

# Aquatic Plant Management

NOTE: Missing or incomplete fields are highlighted at the bottom of each page. You may save, close and return to your draft permit as often as necessary to complete your application. If there are no updates in 90 days, your draft is deleted

This Application has been Signed and Submitted by: i:0#f|wamsmembership|amykay82 signed on 2021-06-07T12:07:07

Site or Project Name:

Southport Marina

The permit application will be saved automatically with this name

Activity:

Chemical Control Application

Eligibility:

(All questions must be no for it to be considered a private pond.)

Is there more than one property owner?

Yes  No

Will there be uncontrolled surface water discharge?

Yes  No

Does the water body have public access?

Yes  No

## 3200-004 Chemical Aquatic Control Application

**NOTE:** To be considered a private pond, a waterbody must meet all of the following requirements:

1. Confined to one property owner.
2. The pond has no uncontrolled surface water discharge.
3. No public access.

Upon submittal of your permit application, a **non-refundable \$20 permit processing fee will be charged**. Additional acreage fees will be refunded if the permit request is denied or if no treatment occurs.

## 3200-004 Chemical Aquatic Plant Control Application

- Annually complete all pages on Form 3200-004 for chemical plant management applications. Complete form 3200-004a for large scale treatments(exceeds 10.0 acres in size or 10% of the area of the water body that is 10 feet or less in depth) as required by NR107.04(3).
  - Form 3200-004 is completed electronically through this system.
  - Form 3200-004a must be completed outside the system and uploaded to the attachments section. Please refer to this link for a copy of this form: <http://dnr.wi.gov/files/pdf/forms/3200/3200-004A.pdf>
- Attach a map that shows the treatment location(s), treatment dimensions and riparian landowners. If requesting WPDES coverage, attach a water body map that shows surface outflow and receiving waters.
- For a large-scale treatment, attach evidence that a public notice has been published in a regional / local newspaper and if required that a public informational meeting has been conducted as defined in NR107.04(3).
- Pay fee online.
- Sign and Submit form.
- A signed permit application certifies to the Department that a copy of the application has been provided to any affected property owner's association/district and to landowners adjacent to treatment area.

## Contact Information

### Applicant Information

Organization Southport Marina

Last Name: Moreland

First Name: Barry

Mailing Address: 21 56th Street

City: Kenosha

State: WI

Zip Code: 53140

Email:

Phone Number:  
(xxx-xxx-xxxx)

Alternative Phone Number:  
(xxx-xxx-xxxx)

### Waterbody Address

Last Name:

First Name:

Street Address: 21 56th Street

City: Kenosha

State: WI

Zip Code: 53140

Email:

Phone Number:  
(xxx-xxx-xxxx)

Alternative Phone Number:  
(xxx-xxx-xxxx)

### Applicator

Name of Applicator Firm: Clarke Aquatic Services, Inc.

Applicator Certification #: 315594, 288191, 312329

Business Location License #: 93-018750-012132

Restricted Use Pesticide #:

Address: 20061 Edison Circle E

City: Clearwater

State: MN

Zip: 55320

Email: akay@clarke.com

Phone Number:   
(xxx-xxx-xxxx)

### Adjacent Riparian Property Owners or Other Individuals Sponsoring Removal

Individuals and organizations (e.g. Lake District, Lake Association, Property Owners Association, County Department of Recreation), sponsoring removal.

**NOTE: Phone and email address are optional fields. This information will be publicly viewable if provided on this application.**

Uploaded riparian owners to attachment tab

Name	Address	Phone	Email Address
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### Site Information - Complete

#### Water Body to be Treated

Waterbody Property Owners Association or Waterbody District Representative :   
 None

Water Body Name:

County:

Latitude:

Longitude:

Section:

Township:

Range:

Direction:  E  W

Waterbody Surface Area:  acres

Estimated Surface area that is 10ft or less  acres

#### Proposed Treatment Area

Area(s) Proposed for Control:

Treatment Length	Treatment Width	Estimated Acreage	Average Depth	Calculated Volume
<input type="text" value="0"/> ft.	x <input type="text" value="0"/> ft.	$\div 43,560 \text{ ft}^2 =$ <input type="text" value="23.00"/> ac	<input type="text" value="10"/> ft =	<input type="text" value="230.00"/> ac-ft
		Estimated Acreage Grand Total <input type="text" value="23.00"/> ac	Calculated Volume Grand Total	<input type="text" value="230.00"/> ac-ft

Is the area with in or adjacent to a sensitive area designated by the Department of Natural Resources.  
 Yes  No

If the estimated acreage is greater than 10 acres, or is greater than 10 percent of the estimated area 10 feet or less in depth in Section II, complete and attach Form 3200-004A, Large-Scale Treatment Worksheet.

**Chemical Aquatic Plant Control Information - Form 3200-004 (R 2/17)**

**Notice:** Use of this form is required by the Department for any application filed pursuant to s. 281.17(2), Wis. Stats., and Chapters NR 107, 200 and 205, Wis. Adm. Code. This permit application is required to request coverage for pollutant discharge into waters of the state. Personally identifiable information on this form may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stats.].

Is this permit being requested in accordance with an approved Aquatic Plant Management Plan?

- Yes  No

Treatment Type:

- Lake  Pond  Wetland  Marina  Other

**Goal of Aquatic Plant Control:**

- Maintain navigation channel
- Maintain boat landing and carry in access
- Improve fish habitat
- Maintain swimming area
- Control of invasive exotics
- Other

**Nuisance Caused By:**

- Algae
- Emergent water plants (majority of leaves & stems growing above water surface, e.g. cattail, bulrushes)
- Floating water plants (majority of leaves floating on water surface, e.g., water lilies, duckweed)
- Submerged water plants (leaves & stems below surface, flowering parts may be exposed: milfoil, coontail)
- Other

**List Target Plants**

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> Algae                 | <input type="checkbox"/> Flowering Rush      | <input type="checkbox"/> Purple Loosestrife    |
| <input type="checkbox"/> Common/Glossy Buckthorn          | <input type="checkbox"/> Hybrid Cattail      | <input type="checkbox"/> Reed Canary Grass     |
| <input type="checkbox"/> Coontail                         | <input type="checkbox"/> Hybrid Watermilfoil | <input type="checkbox"/> Reed Manna Grass      |
| <input checked="" type="checkbox"/> Curly-Leaf Pondweed   | <input type="checkbox"/> Japanese Knotweed   | <input type="checkbox"/> Starry Stonewort      |
| <input type="checkbox"/> Duckweed                         | <input type="checkbox"/> Naiad               | <input type="checkbox"/> Yellow Floating Heart |
| <input type="checkbox"/> Elodea                           | <input type="checkbox"/> Narrow-Leaf Cattail | <input type="checkbox"/> Yellow Iris           |
| <input checked="" type="checkbox"/> Eurasian Watermilfoil | <input type="checkbox"/> Phragmites          | <input type="checkbox"/> Pondweed              |

Other Target Plants:

Note: Different plants require different chemicals for effective treatment. Do not purchase chemical before identifying plants.

**Chemical Control**

Full Trade Name of Proposed Chemical(s)

Select Chemical Name: Tribune Herbicide

Select Chemical Name: Aquathol K Aquatic Herbicide

Select Chemical Name: K-Tea Aquatic Algaecide

Other (not listed above) Other:

Have the proposed chemicals been permitted in a prior year on the proposed site?

All  Some  None

Method of Application:

What were the results of the treatment?

**NOTE: Chemical fact sheets for aquatic pesticides used in Wisconsin are available from the Department of Natural Resources upon request.**

Alternatives to Chemical Control:	Feasible?	If No, Why Not?
1. Mechanical harvesting	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="text" value="fragmentation spreads AIS"/>
2. Manual removal	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="text" value="area too large, cost prohibitive"/>
3. Sediment screens/covers	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="text" value="area too large, prevents beneficial plant growth"/>
4. Dredging	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="text" value="too expensive"/>
5. Waterbody drawdown	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="text" value="not site specific"/>
6. Nutrient controls in watershed	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="text" value="not site specific"/>
7. Other:	<input type="radio"/> Yes <input type="radio"/> No	<input type="text"/>

**Note: If proposed treatment involves multiple properties, consider feasibility of EACH alternative for EACH property owner.**

Will surface water outflow and/or overflow be controlled to prevent chemical loss?

Yes  No

Is the treatment area greater than 5% of surface area?

Yes  No

## WPDES Permit Request

Is WPDES coverage being requested? Refer to

<http://dnr.wi.gov/topic/wastewater/aquaticpesticides.html> for more information

*Yes - complete section VII with signature.*

*No*

*Already have WPDES*

*WPDES coverage not needed*

## Required Attachments and Supplemental Information

**Upload Required Attachments** ( 15 MB per file limit) - [Help reduce file size and trouble shoot file uploads](#)

\* indicates completion of this item is required

**Note:** To add additional attachments using the down arrow icon. To replace an existing file, use the 'Click here to attach file ' link. To remove additional items, select the item and press CNTRL Delete.

Riparian Owners	<input type="text" value="File Attachment"/>	<a href="#">210607SouthportMarina2021RiparianNotificationLetter.pdf</a>
Public Notice	<input type="text" value="File Attachment"/>	<a href="#">210607SouthportMarina2021AdProof.pdf</a>
Large Scale Worksheet	<input type="text" value="File Attachment"/>	
Site Map	<input type="text" value="File Attachment"/>	<a href="#">210607SouthportMarina2021ControlSite.pdf</a>

## Fee Calculation

### Chemical Control Application

1. s. NR 107.11(1), Wis. Adm. Code, lists the conditions under which the permit fee is limited to the \$20 minimum charge.
2. s. NR 107.11(4), Wis. Adm. Code, lists the uses that are exempt from permit requirements.
3. s. NR 107.04(2), Wis. Adm. Code, provides for a refund of acreage fees if the permit is denied or if no treatment occurs.

If Proposed treatment is over 0.25, calculate acreage fee: (round up to nearest whole acre, to maximum of 50 acres) acres X \$25 per acre = \$	23.00
If proposed treatment is less than 0.25 acre, acreage fee is \$0	\$575.00
Basic Permit Fee (non-refundable)	\$20.00
Total Fee	\$595

## Payment Information

**Invoice Number:** WP-00030004  
**Payment Confirmation Number:** WS2WT3006822513  
**Amount Paid:** \$595

## Sign and Submit

### Applicant Responsibilities and Certification

1. The applicant has prepared a detailed map which shows the length, width and average depth of each area proposed for the control of rooted vegetation and the surface area in acres or square feet for each proposed algae treatment.
2. The applicant understands that the Department of Natural Resources may require supervision of any aquatic plant management project involving chemicals. Under s.NR 107.07 Wis. Adm. Code, supervision may include inspection of the proposed treatment area, chemicals and application equipment before, during or after treatment. The applicant is required to notify the regional office 4 working days in advance of each anticipated treatment with the date, time, location and size of treatment unless the Department waives this requirement. Do you request the Department to waive the advance notification requirement?  
 Yes  No
3. The applicant agrees to comply with all terms or conditions of this permit, if issued, as well as all provisions of Chapter NR 107, Wis. Adm. Code. The required application fee is attached.
4. The applicant will provide a copy of the current application to any affected property owners' association inland Lake District and, in the case of chemical applications for rooted aquatic plants, to all owners of property riparian or adjacent to the treatment area. The applicant has also provided a copy of the current chemical fact sheet for the chemicals proposed for use to any affected property owner's association or inland Lake District.
5. Conditions related to invasive species movement. The applicant and operator agree to the following methods required under s.NR 109.05(2), Wis. Adm. Code for controlling, transporting and disposing of aquatic plants and animals, and moving water:
  - Aquatic plants and animals shall be removed and water drained from all equipment as required by s.30.07, Wis. Stats., and ss. NR 19.055 and 40.07, Wis. Adm. Code.
  - Operator shall comply with the most recent Department-approved 'Boat, Gear, and Equipment Decontamination and Disinfection Protocol', Manual Code #9183.1, available at <http://dnr.wi.gov/topic/invasives/disinfection.html>

All portions of this permit, map and accompanying cover letter must be in possession of the chemical applicator at the time of treatment. During treatment all provisions of Chapter NR 107 107.07 and NR 107.08, Wis. Adm. Code, must be complied with, as well as the specific conditions contained in the permit cover letter.

I hereby certify that that the above information is true and correct and that copies of the application shall be provided to all affected property owners promptly and that the conditions of the permit will be adhered to. All portions of this permit, map and accompanying cover letter must be in possession of the applicant or their agent at time of plant removal. During plant removal activities, all provisions of applicable Wisconsin Administrative Rules must be complied with, as well as the specific conditions contained in the permit cover letter.

### Steps to Complete the signature process

**IMPORTANT:** All email correspondence will be sent to the address associated with your WAMS ID).

1. Read and Accept the Responsibilities and Certification
2. Press the Initiate Signature Process button
3. Open the confirmation email for a one time confirmation code and instructions to complete the signature process.

You will receive a final acknowledgement email upon completing these steps .

Check if you are signing as Agent for Applicant.

i:0#.f|wamsmembership|amykay82 signed on 2021.

I hereby certify that the above information is true and correct and that copies of this submittal have been provided to the appropriate parties named in the contact section and that the conditions of the permit and pesticide use will be adhered to.



**June, 2021**

**Southport Marina Occupant(s)  
Kenosha County, WI**

Re: Proposed Aquatic Herbicide Application on Lake Michigan (within marina)

To whom it may concern:

The Southport Marina proposes to assess and chemically treat approximately 23 acres of Lake Michigan (the marina) to control the excessive growth of the exotic and invasive aquatic plants, Eurasian watermilfoil (EWM), its hybrid (HWM) and pondweeds creating navigational constraints. The proposed treatment plan to conduct an application(s) of Aquathol K, Tribune and K-Tea we anticipate occurring sometime in spring and/or summer, 2021 and will proceed only after the District obtains a permit for the treatment from the Wisconsin Department of Natural Resources.

Notification of the exact date of treatment and water use restrictions associated with the use of the herbicides permitted will be provided by the posting of the marina area and public access points.

**There are no fishing or recreational water use restrictions with the proposed use of Aquathol K, Tribune and K-Tea. Do not use treated water for irrigation purposes for 5 days after application(s)**

Additional details regarding the proposed treatment including a copy of the permit application and the WDNR aquatic herbicide fact sheets can be found at [spmarina.net](http://spmarina.net). Should you not have internet access, or you would like a hard copy, the Southport Marina will provide you with one via request through the contact information below.

**For questions about the treatment or to request a hard copy of the permit application package, please contact:**

Barry Moreland  
(262) 657-5565  
[barry@spmarina.net](mailto:barry@spmarina.net)

# Customer Ad Proof

60066356 AMY SOUTHPORT MARINA

Order Nbr 71526

Publication	Kenosha News		
Contact	AMY SOUTHPORT MARINA	PO Number	amy kay
Address 1	21 56TH STREET	Rate	Legal Liners
Address 2		Order Price	42.26
City St Zip	KENOSHA WI 53140	Amount Paid	0.00
Phone	7158916798	Amount Due	42.26
Fax			
Section	Legal	Start/End Dates	06/07/2021 - 06/07/2021
SubSection		Insertions	1
Category	0099 Legal Notices	Size	47
Ad Key	71526-1	Salesperson(s)	Transient Default
Keywords	southport marina	Taken By	Susan Paura
Notes			

**Ad Proof**

1st Pub. June 7, t1  
PUBLIC NOTICE

The Southport Marina proposes to chemically treat approximately 23 acres of Lake Michigan (the marina) to control excessive growth of exotic and invasive aquatic plants. The proposed treatment targeting Eurasian Watermilfoil, its hybrid and/or pondweeds with an application(s) of the aquatic herbicides Aquathol K, Tribune and/or K-Tea to infestations is anticipated to occur in spring and/or summer, 2021 and will proceed only after the Southport Marina obtains a permit for the treatment from the Wisconsin Department of Natural Resources.

The water use restrictions for the aforementioned herbicides are as follows:

There are no swimming, fishing or recreational restrictions. Do not use water from treated areas for irrigation purposes for 5 days.

The Southport Marina will hold a public informational meeting on the proposed treatment(s) if five or more individuals, organizations, special units of government, or local units of government request one in writing. The person or entity requesting the meeting shall state a specific agenda of topics including problems and alternatives to be discussed.

The request for a public informational meeting must be sent in writing to the Southport Marina, 21 56th Street, Kenosha, WI 53140 and to Wisconsin Department of Natural Resources, 141 NW Barstow St. Rm180, Waukesha, WI 53188 within 5 days after the public notice is published.

WNAXLP

**SOUTHPORT MARINA 2021 AIS CONTROL SITE  
KENOSHA COUNTY, WISCONSIN**



A-21

**2021 AIS CONTROL SITE**

A-21: 23 SA, 10' avg depth

# Diquat Chemical Fact Sheet

## Formulations

Diquat, or diquat dibromide, is the common name of the chemical 6,7-dihydrodipyrido (1,2-a:2',1'-c) pyrazinediium dibromide. Originally registered by the EPA in 1986, diquat was reregistered in 1995 and is currently being reviewed again. It is sold for agricultural and household uses as well as for use on certain floating-leaf and submersed aquatic plants and some algae. The aquatic formulations are liquids: two of the more commonly used in Wisconsin are Reward™ and Weedtrine-D™ (product names are provided solely for your reference and should not be considered endorsements).

## Aquatic Use and Considerations

Diquat is a fast-acting herbicide that works by disrupting cell membranes and interfering with photosynthesis. It is a non-selective herbicide and will kill a wide variety of plants on contact. It does not move throughout the plants, so will only kill parts of the plants that it contacts. Following treatment, plants will die within a week.

Diquat will not be effective in lakes or ponds with muddy water or where plants are covered with silt because it is strongly attracted to silt and clay particles in the water. Therefore, bottom sediments must not be disturbed during treatment, such as may occur with an outboard motor. Only partial treatments of ponds or bays should be conducted (1/2 to 1/3 of the water body). If the entire pond were to be treated, the decomposing vegetation may result in very low oxygen levels in the water. This can be lethal to fish and other aquatic organisms. Untreated areas can be treated 10-14 days after the first treatment.

Diquat is used to treat duckweed (*Lemna* spp.), which are tiny native plants. They are a food source for waterfowl but can grow thickly and become a nuisance. Navigation lanes through cattails (*Typha* spp.) are also

maintained with diquat. Diquat is labeled for use on the invasive Eurasian watermilfoil (*Myriophyllum spicatum*) but in practice is not frequently used to control it because other herbicide options are more selective.

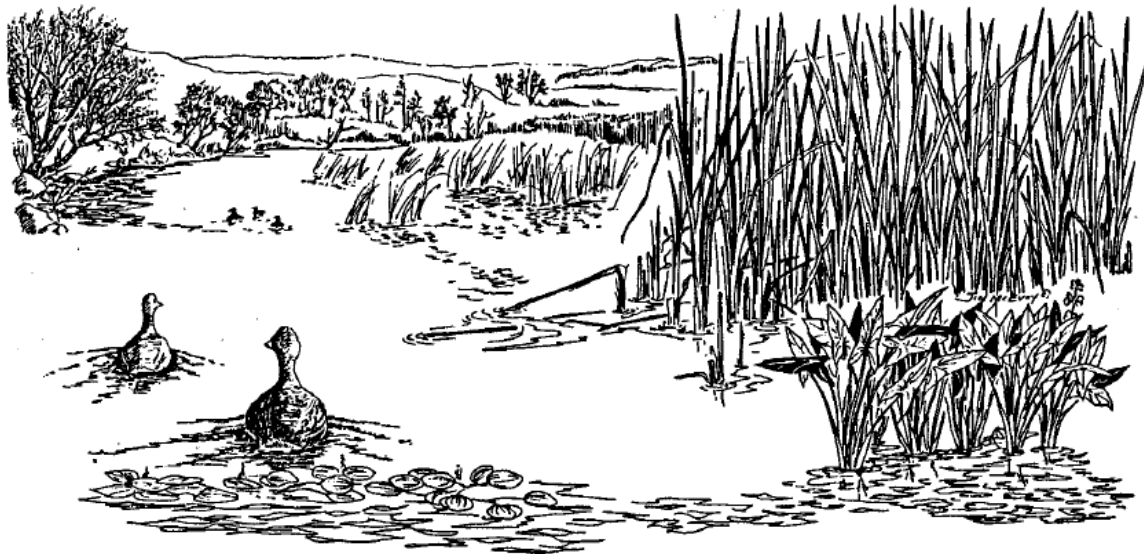
## Post-Treatment Water Use Restrictions

There are no restrictions on swimming or eating fish from water bodies treated with diquat. Treated water should not be used for drinking water for one to three days, depending on the concentration used in the treatment. Do not use treated water for pet or livestock drinking water for one day following treatment. The irrigation restriction for food crops is five days, and for ornamental plants or lawn/turf, it varies from one to three days depending on the concentration used.

## Herbicide Degradation, Persistence and Trace Contaminants

Diquat is not degraded by microbes. When applied to a waterbody, diquat binds with the organic matter in the sediment indefinitely. It does not degrade and will accumulate in the sediments. Diquat is usually detectable in the water column for less than a day to ~35 days after treatment. Diquat will remain in the water column longer when treating a waterbody with sandy soils due to the low organic matter and clay content. Because of its persistence and very high affinity for the soil, diquat does not leach into groundwater.

Ethylene dibromide (EDB) is a trace contaminant in diquat products. It originates from the manufacturing process. EDB is a carcinogen, and the EPA has evaluated the health risk of its presence in formulated diquat products. The maximum level of EDB in diquat dibromide is 10 ppb (parts per billion), it degrades over time, and it does not persist as an impurity.



## Impacts on Fish and Other Aquatic Organisms

At application rates, diquat does not have any apparent short-term effects on most of the aquatic organisms that have been tested. However, certain species of important aquatic food chain organisms such as amphipods and *Daphnia* (water fleas) can be adversely affected at label application rates. Direct toxicity and loss of habitat are believed to be the causes. Tests on snails have shown that reproductive success may be affected, as well. These organisms only recolonize the treated area as vegetation becomes re-established.

Laboratory tests indicate walleye are the fish most sensitive to diquat, displaying toxic symptoms when confined in water treated with diquat at label application rates. Other game and panfish (e.g. northern pike, bass, and bluegills) are apparently not affected at these application rates. Limited field studies to date have not identified significant short or long-term impacts on fish and other aquatic organisms in lakes or ponds treated with diquat.

The bioconcentration factors measured for diquat in fish tissues is low. Therefore, bioconcentration is not expected to be a concern with diquat.

## Human Health

The risk of acute exposure to diquat would be primarily to chemical applicators. Diquat

causes severe skin and eye irritation and is toxic or fatal if absorbed through the skin, inhaled or swallowed. Wearing skin and eye protection (e.g. rubber gloves, apron, and goggles) to minimize eye and skin irritation is required when applying diquat.

The risk to water users of serious health impacts (e.g. birth defects and cancer) is not believed to be significant according to the EPA. Some risk of allergic reactions or skin irritation is present for sensitive individuals.

## For Additional Information

Environmental Protection Agency  
Office of Pesticide Programs  
[www.epa.gov/pesticides](http://www.epa.gov/pesticides)

Wisconsin Department of Agriculture, Trade,  
and Consumer Protection  
<http://datcp.wi.gov/Plants/Pesticides/>

Wisconsin Department of Natural Resources  
608-266-2621  
<http://dnr.wi.gov/lakes/plants/>

Wisconsin Department of Health Services  
<http://www.dhs.wisconsin.gov/>

National Pesticide Information Center  
1-800-858-7378  
<http://npic.orst.edu/>



# Endothall Chemical Fact Sheet

## Formulations

Endothall is the common name of the active ingredient endothal acid (7-oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid). Endothall products are used to control a wide range of terrestrial and aquatic plants. Both granular and liquid formulations of endothall are available for aquatic use in Wisconsin. Two types of endothall are available: dipotassium salt (such as Aquathol®) and monoamine salts (such as Hydrothol 191). Trade names are provided for your reference only and are neither exhaustive nor endorsements of one product over another.

## Aquatic Use and Considerations

Endothall is a contact herbicide that prevents certain plants from making the proteins they need. Factors such as density and size of the plants present, water movement, and water temperature determine how quickly endothall works. Under favorable conditions, plants begin to weaken and die within a few days after application.

Endothall products vary somewhat in the target species they control, so it is important to always check the product label for the list of species that may be affected. Endothall products are effective on Eurasian watermilfoil (*Myriophyllum spicatum*) and also kill desirable native species such as pondweeds (*Potamogeton* spp.) and coontail (*Ceratophyllum* spp.). In addition, Hydrothol 191 formulations can also kill wild celery (*Vallisneria americana*) and some species of algae (*Chara*, *Cladophora*, *Spirogyra*, and *Pithophora*).

Endothall will kill several high value species of aquatic plants (especially *Potamogeton* spp.) in addition to nuisance species. The plants that offer important values to aquatic ecosystems often resemble, and may be growing with those plants targeted for treatment. Careful identification of plants and application of

endothall products is necessary to avoid unintended harm to valuable native species.

For effective control, endothall should be applied when plants are actively growing. Most submersed weeds are susceptible to Aquathol formulations. The choice of liquid or granular formulations depends on the size of the area requiring treatment. Granular is more suited to small areas or spot treatments, while liquid is more suitable for large areas.

If endothall is applied to a pond or enclosed bay with abundant vegetation, no more than 1/3 to 1/2 of the surface should be treated at one time because excessive decaying vegetation may deplete the oxygen content of the water and kill fish. Untreated areas should not be treated until the vegetation exposed to the initial application decomposes.

## Post-Treatment Water Use Restrictions

Due to the many formulations of this chemical the post-treatment water use restrictions vary. Each product label must be followed. For all products there is a drinking water standard of 0.1 ppm and can not be applied within 600 feet of a potable water intake. Use restrictions for Hydrothol products have irrigation and animal water restrictions.

## Herbicide Degradation, Persistence and Trace Contaminants

Endothall disperses with water movement and is broken down by microorganisms into carbon, hydrogen, and oxygen. Field studies show that low concentrations of endothall persist in water for several days to several weeks depending on environmental conditions. The half-life (the time it takes for half of the active ingredient to degrade) averages five to ten days. Complete degradation by microbial action is 30-60 days. The initial breakdown product of endothall is an amino acid, glutamic acid, which is rapidly consumed by bacteria.

## Impacts on Fish and Other Aquatic Organisms

At recommended rates, the dipotassium salts (Aquathol and Aquathol K) do not have any apparent short-term effects on the fish species that have been tested. In addition, numerous studies have shown the dipotassium salts induce no significant adverse effects in aquatic invertebrates (such as snails, aquatic insects, and crayfish) when used at label application rates. However, as with other herbicide use, some plant-dwelling populations of aquatic organisms may be adversely affected by application of endothall formulations due to habitat loss.

In contrast to the low toxicity of the dipotassium salt formulations, laboratory studies have shown the monoamine salts (Hydrothol 191 formulations) are toxic to fish at dosages above 0.3 parts per million (ppm). In particular, the liquid formulation will readily kill fish present in a treatment site. By comparison, EPA approved label rates for plant control range from 0.05 to 2.5 ppm. In recognition of the extreme toxicity of the monoamine salt, product labels recommend no treatment with Hydrothol 191 where fish are an important resource.

Other aquatic organisms can also be adversely affected by Hydrothol 191 formulations depending upon the concentration used and duration of exposure. Tadpoles and freshwater scuds have demonstrated sensitivity to Hydrothol 191 at levels ranging from 0.5 to 1.8 ppm.

Findings from field and laboratory studies with bluegills suggest that bioaccumulation of dipotassium salt formulations by fish from water treated with the herbicide is unlikely. Tissue sampling has shown residue levels become undetectable a few days after treatment.



## Human Health

Most concerns about adverse health effects revolve around applicator exposure. Liquid endothall formulations in concentrated form are highly toxic. Because endothall can cause eye damage and skin irritation, users should minimize exposure by wearing suitable eye and skin protection.

At this time, the EPA believes endothall poses no unacceptable risks to water users if water use restrictions are followed. EPA has determined that endothall is not a neurotoxicant or mutagen, nor is it likely to be a human carcinogen.

## For Additional Information

Environmental Protection Agency  
Office of Pesticide Programs  
[www.epa.gov/pesticides](http://www.epa.gov/pesticides)

Wisconsin Department of Agriculture, Trade,  
and Consumer Protection  
<http://datcp.wi.gov/Plants/Pesticides/>

Wisconsin Department of Natural Resources  
608-266-2621  
<http://dnr.wi.gov/lakes/plants/>

Wisconsin Department of Health Services  
<http://www.dhs.wisconsin.gov/>

National Pesticide Information Center  
1-800-858-7378  
<http://npic.orst.edu/>



# Copper Compounds

## Chemical Fact Sheet

### Formulations

Copper has been used as an aquatic herbicide and algaecide since 1950. Copper compounds for aquatic use are manufactured either as copper sulfate, or as a copper chelate. Both forms contain metallic copper as the active ingredient, but in the chelate forms the copper is combined with other compounds to keep the copper in solution and active in the water longer. Chelated copper is also less toxic to non-target organisms.

There are copper sulfate products available as fungicides and other terrestrial uses, which are not allowed for use in water. Aquatic copper products are sold under a variety of brand names, including Nautique™, Komeen®, Captain™, K-Tea™, Eartheq®, Cutrine®-Plus, Clearigate® and SeClear (product names are provided solely for your reference and should not be considered endorsements nor exhaustive).

### Aquatic Use and Considerations

Copper products are primarily used to treat algae but certain formulations will affect some plants, as well. The target species vary by product, so it is important to confirm that the intended target is listed on the label of the product being used.

Copper works by interfering with enzyme production. Results from treatments for algae occur within hours, while the effects of treatment on plants will be evident in about a week. Large-scale algae die-off can deplete oxygen levels in the water quickly, which can be lethal to fish and other aquatic life. If more than a 1/3 of the total water area is covered in algae, treatments should be done in sections, and applied in a pattern that allows fish an escape route to untreated water. Ten to fourteen days are needed between treatments to protect fish and aquatic life.

Copper products will treat blue-green (free-floating) algae and filamentous (mat-forming)



algae as well as larger algae species that look like plants, such as *Chara* spp. and *Nitella* spp.. In Wisconsin, copper is not typically used to treat aquatic plants, but some are labeled to treat the invasives Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*), as well as the native species coontail (*Ceratophyllum demersum*), naiads (*Najas* spp.), elodea (*Elodea canadensis*), sago pondweed (*Stuckenia pectinata*) and water celery (*Vallisneria americana*).

Determining the correct copper formulation and calculating the proper dosage are key factors in determining how well copper will control undesirable algae. Applicators need to consider target species, water hardness, water temperature, amount of algae present, as well as water clarity and flow.

In hard or alkaline waters, copper sulfate tends to settle to the bottom within 24 hours after application. Chelated copper remains in solution longer, allowing for a longer contact time with the algae.

All copper formulations can be toxic to some species of fish at recommended application rates, especially if the water has less than 50 ppm (parts per million) of carbonate hardness (soft water). However, toxicity generally decreases as water hardness increases.



## Post-Treatment Water Use Restrictions

There are no restrictions on swimming, eating fish from treated water bodies, human drinking water, pet/livestock drinking water, or irrigation.

## Herbicide Degradation, Persistence and Trace Contaminants

Copper is an element, and so is not broken down like other herbicides. Copper precipitates out of the water over a few days and settles into the sediments, where it persists indefinitely and accumulates over time. The buildup of copper in lake sediments is a serious concern, because high concentrations of copper in the sediment are toxic to both plant and animal life.

## Impacts on Fish and Other Aquatic Organisms

Copper sulfate is rarely used in Wisconsin, in part due to its high toxicity to invertebrates (water fleas, crustaceans, mollusks, mayflies, snails, and crayfish) and multiple species of fish (trout, bluegill and minnow) at typical application concentrations. The chelated forms of copper have different toxicology profiles from each other and from copper sulfate.

The chelated copper products can also be toxic to fish at application rates, particularly to trout and bluegill in soft water ( $\text{CaCO}_3 < 50\text{ppm}$ ). Applications to harder water provide a greater margin of safety to fish.

Many of the chelated copper products are also toxic to invertebrates at application rates. High concentrations of copper in lake sediment can be toxic to invertebrates that live on the lake bottom, as well. These invertebrates are an important source of fish food.

Copper does temporarily accumulate in fish, but more in the gills and the liver than in muscle tissue. The copper in fish tissues are reduced once the copper level in the water is reduced.

The EPA risk assessment for birds and small mammals (based on dietary consumption) indicates that some risk may be present to birds or mammals at the worst-case scenario. However, this maximum dietary exposure scenario is likely much higher than the exposure

level that might occur to birds when copper is released into the environment as an algaecide. Birds, like humans, can physiologically acclimate to higher concentrations of copper in order to slow its uptake. Studies of copper's effects on birds have shown to be toxic at high levels; however, effects at standard treatment levels have not been shown to be harmful. Studies have shown that even at low levels (.07ppm) copper sulfate can have detrimental effects on amphibians, including slowed growth rates, decreased mobility and death. Effects on reptiles have not been documented.

## Human Health

The risk of acute exposure to copper is primarily to chemical applicators. The acute toxicity risk from oral and inhalation routes is minimal; however concentrated copper products can be corrosive to the eyes and cause irreversible damage. Prolonged or frequent skin contact can cause allergic reactions in some people. Goggles, protective clothing, and rubber gloves are required when handling.

Even with regular use for many years, very few chronic health concerns have been documented. In one study agricultural applicators of copper were found to have some signs of liver damage, and there is some evidence that high copper may impair immune function. Copper is not carcinogenic.

## For Additional Information

Environmental Protection Agency  
Office of Pesticide Programs  
[www.epa.gov/pesticides](http://www.epa.gov/pesticides)

Wisconsin Department of Agriculture, Trade,  
and Consumer Protection  
<http://datcp.wi.gov/Plants/Pesticides/>

Wisconsin Department of Natural Resources  
608-266-2621  
<http://dnr.wi.gov/lakes/plants/>

Wisconsin Department of Health Services  
<http://www.dhs.wisconsin.gov/>

National Pesticide Information Center  
1-800-858-7378  
<http://npic.orst.edu/>

