Lake Steward

The newsletter of the WLR Lake Stewardship program Vol. 5, No. 3 Summer 1998

Tastes like chicken

Bullying is the bullfrog's bailiwick

Most people see frogs in their lake and feel a sense of contentment, that everything in nature is as it should be. But did you ever take a close look at your frogs? The frogs native to our area are small, usually under four or five inches long. If you have frogs bigger than this, there is a good chance they could be bullfrogs – and that's not good!

Bullfrogs are usually very large – the biggest ones can get up to eight inches long – much larger than any native frogs. They have narrow ridges on either side of the head that start behind the eye and go around both ear drums and down towards the front legs.

Only the males vocalize – if they live at your lake, you're probably very familiar with their deep, resonant voices – most often heard in the summer. You can also tell males from females by the size of their ear drum: the round disc behind their eye. The female's ear drum is the size of her eye or a little smaller; the male bullfrog's ear drum is much larger than his eye.

Bullfrogs are incredibly prolific. They lay their eggs beginning in late June through July. You'll recognize them because there are thousands of eggs in a two foot diameter area - small, black eggs in slippery jelly floating at the surface of the water, usually in an area not more than three feet deep, with sparse vegetation. The eggs hatch a few weeks after they are laid, and the tadpoles will live in the lake for two or three years

(continued on page 3)

The beastly bullfrog.

What's inside...

Exploring the rise and fall of lake temperature.....2

Hard work leads to wisdom and ever improving lake heath.....4

Creating something new in the realm of aquatic plants.....5

Help fight noxious weeds

Looking for weed spotters

The Lake Stewardship Program needs volunteers for a pilot project to identify and survey noxious weeds. Enthusiasts can help protect our lakes against eight vegetative aliens while learning about plants that are beneficial.

Basic plant identification skills will be taught in a two hour training session. Follow-up lakeside trainings will be scheduled for everyone. Volunteers will be asked to survey their lake during the summer of 1998 and follow-up again during 1999.

Survey results will be invaluable in tracking the extent and location of aquatic noxious weed infestations throughout the county – the basis for successful control.

If you are interested in becoming a volunteer noxious weed monitor, the training is scheduled on July 25 from 9:30 to 11:30 a.m. at the Mercer Island Community Center. Contact **Sharon Walton** at **206/296-8382** to attend.

Lake monitors report

Investigating lake temperature

What affects lake temp?

Lake temperatures are influenced by fluctuations in seasonal air temperatures. Surface water layers are the most affected – warming in the day and cooling at night. However, the lake depth, groundwater, surface flows, and quantity of vegetation around the lake can have a greater impact on lake temperatures.

Shallow lakes tend to warm up throughout the water column, while deeper lakes tend to warm at the surface but stay cool at the lake bottom.

Lakes that are greatly influenced by groundwater are likely to remain a more constant temperature and may stay cooler throughout the summer since groundwater maintains a fairly uniform temperature.

Vegetation around lakes provides more shade and shelter which helps keep water cooler in summer and warmer in winter than lakes without plants.

What's going on in our lakes?

Historic weather records from SeaTac tell us that regional air temperatures warm up steadily throughout the month of May. On average, May temperatures start out at around 16.1°C (61°F) and end at about 19.4°C (67°F). Figure 1 shows the air temperature for late April through May 1998. This year, the end of April was unseasonably warm, followed by unseasonably cool temperatures for most of May. By the end of May, air temperatures began rising to more normal levels.

For comparison, the data from three sampling dates in May are also shown by the small circles in Figure 1. These groupings are most tightly clustered around the regional air temperature lining, indicating that water temperature in our lakes is affected by air temperature.

Beginning with this issue, we are trying a slightly altered format for our traditional data article. In response to reader interest, we will take a deeper look at one aspect of our monitoring program. We hope this helps you understand what volunteer data tells lake managers! Let us know what you think!

Figure 2 (on page 6) shows the temperature readings taken at one meter depth on the three dates mentioned above. Lakes like Ravensdale and North exhibited little temperature change over the sampling period. Some lakes, like Paradise, were consistently cooler. All these lakes are most likely influenced by greater groundwater inputs or surface water inflows fed by groundwater than by air temperature.

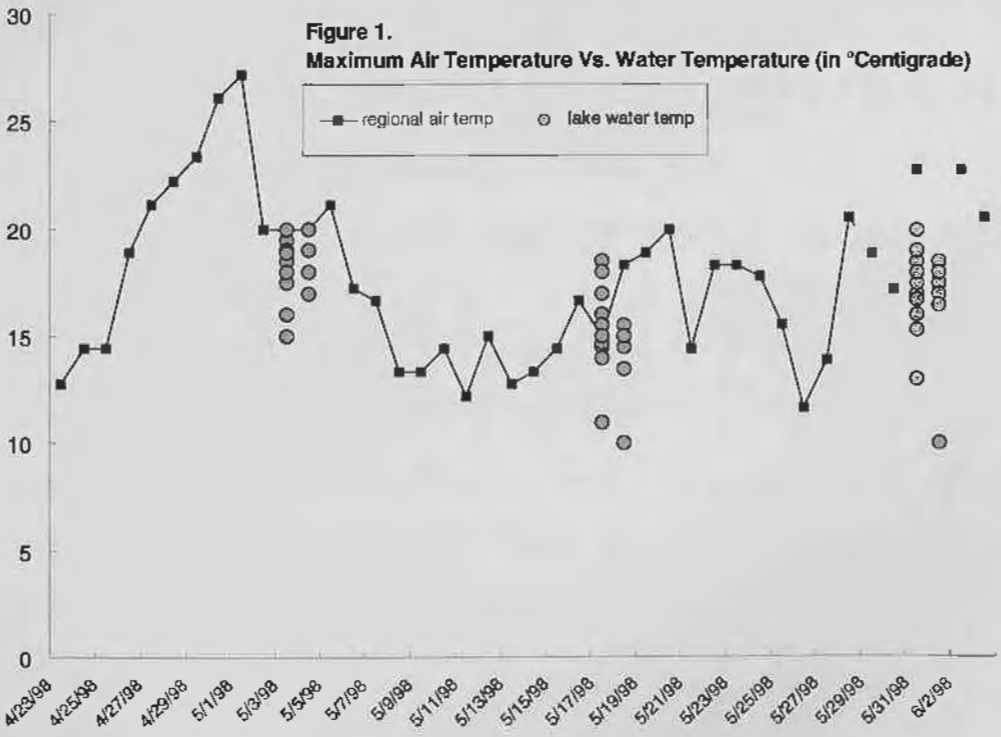

Figure 1.
Maximum Air Temperature Vs. Water Temperature (in °Centigrade)

How does temp affect lake health?

Temperature is a controlling influence on both a lake's chemistry and the organisms that live there. Chemical reactions are typically faster at higher temperatures. In a lake, higher temperatures speed up the breakdown of organic material both in the water column and in bottom sediments. This can lead to oxygen depletion.

Aquatic organisms are "cold blooded" (meaning they

(continued on page 6)

Bullying bullfrogs. . .

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before they metamorphose into adults. That is why you'll find them in many lakes, but not in ponds that dry out in the summer.

Bullfrogs are native to the eastern United States, where they have natural predators. People brought them to the Pacific Northwest during the Great Depression and farmed them – frog legs were a delicacy. There were bullfrog farms on Cottage and Paradise lakes, and other ponds and lakes around the county. When people were done farming, they just opened the pens and set the frogs free. Some people dug new ponds especially for raising bullfrogs. Even recently, people have shared eggs with their neighbors to spread bullfrogs to new habitats, not knowing the damage that bullfrogs could do.

Bullfrogs are a problem because they have voracious appetites. They hunt hy waiting for their prey to get close enough to grab it – and they'll eat anything they can fit in their very large mouths. They've been known to eat insects, other frogs, tadpoles, salamanders, and even birds as large as robins, and ducklings.

Our native amphibians, who aren't as prolific as the giant bullfrogs, often can't breed fast enough to keep up with the large appetite of their neighboring bullfrogs. It is thought that two species of native frogs, the Oregon spotted frog and the Northern Leopard frog, as well as the western pond turtle have disappeared from many areas because of the bullfrog.

As the state law is written today, bullfrogs are a game species. You can capture up to nine of them at any one time with a game license; if you are using them for bait, you can catch as many as you want, and you don't need a license. If you want to trap them for research purposes, you would need to apply for a catch permit from the state Department of Fish and Wildlife.

If you have seen bullfrogs in your lake or a pond nearby, give us a call! We'd like to know – so we can keep track of where bullfrogs are around the county, and see whether they're spreading and causing further disappearances of our native amphibians.

If you're fascinated by our slimy-skinned friends, the amphibians, you might be perfect for our Amphibian Monitoring Program. An all-day training in February teaches volunteers to search for and count egg masses monthly in March, April and May. We only need two volunteers for each lake, so sign up early! Call **Elissa Ostergard** at **296-1911**.

If you should come into contact with frogs, make sure you wash your hands immediately after handling them. Some people have a reaction to frog skin secretions.

Report from the shoreline

Voice of experience from Lake Wilderness

A little over four years ago the Lake Wilderness Preservation Association (LWPA) was formed with the goal of eliminating Eurasian water milfoil and controlling other weeds in the lake. That goal is now coming to fruition! The first treatment of the lake was made on Friday, June 19th, 1998 with more treatments to be applied as necessary.

How did we get this far? Several words describe what it takes: hard work, communication, cooperation, and perseverance. First, there must be an organization with by-laws, officers, and the like. Second, there must be communication and cooperation with all parties included.

For Lake Wilderness, "all parties" meant not only waterfront owners but developments in the watershed, King County Council, Maple Valley Council, County Parks Department, State Department of Ecology, and the general public. We tried to get publicity for our causes wherever we could, including public meetings, newspapers, and journals. We distributed environmental information whenever possible.

Visitors to Lake Wilderness will see signs like this that teach about lake management issues.

Our hard work paid off. The State Department of Ecology awarded us a grant to study the lake and set up a plan for treatment. The grant was managed by the Water and Land Resources Division of King County. The lake was studied. A steering Committee was formed with all parties involved. The result was the Lake Wilderness Integrated Aquatic Plant Management Plan which was finalized in May of 1997.

With plan in hand, an implementation Committee was formed to find funding to carry out the plan which focused on treatmeut of the lake and long term control. A grant was secured from King County and money was budgeted by the City of Maple Valley, LWPA and Maple Valley Rotary.

Since then, a Lake Management District (LMD) has been formed (by an approving vote of over 80% of the watershed) to maintain control of weeds and water quality for the next nine years. An LMD is similar to a utility district, but generally applies only to the affected watershed and collects funds specifically for the management of the lake.

Cleanup is now a reality. Four long years provided many opportunities to give up and quit. The LWPA persevered and the result is positive. The LWPA will continue as a nonprofit organization to follow up on the plan, educate people on environmental issues related to the lake and address problems such as pollutants, fertilizers, septic tanks, poisons, and even aquatic birds such as ducks and geese.

Many thanks to Roger King of Lake Wilderness for providing this article.

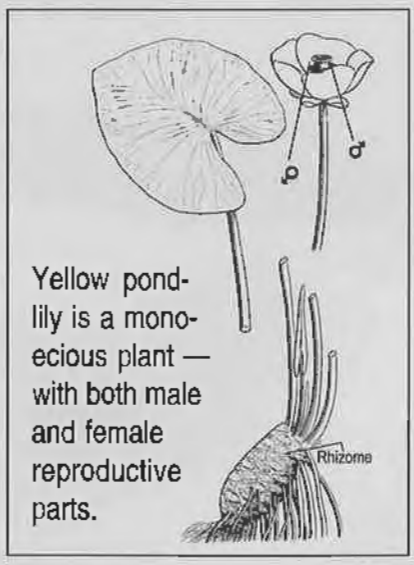
Limnology for the layperson

Birds do it, bees do it, but aquatic plants?

All organisms multiply through sexual or asexual reproduction. Aquatic plants, like their terrestrial counterparts, use one or the other or a combination of both methods to reproduce.

Maintaining genetic diversity

Sexual reproduction involves genetically recombining two parent orgamisms typically defined as male or female. In plants, these male and female parts can be found on the same (monoecious) plant (e.g. cattails or lilies) or on separate (dioecious) plants (e.g. willows). Seeds



Yellow pond-lily is a monoecious plant — with both male and female reproductive parts.

are generally evidence that sexual reproduction has occurred. Only through this genetic recombination is species diversity maintained, providing plants with an evolutionary mechanism to adapt to new environmental conditions.

A clone will do

Asexual or vegetative reproduction produces plants with identical genetic make-up (a clone) of the parent plant. Aquatic plants are particularly well suited to vegetative

Willow is a dioecious plant — with different plants having male or female reproductive parts.

reproduction because of the greater uniformity of the aquatic environment. Plants use a combination of vegetative methods including runners or stolens, underground stems (rhizomes), corms, bulbs, tubers, and leaf buds (turions) to spread. Species diversity may be absent with vegetative reproduction, but the spread of an individual species is particularly efficient resulting in the noxious nature of some species.

Reproduction in action

Many aquatic plants are capable of reproducing both sexually and asexually. Emergent and floating-leafed plants, like cattails and waterlilies, produce seeds each year but generally rely heavily on vegetative means (rhizomes and roots) to expand their coverage.

Many of the submergent plants, like pondweeds, bladderworts, and milfoils, rely almost solely on vegetative means to reproduce. In the fall, these plants form numerous compact leaf-buds on short stems that eventually break off, float away, and sink to the bottom to serve as new plant "starts" the following spring.

Noting noxious weeds

Most noxious weeds are characterized by their prolific ability to reproduce by either vegetative or sexual means. Hydrilla is an example of a plant that can reproduce by various vegetative means including plant fragments, leaf-buds, and tubers. The plant does have the capability of sexual reproduction, but seldom uses it.

Eurasian watermilfoil (Myriophyllum spicatum) is a good example of a noxious weed that spreads through vegetative means. A tiny stem fragment with leaves can start a whole new plant. Milfoil is easily and unknowingly spread by boaters as they move through an area of growth, becoming entangled and breaking the adult plant into numerous pieces.

Purple loosestrife (Lythrum salicaria) is a good example of a plant that reproduces successively by both sexual and asexual methods. The plants flower in June and July, creating over 100,000 seeds for each adult plant. The tiny seeds are easily transported by wind, water, and animals. The plant can also spread from stem parts and via underground roots. With so many successful ways of reproducing, this noxious weed is extremely difficult to eradicate once it's established.

So as the summer wears on, take a closer look at those aquatic plants and see how they are preparing to be around for next year.

Investigating lake temp . . .

(continued from page 2.)

can't regulate their own body temperatures). They are finely adapted to a specific temperature range. Any change in water temperature may cause their metabolisms to slow down, speed up or stop altogether. Dragonflies like it warm (above 20°C) and mayflies like it cold (below 13°C).

So in our lakes, as temperatures rise, lakes that are more sensitive to temperature changes, will have more visible reactions, more insect hatches, greater rates of plant and algae growth, and possibly less oxygen in deeper waters.

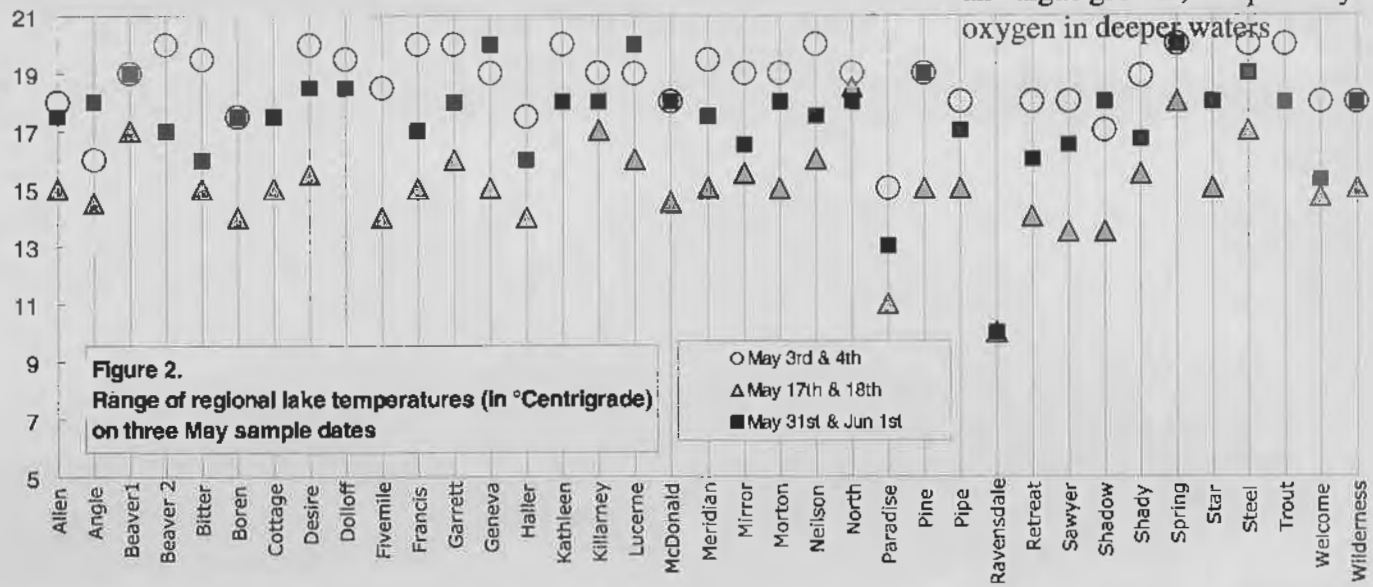


Figure 2.
Range of regional lake temperatures (in °Centrigrade) on three May sample dates

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