Protecting Long Island’s Groundwater
Topics

- Pesticide Pollution Prevention Strategy Overview
- What We’ve Done so Far
- What We’ve Found in Groundwater
- How We’re Measuring Success
- Next Steps
Goal of the Strategy:

1. Protect Long Island's groundwater and surface water

2. Continue to meet region’s pest management needs
Long Island Aquifer

*Drinking Water Source for about 3 Million Long Islanders*

*Equates to: ~270 Million Gallons Daily*
How Does the Strategy Work?

• Pollution Prevention (P2) approach

• Coordinated Collaboration with:
  - Technical Review and Advisory Committee (TRAC)
  - Stakeholder Workgroups

• Monitoring focused on Strategy issues

• Outreach to stakeholders
## Original 47 Active Ingredients

<table>
<thead>
<tr>
<th>Arsenic</th>
<th>Endosulfan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrazine</td>
<td>Ethofumesate</td>
</tr>
<tr>
<td>Azoxystrobin</td>
<td>Fenarimol</td>
</tr>
<tr>
<td>Bentazon</td>
<td>Fipronil</td>
</tr>
<tr>
<td>Bromacil</td>
<td>Fluoride</td>
</tr>
<tr>
<td>Bromoxynil (phenol)</td>
<td>Hexazinone</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>Imidacloprid</td>
</tr>
<tr>
<td>Chlorothalonil</td>
<td>Ipodione</td>
</tr>
<tr>
<td>Chloroxylenol</td>
<td>Malathion</td>
</tr>
<tr>
<td>2,4-D</td>
<td>Mecoprop (MCPP)</td>
</tr>
<tr>
<td>Diazinon</td>
<td>Metalaxyl/Mefenoxam</td>
</tr>
<tr>
<td>Dicamba</td>
<td>Methiocarb</td>
</tr>
<tr>
<td>Dichlobenil</td>
<td>Methomyl</td>
</tr>
<tr>
<td>Dichlorvos</td>
<td>Metribuzin</td>
</tr>
<tr>
<td>Diethyltoluamide (DEET)</td>
<td>Napropamide</td>
</tr>
<tr>
<td>Dimethazone (Clomazone)</td>
<td>Oxadiazon</td>
</tr>
<tr>
<td>Diuron</td>
<td>Pentachloronitrobenzene</td>
</tr>
<tr>
<td>Endosulfan</td>
<td>Piperonyl butoxide</td>
</tr>
<tr>
<td>Ethofumesate</td>
<td>Prometon</td>
</tr>
<tr>
<td>Fenarimol</td>
<td>Propamocarb hydrochloride</td>
</tr>
<tr>
<td>Fipronil</td>
<td>Propiconazole</td>
</tr>
<tr>
<td>Fluoride</td>
<td>Propoxur</td>
</tr>
<tr>
<td>Hexazinone</td>
<td>Siduron</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>Simazine</td>
</tr>
<tr>
<td>Ipodione</td>
<td>Terbacil</td>
</tr>
<tr>
<td>Malathion</td>
<td>Triadimefon</td>
</tr>
<tr>
<td>Mecoprop (MCPP)</td>
<td>Triadimenol</td>
</tr>
<tr>
<td>Metalaxyl/Mefenoxam</td>
<td>Trichlorfon</td>
</tr>
<tr>
<td>Methiocarb</td>
<td>Triclosan</td>
</tr>
<tr>
<td>Methomyl</td>
<td>Vinclozolin</td>
</tr>
<tr>
<td>Metribuzin</td>
<td></td>
</tr>
</tbody>
</table>
**SCOPE OF THE STRATEGY**

- 47 active ingredients currently registered for use on LI and detected in groundwater since 1996
- First 3 active ingredients currently being evaluated:

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>Type</th>
<th>Some Common/Trade Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrazine</td>
<td>Herbicide</td>
<td>Aatrex, Atrazine, Atrazine 4L</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>Insecticide</td>
<td>Marathon, Admire, Gaucho, Provado, Merit</td>
</tr>
<tr>
<td>Metalaxyl/Mefenoxam</td>
<td>Fungicide</td>
<td>Ridomil, Subdue</td>
</tr>
</tbody>
</table>
Timeline

July 2014
LI Strategy Finalized
1) Atrazine
2) Imidacloprid
3) Metalaxyl

CURRENT:
1) Implement BMPs
2) Evaluate BMPs
3) Determine Next Pesticide Al’s

2014-2015 TRAC & Stakeholder Meetings

Earlier 2016 BMPs & Factsheets Developed

2015-16 Education & Outreach
Developed 10 Factsheets

- Authored by CCE of Suffolk County Specialists

- Based on High Priority Use Patterns:

<table>
<thead>
<tr>
<th>Atrazine</th>
<th>Metalaxyl/Mefenoxam</th>
<th>Imidacloprid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Sweet Corn</td>
<td>1) Greenhouse</td>
<td>1) Potato</td>
</tr>
<tr>
<td></td>
<td>2) Container Nursery</td>
<td>2) Greenhouse</td>
</tr>
<tr>
<td></td>
<td>3) Potato/Tomatoes</td>
<td>3) Cucurbits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4) Arborists/Landscapers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5) Turf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6) Fruiting Vegetables</td>
</tr>
</tbody>
</table>

- Currently Available: [http://ccesuffolk.org/agriculture](http://ccesuffolk.org/agriculture)
STAKEHOLDER OUTREACH EVENTS

Long Island Nursery & Landscape Association - Annual Meeting
CCE of SC Managing Landscapes Sustainability Conference
CCE of SC Agricultural Forum - GENERAL SESSION
CCE of SC Agricultural Forum - NURSERY SESSION
CCE of SC LI Greenhouse and Floriculture Conference
Long Island Golf Course Superintendent’s Association
CCE of SC Horticultural Conference
Long Island Cauliflower Association Conference
Long Island Flower Growers Association Meeting
Professional Certified Applicators Annual Conference
Long Island Arboricultural Association - Annual Symposium
NSLGA Annual Professional Turf, Plant & Tree Conference
SiteOne Landscape Supply Winter Seminar
CCE and Suffolk County Parks
USEPA Region 2 Sustainability Forum
Sampling Existing Monitoring Wells: Nassau County

- Annually Collect Groundwater Samples from ~100 Monitoring Wells
Sampling Existing Monitoring Wells: Suffolk County

- 629 Monitoring Well Samples
- 444 Private Well Samples
- 982 Community Well Samples
- 337 Non-Community Well Samples
- “Samples” can represent multiple dates and events at each well
Analyze Samples

• Samples Analyzed by Suffolk County Laboratory

• ~300 Parameters

• >100 Commonly Used Pesticides
2015-16 Detections

1) Currently Registered Pesticides
   - 19 Different Active Ingredients Detected
   - 5 Degradates/Breakdown Products

2) Legacy Pesticides
   - 6 Different Legacy Active Ingredients Detected
   - 10 Degradates/Breakdown Products
1. **Imidacloprid** (Admire, Provado, Marathon, Merit, Gaucho, Pasada, etc.)

2. **Mefenoxam** (Ridomil Gold, Subdue Maxx, Quell, Apron, Ariel, Hurricane, Dividend XL)

3. **Dichlobenil & Degradate BAM** (Casoron)

4. **Atrazine & 2 Degradates** (Atrazine, AAtrex)

5. **Propachlor ESA Degradate** (Ramrod)

6. **Diuron** (Direx, Karmex)

7. **Simazine** (Princep)

8. **Propiconazole** (Tilt, Banner, Orbit, Alamo)

9. **Chlorothalonil** (Quadris Opti, Concert II, Nexgen)

10. **Iprodione** (Rovral, Interface, Armortech)

11. **Ethofumesate** (Prograss, Poaconstrictor)

12. **Trichlorfon** (Dylox, Proxol)*

13. **Propamocarb Hydrochloride** (Tattoo, Banol)

14. **Dichlorvos** (Agrovos, Novus, DDVP, Vapona)*  

   * Dichlorvos is also a degradate of Trichlorfon

**Decreasing Detection Frequency**

1. Chloroxylol (manufacturing)

2. Oxadiazon (Ronstar)

3. Bentazon (Basagran, Pledge)

4. Hexazinone (Velpar)

5. Triadimefon (Bayleton, Accost)
1. Metolachlor and 4 degradates (No LI Use >1998)
2. Alachlor and 2 degradates
3. Aldicarb 2 degradates (No LI Use >1980)
4. Dacthal
5. Chlordane (Cancelled 1988)
6. Propachlor degradeate (No use after 2003)
7. Heptachlor degradeate (Cancelled 1988)
8. Dinoseb
9. Tebuthiuron (No use after 2003)
**2006 Atrazine**

- Atrazine detected in 6 of 1,711 samples (0.35%)

- Concentrations .019 to .08 ppb

- All detections below 3 ppb standard

- Detections occurred in 2 monitoring wells and 3 private well samples
2011 – 2013 Atrazine Detection Locations in Suffolk County

6 Individual Locations

Highest Concentration (0.6 ppb) in Same East Quogue Area

Most Recent Detections Occurring in Areas with Surrounding Agricultural Land Uses
2015 Atrazine

- Detected at 17 locations
- Concentrations from 0.1 to 5.7 ppb
- 3 locations near or above 3 ppb standard
2006 Metalaxyl

- Detected in 128 of 1,711 samples (7.5%)
- Concentrations from 0.1 to 8.4 ppb (below 50 ppb standard)
Mefenoxam Detections

- Detected in 83 Groundwater Samples
- Detected in 52 Separate Locations
- Concentrations Up To 5 ppb
2006 Imidacloprid

- Detected in 189 of 1,378 samples (13.5%)
- Concentrations 0.1 to 407 ppb
Imidacloprid Mis-Uses/Spills/Poor Housekeeping

- Between 2005 & 2008
- Highest concentrations associated with mis-use
- Confirms rapid movement to groundwater
- Concentrations have declined

Suffolk County

- 215 ppb
- 407 ppb
- 84 ppb
- 67.7 ppb
- 67.4 ppb

NYSDOH Standard = 50 ppb
2014 Imidacloprid Groundwater Data

- 75 detections
- Much lower concentrations: ≤ 2.2 ppb
- Likely associated with labeled uses
- Credit to the users
Imidacloprid Detections

- Detected in 85 Groundwater Samples
- Detected in 50 Separate Locations
- Concentrations Up To 23.3 ppb (<50 ppb Standard)
Stakeholder Cooperation

Monitoring & Best Practices

- 19 Cooperators allowing SCDHS groundwater monitoring wells onsite or downgradient and sharing pest management practices with Cooperative Extension
- Currently 3 greenhouses, 3 golf courses, 3 nurseries, 4 vineyards, 4 vegetable farms, 2 sod farms
- Also focusing on public right of ways and residential turf
Pesticide Sales & Use

PRL Data - 2012 to 2014

**Imidacloprid:**
- Gallons: up 13.5% from 4930 to 5600
- Pounds: about the same, from 1.2 Mgals to 1.1 Mgals

**Mefenoxam (little to no metalaxyl):**
- Gallons: way up from 1440 to 21,290
- Pounds: about the same, from 1330 to 1360

**Atrazine:**
- Gallons: down from 1360 to 175
- Pounds: down from 730 to 0!
Measures of Success

Extent of Outreach

- Association conferences, workshops, seminars
  - 2014: 2 events 310 people
  - 2015: 12 events 1960 people
  - 2016: 14 events 2515 people

- Factsheets for Imidacloprid, Atrazine, Metalaxyl
  - At several distributor locations (point of sale!)
  - On DEC and CCESC websites
  - Distributed by associations in newsletters, conference info packages

Implementation of P2 Measures

- Surveys
  - Conducted by CCESC at a couple of events
  - Ask Associations to survey their members
Measures of Success

Groundwater Monitoring
- Look for reductions in detections in terms of:
  - Number
  - Frequency
  - Location
  - Areal Extent
  - Concentration
  - Co-location of multiple active ingredients

Use of pesticides containing active ingredient
- Look for trends in sales and use
- Check pesticide sales and use data (PRL)
- Pesticide Usage Report (CCESC)
Monitoring Program to Establish Baseline Conditions

Identify Areas of Concern

Identify P2/BMP Measures

Assess Effectiveness of Pollution Prevention Measures

Groundwater Trends Over Time

Concentration

Time

Use of BMPs/P2 Measures

Education/Outreach Extent

Adjust Pollution Prevention Measures as Necessary

Continue Monitoring Program
Next Steps

Expand Outreach and promotion of P2 Measures for Atrazine, Mefenoxam and Imidacloprid

Expand surveys to other groups, evaluate results, and modify outreach efforts

Target outreach to specific types of users – greenhouses, turf, nurseries, etc.

Homeowners
Cornell Community IPM is developing Homeowner BMP’s and Factsheet

1) Hire the Professional
2) Apply According to the Label
Next Steps

Groundwater Monitoring

Investigate and evaluate any trends in detections

Focus on monitoring results associated with specific use patterns

Evaluate occurrence of multiple AIs at same locations
Selecting Next Active Ingredients

• Criteria for Prioritizing List of 47 Active Ingredients
  1. Groundwater Detections
  2. Exposure Potential and Risks
  3. Registration Review history
  4. Environmental Fate Properties
  5. Use Rating
  6. Use Patterns and Critical Uses

• Includes TRAC & Stakeholder Involvement
Take Away Message

✔️ Strategy Developed in Response to Pesticides in LI Groundwater

✔️ BMPs and P2 Measures for Priority Use Patterns

✔️ Continue to Detect Pesticides in Groundwater

✔️ Next AI(s) selection process now in progress
Thank You

Scott Menrath, P.E.
Director, Bureau of Pest Management
NYSDEC
625 Broadway, Albany, NY 12233-7254
Scott.Menrath@dec.ny.gov
(518) 402-8788

Connect with us:
Facebook: www.facebook.com/NYSDEC
Twitter: twitter.com/NYSDEC
Flickr: www.flickr.com/photos/nysdec