Notice of Intent

Aquatic Management Program
Baddacook Pond

Groton, MA

Feb. 24, 2015

James Luening
Chair, Great Ponds Advisory Committee

Topics

- Problem Statement
- Revitalization Plan
- Treatment Solution
- Fact Check
- Conclusions and Path forward

Background

- Groton's largest Natural Pond, 76 acres
- Bordered by mostly conservation land
- Popular recreational resource
  - Fishing
    - Stocked twice a year
  - Boating
    - Motor boats, kayaks, canoes
  - Swimming
- Important aquatic habitat
  - Fish, wildlife and native plants

Spring: weeds below the surface

Summer
Weeds re-emerge and spread

Problem Statement

- **Baddacook Pond is infested with Non-native, invasive weeds**
- Impacted area
  - 35 acres are infested (45% of pond)
    - Entire littoral zone
  - Weed Species
    - Fanwort (Cabomba)
      - Prohibited plant in Massachusetts (as of 2006)*
    - Variable Milfoil
- Human introduced environmental damage
  - Source: Boats and trailers
  - Serious problem throughout New England
  -

* Fanwort, An invasive Aquatic Plant, Mass Dept. of Conservation and Recreation, 2006

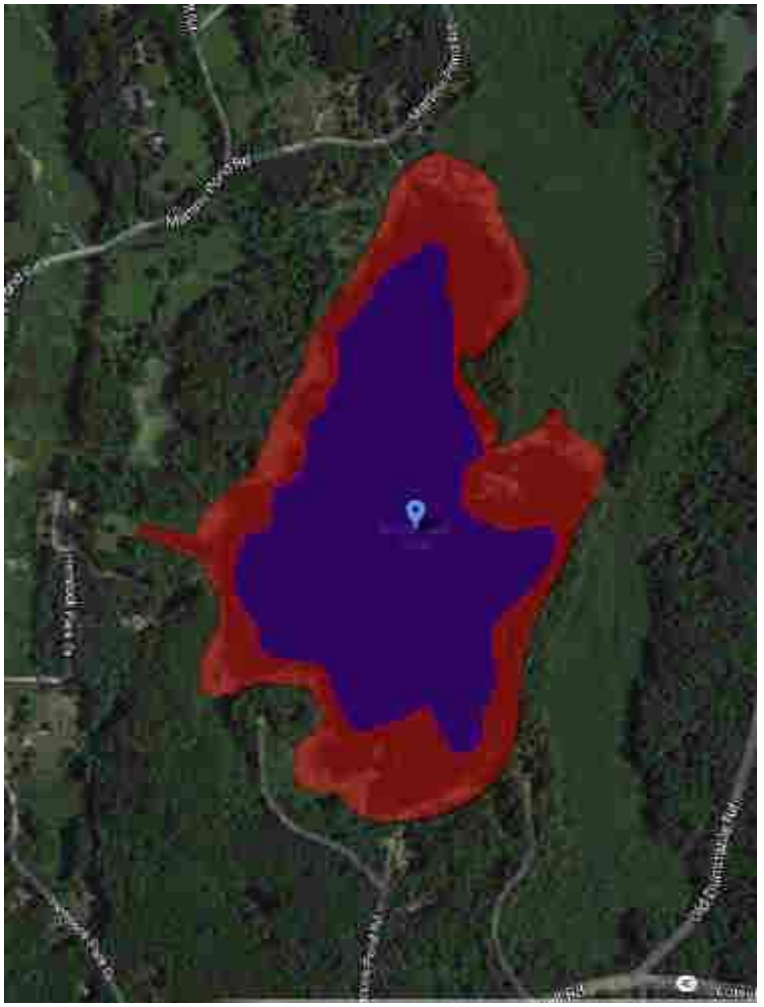

Fig 2 - Baddacook Pond
Red – Cabomba Infestation of 35 acres

Problem Statement

- Access points only usable thanks to the weed harvester
  - Limited to small areas
    - boat launch, beach area and homes
  - Cuts weeds down about 6 ft.
  - Losing the rest of the pond
- We are losing Baddacook as an environmental and recreational resource
- Baddacook is now a weed exporter
  - Transporting these weeds is illegal
  - Thousands already spent to clean up other lakes and ponds

Weeds on trailer after using Baddacook boat launch

Species Threat Evaluation

- **Danger to recreational users**
  - **Drowning by entanglement**
    - **E.G. Framingham, MA in 2008**
  - **Increased mosquito breeding areas**
    - **Mosquito borne illnesses; EEE, West Nile Virus**
- **Impedes recreational use**
  - **Some areas are inaccessible**
  - **Clogs props**
  - **Snagged fishing lines**
- **Negatively affects water quality**
  - **including oxygen, pH and elevated levels of dissolved and suspended organic matter.**
- **Degrades aquatic ecosystem**
  - **Negatively affects wildlife**
  - **Fish avoidance of infested areas – reduced habitat**
  - **Extreme cases can cause fish kills**
  - **Displaces native vegetation**
- **Flooding**
- **Accelerated eutrophication**
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- **Sources: DCR: Rapid response to Fanwort [Cabomba] 2006, Maine DCR Bulletin 2530**
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Show video

Fig 3 – Weeds matting the surface of Baddacook Pond

Baddacook Ecological Restoration and Management Plan

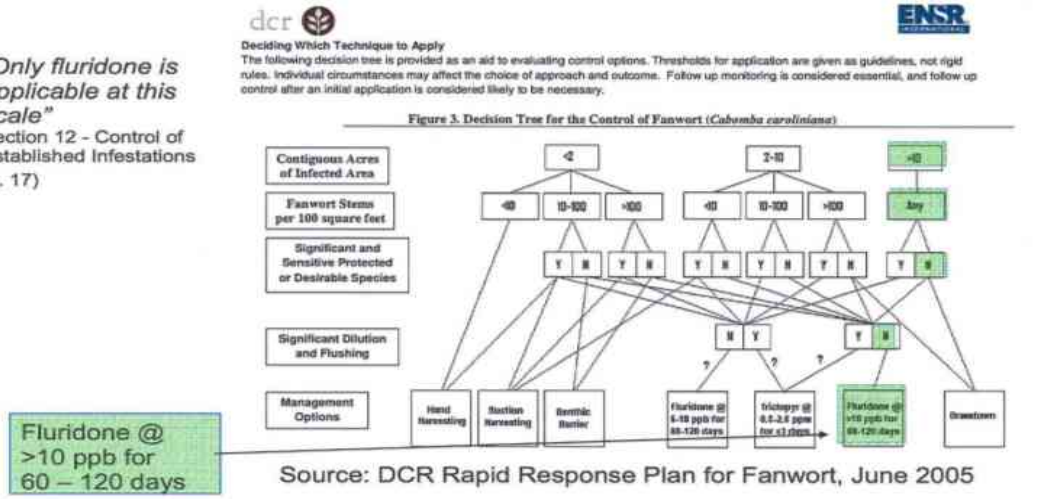
- GLA Education through signage – October 2012
  - Purpose:
    - Education and inform all users at the boat launch
      - STOP The Spread...
      - Its the law sign
      - Brochures
- GLA Weed Watcher Program – February 2013
  - Purpose:
    - Train people to spot invasive weeds
    - Report infestations
    - Remove infestations
    - On going initiative
  - First training class taught at Lost Lake Fire Hall (by the DCR) - May 2013
- GLA Boat Launch Monitoring Program – June 2013
  - Purpose:
    - Provide educational guidance to lake and pond users regarding weed contamination.
    - Emphasize the new law – **its illegal to transport invasive weeds**
    - Help people decontaminate
    - Report offenders to the harbor master
    - Wash station not required based on our experience and DCR recommendations
    - On going initiative
- **Weed Treatment**

Potential Treatments

- **Sonar treatment ($52,000)**
  - **Recommended by DCR**
    - **DCR Rapid Response Plan for Fanwort in Massachusetts - Mass Dept. of Conservation and Recreation, June 2005**
  - **Non-toxic**
  - **EPA approved for potable water supplies (public drinking water)**
  - **Cost effective**
  - **Proven successful in lakes, ponds and reservoirs**
- Driver Assisted Suction Harvesting ($400,000)
  - Not viable for the size of our infestation
    - "The work was expensive and so slow, Carroll said, that by the time an acre of weeds was cleared, another acre had grown in its place. " (Anne Carroll, DCR, Natick, MA)
- Benthic Mats ($1,500,000 to $3,000,000)
  - Not viable for the size of our infestation
  - Smothers everything beneath it, cuts off food sources
  - Dangerous for divers to maintain
- Dredging ($5 Million)
  - Does not ensure weeds are killed
    - MACOLAP dredging briefing showed Milfoil within days after dredging
- Harvester ($24,500 per mowing)
  - No longer viable, infestation has grown too large
  - Only trims weeds, its like mowing your lawn

Solution: Massachusetts Department Conservation and Recreation
Decision Tree for the Control of Fanwort

"Only fluridone is applicable at this scale"
Section 12 - Control of Established Infestations (p. 17)



DCR Fanwort treatment analysis: SONAR is needed for an infestation of this size

Fluridone (trade name: Sonar)

- Purpose
  - A herbicide for management of aquatic vegetation in fresh water ponds, lakes, **reservoirs, potable water sources,** drainage canals, irrigation canals and rivers.
- Restrictions (**< 150 ppb**)
  - Drinking – None
  - Fishing – None
  - Swimming – None
- Treatment level would be 10 bbp
- Sonar does not pose a health risk

Water Use Restrictions Following Applications With Sonar SRP (Days)

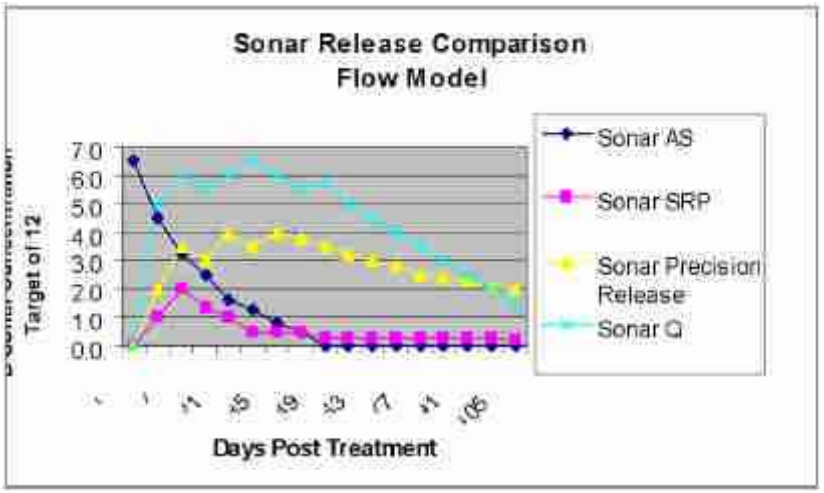
Application Rate	Drinking†	Fishing	Swimming	Livestock/Pet Consumption	Irrigation††
Maximum Rate (150 ppb) or less	0	0	0	0	See irrigation instructions below

† Note below, under *Potable Water Intakes*, the information for application of Sonar SRP within ¼ miles (1,320) feet of a functioning potable water intake.

Source: Sepro Sonar SRP label

Fluridone Application Cycle

- Sonar completely dissolves in water and is readily available for plant uptake
  - Does not adversely affect water chemistry or water quality
  - Does not reduce dissolved oxygen level because it works slowly
- Sonar dissipates by the following means:
  - Photodegradation
  - Plant uptake
  - Hydrosoil absorption
- Half-life of Sonar averages 21 days
  - Ranges from 2 – 60 days based on environmental conditions

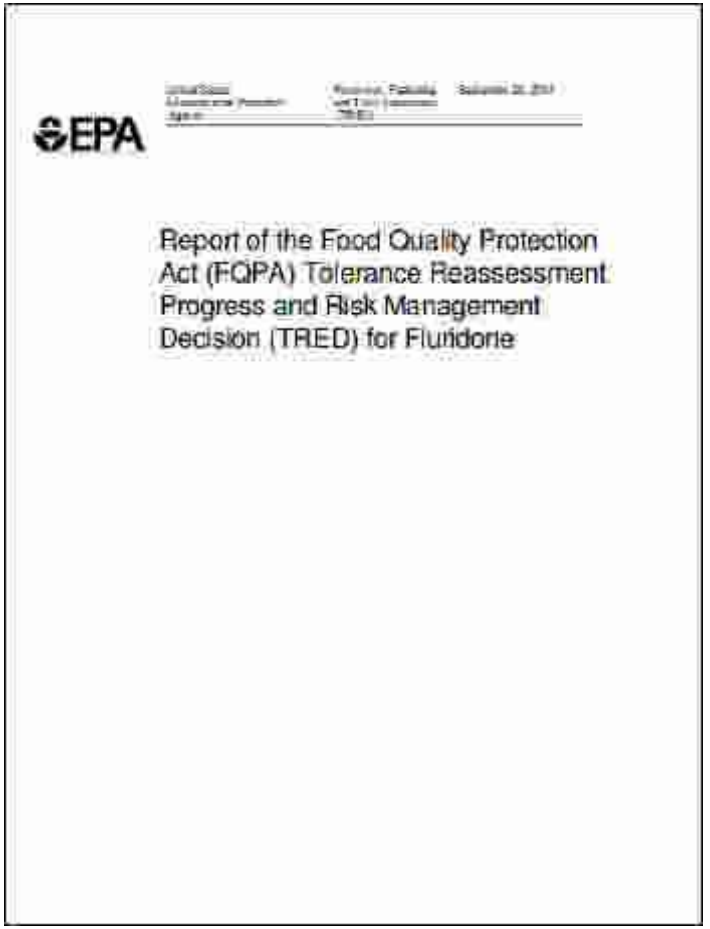


SONAR Release Formulations::
AS (Aqueous Solution)
SRP (Slow Release Pellet)
PR (Precision Release Pellet)
Q (Quick Release Pellet)

* SePro Sonar Aquatic Herbicide Presentation March 8, 2008

Environmental Protection Agency

- **Fluridone was first formulated in 1976**
- **EPA approval testing 1978 – 1986**
- **Approved by EPA on March 31, 1986** (McLaren/Hart, 1995)
  - **Approved for up to 150 ppb in drinking water**
  - 29 years of field use
- **Reassessed and approved on September 20, 2004**
  - **All of the aggregate risks from dietary, drinking water including metabolites, and recreational exposures to fluridone are below the Agency's level of concern and no risk mitigation is required.**


EPA

Report of the Food Quality Protection Act (FQPA) Tolerance Reassessment Progress and Risk Management Decision (TRED) for Fluridone

Environmental Protection Agency Study Results (100s of tests)

EPA test	Result	Description
Mutagen (Cancer)	No	Is Fluridone likely to cause cell mutation such as cancer
Teratogen	No	Is Fluridone likely to cause birth defects
Infant suspectability from in utero or postnatal exposure	No	Is Fluridone likely to cause health issues in infants
Metabolite	No	Will fluridone be absorbed by the body which could lead to long term health risks
All acute and chronic dietary exposures	[No] Below the level of concern	Health risks if it is in food
All drinking water exposure	[No] Below the level of concern	Health risks if humans drink it in their water
Swimming exposure	[No] Below the level of concern	Health risks if humans swim in it
Estrogen, androgen and/or thyroid mediated toxicity	None	Potential to interact with the estrogen, androgen, or thyroid pathways.

Results from: EPA Report of the Food Quality Protection Act (FQPA) Tolerance Reassessment Progress and Risk Management Decision (TRED) for Fluridone, September 20 2004
[From tests were conducted over 2 year period]

Reports and Approvals Sited

- EPA
  - Report of the Food Quality Protection Act (FQPA) Tolerance Reassessment Progress and Risk Management Decision (TRED) for Fluridone, September 20, 2004
  - Human Health Risk Assessment for Fluridone TRED PC Code 112900. DP Barcode D306456, August 17, 2004
- USDA / US Forestry Service
  - Fluridone – Human Health and Ecological Risk Assessment Final Report, P.R. Durkin, November 25, 2008
- Universities
  - Considerations for Using Herbicides for Aquatic Weed Control in Domestic Water Supplies of North Carolina, KA Langeland and DJ Demont, North Carolina State University, June 1986
  - Fluridone: herbicide treatment FAQ, Cornel University, Cornell Cooperative Extension, Ithaca, NY 14850-3555
  - Water Monitoring Post-herbicide Application 2013 (Cayuga Lake, NY), Cornell Cooperative Extension, Ithaca, NY
- State of Massachusetts
  - Fanwort: An Invasive Aquatic Plant, Mass Dept. of Conservation and Recreation
  - Massachusetts Dept. of Environmental Protection, Pesticide Review
  - Massachusetts Dept. of Environmental Protection, ORS recommendations on the use of Aquatic Herbicides within Zone II Water Supply Areas, 28 June 1993
  - DCR Rapid Response Plan for Fanwort in Massachusetts - Mass Dept. of Conservation and Recreation, June 2005
- POCs, locations and field data from Reservoirs, ponds and lakes
  - SEPRO water reservoir List – 20 locations, POCs and phone numbers
    - Boonton Reservoir, NJ
  - Ponds and lakes treated in Massachusetts – Names of 20 bodies of water
  - Herbicide Infiltration Evaluation, Savas Danas, et al
  - Field results from Neponset and Groton

SONAR doesn't migrate into wells

Mass DEP: The DEP has not required testing for Sonar (fluridone) as a special condition in any well. That includes private wells. Based on the assumption the applicator is applying the chemical at the licensed dose and according to label directions, **Sonar is not expected to appear in wells**. **

Sepro: "**In 20 years** of treating ponds, lakes and reservoirs, fluridone, to SePRO's knowledge, has **never been found to have migrated into wells** in close proximity to the treated water body." *

Water Resource	Wells or reservoir	Distance (ft)	Depth (ft)	Fluridone Level
Baddacook Groton MA	**Private Wells**	**50**	**25**	
Lost Lake / Knops Pond	Whitney Well			Below Detectable Limits
Spectacle Pond Littleton MA	Public Well	25	52	Below Detectable Limits
Spectacle Pond Littleton MA	Private Well	30	32	Below Detectable Limits
Spectacle Pond Littleton MA	Private Well	25	35	Below Detectable Limits
Neponset Reservoir Foxboro MA	Public Well	100	35	Below Detectable Limits
Neponset Reservoir Foxboro MA	Private Well	100	38	Below Detectable Limits

Note: Detectable limit >= 1 ppb

Well migration field test results

Source: Aquatic Control Technologies

* SePRO letter to Mr. Mike Gildesgame, Acting Director, Office of Water Resources, Massachusetts DCR, March 16th, 2006
** DEP email dated 01/07/14

Groton Water Commission Memo "Sonar (fluridone) Application at Baddacook Pond", Jan. 2014

- In January 2014, GWC issued memo opposing to treatment based on stated assertions
- Document was peer reviewed by
  - US Environmental Protection Agency
    - Gina McCarthy, EPA Administrator
    - Jim Jones, Director, Chemical Safety and Pollution Prevention
    - Rick Keigwin, Director, Pesticide Re-evaluation Division
    - Neil Anderson, Chief, Risk Management and Implementation Branch I, Pesticide Re-evaluation Division
    - Et al
  - Mass Dept. of Environmental Protection
    - Bob Kubit, Mass DEP, Div. of Watershed Management
    - Eugene Brunelle, Mass DEP, Environmental Engineer
    - Hotze Wijnja, Mass Dept. of Agricultural Resources
- EPA and DEP responses: Assertions found to be incorrect
  - All responses forwarded to the GWC
- Conclusion:
  - Concerns should be voiced and addressed
  - However, we need to make decisions based on facts
  - Information known to be incorrect should corrected
- Recirculated, last week with the same incorrect assertions.

Peer Review Feedback of GWC Jan. 2014 Memo

Assertion	Source/Fact
Sonar use in a Zone 1 is against state regulation	**Mass DEP**: Sonar can be applied after a DEC permit is approved
"The Town of Natick hired unaffiliated outside experts who concluded it was "almost a certainty" that fluridone from the lake treatment would enter the water supply."	**Sepro**, Manufacturer: Sonar has never been known to migrate to wells in close proximity to the treated water body **Mass DEP**: Sonar is not expected to appear in wells. **Verification Studies**: Littleton, Neponset
"Natick BOS and BOH voted against the application of herbicides"	**Mass DEP**: The chemical treatment was applied to Lake Cochituate May 21, 2013. **Natick BWC**: The chemical treatment was applied summer, 2014.
"Unclear how many of the applications [of SONAR] took place in a Zone 1 area"	**SEPRO**: List of 28 reservoirs with direct water intakes provided to GWC in 2013
Data on fluridone's effects on humans especially at various lifecycle stages (e.g. children, unborn fetus, etc) is almost non-existent.	**Mass DEP**: EPA will neither conduct nor support any intentional dosing studies that involve pregnant or nursing women or children [Extensive animal testing]
"The fact that fluridone works by attacking cells and inhibiting enzymes suggests there could be complex interactions and side effects over time."	**US EPA**: All of the aggregate risks from dietary, drinking water including metabilites, and recreational exposures to fluridone are below the Agency's level of concern and no risk mitigation is required.
"The Board found EPA approval to be inadequate as a source of re-assurance for the full spectrum of health concerns.	**Mass DEP response**: The EPA is not just an adequate source of information for water safety. They are the primary and most critically important source.

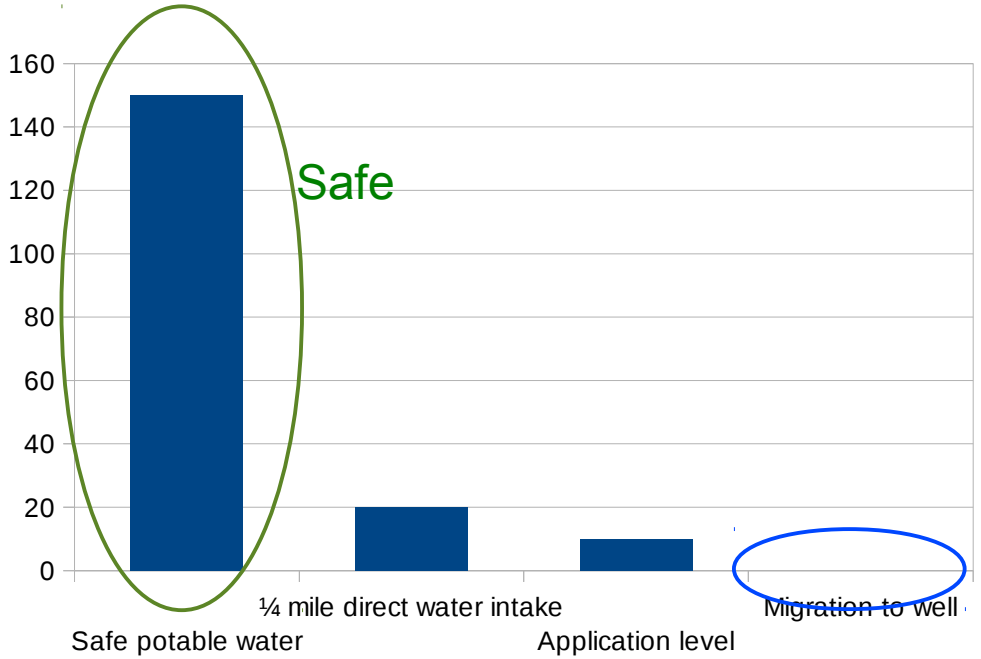
NOI should move forward

- Already 100s of scientifically vetted studies over decades performed by US EPA, State Governments and Universities
  - Conclusions have all been positive
  - No negative impacts recorded
  - Additional studies would likely be costly with no value added
- National Heritage is reviewing the NOI – approval is expected
- Indemnification for a very unlikely application mishap is covered by contractor insurance
- Independent Risk Assessment, Massachusetts Department of Agricultural Resources (2/18/2015)
  - Fluridone
    - *"My supervisor and I would like to reiterate that the fluridone is approved for permitted use in Massachusetts lakes and ponds. Review of this herbicide in context of typical conditions in the state have indicated that the use according to label instructions and any additional conditions specified with the permitting does not cause unreasonable adverse effects to human health and the environment. As indicated in the information that I provided last year, the label allows the use of this herbicide in drinking water reservoirs.* ***During several decades of use of fluridone herbicide, the Department has not learned of any human health issues related to exposure of drinking water to this herbicide."*** Hotze Wijnja, Ph.D, , Environmental Chemist
  - NMF
    - "NMF has never been observed as a breakdown product under natural conditions".. Hotze Wijnja, Ph.D, , Environmental Chemist

Conclusions

- **Baddacook Pond's weed problem must be addressed**
  - Weeds are danger
  - Destroying the aquatic environment
  - Illegal to have or transport in Massachusetts
- Viable solution is Fluridone
  - Massachusetts DCR recommended solution.
  - Approved for use in drinking water
    - US EPA
    - State of Massachusetts and numerous other states
  - **No reason to expect migration to Baddacook well**
- If we are to solve this problem we need to think and act as a community
  - We need to work together
  - We need to use facts and consider the problem rationally
  - This is not a drinking water issue
- We are the stewards of Groton's environmental future

My family's well is close to Baddacook. If there was a cause for concern, I wouldn't recommend this.



Fluridone levels

Baddacook Pond
1913 – 103 acres
2013 – 76 acres (35 acres infested)
2114 – Our choice

- Back up slides