

## *Fluridone Treatment of Hydrilla in the Delaware and Raritan Canal - 2017*

The New Jersey Water Supply Authority (NJWSA) has asked for the endorsement of the Department of Environmental Protection's Division of Water Supply and Geoscience to use the herbicide fluridone in the Delaware and Raritan Canal (Canal) for the elimination of the aggressive invasive aquatic plant hydrilla. Hydrilla was found in sections of the Canal between Lambertville and Princeton in 2016. An infestation of submerged aquatic vegetation, such as hydrilla, would limit the flow of water in the Canal, impair water quality, block sunlight, reduce dissolved oxygen, inhibit recreational activities, and impact habitat for fish, waterfowl and other wildlife as well as significantly limit the Canal's ability to supply water to potable water purveyors.

NJWSA proposes to introduce fluridone in the Canal at Lambertville for hydrilla control at target concentrations between 1 and 4 ppb for a period of approximately 120 days, starting May 31, 2017. At these low concentrations, fluridone does not directly kill hydrilla but instead destroys chlorophyll pigments and prevents photosynthesis. The hydrilla then slowly starves. Aquatic animals and birds should not be affected at the levels proposed to be used in the Canal. The treatment may have to be repeated over several years to control regrowth from tubers in the subaqueous soil. By applying fluridone at the proposed low concentrations, the water purveyors can continue to use the Canal for potable purpose during the herbicide application.


Additional information on aquatic fluridone use for hydrilla control:

1. Fluridone is authorized for use as an herbicide by EPA in water for weed control.
2. The current registered uses of fluridone may result in dietary exposures from food from irrigated crops and from drinking water.
3. According to the USEPA Office of Pesticide Programs, applications of fluridone that result in concentrations greater than 20 ppb are allowed in surface water if greater than a quarter of a mile upstream of a potable water intake. Applications of fluridone within a quarter mile of a surface water intake are restricted to less than 20 ppb concentration at the intake.
4. EPA has no restriction on potable water consumption that contain fluridone in concentrations less than 20 ppb.
5. Fluridone is not regulated under the Safe Drinking Water Act and it has no maximum contaminant level (MCL).
6. The fluridone manufacturer (SePRO) recommends a 3 ppb limit on fluridone in water delivered by water treatment facilities for horticultural purposes to nurseries, greenhouses and aquaculture.
7. USEPA calculated Human Health Benchmarks show that acute (1-day exposure) risk to fluridone is at concentrations above 34,500 ppb, and chronic health impacts above 960 ppb. Both levels are significantly greater than the proposed target concentration of fluridone in the Canal, 1 to 4 ppb.
8. The North Carolina Division of Public Health determined the use of fluridone in the Eno River in NC (at an application rate equivalent to the rate proposed for the Canal) was unlikely to result in any adverse public health effects. This was based on an analysis of a fluridone loading rate significantly greater than was applied for hydrilla control.
9. Fluridone has been authorized for aquatic use in New York, North Carolina, Florida, Wisconsin, and Vermont.
10. A tracer study recently done in the Canal using a conservative tracer supported the practicality of maintaining a 1 to 4 ppb concentration in the Canal downstream of the application point. Application of 5 ppb of the tracer at Lambertville resulted in 2 ppb in New Brunswick, 60 miles away. Applying 1 to 4 ppb concentration of fluridone at Lambertville should maintain an effective treatment level throughout the portion of the Canal with reported hydrilla.

11. Middlesex Water and the New Jersey American Water Companies have determined their water treatment process will reduce fluridone in water removed from the Canal at their intakes at expected concentrations (based on a tracer tests) to less than 1 ppb. North Brunswick Water Department and New Brunswick Water Department are pursuing modifications to their existing treatment based on jar test results to remove fluridone to less than 1 ppb.
12. Application of fluridone at the low doses (1-4 ppb) will allow the Canal to continue to be used as a water supply.

The Division of Water Supply and Geosciences supports the use of fluridone in the Delaware and Raritan Canal for the suppression of the invasive weed hydrilla under the following conditions:

1. The target concentration of fluridone in the areas of hydrilla infestation is set in the range of 1-4 ppb. Application rates must be set to result in this target concentration.
2. Application of fluridone must be done in a secured fashion. The equipment delivering the fluridone will be inspected daily by the NJWSA.
3. Fluridone concentrations in the Canal will be measured at locations specified in table 1 at 1, 3, 5, 6, 7, 8, 9, 11, and 14 days after the start of injection. Thereafter samples will be taken on a weekly basis. Additionally, samples will be taken at the purveyor plants, both intakes and treated water.
4. At any time if the observed fluridone concentration rises above 10 ppb at stations 6, 7, 8 or 9 (table 1) or any upstream location the injection process must cease and an investigation begin to determine what occurred. (Stations 7, 8, and 9 are effectively co-located with potable supply intakes on the Canal.)
5. NJWSA will develop a contingency plan to ensure continued delivery of potable water to all customers in the event 1) the fluridone results are greater than 20 ppb at the intakes or 2) if an uncontrolled release of fluridone accidentally occurs.
6. NJWSA will coordinate with the potable and non-potable water purveyors who use the Canal downstream of the proposed fluridone injection point and report to them all fluridone concentrations in the Canal within 48 hours of receiving laboratory results.
7. NJWSA will also report all fluridone concentrations to the NJDEP within 48 hours of receiving the levels from the laboratory.

  
Patricia Gardner 5/26/17  
Director, Division of Water Supply and Geosciences date

**Table 1. Fluridone Measurement Locations**

Station #	Station Name	Miles Below Injection Point	Note
1	Fireman's Eddy Bridge	1.19	
2	Washington Crossing	6.34	
3	Lower Ferry Rd.	10.89	Nonpotable, Trenton Country Club
4	Carnegie Road	18.63	
5	Alexander Rd.	24.17	
6	Route 518	29.88	
7	Canal Rd./Suydam Rd.	35.27	North Brunswick Water Department
8	10 Mile Lock	41.84	New Jersey American Water Company
9	Landing Lane	49.61	Middlesex Water Company, New Brunswick Water Department, and East Brunswick Water Department