



Lakewalk Manual

A Guidebook for
Citizen Participation





EPA Region 10 thanks *Cassandra Robertson* for her enthusiasm and commitment in producing *Lakewalk*, all the reviewers for their comments, *Bob Reiner* for design and layout, and to *Michele Wickham* for illustrations.

Introduction

The U.S. Environmental Protection Agency (EPA) is committed to helping landowners, farmers, and the general public learn more about the functions and benefits of lakes. Involvement of the public is critical for protecting and restoring threatened or impaired lakes. For these reasons we are inviting your participation in the Lakewalk Program.

Lakewalk gives citizens the opportunity to learn about lakes and collect observed information and data. This puts the power in the hands of the citizens to act on what they learn. Lakewalk is a companion program to the successful Streamwalk and Wetland Walk programs.

Our objectives in developing Lakewalk are to:

- o educate people about the relationship between lakes and watersheds*
- o encourage citizens to actively protect and restore their lakes*
- o develop a screening tool that enables citizens to identify potential problem areas*
- o provide a standardized data collection method so regional and trend comparisons can be made*
- o focus experts' limited resources on suspected problem areas*



What is a Lakewalk?

Lakewalk is a series of simple and important questions you can answer while you walk the banks of a chosen lake. It is designed for people of all ages and educational backgrounds. You do not need any training to participate. Lakewalk will teach you about lake ecosystems, the plants and animal communities that make the lake their home. There are no right or wrong answers and all the data can be obtained by shoreline observations without the need for a boat or monitoring equipment. While you are out walking and learning about the lake, you will be gathering data that can give your local environmental organization information needed to protect and restore the lake. Without volunteers like you who are willing to dedicate time to Lakewalk, many lakes may not get the attention they need and deserve. Thank you for participating and remember this is as much a learning tool for you as it is an information gathering tool for your local lake monitoring organizations.



Who's in Charge ?

You are! Although the EPA has developed Lakewalk, we visualize this as a self-driven grass roots tool. We hope you will use Lakewalk to develop a locally organized, long term citizen lake monitoring program, or to join forces with an existing lake monitoring agency. Working with others offers training and consistency and, by keeping the information local, you and your organization can better protect your specific lake ecosystem.

The limited role for EPA is to provide information and support to local organizations. We encourage local organizations to maintain their own data. Eventually, we expect to develop a Lakewalk database similar to the Streamwalk database that is currently being distributed to interested users. In the future, we may be involved with state and local organizations in interpreting Lakewalk data.

If you have questions or comments about Lakewalk, or would like to be put in touch with Lakewalk coordinators in your area, please contact:

EPA Lakewalk
U.S. EPA Region 10
1200 Sixth Avenue,
Seattle, WA 98101-9797
1-800-424-4372

If you start up a Lakewalk group in your area, please let us know!

To ensure effective communication with everyone, additional services can be made available to persons with disabilities by contacting an EPA representative. For those with impaired hearing or speech, please contact EPA's telecommunication device for the deaf (TDD) at (206) 553-1698.

Before the Lakewalk

Identify the lake you want to survey and choose the site for your Lakewalk. You may wish to collect data along a familiar lake, one that is close to your home, or a favorite. Pick a site that gives you as much access to the lake shore as possible, a site which allows you to walk 50 feet to your left and right. To provide adequate information, please try to survey the lake four times a year, once each season. Doing this enables you to observe the subtle yet incredible changes that occur over the year, and helps you gain a complete picture of the lake's natural life cycle.

Data Collection Tips

Please, consider the following precautionary tips:

- o Get the permission of landowners to cross any private land, posted or not. **DO NOT ENTER AREAS WITHOUT PERMISSION.** It is recommended that you use public access points (such as city/county/state parks and campgrounds).
- o Always work with someone.
- o Be careful of ticks, poison oak, nettles, insects. Bring repellent and protective clothing.
- o Be careful not to swim in deep waters. It is not necessary to enter the water for any of the Lakewalk. Be aware that the lake bed and shore could be slippery and unstable.
- o Do not walk on unstable banks; your footsteps could speed erosion.
- o Be alert of nesting areas and other delicate habitats around the lake. These could be well hidden in tall grasses and shrubs (easy to accidentally walk through). Please have as little impact on the animals and their environment as possible.





- o Be careful of lake side vegetation- disturb it as little as possible.
- o If for any reason you feel uncomfortable about the lake conditions or surroundings, please stop your lakewalk. Your safety is much more valuable than any of the objectives of Lakewalk!
- o If you see anything that does not seem right (e.g. rusting barrels or a clearcut extending to the water's edge) **BE CAUTIOUS**, and contact your local government, or the EPA immediately, 1-800-424-4EPA. Your prompt action could result in positive changes to the lake ecosystem.

The following is a suggested list of items to have along on your Lakewalk:

- o Comfortable rubber boots or old shoes
- o Snag and thorn-proof clothing that is appropriate for the weather
- o Clip board
- o Lakewalk data forms
- o A pencil
- o Folding ruler or tape measure
- o Glass container (an old jar will work fine)
- o Camera and film in waterproof bag. Pictures are an excellent way to document changes in the lake. Photos can be used by resource professionals to assess the changing conditions of the lake. **BE SURE TO TAKE PHOTOGRAPHS AT THE SAME LOCATION EACH TIME YOU SURVEY THE LAKE.** For easy identification of the site, place a sheet identifying the date and site in a visible location for your picture. Save your photos with a copy of the survey data sheet.
- o If you are away from urban or residential areas, the following are recommended for safety:
 - Extra clothes in a waterproof bag
 - Fire starter (candle and lighter)
 - Small first aid kit, flashlight and extra batteries
 - Bottle of water and extra food
 - Whistle



WHAT IS A LAKE?

A lake is an inland body of standing water. It is a critical part of the environment serving as the collection basin for all the water that falls in the **watershed**. Lakes are important to people and ecosystems because they:

- o Provide critical **habitat** for fish and wildlife,
- o Provide a place for **runoff** sediments to settle and disperse,
- o Control floods,
- o Supply drinking water,
- o Provide a recreational area, and
- o Serve as places of beauty and inspiration for residents and visitors.

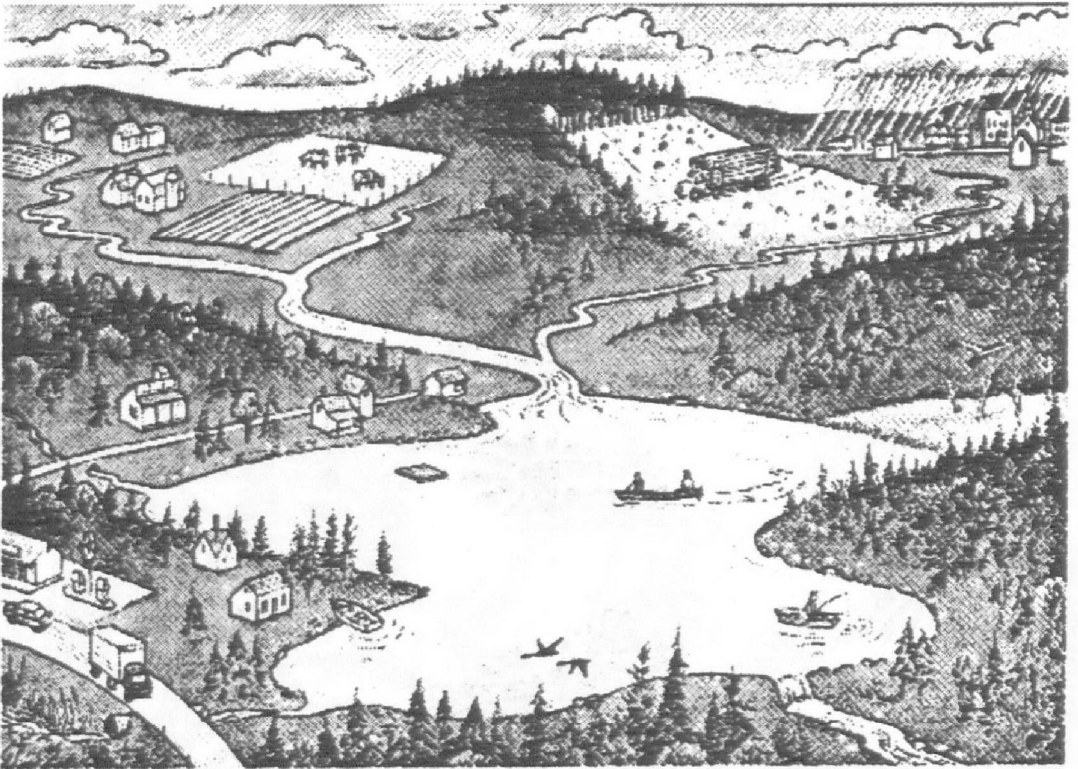
Lakes are continually influenced by the activities in the surrounding watershed. The watershed is the area of land where all the rain collected runs to one single point, usually a lake or river. Any **pollution** or unhealthy changes created in the watershed will inevitably affect the lake.

Lakes age through a process called **Eutrophication**. When a lake is first formed it appears crystal clear. As the lake matures, over time it accumulates **sediments, nutrients, plants, and algae**. This eventually fills the lake changing it into a **wetland** and, after a long time, a forest. This aging process is typical for most lakes but, of course, there are many exceptions. Some lakes never appear clear (often the case for shallow lakes), while others remain clear accumulating very few nutrients over time (true for many deep alpine lakes). Eutrophication normally takes hundreds to thousands of years but, with human influence, can occur in **decades**. Because eutrophication takes time, it may be difficult to tell if it has been caused by nature, humans, or both. By returning to the same site for several seasons you can become familiar with the lake's natural changes and human influences that affect eutrophication.



Within the lake there are processes that determine the types and numbers of **organisms** able to survive. One such process is **stratification**. During warmer months, the lake becomes layered with warm water staying towards the surface and cooler water sinking to the bottom. You might have noticed this while swimming. Stratification affects **oxygen content**, light penetration, and **photosynthesis** all of which affect the entire lake ecosystem.

When looking out over a lake you might not initially think that so much is going on. The lake's plants and animals have worked together over thousands of years to create a balance. Unfortunately, humans can easily tip the balance, forcing changes in the lake's communities. By enhancing your awareness, you will gain a special understanding of the processes and changes in and around the lake. Through your increased appreciation you can become a positive influence in protecting and improving lakes in your area.



A Watershed

Now Is the Time to Begin:

Instructions

Below are directions for filling out the Lakewalk Survey Data Sheet. It may be helpful to briefly review the Lakewalk manual before you begin and have it with you on your walk. To help you understand your data, each survey question has an explanation of what to look for and why it is important. Only write down what you see. If you are in doubt, leave the question blank. If you see something that is important and not in the questions PLEASE record in the space provided for Additional Comments at the end of the Data Sheet. Whatever information you can observe and document will benefit your local organizations, governments, and inevitably the lake ecosystem. Remember, this is not a test. Enjoy this opportunity to discover and appreciate the vital role lakes play in the watershed.



Cover sheet

Please fill out the cover sheet.

Site Survey Data Sheet

Please identify your site for future lakewalks and your own reference. It may be helpful to name your site after a nearby landmark such as a boat dock or a large tree.



Survey Questions and Explanations

1. Weather

Please note the current weather. Rainfall affects inflow, clarity, and amount of water in a lake. Weather reports are available in the daily newspaper or by calling the local weather service. Definitions of weather conditions established by the National Weather Service are:

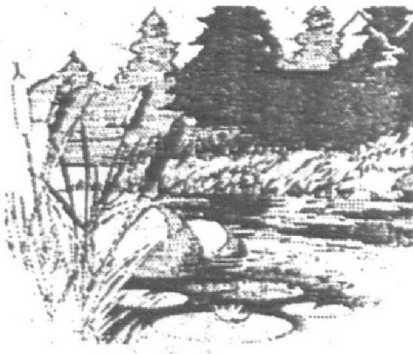
Rain: 1/3" or less in 24 hours - light steady rainfall.

Showers: 1/3" - 1" in 24 hours, intermittent and variable in intensity.

Storm: 1" or more rain in 24 hrs, usually accompanied by winds.

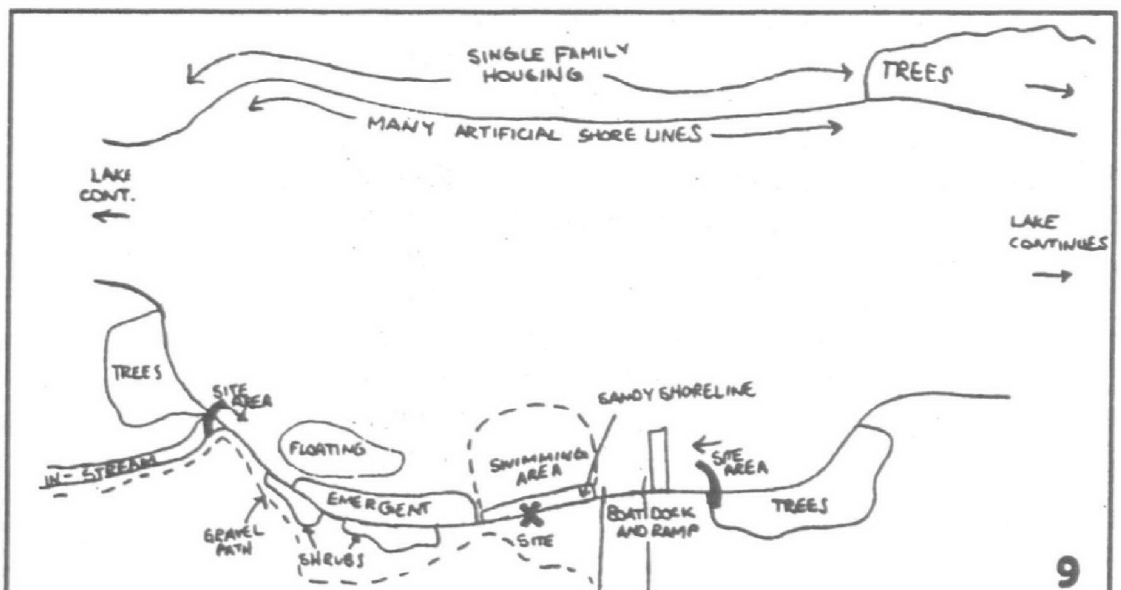
2. Lake map

Please sketch a map of your lake, indicating your survey site and the 100 ft. surrounding it. If you cannot see the whole lake, draw what you can see from your site.



A map of your lake can help decipher the important characteristics that may be affecting the lake's health. It can help you observe changes and remind you what was seen on previous Lakewalks. You may want to make a photocopy of your drawing for future comparisons. Please include your site location, vegetation, observed water inflows and outflow, and any other physical parameters that might affect the lake (e.g. housing developments, boat ramps). The following sketch can give you an idea of information that can be included on your map.

Sample Map



3. Lake Measurements

What is the *depth* and *surface area* of the lake? Indicate if your response is estimated or measured. Sometimes this information might be impossible to estimate. In this case leave the line blank and continue your walk.

Depth might be available at your local library, your state's Environmental Quality Department or at local lake organizations. If this data is not available, please estimate the depth using words such as deep or shallow.

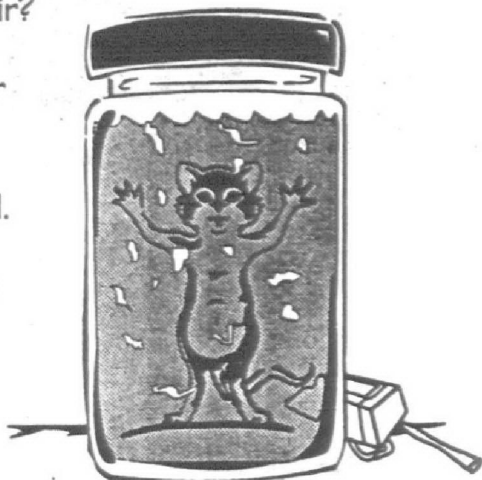
Surface Area can be computed if you have access to a map. In other cases please estimate to the best of your ability. A benchmark is that a standard football field covers approximately one acre (1.03 acre).

4. Type of Lake

Is this a natural lake or a human-made reservoir? Reservoirs are flooded river beds created by a dam at one end. Reservoirs are used for power generation, flood control, and drinking water supply. In order to create a reservoir many natural processes must be altered or stopped. Reservoirs may currently assist humans but they create a great strain on the ecosystems and inhabitants who have adapted to the natural flow of the river.

5. Water Clarity

Does the water appear clear or cloudy? For a closer look, fill a clear glass container with lake water. You may see bits of plants, dirt, or tiny living organisms. Too much of any of these can cloud the water contributing to problems. Cloudy water results from natural processes (a bottom feeding carp stirring up sediment or the milky appearance of glacial flows), and human land uses in the watershed that increase soil **erosion**. Sediment can smother fish eggs and newly hatched insect larvae. Suspended solids absorb heat from sunlight increasing the water temperature and reducing the light available for plant growth. These both decrease the life giving oxygen in the water.





6. Lake Bottom

Describe the lake bottom **substrate** at the shore, under the water line. This material determines what kind of plants are able to survive. Mud supports a wide variety of plants, while boulders support few plants.

Silt/clay/mud: These particles are fine with a sticky, cohesive feeling. The spaces between the particles hold a lot of water, making the sediments behave like ooze.

Sand (up to .1 inch): Sand is made up of tiny particles of rock. It feels wonderful underfoot.

Gravel (.25 - 2 inches): A gravel bottom is made up of stones ranging from tiny quarter inch pebbles to rocks of 2 inches. These range from the size of a pea to a baseball.

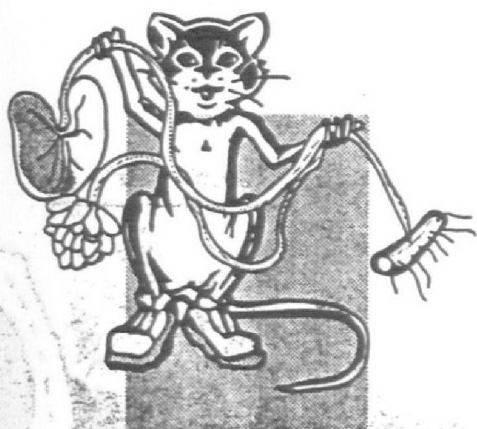
Cobbles (2 - 10 inches): The majority of these rocks range between 2 and 10 inches. The average size is about that of a grapefruit.

Boulders (greater than 10 inches): Most of the rocks on the bottom will be large, greater than 10 inches, rocks you could easily sit on.

7. In-Lake Vegetation

Describe the vegetation in the lake and remember to include it on your map. Types and numbers of aquatic vegetation can be influenced by nature and humans. Typically, few plants grow in low nutrient lakes, while lakes with a lot of incoming nutrients flourish with aquatic plants. Notice the increase or decrease of vegetation over time. Most lakes naturally take thousands of years to gain plants (eutrophy), but with humans influencing the addition of nutrients, aquatic plants can easily over take a lake in a few years. For example, a sudden increase in pond lilies is more likely the result of excess nutrient input (e.g. lawn fertilizer or failing septic systems) than a natural process.

Non-native plants can also alter the lake's natural state. Without natural predators, exotic plants can take over, leaving little space



White Water Lilly
Genus *Nymphaea*

or nutrients for native species. Unless you are familiar with identifying native plants it is difficult to determine if exotic plants exist. You can be suspicious if one plant dominates the whole area.

Submerged: Plants rooted in the lake bottom growing entirely under the water surface.

Floating: Some part of the plant floats and may or may not be rooted in the lake bottom.

Emergent: Plants rooted in the lake bottom growing beyond the water surface.

8. Woody Debris

Please mark the general amount of logs and woody debris in the lake. Logs and woody debris (not twigs and leaves) in the water, shade and cover, providing fish with cool water and hiding places.

9. Buffer Zone

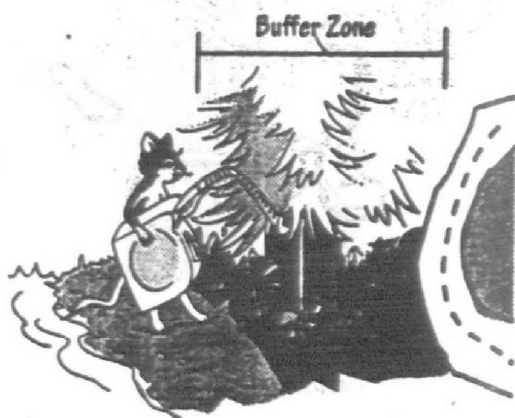
Measure or estimate the width of vegetation at your site and remember to draw it on your map. Walking away from the water, the buffer zone width is measured from the water line to the far edge of the natural vegetation. If the water level is low, measure starting at the top of the beach. If the width changes, measure what you see most often. If the vegetation is pasture, lawn, bark, or landscaped, it is not natural, so please indicate.

The buffer zone consists of the *natural* vegetation on the lake shore. The plants in the buffer zone shade the water; filter sediments and nutrients entering the lake from surrounding areas; hold the soil in place preventing erosion; add nutrients to the lake in the form of leaves and foliage; and provide habitat for lake side wildlife. Recommended widths can range from 5 meters to 100 meters, but currently there is no standard width for protecting a lake.

Buffer zones are important around the *entire* lake. Please estimate the percentage of lake side that is covered by any natural buffer zone. Consider all the lake shore you can see.



Hydrilla
Hydrilla Verticillata



10. Lakeside Vegetation

Please mark the types of plants on the lake shore. The trees and shrubs along the lake side make up the buffer zone. Listed below are some types of vegetation you may see.

Conifer: A cone bearing, evergreen tree (e.g. a douglas fir).

Deciduous: A tree which sheds its leaves in the fall (e.g. an oak tree).

Small trees or Shrubs: Either conifers or deciduous bushes less than 20 feet high.

Grasses: Any of numerous natural growing plants with narrow leaves, jointed stems, or clusters of inconspicuous flowers (This does not include mowed lawns).



11. Artificial Banks

Mark the percentage of artificial banks and include them on your map. Artificial banks include lake side modifications such as riprap (a retaining wall built of rocks or concrete), boat launches, and artificial shorelines made for swimming areas and other easy access. These modifications may help control some shoreline erosion, but they do not filter pollutants or provide natural habitat. Therefore, they are less beneficial to the overall lake ecosystem than vegetated buffer areas.

Looking at the entire lake, please estimate the percentage of lake bank that is artificially modified.

12. Inlets and Outlet

Please identify any visible areas or structures through which water flows into or out of the lake and label them on your map. Water flowing into and out of the lake carries nutrients, sediments, pollution, and organisms. It is important to know where pollution or excess nutrients are coming from in order to limit them in the lake.

Streams: naturally flowing

Wetlands: natural holding areas for water

Culverts: pipes used for transporting water under land and roads

Ditches: human-made streams present along roadways

Other: any other device used for transporting water

13. Animals

Please mark any animals you see. If you do not see any keep an eye out for the objects they use or leave behind. Evidence such as carcasses, scat, tracks, fur, feathers, nests, eggs, or egg sacks can all suggest an animal was there. Listen for noises and calls of nearby animals.

The numbers and types of animals can indicate the health of a lake. Typically, the more types you see the healthier the lake. Of course, there are exceptions. Animals such as pigeons and seagulls have adapted to the human environment and can live in polluted areas. Domesticated animals, such as cats and dogs, drive away or kill wildlife and ruin habitat.

Non-native animals, new animals introduced to a lake, may not have the natural predators needed to keep populations down. They can grow to unreasonable numbers and destroy many of the native plants and animals that were unprepared for a new invader.

14. Adjacent Land and In-Lake Uses

Please record the adjacent land and in-lake uses you can see around the lake. Adjacent land use has a tremendous impact on the health of the lake and its buffer zone. Enter a "1" if the land use is present and "2" if it is clearly impacting the lake. Examples of clearly impacting could include a row of single family housing with green lawns extending to the water line (no buffer zone and an increase in nutrients from too many septic systems), an unpaved road along the shore line (possible erosion), a clearcut leaving little buffer zone (erosion and loss of habitat), or a new construction site with no erosion control.



15. Lake Conditions

Please record the lake conditions. Lake conditions are usually caused by impacts like those identified in #14. By understanding that these symptoms are the result of something else that is happening in the watershed, you can help identify and correct the source of the problem. Enter a "1" if the condition is present or "2" if it is severe. Severe symptoms are those needing attention. A few pieces of garbage in the water is one thing but garbage filling the shore line is definitely severe.



On the Bank

Degraded buffer zone : Indicate if lake side vegetation is trampled, missing, or replaced by landscaping or cultivation. Remember, lawns may look nice but they are not natural. They increase incoming nutrients and take away natural wildlife habitat.

Collapsed or eroded banks : Note if banks have been washed away or worn down. This can occur on very windy lakes or when motor boats drive too fast or close to the shore lines creating large wakes.

Garbage or junk on lake banks : Indicate if human made materials are present on the shore.

In the Lake

Algae floating or covering the lake bottom. Algae is a primitive plant lacking true leaves, stems, and a root system. Algae is difficult to see unless there is a lot in one area where it can look like floating hair, brightly colored water, or pea soup. Algae naturally occurs in lakes, but becomes a problem in large quantities called blooms. Algal blooms occur when the lake's nutrients increase resulting in fish kills and water toxicity. If you see floating mats or the water is a thick soupy color you probably have an algal bloom. **CAUTION**, use something, other than your own bare hands, if touching any algal growths.



Sheen: Sheen can occur naturally or be the result of a pollution problem. For example, an iridescent sheen on the water might be from rotting leaves, or from accumulating car or boat motor oil. Usually, natural sheen is uniform in color while rainbow colored sheen is from petroleum products.



Foam: The color of foam is often a good indicator of possible problems. White foam implies there is pollution where cream or light brown foams occur naturally. Typically a thick foam, more than a few inches high with large bubbles, indicates a pollutant problem. Natural foam tends to be present in small compact amounts.

Lake smell: The smell of a lake can easily tell you if there is a serious problem. Unpleasant odors may indicate there is a lot of decaying matter. This could be from too much plant and animal growth, a result of fertilizer overuse or failing septic systems. Other pollutants, such as petroleum, can also give the lake a peculiar smell.

Garbage or junk in lake: Indicate if human made materials such as litter, tires, hot water heaters, car bodies, and other garbage are in the lake.

16. The Final Question

Weather and your swimming ability permitting, would you like to swim in this lake? Why?

Additional Comments

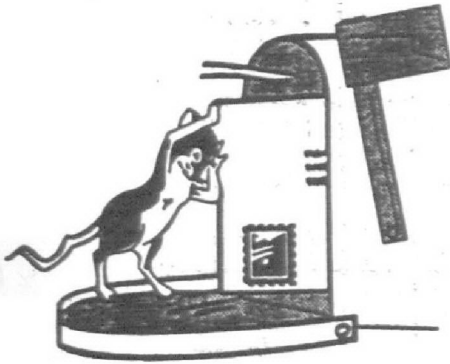
Here is the place to add anything else you think is important for determining the health of the lake. Please use this area to explain in detail anything you feel needs further explanation.



After the Lakewalk

Now that you have gathered your Lakewalk data, you may want to make it available to local lake organizations and governments. Contacting local groups can be beneficial for you and the lake. They may be able to provide you information and background on your lake site helping you understand your data. More importantly, your survey information could be of great use and value in the organization's lake monitoring programs.

Examples of groups to contact include: Your state's local chapter of NALMS (North American Lakes Management Society), Sierra Club, Audubon Society, local fishing clubs, home owners groups, and other local environmental programs.



Latitude & Longitude

The last step before you send on your data is to determine the latitude and longitude of your survey site. This will enable other people to immediately determine your site location, and allow your data to be used in a computerized **Geographic Information System (GIS)**. Topographical (topo) maps are needed in order to accurately identify the latitude/longitude of your site. Topo maps are available at local sporting goods and book stores. The cost is approximately \$5.00. You may also find one to photocopy at your local library. Use the instructions on page 18 to determine the latitude and longitude of your site.

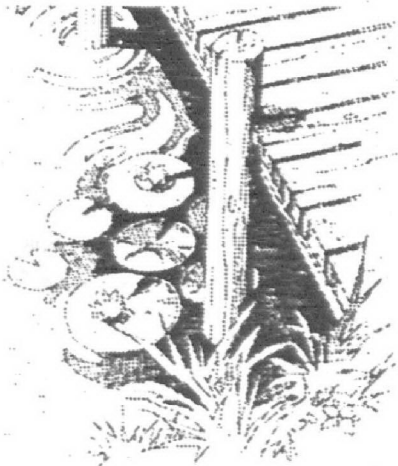
Please return your completed site survey data form to your local Lakewalk coordinator. You may want to keep a copy of the data sheet to note trends and changes.

Local Lakewalk Coordinator:

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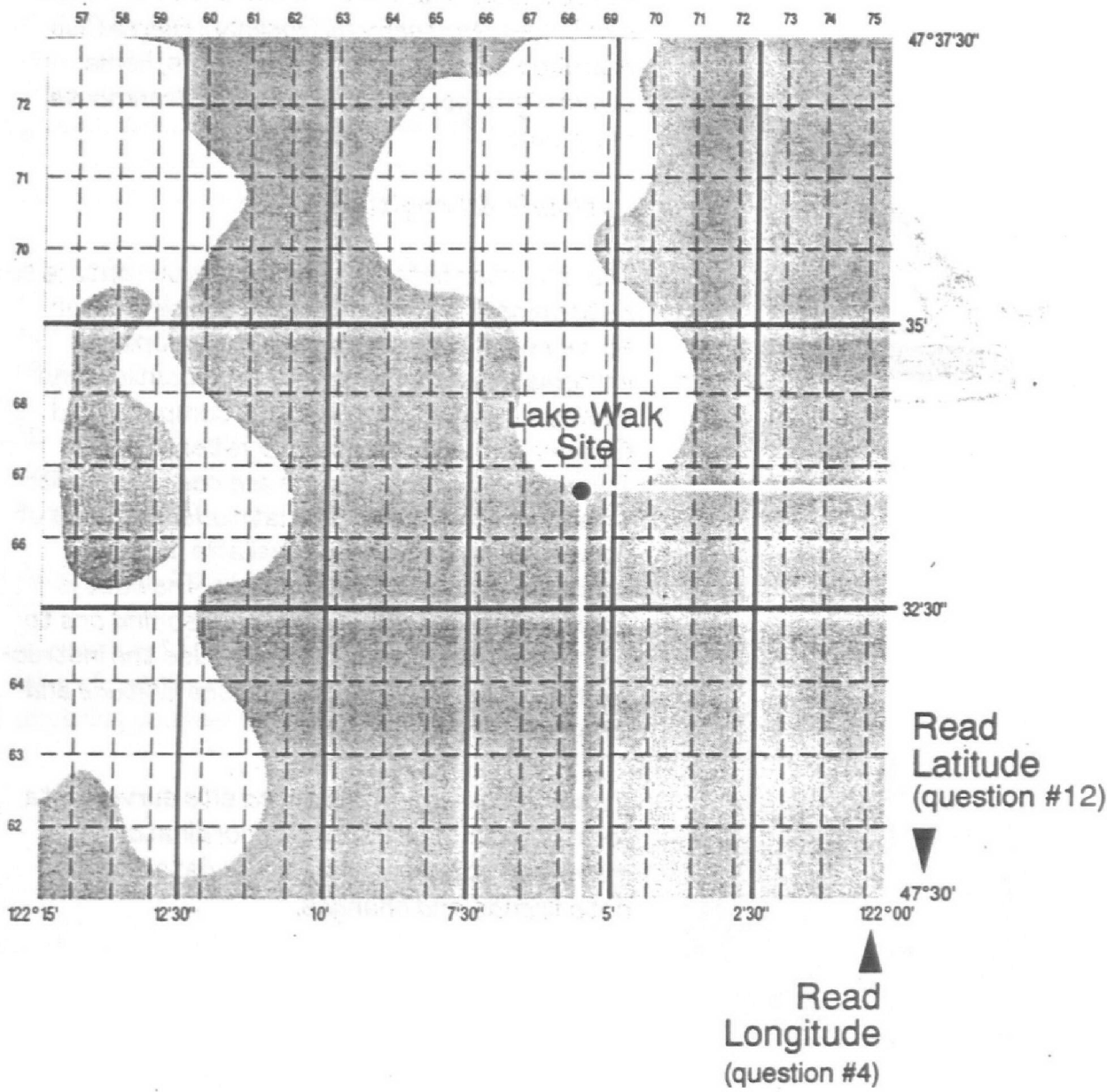
Instructions for Defining LATITUDE and LONGITUDE

Latitude and longitude are defined in degrees, minutes and seconds. There are 60 seconds in a minute and 60 minutes in a degree. The symbols are as follows: ° = degree, ' = minute and " = seconds. The following example may help you determine the Latitude and Longitude for your Lakewalk site.



Mouse Pond Map

7.5 x 15 Minute Series



Longitude

1. Look at the right side (upper or lower corner) under the map name, or the second of two numbers separated by "x", to find the width scale (longitude) of the map:

If "7.5 Minute Series," enter 450

If "15 Minute Series," enter 900

If "7.5x15 Minute Series," enter 900

If "15x30 Minute Series," enter 900

Your Work

Example

900

cm

10 cm

2. Using a ruler, measure the width of your map east to west (exclude borders)

sec/cm

90sec/cm

3. Divide #1 by #2 to the nearest whole number

122°

00

4. Enter the Longitude located in the lower right hand corner.

cm

3.7 cm

5. Using a ruler, measure (centimeters) from your site, straight across, to the right hand side of the map.

37x90

$$= 333$$

6. Multiply #5 by #3 (to the nearest whole number)

333/60

5 times

(300)

7. Convert #6 to minutes and seconds by dividing by 60. Your whole number after division is the number of minutes, and the remainder is the number of seconds. (Do not use a calculator). For example, 215 can be divided by 60 three times. $215 - 180 = 35$. So 215 converts to 3'35".

333-300=

33 left over

or 5' 33"

122•

5'

33*

8. Add #4 to #7

The Answer for #8 is the LONGITUDE of Your Site

Latitude

	Your Work	Example
9. Look at the right side (upper or lower corner) under the map name or the second of two numbers separated by "x", to find the height scale (latitude) of the map. If "7.5 Minute Series," enter 450 If "15 Minute Series," enter 900 If "7.5x15 Minute Series," enter 450	_____	<u>450</u>
10. Using a ruler, measure the length of your map, north to south (centimeters)	_____ cm	<u>10 cm</u>
11. Divide #9 by #10 to the nearest whole number	_____ sec/cm	450/10= <u>45 sec/cm</u>
12. Enter the Latitude located in the lower right hand corner	_____	<u>47° 30'</u>
13. Using a ruler, measure (centimeters) from your site straight down to the bottom of the map.	_____ cm	<u>4.8 cm</u>
14. Multiply #13 by #11 (to the nearest whole)	_____	4.8 x 45 <u>= 216</u>
15. Convert #14 to minutes and seconds by dividing by 60. Your whole number after division is the number of minutes, and the remainder is the number of seconds. (Do not use a calculator). For example, 215 can be divided by 60 three times. 215-180=35. So 215 converts to 3'35"	_____	216/60 3 times (180) 216-180= 36 left over or <u>3' 36"</u>
16. Add #15 to #12	_____	<u>47° 33' 36"</u>

The Answer for #16 is the LATITUDE of your site



Additional Resources

Lakewalk may only scratch the surface in determining the health of your lake. If you want to do more to help insure its protection, the following organizations and publications offer more indepth lake monitoring information.

Organizations

Alaska Department of
Environmental Conservation
P.O. Box 0
Juneau, AK 99811-1800
(907)452-5021

Division of Enviromental Quality
Idaho Department of Health & Welfare
1410 North Hilton
Statehouse Mail
Boise, ID 83702-9000
(208) 334-0550

Oregon Department of Environmental Quality
Water Quality Division
811 SW 6th Avenue
Portland, OR 97204
(503) 229-5696

Washington Department of Ecology
P.O. Box 47710
Olympia, WA 98504-7710
(360) 407-6000



Publications

Volunteer Lake Monitoring: A Methods Manual

USEPA
Office of Wetlands, Oceans and Watersheds
WH-553
401 M Street, SW
Washington, DC 20460

Diet for a Small Lake

Federation of Lake Associations Inc.
2175 Teneyck Avenue
Cazenovia, NY 13035

Lake Smarts

Terrene Institute
1717 K Street NW, Suite 801
Washington D.C. 20006
(202) 833-8317

The lake Book

COLA
PO Box 391
Yarmouth, ME 04096
(207) 846-4271



Glossary

Ecosystem The interaction of plants and animals with their non-living environment.

Erosion The wearing away of the land surface by wind or water.

Eutrophication (eutrophy) The increase of nutrients in lakes either naturally or artificially.

Exotic From another part of the world, non-native.

G.I.S. Geographical Information System. A computer program which provides a map and information (such as point source polluters, and endangered species) of the area specified by the known latitude and longitude.

Habitat The specific environment in which an organism lives and depends on for food and shelter.

Monitor To measure a characteristic such as lake water clarity, dissolved oxygen, or fish population over a period of time, using uniform methods to evaluate change.

Native Being an original inhabitant of a place.

Nutrient A substance, such as phosphorus and nitrogen, which enhances the growth of plants and animals. In small quantities nutrients enhance growth and are beneficial, but too many nutrients can cause an over production of organisms which produces problems for the entire ecosystem.

Organism Any living individual.

Oxygen Content Amount of oxygen in the water influencing fish and other aquatic animals.

Pollution The addition of something unnatural or the addition of too much of something that is natural.



Photosynthesis A chemical process, done by plants, converting sunlight into a usable form of energy (e.g. food).

Run-off The portion of rainfall, melted snow, or irrigation water that flows across the ground surface, possibly carrying pollutants, into streams and lakes.

Scat The excrement of an animal.

Sediment Fine soil or mineral particles that settle to the bottom of the lake or stay suspended in the water.

Species The individual organisms that make up a population and are reproductively compatible. All the differing species make up the communities and all the communities make up the entire ecosystem.

Stratification Layering of lake water caused by differences in water density.

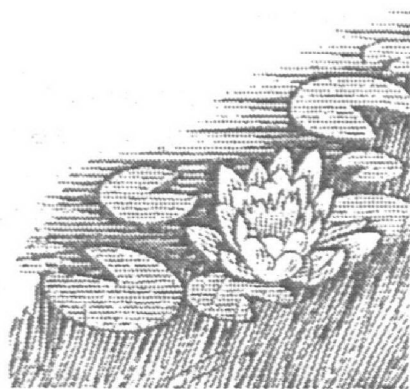
Substrate The material that makes up the bottom layer of the lake, such as gravel, sand, and boulders.

Toxicity: Describes the amount of poison present and its level of danger.

Vegetation The plants in an area.

Watershed The land from which rain collects and runs to a single point.

Wetland Wetlands are areas with soils that are saturated for some part of the year. They can be identified by unique plants which have adapted to oxygen-deficient soils. Wetlands influence stream flows and water quality and may be an integral part of the lake ecosystem.



Notes

