



Crystal Shorelines

The newsletter of the Crystal Lake Watershed Fund

UPDATE #14

WINTER 2001

HIGHLIGHTS

In This Issue:

ZONING

REGULATIONS

IGNORED

PAGE 1

TOP TEN EXCUSES
CLIFFORD H. BLOOM,

ATTORNEY

PAGE 2-3

FOAM ON THE WATER
PAGE 4

ZEBRA MUSSELS
PAGE 4

**STATE OF THE
LAKE-WATER
CHEMISTRY**
PAGE 5

WATERSHED SIGNS
PAGE 5

**BENZIE-LEELANAU
DHD
ENVIRONMENTAL
HEALTH DIVISION
UPDATE**
PAGE 5

**CRYSTAL LAKE
"WALKABOUT"**
PAGE 6

**SOME OF OUR
ACCOMPLISHMENTS**
PAGE 7

**CLWF SCIENCE
REVIEW PANEL**
PAGE 7

**WHO WE ARE,
WHO WE WERE, AND
WHO WE ARE NOT**
BACK PAGE



Keep Crystal Clear

Zoning regulations ignored

(Continued from update #13)

We are continuing to interact with violations of zoning regulations. We are checking, with legal assistance, exactly which statutes are involved, and what remedy may be at hand to insure adequate restoration. Claims of "before and after" are being verbalized with little progress being made – litigation may be the only method to achieve compliance and avoid setting a negative precedent.

How much better it would be to have a new and consistent ordinance which could resolve many of these adversarial issues, thus saving the lake from the effect of unwanted buildings, too close together; injurious soil erosion; clear cuts; road end activity; and funneling of back lands to limited beach areas.

The nearly completed County Master Plan is supposed to heal these problem areas. But there are at least two glitches in the program. One is that some municipalities may not elect to adopt the new plan and the other is that the master plan must be finished by the local citizenry by the creation and adoption of all the rules and regulations that are now being disputed and ignored and which are the very ones that mean so much in saving what we now have. There will be a significant time delay between the time the Master Plan is approved and adopted and the time when all the subscribers agree about the details i.e., overlay districts, minimum lot sizes, side and other distance controls, tree cutting, steep slopes, etc. The time period will probably be at least one or two years and by then many new dwellings will have already been erected on and in the hills surrounding the lake, damaging the forest, causing unnatural erosion and adding aesthetic pollution.

What can be done to obtain control at once until the completed Master Plan is ready? The concerned public must enhance the required awareness to enforce our existing regulations. Township officials must hear from their constituents by fax; letter; phone; net; or personal visit. With no input from citizens, little positive action on their part may be expected.

To aid our understanding of some ways townships deal or not deal with zoning interpretation and enforcement, we have reprinted an article from the current issue of Riparian magazine, August 2001. The writer is Mr. Clifford Bloom, a Grand Rapids attorney. We find his pointed remarks most illuminating. Please make an effort to contact and persuade officials in your township or village.

Top Ten Excuses - Are you kidding?

By Clifford H. Bloom

Are you one of the unlucky riparians who own property on a lake where local officials refuse to do anything to help the lakes? In particular, has your municipality refused to enact anti-funneling/keyholing regulations, road end ordinances or lake preservation zoning techniques because municipal officials have one or more lame excuses for not doing so? Does it frustrate you that the excuses appear to be a smoke screen for municipal officials have one or more lame excuses for not doing so? Does it frustrate you that the excuses for not doing so? Does it frustrate you that the excuses appear to be a smoke screen for municipal officials who do not want to adopt such regulations and do not have the courage to simply say so? If so, this column is dedicated to you and contains the top 10 baseless excuses which some municipal officials use to justify not doing their jobs.

1. Liability.

This is the good old standby excuse. Supposedly, the municipality's attorney has told municipal officials that the adoption of such regulations will cause the municipality to incur damages or liability. There are at least three defects in this reasoning. First, municipalities generally have governmental immunity when it comes to ordinances. While such immunity is not absolute (for example, "takings" cases), it is a formidable barrier to municipal liability. Second, some municipal insurance policies cover some or all of such potential liability. Third, if this is truly a concern, the municipality involved should repeal all of its other ordinances (including the zoning ordinance), sell its park lands, cancel all parades, abolish its fire department and close up shop. Everything which anyone, including a municipality, does in this country involves a liability potential. Nevertheless, matters must be put in perspective. Adoption and enforcement of anti-funneling and road end ordinances involve no greater liability potential than for any other type of zoning provision or ordinance. In fact, based on the case law, a good argument can be made that the liability potential is less than for many other zoning techniques or ordinances.

2. Litigation.

This is a variation of the liability excuse mentioned in Excuse Number 1, above. Some municipal officials will argue that even though it may be unlikely that municipalities will incur liability or have to pay damages if they pass such ordinances, the municipality still could face lawsuits challenging the ordinance, thus incurring considerable expense for the municipality due to legal fees and costs. As previously stated, some (but not all) municipal insur-

ance policies will cover some or all of the municipality's attorney fees and costs if damages are claimed. Even if not covered by insurance, the lawsuit potential should also be kept in perspective. Anti-funneling regulations have been in effect in many municipalities in Michigan for 15 years or longer. In excess of a hundred municipalities have such ordinance provisions today. There has been no rash of litigation regarding such regulations. The favorable decisions of the Michigan Supreme Court regarding such regulations (discussed below) has undoubtedly cut down on such litigation. Finally, there is no evidence whatsoever that anti-funneling and lake regulations will breed any more litigation for municipalities than any other type of zoning provision or ordinance.

3. This is a private matter which the municipality should not get into.

This excuse is particularly perplexing given that zoning ordinances regulate a myriad of other structures, uses and activities which could otherwise be deemed "private." Zoning regulations typically regulate lot size, building height, private roads, setbacks, maximum lot coverage, etc. Regulating lake access and frontage is perfectly consistent with other typical zoning regulations. Zoning regulates a wide range of real property issues, and riparian land and appurtenances are simply another type of real property. Why is it any more of a "private matter" to regulate the lakefront or lake access than to tell someone they cannot place a shed within 10 feet of the side property line or have more than two dogs on their property?

4. We don't have the resources to enforce that type of ordinance.

Again, this argument might be reasonable if the municipality involved had not adopted any other ordinances or is considering repealing all of its other ordinances. Lake-use regulations generally involved no more enforcement expenses (or frequency) than other zoning regulations, junk ordinances in general over the last half decade has become simpler, quicker and cheaper for municipalities given the advent of municipal civil infractions.

Some municipal officials bemoan how difficult they claim this type of ordinance would be to enforce. The counter-question which should be asked is why lake access regulations are any more difficult to enforce than any more difficult to enforce than any other regulation? Determining whether someone is operating an illegal business out of their home or whether a house has been built six inches taller than the height limitations in the local zoning ordinance are areas which are potentially

Top Ten Excuses - Are you kidding?

(Continued from Page 2)

difficult to enforce, but that does not stop municipalities from enacting such regulations. There is no legal requirement that once a municipality enacts a lake access regulation (or any other type of regulation) that the municipality is required to hire a boat load (pardon the pun) of zoning enforcement officials. The enforcement of this type of regulation would be done in the same fashion as any other municipal regulation. Obvious and highly visible violations could be discovered by municipal officials, while other violations would be addressed on a complaint basis. As mentioned above, the advent of civil infraction ticket procedures also makes enforcement much easier.

5. It is not clear that we have the authority to regulate lake uses and the courts may not uphold such regulations.

Anyone who would make such an assertion is either ignorant or is willfully misleading the listener. The top court in Michigan, the Michigan Supreme Court, has upheld these types of regulations in *Hess v West Bloomfield Township*, 439 Mich 550 (1992) and *Square Lake Hills Condominium Association v Bloomfield Township*, 437 Mich 310 (1991), so long as the ordinance involved is reasonable. In fact, the legality of anti-funneling and similar ordinances is much more certain than is the case with the overwhelming majority of zoning regulations, since probably 80% (or more) of the typical zoning provisions found in ordinances throughout the state have never been tested in court.

6. We cannot adopt the ordinance provision without doing an expensive lake carrying capacity study first.

Talk about excuses! Admittedly, the chances of having a particular ordinance provision upheld in court are always greater if there is an expensive study or report done first to support the regulation, preferably by an expert. Unfortunately, such studies and reports are often expensive and time-consuming, and the expense is often used as an excuse not to adopt a particular ordinance provision. There is no requirement in law, however, that such a study or report be done as a prerequisite to passing lake-use regulations. Furthermore, probably less than 1% of all zoning regulations out there based on a particular report or study. If any municipal officials ever uses this excuse, ask that person to show you the comprehensive study which they commissioned before they decided to set a 10-foot side yard building setback for their residential zone. Or for their requirement that buildings in a particular district not exceed 35 feet in height or to support listing restaurants and motels as permitted uses in the light commercial zoning district, but not banks. You get the picture.

Indicating that a study or report must be done regarding on-water carrying capacity is odd for two additional reasons. First, there is no universally-recognized method or standard for determining lake carrying capacity. Second, anti-funneling and road end regulations generally have little to do with on-lake boating activities, but are rather a regulation of land uses.

7. Since there does not appear to be a problem at the moment, we should not adopt such an ordinance.

Under this warped logic, municipalities would never adopt an ordinance or ordinance provision until a severe problem already exists. This area is entitled “zoning and planning.” Planning means that a municipality should look ahead and try to prevent problems before they happen.

Waiting until a “problem” arises might be too late – if a developer commences to develop a major keyhole development and there are no regulations presently in effect governing such developments, the municipality will not be able to stop that development.

8. It’s not our problem – this is best left to some other level of government and it would simply constitute another layer of government regulation.

Some municipal officials will assert that anti-funneling regulations or the regulation of the waterfront is best left to the state of Michigan or the county and that the local municipality should not become involved. Wrong again! Except where county zoning is in effect and where the local municipality has no zoning itself, counties do not have general ordinance powers. Furthermore, regulation by the state of Michigan regarding funneling, road ends, and the lakefront is virtually nonexistent. Theoretically, the Michigan Department of Environmental Quality (“DEQ”) does have some jurisdiction under the Michigan Inland Lakes and Streams Act regarding marinas, permanent docks, and similar matters, but as a practical matter, such jurisdiction is limited and the DEQ has been quite permissive in these areas. Accordingly, to assert that someone other than the local municipality should take action is, in actuality, an argument that nothing should be done.

10. A public access site or existing lake overcrowding makes such regulations useless.

Municipal officials occasionally argue that new lake access regulations would be a waste on a lake or present lake overcrowding. What a goofy argument! Just because a problem exists in some areas of a lake does not mean that you give up on all efforts to prevent similar problems from occurring elsewhere on the lake or on other lakes. This is akin to having a municipality give up on all regulation of commercial uses because a problem with a particular commercial business already exists in one portion of the municipality. Just because one horse has already escaped from the barn does not mean that you don’t shut the barn door to keep in the other five horses!

CLWF On the Internet!!!

The CLWF webpage on the Internet continues to expand! It contains our Mission, Board of Directors, Science Advisory Panel, Calendar of Upcoming Events, Some Interesting Facts About Crystal Lake, Current Projects, Publications, References, Photographs, Selected Internet Resource Links, and other features. It also contains our latest Global Information System (GIS) map of the Crystal Lake Watershed.

Please note(!) that we have a new web address (URL). It is :<http://www.clwf.org>

Special thanks to Paul Murphy for providing suggestions and pictures; to Paul Sanchigren for the original website, and Dr. John C. Walton, for hosting the site since 1999. Other thanks are due to Jim Stamm for providing the new webpage design..

Foam on the Water

People have asked for many years “what is that foam we see in the lake and along the shore?” “Is it bad, is it from septics, or what?” Our contacts at COLA have this to say “Foam along the shore probably does not indicate pollution from laundry waste. Virtually all detergents today are a biodegradable form which is easily broken down by bacteria. Most foam is natural.

Foam is aerated when the surface tension in water is reduced and air is mixed in, causing bubbles. Many

natural organic compounds will reduce surface tension including, those from decomposing algae or fish. In a lake these organic compounds are mixed with air by wind and currents to produce foam. Large quantities of foam are often found on windward shores, coves and in eddies. Natural foam has a somewhat earthy or fish aroma. Detergent foam, in contrast, will have a noticeable perfume smell. We have noted thick foam on Yellowstone Lake which is largely uninhabited.

Zebra Mussels

Quantities of zebra mussels are now being found most everywhere in Crystal and their ages are up to 10 years based on stripe counting. Originally, it was thought that they might be unsuccessful in Crystal due to both a lack of food and hard anchorages. Their anchorage requirement is so strong that we are finding them attached to snails, clams and even crawdads, including their eyes. No one can say what the progression will be, but food chain interruption could cause dramatic variances.

One very noticeable effect of zm’s has been the exceptional water clarity of the lake. Bottom features were visible up to 30’ depths-more than twice as far as some in recent years.

Biologists have become very concerned over the apparently total disappearance of an entire species commonly found in the great lakes which is part of the vital food chain. This is the shrimp like creature named diporeia and has given rise to questions of survival of fish in the great lakes. Biologists are looking to the zm as casual.

One Holland, MIchigan observer reports zm’s attached on top of each other, forming mats of shells which are attached to the sand bottom requiring the use of bathing slippers to avoid cuts.

On the hopeful side, massive dieoffs have occurred on the Mississippi river in some areas and are thought to

be a result of warm water. Also another researcher has found that low frequency soundwaves cause zm’s to die.

It seems that no quick “black box” solution will be found locally, but with the major problem potentials outlined, broad scale research will eventually produce a solution. In the meantime, here on Crystal, we can expect clearer water, perhaps warmer water, water plants increasing along the blue line and changes in the populations of lake growths and fish.



Top photo: Crawfish nearly completely covered with zebra mussels.

Right: zebra mussels.



State of the Lake-Water Chemistry

Sample profiles have been taken all year as has been our practice. No remarkable change has been seen except increased clarity. (See page 4 on zebra mussels).

Watershed Signs

We have installed professional quality signs indicating entering or leaving the watershed on most roads approaching or leaving the area. The idea is citizen awareness of the watershed and its vulnerability as well as its small size to provide visualization how water flows from a given point, either to the lake or away to a neighboring watershed.

The Benzie-Leelanau DHD Environmental Health Division update

Recent progress has been instrumental in county-wide modification of certain septic consideration which will solve some of our more pressing problems - to avoid any misunderstanding, here is a letter by Bill Crawford, our sanitary official.

“The Benzie-Leelanau DHD Environmental Health Division has undertaken two major initiatives in the last year. These initiatives deal with how in a county, in which less than 15% of the residences are on municipal sewers, we can protect our environment as well as the health of the public. The implementation of those two programs is interrelated and therefore needs to be coordinated to be most effective.

“In early April the health department notified 70 Benzonia Township property owners on Crystal Lake that they would need to have their septic systems reviewed to verify if they would need upgrading. This notification followed the requirements of Article IX of the Benzie County Environmental Health Regulations. One month later in Leelanau County the Board of Commissioners appointed a task force to bring recommendations back to the Board on implementation of an Alternative Sewage System regulation. The goal of this regulation was to reduce the increase of holding tanks (and the difficulties that they bring in land disposal) as well as promotion of a more complete treatment of septic effluent.

It was clear after the first 25 inspections were done in Benzonia Township that the great majority of these properties were going to need holding tanks under the current regulation. The Benzie-Leelanau Health Department made the decision that when the Alternative Sewage System regulations was adopted in Leelanau County the health department would present it to the Benzie County Board of Commissioners for their consideration. This additional tool could open up other options for

current and future property owners the opportunity to install an alternative sewage system, since certain properties still could be unsuitable due to site conditions, but it would expand alternatives.

The adoption of the Alternative Regulation in Leelanau County is scheduled for late 2001/early 2002. As soon as the Leelanau County Board of Commissioners and the Benzie-Leelanau District Board of Health approve this it will be presented to the Benzie County Board of Commissioners. This time frame should allow the health department to begin review of alternative system proposals in the spring of 2002. As we all are aware, there is a continued pressure to develop properties with substantial site limitations in the this area of the state and we believe that these alternative regulations will assist in guiding that development.

“The Benzie-Leelanau District Health Department looks forward to this next step toward a more comprehensive and technologically based regulation and would be interested in discussing these issues with you. The Benzonia office of the health department may be contacted at (231) 882-4409.”

Permits Issued

For the 2000-2001 year there were 379 septic system permits issued county-wide including 42 upgrades on Crystal Lake in accordance with the County’s septic system ordinance. This brings the cumulative total of new or upgraded systems on Crystal Lake since the implementation of the ordinance to 503. The lake will increasingly benefit as the older systems are phased out.

Crystal Lake “Walkabout”

The **Crystal Lake “Walkabout”** is an educational program to teach young adults about the Crystal Lake Watershed (Benzie County, MI) and its unique hydrology - how water moves about the Watershed. The “Walkabout” is a “hands-on” educational program of observational monitoring and environmental exploring for young adults. On alternating years, teams walk about four Interpretive Sites, each representing different geological parts of the Watershed. Four Sites are selected for the annual “Walkabout” from a list of eight Sites, each representing a geographically distinct location:

- | | |
|---|-----------------------------------|
| A. Crystal Lake (Lake, East End) | E. Crystal Lake (Lake, West End) |
| B. Cold Creek Sediment Basin (Tributary) | F. Betsie Valley Trail (Wetlands) |
| C. Trapp Farm Nature Preserve (Wetlands) | G. Betsie Bay (Bay) |
| D. Railroad Point Natural Area (High Ridge) | H. Pt. Betsie (Dunes-Great Lakes) |

Environmental professionals describe each Site and conduct group activities. In addition to hydrology, other aspects of watershed management are discussed, including: water quality, ecology, land use, zoning, septic tanks, green belts, sustainable development, and watershed management.

Cosponsors of the “Walkabout”, an annual event since 1997, have included both nonprofit organizations (the Crystal Lake Watershed Fund, Inc., the Grand Traverse Regional Land Conservancy, the Grand Traverse Band of Ottawa and Chippewa Indians, Crystalaire Camp, The Nature Conservancy, the Friends of the Betsie Valley Trail, the Friends of Betsie Bay), and educational institutions (Benzie County Central Schools and Frankfort-Elberta Area Schools, and Crystalaire Camp). The Congregational Summer Assembly and the Interlochen Arts Academy joined us in 2001. Since inception, the “Walkabout” has been financially supported by the cosponsoring organizations and by donations.

The program was expanded to two events in 2001. The Summer “Walkabout” was held on July 25th for 25 participants from the public and Crystalaire Camp. The Fall “Walkabout” was held on October 12th for 415 students from the Benzie Central Schools and the Frankfort/Elberta Schools. Each student received a colorful “Walkabout” Tee-Shirt depicting the familiar GIS map of the Crystal Lake Watershed, and a newly revised Interpretive Manual. The “Walkabout” has grown from 40 participants in 1997, to 120 in 1998, to 160 in 1999, to 300 in 2000. The total of 440 in 2001 represents about 30% of the total school population of 1400-1500 in Grade 5-12 in Benzie County. The original “Walkabout” addressed a need to provide environmental education on issues specific to the Crystal Lake Watershed to young people in Grades 5-12 (ages 9–19). Protecting the integrity of the Crystal Lake Watershed as a valuable natural resource with its high-quality waters and unique environment continues to be a worthy objective.

Thanks to the many volunteers from the cosponsoring organizations (Dr. Stacy L. Daniels coordinated the “Walkabout”, with support from personnel representing the **CLWF**, The Nature Conservancy, the Friends of the Betsie Valley Trail, the Friends of Betsie Bay, the U.S. Coast Guard - Frankfort Station, and the Congregational Summer Assembly), who provided Site Interpreters and other support. Other thanks to the teachers from the Benzie County Central Schools and the Frankfort-Elberta Area Schools who included the concepts of watershed interpretation and management into their curriculums, and provided moral support, chaperons, bus transportation, and esp. their students. Special thanks to the Grand Traverse Regional Community Foundation who provided financial support through the Land Use and Conservation Planning Fund and the Benzie Area Youth Council in 2001.

Other thanks to many individuals and organizations: Congregational Summer Assembly, L’Chayim Delicatessen, and A&W Restaurant, for facilities and refreshments; Michigan Lake and Stream Associations, North American Lake Management Society, Water Environment Federation, USGS, and U.S. EPA, for informative materials; Benzie County Record Patriot, Traverse City Record-Eagle, and TV 7&4 News, for media coverage; Northwest Michigan Council of Governments for GIS map updates; and local village and township governments within the Crystal Lake Watershed for their continued support.

The “Walkabout” will be continued in 2001-2 using the basic format and maintaining direct interaction with local educators while adding a special program for summer residents and visitors. To accommodate differing ages and logistics of increasing numbers, separate Spring and Fall events are being considered.



The CLWF Science Review Panel

The CLWF Science Review Panel (SRP) will be proactive in developing consensus viewpoints by reviewing environmental issues of particular local interest and by providing scientifically sound recommendations where appropriate to the public. This will involve continued review of CLWF sponsored studies, and assessment of studies conducted by other responsible organizations that have demonstrated performance in related areas. It is comprised of a cross-section of knowledgeable individuals who have contributed significantly to past studies of Crystal Lake and who have been involved in various environmental activities positively affecting the Crystal Lake Watershed. It includes the directors of all major water quality studies conducted on Crystal Lake since 1969.

Cochairs:

Dr. Stacy L. Daniels, Director of Research, Quality Air of Midland, Inc. and Adjunct Professor of Environmental Engineering, The University of Michigan;

Dr. Tom Osborn, Professor of Earth & Planetary Sciences, The Johns Hopkins University.

External Reviewer:

Dr. Alfred M. Beeton, Former Chief Scientist of NOAA.

Members:

Dr. John Gannon, University of Michigan, Director of the 1969 Study;

Fred Tannis, Environmental Research Institute of Michigan, Director of the 1978 Study;

John R. Gehring, Benzie Central High School, Director of the 1987 and 1989 Studies;

Heather Rigney, Grand Traverse Regional Land Conservancy;

Jack Randall, Interlochen Arts Academy;

Tom Rohrer, Chief, Surface Water Quality Division, MI DEQ;

Bill Crawford, Benzie/Leelanau District Health Department;

Dr. Eckhardt Dersch, Department of Resource Development, Michigan State University;

Dr. John C. Walton, Department of Civil Engineering, University of Texas at El Paso;

Dr. Richard Whitman, Biological Resources Division, USGS;

Andy Norman, MSU Extension Service;

Dr. Harry Blecker, Crystal Lake Association;

Douglas Gibson, Crystal Lake Elementary School;

Paul Murphy, CLWF Executive Coordinator;

Dr. A. Scott McNaught, Biology Department, Central Michigan University;

Dr. Donald Gatz, Former Chief, Air Quality & Chemistry Branch, Atmospheric Environment Section, Illinois Water Survey.

Dr. Wally Fusilier, Water Quality Investigators.

Dr. Elizabeth B. Rogers, Former TVA & NASA aquatic ecologist.

The collective expertise of the SRP bears directly on the scientific components of several environmental issues having current or potential future impact on the Crystal Lake Watershed. The SRP is proactive in developing consensus viewpoints by reviewing environmental issues of particular local interest and by providing scientifically sound recommendations where appropriate to the public. This involves continued review of CLWF sponsored studies, and assessment of studies conducted by other responsible organizations that have demonstrated performance in related areas.



— *Walkabout in action* —
“*Fascinated Listeners*”

Some of our Accomplishments

Our goal has been to preserve the water quality of Crystal Lake and to do so without great expense to you, its property owners. Your support has permitted us to accomplish the following:

- Write, publish and distribute the book *Crystal Lake-Life or Death* and yearly updates 1 through 12;
- Conceive and facilitate the adoption by Benzie County of a landmark ordinance requiring inspection and updating of all septic systems in the county;
- Partially fund and promote accredited deep water testing by Benzie High School biology instructor John Gehring and his advanced course students;
- Identify the north branch of Cold Creek as a major contributor of phosphorus into Crystal Lake and start a program in cooperation with the DNR to reduce the flow of nutrients into the Lake by returning the property to a wetland which will function as a giant filter;
- Support the gift of the former Trapp celery farm of Muriel Trapp Cross and Judson Cross to the Grand Traverse Regional Land Conservancy with its stipulation of protection of the water quality of Crystal Lake as a first priority;
- Arrange to have the “Lake Lovers” zero phosphate fertilizer available in many area stores;
- Produce the Crystal Lake Water Quality Monitoring Report by Daniels and Osborn.
- Furnish the pilot study of water plants and their distribution in the lake.
- Establish the annual Crystal Lake “Walkabout” educational program for young people.

TECHNICAL SECTION

For those interested in more detail

Update #14 ~ December 2001

Joint Water Quality Programs

The CLWF water quality monitoring program involves cooperative efforts among local volunteers, resident experts, student interns, academic faculty, and governmental officials. The CLWF Program has been integrated jointly or in parallel with programs of the Benzie/Leelanau District Health Department, the Michigan DEQ, the U.S. Geological Survey, the National Park Service, the U.S. EPA, Water Quality Investigators, Great Lakes Environmental Research Laboratory, the Michigan Lake and Stream Associations, the Benzie County Section of the Grand Traverse Regional Land Conservancy, the Tip of the Mitt Watershed Council, MPS-TetraTech, Northwest Michigan Council of Governments, and Michigan State University.

Crystal Lake Watershed Handbooks

The CLWF provides two reference handbooks describing the Crystal Lake Watershed. The first, "Crystal Lake – Life or Death", first published in 1987, was widely distributed and served as a model publication followed by many other organizations. It's contents are still very relevant to students, property owners, and visitors. It contains ten chapters addressing environmental issues affecting the Crystal Lake Watershed: what has been done, what needs to be done, how it can be done, and why everyone living in Benzie County can benefit as a result. Annual updates of water quality monitoring and watershed issues have been published as part of a continuing series (Updates #1-#13). Cumulatively these Updates have become **Crystal Shorelines**, the Annual Newsletter of the CLWF. The current issue is Update #14.

Since 1997, a companion educational handbook has been under development. The Crystal Lake "*Walkabout*" Interpretive Manual now is being used both as an Educational Primer for Students and as a Reference Handbook for Property Owners and Visitors. While the concept of watershed education is national in scope, our Interpretive Manual is specific to the unique environment of the Crystal Lake Watershed. It contains descriptions and environmental issues for eight Interpretive Sites. There is also a cumulative list of participants, sponsors, and supporters; a section on watershed management; a list of references; a timeline of significant historical events; and a list of concerns of the owner of lake and watershed property.

(In 1996, the CLWF was one of 17 lake organizations across Michigan participating in a pilot program of the ML&SA in developing a Workbook to collect history, mapping, hydrogeology, water quality monitoring, and watershed management on their particular lake or watershed in a simple and flexible format. This is an ongoing project of the CLWF to provide standard reference handbooks for public education.)

Biomonitoring of the Cold Creek Watershed

As part of the Volunteer Monitoring component of the Clean Michigan Initiative, the CLWF has received a grant from the Michigan Department of Environmental Quality (MI DEQ) for a "Biomonitoring of the Cold Creek Watershed". The Goals of the Project are to undergo training and conduct biomonitoring of Cold Creek, the major tributary to Crystal Lake. The Objective of this Project is to assist in determining the feasibilities of five management options for improved operation of the Cold Creek Sediment Basin to reduce sediment and nutrient loadings from nonpoint sources. The project will compliment the existing program infrastructure for nonpoint source pollution activities within the watershed. This Project will include: (i) screening evaluation of benthic invertebrate communities and stream habitats, and (ii) monitoring of water quality parameters. It encompasses the three Wadeable branches of Cold Creek, and the Cold Creek Sediment Basin, a former USDA RC&D protection measure limiting sediment and nutrient loadings to Crystal Lake. The Project began in September 2001 and continuing through early 2003, will include local volunteers and students.

Chemical Monitoring of the Crystal Lake Watershed

The Michigan Lake & Stream Associations (ML&SA) has established a collaborative program involving partnership between eight high schools and eight lake associations. As part of this model program, the CLWF is partnering with the Interlochen Arts Academy. Funds provided by the Porter Foundation, the Wege Foundation, and the RGK Foundation will be used to purchase equipment, manuals, and supplies, for monitoring chemical parameters of lakes. The equipment will include specific ion probes, graphing calculators, and data loggers. All schools in the program will be linked through the Internet to allow sharing information. Jack Randall, Chemistry Teacher at the Interlochen Arts Academy and a member of the CLWF Science Review Panel will direct the school program which will be augmented by data collected by the CLWF.

The Crystal Lake Watershed Management Plan

The Crystal Lake Watershed is a valuable natural resource. Protecting the integrity of its high quality waters and unique environment is a worthy objective. Management of the Crystal Lake Watershed is important to the CLWF for three reasons: (1) to determine what we know about our Watershed from the past, (2) to plan to use our Watershed in an environmentally sustainable manner today, and (3) to implement projects to protect our Watershed for the future. The Michigan Department of Environmental Quality has recently formalized the process of developing watershed management plans. Watershed management is not a new undertaking for the Crystal Lake Watershed. Its importance was confirmed in the draft Benzie County Comprehensive Plan. Scientific studies

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(Continued from Previous Page)

of all the “ologies”, i.e. geology (soil), hydrology (water), ichthyology (fish), limnology (lakes), biology (plants and animals), etc., done over the past 160 years form a database for decision-making. Definitive reports of issues and resource plans already have been developed by citizen and governmental committees. The “Crystal Lake Watershed Management Plan” has been, and will continue to be, a continually evolving entity, comprised of various pieces from informed stakeholders. Contributions to the Crystal Lake Watershed Management Plan to date have been made by a number of stakeholders with presence or interest in the Watershed. These have included individual citizens; nonprofit organizations; local, state and federal governments; and academic institutions.

The Crystal Lake Watershed

The Crystal Lake Watershed, located in Benzie County in NW lower Michigan, contains Crystal Lake, the 9th largest inland lake in Michigan. Benzie County was first surveyed in 1938-39 by Alvin and Austin Burt, who called Crystal Lake, “Cap” Lake (short for Whitecap, for the large waves on the Lake). The Lake covers 15.4 sq. mil. (9,854 acres), has a maximum depth of 165 feet (mean depth of 70 feet), and holds 242,000,000,000 (~1/4 trillion) gallons of fresh-water. It is surrounded by steeply wooded bluffs, remnants of the last ice age, which separate it from two adjoining riverine watersheds (Betsie-Platte, USGS 64060194). The high ridges (“bluffs”) rise almost 300 feet (~100 meters) above the surface of Crystal Lake (twice as high as the Lake is deep).

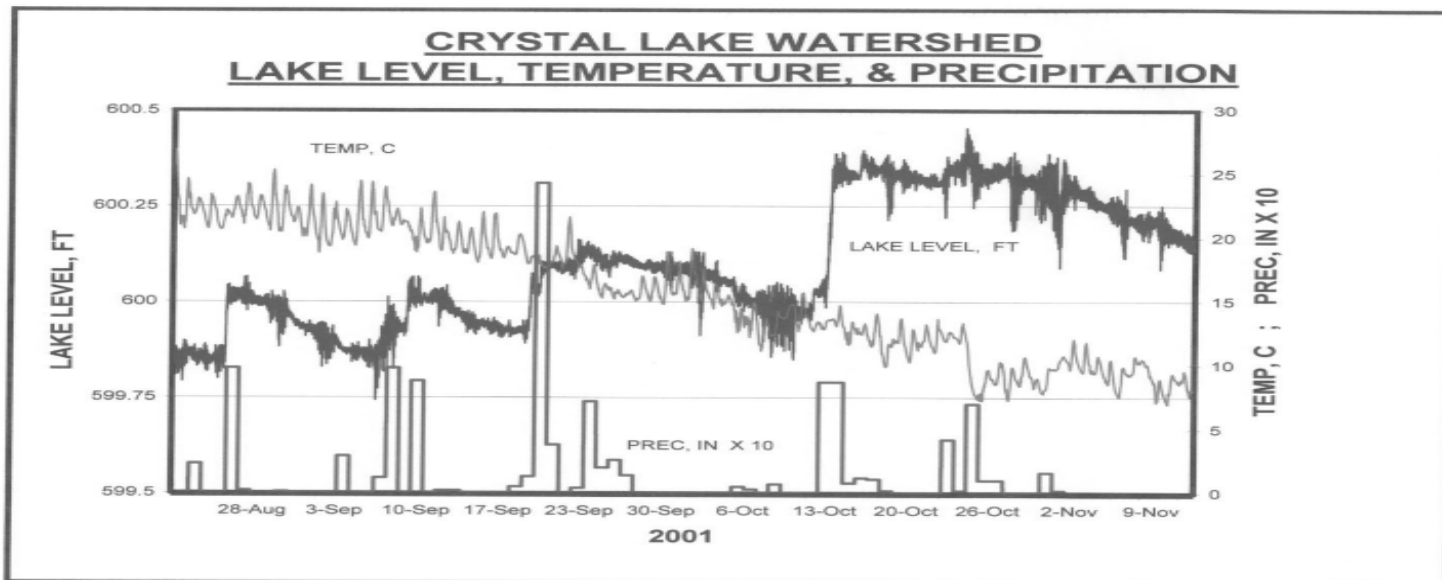
The Crystal Lake Watershed, containing seventeen sub-watersheds, is contiguous to the Platte River Watershed to the North, but it actually part of the Betsie River Watershed to the South, which in turn is part of the much larger Lake Michigan Watershed to the West. Crystal Lake overflows into Outlet Creek, a tributary and subwatershed of the Betsie River, which flows into Betsie Bay and on into Lake Michigan at Frankfort, MI. The Villages of Beulah and Benzonia are near the East End of Crystal Lake. The City of Frankfort and the Village of Elberta are near the West End of Crystal Lake, but are actually in the lower part of the Betsie River Watershed. The Crystal Lake Watershed comprises portions of three townships around the Lake (Benzonia, Crystal Lake and Lake), while parts of three other townships (Homestead, Inland and Weldon), are drained by Cold Creek, the major tributary to Crystal Lake. The North, Middle, and South Brances drain 59% of the land area within the Crystal Lake Watershed or 38% of the total Watershed area (land + water) of 43.58 square miles.

In 2000, the CLWF began developing a series of new multi-colored maps showing many different features of the Crystal Lake Watershed in Geogrphic Information System (GIS) format. Each GIS layer tells us something different: the shapes of the Watershed and sub-watersheds; names of villages, roads, and other places; lake depths and ridge heights; and locations of tributaries and wetlands. Specific locations are described by latitude/longitude, e.g. the center of Crystal Lake is at Latitude 44degrees39’33”N, Longitude 086degrees 09’23”W.

This project is being done in cooperation with the Northwest Michigan Council of Governments (with special thanks to Viet Doan of NWMCOG for his GIS expertise), Michigan Department of Environmental Quality, Michigan Resource Information System (MIRIS), Tetra Tech MPS, and the U.S. Geological Survey. The new GIS map of The Crystal Lake Watershed has been widely distributed as part of the Crystal Lake “Walkabout”. Copies are available from the CLWF for a nominal cost of \$2.00.

Lake and Stream Level Gauging The Level of Crystal Lake

As described in the Summer 2001 newsletter, the CLWF has applied state-of-the-art probes for monitoring water level and temperature in Crystal Lake and its tributaries. These units contain a computer, memory, sensors, and internal power source, and are fully certified by the manufacturer (Troll 4000® (In-Situ, inc.)). Lake level and temperature have been automatically monitored every 30-seconds and averaged every 10 minutes since late spring, a total of more than 25,000 data points! The data are collected and downloaded to a PC, where they are processed, referenced to a surveyed benchmark, and compared with data compiled by the Benzie Co. Drain Commission. In 2001, the Watershed experienced some unusually heavy spring and fall rains. The total rainfall to date at Beulah has been twice what was experienced in 2000. Despite this influx, the level of the Lake has been maintained by the Benzie County Drain Commission at near its legal limits (Summer: 600.25, and Winter: 599.75) ft. above mean sea level. There is a balance between retaining too much water in the Lake and aggravating shoreline erosion during high winds vs. discharging too much water and leaving too little water in the Lake for boating recreation.



Crystal Lake Watershed Fund



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Description of Who We Are, Who We Were, and Who We Are Not

The Crystal Lake Watershed Fund, Inc. (CLWF), a nonprofit 501(c)(3) organization, was formed in 1994 upon merging the Clean Water Committee of Crystal Lake (with focus on water quality monitoring) and the Friends of Crystal Lake (with focus on land use and zoning). Like its predecessors over the past 30 years, the **CLWF** actively supports citizen initiatives for water quality monitoring, septic system control, sustainable development, and land conservancy, through education, for watershed management.”. The **CLWF** operates independent of the Crystal Lake Association.

The former Clean Water Committee of Crystal Lake (now merged in the **CLWF**) was instrumental in supporting the Benzie County Public Health Department in developing a model ordinance to ensure that septic tanks in proximity to Crystal Lake and other water bodies in Benzie County comply with the latest standards in design and performance. The **CLWF** is also continuing to work with the Grand Traverse Regional Land Conservancy to limit phosphorus and sediment inputs from Cold Creek into Crystal Lake.

The former Friends of Crystal Lake (now merged in the **CLWF**) was supportive of efforts by Township and County zoning boards to work with local land owners and builders to promote reasonable and consistent land use regulations which ensure that future development is sustainable and compatible with the desirable environmental qualities unique to the Crystal Lake Watershed.

PLEASE SUPPORT YOUR CLWF

Funding the cost of our educational and water study programs as well as our operational cost has generally been accomplished by contributions from individual supporters. We are a non-profit organization comprised almost entirely of unpaid volunteers. We have stepped up our efforts to address land use regulations and zoning enforcement issues that you see in this and the previous newsletter. Land use has a direct bearing on our primary interest of the water quality of Crystal Lake. When we put this type of emphasis on land use, however, it requires legal assistance which requires additional funding. This is money well spent as bad practice and irregularities must be challenged in order that we operate on a controlled, rule of law basis. We need your usual and now additional support in the form of a tax deductible donation to continue. Please feel free to offer any comments or suggestions as well. Your donation should be sent to:

CRYSTAL LAKE WATERSHED FUND, INC. P.O. Box 104,

Beulah, MI 49617

Telephone/fax number 231-882-5149.