



# Cape Alliance for Pesticide Education

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A local resource for information about toxic chemical pesticides and alternatives to their use

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The combination of herbicides that NSTAR proposes to use has been shown to be potentially hazardous to human health as well as the environment. The NSTAR easements traverse 78% of the zone 2 recharge areas that contribute to the public water supply wells on Cape Cod and uncounted numbers of private and community wells. With our porous soils and lack of topsoil, the potential for contamination of our water supply is undeniable. Many of these power line easements are located on residential properties where personal exposure of the families of property owners via drift and residue migration is also problematic. Herbicides once tracked into the home are less likely to degrade and will remain in house dust, subjecting residents to continual exposure to these toxins.



It is clear that herbicides should not be sprayed on the power line easements in our yards and over our drinking water supply. Unwanted vegetation should be removed by hand or machine as appropriate. Removal should be followed by active planting of low growing native species in the easements. The simple act of choosing the appropriate species of vegetation to plant near overhead lines would save hundreds of millions of dollars annually for electric ratepayers in North America.<sup>1</sup>

The U.S. Geological Survey (USGS) has noted that although pesticides are among the most intensively studied of environmental contaminants and many studies of fate and effects are required to register a pesticide, comprehensive assessment of their potential effects continues to present challenges. Two issues receiving particular attention by the scientific and regulatory communities are the potential effects of pesticide mixtures—NOT tested by manufacturers or any federal or state agency, and the potential effects of pesticides on endocrine systems.

## **Endocrine Disrupting Chemicals**

Federal Law 104–170-the Food Quality Protection Act of 1996- required the EPA to develop and implement a peer reviewed screening and testing program for pesticides that may have estrogenic or other endocrine effects within two years.<sup>2</sup> To date no screening has been completed by the EPA.<sup>3</sup> However the progress of science does not stop and peer reviewed studies have implicated at least two of the herbicides proposed for use by NSTAR-- a triclopyr formulation<sup>4</sup> and a glyphosate formulation.<sup>5 6 7</sup> At least one of the surfactants approved by MDAR for use in the easements is also an endocrine disruptor.<sup>8</sup>

The Endocrine Society published its first statement on endocrine disrupting chemicals in 2009 which includes the following key points:<sup>9</sup>

1. The evidence for adverse reproductive outcomes (infertility, cancers, malformations) from exposure to endocrine disrupting chemicals is strong, and there is mounting evidence for effects on other endocrine systems, including thyroid, neuroendocrine, obesity and metabolism, and insulin and glucose homeostasis;
2. Effects of endocrine disrupting chemicals may be transmitted to further generations through germline epigenetic modifications or from continued exposure of offspring to the environmental insult;
3. The Precautionary Principle is key to enhancing endocrine and reproductive health, and should be used to inform decisions about exposure to, and risk from, potential endocrine disruptors.

The Endocrine Society in their 2009 statement also noted: The timing of exposure is key to human disease because there are critical developmental periods during which there may be increased susceptibility to environmental endocrine disruptors. In those cases in which disruption is directed toward programming of a function, e.g., reproductive health, this may interfere with early life organization, followed by a latent period, after which the function becomes activated and the dysfunction can become obvious. For reproductive function in both humans and animals, fetal life is most vulnerable because there are rapid structural and functional events. The roles of sex steroids in sexual differentiation and thyroid hormones in brain development are of paramount importance at that time. Early postnatal life is also a time when maturation is still rapid (e.g., the central nervous system undergoes significant development at this time, including the hypothalamus which controls reproduction). The organization of the neuroendocrine control of reproduction is not completed at birth and remains sensitive to the interaction of steroids or endocrine disrupting chemicals neonatally such as has been shown for the control of ovulation in rodents.

The Director of the National Toxicology Program of National Institute of Health Sciences, (National Institute of Health in the Department of Health and Sciences) noted the following in testimony before congress in 2010:<sup>10</sup>

1. Endocrine signals govern virtually every organ and process in the body. That means that when outside chemicals interfere with those systems, the effects can be seen in many different diseases and conditions. Normal endocrine signaling involves very small changes in hormone levels, yet these changes can have significant biological effects. That means subtle disruptions of endocrine signaling is a plausible mechanism by which chemical exposures at low doses can have effects on the body.
2. Effects have been observed at or below 10 ppb in several animal models. Effects of exposure to endocrine disruptors can be observed long after the actual exposure has ceased. This is especially true for growth and development, processes that are very sensitive to endocrine regulation. Moreover, there are some endocrine disrupting chemicals whose effects can be seen at low doses but not at high doses, in opposition to the usual dose-response curve familiar to toxicologists, which shows continually increasing responses with increases in dose.

### **Additional Health Concerns:**

#### **TRICLOPYR**

A Triclopyr formulation with an APE surfactant was found to be an estrogenic endocrine disruptor with potential significant adverse health effects at low dosages. This formulation was estrogenic at tryclopyr concentrations of 10 or less ppb with a surfactant concentration of 130 ppt or less.<sup>11</sup>

Exposed female mice had a significant increasing trend in mammary gland adenocarcinomas.<sup>12</sup>

TCP – (a *Triclopyr breakdown product*) inhibits development of nerve cells. TCP has also been shown to inhibit neurite outgrowth. TCP concentration is about 3-fold higher in the fetal brain

compared to adults. Even a relatively small effect of TCP may be dangerous to the developing organism.<sup>13</sup>

#### FOSAMINE AMMONIUM:

According to the USEPA "There are no residential uses for fosamine ammonium, therefore, a residential exposure risk assessment has not been conducted".<sup>14</sup> The pesticide label does not list any residential uses.<sup>15</sup>

The Pest Management Regulatory Agency (Canada) cautions users as follows: "Do not use in residential areas or areas where bystanders may be in contact with treated foliage. Residential areas are defined as sites where bystanders, including children, may be potentially exposed during or after spraying. These include areas around homes, school, parks, playgrounds, playing fields, public buildings or any other areas where the general public, including children, could be exposed."<sup>16</sup>

The effects of a commercial spray preparation of ammonium salt ppf fosamine (a defoliant) on quail and chick eggs had a teratogenic effects on the skull and on the cervical, dorsal and posterior axial skeleton.<sup>17</sup>

#### GLYPHOSATE

Glyphosate formulations have been found to be endocrine disruptors with potential significant adverse health effects at low dosages.<sup>18 19 20</sup>

Population studies have found that glyphosate exposure is associated with an increased risk of the following: non-Hodgkins lymphoma,<sup>21</sup> spontaneous abortion (both pre and post conception),<sup>22</sup> and ADD/ADHD.<sup>23</sup>

#### IMAZAPYR

Quinolinic acid is a breakdown product of imazapyr that has been associated with neurologic effects in experimental animals.<sup>24</sup> Quinolinic acid plays a role in several major neuroinflammatory diseases.<sup>25</sup> Imazapyr is also used to treat the railroad beds on Cape Cod.

#### METSULFURON-METHYL

Formaldehyde is one of the ingredients in Escort the trade name of the Metsulfuron-methyl product proposed for use by NSTAR.<sup>26</sup> EPA has designated formaldehyde as a hazardous air pollutant, water pollutant, and waste constituent, and states that it is reasonably anticipated to be a human carcinogen.<sup>27</sup>

### **EVIDENCE OF GROUNDWATER CONTAMINATION**

The United States Geological Society (USGS) has completed a nationwide assessment of pesticides in the environment and has determined that, even in undeveloped areas, pesticides are found in 65% of streams and 29% of wells. According to the USGS the presence of pesticide compounds in predominantly undeveloped watersheds may result from past or present uses within the watershed for purposes such as forest management or maintenance of rights-of-way among other sources.<sup>28</sup>

In southeastern Massachusetts the USGS found the following:<sup>29</sup>

- Herbicides were detected more frequently in water from the public-supply wells completed in sand and gravel aquifers (30 percent of 29 wells).
- Relatively shallow and permeable sand and gravel aquifers are more susceptible to downward movement of pesticides.
- The highest pesticide concentration in ground water was 0.18 µg/L for tebuthiuron from a public-supply well in Massachusetts.
- In New England, tebuthiuron is commonly used to control plant growth in powerline and pipeline rights-of-way. Clearly, current State regulations aren't sufficient to protect water.

Herbicide or Degradate	Findings
<b>Glyphosate or its first metabolite AMPA</b>	Found in 75 of 484 samples tested by the USGS. <sup>30</sup> Found in wells below an electrical substations. <sup>31</sup>
<b>Fosamine ammonium</b>	Fosamine ammonium appears to be very mobile in sandy loam soil; has a very low binding affinity to sandy loam and silt loam textured soils. Residues were detected to the deepest level tested - a depth of 15 inches in soil samples after 3 to 12 months post application. <sup>32</sup>
<b>Imazapyr</b>	Laboratory studies show imazapyr is essentially stable to hydrolysis, aerobic and anaerobic soil degradation, as well as aerobic and anaerobic aquatic metabolism. Field dissipation study observations are consistent with imazapyr's intrinsic ability to persist in soils and move via runoff to surface water and to leach to groundwater. <sup>33</sup>
<b>Triclopyr</b>	"Triclopyr is slowly degraded under anaerobic conditions. Triclopyr degraded to TCP with a half life of about 3.5 years." <sup>34</sup> To reduce Triclopyr to 1% would, under these conditions, take 25 years. "Triclopyr is stable in water without sunlight." <sup>35</sup> "The principle degradate, TCP, is relatively mobile and persistent and has the potential to contaminate ground water." "If triclopyr or its degradates reach deeper soil levels where anaerobic conditions exist, persistence will increase and it is more likely to reach ground water." <sup>36</sup>
<b>Metsulfuron methyl</b>	Moderately to very mobile, depending on organic matter content and soil texture. Leaches through silt loam and sandy soils. <sup>37</sup>

Cape Cod soils are very sandy- a feature verified by an analysis of soil data collected by soil scientists. According to the soil data for Cape Cod, over 75% of the land area is composed of soils that are poor filters and too sandy to serve as good sanitary system soils. Another 15% is indeterminate and just 10% of our soils percolate water slowly.<sup>38</sup> In other words we live on a predominately sandy peninsula though which water percolates very quickly but does not filter water very effectively. There is minimal organic material, allowing for a possible a worst case scenario where our soils do not effectively protect us from surface pollutants into our groundwater/drinking water.

### **EXPOSURE IN NSTAR EASEMENTS AND TRACKING OF PESTICIDES INTO THE HOME**

The NSTAR lines are located in easements on residential properties where the easement does double duty as the front, back, or side yard of the home owner's property. These areas are utilized by the home owners as gardening areas and recreational areas. Families will be exposed to the pesticides applied on their property/NSTAR easement (see pics p.1).

Children are particularly vulnerable to the harmful effects of pesticides. Young children are more likely to be exposed to these pesticides because of their normal tendency to explore their environment orally, combined with their proximity to potentially contaminated floors, surfaces, and air.<sup>39</sup> Physiologic characteristics of young children, such as high intake of food, water, and air per unit of bodyweight, may also increase their exposures. Because children are developmentally immature, they may also be at higher risk for adverse health effects.<sup>40</sup>

The mixture of pesticides, breakdown products, and additives is easily tracked into the home where they degrade more slowly than outdoors and can last for years.<sup>41</sup> Exposure is more problematic for pets and small children who play on the floor or carpet. Because of their proximity to the pesticide residue in house dust on the floor and frequent hand to mouth activity, children are especially susceptible to this exposure in a vulnerable developmental period.<sup>42</sup>

Field simulation studies following lawn applications of pesticides have shown that residential track-in of pesticide residues can occur, and that walking over treated turf as much as one week after application can transport residues on shoes from turf to carpets.<sup>43 44</sup>

### **LACK OF SAFTY IN REVIEW OF PESTICIDES**

Pesticides are not regulated to be safe and it is against the law to make such misleading claims. The Federal Code 40 CFR 156 - Labeling Requirements For Pesticides And Devices prohibits false or misleading statements about pesticides including claims as to the safety of the pesticide or its ingredients, including statements such as "safe," "nonpoisonous," "non-injurious,"

“harmless” or “nontoxic to humans and pets” with or without such a qualifying phrase as “when used as directed”.<sup>45</sup>

This prohibition on safety claims also extends to advertisements.<sup>46</sup>

In 1996 Monsanto agreed to pay \$50,000 to the states of New York and to cease using false claims that their product glyphosate-used on Cape Cod ROW- was safe and biodegradable.<sup>47</sup>

## **RECENT EPA IMPOSED RESTRICTIONS ON COMMONLY USED PESTICIDES**

Diazinon, chlorpyrifos, and chromated copper arsenate (CCA) treated wood are pesticides that were used extensively on residential property and then removed in the 21st century after decades of use due to concerns regarding their health effects. The endpoints of concern were nerve damage in the developing child from diazinon and chlorpyrifos, and bladder cancer from CCA wood exposure.

We are continually learning more about the harmful effects of pesticides-usually after they have been in commerce for decades. It is unnecessary to contaminate our yards and groundwater with pesticides when mechanical methods have been used to clear electrical rights-of-way successfully for decades. Allowing chemical treatment of the power line easements that interface residential and municipal properties and overlay an EPA designated sole-source aquifer is irresponsible, at best, and demonstrates a serious disregard for the Cape Community.

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