda and Johnson, 1984). These lakes are no longer aesthetically pleasing, and recreationists have turned to other relatively unspoiled lakes. Those of northern Michigan are easily accessible to millions or people with today's modern transportation facilities. This region has become one of the prime recreational areas in the United States. Its numerous inland lakes, scenic rolling hills, open farmland, and dense forests are viewed not only with appreciation, respect, and concern, but with exploitative disregard as well.

These pressures will surely increase northern Michigan lakeshore development in the next few decades. If sound lake protection policies are not instituted now, severe declines in water quality will follow.

The problem with implementing lake protection policies is that lakes still in good water quality condition attract little concern. Early, often subtle, declines in water quality can go unnoticed while resource management agencies direct their limited manpower to more severe problems elsewhere. Most lakes, especially smaller water bodies, receive little or no attention until local citizens notice adverse changes in water quality. Then employees of resource management agencies, colleges, or environmental consulting firms initiate or intensify analyses when it may be too late to implement preventive measures to protect water quality.

Those lakes that are already showing symptoms of pollution may require restoration to a previous water quality condition. A variety of lake restoration techniques has been developed in recent years. Although some of these techniques promise to reverse the course of eutrophication in some lakes, it is more logical and inexpensive to prevent problems through lake protection measures. Most lake restoration measures treat only the symptoms and provide only temporary relief. Brezonik et al. (1969), aptly stated that: "Since lakes are slow to change, a considerable lag may ensue before lakes respond to restorative measures. Therefore, it is essential to regulate pollu-

tion stress on lakes so as to maintain a desirable level of water quality at a stage where preventive measures will suffice."

This paper is a case history of an ongoing lake protection effort in the northern tip of Michigan's Lower Peninsula. It describes the interaction between a technical information source (the University of Michigan Biological Station) and the subsequent development of a locally supported organization, (the Tip of the Mitt Watershed Council), and a user community (lake property owners associations). Although the program evolved through time and sometimes took courses not initially predicted, the lessons learned and the emergent environmental communications strategy apply to other lake-oriented communities and their lake protection efforts.

ORGANIZATIONS

The Information Source

The Biological Station conducted limnological studies on 40 inland lakes in the Cheboygan River Watershed (Fig. 1) during 1972-1972-76. Water quality was

generally excellent, although signs of early cultural eutrophication were prevalent on many lakes (Gannon and Paddock, 1974). Because water quality degradation was subtle, active involvement of the local community was considered necessary to safeguard the area's natural environment. Implementation of a long-term water quality monitoring program and curtailment of nutrient loading through wetlands protection, installation of lakeside greenbelts, improvements in on-site wastewater management, and lakeshore population density control were identified as the key elements of a local lake protection program.

During 1977-78, the Biological Station effort evolved from a limnological emphasis into an environmental education and communications research program. Strong links to the local community (lake propertyowners and local officials) were the cornerstone of the program. Multiple methods were used to communicate study results, including information packet distribution, use of mass media, and regular contacts with community leaders and public officials informally and in public forums (Pelz and Gannon, 1979; Gannon and Secret-Gold, 1981). A series of short booklets on lake ecology and lake protection

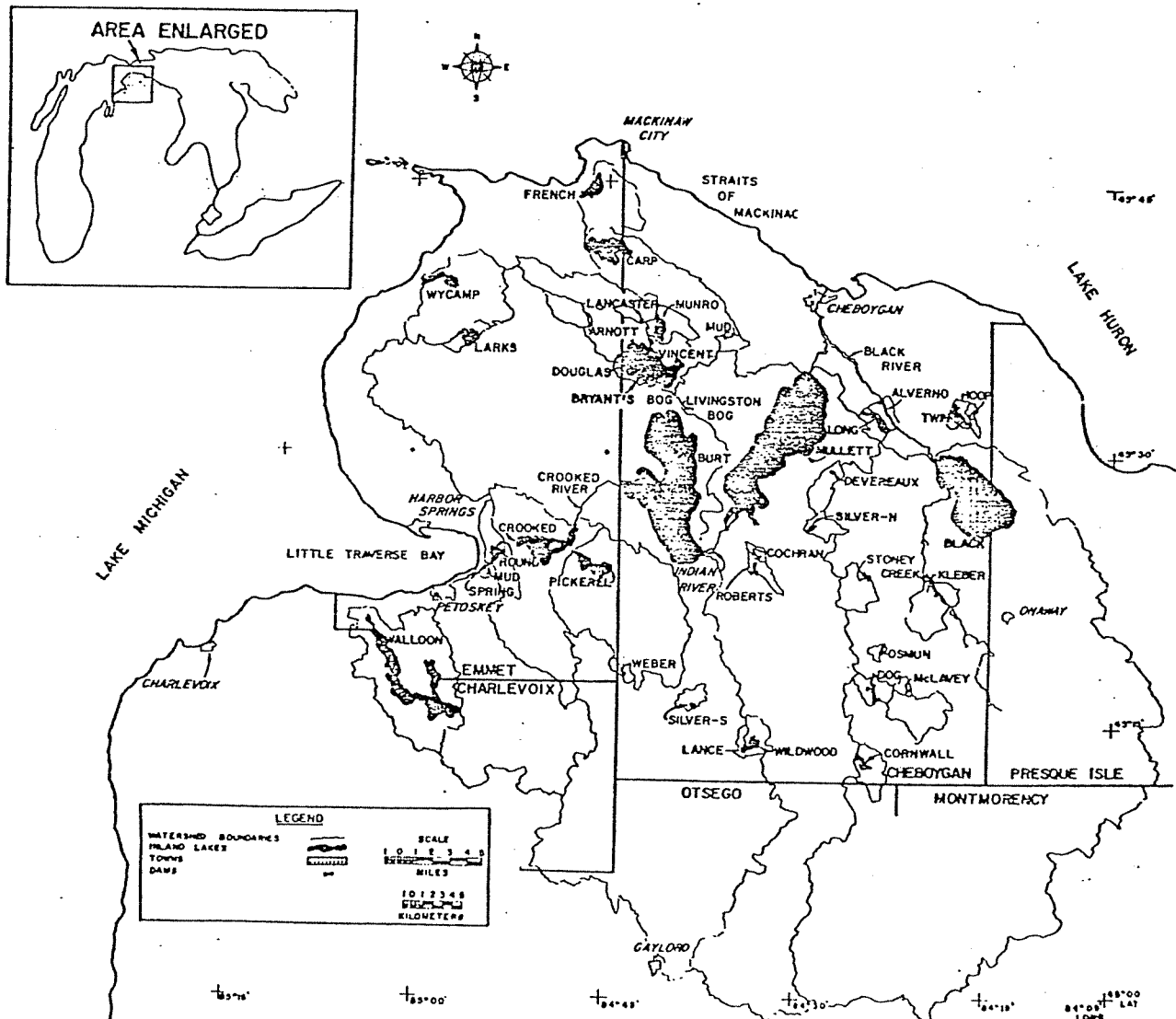


Figure 1.—The Tip of the Mitt Watershed Council serves lake propertyowners' associations on inland lakes in northern Michigan, encompassing lakes in and adjacent to the Cheboygan River Watershed. The University of Michigan Biological Station is located on Douglas Lake.

themes, providing technical information and action implications in lay person's terms, proved to be effective (Pelz and Gannon, 1980).

Biological Station students met with lake property owners in a series of environmental education and communication programs known locally as Project CLEAR (Clean Lakes Environmental Awareness Research). These proved especially effective. It became clear that reports alone did not strongly affect environmental awareness and action. Multiple and mutually reinforcing channels of communication must be employed to develop a climate of receptiveness and understanding for lake protection efforts (Pelz and Gannon, 1979).

The User Community

Typical of other regions, many lakes in the tip of northern lower Michigan have a lake property owners' association. Many of the larger property owner groups have multiple associations representing specific clusters of cottages along the lakeshore. A few highly organized ones have a board of directors, committee structure, and substantial budgets, but most are strictly volunteer with a low level of activity. The lake associations usually were formed to protect property values or to protest rising local taxes that rarely benefitted riparian owners. Environmental protection was not a prime motive for their initial organization and the lake associations rarely communicated with each other, especially about environmental affairs. The educational and research efforts at the Biological Station, however, did provide a forum for the lake associations to communicate with one another.

As an information source the Biological Station had sufficiently documented local water quality problems, and through educational programs had suggested an array of resource management and community action alternatives. However, the local community, not the Biological Station, could implement lake protection programs. Project CLEAR staff organized a conference entitled, "Inland Lakes Exposition (EXPO)," in August 1978 to encourage greater community involvement in lake protection efforts. EXPO, a day-long water quality fair with a diversity of miniworkshops, demonstrations, field trips and displays was attended by over 150 lake association representatives, community leaders, and local public officials.

A reoccurring theme was that if residents took preventive actions (which require little outlay of labor, capital, or energy) immediately, they might avoid costly corrective measures in the future. A recommendation emerged from the conference for the community to form a watershed council to act as an "umbrella" organization and a communication link among the various lake associations and to interact with local and State governments on matters of common interest.

The Tip of the Mitt Watershed Council was formed in 1980. It geographically encompasses the Biological Station's original study area (Fig. 1) and several adjacent lakes. Through membership dues and local citizen support and fundraising activities, the Council has grown from a small volunteer operation to a substantial organization with a Board of Directors and a salaried staff including an executive director, a limnologist, and an attorney. The Watershed Council strives to protect water quality and promote wise use of water resources of the region.

Although forging its own direction of activities, the Council nevertheless has continued work on the key elements of lake protection originally identified by the Biological Station staff. This apparent continuity occurred with minimal input from Biological Station personnel because of changes in its research emphasis and the departure of key staff persons. As the Watershed Council grew more active, it began assuming the role of an information source with close and effective links with the lake associations and other elements of the local community.

LAKE PROTECTION PROGRESS

In the Tip of the Mitt Region, community action strategies for lake protection are generally composed of several facets. Problemsolving initiatives are often independently devised and administered by individual lake associations. The Watershed Council focuses on: "watchdogging" local and State agencies to ensure proper administration of environmental regulations; developing local regulations and ordinances to institutionalize lake protection programs; providing technical information to lake residents; and networking with other concerned citizen groups (lake associations, environmental organizations, and such) that are interested in lake issues. The examples below illustrate some of these aspects.

Lakeside Greenbelts

Greenbelt zoning ordinances have been actively promoted by the Council staff. On one lake, a lakefront boardwalk in common ownership has become an effective greenbelt and has been used as an exemplary model program. On another lake a newly enacted township zoning ordinance requires a 35-foot wide natural greenbelt to be retained along waterfront development. Emmet County, the site of five of the Council's lakes, is now working with the Council staff to develop a countywide greenbelt zoning ordinance.

In 1978, Project CLEAR staff held a demonstration program and plant sale at a lake association annual meeting. Since that time, the lake association has continued to distribute shrubs and ground covers to its members at discount prices. Although no information exists on the percent of shoreline protected by a greenbelt, the program has certainly succeeded in educating lake residents to the adverse impact of nearshore fertilization. In this program the Watershed Council is viewed as a source of pertinent brochures and technical information.

Wetlands Protection

Wetlands protection through acquisition has been a major focus of the Watershed Council. The Council identifies sensitive parcels and then works in conjunction with a local land trust fund, the Little Traverse Conservancy, to acquire them. A 23-acre wetland parcel on one lake has been entrusted to the Little Traverse Conservancy. The Council, with approval from the State, is attempting to promote a land trade by swapping privately-held riparian wetlands for State-owned uplands. One of the member lake associations has developed its own nonprofit trust and has received funds and lakeshore wetland parcels from lake property owners.

The Council regularly reviews State and Federal permit applications for development projects which

may adversely affect wetlands and adjacent lake water quality. On a proposed riparian wetland development, the council provided information that led to a denial of a permit to fill and destroy the wetland. In instances where permits for wetlands development have been approved, the Council has attempted to negotiate with developers to include setbacks or boardwalks, thereby maintaining many of the wetland values at the site.

Improved On-Site Wastewater Management

Since 1978 residents of one lakeshore association have been cooperating in a voluntary septic system maintenance plan that ensures regular pumping and inspection of members' septic tanks. Developed in conjunction with Project CLEAR staff, the plan consists of a group reduced rate contract with one pumper who annually checks and, when necessary, cleans the tanks. Although a formalized maintenance program is located only on one lake community, others have instituted the program on a one-time basis. Moreover, the Council produces a septic system maintenance brochure that lake associations distribute annually to their members.

The Watershed Council has played an active role in revising sanitary codes. Increased setback of septic systems has been written into the new code of one county. The Council is promoting a model ordinance on phosphorus control measures. In addition, the Council has policed appeals board decisions and worked to place lake-oriented personnel on the appeals board.

Lakeshore Density Control

On many lakes of the region, most of the well-drained suitable lakeshore sites are already developed. This has prompted an increase in a comparatively new trend, sometimes called "key-hole" or "funnel" development, whereby a relatively large parcel of non-riparian backland is developed and owners are provided access to the lake through a small lakeshore lot. Such developments, usually associated with condominiums, have the potential to vastly increase the number of people using the lakefront, thereby potentially causing overcrowding, declining recreational quality, and environment degradation.

Three methods have been employed in the Tip of the Mitt Region to address funnel development: zoning, legal action, and negotiation. One township, which includes part of the shoreline of the area's largest lake, specifically restricts funnel development by limiting housing to one dwelling unit per 100 feet of linear lake frontage. Many lawsuits have been filed concerning funnel development but they rarely go to trial. In one instance, improper land use permit procedures involving a condominium project received court action. Most litigations end in consent judgments reached through negotiation. In these, compromises are made in the size and placement of near-shore parking and recreational facilities, number of power boat slips, and size and placement of docks and swimming rafts that substantially restrict lakeshore usage and development. Such lakeshore restrictions have reduced impacts on the lakeshore and often have resulted in downsizing the number of backland condominium units.

Monitoring

During the 1970's the State of Michigan promoted and administered a volunteer (self-help) lake monitoring program. When budget cuts eliminated this activity, the Watershed Council assumed the coordinating and supporting role. Lake resident volunteers take Secchi disk readings and collect water samples. The Council runs chlorophyll α analyses, compiles the results, and interprets these data for the individual lake associations.

To identify gross nutrient inputs from shoreline homes (generally from failing septic systems), individual lake associations have conducted lakeshore algal surveys. These surveys rely on the presence of *Cladophora*, an attached green algae, to signal the potential for nutrient inputs. Volunteers receive a brief training session and then walk a specified shore section. The associations follow up on the survey by informing owners that their septic systems may be failing, and suggest that they contact their health department for dye tests and further investigations. Several leaky systems have been identified and replaced through this program and, in other instances, excessive lawn fertilization has been indicated.

Along with shoreline and lake monitoring, one of the Council's member lake groups has solicited professional services to determine the watershed's hydrology and monitor the quality of its ground water. The association has now identified the major ground water flow patterns and ground water recharge sites. Efforts are underway to monitor the effects of development and agricultural activities on these recharge sites and to develop appropriate nutrient control strategies where necessary.

DISCUSSION

A watershed council, acting as a permanent and collective voice, can be an important vehicle in overcoming the parochial and political problems that can adversely affect implementation of lake protection programs. The usual rectangular political boundaries (such as township and county lines) never coincide with the natural, irregular watershed boundaries. A watershed council can provide an effective coordination function for lake planning and management on a watershed basis, usually transcending the boundaries of several political jurisdictions and encompassing a region of geographic integrity often including many lakes.

Volunteer lake associations are usually parochial in their viewpoints and rarely express interest in other lakes and their problems, even if they are close neighbors. In some areas, the majority of lake property owners are only seasonal residents without local voting privileges; therefore, they are often ignored by local politicians. A watershed council can be an important mechanism linking individual lake associations together to influence political and resource management decisions in favor of regional lake protection.

In northern lower Michigan, there is a rather informal relationship between individual lake associations and the Tip of the Mitt Watershed Council. Member associations have representation on the Council's Board of Directors but the lake associations retain complete autonomy. Some lake protection initiatives are generated by the Council while others emerge from individual lake associations.

Based on our experience, a watershed council's role includes the following:

Educator—to provide information and materials, often drawing upon pertinent materials and experiences of watersheds and lake associations elsewhere;

Communicator—serve as a communication forum and link between lake associations;

Coordinator—to provide a coordination function between various lake associations and between other agencies and lake associations;

Technical Supporter—to furnish technical support and advice to member and nonmember lake associations by drafting model ordinances, and interpreting water quality data; and

Regulatory Watchdog—this is one of the most important functions of a watershed council. Resource management agencies are often understaffed or their personnel lack sufficient knowledge of the local area. Review of the administration of environmental regulations, permit procedures, notices and applications rarely receives the necessary attention by the local community.

The initial limnological research program at the University of Michigan Biological Station gradually evolved into grassroots environmental education and communication activities (Pelz and Gannon, 1979; Gannon and Secrest-Gold, 1981). The program did not follow a rigid predetermined strategy. Rather, it gave particular attention to the public's perception of specific water quality issues and how the issues related to local situations and individual concerns. Regardless of slight differences between strategies employed on specific issues, the development of action followed a definite sequence (depicted in Fig. 2).

There was two-way communication and interaction between the information source (Biological Station, and later the Watershed Council) and the user community (lake associations) during identification of a problem, but the information source with its technical expertise and experience provided most of the documentation and further definition of the problem (Fig. 2). Proper audience identification is critically impor-

tant so that printed materials and other communicative tools are understandable and pertinent to the recipients. It must be emphasized that a program that relies on a one-way flow of information from the technical source to the user community has little chance of success.

Multiple forms and channels of communication were employed and communication links were encouraged (Fig. 2). Citizens, public officials, and research scientists came together, often for the first time, to discuss matters of lake protection and resource management. Once the links were established, joint problemsolving and reciprocal actions could proceed. Only after a period of time and a great deal of interaction could the user community, a group of nonscientists, have the understanding and technical skills necessary to develop and implement lake protection initiatives. Similarly, without the local community, the information source could not have designed a program to meet the local needs and capabilities. The two sides had to work together, share information and ideas, and then pool their knowledge to develop feasible management options.

Actual problemsolving through implementation (establishing a voluntary program) or institutionalization (adopting an ordinance, law, etc.) is the primary responsibility of the community. At this point, the information source has little involvement (Fig. 2). Only casual advice, encouragement, and persuasion from time to time is helpful, unless a new problem is identified. Then, the process might be repeated (return to the top of Fig. 2).

An important feature of local success is that the Watershed Council has matured into assuming the role of information source, thereby providing much stronger and more permanent links to the user community than the Biological Station ever could. Indeed, the Biological Station is still consulted occasionally, but the Watershed Council is definitely the primary information source today. Moreover, the Biological Station's role seems apropos in this context. As an academic institution, it furnished an initial infusion of externally funded, problem-oriented research into the local community. In the future, it may continue its current low level extension function or begin new research thrusts of possible local interest and benefit. Regardless, lake protection programs will continue through the locally funded and supported Watershed Council.

In conclusion, we describe here a sequence of events between an information source (University of Michigan Biological Station and the succeeding Tip of the Mitt Watershed Council) and a user community (a group of lake associations). The environmental communications strategy evolved through a sequential series of events that may provide a useful model in implementing similar programs elsewhere. No huge success story is reported here; rather it is a scattering of individual and collective lake protection initiatives that have been developed in the region, using the information source as the initial impetus but with actions generated entirely at the grassroots community level. It all adds up to heightened community awareness and a healthy environmental ethic rarely observed in our society today. Such grassroots involvement is the cornerstone of low cost but effective lake protection efforts. The heightened level of environmental awareness and sensitivity within the community may be more important to long-term environmental protection than the specific initiatives implemented thus far.

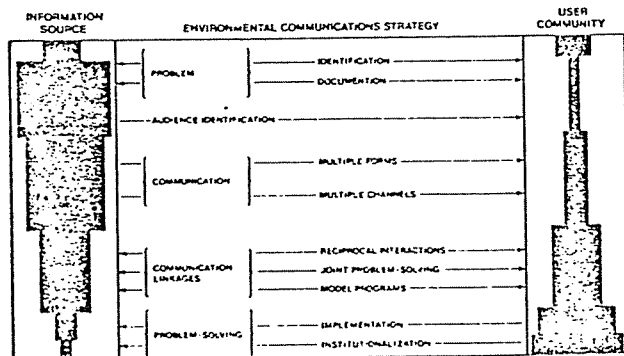


Figure 2.—A graphic model of an environmental communications strategy involving cooperation between an information source and a user community. Two-way communication is essential, but the degree of involvement of the information source and the user community changes as the program progresses from identification of the problem to its solution. The size of the blocks shows the relative degree of involvement of the two groups at each step in the program. The arrows indicate the major direction(s) of information flow.

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