

Milfoil Control: Chemical Treatment Option
Submitted by Rick Schweller, Ed Boyer 12/19/08

- A) Cost: Initial:** Prices quoted by chemical applicators range from \$315.00 to \$425.00 per acre, depending on which product is used and whether you treat the whole lake or not . **Follow up cost:** depends on need for follow-up spot treatment (more info below).
- B) Estimated time frame for effectiveness:** Most organizations we spoke with who used chemical treatment saw immediate results. Jerry Angers (a certified herbicide application technician) said full effect could be expected by approx 10 days after treatment. (see referrals in attachment # 1)
- C) Estimated length of effectiveness before requiring reapplication:** Ranges from 3 to 7 years or more. Monitor lake conditions and spot treat only as needed. Jerry Angers quoted a kill rate of 75-90%. Bear Lake experienced an even higher success rate. (see referrals attachment # 1)
- D) If control agent used, can it effectively confined to intended application target:** Yes, chemical can be controlled. See Petoskey Department of Parks & Recreation info regarding use of special anti-drift agents in attachment # 1.

E), F), G), H)* **Effect of Chemical Weed Control Agents on Human, Fish, Bird & Animal Populations and Non-Targeted Plant Life*

The chemical herbicides used by certified herbicide applicators to treat milfoil must be registered with the United States Environmental Protection Agency (EPA) and have had to undergo rigorous aquatic bio toxicity studies before being certified as safe for use. The EPA has certified that these herbicides are safe and do not affect Human, Fish and Animal populations if used according to the label and if proper procedures are followed. For example, you'd probably give a person two Tylenol for a headache if asked without giving it a second thought. On the other hand, you'd probably be concerned if they took the entire bottle of tablets. Many lake associations hire a limnologist to oversee any herbicide application and ensure that proper procedures are followed.

The herbicide most likely to be used in our situation would be 2,4-D. Millions of pounds of 2,4-D are used in the US each year and is one of the oldest and most studied herbicides in use today. 2,4-D is used in branded

name products such as Scott's Weed & Feed and Miracle Grow Weed & Feed Fertilizers.

Primary uses of the herbicide in the US:

- 11 Millions Pounds are used on range and pastures used for hay production that is used to feed cattle and enter the food chain in the US beef market.
- 8 Million Pounds are used by home owners in various ways to treat weeds in lawns, flower beds and vegetable gardens.
- 7 Million Pounds are used to control weeds in Wheat Fields and enters the food chain in everything that uses Wheat Flower.
- 3 Million Pounds are used by Lawn care Companies to treat weeds in lawns.

Reference:

www.epa.gov

Why Aquatic herbicides affect Aquatic Plants and Not You

There are many different types of pesticides. Each pesticide is designed to impact specific targets. Insecticides, for example, are intended to kill insects, rodenticides to kill rodents and so on. Herbicides are intended for application on plants. Each of these products have a different chemical composition.

Submerged flowering plants can be controlled with products such as Aquathol, Reward, Sonar, or 2-4-D. A complete list of chemicals approved for use in the State of Michigan can be found on the DEQ website. The two chemicals most often used to treat milfoil are Sonar (used predominately when treating the entire body of water) and 2-4-D (used primarily when treating portions of a body of water) and is the focus of this paper.

A key process that plants can do that we as animals cannot do is photosynthesize, and in order to photosynthesize, plants have to be able to make chlorophyll and carotenoid pigments. Chlorophyll is very sensitive to sunlight; in fact, if it is unprotected, it will start to bleach and die. The carotenoids function as a sunscreen, protecting it from excessive rays from the sun.

Sonar does not affect chlorophyll synthesis but instead targets and inhibits the synthesis of carotenoids. Humans and other animals cannot manufacture carotenoids—therefore, humans and other animals are not affected by Sonar.

Plants can also make certain types of hormones—one of those types is auxin. If a plant cell is exposed to auxin, that plant cell is then stimulated to grow and become larger. Animal cells, on the other hand, are not affected when exposed to auxin and will stay the same size. The reason the animal cell is not affected by auxin is because it does not have receptors on its outer cell membrane that recognizes the auxin. 2-4-D acts like a hormone. However, 2-4-D acts primarily on Dicots (Broadleaved Plants) and has little impact on Monocots (Narrow Stemmed Plants). Most native weeds are Monocots which is why 2-4-D can more selectively attack milfoil (which are Dicots), leaving native Monocot species to function in their normal roles as producers of habitat, shelter and oxygen for aquatic wildlife.

To summarize, compounds like Sonar & 2-4-D act in a very specific manner. These chemicals effect processes that occur in plants and not humans or other animals. This is why toxicity of these herbicides is very low. Toxicity in mammals is measured as an oral LD50. The LD50 is the dose of the compound in milligrams per kilogram of body weight that will cause mortality to 50 % of the test population, in this case, rats. The LD50's of 2-4-D and Sonar range from 800 to greater than 10,000 milligrams per kilogram of body weight of a rat. In other words, it would take anywhere from an ounce to as much as a quart of these two products to cause death to humans and other living organisms —and only if we were to drink the herbicide straight from the jug. Fortunately, if anyone were to try and drink an ounce, much less a quart, they would experience a gag reflex before they could consume much. Herbicides are diluted per manufacturer and EPA specifications before being applied to weeds in a body of water. For a person to become ill, they would have to drink over 1,000 gallons of water a day, every day, over a life time to get an adverse effect. The phrase “The poison is in the dose” is very true here. To confirm, aquatic herbicides are diluted to extremely low concentrations, such that they have little toxic affect once they have been applied to the water.

Also, 2-4-D & Sonar have a very short shelf life after being exposed to the environment. For instance, 2-4-D is very susceptible to microbial degradation. Sonar is removed from the water by photo degradation—its half life is only 20 days. Therefore, these two compounds have a very short life in the water. Consequently, even if you were able to drink 1,000 gallons

of water a day, the compound would not even be there after, at most, 30 days.

What is the potential of these products to cause cancer? All pesticides go through a vigorous registration process with the EPA. The EPA registers the toxicity of a chemical via an alphabetical system of “A” to “E”. “A” compounds are known to cause cancer. “E” compounds have shown that they do not cause cancer. Extensive research by the United States FDA, Canadian Centre of Toxicology and the World Health Organization has determined that 2,4-D is to be classified as “D” grade product. The “D” classification means that it is “not classifiable as a human carcinogen and that there is inadequate or no data at all that suggests the product is a carcinogen”. Sonar is registered as E, which means multiple tests have confirmed that it is non-carcinogenic.

The information noted above explains why herbicides affect aquatic plants and not humans, birds or other aquatic creatures. Herbicides have an excellent track record of controlling aquatic weeds. Extensive worldwide research has proven repeatedly that herbicides are safe when used properly. Proper use of herbicides ensures no adverse effects on the aquatic environment (other than the milfoil). they are a proven excellent tool for lake management.

Dr. Carole Lembi, Professor of Botany, Department of Botany and Plant Pathology, Purdue University. www.btny.purdue.edu/faculty/lembi

What is the predictable weed kill & what can be expected in terms of retreatment from using Sonar and 2,4-D like Herbicides

Sonar: Sonar is the preferred herbicide when treating 100 % of a lakes surface acres. The data summarized below comes from a consortium of lakes that used Sonar: Silver Lake, Big and Little Myers Lake, Lake Miramichi, Sherman Lake, Selkirk Lake, Little Pine Lake, Sandy Pines, Jordan Lake, Lake of the Woods, North Lake Gobels, Round Lake, Bass Lake, Houghton Lake, Wall Lake, Gitchegumee. All of these lakes are located in Michigan.

Initial treatment with Sonar can be expected to last between 3-7 years before needing to treat the lake again. The upper end of this range was achieved by spot treating small areas of weeds in the lake each year with products like 2,4-D. Silver Lake has gone 8 years without a whole lake re-treatment as they spot treat each year with a 2,4-D and/or similar product.

2,4-D: 2,4-D is used when not treating the whole lake. Expect at least a 65-75 % weed kill with the initial application. Bear Lake achieved an even greater kill rate and Jerry Angers (a certified herbicide applicator) said he usually experiences 75% -90% milfoil kill rate. Some lakes may re-treat ~ 25 % of the initial area treated in year 2 with some minimal spot treatment going forward (depending on the criteria established by the community as to what milfoil concentrations are acceptable ongoing, lake conditions i.e. depth, water clarity, nutrient levels, etc)...

References:

DickOsgood@USInternet.com

www.aquaticnuisanceplantcontrol.com

E) Funding options both public and private: Funding research is also being handled by Cathy Freebairn

F) Applicable governmental requirements(certifications, permits, etc.) and restrictions:

See attachment #2 for DEQ permit request form.

See attachment #3 for DEQ Treatment Report form.

See attachment #4 for Frequently Asked Questions, part 1

See attachment #5 for Frequently Asked Questions, part 2