Exotic Aquatic Weeds and Species Committee
Meeting of 10 October 2011, LOB 308, 10:30 AM
Minutes of Proceedings

Members present: Rep. Dick Drisko, Rep. Mike Kappler, Rep. Laurie Pettengill, Rep. David Russell (Vice Chair); Public Members Bob Reynolds (Clerk) and Ken Warren

Members Excused: Rep. Chris Christensen (Chair), Sen. Jeb Bradley, and Public Member Don Foudriat

Guests present: Amy Smagula (DES), Bob Wolff (NH Dept. of Agriculture, Division of Pesticide Control)

Vice Chairman Russell called the meeting to order at 10:33 AM. Members and guests introduced themselves.

Minutes of the August 08 meeting were discussed, and no revisions were suggested. Rep. Kappler moved that the minutes be approved as written. Mr. Warren seconded. The motion passed 6-0.

Mr. Reynolds and Amy Smagula, NH DES Exotic Species Program Coordinator, presented an overview of the toxicology and environmental fate of 2,4-D, an herbicide used for the control of variable milfoil in water bodies. 2,4-D is the most widely used pesticide in the world, and has been applied to agricultural, residential, and forestry plants to control broadleaf weeds since the 1940s. It is also effective in the control of aquatic weeds. As perhaps the most extensively studied pesticide, it has been found to have remarkably few toxic effects in non-target species, and has a short half-life in the typical aquatic environments where used to treat variable milfoil. Some international agencies express doubts about the risks of 2,4-D, and some animal studies have shown adverse health effects caused by 2,4-D. However, US agencies and scientific organizations have repeatedly determined that, when handled and applied appropriately, 2,4-D does not pose any unacceptable risks to human health or the environment. To help prepare Committee members for public meetings when the toxicology of 2,4-D is debated, Ms. Smagula answered a series of questions often raised by citizens. A copy of the presentation is attached.

Rep. Bob Kingsbury was invited to speak to the Committee regarding LSR 2012-H-2338-L entitled "Prohibiting the introduction of biocidal chemicals into waters of the state," but he was unable to attend. Several representatives of the House and DES have spoken with Rep. Kingsbury to provide him with information and to convince him of the safety and effectiveness of herbicides in the control of exotic aquatic species invading NH water bodies. Rep. Kappler requested that individual members of the Committee discuss these issues with Rep. Kingsbury.

Rep. Drisko discussed the status of HB 439 (co-sponsored by Representatives Drisko, Christensen, and Russell) to prohibit invasive species from being claimed as habitats for endangered species, as a reason to stop activities to control the spread of invasive species. At an initial hearing of the Senate Energy and Natural Resources Committee (Senators Jeb Bradley, John Gallus, Gary Lambert, Amanda Merrill, and Chairman Bob Odell), NH Fish & Game Department representatives described examples of terrestrial species (e.g., Snow Rabbits) that actually do use an invasive species as a habitat. With advice from our Committee, Rep. Drisko submitted an amendment to make HB 439 more specific to invasive aquatic species (e.g., milfoil). At the latest Energy and Natural Resources Committee hearing, Renee Pelletier of DES discussed a Memorandum of Understanding that is being negotiated between executives from DES, F&G, DRED, and Agriculture to work more cooperatively on the pesticide application approval process. Sen. Odell requested that the MOU be submitted for his Committee's review. Action is scheduled in January 2012.

Ms. Smagula also presented information on financial and activity reports on the DES Exotic Species Program. To date in 2011, there have been no new variable milfoil infestations (the one discovered in Rocky Pond in Hollis was successfully eradicated and will be monitored). Two herbicide treatments were performed this fall – 130 acres in the Moultonborough area of Lake Winnipesaukee to control variable milfoil and 3.5 acres in Post Pond in Lyme to control Eurasian water milfoil. DES and contract divers also performed various hand-pull and DASH projects. DES participated in the interagency meeting to evaluate and streamline the agricultural herbicide permitting process, and supported efforts to draft and revise the interagency MOU for invasive aquatic plants (the document has not yet been routed to other agencies for review). Ms. Smagula is updating the template for long-term management plans, and will issue a solicitation

today for Prevention and Research Grants. Solicitations for 2012 Control Grants generated 32 requests for funds by the September 15 deadline, grant proposals are due by October 31, and notifications of grant awards will be made by November 30.

Financially, the DES Exotic Species Program will have approximately $318,212 available to prevention, research, and control grants in 2012. The percentage allocated to each grant type and matching percentage(s) will be determined in November for control grants and in January for prevention and research grants. The Program is currently closing out 2011 projects and processing invoices for control efforts partially funded with state grants. If there are unspent funds from 2011, they will try to carry them forward to 2012 to be used for control grants.

Mr. Warren discussed correspondence regarding NH Lakes Association's concern about possible revisions to RSA 487:26 (Milfoil and Other Exotic Aquatic Plants Prevention) to reallocate some funds generated by boat registration fees and deposited into the Lake Restoration and Prevention Fund (RSA 487:25) – i.e., to move some funds from milfoil prevention to milfoil control. NHLA's position is that both prevention and control are underfunded, but that in the long run it is more cost-effective to prevent an exotic aquatic infestation than to control an infestation, especially since it is currently not likely that an infestation can be completely eradicated. NHLA does not believe that providing more self-inspection signs at public boat ramps, without Lake Hosts present at the ramps, would help to alleviate the problem. Funding is currently inadequate to staff public boat ramps with a Lake Host 7 days a week during all daylight hours, or to expand the Lake Host Program to all ramps in the state. NHLA's recommendation is to work to increase funding for both prevention and control activities.

It was noted that annual Committee reports to the Speaker of the House, the Senate President, and the Governor were not submitted for 2008, 2009, or 2010. Rep. Christensen and Rep. Drisko are preparing the 2011 Committee report, due by November 1, to include Committee findings and recommendations for the period 2008 through 2011. Ms. Smagula will provide notes on key activities of the Committee during 2008 through 2010 to Rep. Drisko and Rep. Christensen. Rep. Drisko asked if the evolutionary change in scope of the Committee (from a research committee to more of an advocate role) should be reflected in legislation amending the RSA.

Mr. Reynolds distributed photographs of the Moultonboro/Tuftonboro/-Wolfeboro DASH unit (partially paid for with funds from the Committee and a NHLA grant) that was included in the Wolfeboro July 4th parade, winning the Commander's award. The same float also participated in the Sandwich Grand Parade and won the Doris L. Benz award for the best agricultural-related entry.

Running short of time, Rep. Russell rescheduled discussion of the topic "Relations with Lake and River Associations" to the next meeting.

Based on the previously approved schedule, the next two meetings will be held at 10:30 AM on December 12, 2011 and February 13, 2012 in Room 308 of the Legislative Office Building.

Rep. Drisco moved to adjourn the meeting at 11:59 AM. Rep. Pettengill seconded. The motion passed unanimously.

Respectfully submitted,
Bob Reynolds, Clerk

Toxicology and Environmental Fate of 2,4-D

A Summary of Scientific Data and Typical Questions and Answers

Prepared by Bob Reynolds, Ossipee Lake Alliance
and Amy Smagula, NH Dept. of Environmental Services

For the HN Exotic Aquatic Weeds and Species Committee

October 10, 2011

Why Worry About 2,4-D?

- 2,4-D (2,4-dicholorphenoxyacetic acid) is the most widely used pesticide in the world (3rd most widely used in the US)
- It is currently one of the most effective methods of controlling the growth of variable milfoil in NH lakes and rivers
- Thus, we are often exposed to 2,4-D and it is important to our mission of controlling the growth of milfoil in NH

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What Is "Toxicology"?

- It's the science of how poisons affect living organisms
- The ultimate goal is to predict the effect of poisons (toxins) on humans
- We test the effects in different species of animals to predict the effects in humans
- We give as much toxin as the animals can tolerate to maximize the chance of observing toxic effects

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Key Principles of Toxicology

- Concentration (dose) and Time of Exposure to a toxin are most important
- Route of Exposure is important:
  - Oral (eating or drinking)
  - Dermal (contact with skin, eyes, etc.)
  - Inhalation (breathing)
- Different species can have dramatically different reactions to toxins (e.g., Thalidomide)

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Key Principles of Toxicology

- We evaluate different toxic effects:
  - Toxicity (short-term (acute) and long-term (chronic) health effects, death [LD_{50} / LC_{50}], specific organ damage, behavioral effects)
  - Carcinogenicity (cancer)
  - Teratogenicity (birth defects)
  - Mutagenicity (causing mutations)
- Regulators evaluate all of the data and use mathematical models to estimate a "safe" dose for humans

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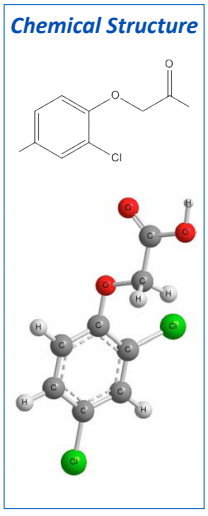
What is 2,4-D?

- An herbicide (pesticide) used primarily as a broadleaf weed killer
- A synthetic plant hormone (auxin)
- Mostly used for weed control in residential (lawns), agricultural (wheat, corn, rice, soybeans, sugar cane, potatoes, grasslands, orchards), and forestry settings, and for control of aquatic weeds
- Developed in 1942; now over 1,500 herbicide products include 2,4-D such as Navigate, Aqua-Kleen, Weed B Gon, Weedaway, etc.



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Environmental Fate of 2,4-D

- In water, 2,4-D's half-life is from 9 hours to < 15 days
  - Dependent on levels of oxygen, microbial activity, acidity, sunlight, and plants
- In sediments, 2,4-D's half-life is between 1-14 days
  - In one study in alkaline water with little oxygen, 2,4-D was detected in sediment for 186 days

The "half-life" is the time required for half of the chemical to break down in the environment:

1 half-life = 50% remaining
2 half-lives = 25% remaining
3 half-lives = 12% remaining
4 half-lives = 6% remaining
5 half-lives = 3% remaining

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Toxic Effects of 2,4-D

- Acute (single exposure) toxicity:
  - Oral – "low" toxicity
  - Dermal – "low" toxicity, severe eye irritation
  - Inhalation – "low" to "very low" toxicity
  - Dogs are more sensitive – vomiting, weakness
  - Humans – "low" toxicity; mostly associated with suicide attempts; causes vomiting, diarrhea, headache, confusion
  - Most toxic effects result when the kidneys are overloaded and renal capacity is exceeded

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Toxic Effects of 2,4-D

- Chronic (long-term exposure) toxicity:
  - 90-day "No Observed Effect Level" in rats is comparable to feeding an average man 2.86 pounds of 2,4-D per day for 90 days
  - 2-year NOEL in rats and mice was comparable to 9 ounces of 2,-4-D per day for 2 years in humans
  - Doses comparable to 5.7 pounds per day for 2 years (in humans) caused toxicity in the eye, kidney, thyroid, and liver in rats
  - Human chronic exposure to 2,4-D has not been linked to any effects seen with other pesticides

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Carcinogenicity of 2,4-D

- US EPA evaluated 2,4-D for carcinogenic effects in 1988, 1992, and 2004
- Animals studies consistently show no carcino-genic effects; there are some positive results
- Epidemiological studies claiming a link between 2,4-D and cancer were evaluated and found to lack enough evidence for the linkage
- US agencies list 2,4-D as "not classifiable as to human carcinogenicity
- Some international agencies list 2,4-D as a "potential human carcinogen"

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Teratogenicity of 2,4-D

- Studies in rats and mice fed doses comparable to 9½ lbs per human showed no observable reproductive effects
- Mice and rats fed doses comparable to 38 pounds per human showed signs of reproductive toxicity, but very limited teratogenic effects
- No direct evidence of reproductive or teratogenic effects in humans is available

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Mutagenicity of 2,4-D

- 2,4-D has been extensively tested for mutagenicity
- It is non-mutagenic in most test systems
- One study reported chromosome damage in cultured human cells
- Most effects seen are cytotoxic – not mutagenic

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Ecological Effects of 2,4-D

- "Low" to "Very Low" toxicity to wildfowl (mallards, pheasants, quail, pigeons), brown shrimp, dungeness crabs, and most aquatic invertebrates
- Honeybees had impaired reproductive effects at moderate doses, but actually survived longer than controls at low doses
- Some formulations are highly toxic to fish while others are only slightly toxic (including formulations used for milfoil)

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In Summary

- 2,4-D has been used on our crops and in our lakes and rivers for 50+ years
- For a pesticide, it is remarkably non-toxic or only slightly toxic to most non-target species, especially humans
- At the carefully regulated concentrations used to treat variable milfoil, 2,4-D is essentially non-toxic to non-target species and disappears from the environment within days

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Questions and Answers

- These are general responses to common questions that are asked about 2,4-D, and general "non-technical" responses that are intended to be clear and understandable to the general public
- Much information is available about 2,4-D, in particular, the U.S. Environmental Protection Agency's website
- People with additional questions about this product are encouraged to consult that site for more detailed explanations of this information

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Questions and Answers (1)

- Isn't 2,4-D in Agent Orange? That was TERRIBLE stuff!

  2,4-D was a component of Agent Orange, but did NOT cause the infamous adverse health effects.

  Agent Orange was a combination of two herbicides (2,4,5-T and 2,4-D).

  The serious Agent Orange health effects were caused by a dioxin formed when 2,4,5-T is manufactured.

  As a result, 2,4,5-T was banned in 1985, and has not been used in NH since 1983

  Neither 2,4,5-T nor dioxins are present in any of the herbicides used for milfoil control in NH

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Questions and Answers (2)

- We've read that the inert (or "other") ingredients in Navigate are toxic to humans, animals, and/or the environment. Is this true?

  Many of the common concerns stem from the clay carrier used to form the Navigate pellets – the clay particles becoming airborne and could affect the lungs.

  New technologies and application methods have lessened the amount of dust that results from application of the product in the granular form.

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Questions and Answers (3)

- We've heard that the breakdown products (in water) are more toxic than 2,4-D itself. Is this true?

  There have been documented toxic forms of degradates of 2,4-D, but they have only been measured under controlled laboratory conditions.

  It is thought that in natural systems, the breakdown products that may be more toxic are quickly converted into other more non-toxic forms.

  2,4-D breakdown products have a fairly short half-life, so by-products are generally short-lived.

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Questions and Answers (4)

- If 2,4-D is so safe, why do they ban swimmers in the lake for 30 days after treatment?

  There is no 30-day swim ban after treatment; the current pesticide label imposes no swim restriction.

  The swim restriction in NH is 24 hours, primarily to keep swimmers away from 2,4-D pellets as they settle to the bottom, dissolve, and are absorbed by the milfoil plants.

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Questions and Answers (5)

- We've heard that 2,4-D is an endocrine disrupter. What does that mean?

  EPA has become concerned in recent years that disposal of consumer pharmaceuticals might be causing adverse "hormonal" effects in the environment – endocrine disruptors.

  Since 2,4-D is a synthetic plant hormone (auxin), it is logical to think that it might have endocrine disrupting effects.

  EPA is currently evaluating the endocrine disrupting potential of 2,4-D, but no direct evidence of this has been shown to date.

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Questions and Answers (6)

- Maine has banned the use of 2,4-D – that means it's toxic, right?

  Maine has not banned 2,4-D, they just do not use it often.

  They just recently used it to control a new infestation of Eurasian water milfoil in one of their ponds.

- Canada has banned the use of 2,4-D – that means it's toxic, right?

  Canada did ban the product for some time, but they reversed their decision in 2008 and now allow its use – but interestingly, not for aquatic use.

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Questions and Answers (7)

- We've heard that 2,4-D causes cancer. Is that true?

  There are no scientifically accepted data that support that 2,4-D is a carcinogen.

  For the 4th time, EPA is currently re-evaluating the carcinogenicity of 2,4-D, but there is no direct linkage to cancer.

- We've heard that 2,4-D causes birth defects. Is that true?

  There are no scientifically accepted data to support this claim.

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Questions and Answers (8)

- We've heard that 2,4-D kills fish. Is that true?

  We have not documented any fish kills as a result of a 2,4-D treatment in NH.

  Generally a fish kill can be caused by decomposition of large amount of vegetation, so in a whole-lake treatment targeting all plants, decomposition may lead to loss of oxygen and fish kills.

  Safeguards are put in place (on the pesticide label and in the permitting process) to make sure treatments are conducted in a way that will lessen the likelihood of this.

  Used at appropriate concentrations to kill milfoil, 2,4-D is not directly toxic to fish to result in their death.

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Questions and Answers (9)

- Is it true that 2,4-D kills other aquatic plants?

  2,4-D is an herbicide and its purpose is to kill plants; so yes, this is true.

  Pesticide effectiveness is a function of dose and exposure time. Milfoil is killed by a low application rate (100 lbs/acre in most scenarios), which is too low a concentration to affect most other aquatic plants.

  Our goal is not to kill all plants, so we use low concentrations when possible. Higher rates are only used when dilution is a factor (flowing water), and then a slightly higher rate is applied to achieve a target concentration in the water to overcome dilution effects.

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Questions and Answers (10)

- I know you say it's safe, but isn't all that data just provided by the manufacturers who want to protect their product and profits?

  Much of the testing is done by Federal government agencies, which are not paid by manufacturers, so they are not influenced in their research

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Questions and Answers (11)

- I worry about 2,4-D getting into my drinking water. Isn't that a danger?

  Permitting agencies are very cautious about allowing chemical treatments near drinking water sources.

  They "run the numbers" to make sure there is no risk of contamination that would exceed drinking water standards, and often err on the side of caution and call any amount of herbicide in the water too much.

  For wells, it is unlikely that 2,4-D moves readily through the soil to groundwater. We have never detected it in near-shore wells adjacent to treatment area in NH that DES and Agriculture have sampled.

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Questions and Answers (12)

- I know you say it's safe, but I still worry about chemicals building up in our lake and drinking water. How do you know that 2,4-D doesn't build up in the water?

  2,4-D is not a product that bioaccumulates in nature. It is broken down by microbes and by oxygenation.

  Routine water quality monitoring post-treatment in the last several years shows that 2,4-D does not linger in the water column, and sediment sampling shows it does not persist in sediments.

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Hillsborough District 19
Merrimack, NH

From: Andrea LaMoreaux [alamoreaux@nhlakes.org]
Sent: Friday, September 30, 2011 9:02 AM
To: Christensen, Chris
Cc: 'ken Warren'; 'John B. Wilson'; tobrien@nhlakes.org; 'Dana Bisbee'; 'Susan Goodwin '
Subject: NH LAKES input on possible change to RSA 487:26 Milfoil and Other Exotic Aquatic Plants Prevention

Dear Representative Christensen,

Ken Warren, New Hampshire Lakes Association's (NH LAKES) representative on the Exotic Species Committee, requested that I email you regarding your August 8th email to him discussing a possible change to RSA 487:26 Milfoil and Other Exotic Aquatics Plants Prevention.

NH LAKES would be concerned about an effort to reallocate some of the funding generated by boat registration fees and deposited into the Lake Restoration and Prevention Fund (RSA 487:25) away from milfoil prevention grants to milfoil control, for the following reasons:

- In the long run, it is more cost-effective to prevent an exotic aquatic plant infestation than to manage (control) an infestation, particularly because it is currently not likely that an infestation will be completely eliminated.

o We agree that milfoil control activities are underfunded, but it is important to keep in mind that milfoil prevention programs (such as the NH LAKES Lake Host Program) are underfunded as well. For example:

§ During summer 2011, NH LAKES received a $169,000 Milfoil and Other Exotic Aquatic Plants Prevention grant to implement the Lake Host Program.
- Local communities have matched this grant award with $204,128 cash equivalent volunteer time (serving as volunteer lake hosts) and with $195,338 in hard cash from lake associations and municipalities to provide more funding for paid Lake Host salaries.

§ Over the years, the number of community groups participating in the Lake Host grant program has increased, but the amount of funding available for the program has decreased. This has resulted in:

- smaller grant awards to support paid lake hosts
- more money and volunteer time required from local community groups

to keep the Lake Host program continuing at the same level as in previous years

§ To offer the most protection against new exotic aquatic plant infestations, all public boat ramps should be staffed by a Lake Host 7 days a week during daylight hours. Unfortunately, there is not sufficient funding to expand the Lake Host Program to all ramps in the state nor are there adequate resources to staff ramps covered through the program 7 days a week during all day light hours.

In addition, NH LAKES would be concerned using some of the prevention funds for things such as 'self inspection' education signs instead of prevention grant programming, such as the Lake Host Program for the following reasons:

- Self inspection signage at almost all public boat ramps already exists. These signs are made available from the DES Exotic Species Program (Amy Smagula).

- Despite self inspection signs being posted at most all public boat ramps, during summer 2011 along, Lake Hosts either working or volunteering with the NH LAKES Association have removed 37 pieces of exotic aquatic plants from boats and trailers—18 of these events occurred at the ramp of an exotic-free lake just before the boat entered the lake.

- Providing self inspection signs alone (with no Lake Hosts present at boat ramps) will likely result in more lakes becoming infested with exotic aquatic plants than would become infested with exotic aquatic plants with a combination of already existing self inspection signs and Lake Host present.

NH LAKES strongly believes that efforts should be focused on securing more funding for both milfoil management and milfoil prevention and not reallocating an already too small pot of money between the two. We would be pleased to help the committee explore additional funding possibilities.

We thank you for asking for NH LAKES' input. Should you wish to add this topic to an upcoming committee agenda, Ken Warren or I would be pleased to discuss NH LAKES' position.

Sincerely,