



# Lake Steward



The newsletter of the WLR Lake Stewardship program Vol. 8, No. 3 Summer 2001

## King County's Lakeside Building Regulations

# Untangling the permit process

The Department of Development and Environmental Services (DDES) implements King County's development and environmental regulations. These regulations cover all aspects of land use and land development in the unincorporated areas of King County. Regulations concerning shoreline development are of particular interest to lake residents. Usually any type of construction activity within the shoreline setback or within the waterside of the ordinary high water mark will require at least a shoreline exemption.

### Dealing with Docks

On King County lakes, pier and dock construction requires

either a shoreline exemption or substantial development permit. If the market value of the construction is less than \$10,000, only a shoreline exemption is required when the resulting construction is 80 feet in length or less, does not exceed 13 feet in depth, and is 600 square feet or less in surface area. If the proposed construction is greater than \$10,000 or does not meet the above criteria, a shoreline substantial development permit must be obtained. Generally, a shoreline exemption takes about 30 days for DDES to review while a shoreline substantial development permit may take up to 120 days for DDES to review.

### Building Bulkheads

Establishing a hulkhead or add-



ing riprap to a shoreline area is normally permitted only when necessary to protect existing legally established structures and public improvements or to preserve important agricultural lands as determined by DDES. Bulkheading is not usually permitted on the water side of the ordinary high water mark.

*(continued on page 8)*

## Backyard Wildlife

# Going batty for bats



Look up as the sun fades from the summer sky and perhaps you will be lucky enough to see some of our local bats. Fascinating and elusive nocturnal mammals, bats living in King County dine exclusively on insects. One little brown bat can eat over 600 mosquitoes in an hour! The smallest bat in the world is the size of a bumblebee,

while the largest sports an incredible six-foot wingspan. Bats found in the Northwest are all relatively small, ranging from 2 to 4 inches in length, with wingspans of 9 to 16 inches.

### Basic Bat Facts

Contrary to popular belief, bats have very good eyesight. They also find insects and navigate in the dark with a special type of radar called echolocation. During the winter

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## Lake Monitors Report

# Summer at the lake

Lakes are living ecosystems. Birds, plants, algae, insects, snails, fish, frogs, bacteria, and even leeches are just a few of the creatures that are at home in lakes. All these organisms respond to and depend on the seasonal water chemistry of a lake, which is largely driven by light and temperature.

### Let the Light Shine

Plants and algae convert light energy to energy for growth and reproduction through the process of photosynthesis. Long hours of sunlight, in combination with nutrients such as phosphorus and nitrogen, allow plants and algae to grow rapidly during the summer months.

In many shallow lakes, light can penetrate the water column to large areas of the lake bottom and encourage rooted plant growth. In lakes with high nutrient concentrations, algae can grow thickly and cause nuisance conditions in the summer months.

### Plant Power

Plant habitat is very beneficial to the other organisms in a lake. Plants provide food, structure for attachment, shelter from predators, and shaded areas. During the summer when most people want to get outside and enjoy the lake, plants are providing resources for a whole host of other critters.

Sometimes plants can grow so thickly, especially non-native weeds, that they inhibit recreational activities such as boating, fishing, and swimming. However, a healthy

shoreline of native plants helps to support a diversity of mammals, waterfowl, amphibians, fish, and microorganisms, and is the most ecologically rich part of a lake.

### Lakes Run Hot and Cold

Ever been swimming in the lake during the summer and noticed a layer of cold water beneath the warm surface layer? Then your lake has probably thermally stratified. Volunteer monitors in King County's Lake Stewardship Program report that most lakes cool to near freezing temperatures of 4° Centigrade (39° Fahrenheit) in the winter months. During the spring the surface water warms as the air temperature warms. Summer lake surface temperatures of 23° Centigrade (74° Fahrenheit) are frequently reported. If the lake is deep enough, the bottom water may stay cool. Eventually the temperature difference between the surface water and the bottom water becomes

great enough that the lake thermally stratifies.

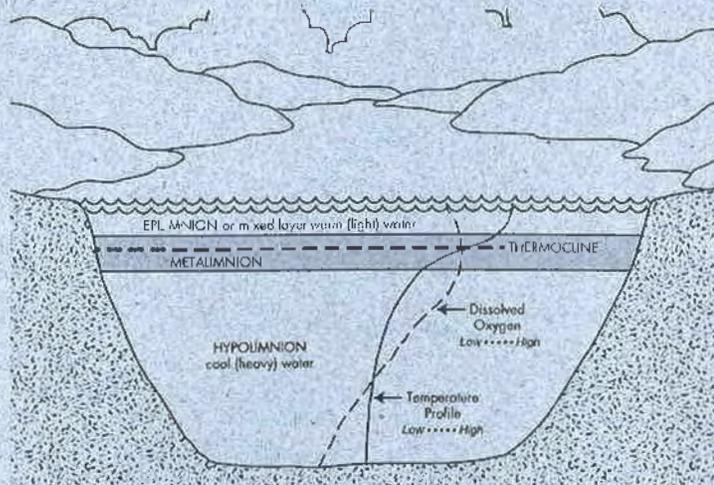
In other words, the cool bottom layer of water (the hypolimnion) becomes thermally isolated (Figure 1) from the warm surface layer of water (the epilimnion). A middle layer known as the metalimnion separates the warm and cool layers. The metalimnion is characterized by large temperature changes over a small change in lake depth.

### Profiling a Lake

Twice a summer, King County volunteer lake monitors profile their lake. That means they collect water samples from different depths of the water column: surface-depth, bottom-depth, and mid-depth.

True stratification has been defined as a temperature difference of greater than one degree centigrade per one meter of depth in the hypolimnion (Wetzel, *Limnology*, 1983). Volunteer monitors take profile samples in late June, and then

Figure 1: Example of a thermally stratified lake in mid-summer



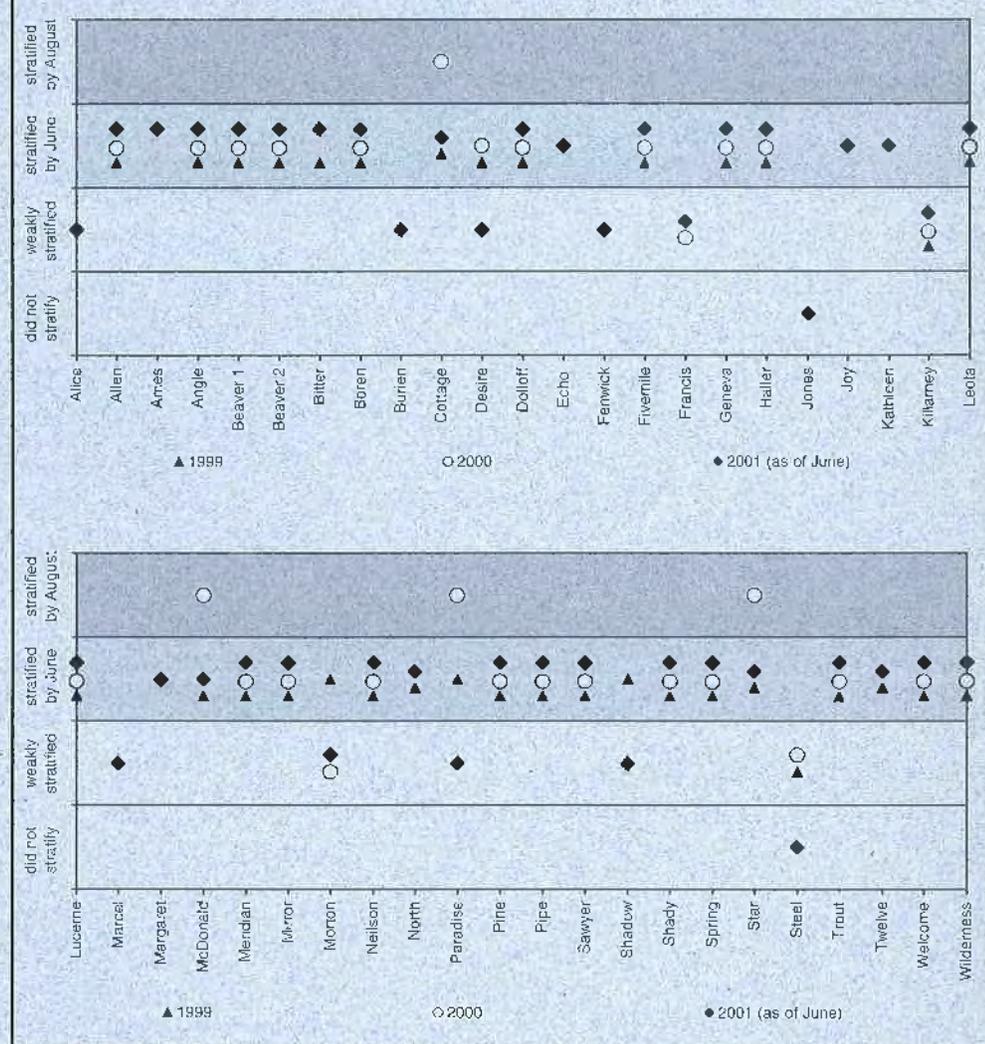
again in late August. As of June 2001, 33 of the 45 lakes profiled had stratified (Figure 2). Jones and Steel lakes showed no signs of stratifying, and ten other lakes were weakly stratified. In the summer of 2000, 23 of the 31 lakes profiled had stratified by June, four more had stratified by August, and four only weakly stratified in the course of the season. Finally, in the summer of 1999, 32 of the 34 lakes profiled had stratified by June.

Factors that can impact the timing and likelihood of lake stratification include lake depth, total water volume in a lake, the volume of inflow and outflow, surface area, and the position of the lake basin in relation to wind action. Lakes Francis and Jones are very shallow lakes, both are less than 9 feet deep, and therefore sunlight warms the lake water all the way to the bottom. The depth of Steel Lake is comparable to many lakes in King County that stratify strongly, and yet it only weakly stratifies. Wind action at this lake may mix the surface water with the lower layer and thereby warming the lake throughout.

### Your Lake has Chemistry

Over the course of the summer, the epilimnion and hypolimnion layers of water do not mix and over the course of the summer water chemistry becomes very different in each layer. As the summer progresses, the hypolimnion can

Figure 2: Stratification pattern of lakes in the Volunteer Monitoring Program



become depleted of oxygen (anoxic). This occurrence can stress fish which require cool, oxygenated waters.

When the hypolimnion becomes anoxic, changes in the water chemistry can release nutrients from the sediments into the water. In the fall, as the air temperature cools, the nutrient rich bottom layer re-mixes with the surface layer and an algal bloom can result.

### To Your Health

Things you can do to help your lake retain a healthy and diverse ecosystem and discourage nuisance algal blooms include: planting native plants along the shoreline, limiting or eliminating use of fertilizers and pesticides, picking up pet waste, preventing erosion, and making sure that your septic tank is functioning properly. Contact **Michael Murphy** at (206) 296-8008 to learn more. 🐾

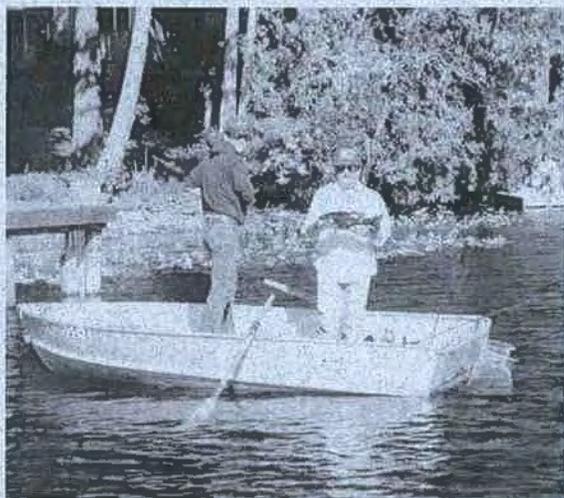
## The FYI File

# Fish stocking in King County lakes

Our lakes and streams offer abundant opportunities for anglers, including an array of possible catches originating from the eastern United States. *Say what?*

## Fish by the Trainloads

Ever since the 1890s, King County lakes have been stocked with a mixture of native and non-native fish. Western Washington has approximately 46 native freshwater fish species, including several varieties of sculpins, rainbow trout, and cutthroat trout. However, as settlers arrived to the area they brought with them an appetite for eastern fish such as bass, crappie, bluegill, perch, and brook trout. With the approval of the federal government, approximately 30 species of fishes were eventually introduced by these early settlers. During the heyday of this stocking effort, trainloads of imported fish arrived to western Washington, destined for area lakes.

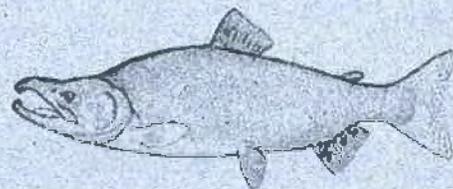


Anglers and others benefit from waters stocked with a variety of fish.

Today, most King County lakes continue to be stocked, either by private organizations or by the Washington Department of Fish and Wildlife (WDFW). County lakes with public access are often stocked in mid-April to mid-May so that the fish will be available for the opening of fishing season. A Fish Stocking Permit from WDFW is required to plant fish into ponds or lakes on private land in Washington. According to the WDFW, rainbow trout, largemouth bass, bluegill sunfish, and channel catfish are the best choices for private waters in Western Washington.

## Stocking and Fishing Permits

Regardless of the size of the fish stocking program (from small private ponds to large lakes), care must be taken to protect existing native species and important non-native fish. The spread of stocked fish species can have a detrimental impact on existing fish populations through predation or competition. Additionally, stocked fish species coming from commercial or wild sources may carry disease agents to waters that currently do not have them. By requiring a Fish Stocking Permit, WDFW biologists are able to make determinations on the risk to fish in the waters intended for stocking and any nearby state waters.



Kokanee (landlocked sockeye salmon) are commonly stocked in area lakes.

Applications for a Fish Stocking Permit may be obtained at the Region 4 WDFW office located in Mill Creek. There is a \$24 fee that must accompany the application. When your application is received, you will be contacted by a WDFW fish biologist to arrange an appointment for an on-site evaluation.

Once you've found where the fish are biting, don't forget to obtain a fishing license. New this year, WDFW has an automated system allowing the license to be purchased over the phone. Also an Access Stewardship Decal is required to park a vehicle in most of the public access areas maintained by WDFW. These decals are free with the purchase of a fishing license or may be purchased separately for \$10. For more information on decals and licensing, call the WDFW at (360) 902-2434 or visit WDFW's website at <http://www.wa.gov/wdfw/>.

## What's in my Lake?

For the 2001 fishing season, most King County lakes were stocked with trout. You can find out specifics for your lake by going to the WDFW Region 4 web page at <http://www.wa.gov/wdfw/fish/regions/reg4/reg4.htm>. Or call them at (425) 775-1311. 🐟

## Learning About Leeches

# Ask Dr. Lakenstein

I heard that in the summer lakes have leeches in them.

Gross! What should I do to avoid them?  
—Afraid to Swim



Dear Scared Swimmer,

It's true: Leeches are more abundant during the summer. They reproduce in the spring, and several weeks later the young leeches are out on their own. Leeches are commonly found in lakes and ponds around King County, attached to the undersides of rocks, logs, and submerged vegetation. Leeches, which are aquatic worms, provide food for fish, turtles, ducks, and other shorebirds. When active, leeches tend to swim in shallow areas, near the bottom of their aquatic habitats to avoid predators.

This area is also where most humans come in contact with leeches—as they are wading the shallows of a lake.

The good news is leeches prefer to attach themselves to invertebrates and other vertebrate hosts such as fish, reptiles, and small mammals, but if a human is around, a leech may climb on for a meal. But before we talk about this one unpleasant aspect of a leech's personality, let's look at some of the cool things it does for us and the environment.

Leeches provide food for all sorts of critters, which is a very good thing. Leeches are also used for a variety of scientific and medical purposes. Modern medical practices occasionally rely on the natural anticoagulant and clot-digesting

properties found in leech saliva. It is already commonly used in plastic and reconstructive surgery. Researchers have also started studying using leeches for treating heart attacks and strokes.

If you find a leech has attached itself to you, don't panic. The amount of blood it is taking is minimal. To get the critter to let go, sprinkle some salt on it. It will release its grip and fall off. A leech will also release on its own once it has had its fill. Avoid pulling it off as this may tear your skin and increase the size of the wound.

Leeches are an important part of aquatic ecosystems acting both as predators and as prey. For more information and fun facts about leeches, go to <http://dnr.metrokc.gov/wlr/waterres/Bugs/Leeches.htm>. 🐞

## Volunteer Spotlight

# Minding Meridian

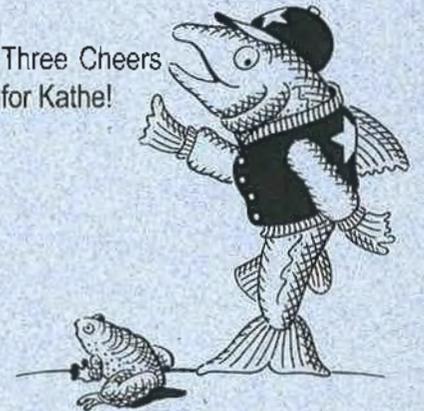
For nearly a decade with boundless energy and enthusiasm, Kathe Dizard has monitored the health of Lake Meridian, a 150-acre urban water body 4 miles east of Kent. She and her husband and two children moved to Lake Meridian in 1991 and shortly thereafter Kathe began volunteering with King County's Lake Stewardship program. Since then, Kathe has logged in a "hoat load" of data sheets, tracking daily precipitation and lake levels, as well as weekly Secchi depth readings.

Kathe recalls that she was drawn to the volunteer program as a way to teach her then young children about

the lake's natural gifts. Through the years, Kathe's son and daughter have taken turns assisting with the monitoring duties. "I wanted our children to appreciate how lucky we are to live here—we see bald eagles, turtles, frogs, ducks, all kinds of wildlife. That's what we like, the little reptiles and amphibians we get to see while monitoring the lake. All those things are so cool; the wildlife is the big draw."

In addition to her tireless work volunteering, Kathe teaches third grade at Horizon Elementary, located across from street from the

Three Cheers  
for Kathe!



lake. She takes what she has seen and learned monitoring Lake Meridian and inspires her young students to care about the lake's ecology as well. As it happens, Kathe's classroom looks out on Lake Meridian and an active eagle's nest. Her students have  
*(continued on page 8)*

# Bats. . .

(continued from page 1)

when insects become scarce, Northwest bats must either migrate to warmer places or hibernate. When hibernating, which can be as long as six months, bats live off the fat they built up during the summer. In the spring, female bats seek out maternity roosts and by the early days of summer, each will give birth to a single pup.

People often fear bats because they mistakenly believe they all carry rabies. In reality, less than one percent of all bats in the world are infected with the rabies virus. Still, as with all wild animals, caution should be exercised and one should never attempt to feed or pet these creatures.

## Bats in Your Belfry

Bats are a vital part of the Pacific Northwest ecosystem and a great animal to have around the yard for insect control. However, you probably do not want one taking up permanent residence in your house. If a bat flies into your home, remain calm and open the doors and windows so that it can find its way out. Keep children and pets from coming in contact with it. Typically a stray bat is a juvenile learning to fly. If the bat does not leave on its own, put on a pair of gloves and gently place the animal into a container and then release it outside.

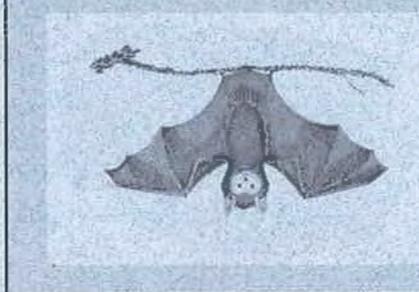
## Helping Our Bats

In King County eight common species of bats have been identified residing here, but as many as 12 to 15 different species may live here, at least part time. As people move

## Attracting bats to your backyard

Habitat loss is the greatest threat to our Northwest bat populations. In addition to learning to landscape with native plants and keeping natural areas, homeowners can aid bats by providing a couple of well placed bat boxes on their property.

Lakeside residents have an ideal environment for bats. Bats prefer roosting in sunny areas near water



further out to the rural areas of the county, bats are losing their maternity roosts in old trees and snags and hibernation sites they favor in caves, rock crevices, or abandoned mines. Yet, there is still time to help these gentle creatures. First and foremost, never disturb bats in hibernation. This uses up valuable fat reserves. If the bat is disturbed again, or the winter is long, it may not have enough fat to survive. You can also aid bats by putting up a bat box in your yard as an alternate roosting site. The bat gets a suitable home and you get a great nighttime show as it dashes around.

## Learn More

The **King County Wildlife Program** at (206) 296-7266 or <http://dnr.metrokc.gov/wlr/lands/wildlife.htm> provides a wealth of information on bats. Also check out **Bats Northwest** at [batsnorthwest.org](http://batsnorthwest.org) 🦇

and those areas that have a readily available food supply. Erecting bat boxes is fairly easy and inexpensive. **Bats Northwest** provides extensive information on bat houses on their website, [batsnorthwest.org](http://batsnorthwest.org).

While there is no guarantee that bats will inhabit your box, there are a number of features it should have to be successful. Bats want warm places to roost, so put your box where it gets as much sun as possible. If it is attached to a tree, trim back branches shading it. Paint it with flat black latex paint. Caulk the sides and top so the bats' body heat will be retained. Make sure the back of the box extends down a few inches to give them a "landing pad." Patience is the key. Bats are so faithful to their known roosts, it may take a couple of seasons for them to find a new one.

Even if you do not have a suitable place to erect a bat box, there are things you can do to create a good "bat environment." One easy way is to provide food for bats. Encourage night flying insects by placing solar lights in your garden or planting night blooming plants such as salvia, silene, phlox, spearmint, and comflower. Although it seems counter-intuitive to foster an insect invasion, homeowners find that mosquitoes and other flying insects are greatly reduced when bats regularly hunt in the area.

# Beware the invaders

Our lakes and wetlands are threatened by a variety of invasive plant and animal species. Most of us are familiar with invasive plants like purple loosestrife and Eurasian watermilfoil, which are already impacting our lakes. Less familiar to us but equally threatening are the new invaders like hydrilla (*Hydrilla verticillata*) and yellow floating heart (*Nymphoides peltata*). On the animal front, non-native bullfrogs have displaced many of our native frog species and our lakes fisheries feature a host of introduced species from other parts of the world. Now, zebra mussels (*Dreissena polymorpha*) represent the latest threat to our aquatic systems.

## The Next Invader

Zebra mussels are small (fingernail-size) freshwater mollusks that were accidentally introduced to the Great Lakes during the discharge of ballast water from incoming ships. Since their 1986 introduction, zebra mussels have spread to 20 states and two Canadian provinces (Figure 1).

Zebra mussels colonize on a variety of surfaces including docks, boats, nets, and water intake pipes. Once established, the colonies are very difficult to remove and can eventually damage affected equipment.

The spread of zebra mussels occurs primarily by trailered boats. If a boat has been in infested waters for one day or for one year, it can be a carrier of zebra mussels. One female mussel can release a million eggs each year so infestation can occur quite quickly.

To combat the potential spread of zebra mussels westward, *The 100<sup>th</sup> Meridian Initiative* partnership has been formed. The 100<sup>th</sup> meridian is the "line in the sand" which runs north to south through North Dakota down to Texas (Figure 1). This partnership includes agencies, private industries, and user groups interested in preventing the spread of zebra mussels westward.

## Zap the Zebra

You can participate in regional efforts to track the potential

spread of zebra mussels in the Pacific Northwest. Portland

State's University's Center for Lakes and Reservoirs is currently soliciting volunteers to participate in a zebra mussel early warning system. Volunteers must have access to natural waters and be able to deploy substrates for zebra mussel colonization. The substrates are made of perforated PVC pipe that can be hung from a dock or other fixed object. The University will provide all the materials you need. For more information contact **Ryon Edwards**, zebra mussel coordinator at (503) 725-3834 or at [psu12260@pdx.edu](mailto:psu12260@pdx.edu)

## Practice Preventative Measures

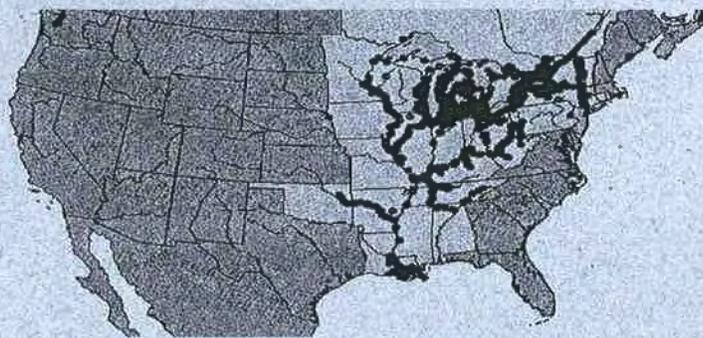
As a general preventative action against the spread of invasive plants and animals, washing, scrubbing, and drying your boat, the cooling system of your motor, and its equipment between sites will help prevent accidental introductions to uninfested waters. For more information, check out the following websites:

- <http://www.wa.gov/wdfw/fish/nuisxsun.htm>
- <http://ANSTaskForce.gov>
- <http://dnr.metrokc.gov/wlr/LANDS/weedsweedid.htm>
- [http://www.wa.gov/agr/weedboard/weed\\_info/index.html](http://www.wa.gov/agr/weedboard/weed_info/index.html)



Zebra mussel

Figure 1: Known zebra mussel distribution in the U.S. as of November 2000



\*\*indicates inland and adjacent waters affected. So far, infestation is limited to the eastern United States. Map courtesy of USGS.

# Untangling permits. . .

(continued from page 1)

## Establishing Setbacks

A setback is the distance required from the closest part of a structure to the ordinary high water mark. Building setbacks vary with the type of environment as defined by the Shoreline Management Act. For urban or rural environments, the setback is 20 feet. For conservancy environments, the setback is 50 feet and for natural environments, the setback is 100 feet. Be aware, setback greater than those established under the Shoreline Management Act may be required under the sensitive areas provisions of the King County Code (KCC21A.24).

## Removing or Adding Materials

A clearing and grading permit is required when clearing, filling, or excavating vegetation or other material within a sensitive area like a shoreline, steep slope, wetland, lake, or stream. For more information about shoreline development and associated permits, call **DDES** at **(206) 296-6640**.

DDES also has numerous customer service bulletins that address frequently asked questions. Copies may be obtained by calling **(206) 296-6600** or printed directly from the Internet at [www.metrokc.gov/ddes/bulletin.htm#alpha](http://www.metrokc.gov/ddes/bulletin.htm#alpha)

# Minding. . .

(continued from page 5)

watched a mated pair raise several offspring over the past three years. With Kathc's help, students track the birds' progress on the school's website.

When not teaching class, Kathe likes to bike, hike, and spend time in the garden. But mostly she is content to watch Meridian's ever-changing watery world. "We enjoy the nature and wonderful surroundings here," Kathe notes.

The staff at the Lake Stewardship Program thanks you for your valuable contribution and continued participation!



## Water and Land Resources Division

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