



*The
Geneva Lake
Book*

By George W. Johnson
Geneva Lake Environmental Agency

This book was published in 1997 and while some of the information has changed, there is still much useful information contained making it a worthwhile and informative publication.

by George W. Johnson, Resource Manager

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The Geneva Lake Book

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Forward

Geneva Lake is magical and mystical. Spring is heralded by the eerie calls of loon. The greenery and warmth of the summer invites us to view, swim and boat. Late summer nights brings the blur of the milky way juxtaposed with the Perseids meteor shower. Fall brings “eye candy” with the changing color of the leaves.

To me, the lake is the best when it sings in the winter. The best singing happens after the first thaw when the lake is completely frozen. The ice expands singing its song that would make the Arctic narwhal cry.

Geneva Lake is changing, and not for the better. As Pogo said, “we have met the enemy and he is us.” It is up to us, the Geneva Lake lovers and stewards, to make proud what we hand down to future generations. Our mission is to protect, preserve and enhance this most precious resource.

George Johnson
August 1997

Dedication:

I thank and dedicate this work to my colleague, Mary King. She best emulates that which I perceive I am about and wish to do for this world.

Acknowledgements:

This text was conceived by many people who have a sincere interest in Geneva Lake. Thanks to Ted Peters, the Director of the Geneva Lake Environmental Agency and the Board; Dr’s Nelson, Epps, Sable, Solhiem and Shaw, University of Wisconsin-Whitewater. Thanks to those Geneva Lake mentors: Maggie Gage, Miles Stedjskal, Bill (my buddy) Pope, Dr. Jeff Thornton, Robert Korth and John Palmer. Thanks to Carol Watkins, for the graphics. Liz, thanks for putting up with me during this ordeal.

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Chapter 1. Geneva Lake in the Balance: Citizen Concern and Participation

The lake is the landscape's most impressive feature. It is the earth's eye looking into which the beholder measures the depth of his own nature.

-Henry David Thoreau

Nothing is more inspiring than a lake, and no environment has more character.

-A.S. Pearce

Introduction

All too often we think of ourselves as external to our environment. We ignore our relationships among ourselves, living creatures and our surroundings. This is done at risk to ourselves and our other living neighbors. Solutions to environmental problems are more effective when they consider the complex interconnections among all parts of the ecosystem.

Sometimes we take lake quality and the diversity of plant and animal life for granted. We expect a healthy and diverse lake, clean and plentiful water to view, swim, fish and boat in. We must take steps to ensure that the Geneva Lake water quality remains suitable for these uses. If we do not, the excellent water quality we take for granted may vanish.

Water as a Resource

Water is truly a unique resource. Most of the processes of our physical environment, the atmosphere, soil and all living things ultimately depend on its unique properties. More substances dissolve in water than any other liquid. Water's ability to dissolve nutrients and transport eroded minerals, nutrients, sand and silt from the land makes Geneva Lake a chemical repository.

We are an integral part of this process. Every time we improperly fertilize our lawns, walk our pets or wash our cars we add our own wastes to the waters flowing to the lake. While these kinds of actions may not present the worst threat to the lake, they are preventable or can be reduced. It is time we stopped taking Geneva Lake's water quality for granted. We must realize that **Geneva Lake's** problems are **our** problems if we are to preserve and protect this great natural resource.



We must take the steps to ensure that Geneva Lake's water quality remains high.

One assumes that the riparians (those who live next to a lake or stream) potentially have the greatest water quality effect because of the proximity to the lake. This is not necessarily so. For example, it is important to note that urban watersheds (drainage basins) serve by storm sewers can have the same direct pollution effect as if the properties were located directly on the lake. The storm sewers simply convey run-off directly from the urban areas to the lake. This is because the storm sewer systems offers no chance³ of reducing or absorbing pollutants.

We must realize that Geneva Lake's problems are our problems if we are to preserve and protect this great natural resource.

Those who live near streams and drainage swales or ditches similarly can affect lake quality. Under the proper conditions, water quality can be improved as it courses down these streams and ditches. However, the effect can be minimal or even worse. This is because human activities concentrate and increase run-off that can cause channel erosion.

Water quality affects one's perception of the lake. For example, the most cited recreational use of the Geneva Lake is not swimming or boating but simply viewing the lake. What would one be more inclined to look at, a beautiful, clear and blue Geneva Lake or an algae-infested, green and smelly polluted body of water?

The Lake as an Economic Value

Water clarity is one way to measure water quality. According to recent study in Maine, water clarity strongly influenced property values. Increases of one meter visibility were estimated to boost property values by \$7,000 and one meter decrease equated to a \$11,000 property value decline. This real estate value would probably be conservative for Geneva Lake frontage.

Attributes that promote Geneva Lake water quality protection:

- a love of the resource
- not taking the resource for granted
- protection of a real estate investment
- a future inheritance to protect

The area economy and the local units of government are dependent on a high quality lake. Over one million people visit the Geneva Lake area annually and our tourist industry is an important part of our local economy.

A healthy Geneva Lake is important for:

- tourism
- property values
- recreation
- the local economy
- tax base
- fish and wildlife

Most of the taxes raised locally come from those few properties surrounding the lake. These residents and the tax base would be compromised without the high quality lake we know and expect. Tourists do not like polluted lakes, homeowners move away and business close.

Empowerment Issues

Lake management problems exist. Many of us feel that we are not empowered with being part of the protection team. We may possess a potentially ill-advised attitude that "I can pay to protect the lake rather than personally protect the lake." Some may be apathetic about the health of the lake or commit time and loyalty to other efforts perceived to have a higher priority than lake management. Some may be disenchanted with environmental decision making because they cannot vote locally due to their nonresident status. Some may be turned off by legislation that is militant, micro-management oriented or otherwise mandating environmentally correct behavior. Some may simply not know the intricacies of septic systems, lawn fertilizers and buffer areas. Still others, wishing to do the right thing, lack the necessary information.

On the other hand, the Geneva Lake Environmental Agency has found that most of us exhibit many positive attributes that promote water quality protection. We exhibit a love of the resource and are less likely to take the resource for granted.

We have considerable economic investment and a future inheritance to protect, and thus wish to protect Geneva Lake for future generations of lake lovers.

Public interest in protecting Geneva Lake has always been strong. The Geneva Lake Book is designed with the protection, preservation and enhancement of Geneva Lake's water quality in mind. It is intended to empower all Geneva Lake residents to protect water quality.

It is dedicated to the enthusiasm and creativity of people like you, the people who live around Geneva Lake, to help improve your property, reduce erosion, toxic chemicals, failing septic systems, over fertilization of lawns, inappropriate landscaping and shoreline erosion. With the help of this guide, we hope that you can enhance your respect and care for the lake, your home and neighborhood.

What We Can Do:

We invite you, the Geneva Lake stewards to accept this important challenge to protect, preserve and enhance the lake for future generations of lake lovers. Each chapter of the Geneva Lake Book contains specific suggestions about what you can do to improve your quality of life while promoting Geneva Lake Water quality.

- **Learn about your daily routines and how they affect Geneva Lake. Good habits begin at home. Realize that we are part of the problem and an integral part of the solution.**
- **Become Geneva Lake's number one fan. Encourage your family, neighbors, community, civic groups, and governments to protect water quality.**
- **Ask questions. Contact those people listed in the Geneva Lake Book. They are water quality advocates with the technical ability to help us help ourselves.**
- **Do not take water quality for granted. Realize that water quality is strongly related to your enjoyment of the lake, property values and an important legacy to leave for future generations.**
- **Follow the easy-to-do suggestions in this Geneva Lake Book to protect water quality.**

Chapter 2. Lake Formation and Early History

The Geneva Lake area exhibits the highest elevation in southeastern Wisconsin. The topography surrounding the lake is characterized by steep moraine ridges. These ridges run in a northeastern-southwestern direction and reflect a glacial deposition over a pre-glacial bedrock valley. This is the principle work of the last glacier that receded about 10,000 years ago.

The pre-glacial Geneva lake valley originally drained to the southwest. As the area warmed, moraine deposition occurred on the western end of the lake. This changed the outflow direction eastward to what is now the White River.

During the last glacial recession the current lake basin contained a large ice block. Materials were deposited around this giant ice cube when the glacier retreated. This accounts for the lake's great depth of about 140 feet!

The post glacial watershed (drainage basin) contained forests, prairie and oak savanna (a hybrid prairie-forest community). The plants and animals interacted with their environment for millennia to create this intricate and complex biotic systems called Geneva Lake.

The Native Americans highly valued the Geneva Lake area. They lived, hunted, fished, and foraged here. They developed a social structure that revered the land. They made sure that a shore path circled the lake before the area was turned over to the settlers.

The Native Americans burned the prairie to drive game, reduce insect pests and to perpetuate and increase the size of this community rich with wildlife and food resources. The prairies created that area's rich soils. However, the nutrients locked up these rich soils, if allowed into the lake, can contribute to the growth of undesirable plants and animals.



What We Can Do:

- **Respect the fact that the area's evolution took millennia to create and can be destroyed in short order by our actions.**
- **Understand that the area's rich soils can erode and cause water quality problems.**
- **Like the Native Americans, act as a Geneva Lake steward.**
- **Remember that we are here for only a brief time, but the lake must be protected forever.**

Chapter 3. History of the Geneva Lake Area's Environmental Concern

The Early Years

The Geneva Lake area exhibits a long and interesting history with respect to environmental concerns. Much of this credit must be given to the early Chicago residents who constructed mansions on large tracts of land along the Geneva Lake shoreline.

The early Geneva Lake riparian owners traveled to the area by train because of the poor quality of the existing road system. They would then travel from the local train stations to their estates by elegant steam yachts. They spent summers on the lake akin to weekends in the English countryside. The estates were pastoral and Victorian in nature as manifested by formal gardens and areas of natural serenity.

This was an era of excellent water quality. Water quality degradation was not an issue because of the existing high quality lake, the small amount of watershed development and the small number of estates. The lakefront was well endowed with trees because they had little economic but high aesthetic value. Only a small number of cattle grazed near the lake.

It was an era that emphasized nature. Frederick Law Olmsted and Jen Jensen, world renowned landscape architects, were responsible for landscape designs incorporated into many estates. For example, the Huchinson estate had an extensive area dedicated to the preservation of nature. No less than three books were written about the Huchinson's natural area and estate activities. These books are in the Lake Geneva Library. In 1882 the Leiter and Fairbanks families took on the task of stocking the lake with native and exotic fish. The Swift estate hired professional tree trimmers to maintain their arboricultural endeavors. These activities, especially the Huchinson experience, positively influenced other riparians.

Access was most generously afforded to the nonriparians during this era. Many riparians would open their estates on weekends to exhibit their vegetable and flower gardens, plant and animal

breeding programs and experimental farming activities. An estate gardeners' association was formed resulting from the activity of lakeshore residents. Historic Horticultural Hall in downtown city of Lake Geneva was constructed to further the educational needs of the estate gardeners. Horticultural Hall became the focal point for the estate gardening foreman's activities. The Hall became a competitive, cooperative and educational showcase for gardening handiwork and livestock breeding activities. Annual summer flower shows were held and were open to the public. A horticultural library was also established.

Geneva Lake's earlier settlers emphasized nature.

A developmentally restrictive covenant was signed by 58 Geneva Lake riparians in 1910. The properties involved in the covenant extended from Cedar Point to Black Point, about two-thirds of the Geneva Lake riparian parcels. This restricted the parcels to "first class residential development."

The Changing Face

The early environmentally friendly Victorian era waned. The period of 1920 through the 40's, the Depression and the War years, exhibited a decrease in land-friendly activities. After the 40's, many large estates were subdivided into smaller estates. Several Large Victorian homes were demolished because of their inefficient and outdated heating, electrical and plumbing systems. In short, the large estates, their Victorian homes, public access, natural areas, gardens, experimental farming, and breeding programs regrettably had decreased in size, number and scope.

AT the same time, the Geneva Lake riparian population increased with the breakdown and subdivision of the large estates. An increasing population coupled with increased leisure time and recreational uses have brought an increasing stress on the lake resource and have affected water quality.

The Groups That Help Protect the Lake

Several environmental groups have been organized for the protection of Geneva Lake and its environs. These groups, in part or totally, are funded by donations or dues. The combined 1994 voluntary commitment to the environmental groups was more than \$100,000. The Geneva Lake environmental groups include:

- The Geneva Lake Association. The GLA was founded in 1935. Its mission is to promote the conservation, preservation, environmental education and general welfare in the Geneva Lake area. (For more information contact the Geneva Lake Association at (262)-203-7108, GlaOffice@aol.com or www.genevalakeassoc.org)
- The Geneva Lake Association Environmental Education Foundation. The Foundation was formed by the Geneva Lake Association to fund environmental sciences educational scholarships. To date, it has funded numerous scholarships for graduating high school seniors and grade and high school student summer camp scholarships. (For more information contact the Geneva Lake Environmental Agency at (262)245-4532)
- The Geneva Lake Environmental Agency. The Agency was formed in the mid 1970's. Its goal is to help maintain the desirable lake and watershed quality. The Agency provides scientific research, education and advice to area citizens and units of government. (For more information contact the Agency at (262)245-4532)
- The Geneva Lake Conservancy, Inc. The Conservancy was established in 1977 in response to the pollution of Buena Vista Creek. Its scope has been broadened to include environmental advocacy for the Geneva Lake area. In 1982 it established a division to establish land trusts and purchase and accept real estate or conservation easements. (For more information contact the Conservancy at (262)275-5700 or www.genevalakeconservancy.org)

What We Can Do:

- **Become more informed about, participate in, and donate to these groups which support Geneva Lake management.**
- **Emulate the commitment of the former Geneva Lake stewards and duplicate their efforts when and where possible.**

Chapter 4. Environmental Corridors and Conservation Easements

The Environmental Corridor Idea

Environmental corridors are a composite of the most important natural resources and have immeasurable environmental and recreational value. Their protection and preservation are important for an increasing population requiring recreational opportunities and a habitable environment for all forms of life. Our general well-being and environmental quality are dependent on the preservation, protection and enhancement of environmental corridors.

The Geneva Lake Environmental corridors contain concentrations of natural and cultural resources:

- **streams, lakes, shorelands, and flood plains**
- **wetlands and wet, poorly drained organic soils**
- **woodlands, prairies and wildlife habitat**
- **rugged terrain and steep slopes**
- **natural and scientific areas**
- **park, recreation, historic, and other cultural sites**
- **scenic areas and vistas**

The Southeastern Wisconsin Regional Planning Commission and the Geneva Lake Environmental Agency have recommended that these corridors remain in essentially natural open uses. The failure to do so could result in environmental degradation and creation of problems such as water pollution.

Corridor protection is important because of the interlocking and interacting relationships between us, the organisms and our environment. All corridors are critical for wildlife that is being forced into an ever shrinking area. The large north shore environmental

Corridor located west of the City of Lake Geneva contains unique flora worthy of a scientific area status. Environmental corridors come in three sizes. The largest is the primary environmental corridor. This corridor encompasses about one fourth of the Geneva Lake watershed. This corridor has become a primary target for development because of the abundant natural resource amenities. The smaller secondary corridors and smallest isolated natural areas are associated with streams, isolated pockets of woods and connecting areas between the primary corridors. These two corridors represent about 3% of the watershed.

The Corridors and Geneva Lake Water Quality Protection

Without question, areas such as the environmental corridors, left in their natural state, are infinitely more water quality friendly than areas influenced by human development. Some corridors contain fragile resources. For example, wet, poorly drained soils are expensive to develop and do a poor job of treating septic wastes. Steep slope areas rapidly shed water that can lead to erosion. Areas near the streams and the lake do not allow much time for run-off to be purified.



Our general well-being and environmental quality are dependent on the preservation, protection and enhancement of environmental corridors.

Conservation Easements and Land Donations

Another way to protect water quality is through a conservation easement. A conservation easement is a legally binding restriction placed on one's property by the owner. The easement is designed to restrict the property's future use and protect natural resources. Similarly, one's property can be donated to the Geneva Lake Conservancy. Both the easement and land donation can have local, state and Federal tax advantages.

The easement or land donation is an excellent way to protect environmentally important land for future generations of lake lovers. These two legal methods are an ideal way to preserve and protect water quality and environmental features.

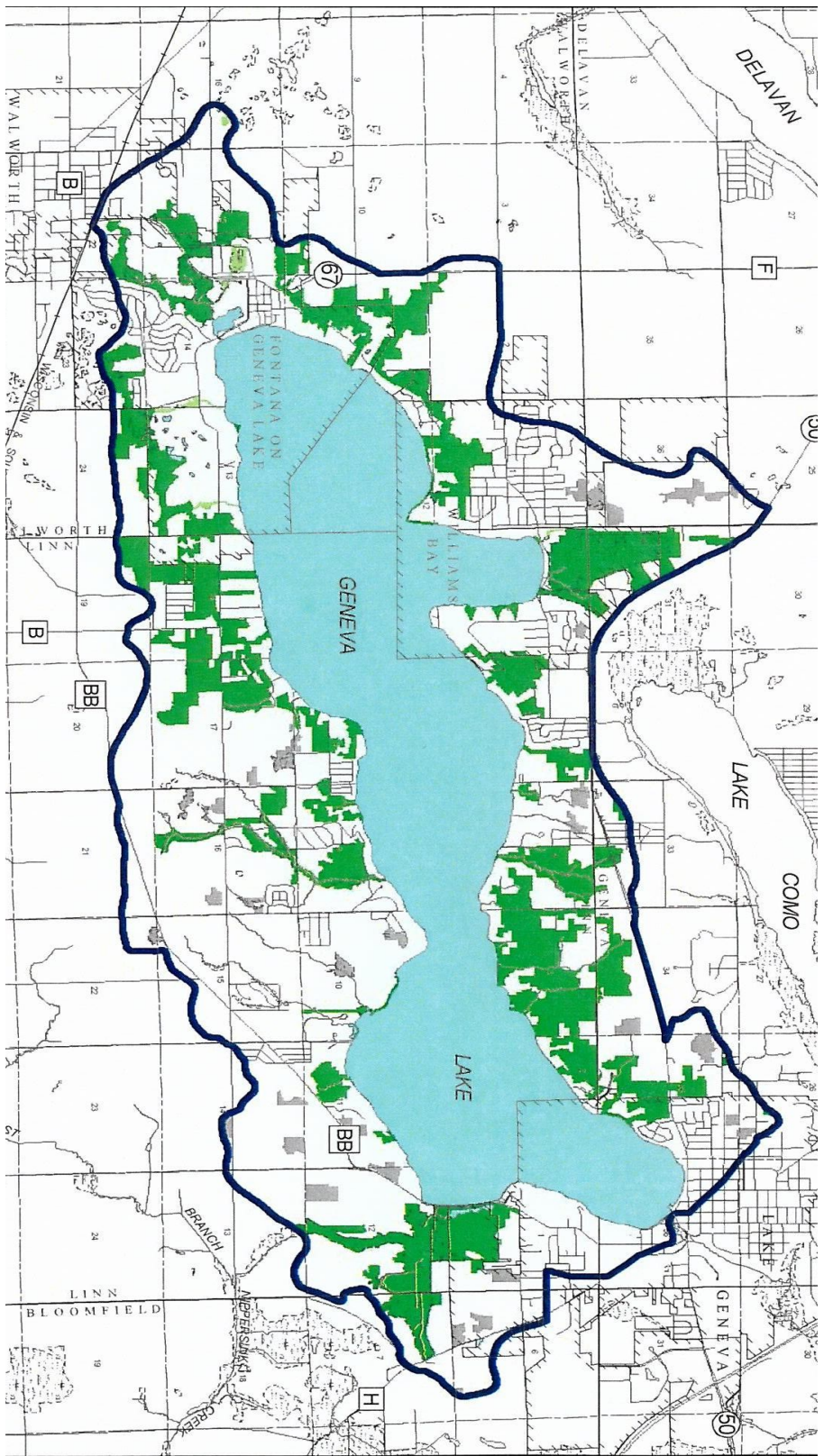
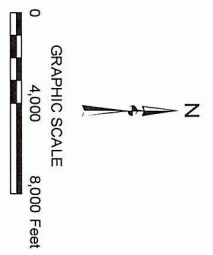
For more information call, (262)-275-5700, or visit the Conservancy's website at www.genevalakeconservancy.org.

WHAT WE CAN DO:

- **Locate your home on the environmental corridor map. Figure out what natural resources require protection. Use the Geneva Lake Book and resource people to help protect water quality.**
- **Recognize that we all have a responsibility to protect water quality and the plants and animals depend on a healthy natural environment.**
- **Encourage community adoption of laws that preserve environmental corridors in natural open uses.**
- **Consider deed restricting one's property to protect and preserve Geneva Lake for the future generations of lake lovers.**

- PRIMARY ENVIRONMENTAL CORRIDOR
- SECONDARY ENVIRONMENTAL CORRIDOR
- ISOLATED NATURAL RESOURCE AREA
- SURFACE WATER

Source: SEWRPC.



Chapter 5. Sources of Water Quality Degradation and Protection Practices

**We have met the enemy and he is us.
--Pogo**

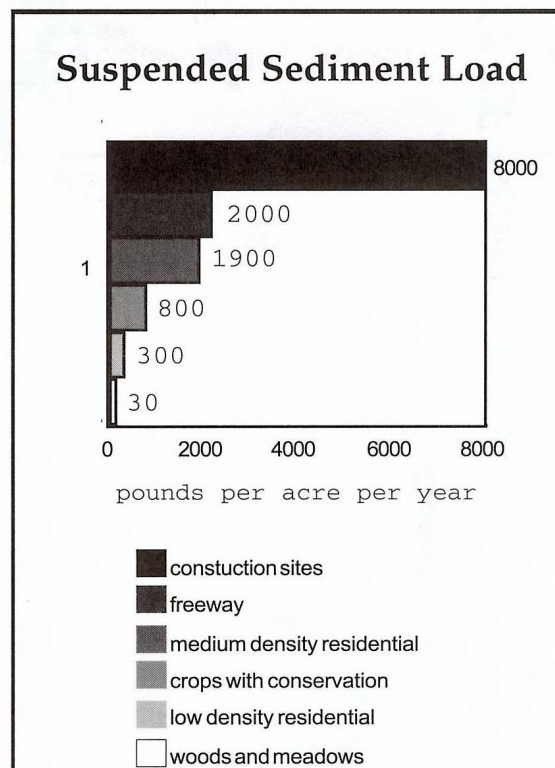
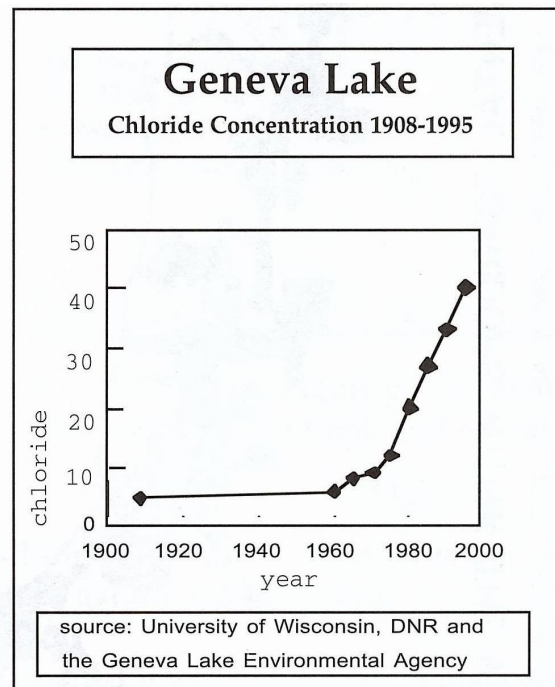
Water Quality

Geneva Lake water quality depends on many factors. Besides one's proximity to the lake and storm sewer systems, human activities and land use patterns are the most important factors influencing water quality. Our Geneva Lake water quality is most threatened by cultural eutrophication (lake aging augmented by the addition of nutrients resulting from human activities), toxic chemicals, exotic species, shoreland development, and user conflicts.

The presence of chlorides is an excellent indicator of human impact on water quality. Chlorides are associated with human activities such as road salting, water softeners and septic systems. Unlike nutrients, they tend to accumulate in the lake rather than being incorporated into living matter. The chart on the right graphically represents how what we do affects water quality.

The manner in which one uses the land can have a profound effect on water quality. For example, construction site activities can generate 30 times more sediment per acre than low density residential and 300 times more than natural areas such as woodlands and open meadows.

The manner in which one uses the land can have a profound effect on water quality.



Nutrient Loading Sources

Excessive nutrients result in the growth of undesirable plants and animals. This disrupts the lake's ecological balance and detracts from our enjoyment. About half of the nutrients entering the lake come directly from the atmosphere. Pollution loading (the total quantity of pollutants) from the atmosphere comes from many varied sources such as cities and farm fields that are upwind of the lake. These sources can be located far away from the lake and change every time the wind shifts direction. The atmosphere is a hard, if not impossible pollution source to control. Short of building a dome over the lake, not much can be done to control this loading source.

On the other hand, there are pollution sources that we can do something about. Run-off coming from the human impacted land uses produces the other half of Geneva Lake's pollution. We are the source of the problem and part of the solution.

Phosphorus is the nutrient that is of most concern. It is in least supply in Geneva Lake. Since it is the most lacking nutrient, additions of phosphorous can cause the growth of undesirable plants and animals. It comes from many sources, all of which are enhanced by human activities.

Protection Versus Rehabilitation

Geneva Lake's water quality requires protection, not rehabilitation. Protection deals with preventing nutrient enrichment in the first place. It is a penny wise, cost effective and human oriented intervention. In short, something we can all be involved with. Prevention saves us money while protecting a most precious resource and real estate value.

The alternative to prevention is rehabilitation. Lakes require rehabilitation when in lake nutrient concentrations are high and the lake's physical, chemical and biological systems are overloaded. An example of rehabilitation is the ongoing efforts on Delavan Lake. This huge lake rehabilitation project is arguably the largest in the world. Just the interest on the rehabilitation expenditures is more than double what we currently spend on protection for Geneva Lake, a lake that has many times more water volume than Delavan Lake!

Luckily, Geneva Lake does not require rehabilitation. Geneva Lake is too large for rehabilitation measures because of the astronomical expenditures and level of technical understanding needed to undertake such a massive project. Therefore, protection, not rehabilitation is our only alternative. We, the Geneva Lake stewards are charged with this responsibility.

Geneva Lake is too large for rehabilitation measures because of the astronomical expenditures and level of technical understanding needed to undertake such a massive project. Therefore, protection, not rehabilitation, is our only alternative.

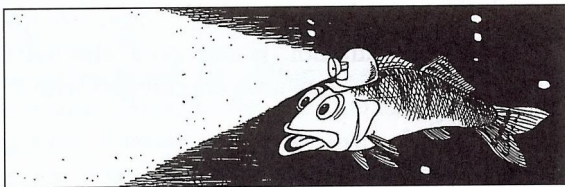
What We Can Do:

- **Since restoration is not technically or economically feasible, realize that protection is the only lake management alternative.**
 - **Understand that the sources of pollution are diverse and that we are responsible for, and also the solution to water quality degradation.**
 - **Use the Geneva Lake Book and resource people to learn about, and carry out those pollution prevention strategies.**
-
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Chapter 6. Shoreline Erosion Control

Shoreline and stream bank erosion can be a significant source of Geneva Lake's sediment load. Sediment can create turbidity, warm the water, interfere with light penetration, deplete oxygen, ruin underwater habitat and allow the proliferation of undesirable plants and animals and fill the lake.

The most sound approach to reducing sediment loading is to prevent it from getting into the lake in the first place.



Sediment makes life difficult for fish and other living creatures.

Stream Bank Erosion Control

Five or more tons of sediment can be eroded per mile from unstable stream banks. In fact, it can be more serious than erosion from upland areas. We have found this to be true in Southwick Creek, Williams Bay, where stream bank erosion is a serious problem. How fast water flows, how long it flows and the types of soil it flows over determines the amount of stream bank erosion. Urbanized areas have increased hard surface acreage. This results in more water being directed toward the creeks and less soaking into the ground.

Creek basins are noted for their soft depositional soils. These soils erode easily because of the increased water volume and velocity associated with urban runoff.

Vegetating banks with natural vegetation above the high water mark is the desirable, long term and low maintenance stabilization approach. However, where creek velocity is high or the banks slope exceeds one foot vertical for one foot horizontal, vegetation may not hold. Mechanical stabilization measures and reshaping the bank may be necessary to prevent erosion. A single course of basketball sized rock laid along the stream bank (rip rap) acts as a shock

absorber for the onrushing water. The roughness of the rock helps dissipate the water's velocity and erosional force. Vegetation can grow between the rocks. The vegetation further resists erosion and the roots anchor the soil to the ground. However, rip rap is time consuming and requires minor maintenance to keep the rock in its proper place.

Stream bank erosion control structures and choice of vegetation are technical matters. You may wish to contact the Geneva Lake Environmental Agency or the United States Department of Agriculture Soil Conservation Service (See Chapter 16) or an engineer for further advice.

Control of Shoreline Erosion

The crashing waves driven by strong winds can be erosive on the Geneva Lake shoreline. Under the right conditions, the larger planning hull boats can create a wave equal to that caused by a 50 mph wind. The heaving of ice can be even more erosive. The amount of damage done by wave action is related to the length of fetch (uninterrupted open water) that the wind is exposed to and the type of shoreline material. Ice damage is also affected by fetch, shoreline material and the amount and force generated by the ice.

The Geneva Lake shore is generally protected against erosion by two methods. The least preferred is the installation of rigid structure such as a sea wall. These structures are very expensive to install and should be used under the most adverse situations since they can be undermined by ice heave. Sea walls reflect, rather than absorb wave action. These reflected waves make the lake more wavy during periods of heavy boating use. Sea walls detract from natural shoreline beauty. They reduce shoreline habitat because the water in front of the sea wall becomes turbulent. For example, this near-shore area, a prime spawning habitat for northern and walleye pike, is compromised by the turbulence caused by sea walls.

A permit from Wisconsin Department of Natural Resources (DNR) and the Geneva Lake communities are generally required for sea wall installation.

However, the DNR frowns on allowing these structures because of the greatly reduced habitat. Contact both the DNR and your local building inspector listed at the end of this chapter for more details and permit applications.

Rip Rap Installation

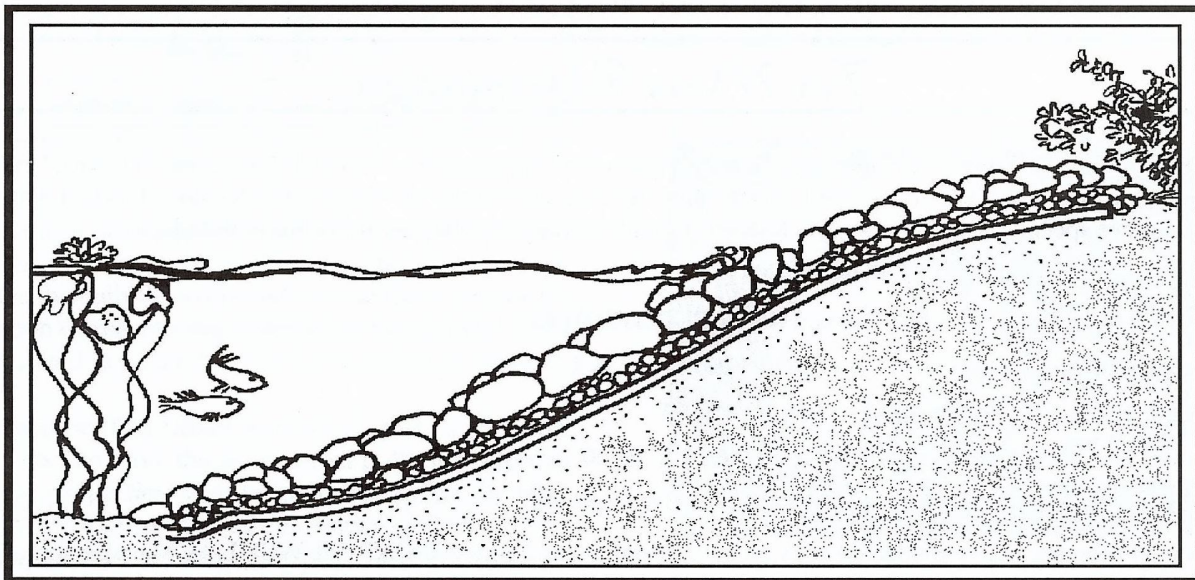
The installation of rock rip rap is the more preferred and least expensive shoreline erosion protection method. Rip rap absorbs rather than reflects wave energy, creates near-shore habitat, looks more natural, is less expensive to install, minimizes ice damage and is easier to obtain a DNR permit to construct.

Sloping the bank and stabilizing shore areas with natural vegetation (see Chapter 11) are the most important steps prior to the installation of rip rap. Rip rap requires regarding the bank to its natural angle of repose and placing specific gradations of rock above and below the lake level. The surface layer of stones acts as an armor plate to protect against wave and ice damage. This usually involves hand labor and a minor amount of annual maintenance.

Why choose rip rap over a sea wall:

- **is less expensive to install and maintain**
- **absorbs rather than reflects wave energy making the lake less choppy**
- **creates near-shore habitat**
- **appears more natural**
- **decreases ice damage**
- **adds to natural shoreline beauty**
- **is easier to obtain a construction permit**

Designing these structures involves many considerations such as wave height, wave run-up, the normal elevation of the ordinary high water mark and the stability of the shoreline parent material. In general, the Geneva Lake shoreline parent material is relatively stable. The Geneva Lake Level Corporation controls the lake elevation. The lake level average annual change is only about four inches; lower in the winter and higher in the summer. However, occasionally the level can be as much as 6" above or 12" below the ordinary high water mark.



Properly installed rip rap prevents erosion above and below the water line.

The design of rip rap is a technical matter for the Soil Conservation Service or an engineer. It needs to be sized so the largest wave plus the elevation due to fluctuating water level does not overtop the structure. Protect the toe (bottom underwater section) and flanks from erosion. Install heavier stones for the surface coat. Lay filter fabric behind the structure to prevent wave wash from undercutting the structure. Graded layers of stone should be laid on top of the filter fabric above and below the ordinary water mark. The total thickness should be twice that of the thickness of an average face stone. The outer face stone should be as large as practical, basketball size or larger if possible.

On the near-shore land, consider terracing where an existing erosion problem can not be repaired by re-sloping and re-vegetating. Refer to Chapter 11 for details.

Contact Heidi Jasso, WDNR at 414-263-8678 or the building inspector in your community for more sea wall information or rip rap permits.

Geneva Lake area community contact for building inspections.

Williams Bay	262-245-2704
Linn Township	262-275-6300, ext. 13
Fontana	262-275-6136
City of Lake Geneva	262-248-3911

What We Can Do:

-
- **Plant and protect trees, shrubs and vegetation on and near stream banks and shorelines. Their roots anchor soils, remove nutrients and provide shade that makes suitable fish habitat.**
 - **Remove obstructions from the creek bed that impede natural flows.**
 - **Keep heavy loads, people, cars and grazing animals from the bank and shoreline to decrease erosion and soil compaction.**
 - **Seek further advice from the technical resource personal. (See Chapter 16)**
-

For More Information

Contact the Geneva Lake Environmental Agency, Wisconsin Department of Natural Resources (WDNR), United States Department of Agriculture Soil Conservation Service, University of Wisconsin Extension (UWEX) water management specialists and review the following publications (see chapter 16 for more details):

Saving your shoreline, WDNR PUBLWZ005 86

Protecting Shorelands in Urban Areas, WDNR PUBLWZ001 85

Shoreline Retaining Wall Facts and Considerations, WDNR

Shoreline Plants and Landscaping, UWEXGWQ014

What is a Shoreline Buffer Zone?, WDNR PUBLWR 169 87

The Benefits of Well Managed Stream Corridors, UWEXG3404

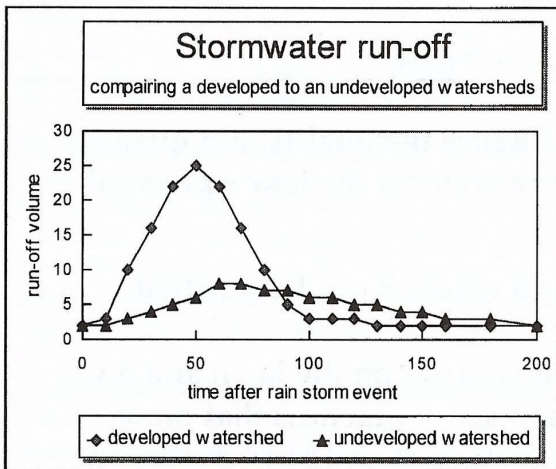
Advice on growing native plants: Geneva Lake Environmental Agency, WDNR & UWEX Lake Management staff

Chapter 7. Drainage

Rainy Day Blues

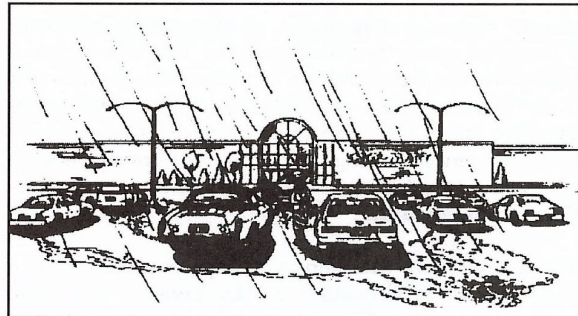
How rain water moves over and through the ground is important to those whom have experienced flooded basements or septic systems. Solving surface water run-off problems are also important to Geneva Lake water quality.

Roof tops and driveways concentrate rain. Run-off becomes further concentrated as it meets run-off from other areas. The increased amount of hard surfaces associated with urban watersheds not only generate more run off but a significantly greater peak velocity. This increased volume and velocity can cause considerable erosion, especially in streams. Also, the hard surfaces do not allow rain to soak into the ground where it can be purified.



Pollution can occur when soil is too wet to filter run-off or the water table is shallow. The run-off percolates through the saturated soils without proper filtration or reaches the water table too quickly. Soils saturated in water do little if any pollution removal.

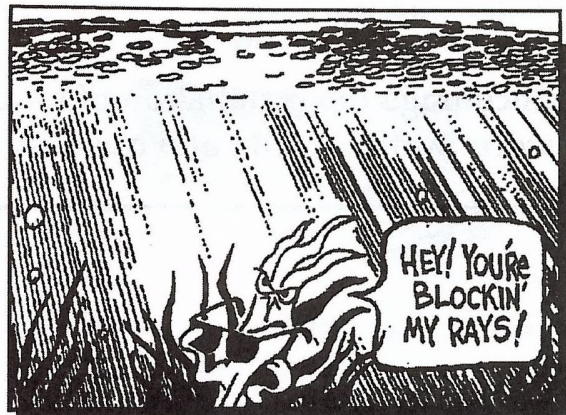
Remember that urban watersheds served by storm sewers can have the same direct pollution effect as if the properties were located directly on the lake. This is because the storm sewer system, unlike streams and swales (run-off drainage ditches), offers no chance of reducing or absorbing pollutants. Storm sewers convey water as quickly as possible to the nearest stream or lake.



Hard surfaces:

- increase run off quantity
- decrease water quality
- create downstream erosion
- reduce infiltration

Soil is eroded by the rain run-off and carried to streams or storm sewers and ultimately the lake. This soil, now called sediment, decreases light penetration, smothers fish eggs and fills up the lake. It carries nutrients such as nitrogen and phosphorus which can cause excessive growth of algae, undesirable plants and animals. This run-off may also contain pesticides, road salt, animal droppings and other nutrients or toxic materials to the lake.



Dealing with Surface Water Run Off

Storm water management is everyone's concern. Rainwater runs downhill toward the lake. Some soaks into and is filtered by the soil. Some runs directly into streams or storm sewers and ultimately into the lake. One can help prevent erosion problems by encouraging rainwater to move slowly across the vegetation so most soaks into and is purified by the ground.

There are many inexpensive ways you can control excessive run-off created by driveways, roof tops, patios and sidewalks. Depending on your soil's drainage characteristics one can use swales, berms (earthen mounds) and basins (storm water fun off ponds) to control run off, reduce its speed, allow it to infiltrate or soak into the ground and filter out impurities.

Where drainage is good or when infiltration devices are used, one can regrade the land to create a basin. The basin will allow the water to soak into the ground. Basin effectiveness is based upon the soil's texture, in that the soil should not be heavy but moderately permeable. These devices should be elevated at least two feet about the seasonally high water table. The basin should be properly designed so that, during huge rains, an emergency outlet will allow excessive water to escape.

Swales or grass ditches provide tremendous water quality benefit. They slow the water velocity down which allows the larger particles to settle. The grass incorporates the trapped nutrients during the summer growing season. The swale can be used to direct water away from your wet basement, for example. Large swales are often used in the urban developments in Williams Bay and Fontana. They provide infinitely greater water quality benefit than storm sewers and give those communities more of a rural character.

What We Can Do:

- **Realize that human activities greatly influence the quality and quantity of run off. Poor water quality has a negative effect on the lake's physical, chemical and biological processes.**
 - **Encourage run off to soak into the ground where it can be purified.**
 - **Properly dispose of pet droppings, wash your car on the lawn and away from the storm sewers, and other common sense practices that protect water quality.**
 - **Encourage the installation of swales rather than storm sewers and draft storm water quality and quantity management ordinances.**
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Chapter 8. Construction Site Erosion Control

On a per acre basis, construction site erosion is one of the greatest contributors of sediment and dissolved nutrients that can harm Geneva Lake's water quality. Yet it is easy to prevent. A number of common sense suggestions are given in this chapter in order to minimize construction site erosion.

The basic idea is to disturb a minimum amount of area for as short time as possible. One should protect disturbed soil, divert run-off from the disturbed area and install silt fences or straw bales to prevent construction site erosion.

Construction site erosion is easy to prevent, yet is one of the greatest contributors of sediment and dissolved nutrients that harms Geneva Lake water quality.

Silt Fences and Straw Bales

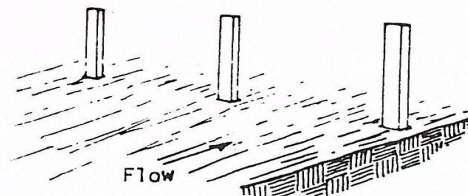
Silt fences or straw bales are commonly used on construction sites to temporarily control construction site erosion and retard sediment movement off the construction site. Sediment (eroded soil transported by storm water) can fill in streams and lakes, reduce habitat and transport nutrients and other materials deleterious to water quality.

From a water quality standpoint, properly installed and maintained silt fences or straw bales, under most conditions, do an adequate job of retaining sediment. However, many of these structures are not properly sized, installed, maintained or anchored in the ground. It is important to use such devices in a rapidly developing watershed such as around Geneva Lake.

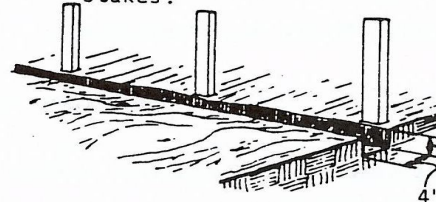
While properly installed and maintained silt fences or straw bales may do an adequate job of trapping sediment, they do little for dissolved nutrient removal. Nutrient mitigation involves limiting the construction site disturbance to a minimal area for the shortest time possible. In fact, the idea of properly timing construction and limiting the activity area is more important than the installation of silt fences as far as water quality protection is concerned.

Silt Fence installation detail

1. Set the stakes.



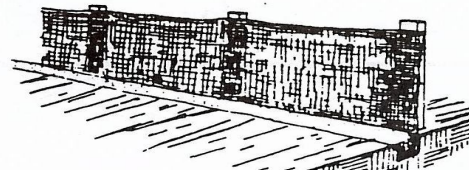
2. Excavate a 4"x4" trench upslope along the line of stakes.



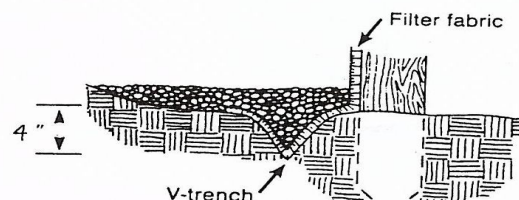
3. Staple filter material to stakes and extend it into the trench.



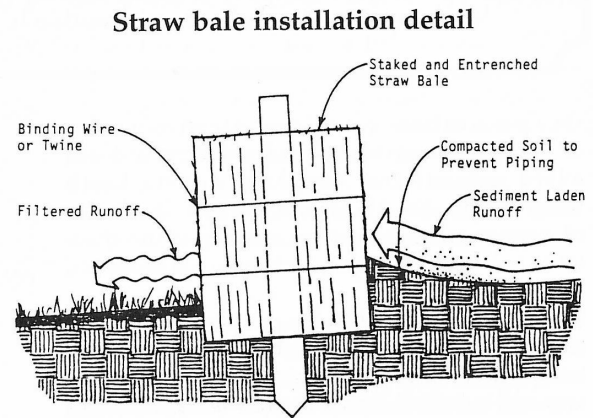
4. Backfill and compact the excavated soil.



CONSTRUCTION OF A FILTER BARRIER



For more information regarding silt fences or construction site erosion, feel free to give the Agency a call at 245-4532. Notify your building inspector (see chapter 6) if one observes improperly installed silt fences or straw bales. In Linn Township, if the construction site is within 1000 feet of the lake or 300 from a stream, notify the Town Building Inspector.



What We Can Do:

-
- **Fit development to the terrain**
 - **Time grading and construction sequencing to minimize soil exposure.**
 - **Retain existing vegetation wherever feasible.**
 - **Vegetate and mulch denuded areas as quickly as possible.**
 - **Minimize slope length and steepness.**
 - **Keep run-off velocities low and divert them from areas of disturbed soil.**
 - **Prepare drainage systems to handle concentrated or increased run-off.**
 - **Inspect and maintain construction site erosion control measures.**
 - **Encourage construction site erosion control practices in your community and report violations to the building inspector.**
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Chapter 9. Septic Systems

The incorporated Geneva Lake area municipalities collect sewage via sanitary sewers and treat the wastes at the treatment facilities. Linn Township residents are served by septic systems. Linn has less than half of the watershed residences but more than half of the shoreline. This is because the zoning in the unincorporated areas requires larger lot sizes for septic systems. Assuming the septic systems function properly, Linn Township's absence of sewer lines decreases human impact on the lake!

The septic system is composed of the septic tank and soil absorption field. The solids and liquids put into the sink or toilet flow into the septic tank. In the tank, most solids settle to the bottom and are partially decomposed. Some materials float to the top and form a scum. If the bottom solids or scum build up to a point where they flow out, they will decrease the soil absorption field life. As such, it is a wise investment to have your septic tank pumped at least every three years. Besides, it is the law for septic systems installed in the last ten years.

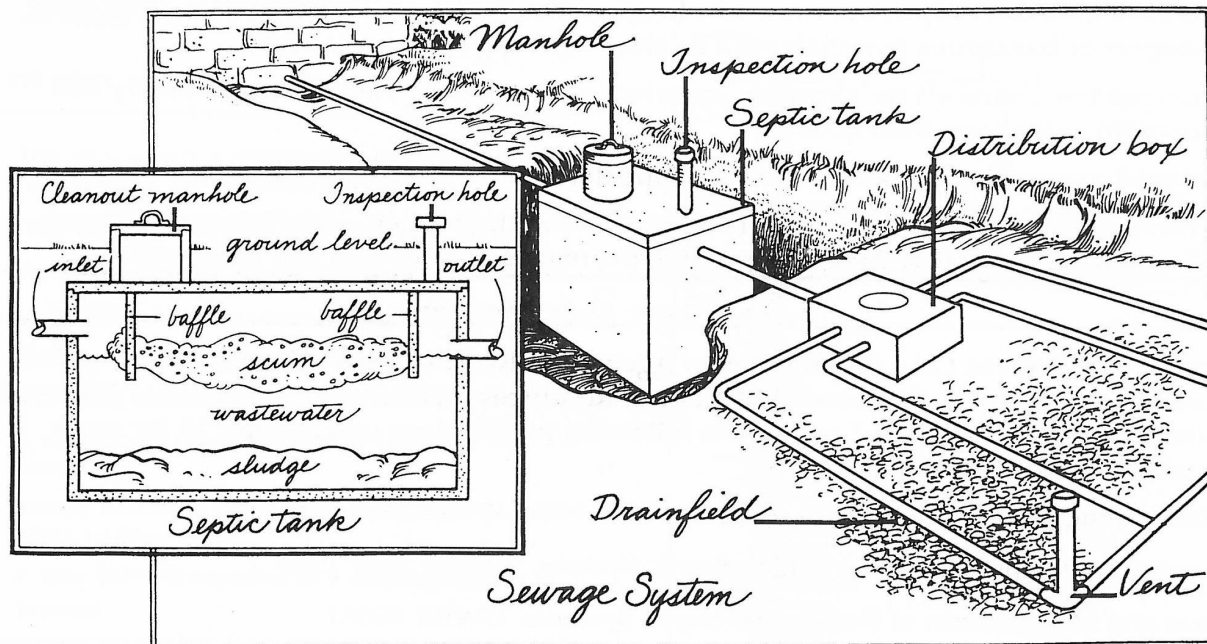
The liquids in the tank may contain human bacteria, viruses and other potentially harmful substances that can contaminate the groundwater, wells or the lake. Under normal systems, these harmful elements are destroyed in the septic tank.

However, if not working correctly, they may flow into the septic absorption field and percolate through the ground and contaminate the groundwater and one's drinking water.

The partially purified waste water flows into the field from the tank where it is purified by the filtering action of the soil and soil microorganisms. However, solvents, drain cleaners and other household chemicals are not purified in this process. Dousing the field with too much of these materials or too much water decreases field life.

The characteristics that affect soil absorption field functioning are soil permeability, water table depth and slope.

Permeability is the rate at which the effluent or liquid septic waste moves through the soil. It is influenced by the soil's texture (percent of sand, silt and clay). Septic fields work best in moderately permeable soil. Effluent that moves quickly through sandy soil is only partially treated. Effluent that moves slowly through tight clays may cause back-ups or the effluent may end up on the ground surface. Most of the Geneva Lake area soils tend to be moderately permeable to tight.



The water table is the area below the ground surface fully saturated with groundwater. A high water table limits septic system applications. The ground-water level varies from season to season. If the soil above the water table is not sufficiently deep, the effluent will not be properly treated as it percolates through. Once the effluent reaches the groundwater, little if any treatment takes place. If the effluent mixes with and contaminates the groundwater, the drinking water supply becomes contaminated with nutrients, bacteria, viruses and hazardous chemicals. Soil in the Lake Geneva Beach and Trinkie subdivisions have areas of high groundwater.

Steep slopes can cause septic field construction and maintenance problems. Controlling the downward movement of effluent is difficult because it may move through the soil laterally and may surface at the base

or the side of the slope. The Highlands and Edgewater Terrace subdivisions exhibit steep slopes.

Septic system codes are established by the state. The codes specify how much soil is required about the groundwater or an impermeable soil layer; the allowable soil texture, the minimum distance from streams, lakes, water wells and other such items.

Soil absorption fields only last so long and are expensive to replace. Their longevity is dependent on proper installation, correct soil type and texture, minimizing the volume of liquid that is treated, the amount of time the system is inactive and periodically pumping the septic tank. Overloading the septic field with too much water and not having the septic tank pumped out frequently are most responsible for the septic field failure.

What We Can Do:

- In order to increase septic field life, have the septic tank pumped out at least every three years or when the bottom solids or scum reach levels where they can enter the septic field.
- Do not overload the septic field with excess water. Practice water conservation. Direct surface water drainage away from the field. Do not direct the basement sump pump or downspouts into or toward the field.
- Do not load one's septic system with clogging materials such as grease, fats, disposable diapers or hazardous materials such as cleaning fluids, paint, pesticides.
- Do not use chemicals to "clean" or "sweeten" your system. They are unnecessary and may do more harm than good.
- Avoid compacting the soil above the septic field.
- Have your system regularly evaluated by a licensed plumber. The Walworth County Sanitarian's office (741-7919) can provide the names of plumbers and inspectors.

For More Information

Contact the Geneva Lake Environmental Agency, Walworth County Zoning Planning and Sanitation, Wisconsin Department of Natural Resources (WDNR) or University of Wisconsin Extension (UWEX) staff and review the following publications (see chapter 16 for more details):

Maintaining Your Septic System, WDNR PUBL-WR 165 90 REV

Upstream-Downstream-Your Failing Septic System, WDNR May 1978

Care and Maintenance of Residential Septic Systems, UWEX B3583

Inspecting and Troubleshooting Wisconsin Mounds, UWEX

Chapter 10. Wells and Drinking Water

Water Supply

The area's drinking water comes from groundwater wells. Those who live in the incorporated areas receive their water from the municipal wells and the rural residents tap the groundwater with their own private wells. This abundant water supply comes from the aquifer, the underground soil and rock formations that store and move water. Rain and snow melt seep through the soil and bedrock to replenish the aquifer. Most water enters the aquifer within a few miles of the well.

In general, the deeper the well, the better the water supply, both from a quality and quantity standpoint. The water quality is better because the water has to percolate through more purifying soil and sub strata before it reaches the aquifer.

Drinking Water Testing

Those with private wells should not assume that the water is safe. Failing septic systems and underground fuel tanks can pollute the water supply. As such, one should endeavor to remove any potential sources that can harm groundwater because the water source you may harm may be your own!

Test your well if:

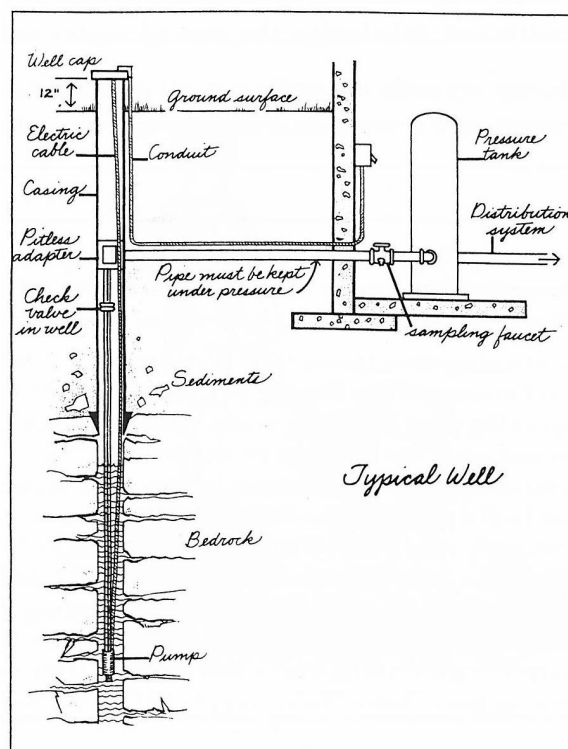
- **The well is newly constructed or major plumbing repair or replacement has occurred.**
- **The well has not been used in a long time.**
- **A change in taste, odor or color is noticed.**
- **A neighbor's well is found to be unsafe.**
- **A chemical spill occurred close by.**
- **Flooding has overtopped the wellhead.**
- **A significant change in nearby land use has occurred.**
- **Family members experience recurring stomach aches or diarrhea.**
- **A new baby is expected or a nursing mother is present.**

One's well should supply bacteriologically safe water without need for treatment if properly maintained, located and constructed. However, periodic testing is an important part of maintenance and personal health.

One should test annually for fecal coliform bacteria to determine if disease-carrying bacteria may be entering your well. One should consider this test as a very inexpensive form of health insurance. There are not standards for private wells, but public well supply is required to be bacteria free. A sample bottle can be obtained at the Geneva Lake Environmental Agency Office. One should collect the sample faucet near the pressure tank or from the tap.

Test for nitrates annually for the first few years after installing a new well, especially if infants are in the household. If nitrate levels are low, decrease the sampling frequency to every five years. 10 mg/l is the public drinking water nitrate standard. Nitrates can be elevated in agricultural areas.

The Environmental Agency and the Walworth County Public Health Division have sample bottles which can be sent to the State Laboratory of Hygiene in Madison (800-442-46189) for analysis.



Homes built prior to 1984 may have lead pipes or lead containing fixtures in the water distribution system. Lead is a toxic metal that can cause a multitude of problems to children and adults. Run the water 2-3 minutes before drinking. Lead analysis can be obtained from the State Laboratory of Hygiene.

Bacteria, nitrate and lead are the most tested items. However, many more drinking water items could be tested. Each of these additional tests becomes expensive. For further information call Geneva Lake Environmental Agency, the University of Wisconsin Extension at 741-4951 or the water supply section of the Department of Natural Resources at 262-884-2356.

Hard Water and Water Softeners

In some places the groundwater may be hard (containing a high concentration of magnesium and calcium) and possess high iron content. Be sure to identify these problems before spending money on special equipment. Contact water supply professionals before deciding on a solution.

Most of the time, water softener salt with iron removing properties and special filters can eliminate hardness and iron. However a slight residual of salt can occur in drinking water. This may pose a risk for people with high blood pressure. The soil does a poor job at removing the salt. Part of the elevated Geneva Lake salt levels are associated with this phenomenon.

What We Can Do:

- **Have your well tested for bacteria, nitrates and lead.**
- **Make sure your well is properly installed, meets current codes and is properly maintained.**
- **Divert any deleterious materials away from the water supply wells. Keep rotting vegetation away from the well head to avoid insect infestation.**
- **Install devices to remove hardness or iron after consulting professionals. If using a softener, minimize the use of water softener salt.**
- **Keep records regarding well depth, date of installation, installer, pump and tank warranties, bacteria and nitrate test results.**

For More Information

Contact the Geneva Lake Environmental Agency, Walworth County Zoning Planning and Sanitation, Wisconsin Department of Natural Resources (WDNR) or University of Wisconsin-Extension (UWEX) staff and review the following publications (see chapter 16 for more details):

Maintaining your Home Well Water System, UWEX-G3399
Your Personal Water Supply, WDNR PUBL-WS 021
Improving your Drinking Water Quality, UWEX-G3378
You and Your Well, WDNR PUBL-WS002
Bacteriological Contamination of Drinking Water, WDNR PUBL-WS003 REV
Lead in Drinking Water, WDNR PUBL-WS 015
Earwigs in Your Well, WDNR PUBL-WS 029 93
Choosing a Water Treatment Device, UWEX-G35585-5
Drinking Water Contamination: Understanding the Risks, UWEX-G3339
Evaluating the Condition of Your Private Water Supply, UWEX-G3558-2
Interpreting Drinking Water Test Results, UWEX-G3558-4
Keeping your Home Water Supply Safe, UWEX-G3558-1

Chapter 11. Landscaping, Lawns and Pesticides

Native Landscaping Versus Manicured Lawns

Natural buffer vegetation or green belts between homes and the lake are generally lacking around Geneva Lake. What is “in” is the manicured lawn look. Trees are sometimes removed so the lake can be better viewed and those on the lake can better view the lakefront homes. This may not be the best situation for wildlife, aesthetics or water quality.

The area near streams, storm sewers and the water’s edge is most critical for water quality. In addition, this area, left in a natural state supports a considerable amount and diversity of plants and wildlife. Both land and lake plants and animals benefit from this diversity.

Natural buffer areas require less maintenance, add privacy, reduce noise and add a host of other positive benefits. Shad offered by trees keep one’s house cooler in the summer and warmer in the winter by blocking winter winds. Wild flowers, native shrubs and trees provide beauty and environmental variety.

Naturally vegetated areas have multiple vegetation layers with many deep-rooted plants. The multiple layers intercept the erosive force of the falling rain drops and gently lay the ran drops on to the ground where it soaks in. Their deep root structure better resists erosion and traps sediment better than lawn turf. Reducing sediment reduces aquatic weed growth in front of one’s home. Especially in steep sloping areas, natural vegetation should be encouraged over a lawn turf.

Restoring buffer areas is not difficult. On existing lawns, start by leaving strips of unmowed grass along the shoreline. Native flowers, grasses, shrubs and trees can be added over time. For more information, consult the Geneva Lake Environmental Agency or any of the references at the end of this chapter.

Manicured lawns do not provide water quality protection like natural vegetation but are still important for water quality purposes. They do filter out impurities and allow water to soak into the ground where purification takes place. Below are some suggestions for lawn care with water quality in mind.

Lawn Care Tips:

- Choose the right type of grass or ground cover. This depends on many factors such as soil type, moisture and amount of sunlight. A grass seed mixture containing Dutch white clover stays greener longer, requires no fertilizer and holds the soil better because of its deeper roots. For new lawns, seed in late August to end of September rather than in the spring.
- Installing sod is preferable (and more expensive) than seeding for water quality purposes because it immediately protects the bar soil form eroding.
- Mow no more than 1/3 of the grass leaf blade. Make sure the mower blades are sharp.
- Leave the grass long (4” or so) and mow more frequently.
- Water infrequently, only during dry periods and at night. Add an inch of water if possible.
- Do not over water.
- Leave grass clippings on the lawn. They provide nitrogen and organic matter needed by the lawn.



Lawn Fertilizer

It is important to have one's soil tested before applying fertilizer. Often, fertilizer is not necessary. The University of Wisconsin Extension provides these service for a small charge.

Soil sampling is simple. The homeowner needs only to bring in about three cups of soil for analysis. Collect equal amounts of soil from many representative locations, mix and deliver to their facility in the court house annex in Elkhorn. Call 741-4951 for further information.

The soil sample results will provide the information necessary to grow a healthy lawn. By the way, a healthy lawn contains more organic content and better soil structure that can better act as a filter and absorb more water.

For Lawn Fertilizing:

- Apply smaller fertilizer applications rather than one large application. This will reduce run off and the possibility of the fertilizer "burning" your lawn.
- Make sure the amount of fertilizer is appropriate for the lawn as detected by the soil test. This makes both economic and ecological sense
- Use a calibrated spreader that allows uniform application and controls overuse.
- Do not fertilize on steep slopes and seep up fertilizer spilled or spread on walks or driveways.
- Clean up equipment in a location where the fertilizer will not cause harm to water quality.
- Water the lawn soon after fertilizing. Use enough water to wash the fertilizer off the grass and into the soil.
- Use no or low phosphorous fertilizer.

A Word About Lawn Care Companies

Most of these companies apply a generic mixture of fertilizer and herbicides without testing the soil. One can purchase and apply these products, thus saving expense and possible harm to the environment.

Require the lawn care company to test the soil and apply only those items necessary for a healthy lawn. Make sure the company is reputable.

Use Pesticides Responsibly

Most household pesticides are either herbicides (plant killers) or insecticides (insect killers). Some can be harmful if improperly used and if they get into the lake or groundwater.

When using pesticides:

- Buy only the amount you need and the least toxic formula.
- Carefully follow label instructions.
- Store in a cool, dry and locked location.
- Wear protective clothing. Wash your hand after applying.
- Avoid application near the shore, storm sewer system, well, on bar ground, steep slopes or pet areas.
- Avoid disposing pesticides down the toilet especially if one has a septic system.
- Spot treat individual plants rather than the whole yard.
- Keep children and pets off treat areas.



What We Can Do:

- **Encourage the natural, multi-layered buffer vegetation over grass turf especially in areas critical for water quality or wildlife purposes.**
 - **Test your soil and do those things necessary to grow a healthy lawn to reduce erosion and nutrient transport.**
 - **Apply water, fertilizers and pesticides correctly, carefully and only as necessary.**
-

For More Information

Contact the Geneva Lake Environmental Agency, United States Department of Agriculture Soil Conservation Service, Wisconsin Department of Natural Resources (WDNR) or University of Wisconsin-Extension (UWEX) and review the following publications (see chapter 16 for more details):

Sampling Lawn and Garden Soils for Soil Testing, UWEX-A2166

Lawn and Garden Fertilizers, UWEX-GWQ006

Practical Tips for Home and Yard, UWEX-GWQ007

Beneficial Landscape Practices, UWEX-GWQ008

Rethinking Yard Care, UWEX-GWQ009

Lawn and Garden Pesticides, UWEX-GWQ011

Better Lawns and Gutters, UWEX-G3531

Lawn Establishment, UWEX-A3434

Lawn Maintenance Problems, UWEX-A3435

Lawn Watering, UWEX-GWQ012

Lawn Weed Control, UWEX-GWQ13

Yard Care, Do your Share!, WDNR PUBL-SW 073 92REV

Planning and Designing your Home Landscape, UWEX-A3383

Ground Cover for the Midwest, UWEX-NCR356

Mulches for Home Gardens and Planting, UWEX-A3383

Home Composting, Reap a Heap of Benefits, WDNR PUBL-SW 072 92 REV

Home and Garden Practices for Lake Protection, WDNR PUBL-WR 188 88

Shoreline Plants and Landscaping, UWEX-GWQ014

What is a Shoreline Buffer Zone?, WDNR PUBL-WR 169 87

Chapter 12. Riparian Rights, Piers, Buoys and the Shore Path

Riparian Rights

Lakes in Wisconsin are like public parks where all are allowed to enjoy these remarkable resources. The Wisconsin residents own the lakes in common. The State is the trustee and manager of this resource with the benefactor being the public. However, the riparians sometimes view the lake and especially the area in front of their homes as their private domain.

The riparians own land up to the water's edge. Riparians have certain additional but limited rights to Geneva Lake provided they do not harm the public's interest in waters. Some of these rights are to place a pier and moor their watercraft.

Remember the near shore area is an ecologically fragile and biologically productive area. This area, because of its proximity to the lake has a great impact on water quality.

Pier Design and Permits

Our Geneva Lake pier design is unique. These piers have evolved because of the size of craft, the deepness of water and size of the lake. Clear water allows one to place the pier superstructure into the cribs embedded in lake bed. This truly is an engineering work in process unique to our Geneva Lake!

New Piers and Pier Additions

The State of Wisconsin and the Geneva Lake communities both regulate the placement of piers, both old and new. New piers require a local and a state permit. Contact the building inspector (chapter 6) or Liesa Nesta, WDNR (414-263-8678) for details.

The communities require new piers to be not longer than 100 feet long and placed 12 1/2 feet from the property line and the riparian line. The riparian line is defined in many ways. A good way to envision the riparian line is to divide in half the angle formed between adjacent properties. That line extended into the lake is the riparian line. Boats on piers, buoys and shore stations are not to be moored in this area as well.

The State allow two boats for the first 50 feet of shoreline and one boat per 50 feet after that. This equation applies to all craft moored in one's riparian zone regardless if they are on piers shore stations or buoys.

Buoys and Swim Rafts

Buoy placement requires a State, and sometimes a local permit. The buoy must be within one's riparian zone. For buoy placement, the riparian zone is defined by the riparian lines and extends 200 feet from shore. Since boats on buoys swing in the wind, one needs to consider this when placing the buoy.

It is important to note that the State of Wisconsin views piers:

- as an aide to navigation and a place to moor one's boat. One can fish, swim, picnic or sun bathe but the law restrict pier dimensions to that necessary for mooring purposes.
- as potentially visually obtrusive. The State recommends painting piers a color harmonious with the environment. However the typical choice of white may be preferable due to the higher boat usage characteristic of Geneva Lake.

One may place a modest sized swim raft in the same riparian zone that buoys are placed. This does not require a state permit. Like piers and buoys, the raft may not obstruct navigation or interfere with public uses of water.

Shore Path

The Geneva Lake shore path is both interesting and unique. Very few, if any, other lakes in the world have such a feature. Before leaving the area, the Native Americans insisted on leaving this path in perpetuity for all to enjoy.

The shore path traverses Geneva Lake's 21 miles of shoreline and is a fun and healthy one-day hike. The path is about 11 miles from Fontana to the City of Lake Geneva following either the south or north shore.

Highlights include small forested, prairie and wetland natural areas and close to one billion dollars worth of real estate! For the most part the trail follows the lake shore and is well marked but has many ups and downs.

The public is not allowed to trespass beyond the path or use bicycles or snowmobiles on the path. Report infractions to the police (Dial 911).

The path should be kept passable. Since the path is free to use by all, Wisconsin Statutes offer the riparian a certain amount of protection against liability. One may wish to discuss this with your insurance agent. Also, one should be considerate of the path users when the piers are removed in the fall. Piers stacked on the shore path makes trekking difficult from the fall to the following spring.

What We Can Do:

- **Respect the lake rights of both the riparians and the public.**
 - **Realize that what one does with the lake area is front of one's property may involve state and local permits.**
 - **Walk and enjoy the shore path, report violators and endeavor to keep the trail**
-

For More Information

Contact the Geneva Lake Environmental Agency, Geneva Lake conservancy, or Wisconsin Department of Natural Resources (WDNR) lakes staff. The police (911) enforces trespass laws. You may wish to contact an attorney on how these matters affect one's property. Review the following publications (see chapter 16 for more details):

Trespass Laws in Wisconsin an Overview, UWEXG3409

Wisconsin's Recreational Use Statute, UWEXG3326

Protecting your Land: a Guide for Private Landowners, WDNR PUBLER 058 92

Public or Private: Navigability, WDNR PUBLWZ 003 91

Public or Private: The Ordinary High Watermark, WDNR PUBLWZ 004 91

Pier Planner, WDNR PUBLWZ 017 93

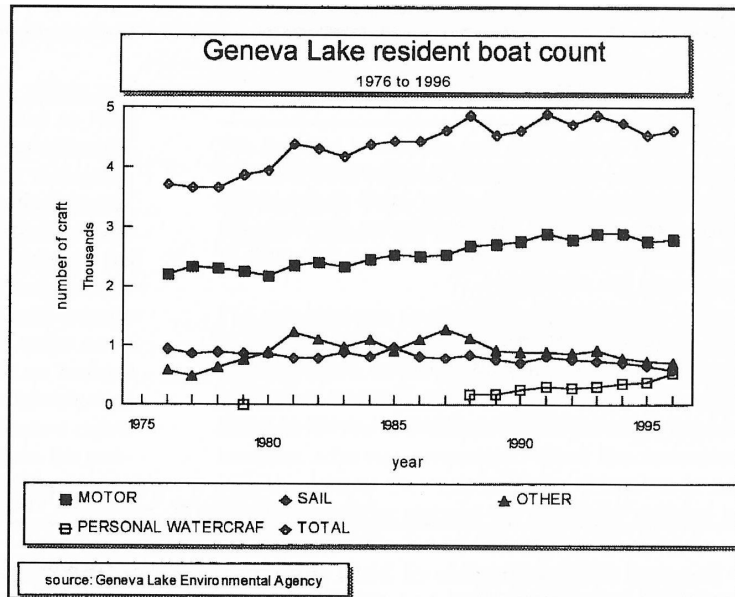
Guidelines for Marinas and other Similar Mooring Facilities, WDNR 4/93

Boat Shelters Construction Standards Wisconsin Administrative Code, NR 326

Chapter 13. Recreational Boating

Geneva Lake has long been recognized as a recreation area and one of the nation's top sailboat racing lakes. As early as 1969, Geneva Lake received 68 of the 72 possible points for its fishing, swimming, boating and aesthetic potential. The lake's historic development, size, depth, water quality, variety of boating opportunities and proximity to large urban population centers make it a heavily used boating lake. Boating ranks behind esthetic use and swimming as the most popular recreational activity.

As occurring nationwide, Geneva Lake recreational boating is increasing in popularity. Larger, faster and sometimes more dangerous craft compete for space on our lake resulting in use and space conflicts and safety concerns.



Geneva Lake Resident Boating Population

The Geneva Lake Environmental Agency has conducted an annual Geneva Lake Resident Boat census since 1973.

From 1973 to 1991 the total Geneva Lake resident craft has exhibited a linear and annual increase of about 2% per year. The number of craft has grown from 3,600 to a present population of approximately 5,000 total craft. If the resident boats were tied bow to stern, they would almost equal Geneva Lake's 20.5 miles of shoreline. Probably few other lakes exhibit this type of resident boat density.

These resident craft are found along Geneva's shore, at ashore stations, about 800 piers, over 1,000 buoys, two dry or stack storage facilities, two small lagoons and one 13-acre marina. The craft are associated with approximately 1,000 single family homes or approximately 45 lake accessing subdivisions.

The Geneva Lake Environmental Agency has conducted an annual Geneva Lake resident boat census since 1973. From 1973 to 1991 the total resident craft has exhibited a linear and annual increase of about 2 percent per year. The number of

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Trends and Types of Geneva Lake craft:

- Motor boats range in size from about 18' to over 80' with motors from 25 to 800 horsepower. Motor boats have grown in number and percent of the total and now account for about 60% of the lake craft. These motor boats are not evenly spaced around the lake. Fontana has twice the density of Williams Bay and City of Lake Geneva and three times Linn Township.
- Sailboats range in size from wind surfers to racing yachts more than 30' long. The sailboat population has decreased and its percent of the total has dropped from 25% to about 15%. A shift from the smaller scow type to the larger keel type sailboats has occurred.
- The "others" include smaller craft such as canoes, row and fishing boats. The "others" has increased in number but leveled off or decreased.

a few years ago. This occurred when the personal watercraft group was removed from the “others” group and counted separately.

- The personal watercraft (jet skis and wave runners) is the last group. In the last few years, the personal watercraft has increased considerably. In 1995 they represented about 8% of the Geneva Lake watercraft but only about 3% of the craft registered in Wisconsin. In 1996, their numbers increased almost 50% in one year. These craft are involved with more accidents and issued more boating violations than its percentage of boats would reflect.

Linn Township’s shoreline exhibits the lowest boat density of one boat per 33 feet of shoreline. This lower density is partially attributable to the Township’s larger lot sizes typical of unincorporated areas and smaller density of lake accessing subdivisions. However, Linn’s density is increasing at the greatest rate as it becomes more fully developed.

The Village of Williams Bay and the City of Lake Geneva exhibit a density similar to the Geneva Lake average of about one boat per 23 feet of shoreline. A greater boat density is associated with these two communities because of their almost fully developed shoreline containing many lake accessing subdivisions.

The Village of Fontana exhibits the greatest boat density of about one boat per 12 feet of shoreline, almost twice that of Williams Bay, Lake Geneva and the lake average and about three times the density of Linn. Fontana municipal limits encompass 19% of the Geneva Lake shoreline, about 33% of the total number of lake craft and about 40% of the motorboats. Fontana shoreline almost completely developed, possesses many lake accessing subdivisions and one harbor that contains about 400 powerboats and three boat sales, storage or rental businesses.

All Geneva lake communities have experienced an increased personal watercraft density. Fontana and the City of Lake Geneva exhibit the highest personal watercraft densities. Both Fontana and Lake Geneva have personal watercraft rental businesses that partially explain their higher density.

Geneva Lake Access Site Boating Population

The boating public generally gets on Geneva Lake via the public access sites operated by the City of Lake Geneva, Williams Bay, Fontana and Linn Township. Geneva Lake experienced a threefold increase in access site launches between 1981 and 1988. Since 1989, the number of seasonal launches has remained constant at around 20,000 per season.

The Geneva Lake access site craft are typically smaller, lighter and less horsepower than the resident craft. These boaters generally do not live in Wisconsin, tend use the lake earlier and later in the day for fishing, a less space consumptive activity.

Environmental Considerations

Boating can affect the lake’s environment. Motor boating can result in gas and oil spills and release exhaust into the water and air. Motorboats stir up bottom sediments that release nutrients. However, sediment release is not much of a consideration because Geneva Lake is so deep.

The gas, oil and sediment disturbance is probably not as significant factor compared to the shoreline erosion created by motorboats. The Geneva Lake motorboats have become larger, heavier and faster. Some larger motorboats, when operated at inefficient speeds create waves equal to a 50-mph wind. These waves erode shorelines and destroy near-shore habitat (see chapter 6 for shoreline erosion solutions).

User Conflicts and Safety

During peak usage times, user conflicts between persons fishing and water skiers were noted in a 1969 survey. These conflicts have increased and diversified since then. The larger craft generate bigger wakes and personal watercraft present a new type of conflict. Fishers now complain not only about water skiers, but big boat waves and “jet skis” as well. It appears that the fishers have become more selective in their fishing times because of such conflicts.

A 1988 survey found that the resident boater, on average, represents about 65% of the boats in use oat any given time. The residents account for more boats in use during the mid afternoon peak use time. Recently the number of access site boaters has remained constant while the number of resident craft has increased. Consequently, the residents now

account for a larger amount of currently active Geneva Lake boat traffic especially during the peak use time.

Each craft using the lake requires 15.9 acres for safe and enjoyable recreation according to *The Water Quality Management Plan* for Geneva Lake. The standard was calculated on the basis that motorboats require greater navigation space than sailboats, which in turn, require more space than fishing boats. This space demand was developed in the 1960's and was based upon smaller and slower craft and a mix of boats weighted less toward the more space consumptive motorboats. Also, the standard assumes a uniform lakewide boat distribution when, in fact, most boaters tend to hug the shoreline.

In 1990, the Geneva Lake boat density standard was exceeded during three of the four busiest summer weekend days that were monitored. The standard was exceeded by almost threefold during a Fourth of July weekend. The resident craft are larger and faster and need more space to operate. Personal watercraft, operating in and among these predominantly residential craft, are smaller, at times operate in less than prudent manner and are harder to see. For this reason, safety is suspect during the peak boating times.

What We Can Do:

- **Purchase a smaller power boat or a sail boat and use one's boat more during the week and less on the weekend.**
- **Operate ones boat so as not to create big wakes or spill gas and oil. Do not throw trash into the lake. Use low phosphate soap to wash a boat and use caution when applying boat cleansers and paint.**
- **Wear personal flotation devices and observe the rules.**
- **Attend boating safety classes to learn to operate your craft safely. Call the Water Safety Patrol at 248-4436 for details.**
- **Encourage the Geneva Lake municipalities to limit the number of resident craft, establish a maximum number of craft for new subdivisions, reduce the back lot boater access, limit mooring areas, institute time or space restrictions, increase safety equipment inspections, institute lower speed limits, increase police enforcement and issue more citations or greater fines.**

Chapter 14. Aquatic Plants and Management

The aquatic plants provide many important physical, chemical and biological benefits to the lake. This community provides habitat for fish and other aquatic biota, improves water quality, reduces turbulence, breaks wave action, provides oxygen, traps nutrients and suspended materials, enriches biotic diversity, food webs and supports waterfowl populations.

An unbalanced aquatic plant community composed of densely growing single species stands often impedes boating, swimming, fishing and other activities. Decomposing plants can produce noxious odors, litter beaches, remove oxygen and release nutrients. These stands interfere with our esthetic enjoyment and discourage a variety of birds and other wildlife.

Geneva Lake has good water quality and diverse and hearty planktonic and fish communities despite being located near urban centers and an area of nutrient rich soils. The Geneva Lake plant community is generally characterized as diverse and is composed of mostly desirable species. These plants grow to great depths, (about 25 feet) because of good water clarity.

Geneva Lake's depth and wave action limit the submerged aquatic plant growth to a narrow band, 200-300 feet from the shoreline excepting for a few shallow locations. This zone is approximately 965 acres or about 18% of the lake surface.

Aquatic plants need a certain type of bottom to anchor their primitive roots. Certain areas like Buttons Bay have a gravel bottom in which these plants root poorly. Other areas like the bays and near stream outlets have muck bottoms. In these areas the nuisance species grow luxuriantly, often in dense single species stands.

The Changing Face of the Aquatic Plant Community

The aquatic plant community is changing. Two species of water milfoil were identified as dominant in the 1977 and 1994 Geneva Lake plant surveys but were not found during the 1967 survey. A primary concern is the increase in the abundance of both these milfoils. Northern water milfoil is native that grows in luxuriant dense stands but in a manner that coexists with the other native plants. However, the other plant, Eurasian water milfoil is of greater concern.

Eurasian water milfoil is the most common nuisance aquatic plant found in New England and the Midwest. It could become a serious nuisance in Geneva Lake because this alien species can out compete the native plant communities resulting in plant diversity decrease, an unhealthy situation for Geneva Lake.

The Geneva lake aquatic plant growth appears to be more luxuriant lately. The reason is unclear but many factors may be involved. Winters as of late have been mild and without much snow cover. The lake has frozen late and ice-off has been early. The warmer water and abundant winter time sun seem to have allowed these plants to get an early spring start. This condition especially favors Eurasian water milfoil. This early growth, in turn, suppresses the other natives which grow later in the season.

The future looks bright for aquatic plant growth in nuisance proportions. Additions of sediment and nutrients occur as the Geneva Lake watershed develops. Global warming may be contributing to the lack of winter snow cover and a quicker spring warm-up. Zebra mussels may improve water clarity allowing the aquatic plants to grow deeper. Eurasian milfoil may become a more dominant plant.

The lake's water quality is a reflection of the surrounding watershed activities. The most controllable source of sediment and nutrients that promote plant growth is the human activity watershed. Sediment is the necessary anchor for the plant roots. The best way to control excessive plant growth is to stop nutrients and sediments from entering the lake.

Keep Sediment and Nutrients Out of Geneva Lake:

- Retard run-off from construction sites with erosion control measures.
- Stop or reduce fertilizer use near the lake or waterways.
- Properly maintain one's septic system.
- Dispose of pet wastes away from the water.

- Keep garden waster, grass clippings and leaves away from the water.
- Maintain a vegetative buffer strip along the shoreline of streams, drainage ways and the lake.
- Encourage your community to adopt ordinances that protect water quality and enforce ordinances already on the books.

Managing Aquatic Plants

Remember, not all the Geneva Lake aquatic plants are bad. Most are important to the proper functioning of the aquatic ecosystem. One may wish to consider controlling only those plants that grow in nuisance proportions. Choose the plant management control that offers the least potential of harming the local aquatic environment. Contact Dan Helsel (414-263-8714) or Bob Wakeman (414-263-8700), the Department of Natural Resources aquatic specialists. They can help to decide the method that will work best.

Many methods are employed to deal with the aquatic plants when they interfere with recreational use. The best aquatic plant control method is to stop nutrients and sediment from entering the lake. However, this may take many years to show results. If this is not practical, then several options exist that can produce a more immediate result. Most plant control methods are a seasonal affair. One should consider the advantages and disadvantages of each control method before taking action.

Hand Harvesting

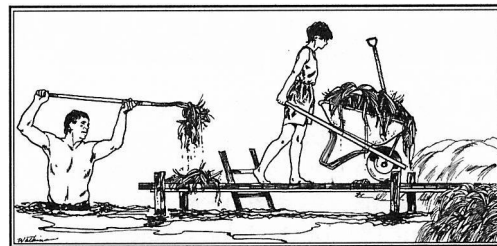
Hand harvesting is a simple and effective technique. This technique is limited to waters less than six feet deep, applicable to smaller areas and is labor intensive.

Hand pulling individual plants can remove the entire plant for up to two seasons. It allows one to selectively remove only the nuisance plants. For this reason, manual removal may be the best option. For deeper water, one can use a snorkel or scuba equipment. The trick is to remove the plant root.

Raking with a long-handled steel garden rake can remove most of the plant tops and some plants by the roots. An extension to the handle can help reach plants in deeper water. Similarly, drag a big chain or a metal bar along the bottom to remove plants in deeper waters. Pull the chain or bar behind a boat or manually drag onto the shore.

A hand-held weed cutter can be thrown from the shore or pier or pulled behind a boat. This cuts the plant stems near the root. This is a more rapid plant removal technique than pulling or raking but does little to remove the roots or selectively remove undesirable species.

When harvesting, the law requires removal of plant fragments from the lake. If not removed, these plants can drift away, re-root, release nutrients, obstruct navigation. Once cut or uprooted, the plants float to the surface. One should consider harvesting only during an on shore wind. Flip the plants onto the shore and let them dry for a few days. This will reduce the amount of moisture and volume of plant material. Make sure to remove the de-watered plants so their nutrients do not get back into the water!



The

aquatic plants make excellent mulch. They hold moisture well and are weed seed free. Also, composting plants is a viable disposal method. Mix these plants with other more nutrient rich materials, such as grass clippings, to form compost rapidly.

Aquatic Plant Screens

Manufactured aquatic plant screens will control aquatic plants. These screens block light and restrict growing space. They are effective when properly installed early in the season, anchored firmly and placed in suitable locations. They must be removed and cleaned in the fall.

Screens work best around piers and in deeper water where other control methods are not as effective. They clear the area for immediate use and prevent new plant growth.

They are not, however suitable for large scale control. This anchoring requirement usually limits the depth at which the screens can be installed.

Screens can eliminate fish and aquatic habitat. Screens do poorly in shallow water, strong wave action, heavy motor boat traffic areas and where the anchor weights may pose a hazard to swimmers.

A DNR water regulation permit is required to place the aquatic screen. The permit ensures that the screens will not hinder navigation or destroy critical habitat. Call Liesa Nesta, DNR at 414-263.8678 for a permit application or more information.

Aquatic Herbicides

A number of aquatic herbicides are approved by the state and federal regulatory agencies for use on lakes. Once applied, they poison the plants on contact or disrupt the plant growth system.

In recent years, some possible side effects of using chemicals have become apparent. Yet, the chemicals will always play an important part in our lives. The proper use of these products is essential.

Herbicides are less labor intensive than manual harvesting, may be cost effective and relatively easy to apply. Of all plant control methods, herbicides have the greatest potential to harm the lake ecosystem in the area of application, if improperly applied. Herbicides must be applied by licensed applicator with a properly calibrated dosage rate. They are not very selective regarding the plant species to be removed.

What We Can Do:

- **Understand that aquatic plants are not necessarily weeds. Most of these plants play an important role in lake ecology and are limited to a narrow near-shore area.**
 - **The nuisance plants are increasing due to many factors related to poor land use practices and warmer winters.**
 - **The best control method is to eliminate nutrient and sediment inputs. Other control methods are available to control existing nuisance growth. The best method is one that is plant and area specific. One should consult with technical people to establish the best method.**
-

For More Information

Contact the Geneva Lake Environmental Agency or Wisconsin Department of Natural Resources (WDNR) lakes staff and review the following publications (see chapter 16 for more details):

Non-mechanical Methods of Aquatic Plant Harvesting, WDNR PUBLWR 204 88

Machine Harvesting of Aquatic Plants, WDNR PUBLWR 201 88

What to do with Harvested Aquatic Plants, WDNR PUBLWR 203 88

Aquatic Plant Screens, WDNR PUBLWR 202 88

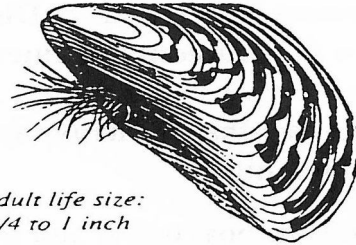
Chapter 15. Zebra Mussels

The zebra mussel is a mollusk native to Europe. It was discovered in the Eastern Great Lakes and recently has moved into Lake Michigan. It was probably discharged from the ballast water of large cargo ships. This exotic species was first discovered in Geneva Lake in 1995. It has also moved into a few other Wisconsin inland lakes and the Wisconsin, Mississippi and Illinois River.

The Geneva Lake Environmental Agency and the Geneva Lake Conservancy have carried out a zebra mussel monitoring program for a number of years. Zebra mussel traps were placed at the boat launch sites. Many samples have been taken to look for the veligers, the immature free floating form. Both the adult mussels and the veligers have been spreading west from the eastern Geneva Lake basin. They may gain nuisance proportions in the next few years.

Zebra mussels can grow up to one inch long and have a yellow or brown shell with alternating black stripes. The mussel is very prolific and can form colonies of thousands of animals. They are commonly found on boat hulls, pier posts, shore stations, aquatic plants or any submerged hard surface. These mussels can interfere with boat performance, clog water intakes, foul beaches with their sharp shells and putrid odors and dramatically alter the aquatic ecosystem.

More important, this alien can have a tremendous impact on the lake ecosystem. Because of its tremendous filtering capacity and large numbers, the mussels filter tiny organisms that are important food for fish.



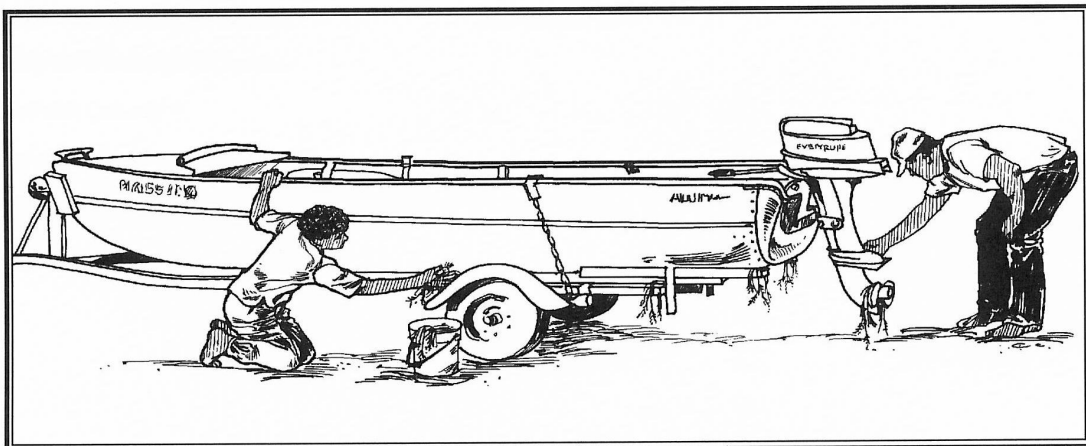
Adult life size:
1/4 to 1 inch

Zebra Mussel

Dreissena polymorpha

This filtering increases water clarity, allowing the rooted aquatic plants to grow to deeper depths. This mussel attaches to turtles and crayfish restricting their mobility, often resulting in death. They often smother fish breeding grounds resulting in decreased reproduction. As with the case of most alien species, these mussels have no manners so to speak. They do not fit in with and displace native species that have evolved together for many centuries.

According to the University of Wisconsin Sea Grant Institute, these mussels attach to aquatic plants and are being transferred by boat trailers. Likewise these trailered aquatic plants may be Eurasian milfoil, another unwanted exotic that is causing problems in Geneva and other lakes. Thus, one should clean their boats and trailers of these plants before moving to another lake. In addition, follow the procedure outlined below before one's boat is moved to another lake.



Remove all exotic species before transferring one's craft to another lake

What We Can Do:

- **Be on the lookout for the black and white striped mussels when you remove your equipment from the lake. Dispose of them so they can not spread to other lakes. Follow the procedure outlined about when moving your boat to another lake.**
 - **Realize that the non-native species can do tremendous harm to Geneva Lake's biological community.**
 - **Clean your boat trailer and hull thoroughly and scrape the bottom if necessary.**
 - **Flush clean water through your engine cooling system.**
 - **Drain bilge water, live wells, bait buckets and engine compartments and make sure water or weeds are not trapped in or on your trailer.**
 - **Disinfect live wells, bilges, anchors, bait buckets or other wetted surfaces with a 1:10 solution of bleach.**
 - **Allow the boat to dry thoroughly for at least two days before entering another lake.**
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Chapter 16. Directory, Additional Resources, and Suggested Reading

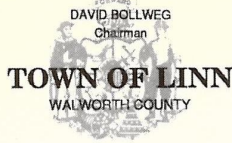
Resources:

Building Inspectors: see chapter 6.

Geneva Lake Association	Jim Smith	262-203-7108
Geneva Lake Conservancy Inc.	Janet Happ	262-275-5700
Geneva Lake Environmental Agency	Theodore Peters	262-245-4532
Geneva Lake Law Enforcement Agency		911 or 262-245-9824
Police, Fire or Rescue		911
Water Safety Patrol	Theodore Pankau	262-245-6577
Walworth County Planning, Sanitation and Zoning		262-741-4976
Wisconsin Lakes		608-661-4313 or 800-542-5253
Wisconsin Department of Natural Resources	Fishery: Luke Roffler	262-884-2364
	Lakes: Heidi Bunk	262-574-2130
Conservation Warden:	Juan Gomez	262-818-4157
WDNR Hot line:		800-847-9367
U.S. Department of Agriculture Natural Resource Conservation Service		
	Walworth County: Greg Igl	262-723-3216
University of Wisconsin-Extension:		
	Walworth County	262-741-4951

Suggested Reading (Available at the Geneva Lake Environmental Agency Office):

- Adopt-a-lake project, a resource guide for leaders. (1991). Fox Lake District, Wisconsin Association of Lakes, Wisconsin Department of Natural Resources University of Wisconsin Extension: University of Wisconsin Stevens Point WI.
- Betts, G. P. (1994). Growth management an assessment of problems and issues in four Walworth County Towns. University of Wisconsin-Extension: Madison, WI.
- Baybook, A guide to reducing water pollution at home. (1986). Chesapeake Bay Trust. Annapolis, Maryland.
- Department of Natural Resources (1969). Lake Geneva. Wisconsin Department of Conservation: Madison, WI.
- Dresen, M. D., & Korth, R. M., (1995). Life on the edge..owning waterfront property. University of Wisconsin-Extension: Stevens Point, WI.
- Environmental Protection Agency (1995). Empowering watershed stakeholders, a training workshop. August 1995. Northeastern Illinois Regional Planning Commission, Chicago, IL.
- Fuller, D. (1995). Understanding, living with and controlling shoreline erosion. Tip of the Mitt Watershed Council: Conway, MI.
- Johnson, G. (1992). Long term boating trends, conflicts and management, Geneva Lake, Wisconsin. Presentation North American Lake Management Society Symposium, November 14, 1992: Seattle, Washington.
- Lake Leaders Handbook. (1995). University of Wisconsin Extension, University of Wisconsin Stevens Point, CNR: Stevens Point, WI.
- McComas, S., (1993) Lake Smarts. Terrene Institute: Washington , DC.
- Southeastern Wisconsin Regional Planning Commission, and Geneva Lake Environmental Agency (1985). A water quality management plan for Geneva Lake. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI.
- Warbach, J. D., Wyckoff, M. A. & Williams, K., (1990). Protecting Inland Lakes: A Watershed Management Guidebook. Planning and Zoning Center, Lansing, Michigan.



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- It is up to us, the Geneva lake stewards, to take care of this precious resource for future generations of lake lovers. We should strive to duplicate the native American and early settler lake-friendly actions.
 - Our economic and environmental well-being is dependent on the protection and preservation of the lake and surrounding land resources. Our only option is to protect Geneva lake because it is not economically or technically feasible to rehabilitate.
 - Understand that the manner in which one uses the land has a profound impact on water quality and quality of life. We are responsible for the diverse sources of pollution and the solution to protecting Geneva Lake.
 - Discover inside important Geneva Lake information about environmental corridors, shoreline erosion, run off, erosion control, septic systems, lawns, landscaping, boating, aquatic plant management and much more.
-

***Geneva Lake Environmental Agency
P.O. Box 914
Williams Bay, WI 53191***

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