

Aquatic Herbicide Alert

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**Please read this document if you are considering the use of herbicides in ponds or lakes for controlling nuisance and invasive weeds.
False and misleading statements on the safety and characteristics of these herbicides are being promulgated in Massachusetts.**

Executive Summary

Certain vendors are approaching pond and lake associations, city councilors, conservation commissions, and selectmen and advocating herbicide use as the method of choice for controlling nuisance and invasive weeds in water bodies. These vendors are not revealing the health risks involved with pesticide use, and are, in fact, illegally¹ making false and misleading claims about the safety, characteristics, and endorsements of their products.

The most serious misleading statements encountered involve understating the health risks, environmental effects, and persistence of the chemicals; falsely linking United States Environmental Protection Agency (EPA) registration with verifications of safety and/or non-carcinogenic status; and false claims of endorsement by the Massachusetts Audubon Society for using herbicides in water bodies.

Never accept the material presented by a vendor on the health and environmental effects of an herbicide without verifying it with an independent authority such as the Environmental Protection Agency, Department of Environmental Protection, Exttoxnet, the Material Safety Data Sheet, or the Product Label itself.

Herbicides are a type of pesticide. The following four synthetic herbicides are being proposed, all are subject to site-specific local and state approval: 2,4-D, Diquat bromide (Reward), or Fluridone (Sonar), for killing aquatic plants; and glyphosate (Roundup or Rodeo) for killing embankment plants. All four pose health and environmental risks and provide only temporary relief from the weed problems.

Although EPA allows registration and restricted use of pesticides, they do not encourage their use. Registration of a product by the EPA does not imply that it is safe; there are currently thirty-six EPA registered pesticides which are carcinogenic. In fact, the EPA states that all "pesticide use creates some risk of harm to humans, animals, or the environment." Pesticides should not be used as a routine, repeated, or long-term method for controlling invasive weeds in ponds and lakes. Even single-use applications must be carefully considered to ensure that the voluntary and involuntary health and environmental risks associated with broadcasting toxic chemicals into the environment are justified, and that alternative methods are not available.

Presented here is a summary of what is known about the actual health and environmental effects, and persistence, of the chemical herbicides in question. This information is obtained from the manufacturer's Material Safety Data Sheets; the EPA; the DEP; EXTTOXNET multi-University pesticide database; the New York State Board of Health; and the references appended to this document. A description of some of the non-chemical alternatives is also presented.

Chemical Summary

2,4-D: (2,4-dichlorophenoxy)acetic acid. *Exposure routes:* 2,4-D is toxic if inhaled, ingested, or absorbed through the skin. *Acute toxicity:* 2,4-D is moderately toxic via ingestion: an amount equivalent to two Lifesavers administered to each of four kindergarteners would kill two of them (oral LD50 as low as 320mg/kg). It is highly toxic via eye exposure. It is readily absorbed through the skin and lungs. *Chronic toxicity* includes adverse effects to the liver, nerves, bone development, and possibly cancer. *Environmental effects:* It is moderately toxic to birds and highly toxic to fish. *Persistence:* The half-life in soil is less than 7 days. Despite its short half-life in soil and in aquatic environments, the compound has been detected in groundwater supplies in at least five States and in Canada. Very low concentrations have also been detected in surface waters throughout the U.S.. The current Maximum Contaminant Level² (MCL) drinking water standard is 0.07mg/l. *Breakdown products:* 2,4-D transformation products include at least 4 dioxins, which are carcinogens, and TCDD, which suppresses the immune system of developing children. *Contaminants and inerts*³ The carcinogen dioxin, a common by-product of the manufacturing of chlorinated compounds such as 2,4-D, has been known to contaminate 2,4-D products.

Diquat bromide (Reward): 1,1'-ethylene-2,2'-bipyridylium dibromide salt. *Exposure routes:* Diquat bromide is toxic if inhaled, ingested, or absorbed through the skin. The possibility for poisoning increases with repeated exposure. *Acute toxicity:* It is moderately toxic via ingestion: an amount equivalent to two Tic-Tacs, administered to each of four kindergarteners, would kill two of them (oral LD50 as low as 30 mg/kg.). *Chronic toxicity* includes adverse effects to the gastrointestinal tract, eyes, kidneys, liver, and the lungs, in particular cataracts in the eyes. *Environmental toxicity:* It is moderately toxic to birds, fish and aquatic invertebrates. Since DIQUAT DIBROMIDE IS A NONSELECTIVE HERBICIDE it may present a danger to non-target plant species. *Persistence:* It is highly persistent, with reported field half-lives of greater than 3 years. It has the ability to eventually use up all the available adsorption sites on soil clay particles. Field studies for the New York State Board of Health showed that 5 days after application the concentration in the water is greater than MCL² current drinking water standards of 0.02mg/l. "Swimming, fishing and watering of domestic animals should not be allowed for at least 14 days after application of the herbicide to water," according to Exttoxnet. *Breakdown products:* unknown. *Contaminants and inerts*³: From the MSDS: "This product contains a chemical known to the State of California to cause cancer (Ethyl-4,4'-dichlorobenzilate)."

Fluridone (Sonar): 1-Methyl-3-phenyl-5- [3-(trifluoro-methyl) phenyl]-4(1H)-pyridinone *Exposure routes:* Fluridone is toxic if inhaled, ingested, or absorbed through the skin. *Acute toxicity:* Fluridone is considered an immediate health hazard. It has low acute toxicity via ingestion: an amount equivalent to a scoop of ice cream administered to each of four kindergarteners would kill two of them (LD50 5000mg/kg). *Chronic toxicity* includes adverse effects to eyes, liver, kidney, and testicular atrophy. Studies by Dynamac Corporation for the EPA reported fluridone to be a carcinogen. *Environmental toxicity:* Fluridone is moderately toxic to birds, fish and aquatic invertebrates. Trees and

shrubs growing in treated water may develop chlorosis (loss of green pigment). Irrigation with treated water may result in injury to plants. *Persistence*: It has a half-life of 5-60 days, depending on conditions. It must remain in contact with target plants for 45 days to be effective. **NO DRINKING WATER STANDARDS CURRENTLY EXIST²**. *Breakdown products*: Fluridone degrades to a number of intermediates, including n-methylformamide(NMF), which has been shown to cause birth defects, liver damage, spina bifida, and deformity of the brain and internal organs. *Contaminants and inerts³*: The “inert” 1,2-propanediol may be harmful by ingestion, inhalation or through skin contact, and cause skin or eye irritation.

Glyphosate (Roundup, Rodeo): N-(phosphonomethyl) glycine. *Exposure routes*: Glyphosate is toxic if inhaled, ingested, or absorbed through the skin. *Acute toxicity*: Glyphosate has low acute toxicity via ingestion: an amount equivalent to a scoop of ice cream administered to each of four kindergarteners would kill two of them (LD50 5000mg/kg). *Chronic toxicity*: Miscarriages, premature births, non-Hodgkin’s lymphoma. *Environmental toxicity*: It is a broad spectrum, non-selective herbicide, that affects non-target and native plants. It is slightly toxic to birds, fish and aquatic invertebrates. *Persistence*: Glyphosate is moderately persistent in soil, with field half-lives of up to 174 days. Its half-life in pond water ranges from 12 days to 10 weeks. It is extensively metabolized by some plants, while remaining intact in others. Current MCL² drinking water standards are 0.7mg/l. *Breakdown products*: Transformation products include formaldehyde, a known carcinogen, and N-nitrosoglyphosate. *Contaminants and inerts³*: Of serious concern is the inert ingredient in the Glyphosphate formulation called polyoxyethyleneamine (POEA), a surfactant. This and possible other “inerts” are moderately toxic and appeared to be the cause of death and illness in reported cases of accidental poisoning. They can cause a wide range of respiratory, cardiovascular, reproductive and central nervous system problems. A 1999 study by the American Cancer Society found elevated incidence of the cancer, non-Hodgkin’s lymphoma.

1. It is a violation of Massachusetts State Law to make false or fraudulent claims about pesticides, including verbally. “12) All persons shall: c) Make no false or fraudulent claims. The term **fraud includes misrepresentation personally** or through the media, falsified records, invoices or reports,” -333 CMR 13.03 Massachusetts Pesticide Regulations.

2. ”The law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals (MCLG). Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable current treatment technologies.” -U.S. EPA. Note that the pesticide concentration in the **MCL drinking water standard may be higher than the level at which health risks may be expected to occur.**

3. Be aware that chemicals listed as **inert ingredients can be highly toxic**. Inert ingredients may comprise up to 99% of a pesticide product, but are considered trade secrets so are not disclosed. “Since neither the federal law nor the regulations define the term “inert” on the basis of toxicity, hazard or risk to humans, non-target species, or the environment, it should not be assumed that all inert ingredients are non-toxic,” -U.S. EPA.

Alternatives

Pond weed treatment should not be considered until the creation and implementation of a watershed management plan to address the root causes of the pond's excess eutrophication. It is primarily the nitrogen and phosphorus in run-off from lawn fertilizer, atmospheric deposition, and septic system releases which cause excess growth of weeds and algae in the first place. Reducing the source of nutrients coming into a pond will alleviate excess weed and algae growth.

Consideration should be given to the "no action" option with the understanding that aquatic vegetation provides critical habitat for pond organisms, which could be adversely affected by its removal. Removal of weeds can also stimulate growth of algae, which take advantage of the nutrients no longer sequestered by the plants.

Some sustainable solutions to weed infestation include 1) biological controls which will establish an equilibrium and keep the weeds in check, or 2) a harvesting program to clear the water and reduce the total organic matter, which will slow or reverse the natural eutrophication process. The harvested material, if not contaminated with heavy metals or herbicides, can be used as feed for municipal and commercial composting systems. Such programs should be evaluated for their impact on overall pond health and environmental impact. One approach being developed for this season is a comprehensive hand-pulling program. For information on alternatives, contact Jackson Madnick in Wayland, at jacksonmadnick@msn.com, or James Straub, Program Director of Mass. Dept. of Environmental Management, Lakes and Ponds Program 508-792-7716.

False Safety Claims

When considering the use of herbicides to control invasive weeds, remember that information provided by herbicide applicators on effectiveness and safety involves a conflict of interest. In addition, there is a higher profit margin involved with pesticide and herbicide applications than with manual labor. Always obtain your health, environmental, and effectiveness information from independent sources such as the EPA, the National Institutes of Health, or other non-industry funded studies. Then make sure you have thoroughly explored alternatives and have weighed the risks you are taking as well as those you might be imposing on other people and the environment.

The issue of false-safety claims by pesticide manufacturers and applicators is quite serious. The United States General Accounting Office (GAO) was charged with reviewing the information that pesticides industry- manufacturers, distributors, and professional applicators- provides to the public about the safety of its products. They found that the pesticides industry continues to make prohibited claims that its products are safe or nontoxic. The GAO also found that EPA has yet to establish an effective program to determine whether pesticide manufacturers and distributors are, in fact, complying with requirements. It is illegal in the State of Massachusetts to make fraudulent claims, even verbally.

In particular, beware of claims that a product is "safe as salt," "less toxic than caffeine," "safer than aspirin," "a child would have to drink 50 gallons a day for four years" or other such comparisons of the pesticide toxicity to common foods, medicines, or consumption. This type of comparison is based on the acute toxicity of a chemical. The value used is

the amount of material necessary to immediately kill 50% of the rats to which it is fed (known as the LD50). Extrapolating these acute toxicity values to represent long-term, low dose, or chronic exposure effects in humans has been proven to be extremely inaccurate and can lead to widespread adverse health effects, particularly in the developing child (lead and mercury are two cases in point).

Conclusions

The use of herbicides to control pond weeds involves chemicals with both known and unknown health and environmental risks. These add to the risks imposed by the many chemical exposures that we as citizens are voluntarily and involuntarily exposed to each day. Children are particularly susceptible to the harmful effects of herbicides, and “just a small amount of toxin exposure during critical periods of development can have an irreversible effect lasting a lifetime.” -American Public Health Association.

We do not recommend the use of pesticides such as herbicides unless human or environmental health is at risk, and viable alternatives do not exist. Please independently verify all the information presented to you by pesticide applicators, learn about alternatives, and make a sound decision based upon protecting public and environmental health.

References

Inerts

www.epa.gov/opprd001/inerts

Massachusetts Law

www.state.ma.us/dfa/legal/regs/pesticides_33313_std_application.pdf

2,4-D

<http://oaspub.epa.gov/pestlabl/ppls.getimage?imgid=149077> (product label)

<http://www.pesticide.org/2,4-D1.pdf>

<http://www.pesticide.org/24Dtoxpt2.pdf>

<http://www.pesticide.org/24Decological.pdf>

<http://www.pesticide.org/24Dinert.html>

<http://pmep.cce.cornell.edu/profiles/extoxnet/24d-captan/24d-ext.html>

Diquat Bromide

<http://oaspub.epa.gov/pestlabl/ppls.getimage?imgid=157325> (product label)

<http://pmep.cce.cornell.edu/profiles/extoxnet/dienochlor-glyphosate/diquat-ext.html>

Fluridone

<http://oaspub.epa.gov/pestlabl/ppls.getimage?imgid=151106> (product label)

http://www.sepro.com/pdf_lit/aquatics/sonar/Sonar_AS_MSDS_A72MC02.PDF
(MSDS)

Glyphosate

<http://oaspub.epa.gov/pestlabl/ppls.getimage?imgid=154058> (product label)

<http://www.pesticide.org/glyintro.pdf>

<http://www.pesticide.org/gly.pdf>

<http://pmep.cce.cornell.edu/profiles/extoxnet/dienochlor-glyphosate/glyphosate-ext.html>