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## **Herbicide use in Houghton Lake: An Overview of Purpose**

Herbicides have become necessary to use on Houghton Lake over the past decades due to the invasion of exotic species such as Eurasian watermilfoil and starry stonewort. These invasive species are able to out-compete native species and often times displace natives in large areas of a waterbody. Previously, in 2000, it was reported that Eurasian watermilfoil occupied about 50 percent of the area in Houghton Lake. Much of this area was topped-out and extremely dense. These large mats hindered navigation, negatively impacted fishing and reduced aquatic plant biodiversity. **It is important to realize that during any given year, less than 5% of the total surface area of Houghton Lake is treated with aquatic herbicides.**

Herbicides are a substance or combination of substances that have been developed to control vegetation. Most aquatic herbicides were developed for agricultural use initially and then vetted for potential use in aquatic environments. If an agricultural active ingredient is found to be scientifically useful in the aquatic ecosystem, then additional EPA registration for an aquatic label will be required.

To be used in the State of Michigan, an aquatic labeled herbicide must be registered and labeled with the U. S. Environmental Protection Agency (USEPA), registered for use by the U.S. Department of Agriculture (USDA), and approved for use by the Michigan Department of Environment, Great lakes and Energy (EGLE). All herbicides used under the authority of the Houghton Lake Improvement Board (HLIB) are applied by a licensed company and certified applicator and must follow the annual EGLE permit. Aquatic herbicide applicators are required to submit annual treatment reports on the lake treatment to EGLE for review.

Herbicides on Houghton Lake are only used after a rigorous whole-lake survey annual of tens of thousands of GPS sampling sites is completed to establish those areas only where infestations are present. Herbicides are only used after careful consideration by the consultant and a recommendation to the HLIB. Like many substances, the amount of herbicide used needs to be tailored to the plant to be controlled, water depth, and water temperature. Herbicides have a range of toxicity, and many are less toxic than other common products such as aspirin, table salt or caffeine (Table 1).

**Table 1. Relative toxicity of aquatic herbicides based on risk and benefit as explained by the licensed herbicide application company, Professional Lake and Land Management (PLM).**

Least Toxic	Substance	Acute Oral-Rates LDC/50 mg/kg
		Fluridone
	Glyphosate	5,600
	Table Salt	3,000
	Triclopyr	2,574
	Aspirin	1,000
	2,4-D	300-1,000
	Copper Sulfate	300
	Diquat	230
	Caffeine	192
	Nicotine	53
Most Toxic	Sodium Cyanide	6.4

**NOTE: LDC/50 (lethal dosage/50%) is the amount of active ingredient required to cause the death of one-half of the test population.**

Most aquatic herbicides are mixed with water and spread evenly over the surface of the area to be treated. Dilution of the herbicide quickly occurs as it mixes with the water column. For example, Reward® (diquat) when applied at 2 gallons per surface acre would require a 150-pound person to consume 3,750 to 7,500 gallons of treated water to ingest enough of the active ingredient to achieve a lethal dose concentration 50 percent of the time.

Herbicides are generally classified as contacts or systemics. Contact herbicides are taken up by the foliage and directly reduce the plant foliage yet are not uptaken by plant roots. Contact herbicides are frequently used to reduce the biomass of dense native vegetation. Systemic herbicides are taken up by the foliage and roots and distributed throughout the plant and generally take longer for mortality to occur. Systemic herbicides are more selective and are frequently used on Eurasian watermilfoil.

EPA registered herbicides are approved for use as labeled but that does not mean there is no risk to the environment. It does mean that for use in the United States, the benefits have been determined to outweigh the risks. RLS oversees all major treatments on Houghton Lake to insure proper use, location, and rate of use. Most aquatic herbicides break down rapidly in the aquatic environment. Depending on the products used, a combination of sunlight, water chemistry and microbial action break the herbicide down into natural components. Some herbicides such as diquat bind with the sediments and are neutralized, therefore no longer available as an herbicide.

In Michigan there are no restrictions on fishing or the consumption of fish from areas treated with herbicides. Fish often times move out of treatment areas briefly when treatment occurs. Swimming is restricted for 24 hours after herbicide treatment in those areas of the lake that are treated.

The herbicide applicator is required to notify all property owners 45 days prior to the treatment season via mail of the proposed use of herbicides. On the day of treatment, areas that are treated are posted with signs referencing the products to be used and any restrictions that are required such as watering and swimming restrictions. Boat launch areas are posted with a map of areas that are to be treated.

**Literature Cited:**

Risk Benefit Statement, PLM Lake and Land and Management Corp

Frequently Asked Questions about Aquatic Herbicide Use in Wisconsin, Wisconsin DNR