

Lake Steward



The newsletter of the WLR Lake Stewardship program Vol. 6, No. 2 Spring 1999

The WSU Cooperative Extension King County

Helping you put knowledge to work

Want to learn more about natural resource management? How about lake-friendly gardening practices? The Washington State University (WSU) Cooperative Extension King County offers a variety of family and community service programs including the Land/Water Steward and Master Gardener Programs.

Land/Water Stewards

The Land/Water Stewardship Program recruits, selects, trains and supports adult volunteers who are interested in teaching others about the basics of watersheds, wetlands, streams, water quality, forestry, native plants, wildlife, and other natural resource topics. Through the program, volunteers are em-

powered to bring natural resource information to the public.

Through structured training, volunteers develop a basic understanding of natural resources and the human activities and systems that affect those resources. After receiving training, each steward is expected to perform educational service.



Most stewards work within their communities, workplaces, clubs and associations, and places of worship. Some help with public education booths at community events while others work on

publications, displays, and related educational projects.

For more information about the Land/Water Stewardship Program or to be added to their mailing list, call (206)296-3900 or e-mail them at wsu.coopext@metrokc.gov. People on the mailing list receive notice of upcoming training programs as well as WSU sponsored workshops, classes, and activities related to natural resource education.

Master Gardeners

The Master Gardener program grew out of the need for county agents to respond to the growing interest in home gardening. Over 25 years ago, WSU Cooperative *(continued on page 3)*

The Watershed Waltz & The Sammamish Swing

The dance to healthy lakes

We want to introduce you to *The Watershed Waltz and The Sammamish Swing*, an environmental manual designed to teach homeowners how to "dance their way to healthier lakes and streams in 25 simple yet elegant steps." The manual was originally designed for



distribution to residents of the Lake Sammamish watershed but the information is applicable to any northwest lake. The manual explains and illustrates day-to-day alternatives that will reduce most lake's primary source of pollution—high levels of phosphorus originating from our everyday activities.

To order a copy of the manual call the **Pomegranate Center** at (425) 557-6412 or e-mail heidim@pomegranate.org.

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Lake monitors report

Jetstream express...gusting near you!

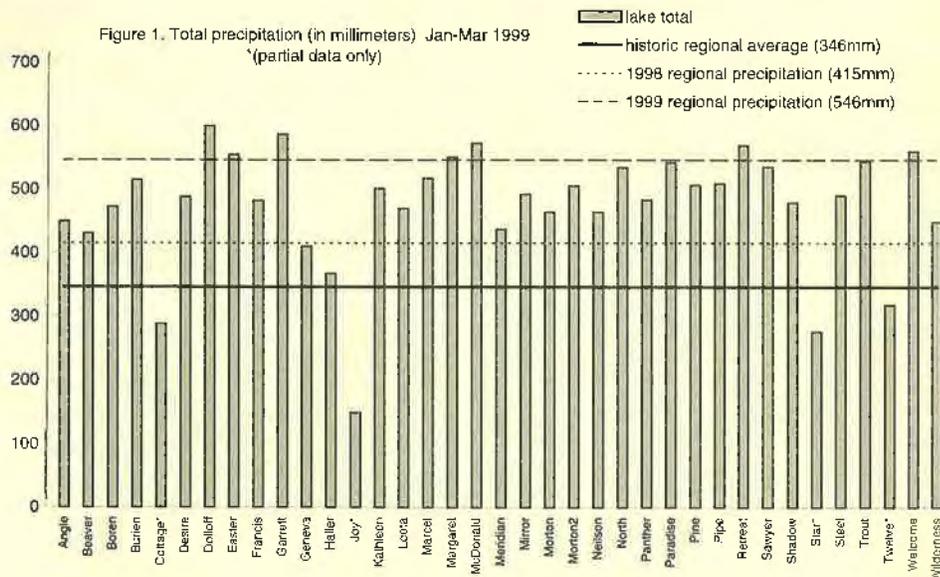
Wet weather

La Nina's continued influence was felt in King County as volunteer lake monitors recorded heavy springtime precipitation (Figure 1). Rainfall totals measured well above Sea-Tac Airport's historic average (346 mm) for the January-March quarter. Exceptions include lakes Cottage, Joy, Star, and Twelve where volunteers were not able to collect data for the full quarter.

Precipitation totals at seven of the 37 lakes were above the 1999 regional average of 546 mm and 31 of the lakes were above the 1998 regional average of 415 mm. The regional average was calculated from a rain gauge just north of Sea-Tac Airport at Lake Reba.

Stormy weather

Many of our lake volunteers had difficulty collecting data this spring because of high winds and stormy weather throughout the sampling quarter. This period coincides with the National Weather Service reporting that "a very strong



jetstream" across the North Pacific generated an active winter storm pattern for the Pacific Northwest.

Two jetstreams influence our local weather: the Pacific Jetstream and the Polar Jetstream. A jetstream is a stream of strong wind concentrated within a narrow zone of the atmosphere. Many forces lead to the creation and flow pattern of jetstreams, including rotation of the planet and heat exchange from the earth's surface to the atmosphere. Jetstreams usually

flow from west to east, including the westerlies from east Asia that jetstream to the Pacific Northwest.

So as winter turns to spring, and icy-cold blasts turn to mild breezes, think about the jetstream high in the atmosphere that is flowing your way. To learn more about jetstreams and global climate patterns check out the great El Nino/La Nina tutorial at the Climate Prediction Center Website: http://www.cpc.ncep.noaa.gov/index_frame.html.

Hi-ho it is off to sampling we go

On May 2, Level II lake monitors began sampling their respective lakes for phosphorus, nitrogen, and algae levels. Level II monitors also collect information on temperature, water clarity, color, waterfowl usage, and recreational usage.

Level II volunteers will continue to collect this information on a biweekly basis through October.

Data collected by both Level I monitors (who collect information year-round on lake level, rainfall, water clarity, color, and temperature) and Level II monitors is reported annually in the volunteer monitoring report.

This information is used to establish benchmarks for lake water quality and provide data for ad-

ressing lake management issues.

We are still looking for Level I or Level II volunteers or back-up volunteers on the following lakes: **Burien, Echo, Fenwick, Garrett, Panther, Ravensdale, Shadow, Twelve, and Webster.**

If you are interested, please call **Jessica Anderson (206) 296-8008** or **Wendy Cooke (206) 296-1949**.

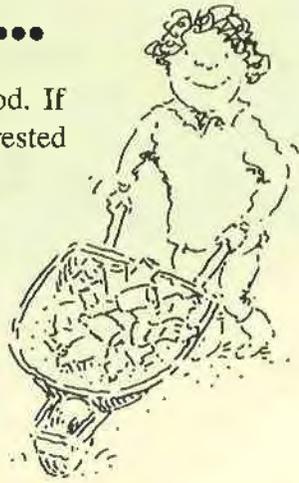
Knowledge to work...

(continued from page 1.)

Extension agents trained the first volunteers in the basics of gardening. Today, over 600 Master Gardeners in King County work as trained volunteers in local communities and teach good gardening practices. Master Gardeners give lectures, maintain demonstration gardens, and staff neighborhood Plant Problem Clinics.

You may already have a master gardener on your lake or in your

neighborhood. If you are interested in getting in contact with your local Master Gardener or want more information about becoming one yourself, call (206) 296-3425 or



visit their web page at <http://king.wsu.edu/hort/mastergd.htm>.

Garden stewardship

The WSU Cooperative Extension is a great source of information for northwest gardeners who are interested in lake-friendly gardening. Lake-friendly garden practices result in the development of desired garden elements but also provide habitat for birds and insects, and protect soil, water, and energy resources. Beneficial garden practices include composting, selecting site-adapted plants, using non-toxic or no pesticides, conserving water, protecting water quality, using organic fertilizers, and protecting soil resources by planting cover crops.

The WSU Cooperative Extension gardening web page (<http://gardening.wsu.edu>) offers expert information on a variety of gardening topics including lawns, weeds, landscaping, and native plants. For more information about the range of services available from the WSU Cooperative Extension, visit their web site at <http://king.wsu.edu> or call (206) 296-3900.

Are you a resource in your own backyard?

Are you a Land/Water Steward or Master Gardener wanting to be a resource for your lake community? Do you want to network with other Stewards or Master Gardeners? If so, then give us a call at 296-1949 and we will publish your name, lake name, and phone number in our next newsletter. 🐾

Watershed Wisdom

One place to start living in harmony with your watershed is in the garden. Take this quiz to find out if you are doing "The Watershed Waltz & The Sammamish Swing" (see cover article).

A. Have some of your plantings been selected specifically for drought tolerance?

Yes, some (+5)

None (0)

We don't have droughts in the Pacific Northwest (-10)



Drought tolerant plants, such as Purple Coneflower (*Echinacea purpurea*), require less water and maintenance.

B. What percentage of your landscape is native Northwest plants?

100% (+15)

70% (+10)

30% (+5)

Don't know (0)



Bunchberry (*Cornus canadensis*) is an elegant, native groundcover that grows well in shady areas.

C. How do you respond to the appearance of weeds?

Give them little name tags (0)

Icy indifference (+5)

Rip them from the earth with my bare hands(+5)

Blast them with chemicals (-10)



Weeds, such as dandelions, are best pulled by hand or ignored when living near a lake.

10 to 25 points: Your landscape is a symphony

5 to 10 points: Your landscape can hum a few bars

less than 5 points: Your landscape is singin' the blues

Report from the shoreline

An inquiry into incredible Inle Lake

Inle Lake is situated in Nyaungshwe Township, southern Shan State in Burma. It is the second largest lake in Burma at about 14 miles long and 7 miles wide (about twice the size of Lake Sammamish). The Inle region is characterized by a large, flat valley running north to south which is surrounded by mountain ranges averaging 4000 feet in elevation. The lake averages 2915 feet above sea level. Over 200 villages border the lake and inhabit the surrounding watershed.

The depth of the lake fluctuates with seasons. The average depth in the summer is four meters and in the rainy season, seven meters. The lake bed is comprised of fine silt deposited by the surrounding streams which flow through the plateau's limestone.

Thirty streams flow into the



Local fisherman with a traditional bamboo trap on Inle Lake.

lake: 17 from the east, 12 from the west, and one from the north. Inle lake has one outlet which flows south, entering the Thanlwin River.

Fishes and birds

Sixteen species of fish inhabit Inle Lake, including carp, catfish, and snakehead fishes. Inle is rich in birds with 57 species of forest birds and 43 species of water birds. Several species of egret, sea gull, commorant, wild duck, and magpie are abundant in northwest Inle. Migratory birds usually live in Inle wetlands from October to May.

Nga-phane, a symbol of Inle

The Inle carp, *Cyprinus carpio intha* or Nga-phane, plays an important role in local food supply as well as the cultural symbol of ethnic Intha. The carp breed year-round with clean and clear water. However, because of poor water quality, the Nga-phane population has become surprisingly scarce.

Inle flora

Native aquatic plants include pondweeds (*Potamogeton*), coontail (*Ceratophyllum*), bladderwort (*Utricularia*), stonewort (*Nitella*), muskgrass (*Chara*), and elephant grass (*Saccharum spontaneum*). People use elephant grass to make mats while pondweeds are used for food by both people and fish.

Invasive plants in Inle Lake

Water hyacinth (*Eichornia crassipes*) was introduced to the lake about 60 years ago as an ornamental plant. Although the plant is used for gas production,



Map of Myanmar (Burma).

paper, and bag making, the over abundant population obstructs waterways along the lake.

The pollution problem

The main business of the Inle Lake region is floating garden agriculture. Tomatoes, the primary cash crop, comprise two-thirds of the region's agriculture. The remaining one-third consists of flowers, vegetables, and sugarcane plantations. The farmers use pesticides and fertilizers for their crops.

The Inle area is also well-known for its textile products. In eight villages, major textile industries use chemical dyes as well as natural dyes. In addition to the floating gardens and textiles industries, waste and garbage from households, lack of proper sanitation system, and live stock breeding contribute to poor water quality.

(continued on page 6)

Too much of a good thing...Phosphorus

Webster defines "nutrients" as something that nourishes or as a food ingredient. The primary nutrients for plants (including algae) are phosphorus and nitrogen. The more nutrients available to plants, the better they grow.

In most fresh water systems, phosphorus is less abundant than nitrogen (phosphorus limited). When the phosphorus supply runs out, plant growth slows or stops. When the phosphorus supply increases, plant growth increases. This increase in growth, left unchecked in a lake or stream, can result in unsightly and nuisance algal blooms. Subsequently, limnologists study ways to manage phosphorus levels in lakes.

Where Does Phosphorus Come From?

Phosphorus is found naturally in soil, plants, and animal tissue and occurs in several forms. Level II volunteers collect samples which are analyzed for total phosphorus (TP). This form includes all phosphorus that is bound in plant or animal tissue, attached to soil particles, or dissolved in the water. Soluble phosphorus (SRP) is the form of the nutrient which is dissolved, making it readily available to be utilized by plants.

Phosphorus binds readily with iron in soils and can become a problem for lakes that stratify. When bottom waters become low in oxygen, the iron-phosphorus bond is broken and phosphorus is re-

leased into the water column. When the lake mixes during the fall, the phosphorus becomes available throughout the water column, sometimes causing new algal blooms.

Aquatic plants (and algae) die back and decay in late autumn as the growing season ends. Phosphorus in the plant tissue is then re-released back into the water column.

Other Sources of Phosphorus

Phosphorus contained in animal feces can be a troublesome source of nutrients to a lake (Figure 1). For example, when a population of waterfowl becomes too large or when large animals such as horses and cattle have free range near a

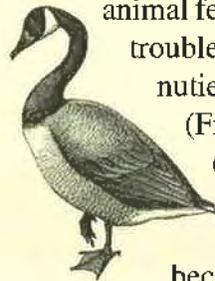


Figure 1. The scoop on poop

Fecal Sources	Potential Annual Phosphorus Load (kg TP/ year)
septic system	2.2 per system
cattle	18 per 1000 pound bull
horse	8 per 1000 pound horse
goose	0.6 per goose
mallard	0.2 per duck

stream or lake, fecal runoff enters nearby surface waters. Pets can contribute nutrients with their "droppings" when this waste is left to wash into surface waters. Human feces also contribute phosphorus when septic systems fail.

Synthetic detergents or fertilizers are a source of SRP. Soaps and detergents flushed down the drain

into a septic system can end up in nearby waters, since drainfields are not designed for phosphorus removal. Washing your car at home can also feed nutrients into nearby surface waters or groundwater. In our yards, fertilizers are easily washed into our lakes and streams.

A Good Balance

If a lake's ecology is balanced, algal growth will be kept in check by the animals (zooplankton) that eat algae. Too many nutrients create a system out of balance and undesirable algae can start to flourish causing blue-green algal blooms.

Because blue-green algae often clump together to form larger colonies, they become too large for tiny animals to eat. In addition, these algae have special cell structures, which allows them to

float, forming unsightly surface scums. Occasionally, blue-green algae produce toxins causing skin irritation and stomach upset in humans and harming or killing fish, waterfowl and other animals.

Once phosphorus enters a lake, it can be recycled over and over via plant growth, decay, and sediment release. It can take many years before it eventually gets flushed out of the lake. Therefore, the best way to protect your lake from an over abundance of phosphorus is to prevent it from entering the water in the first place. 🐾

Inle Lake...

(continued from page 1.)

Excess siltation

In the western area of the Inle Lake watershed, deforestation is a big issue. Slash and burn agricultural practices on the adjacent hills contribute to soil erosion. Expansion of the villages throughout the watershed has also increased siltation. The addition of silt blocks or hinders the proper flow of water.

Preservation activities

In Burma, Inle Lake is a major tourist attraction. When the military regime promoted tourism in 1996, the government became aware of local efforts to preserve Inle Lake. In 1997, the Inle Lake preservation

project was launched by the government. The project's executive committee includes members from Shan State Peace and Development Council, Nyaungshwe Township local authorities, and Government sector personnel (Irrigation, Agriculture, and Forestry departments).

The preservation project continues as lake management is performed by multiple interests. Public awareness and participation will continue to play a vital role in Inle Lake's preservation.

*Thanks to
Myint Su, University
of Washington
Humphrey Fellow, for
this article.*



Upcoming events:

Landscaping the lake-friendly way

Saturday, May 22

Renton Community Center

Call **Debra Bouchard** at (206)

296-1989 for more information.

Tour lake-friendly landscapes at Lake Sammamish

Monday, June 14, 6:30-9:00pm

Call **Claire Dyckman** at (206)

296-7279 for details.

Great American Secchi dip-in

June 26-July 11; Stay tuned for
more information...

Aquatic Weed Workshop

Saturday, July 17

Learn the top eight pesky aquatic
weeds. Call **Sharon Walton** at
(206) 296-8382 for details.



KING COUNTY

Department of Natural Resources

Water and Land Resources Division

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