LONG ISLAND
PESTICIDE POLLUTION PREVENTION STRATEGY

New York State
Department of Environmental Conservation
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EXECUTIVE SUMMARY

INTRODUCTION

Pest management plays an integral role in the health and economic vitality of New York State. At the same time, improperly used pesticides have the potential to impact environmental quality. This draft Long Island Pesticide Pollution Prevention Strategy (Strategy) was developed in response to concerns over detection of pesticide-related constituents in the groundwater over time at various locations on Long Island and recognition of the importance of protecting the environment while meeting critical pest management needs.

The New York State Department of Environmental Conservation (DEC) regulates the registration, commercial use, purchase and custom application of pesticides. The Environmental Conservation Law (ECL) sets forth the state's policy regarding pesticide usage. ECL 33-0301. According to the ECL, pesticides, when properly used, are "valuable, important and necessary to the welfare, health, economic well-being and productive and industrial capabilities of the people of this state." ECL 33-0301. However, pesticides also present potential dangers to health, property and the environment if improperly used. ECL 33-0301.

DEC exercises its broad regulatory responsibilities in consultation with the Departments of Health (DOH) and Agriculture and Markets (DAM) in order to protect public health and the environment while ensuring that pesticides proposed for use in New York State are properly registered and applied for the benefit of agricultural and other economic enterprises that rely on pesticide usage. In the interests of providing further protection to Long Island's precious groundwater resources, DEC engaged the public, municipalities, agricultural and other regulated communities in a discussion on how to further protect Long Island's groundwater resources. As a result, DEC developed the draft Long Island Pesticide Pollution Prevention Strategy. Implementation of the Strategy will enhance DEC's existing regulatory program using principles of pollution prevention. The Strategy presents a blueprint for DEC, in consultation with stakeholders, to evaluate pesticide usage on Long Island, identify pesticides that have the greatest potential to cause adverse impacts and work with partners to reduce or eliminate such usage or find alternatives that do not present such impacts. This approach will both protect Long Island's water resources from pesticide impacts and encourage effective methods of pest management.

ES.1 THE CHALLENGE OF PESTICIDE USE AND GROUNDWATER ON LONG ISLAND

ES.1.A. Critical Natural Resource and Essential Pest Management

Almost three million people in Nassau and Suffolk Counties rely on clean drinking water from Long Island's sole source aquifer, a unique and critical resource in the State. The heavy reliance on the sole source aquifer plus the nature of the aquifer system itself (e.g., shallow depth of groundwater, sandy and permeable soils overlying it), which is a factor in its vulnerability to contaminants, underscores the critical need to protect the quality of the groundwater before it becomes impaired for such usage. Pesticides play an important and beneficial role in managing

pests on Long Island. This includes regional pests which threaten public health, agricultural and horticultural productivity, structural integrity of public and private infrastructure (e.g., termite/carpenter ant control), quality of stored and marketed goods, and the condition of the environment. Annual regional pesticide use by many entities (e.g., agriculture, businesses, institutions and homeowners) averages in the millions of pounds and hundreds of thousands of gallons.[1]

ES.1.B. Pesticide Detections in Long Island Groundwater

Water quality monitoring by Suffolk County and other entities shows that pesticides are among a number of contaminants detected in Long Island groundwater as a result of a wide range of human activities (e.g., nitrates, volatile organic compounds, pharmaceuticals and personal use products). The water quality monitoring data presented in this document, as well as the water quality monitoring data summary tables, are available at ftp://ftp.dec.ny.gov/dshm/pesticid/liwaterqualitydata.docx Data obtained from Suffolk County indicates that 117 pesticide-related chemicals were detected in the groundwater at a number of locations on Long Island at various points in time since 1997.[2] Approximately half of these are legacy compounds (from pesticides no longer or never registered for use on Long Island or in New York State), which have not been used in many years. Although the samples demonstrate that pesticides can persist in the Long Island aquifer, most detections were at low or trace levels. Some pesticide-related compounds were detected (mostly at low levels) at multiple locations, distributed broadly over Long Island. Primary examples include the active ingredients imidacloprid (insecticide), metalaxyl (fungicide), and atrazine (herbicide).[3]

ES.1.C Drinking Water Quality

It is important to note that much of the water quality monitoring data presented in this document does not represent what the majority of residents of Long Island are using for drinking and other household purposes. Few detections of individual pesticide-related contaminants exceeded applicable standards. The Suffolk County Water Authority ensures that finished water (treated water) that they supply to their customers exceeds expectations for quality set by New York State drinking water standards.[4] Public water supplies are subject to regulation by the NYSDOH through the Suffolk County Department of Health Services (SCDHS) under New York Codes Rules and Regulation (NYCRR) Subpart 5-1.[5] The regulations establish water quality standards known as maximum contaminant levels (MCLs), and require routine water quality monitoring. If finished drinking water is found to contravene a standard, corrective action is required. Private wells are not regulated by NYSDOH, but SCDHS has a program to test private wells for pesticides and other contaminants. Through their work, if contaminants are found in a private well that exceeds standards then the homeowner is advised to not drink that water, and to either

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[1] NYS Department of Environmental Conservation, Final Annual Report for New York State Pesticide Sales and Applications 2005. http://www.dec.ny.gov/chemical/37825.html

[2] See Appendices A and B of the Strategy for a summary of results of Long Island water quality monitoring conducted by the Suffolk County (SC) Department of Health Services, SC Water Authority, and U.S. Geological Survey. See additional monitoring data at http://www.dec.ny.gov/.

[3] DEC data analysis regarding these active ingredients (AIs) is contained in Appendix B of this Strategy.

[4] 2012 Annual Drinking Water Quality Report, Suffolk County www.scwa.com.

[5] Title 10. Department of Health Chapter I. State Sanitary Code Part5. Drinking Water Supplies Subpart 5-1. Public Water Systems.

find an alternative source or to invest in treatment to achieve compliance with drinking water standards.

ES.1.D. Significance of NYSDEC Pesticide Product Registration

DEC's pesticide product registration process forms an integral component of a comprehensive pest management program. The product registration program acts as a gatekeeper to control the universe of pesticide products in New York State that may be made available consistent with public health and environmental protection. The current in-depth pesticide product review process did not exist prior to the early 1990s. Older pesticides, registered before that time, have often not received a comprehensive DEC review, or received only a very limited review of a subset of products. The data demonstrate that DEC's existing pest management regulatory program has proven effective at preventing products which pose unreasonable adverse effects from being registered and used in the State. DEC's enhanced pesticide registration program relies on the New Active Ingredient (NAI) and Major Change in Labeling (MCL) review process. During this process pesticide registrants work with DEC to implement a feasible and effective resolution of any environmental concerns identified during DEC's review. For example, some pesticides may be registered for use in New York State with restrictions that prohibit or modify use on Long Island if the chemical or product use pattern poses a leaching risk for Long Island's vulnerable groundwater system. In this way, the current regulatory process effectively provides pesticide products needed by the user community while ensuring groundwater protection.

ES.2 PESTICIDE POLLUTION PREVENTION GOAL

In general, once a contaminant that has the potential to adversely impact public health or the environment is found in groundwater, technological and fiscal constraints severely limit remedial options, and accurate assessments of public health and environmental quality implications are challenging. Therefore, it is essential to prevent contamination in the first instance, to the extent practicable, while still allowing for needed pest management.

DEC developed this Strategy as an approach for managing the ongoing need to prevent potential pesticide impacts to water resources while continuing to meet critical pest management needs on Long Island. In general terms, pollution prevention means reducing or eliminating the creation of pollutants at the source. In the context of pesticides on Long Island, pollution prevention may mean modifying pest management processes, promoting the use of alternative pest management practices, and utilizing effective, less-toxic products when available.

GOAL OF STRATEGY

Prevent adverse effects on human health and the environment by protecting Long Island's groundwater and surface water resources from pesticide-related contamination, while continuing to meet the pest management needs of agricultural, residential, commercial, industrial, and institutional sectors.

ES.3 PESTICIDE POLLUTION PREVENTION (P2) BLUEPRINT

DEC's strategy to meet this goal of protecting water quality while meeting pest management needs is based on a blueprint of actions to further pesticide pollution prevention on Long Island. The greatest benefits can be gained from prevention when it is implemented through collaboration with involved entities. Therefore, the pesticide pollution prevention (P2) blueprint includes components to be acted on by DEC, in conjunction with various partners and Long Island stakeholders. In brief, the blueprint forms an approach for moving forward by supplementing the existing protective measures of the product registration, compliance and outreach components of DEC's pesticide regulatory program with P2 measures.

There are five main components in the pesticides P2 blueprint. The blueprint calls for actions essential to effective implementation of pesticide P2 in Long Island and, without which the Strategy cannot be meaningfully implemented. The blueprint is summarized below. Most of its components are based on multi-party actions needed to bring pesticide P2 to fruition. The actions must be feasible and carried out with available resources of DEC and its partners.

PESTICIDE P2 BLUEPRINT SUMMARY

DEC Conducts Initial Assessments of Specific Active Ingredients (AIs) and Related Pesticide P2 Needs

DEC Forms, Convenes and Chairs Pesticide P2 Workgroups; Workgroups Consider Various Matters Regarding Specified AIs and Related P2 and Advise DEC

DEC Identifies and Prioritizes Pesticide P2 Measures and Partners Collaborate to Implement P2 Measures

DEC Tracks Pesticide P2 Results and Assesses Need for P2 Modifications

DEC Maximizes Department Use of Water Quality Monitoring for Pesticides (Monitoring underlies implementation of the entire blueprint.)

These interrelated blueprint components follow a sequence which starts with assessing certain pesticide active ingredients detected in Long Island groundwater, then evaluating the type of P2 needed and implementing it, followed by tracking P2 results and modifying P2 if needed. Maximizing DEC use of water quality monitoring for pesticides involves actions which will provide an important part of the foundation for implementing P2 throughout the blueprint.

A number of action steps are needed to implement each component of the blueprint. These are shown in the full P2 blueprint on the following pages. Implementation of each component is designed to yield benefits which facilitate carrying out subsequent components and steps in the P2 process. Further detail on the blueprint is contained in chapter 3.

BLUEPRINT for LONG ISLAND PESTICIDE POLLUTION PREVENTION

NYSDEC Conducts Initial Assessments of Active Ingredients (AIs) and Related Pesticide P2 Needs

Review water quality monitoring results for Long Island groundwater; identify AIs detected as well as factors such as location, number, frequency and concentration of detections and potential for human exposure and associated health risks.

- Review AI-related standards, use and product information and water quality standards and benchmarks
- Identify AIs for which P2 measures potentially need to be taken
- Identify types of additional information needed to consider potential pesticide P2 needs and plan for AIs.

Note: DEC anticipates that the first group of AIs to be considered for assessment will be metalaxyl (fungicide), atrazine (herbicide) and imidacloprid (insecticide). These AIs have been detected by Suffolk County at multiple groundwater monitoring locations.

DEC Forms, Convenes and Chairs Pesticide P2 Workgroups; Workgroups Consider Various Matters Regarding AIs and P2

NYSDEC forms, convenes and chairs workgroups:

- A Technical Review and Advisory Committee (TRAC) which, at the request of DEC, considers AIs specified by the Department and advises on factors such as AI use and critical needs, potential for human exposure, human health risks, effective alternatives for AI, aquifer vulnerability, potential pesticide P2 measures (see below), P2 implementation partners, and other considerations to provide DEC with background information to support Department decisions regarding AIs and related P2 actions and implementation. (For further information on the TRAC, see Box ES-3 at close of the Executive Summary.)
- Additional workgroups, to ensure broad representation of involved entities in consideration of AIs and P2 measures (e.g., entities with direct involvement in pest management, pesticide use, and water quality on Long Island as well as academia). These workgroups may also consider AIs specified by NYSDEC, provide NYSDEC with requested information on particular subject areas (e.g., human health implications, water quality concerns, effective alternatives), and suggest feasible P2 measures and implementation partners.

NYSDEC Identifies and Prioritizes Pesticide P2 Measures and Partners Collaborate to Implement P2 Measures

NYSDEC considers workgroups' information and determines, the scope and priority of pesticide P2 measures appropriate for each AI to be addressed.

- NYSDEC will identify and prioritize P2 measures from among this overall scope of primary P2 measures:
  - Develop and disseminate best management practices and track their use.

BLUEPRINT for LONG ISLAND PESTICIDE POLLUTION PREVENTION

DEC Identifies and Prioritizes Pesticide P2 Measures and Partners Collaborate to Implement P2 Measures, cont'd.

- Research alternative products and practices, including organic practices, and provide related outreach and education to implement
- Conduct outreach and education on use pattern-specific integrated pest management
- Encourage voluntary label revisions (through registrant and USEPA process)
- Restrict products to certified applicator use.

- DEC will identify partners to collaborate with the Department to implement pesticide P2 measures (e.g., product registrants, user groups, academic entities, State and local agencies) and, as needed, convene P2 implementation workgroups.
- DEC and partners will collaborate to implement P2 within available resources.
- DEC may strengthen existing outreach partnerships with Cornell University and other entities, forge new partnerships and maximize Internet resources.
- DEC and partners will identify stakeholders and build P2 implementation support.

DEC Tracks Pesticide P2 Results and Assesses Need for P2 Modifications or Regulatory Measures

- DEC, with, as needed, assistance of pesticide P2 partners, monitors results of P2 implementation and determines additional monitoring and measures, if any, for effective pest management and water quality protection.
- DEC may consider certain regulatory measures to manage use of a specific AI, if P2 actions prove insufficient and if DEC and NYSDOH determine that detections of a pesticide-related chemical in water quality monitoring data indicate significant public health or environmental impacts may occur. Under such circumstances, DEC may reassess the registration status of products containing the target AI by reviewing the product registrations associated with the AI and, if necessary, take regulatory action to prohibit use on Long Island.

DEC Maximizes Department Use of Water Quality Monitoring for Pesticides

NOTE: This underlies all actions under the blueprint, in that water quality monitoring results are essential to conducting the work under each component (e.g., determining AIs to be considered, specifying P2 needed, etc.)

- Adjust emphasis of monitoring, as needed and within available resources and flexibility, to meet DEC information needs for Long Island (e.g., focus on specific AIs to capture information and discern trends and new detections in particular pesticide use settings, such as greenhouses, turf, vineyards) as well as to monitor P2 results, if applicable.
- Focus water quality monitoring, including the acquisition of finished drinking water monitoring results, conducted under available resources by Suffolk County and Cornell University or others, on AIs of concern to determine trends and changes in detection levels and frequency.

TECHNICAL REVIEW AND ADVISORY COMMITTEE (TRAC) - SUMMARY DESCRIPTION

Composition: DEC will convene, approximately six months after this Strategy is finalized, a TRAC to pool expertise of State and local government agencies as well as statewide and local public service and academic entities closely involved with pesticide regulation and water quality monitoring for Long Island:

- New York State: DEC (Chair), Department of Health, Department of Agriculture and Markets; Cornell University Department of Agriculture and Life Sciences.
- Local Entities: Suffolk County Department of Health Services, Water Authority, and Soil and Water Conservation District; Nassau County Health Department; Cornell Cooperative Extension of Suffolk County

After 5 years, Department and involved participants assess ongoing need for TRAC.

Primary purposes:

- Assist DEC in investigation and assessment of active ingredients (AIs), identified and ranked by the Department (potential contaminants detected in Long Island groundwater)
- Consider factors such as groundwater monitoring data, exceedances of chemical-specific water quality standards, potential for human exposure, public health risks, existing needs for pest management, and pest management alternatives
- Advise DEC regarding potential and feasible response actions to prevent further pesticide-related impacts to the Long Island aquifer while recognizing pest management needs. (Scope of response actions - see P2 measures in Information Box ES-1.)

ES.4 SUMMARY OF LONG ISLAND PESTICIDE P2 STRATEGY CONTENTS

A summary of the contents of each chapter in the Strategy is contained in Table ES-1.

Table ES-1: EXECUTIVE SUMMARY OF CHAPTERS AND APPENDICES
LONG ISLAND PESTICIDE POLLUTION PREVENTION STRATEGY

	Summary of Chapters and Appendices
1. Goal, Philosophy, and Purpose	***Goal:*** Given that groundwater, pest management and pesticide use are vital to public and economic welfare on Long Island, the overall goal of this Strategy is to: Prevent adverse effects to human health and the environment by protecting Long Island's groundwater and surface water resources from pesticide-related contamination, while continuing to meet the pest management needs of agricultural, residential, commercial, industrial, and institutional sectors. ***Philosophy:*** The goal of enhancing water quality protection from pesticide impacts and maintaining needed pest management on Long Island can be effectively achieved through a strong pollution prevention approach that recognizes the importance of both and incorporates the involvement and cooperation of various stakeholders. Preventive measures can be taken to both minimize further pesticide contamination after a pesticide has been detected and to prevent contamination before a pesticide is detected in water resources. ***Purpose:*** Establish a long-term pesticide pollution prevention blueprint to meet the goal of the Strategy and to outline enhanced DEC partnerships with involved entities that are essential to success. This blueprint should serve to enhance use of pest management methods on Long Island that incorporate pollution prevention techniques and protect Long Island water resources from pesticide-related contamination.
2. Overview: Groundwater and Pesticide Use on Long Island	▪ ***Importance of Long Island sole source aquifer and its protection.*** ▪ ***Aquifer structure and multiple uses by approx. 3 million people make it a critical resource.*** ▪ ***Pesticide-related statistics for Long Island*:** • Of the 13,688 pesticides registered in the State, 361 are prohibited from use and 145 are registered for use on Long Island only when certain conditions are met (June 2012); • 4,733 certified pesticide applicators and technicians on Long Island (2012); • 5.3 million pounds and 407,000 gallons of pesticides applied on Long Island (2005). ▪ ***Pesticide use yielded substantial benefits***, including Suffolk County's statewide lead in sales of horticultural, agricultural and vineyard products. ▪ ***The signs of pesticide use are showing up in Long Island's groundwater.*** 117 pesticide-related chemicals detected in the aquifer at various locations since 1997; approximately half are legacy compounds (no longer or never registered in NYS). Some detections at multiple locations and multiple compounds detected at individual wells. ▪ ***Most pesticide-related detections are much lower than water quality criteria.*** Seven types of State and federal water quality criteria are summarized.

Table ES-1: EXECUTIVE SUMMARY OF CHAPTERS and APPENDICES, cont'd.
LONG ISLAND PESTICIDE POLLUTION PREVENTION STRATEGY

Chapter	Summary of Chapters and Appendices
3. Action Plan to Implement Pesticide Pollution Prevention Strategy	▪ ***Pollution prevention can prevent water quality impacts while continuing to meet critical pest management needs.*** ▪ ***DEC Pesticide P2 Process Steps:*** • Conduct Initial P2 Needs Assessment • Determine Scope of Applicable P2 Measures • Convene P2 Working Groups • Review Information from P2 Working Groups as Basis for P2 Assessment • Identify and Prioritize Active Ingredients and P2 Measures • Collaborate with Partners to Implement P2 Measures and Build Stakeholder Support • Monitor Results of P2 Actions and Determine if Further/Modified Action Needed Based on Success Criteria
4. Pesticide Registration in New York State	▪ ***History and evolution of New York State pesticide registration process*** ▪ ***Current NYS registration process*** ▪ ***NYS product review process for potential groundwater impacts*** - Safeguards against groundwater pollution built-into process ▪ ***Factors considered during registration,*** include land and groundwater characteristics ▪ ***Overview of leachate assessment and modeling*** of new active ingredients ▪ ***Current Pesticide Use Statistics in NYS:*** Approximately 13,688 registered products, and 1,700 restricted pesticides , 361 of which are prohibited from use on Long Island
5. Existing Pollution Prevention Programs and Activities	▪ ***Summary of existing non-regulatory and regulatory measures to prevent or reduce potential impacts of pesticide use.*** Examples of non-regulatory: outreach, education, best management practices, integrated pest management, environmental benefit projects, agricultural environmental management. Examples of regulatory preventive measures: pesticide product registration, mixing and loading requirements, toxic and hazardous materials storage, and local pesticide phase-outs. Measures conducted by State and local governments, academia, pesticide users, interest groups and others.
6. Legal Authority and Enforcement	▪ ***Summary of existing DEC statutory and regulatory authority over pesticides*** registration, sales, use, storage and disposal as well as certain water quality requirements, primarily under the Environmental Conservation Law and related regulations. ▪ ***Comparison of DEC and USEPA authorities*** ▪ ***Summary of DEC enforcement mechanisms related to pesticides*** ▪ ***Summary of statutory authorities of other State agencies*** to conduct pesticide-related work, such as water quality and pesticide management-related functions under the authority of State laws.
Appendices	▪ *Appendix A* Pesticide-Related Chemicals Detected In Long Island Groundwater 1996-2010 ▪ *Appendix B* DEC Summaries of Long Island Water Quality Monitoring Data ▪ *Appendix C TRAC Description and Ongoing Pest Management Education and Outreach Efforts*

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Chapter 1. GOAL, PHILOSOPHY AND PURPOSE

The New York State Department of Environmental Conservation's (DEC's) goal and philosophy, which are summarized here, go hand-in-hand as the core concepts underlying the purpose and details of this Strategy.

GOAL OF STRATEGY

Given that groundwater, pest management and pesticide use are vital to the public and economic welfare on Long Island, the overall goal of this Strategy is to:

Prevent adverse effects on human health and the environment by protecting Long Island's groundwater and surface water resources from pesticide-related contamination, while continuing to meet the pest management needs of the agricultural, residential, commercial, industrial, and institutional sectors.

PESTICIDE POLLUTION PREVENTION PHILOSOPHY

The primary philosophy underlying the goal of this Strategy is:

The goal of enhancing water quality protection from pesticide impacts and maintaining necessary pest management on Long Island can be effectively achieved through a strong pollution prevention approach that recognizes the importance of both and incorporates the involvement and cooperation of various stakeholders. *Preventive measures can be taken to both prevent contamination before a pesticide is detected and minimize further pesticide contamination after a pesticide has been detected in water resources.*

PURPOSE OF LONG ISLAND STRATEGY

The overarching purpose of this Strategy is to:

Establish a long-term pesticide pollution prevention blueprint to meet the goal of the Strategy and to outline enhanced NYSDEC partnerships with involved entities that are essential to success. *This blueprint should serve to enhance use of pest management methods on Long Island that incorporate pollution prevention techniques and protect Long Island water resources from pesticide-related contamination.*

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Chapter 2. OVERVIEW: GROUNDWATER AND PESTICIDE USE ON LONG ISLAND

2.1 INTRODUCTION

U.S. Census Bureau population estimates for calendar year 2010 indicate that more than 1.3 million people reside in Nassau County and nearly 1.5 million reside in Suffolk County.[6] These 2.8 million people depend on underlying groundwater (see Figure 2.1)[7] as their principal source of clean, potable water. This water supply, containing approximately 90 trillion gallons of fresh water, is one of the nation's most critical sole-source aquifers.[8] More than 138 billion gallons are taken annually from this aquifer system for human use.[9]

2.2 GROUNDWATER AND THE IMPORTANCE OF PROTECTING IT

This Strategy centers on measures that can be taken to manage pesticide use to protect groundwater. To facilitate an understanding of this essential resource and the critical importance of protecting its quality to the maximum extent possible, this section summarizes the importance of the aquifer, contains a basic description of its structure and how it functions, provides an overview of the use and impact of pesticides on Long Island, and provides a brief description on various water quality criteria.

For Long Island, the key reason that protecting groundwater is so significant is that it is the sole source of fresh water for regional residential, agricultural, horticultural, commercial, industrial, institutional and other uses that include drinking, cooking, bathing, and irrigation. Groundwater is a source for municipal and private wells, and above-ground springs. The sandy soils of Long Island have, in part, enabled an abundant supply of groundwater to develop. However, those soils do little to shield this system of aquifers from contaminants and potential degradation associated with human activities, including pesticide use. A clean supply of groundwater is vital to those who live, work, and recreate on Long Island; therefore, it is critically important that this essential environmental resource be protected.

In recognizing the importance of conserving, protecting and managing the waters of the state, the New York State Legislature specially noted that the unique qualities of Long Island's unified aquifer system merit special attention, that this groundwater resource is sensitive to pollution, and that adequate supplies of good quality groundwater are essential to the health, safety and welfare of New Yorkers and the economic growth and prosperity of the State (ECL Article 15). In 1978, the U.S. Environmental Protection Agency (USEPA) determined that the aquifer system underlying Nassau and Suffolk counties is the principal source of drinking water for these

[6] U.S. Census Bureau, "State and County Quick Facts," http://quickfacts.census.gov/qfd/states/36/36059.html and http://quickfacts.census.gov/qfd/states/36/36103.html.
[7] Long Island Water Conference, http://www.liwc.org/pages/eduSource.htm.
[8] Long Island Water Conference; http://www.liwc.org/pages/aboutUs.htm.
[9] City of New York Department of Design and Construction, "Geothermal Heat Pump Manual," Ch. 5, p. 6, August 2002; http://www.nyc.gov/html/ddc/downloads/pdf/geotherm.pdf.

counties and that if the aquifer system was contaminated, it would create a significant hazard to public health.

2.2 A. Structure and Operation of the Aquifer

The aquifers underlying Long Island are among the most prolific in the country. Almost all of Long Island's drinking water is from groundwater, while surface water is an insignificant contributor. According to the *USGS Estimated Use of Water in the United States in 2000*, Nassau and Suffolk counties utilized more than 375 million gallons of groundwater per day for public, domestic, industrial, and irrigation uses. The three most important Long Island aquifers are the Upper Glacial Aquifer, the Magothy Aquifer, and the Lloyd Sands Aquifer, and are depicted in Figure 2.1.[10]

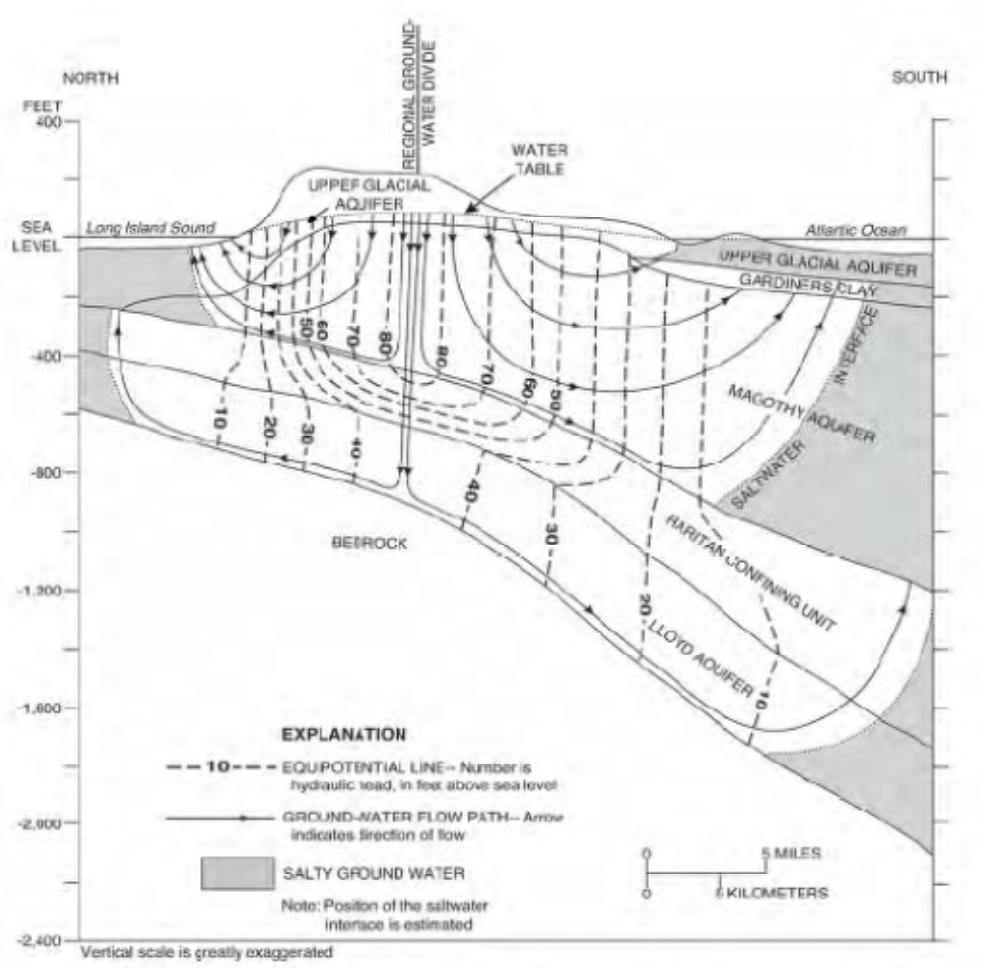
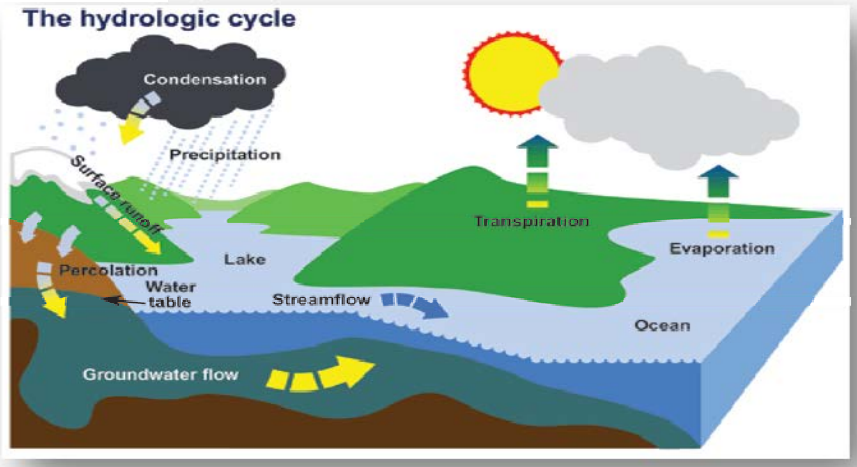


Figure 2.1: Long Island's Aquifers Generalized flow lines in the groundwater system of Long Island, N.Y., under natural (predevelopment) conditions. (Modified from a figure from Franko and Cohen, 1972).

[10] Water-Table and Potentiometric-Surface Altitudes of the Upper Glacial, Magothy, and Lloyd Aquifers on Long Island, New York, in March-April 2000, with a Summary of Hydrogeologic Conditions, by Ronald Busciolano, U.S. Geological Survey Water-Resources Investigations Report 01-4165.

About half of Suffolk County derives its drinking water from the Upper Glacial Aquifer, an unconfined aquifer directly underlying the surface of the ground. The Magothy Aquifer is the largest of Long Island's aquifers and is the source of water for most of Nassau County and about half of Suffolk County. The Raritan Clay Formation underlies the Magothy. The Lloyd Sands Aquifer is the deepest and oldest of Long Island's aquifers. It is a sand and gravel formation ranging in vertical thickness from zero to five hundred feet. At its deepest point beneath Long Island, the bottom of this aquifer is 1,800 feet below the surface of the ground. Not many wells tap this formation and ECL 15-1528 establishes a moratorium on the use of water from this formation in order to maintain it for future generations.

Figure 2.2.



On Long Island, groundwater is recharged by approximately 44 inches of precipitation that falls annually, half of which percolates into the ground and recharges the groundwater system.[11] As shown in Figure 2.2, during the hydrologic cycle, precipitation percolates downward through the soil to the water table where it is considered groundwater and where it follows the contours of the aquifer system. Eventually, groundwater may resurface, particularly shallow groundwater, and discharge to the atmosphere via evapotranspiration or feed into streams or other surface waters, some of which may be ecologically sensitive, such as the Peconic Estuary, the Long Island Sound South Shore Estuary, and the Long Island Sound.

2.3 OVERVIEW OF PESTICIDE REGULATION AND USE ON LONG ISLAND

The New York State Department of Environmental Conservation (DEC) regulates the registration, commercial use, purchase and custom application of pesticides. The Environmental Conservation Law (ECL) sets forth the state's policy regarding pesticide usage. ECL 33-0301. DEC exercises its broad regulatory responsibilities in consultation with the Departments of Health (DOH) and the Agriculture and Markets (DAM) in order to protect public health and the environment while ensuring that pesticides proposed for use in New York State are properly registered and applied for the benefit of agricultural and other economic enterprises that rely on pesticide usage.

According to the ECL, pesticides, when properly used, are "valuable, important and necessary to the welfare, health, economic well-being and productive and industrial capabilities of the people

[11] City of New York Department of Design and Construction, "Geothermal Heat Pump Manual," Ch. 5, p. 5, August 2002; http://www.nyc.gov/html/ddc/downloads/pdf/geotherm.pdf.

of this state." ECL 33-0301. However, pesticides also present potential dangers to health, property and the environment if improperly used. ECL 33-0301.

Pesticides are used on Long Island to limit the potentially harmful effects of a wide range of pests that affect people, companion animals, wildlife, structures, agricultural crops and other plants. They are defined by Part 325.1(aw) of Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) as follows:

> *Pesticide means: (1) Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, or other forms of plant or animal life or viruses, except viruses on or in living humans /or other animals, which the department shall declare to be a pest; and (2) any substance or mixture of substances intended as a plant regulator, defoliant or desiccant.*

However, broad use of relatively large volumes of pesticides may have unintended consequences where groundwater quality is concerned. Although they play an important role in managing pests, pesticides pose a threat to groundwater quality when they are misused in violation of pesticide laws, rules and regulations, including use in contravention of label directions (pesticide misuse). Pesticides may also pose a threat to groundwater even when they are lawfully used in accordance with label directions if they exhibit properties and characteristics associated with chemicals already detected in groundwater, or are known to leach through soil into groundwater under certain conditions. Note that "pesticide use" is defined by 6 NYCRR Part 325.1(ax) as follows:

> *Pesticide use means performance of the following pesticide-related activities: application; mixing; loading; transport, storage or handling after manufacturer's seal is broken; cleaning of pesticide application equipment; and any required preparation for container disposal.*

The illegal use of pesticides, including improper storage, handling, and application is an issue that could have a significant impact on the groundwater in Long Island. Through the routine evaluation of groundwater monitoring data and reporting data, and by conducting investigations and inspections, the Department is able to determine the source of many illegal applications and take appropriate actions associated with these applications. Routine inspections of facilities also provide an opportunity for the Department to ensure that the pesticide use practices at the facilities are in compliance with the Environmental Conservation Law and its regulations. In addition, the routine inspection of pesticide dealers will help keep pesticides that are not permitted to be sold in Long Island from being sold there.

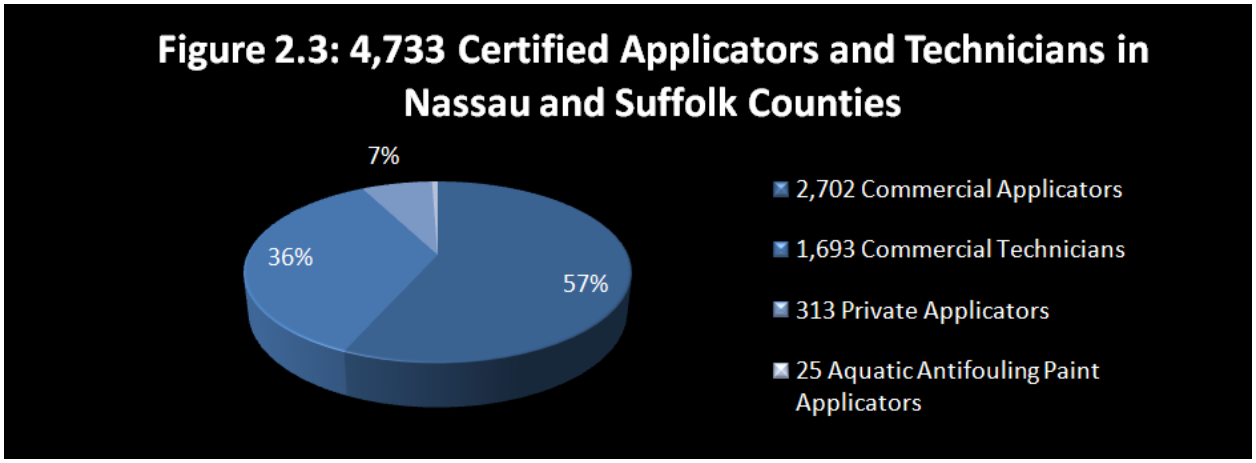
2.3 A. Quantity of Pesticide Use on Long Island

In 2005,[12] 5.2 million pounds[13] and 397,000 gallons[14] of pesticides were applied in Nassau and Suffolk counties by commercial pesticide applicators and technicians and another 112,000[15] pounds and 10,700[16] gallons were sold to private applicators, for a total of about 5.3 million pounds and 407,000 gallons. This represents about 30 percent of the total number of pounds of pesticides applied by occupational users in New York State in 2005 (17.6 million pounds), and 14 percent of the total number of gallons used statewide (2.8 million gallons). Reported weights and volumes are the weights and volumes of all inert and active ingredients in the pesticide products applied not the weights and volumes of the active ingredients alone. Commercial applicators must report the total weight or volume of a pesticide product applied, not merely the active ingredient. This means that, if a commercial applicator applied 100 pounds or 100 gallons of a product that contained only 1 percent of active ingredients, the applicator must report the entire 100 pounds or 100 gallons applied, while the amount of active ingredients applied would be only 1 pound or 1 gallon. It should be noted that commercial applicators do not report the use of registration-exempt minimum risk pesticides, and homeowner use of pesticides is also not reported.

The Pesticide Reporting Law requires reporting of information about certain pesticide applications as well as sales of certain pesticides. DEC has identified many errors in this data, resulting from under-reporting, over-reporting, incorrect units of measure, incorrect location information, and many other reasons. Despite numerous data quality deficiencies, DEC can still identify active ingredients registered for use on Long Island, as well as products sold and applied and their relative or approximate quantities from the data and from inspections and interviews with pesticide users. This information can and will be used, albeit with caution, to help guide water quality monitoring efforts on Long Island. Changes in pesticide reporting requirements could potentially improve timeliness, accuracy, and availability of the data.

As shown in Figure 2.3, as of June 2012, 4,733 certified commercial pesticide applicators and technicians, certified private pesticide applicators (growers), and aquatic antifouling paint applicators in Nassau and Suffolk counties were certified to apply pesticides.

[12] Calendar year 2005 is the most recent year for which pesticide application data has been compiled from reports submitted by the occupational pesticide user community in accordance with the provisions of Title 12 of the New York State Environmental Conservation Law, known as the Pesticide Reporting Law.
[13] NYS Department of Environmental Conservation, Pesticide Reporting Law (ECL Art. 33, Title 12) statistics; http://www.dec.ny.gov/chemical/37855.html.
[14] NYS Department of Environmental Conservation; Pesticide Reporting Law (ECL Art. 33, Title 12) statistics; http://www.dec.ny.gov/chemical/37851.html.
[15] NYS Department of Environmental Conservation, Pesticide Reporting Law (ECL Art. 33, Title 12) statistics; http://www.dec.ny.gov/chemical/37847.html.
[16] NYS Department of Environmental Conservation, Pesticide Reporting Law (ECL Art. 33, Title 12) statistics; http://www.dec.ny.gov/chemical/37843.html.



There are approximately 12,700 certified commercial applicators, 6,500 certified technicians, 6,750 private applicators, and 50 Aquatic Antifouling Paint Applicators statewide. Long Island represents approximately 18% of the total number of applicators in the state. In order to become certified both certified applicators and technicians must pass a core exam and a category exam and meet the eligibility requirements to take the exams. The eligibility requirements vary between certified commercial applicators, certified technicians, private applicators and Aquatic Antifouling Paint Applicators; these requirements can be found in 6 NYCRR 325.8 and 9. Once certified commercial applicators and private applicators are certified they must recertify by attending Department approved courses during their recertification cycle. In addition, certified commercial applicators, certified technicians, Aquatic Antifouling Paint Applicators must report all commercial applications to the Department and keep records of the applications. Private applicators must maintain a record of restricted use pesticide applications.

The use of pesticides has produced substantial benefits to public health, agricultural production, and economic viability on Long Island. Consider the following statistics relating to Long Island.[17], [18], [19]

- Suffolk County has the highest amount of horticultural sales and service of any county in New York State,
- Suffolk County has the highest sales of agricultural products in New York State,
- Long Island's Nassau and Suffolk counties had agricultural sales of $258.7 million in calendar year 2007 – the highest of any two counties in New York State,
- Suffolk County, with 585 farms and 34,400 acres of farmland, accounted for 93 percent of the region's agricultural sales,
- Nassau and Suffolk County vineyards and wineries contributed significantly to New York State being the second-largest producer of wine in the Nation behind California in calendar year 2007,
- Suffolk County is New York's top producer of greenhouse and nursery flowers, plants, and sod,

[17] Long Island Wine Council, "Fast facts," http://www.liwines.com/default.ihtml?page=theregion&subpage=fastfacts.
[18] Cornell Cooperative Extension of Suffolk County, "Agriculture," http://ccesuffolk.org/agriculture/.
[19] State of New York Comptroller, "The Role of Agriculture in the New York State Economy," Report 21-1010, February 2010, http://www.osc.state.ny.us/reports/other/agriculture21-2010.pdf.

- Suffolk County is home to one-quarter of New York State's wineries, with 56 wineries and 60 vineyards ranging in size from 2.5 acres to 500 acres in size, and
- Suffolk County is New York State's top producer of aquaculture, which is the farming of freshwater and saltwater organisms such as mollusks, crustaceans, and aquatic plants.

2.4 PESTICIDE DETECTIONS IN GROUNDWATER ON LONG ISLAND

Groundwater is the source for municipal and private drinking water wells in Nassau and Suffolk Counties. For more than 30 years, federal, state, and county governments have periodically monitored such wells for the presence of pesticides. For example, from October 1997 through March 2002, over 4,000 wells (private domestic, public supply, and monitoring) were sampled in Nassau and Suffolk Counties. Results from this monitoring suggest that pesticide residues are common in groundwater in certain areas of Long Island (primarily the agricultural regions of the North and South Forks of eastern Suffolk County).

Water quality monitoring by Suffolk County and other entities has shown that pesticides are among a number of contaminants detected in Long Island groundwater as a result of a wide range of human activities (e.g., nitrates, volatile organic compounds, pharmaceuticals and personal care products). Long Island has the dubious distinction of being the location where a pesticide was first detected in groundwater in the United States. Aldicarb was first found in Suffolk County in 1979. A concise summary of this historical note is presented in the following portion of the abstract to an article that appeared in the *American Journal of Public Health*[20] - "Pesticides in Groundwater: The Aldicarb Story in Suffolk County, NY":

> *Aldicarb, a carbamate pesticide, was detected for the first time in groundwater in Suffolk County, New York, in August 1979. Although all laboratory and field studies indicated that the pesticide could not reach groundwater, a combination of circumstances allowed its residues not only to reach groundwater, but also to be ingested by humans. Inquiries in hospitals and poison control centers did not reveal any cases of carbamate poisoning.*
>
> *The extensive monitoring program, conducted by the County in cooperation with the federal and state agencies and the Union Carbide Corporation, showed that 1,121 (13.5 percent) of the 8,404 wells examined exceeded the state recommended guidelines of 7 ppb. Of the contaminated wells, 52 percent contained aldicarb between 8 and 30 ppb, 32 percent between 31 and 75 ppb, and 16 percent more than 75 ppb. Residents whose wells exceeded the guidelines were advised not to use the water for drinking or cooking purposes and to obtain an alternate source of potable water. The Union Carbide Corporation provided those residents with activated carbon filtration units.*

The DEC's response to the detections of aldicarb in Long Island groundwater well above the recommended guideline of 7 ppb at the time (the current New York State drinking water

[20] Mahfouz H. Zaki, M. D. (1982). Pesticides in Groundwater: The Aldicarb Story in Suffolk County, NY. *American Journal of Public Health* , Vol. 72, No. 12, 1391-1395.

standard is 3 ppb), was to issue an emergency ban in 1980 from use on potatoes. USEPA also revoked its approval of aldicarb use on Long Island in early 1980 at the manufacturer's request.[21]

Continued monitoring has shown that 117 pesticide-related chemicals have been detected in the groundwater at various locations since 1997.[22] Approximately half of these are legacy compounds (from pesticides no longer or never registered for use on Long Island or in New York State), which have not been used in many years, demonstrating that some pesticides can persist in the Long Island aquifer for considerable periods of time. While certain detections have exceeded water quality and public drinking water standards, most are at low or trace levels. Some have been detected at multiple locations, distributed broadly over Long Island. Moreover, multiple compounds have been detected in individual wells at a number of locations. Data summaries of the pesticides and their related degradates that have been detected in groundwater and surface water by Suffolk County and by the United States Geological Survey (USGS) are available at ftp://ftp.dec.ny.gov/dshm/pesticid/liwaterqualitydata.docx

Several active ingredients, most notably metalaxyl, imidacloprid, and atrazine, have been detected hundreds of times in certain well types since 1997, including hundreds of locations on Long Island. As mentioned above, the vast majority of these detections are at low concentrations that are slightly above or at laboratory detection levels, and fall well below drinking water standards and groundwater standards and guidance values. As stated in the blueprint at the beginning of this document, DEC anticipates that metalaxyl, atrazine and imidacloprid will be the first group of AIs to be considered for assessment based on the number of detections by Suffolk County at multiple groundwater monitoring locations. In addition, Appendix B includes maps showing the locations of these detections and charts showing the concentrations detected in groundwater and surface water samples over time. An overview of various water quality criteria is provided below to help explain the basis for their development and how they can be used in evaluating detections.

It is important to note that much of the water quality monitoring data presented in this document does not represent what the majority of residents of Long Island are using for drinking and other household purposes. Data from groundwater monitoring wells do not represent household supply water. Among other factors, public water suppliers generally provide treatment for their customers. Sampling results from certain private wells, however, may represent the individual water supplies for those locations that do not have access to public water. Overall, for all of these wells, few detections of individual pesticide-related contaminants exceeded applicable standards. The Suffolk County Water Authority ensures that finished water (treated water) that they supply to their customers exceeds expectations for quality set by New York State drinking water standards.[23] Public water supplies are subject to regulation by the NYSDOH through the Suffolk County Department of Health Services (SCDHS) under New York Codes Rules and Regulation (NYCRR) Subpart 5-1.[24] The regulations establish water quality standards known as

[21] Aldicarb-Pesticide Contamination of Groundwater in Eastern Suffolk County, Long Island, New York. US Geological Survey Water-Resources Investigations Report 84-4251,1984. pubs.usgs.gov/wri/1984/4251/report.pdf.
[22] See Appendix A – "Pesticide Active Ingredients and Degradates Detected in Long Island Groundwater Between 1996 and 2010."
[23] 2012 Annual Drinking Water Quality Report, Suffolk County www.scwa.com.
[24] Title 10. Department of Health Chapter I. State Sanitary Code Part 5. Drinking Water Supplies Subpart 5-1. Public Water Systems.

maximum contaminant levels (MCLs), and require routine water quality monitoring. If finished drinking water is found to contravene a standard, corrective action is required. Private wells are not regulated by NYSDOH, but SCDHS has a program to test private wells for pesticides and other contaminants. Through their work, if contaminants are found in a private well that exceeds standards then the homeowner is advised to not drink that water, and to either find an alternative source or to invest in treatment to achieve compliance with drinking water standards.

Pesticides have the potential to be carried downwards with recharge from precipitation or snowmelt or with irrigation water into aquifers, where groundwater conditions may act to preserve such contaminants. In some locations, groundwater may move only a few feet per month or even per year. Slow groundwater movement means that it may take years before a contaminant, which originated at the land surface, appears in a well. It is also possible that portions of the aquifer system will discharge pesticide contaminants into surrounding surface water resources, which may include ecologically sensitive seagrass beds and freshwater and tidal wetlands, but only after decades or longer. On the other hand, due to characteristics of the pesticide or soil, some pesticides can readily move from locations where they were applied, enter groundwater, and travel hundreds of feet in a year to degrade groundwater quality.

Because of the vulnerability of Long Island's groundwater, pollution prevention is the most effective approach to water quality protection. Once a contaminant is found in groundwater, technological and fiscal constraints limit remediation options and accurate assessment of public health and environmental quality implications is challenging. Co-occurrence of multiple contaminants at the same locations can heighten these challenges.

Note that, while this Strategy addresses most aspects of pesticide use on Long Island, it does not address potential surface water and groundwater impacts associated with aquatic pesticides, directly and lawfully applied to or over Long Island surface waters, to manage aquatic insects such as mosquito larvae and pupa, or mosquito adulticides. Such products can also target invasive plant and fish species. The application of aquatic pesticides and the application of mosquito adulticides via aerosol delivery over surface waters has been the subject to years of review and critical analysis involving many experts. The Suffolk County *Vector Control and Wetlands Management Long-Term Plan*, established a sustainable framework for protecting public health, reducing pesticide usage, and restoring marshes. Further explanation about why the Strategy does not address the use of mosquitocides and other aquatic pesticide use can be found in the Supplemental Information to the Strategy. Information on regulatory programs relating to aquatic pesticides, point source discharge permits and vector control can be found at DEC and Suffolk County online resources.[25]

[25] Information on NYSDEC's aquatic pesticide permit program can be found at http://www.dec.ny.gov/chemical/8530.html . Information on the State Pollutant Discharge Elimination System (SPDES) General Permit for point source discharges to surface waters from pesticide applications can be found at http://www.dec.ny.gov/chemical/70489.html. Information on mosquito control in Suffolk County is available at the Suffolk County Department of Public Works' Division of Vector Control web page at http://www.suffolkcountyny.gov/Departments/PublicWorks/VectorControl.aspx.

2.5 WATER QUALITY CRITERIA

Federal and New York State water quality standards provide a quantitative basis for the implementation of the pollution prevention elements of this Strategy. These standards have been used all along as our benchmarks in water quality monitoring to evaluate the level at which pesticide contamination has been detected and confirmed and are a factor in determining the type of response actions needed. These standards will continue to be used as the critical threshold calling for intervention and action under the Strategy. As noted, many of the pesticide residues referenced above have been detected at concentrations much lower than these critical thresholds, although some have exceeded those thresholds. The enhanced protections of the pollution prevention Strategy will detail a process by which assessments and mitigative pollution prevention measures may be initiated upon identification and verification of pesticides and their degradates in the groundwater, even at low concentrations.

Reference points in this Strategy include standards and guidance values. A *standard* is a value that has been promulgated and placed into state or federal regulation. A *guidance value* may be used where a standard for a substance or group of substances has not been promulgated into regulation. Both standards and guidance values are expressed as the maximum allowable concentration in units of micrograms per liter (and parts per billion) unless otherwise indicated.

For each pesticide active ingredient and each active ingredient associated with a degradate detected in surface water and groundwater, several reference points will be used to inform this enhanced Long Island pollution prevention Strategy in evaluating the need for preventive or corrective actions. The reference points are, in summary:

- DEC ambient groundwater quality standards for taste-, color- and odor-producing, toxic and other deleterious substances (6 NYCRR 703.5; includes the Principal Organic Contaminant (POC)[26] groundwater standard),
- DEC ambient groundwater guidance values where no water quality standard is assigned (6 NYCRR 702.15, DOW TOGS 1.1.1.),
- NYSDOH drinking water standards (10 NYCRR Part 5; includes POC and Unspecified Organic Contaminants ("UOCs") generic Maximum Contaminant Levels (MCLs)[27] as well as specific MCLs),
- Federal Drinking Water Maximum Contaminant Level Goals (MCLG) as guidance values for non-carcinogens,
- Federal Safe Drinking Water Act standards (MCLs), or
- USEPA Human Health Benchmarks for Pesticides.[28]

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[26] *Principal organic contaminant classes* defined in 6 NYCRR 700.1 means the following classes of organic chemicals: Halogenated alkanes, Halogenated ethers, Halobenzenes and substituted halobenzenes, Benzene and alkyl- or nitrogen-substituted benzenes, Substituted, unsaturated hydrocarbons, or Halogenated nonaromatic cyclic hydrocarbons.

[27] UOCs comprise any organic compound (including pesticides and their degradates) for which the POC designation does not apply, and for which a specific MCL has not been adopted. The UOC standard is 50 ppb for any individual substance in the class. There is also a standard of 100 ppb for "total POCs and UOCs." UOCs, which apply to public water supplies in New York State, are not directly adopted as ambient groundwater standards.

[28] USEPA Human Health Benchmarks for Pesticides, April 2012. http://www.epa.gov/pesticides/hhbp.

Federal water quality criteria for pesticides include drinking water Maximum Contaminant Levels (MCLs),[29] which are considered to be regulatory standards.
New York State led the nation in 1978 by establishing ambient groundwater quality standards for approximately 50 pesticides. The standards, expressed in 6 NYCRR Parts 700-705,[30] are applicable to the groundwater resource itself. New York State has also established ambient groundwater guidance values using procedures identified in 6 NYCRR Part 702.[31] These guidance values are formally established in the DEC Division of Water Technical and Operations Guidance Series (TOGS) 1.1.1.[32] New York State also led the nation in 1989, by establishing a drinking water standard system which encompassed virtually all pesticides and their metabolites (if organic compounds) that were not already assigned specific MCLs (10 NYCRR Part 5).[33] The DEC has incorporated some of these default drinking water standards as groundwater standards under 6 NYCRR Part 703.

The USEPA has developed guidance associated with Human Health Benchmarks for Pesticides. The guidance was created to set benchmarks for approximately 365 pesticides that are used on food crops, setting limits for acute exposure and chronic exposure. These benchmarks were developed to enable states to determine whether pesticide detections in drinking water or drinking water sources could be a potential health risk. The pesticides in the guidance are for pesticides for which USEPA has not set a drinking water health advisory or set an enforceable drinking water standard. Advanced testing methods now allow pesticides to be detected in water at very low levels The USEPA recognizes that small amounts of pesticides detected in drinking water or source water for drinking water do not necessarily indicate a health risk. However, the Department recognizes that potential long-term exposure to low levels of pesticide-related contaminants, and, in some cases, multiple contaminants, may be a concern that will be addressed through implementation of the action plan outlined in Chapter 3.

The water quality criteria for metalaxyl, imidacloprid, and atrazine are presented in Table 2.1 for illustration purposes.

[29] For information about MCLs, see http://water.epa.gov/drink/contaminants/index.cfm.
[30] To view 6 NYCRR Parts 700-705, see http://www.dec.ny.gov/regs/2485.html.
[31] To view 6 NYCRR Part 702, see http://www.dec.ny.gov/regs/2485.html.
[32] To view TOGS 1.1.1, see http://www.dec.ny.gov/regulations/2652.html.
[33] To view 10 NYCRR Part 5, subpart 5, see http://w3.health.state.ny.us/dbspace/NYCRR10.nsf/56cf2e25d626f9f785256538006c3ed7/8525652c00680c3e852565f6004a8705?OpenDocument.

TABLE 2.1
WATER QUALITY CRITERIA FOR ATRAZINE, IMIDACLOPRID AND METALAXYL
(All units are in micrograms/liter)

Pesticide	DEC 6 NYCRR Part 703.5	DEC DOW TOGS 1.1.1[34]	DOH 10 NYCRR Part 5	USEPA Safe Drinking Water Act MCLs[35]	USEPA Human Health Benchmarks[36]
Atrazine	7.5	7.5	3.0	3.0	NF*
Imidacloprid	NF	NF	50[5]	NF	399
Metalaxyl	NF	NF	50[5]	NF	519[37]

*NF=Not found in reference

[34] NYSDEC Division of Water (DOW) Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (PDF).
June 1998 Edition (464 kB). This is a standard for Class GA groundwater. Class GA waters are fresh groundwaters. The best usage of Class GA waters is as a source of potable water supply.
[35] MCL=Maximum contaminant level.
[36] USEPA Human Health Benchmarks for Pesticides, April 2012, publication EPA-822-F-12-001. http://www.epa.gov/pesticides/hhbp/HHBP-fact-sheet.pdf.
[37] This benchmark is for Mefanoxam, an isomer of Metalaxyl detected in the Long Island aquifer.

Chapter 3. ACTION PLAN TO IMPLEMENT THE LONG ISLAND PESTICIDE POLLUTION PREVENTION STRATEGY

3.1 PESTICIDE POLLUTION PREVENTION: MEETING THE GOAL AND PURPOSE OF THE STRATEGY

A broad range of pesticide-related contaminants (and other contaminants) have been detected over a fairly wide area in the groundwater underlying Long Island. The concentrations of pesticide-related contaminants have generally been very low and do not indicate a significant public health threat, although historic data indicates that some contaminants have exceeded drinking water standards at some time. In addition, much of the water quality monitoring data included in this document do not represent finished water (water that has been treated), which is the water distributed by public water systems to the public for drinking and other household purposes. Thus, the current situation does not necessitate direct or immediate regulatory action. However, pollution prevention (P2) provides an ideal and effective approach to meet the goal of the Strategy over both the short- and long-terms. This means employing a pollution prevention approach to achieve the goal: preventing pesticide-related adverse impacts, while meeting pest management needs.

3.2 A PESTICIDE P2 BLUEPRINT

The purpose of this Long Island Strategy is to establish a blueprint for long-term pesticide pollution prevention on Long Island to meet the goal. Pollution prevention measures outlined in the blueprint serve as a framework for minimizing pesticide-related risks to Long Island's irreplaceable groundwater resources, while encouraging reliance on integrated pest management and sustainable pest management practices to maintain benefits derived from pesticide use. There is a need for a balanced and science-based approach that recognizes the important roles pesticides play in the economic and public welfare of Long Island and the importance of protecting human health and precious environmental resources from pesticide-related contamination.

GOAL OF STRATEGY - Prevent adverse effects to human health and the environment by protecting Long Island's groundwater and surface water resources from pesticide-related contamination, while continuing to meet the pest management needs of agricultural, residential, commercial, industrial, and institutional sectors.

This Strategy will involve the cooperation and expertise of a number of stakeholders: State and local government agencies; pesticide product registrants; commercial pesticide applicators; Cornell Cooperative Extension; and others. These stakeholders will assist the Department in an assessment of active ingredients of concern and associated products, focusing on top priority active ingredients, development and implementation of best management practices, and outreach and education to affected pesticide users. This pollution prevention initiative represents a significant effort by all involved partners during the short and long-term time frames. Pollution prevention measures must be feasible and carried out with available resources of DEC and its partners.

Chapter 5 identifies a number of preventive measures that are already being conducted on Long Island and across the State. Many of them are non-regulatory, pollution prevention activities and are conducted or managed not only by the Department, but also by local organizations and agencies. Others are State or local regulatory requirements that are also designed to prevent pesticide pollution. The pesticide product registration program is the State's main pesticide product regulatory process; that process also acts as an initial pesticide pollution prevention measure by limiting or precluding adverse environmental and human health impacts from pesticides through special registration conditions or denying registration for use on Long Island or in New York State in its entirety. This Strategy addresses pesticide-related contamination of groundwater associated with normal pesticide use patterns from currently registered pesticides, rather than those related to unlawful activities (addressed by the State's pesticide enforcement program). A program to address contaminants from past pesticide practices, particularly those related to pesticides that have not been registered for many years, is beyond the scope of this Strategy.

The primary components of the pesticide P2 process for Long Island are summarized below, followed by the full P2 blueprint of actions.

PESTICIDE P2 BLUEPRINT SUMMARY

DEC Conducts Initial Assessments of Specific Active Ingredients (AIs) and Related Pesticide P2 Needs

DEC Forms, Convenes and Chairs Pesticide P2 Workgroups; Workgroups Consider Various Matters Regarding Specified AIs and Related P2 and Advise DEC

DEC Identifies and Prioritizes Pesticide P2 Measures and Partners Collaborate to Implement P2 Measures

DEC Tracks Pesticide P2 Results and Assesses Need for P2 Modifications

DEC Maximizes Department Use of Water Quality Monitoring for Pesticides (Monitoring underlies implementation of the entire.)

BLUEPRINT for LONG ISLAND PESTICIDE POLLUTION PREVENTION

NYSDEC Conducts Initial Assessments of Active Ingredients (AIs) and Related Pesticide P2 Needs

Review water quality monitoring results for Long Island groundwater; identify AIs detected as well as factors such as location, number, frequency and concentration of detections and potential for human exposure and associated health risks.

- Review AI-related standards, use and product information and water quality standards and benchmarks
- Identify AIs for which P2 measures potentially need to be taken
- Identify types of additional information needed to consider potential pesticide P2 needs and plan for AIs.

Note: DEC anticipates that the first group of AIs to be considered for assessment will be metalaxyl (fungicide), atrazine (herbicide) and imidacloprid (insecticide). These AIs have been detected by Suffolk County at multiple groundwater monitoring locations.

DEC Forms, Convenes and Chairs Pesticide P2 Workgroups; Workgroups Consider Various Matters Regarding AIs and P2

NYSDEC forms, convenes and chairs workgroups:

- A Technical Review and Advisory Committee (TRAC) which, at the request of DEC, considers AIs specified by the Department and advises on factors such as AI use and critical needs, potential for human exposure, human health risks, effective alternatives for AI, aquifer vulnerability, potential pesticide P2 measures (see below), P2 implementation partners, and other considerations to provide DEC with background information to support Department decisions regarding AIs and related P2 actions and implementation. (For further information on the TRAC, see Box ES-3 at close of the Executive Summary.)
- Additional workgroups, to ensure broad representation of involved entities in consideration of AIs and P2 measures (e.g., entities with direct involvement in pest management, pesticide use, and water quality on Long Island as well as academia). These workgroups may also consider AIs specified by NYSDEC, provide NYSDEC with requested information on particular subject areas (e.g., human health implications, water quality concerns, effective alternatives), and suggest feasible P2 measures and implementation partners.

NYSDEC Identifies and Prioritizes Pesticide P2 Measures and Partners Collaborate to Implement P2 Measures

NYSDEC considers workgroups' information and determines the scope and priority of pesticide P2 measures appropriate for each AI to be addressed.

- NYSDEC will identify and prioritize P2 measures from among this overall scope of primary P2 measures:
  - Develop and disseminate best management practices and track their use.

BLUEPRINT for LONG ISLAND PESTICIDE POLLUTION PREVENTION

DEC Identifies and Prioritizes Pesticide P2 Measures and Partners Collaborate to Implement P2 Measures, cont'd.

- Research alternative products and practices, including organic practices, and provide related outreach and education to implement
- Conduct outreach and education on use pattern-specific integrated pest management
- Encourage voluntary label revisions (through registrant and USEPA process)
- Restrict products to certified applicator use.

- DEC will identify partners to collaborate with the Department to implement pesticide P2 measures (e.g., product registrants, user groups, academic entities, State and local agencies) and, as needed, convene P2 implementation workgroups.
- DEC and partners will collaborate to implement P2 within available resources.
- DEC may strengthen existing outreach partnerships with Cornell University and other entities, forge new partnerships and maximize Internet resources.
- DEC and partners will identify stakeholders and build P2 implementation support.

DEC Tracks Pesticide P2 Results and Assesses Need for P2 Modifications or Regulatory Measures

- DEC, with, as needed, assistance of pesticide P2 partners, monitors results of P2 implementation and determines additional monitoring and measures, if any, for effective pest management and water quality protection.
- DEC may consider certain regulatory measures to manage use of a specific AI, if P2 actions prove insufficient and if DEC and NYSDOH determine that detections of a pesticide-related chemical in water quality monitoring data indicate significant public health or environmental impacts may occur. Under such circumstances, DEC may reassess the registration status of products containing the target AI by reviewing the product registrations associated with the AI and, if necessary, take regulatory action to prohibit use on Long Island.

DEC Maximizes Department Use of Water Quality Monitoring for Pesticides

NOTE: This underlies all actions under the blueprint, in that water quality monitoring results are essential to conducting the work under each component (e.g., determining AIs to be considered, specifying P2 needed, etc.)

- Adjust emphasis of monitoring, as needed and within available resources and flexibility, to meet DEC information needs for Long Island (e.g., focus on specific AIs to capture information and discern trends and new detections in particular pesticide use settings, such as greenhouses, turf, vineyards) as well as to monitor P2 results, if applicable.
- Focus water quality monitoring, including the acquisition of finished drinking water monitoring results, conducted under available resources by Suffolk County and Cornell University or others, on AIs of concern to determine trends and changes in detection levels and frequency.

3.3 CONDUCT INITIAL ASSESSMENTS OF SPECIFIC ACTIVE INGREDIENTS AND PESTICIDE P2 NEEDS

DEC will review, based on past water quality monitoring results, groups of active ingredients (AIs) detected in Long Island groundwater and currently registered pesticide products containing those active ingredients. The P2 needs assessment will be based on active ingredients and product use patterns in order to capture all of the products that might contribute to the overall exposure picture for a particular active ingredient. It will be imperative to focus initial assessments on active ingredients that have not been previously reviewed by the Department or for which additional information is available for review.

The P2 needs assessment would begin with an evaluation of water quality or other environmental monitoring data and information, as described below, to systematically screen active ingredients in currently registered pesticides to define the environmental and human health impacts of those active ingredients. The active ingredients will be prioritized with respect to the need for pollution prevention measures based on the P2 needs assessment and comparison with other active ingredients. The initial list of active ingredients to prioritize will be based on the currently registered active ingredients identified in Appendix A. Potential criteria for prioritizing these active ingredients include:

- Detection (concentrations, number of detections, locations, frequency, co-occurrence of contaminants, etc.) in groundwater and surface water monitoring data,
- Never reviewed by New York State, only a subset of product types reviewed, or more than 10 years since review,
- Major data gaps in the face of concerns (outstanding required studies, data call-ins, etc.) identified by either New York State or USEPA,
- Major hazards prominent in the scientific literature,
- Major action (regulatory change, reassessment, reclassification based on hazard) by another regulatory entity,
    - Under Special Review at EPA (for example, products containing neonicitinoids)
    - Under reassessment by California
    - Regulatory/legal action by other entities (other states, Canada, European Union), and

  In the same chemical class, or related to, another pesticide of concern. For example, it may be worthwhile to assess classes of pesticides (e.g., fungicides, triazines, etc.) at one time rather than individual active ingredients. Suitable alternatives or pollution prevention measures identified during the evaluation of one fungicide may also be suitable for other fungicidal active ingredients. Similarly, DEC and the TRAC may find it beneficial to review active ingredients from a similar chemical class, such as triazines, at the same time due to similarities in environmental fate, human exposure or toxicity.

Within the top priority group identified using the criteria above, active ingredients would be further prioritized based on:

- Amount of reported use and/or sales in New York State,
- Exposure potential (e.g., frequent agricultural reapplications, residential use, aerial application, interior use, sensitive or vulnerable populations),
- Number and type of products containing the active ingredient,
- Availability of effective and lower-risk alternatives, and

- Critical need or necessity of these pesticides to meet the pest management needs of agriculture, industry, residents, agencies and institutions.

The following examples show some of the criteria mentioned above that might be applied in evaluating a couple of active ingredients:

- Metalaxyl: Concerns have been identified regarding numerous low- level groundwater detections in Nassau and Suffolk Counties, and lack of prior New York State review. Currently, there are approximately 40 products containing metalaxyl registered in New York State.

- Chlorothalonil: Concerns have been identified due to the amount of use, hazard characterization and lack of prior New York State review. EPA has completed a Re-registration Eligibility Decision (RED) and concerns were identified for the use of chlorothalonil in residential settings. Chlorothalonil was first registered in the United States in 1966. There are currently 114 products registered in New York State which contain chlorothalonil.

DEC will:

- consider whether P2 measures are needed to address active ingredients that are identified by applying the above criteria,
- assess whether sufficient information exists to make a final determination on appropriate P2 measures to implement,
- identify, based on that review, active ingredients that are most suitable for applying P2 measures associated with their use on Long Island and the type of information needed to design a P2 action plan for those active ingredients, and
- review, periodically, additional active ingredients or groups of active ingredients and go through the same process.

DEC will not pursue pollution prevention measures, registration changes or the removal of any pesticides simply based on the fact that they contain a particular active ingredient. Assessments and subsequent actions related to active ingredients will be based on the criteria noted in section 3.7.B relating to their detection in the groundwater and surface water and their use patterns. There are many pesticide products which are currently registered with very limited use patterns, such as indoor baits and gels and outdoor spot treatment that have little or no potential to impact the environment. DEC, with the help of the TRAC and other workgroups, will attempt to identify problematic use patterns and applications of products containing active ingredients of concern which may have a negative effect on water resources.

3.4 MAXIMIZE USE OF WATER QUALITY MONITORING FOR PESTICIDES

NYSDEC contracts with the Suffolk County Department of Health Services (SCDHS) to monitor and report to DEC on groundwater quality on Long Island. Under these contracts, the Department will focus ongoing water quality monitoring conducted by SCDHS, to help answer questions or respond to needs identified in the P2 assessment process. Annual scopes of services

with SCDHS, and potential arrangements with other entities, are intended and will be designed to ensure that a comprehensive monitoring program is developed over time which is sufficient to identify the nature and extent of pesticide-related contaminants in the groundwater and surface water. The monitoring program will be modified over time to improve monitoring related to specific active ingredients, use patterns and locations, and to incorporate newly registered and other active ingredients, when necessary, that have not been included in the monitoring program to date based on factors such as their toxicity, leachability, and physical characteristics. Comprehensive evaluations of contaminants in groundwater and surface water are needed to understand their nature and extent and to more clearly identify potential exposure and risks and feasible pollution prevention measures. The Department will use its limited resources to target identified areas of concern. Areas where pesticides have been detected in groundwater at higher levels than elsewhere on Long Island and where there is an identified potential for these detected pesticides to pose an increased risk to human health through consumption of drinking water or to the environment will be given special attention. Information collected from these tasks will assist NYSDEC in focusing attention and prioritizing efforts in the registration program to minimize the environmental and potential human health impact from the use of pesticides. Examples of other tasks which the Department may contract with SCDHS to conduct are:

- implement a task to monitor wells down gradient of existing green-houses all over Long Island to determine the quality of groundwater in those areas,
- evaluate crops and application methods used to apply certain active ingredients to determine if particular crop/application method combinations are potentially causing an impact to water quality, and
- implement a task to monitor and report on finished drinking water samples to assess the potential human health exposure and risks.

Targeted and maximized use of water quality monitoring results will be important to all phases of pesticide pollution prevention on Long Island, from initial assessment to implementation of P2 measures.

3.5 ESTABLISH, CONVENE AND CHAIR PESTICIDE P2 WORKGROUPS

The Department will determine whether additional information is required to complete a P2 needs assessment for a specific active ingredient; however, DEC does not have the resources to obtain exhaustive information relating to multiple P2 scenarios for an active ingredient. Therefore, it is likely that advisement from entities with expertise will be needed regarding many active ingredients. Overall, the intention is for workgroups to collaborate on ways to evaluate and improve pesticide use, pest management and water quality protection to implement pesticide P2 on Long Island.

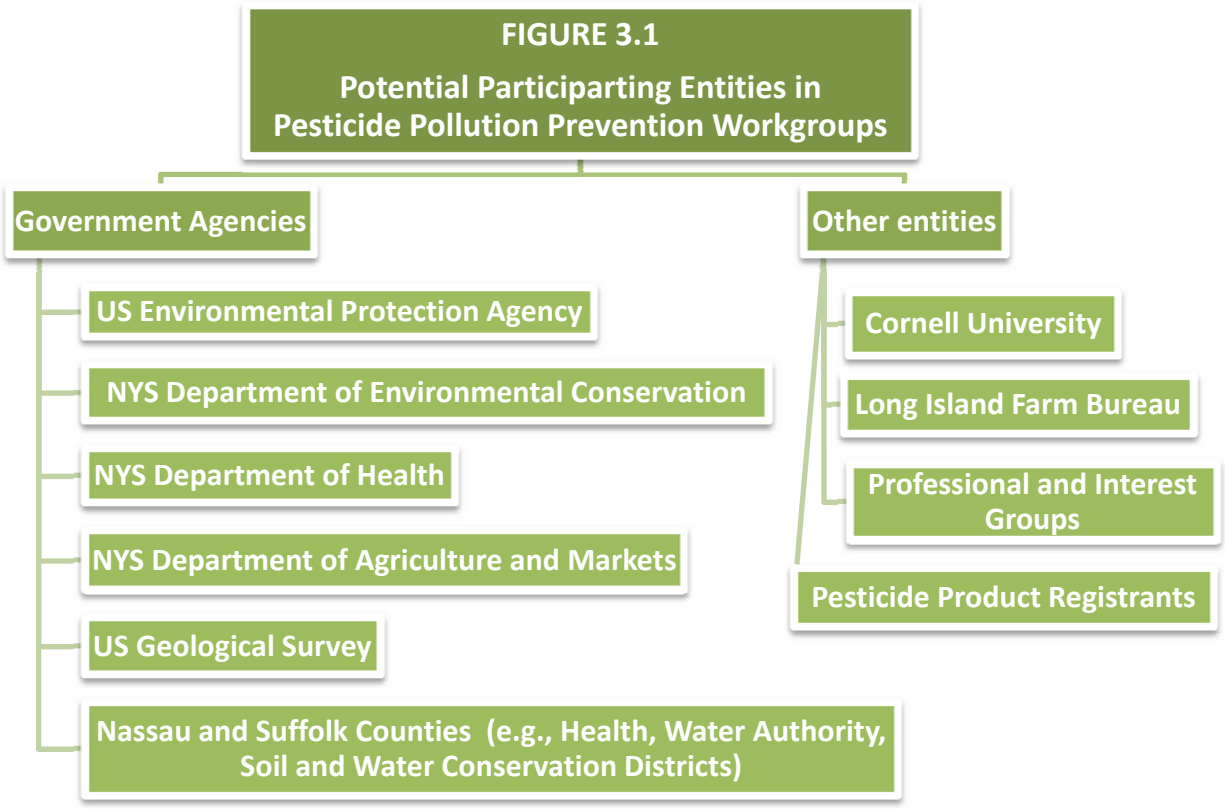
3.5 A. Purposes of P2 Workgroups

Workgroups will be needed to advise DEC and provide background information regarding specific active ingredients and feasibility of potential related P2 actions. DEC will form and convene several workgroups, representing a cross-section of entities with expertise and direct involvement in pest management, pesticide use, and water quality on Long Island. DEC will compile available information and request their consideration of certain active ingredients. The primary purposes of these groups will be to:

- *Provide information and advice to DEC based on their expertise and constituent base interests*.
- *Expand Knowledge Base to Support DEC P2 Decisions* - Such information would serve to expand the knowledge base supporting DEC pollution prevention measures for Long Island regarding specific active ingredients or use patterns. Over time, work groups would be phased-out once the original purpose(s) for which they were convened have been met.
- *Partner with DEC on P2 Implementation* – DEC will need the expertise and resources of certain entities to implement certain P2 measures, depending upon the nature of the measures to be taken. Entities on the workgroups with the most relevant expertise would be asked to collaborate with DEC to develop and disseminate information about these measures.

3.5 B. Types of P2 Workgroups and Participants

Several workgroups will be formed and convened, depending upon expertise and collaboration resources needed to implement pesticide P2. They would include representatives from involved State and local government agencies, pesticide user groups (e.g., agriculture, lawn care, etc.), product registrants, academic institutions, public interest groups, and others, all of whom are involved in some way in the registration, regulation or use of pesticides as well as water quality management on Long Island. The government agencies and other entities are illustrated in Figure 3.1.



The following workgroups are envisioned to implement the Strategy:

Technical Review and Advisory Committee
A Technical Review and Advisory Committee (TRAC) will be formed. At the request of NYSDEC, the TRAC will consider AIs identified by the Department and will advise on factors such as AI use and critical needs, potential for human exposure, human health risks, effective and lower-risk alternatives for the AI, aquifer vulnerability, potential pesticide P2 measures (see below), P2 implementation partners, and other considerations to provide DEC with background information to support Department decisions regarding AIs and related P2 actions and implementation. TRAC composition and purposes are summarized below.

The NYSDEC will coordinate the activities of the TRAC. Each entity and its representatives will participate in the TRAC in a manner that is consistent with its specific mission, purpose, resource capabilities and constraints, and priorities.

TECHNICAL REVIEW AND ADVISORY COMMITTEE (TRAC) - SUMMARY DESCRIPTION

Composition: NYSDEC will convene, approximately six months after this Strategy is finalized, a TRAC to pool expertise of State and local government agencies as well as statewide and local public service and academic entities closely involved with pesticide regulation and water quality monitoring for Long Island:

- New York State: DEC (Chair), Department of Health, Department of Agriculture and Markets; Cornell University
- Local Entities: Suffolk County Department of Health Services, Water Authority, and Soil and Water Conservation District; Nassau County Health Department and Soil and Water Conservation District; Cornell Cooperative Extension of Suffolk County

After 5 years, Department and involved participants assess ongoing need for TRAC.

Primary purposes:

- Assist NYSDEC in investigation and assessment of active ingredients (AIs), identified and ranked by the Department (potential contaminants detected in Long Island groundwater)
- Consider factors such as groundwater monitoring data, exceedances of chemical-specific water quality standards, potential for human exposure, human health risks, existing needs for pest management, and effective and lower-risk pest management alternatives
- Advise NYSDEC regarding potential and feasible response actions to prevent further pesticide-related impacts to the Long Island aquifer while recognizing pest management needs. (Scope of response actions - see P2 measures in Information Box ES-1.)

Further information on the TRAC is contained in Appendix C.

The mission of the proposed TRAC is to make recommendations to the Department, but it will not have a regulatory role. Jurisdiction in all matters pertaining to the distribution, sale, use and

transportation of pesticides, is vested exclusively in the Commissioner and EPA. DEC cannot shift any of its authority to the TRAC or any other entity. The TRAC is not an advisory committee as described in §33-0715 of the ECL, which is formed at the request of the Commissioner or a registrant and which is limited to recommending registration changes to the Commissioner. The TRAC's purpose will include evaluating the use, impacts, risks, alternatives, and potential pollution prevention measures related to the pesticides identified in implementing the Strategy and providing information to support the scientific approach for pesticide product registration. The TRAC will assist in investigation and assessment of active ingredients identified by DEC, evaluate existing information related to the active ingredients, such as monitoring data, potential human health risks, existing pest management needs, and effective alternatives, and it will advise DEC regarding potential response actions to prevent further pesticide-related impacts. DEC will work with county agencies and other members of the proposed TRAC to identify effective alternatives to particular active ingredients. It is also recognized that the other stakeholders have much of the expertise for identifying safer alternatives; notable in this regard are Cornell, certified applicators and their associations, product registrants, and public interest groups. Their participation in various workgroups will therefore be sought. When appropriate, they will also be invited to participate in TRAC meetings to offer technical advice. DEC and the TRAC may also consult with specialists when necessary for technical or other advice.

Pesticide Product Registrants

The Department will seek to work with pesticide product registrants and their industry associations to assess the environmental and human health impacts of their products and mitigate adverse impacts through measures such as voluntary changes in labels or use patterns, and development and dissemination of best management practices.

Pesticide Applicators (Pesticide Applicator Associations, Long Island Farm Bureau and New York Farm Bureau)

The Department will seek to develop partnerships with associations and entities representing a variety of pesticide applicators on Long Island to:

- Promote sustainable pest management and appropriate pesticide use to prevent groundwater impacts,
- Sponsor training courses that promote these practices and principles, and
- Gain feedback and gather information on pesticide use on Long Island.

Cornell University

- Support from the Cornell NYS Integrated Pest Management Program and Pesticide Management Education Program will be sought to:
    - Identify sustainable, cost-effective pest management methods with minimal risks to human health and the environment,
    - Promote agricultural & community IPM education and outreach on Long Island,
    - Provide IPM use recommendations.
    - Incorporate more information on Long Island groundwater protection in pesticide applicator certification and recertification training, and additional education activities for professional applicators and others,

- Provide leadership and training resources for statewide training of pesticide applicators,
- Provide guidelines on integrated crop management, organic production, and turfgrass pest management, and
- Perform pesticide impact assessments.

Cornell Cooperative Extension of Suffolk County
Support from Cornell Cooperative Extension of Suffolk County will be sought to:

- Identify sustainable and cost-effective alternatives to pesticides with the potential to leach.
- Conduct agricultural and horticultural pest management educational programs.
- Develop and provide best management practices for all crops and landscapes.
- Provide groundwater protection information in pesticide applicator certification and re-certification training.
- Develop pesticide use profiles/pesticide impact assessments.
- Disseminate pesticide use/groundwater protection information through emails, website, monthly magazines and newsletters.

Public Interest Groups
The Department will seek input from public interest groups regarding concerns about the environmental and human health impacts of pesticides and recommendations to mitigate such impacts. Public interest groups may also be able to assist with dissemination of information on pesticides, alternatives, and best management practices.

NYSDEC
DEC staff from the Divisions of Materials Management (DMM), Water (DOW), and Office of General Counsel (OGC) in the Central Office and Region 1 will be on the Department's team to implement the Strategy, headed by DMM Central Office staff. DEC will establish the administrative details of P2 workgroups (timing and frequency of meetings, etc.), when the Department implements this Strategy.

Technical Advisory Committee
A 25-member Technical Advisory Committee (TAC) representing a broad spectrum of interested stakeholders was established to assist with development of the Strategy. DEC will convene the TAC at least annually, to report on progress to the TAC and receive their input and recommendations.

3.6 P2 WORKGROUPS CONSIDER SPECIFIED ACTIVE INGREDIENTS AND RELATED P2

Workgroups will be asked to provide information and advice, in keeping with their area of expertise, for DEC consideration regarding specific active ingredients under consideration and degradates formed from the parent active ingredients, as well as any DEC research on subjects such as:

- Product use patterns,
- Primary users of the active ingredient and pest management purpose,
- Critical pesticide use and pest management needs and related economic factors,

- Additional scientific data from product registrants,
- Existing monitoring results and related water quality impacts,
- Results of focused new monitoring for active ingredients under consideration,
- Existing groundwater vulnerability assessments and groundwater/pesticides research from peer reviewed government or academic entities,
- Assessments of feasibility, practicality, cost-effectiveness, and efficacy (in terms of pest management) of potential P2 measures for specific active ingredients,
- Projection of degree of water resource protection to be achieved by potential P2 measures,
- Audiences to be affected by P2 measures,
- Potential exposure and risks to affected audiences,
- Evaluation of exposure potential and risk to human health, including potential additive or antagonistic effects of exposure to multiple contaminants,
- Partners to assist in conducting P2 measures and middlemen to spread P2 messages, including members of TRAC and external stakeholders,
- Additional entities, if necessary, to help support the assessment process, provide links to audiences and potentially contribute resources or services, including participating in P2 support efforts,
- Economic factors associated with pesticide use and the selection of pest management alternatives. These may include, among other things, the costs of treatment provided by water suppliers such as the Suffolk County Water Authority to address pesticide-related contaminants in drinking water, and agriculture industry financial benchmarking to identify the costs and risks associated with changing farming practices. DEC will work with these stakeholders to consider such economic factors,
- Potential opportunities for financial or marketing incentives, such as grants, insurance, or other programs that provide sources of funding or financial protections that help promote pursuit of certain P2 measures.

3.7 NYSDEC IDENTIFIES AND PRIORITIZES P2 MEASURES

3.7 A. Potential P2 Measures

Potential P2 measures could include a range of actions (e.g., technological, methodological, educational), such as:

- Develop and disseminate best management practices for currently used pesticides (e.g., pest problem identification, limit applications, buffer zones),
- Research and identify alternative pest management products and associated leachability and efficacy associated with those alternatives. Assess applicability of organic practices to specific Long Island pest management needs. Communicate alternatives to user groups through demonstration projects and outreach and education,
- Perform outreach and education on general pest management topics (in addition to outreach and education associated with best management practices (BMPs) and alternative pest management methods),
- Seek USEPA grant for organic land care education and outreach on Long Island
- Enhance or build upon existing DEC efforts, such as a permanent CleanSweepNY collection program, enhanced protection of seagrass, DEC's Be Green Organic Yards

NY program, or other initiatives the state may undertake to address broader Long Island water resource issues, and

- Product label and registration revisions:
    - NYSDEC restrict product to certified applicator use,
    - Registrants make voluntary label revisions through the USEPA label process.

Use of one or more of these measures would be dependent upon a number of factors regarding the background information on characteristics of the involved active ingredients, use patterns, economic impacts, resources needed for implementation of the measure, and other factors.

3.7 B. Potential Regulatory Preventive Measures

Changes in the NYS registration status of a product containing an active ingredient of concern, such as denying, cancelling or suspending registration or restricting product use through rulemaking, are potential actions available to the Department under existing regulations and statute, as discussed in Chapter 6 on Legal Authority and Enforcement. The regulations and statute allow for the Department to weigh the potential for human health and ecological risks against the potential benefits from using a pesticide product in making product registration decisions, which is an application of the goal of the Strategy. The Department may consider these regulatory preventive measures if P2 actions prove insufficient and if DEC and NYSDOH determine that detections of a pesticide-related chemical in water quality monitoring data indicate public health impacts may occur. The Department can also pursue enforcement actions with respect to product use even without pursuing pollution prevention steps, where necessary to protect public health or the environment. Appropriate courses of action, including additional regulatory measures, will be considered based on a variety of relevant factors applicable to the particular active ingredient, including:

--the magnitude of groundwater concentrations of the active ingredient;
--exceedances or near-exceedances of the applicable standard;
--temporal trend in the groundwater data;
--evidence of the leachability of the pesticide;
--usage of groundwater for drinking water near the areas of contamination;
--agricultural dependence on the active ingredient;
--availability of a less toxic alternative;
--efforts to use alternatives or to change application practices, and outcomes; and
--other relevant factors.

As part of the P2 Strategy for Long Island, NYSDEC would take several steps leading to implementation of P2 measures. Based on the review of the available information listed in Section 3.6, NYSDEC would:

- Prioritize the active ingredients to which P2 measures would be applied on Long Island.
- Identify the scope of P2 measures needed
- Determine P2 measures with the greatest potential for positive results, considering feasibility and effectiveness, and prioritize measures to be implemented
- Develop short and long-term P2 objectives and implementation schedules for each active ingredient.

3.8 NYSDEC AND PARTNERS COLLABORATE TO IMPLEMENT P2 MEASURES

Two key steps for a successful P2 program will be to collaborate with partners to implement P2 measures and build stakeholder support for implementing the measures. This is the most critical component of the P2 program as the culmination of all of the efforts outlined herein is the implementing of actions, not simply gathering and reviewing information. Appropriate stakeholders will be encouraged to implement or support P2 measures that are applicable to their business, association, or other functional roles as their available resources allow. In order to accomplish this, the Department will need to:

- Identify partners needed to implement priority P2 measures (e.g., product registrants, user groups, academic entities, State and local agencies).
- Convene partner groups and communicate, collaborate, and plan P2 implementation with them.
- Identify stakeholders and means to build support (meeting, web content, etc.).
- Utilize NYSDEC and partner websites to the greatest extent possible to implement P2 measures, monitor results, and communicate with stakeholders.
- Involve stakeholders at the state and local levels to help implement outreach and education to protect water quality and manage pesticide use and pests on Long Island. Outreach and education are longstanding core elements of pest management and water quality programs. A number of ongoing outreach and education efforts are described in Appendix C. They continue to be essential activities tied to promoting use of integrated pest management (IPM) and alternatives to pesticides, and proper pesticide use to decrease the risk of pesticide impacts to resources including groundwater, as well as for preventing misuse of pesticides.
- Work with partners and stakeholders to implement P2 measures.

3.9 NYSDEC MONITORS PESTICIDE P2 RESULTS AND ASSESSES NEED FOR P2 MODIFICATIONS

- NYSDEC, with TRAC and certain other partners, monitors results of P2 implementation and determines whether additional measures (P2 or otherwise) need to be taken,
- Monitor P2 results through environmental monitoring, inspections, user surveys and reporting, etc. and make adjustments as needed, and
- Collaborate with stakeholders on review of monitoring results and their application to other active ingredients.

The action plan outlined in this Chapter includes specific steps for each group of active ingredients under evaluation. However, they are not designed or intended to impede progress or preclude rapid implementation of obvious and appropriate pollution prevention measures, including the use of known and effective alternatives. The steps also do not have specified time frames. The process, and each step in the process, may take different amounts of time for different active ingredients. Each active ingredient will follow its own timeline as the characteristics, use patterns, monitoring results, pollution prevention measures and progress toward implementation and meeting pollution prevention and water quality goals will be different for each. Timelines for each active ingredient may be estimated as the action plan for

each is implemented. In addition, the process for the each successive group of active ingredients to be addressed will be triggered as soon as sufficient resources become available.

3.10 CRITERIA FOR MEASURING SUCCESS OF P2 MEASURES

Ongoing monitoring of the results of P2 implementation will be performed by DEC, along with the TRAC and certain other partners, to determine whether additional measures (P2 or otherwise) need to be taken. Monitoring will include not only environmental monitoring, but also inspections, user surveys and reporting, etc., so that adjustments can be made to specific P2 measures or to methods used to promote and explain those measures, or to determine if additional P2 measures are needed. Potential P2 measures could include a range of actions involving alternative products, practices, processes, and outreach; therefore, several types of criteria or evaluations are necessary to measure their success.

First, groundwater and surface water monitoring can demonstrate the eventual environmental results of implementing the Strategy. However, the success of the Strategy should also be measured in terms of disseminating information and implementing specific P2 measures. For example, DEC will collaborate with partners to develop and disseminate best management practices (BMPs) for currently used pesticides, and provide outreach and education on general pest management topics, BMPs and alternative pest management methods. Criteria for success may therefore be defined in terms of monitoring data, outreach and education, and implementation of P2 measures.

Criteria based on Environmental Monitoring Data.
Part of the overall goal of the Strategy is to prevent adverse effects on human health and the environment by protecting Long Island's groundwater and surface water resources from pesticide-related contamination. In some cases, water quality objectives or goals may be developed for specific pollution prevention measures implemented to address certain active ingredients. Development of such objectives should consider a variety of factors such as the characteristics of the active ingredient, site-specific hydrogeologic conditions, the P2 measures implemented, the rate of expected progress, and other factors. Success in achieving the overall goal of water quality protection would be assessed in terms of progress toward overall reduction of those contaminants as measured by parameters such as those listed below. Environmental monitoring data represents the most important means for measuring the success of the Strategy. It should be noted that these factors are interdependent and need to be evaluated together in order to get a complete picture of progress. Effective P2 measures should result in a decrease in each of these parameters.

- Number of detections – The overall number of detections should decrease if all other facets of a monitoring program remain the same. However, the number of detections needs to be evaluated with respect to the consistency of the monitoring program as well as of detection limits. The number of detections can increase or decrease simply by expanding or contracting the number of locations or the frequency of sampling within the monitoring network or by changing detection limits.
- Concentrations – The concentrations at each location and overall concentrations throughout the monitoring network should steadily decrease. If concentrations increase at any location, potential sources and causes of those increases need to be investigated.

- Frequency – The frequency of detections should steadily decrease. Again, this can be affected by the consistency of operating the monitoring program, as mentioned above, and needs to be evaluated in that context.
- Co-occurrence of contaminants – The detection of multiple pesticide-related contaminants should steadily decrease at each well and throughout the monitoring network in terms of all of the other parameters – number, concentration, frequency, etc. The number of contaminants could temporarily increase if degradates are formed as some pesticides degrade. But the detection of degradates should decrease over time as well.
- Locations – Detections should be observed at fewer locations. Again, this depends on and will be evaluated in the context of the consistency of operating the monitoring network. Consideration should also be given to whether the network is expanded or contracted in terms of the number of locations sampled or if locations are added (new wells installed or new surface water sampling locations) or reduced (wells taken out of service).

Criteria based on Implementation of P2 Measures.
The Strategy outlines a variety of P2 measures intended to reduce pesticide levels in groundwater. Some criteria for measuring the success of those efforts could include:

- Alternative pest management products – Identify products, research on those products, and how much they are used through inspections, user surveys or reports; introduce the alternative products.
- Best Management Practices – Identify BMPs and track the number and percentages of entities which implement them.
- Product label and registration revisions – Track all products for which registrants voluntarily agree to label changes.

Criteria based on Modeling.
The likelihood of alternative products entering groundwater can be predicted with leachability modeling. Results of such modeling could demonstrate the effectiveness of substitution of alternative products for those currently used and detected in groundwater. For example, if alternative product X has a significantly lower modeled leachability than a widely used active ingredient Y, the modeling data, coupled with information on the expanding use of product X, could point to progress of the Strategy.

Criteria based on Outreach and Education.
The Strategy outlines a variety of ways for DEC and stakeholders to reach out to pesticide users about P2 measures. Some criteria for measuring the success of those efforts could include:

- Training courses and programs – Identify training courses, programs, demonstration projects and sponsors (registrants, applicator associations, Cornell) that cover information on pesticide active ingredients of concern. This can also include the number of courses and the target audiences (professional applicators, consumers).
- Informational brochures, websites, etc. – Identify specific information about pesticides and alternatives that are developed or being developed and distributed to users.
- Training materials - Identify information on Long Island groundwater protection in pesticide applicator certification and recertification training.

Chapter 4. PESTICIDE REGISTRATION IN NEW YORK STATE

4.1 INTRODUCTION

The NYSDEC Pesticide Product Registration process is an integral component of a comprehensive pest management program. The product registration program acts as a gatekeeper to control the universe of available pesticide products in New York State and operates within specified legislatively mandated timeframes. The current pesticide product review process did not exist prior to the early 1990s. Older pesticides, registered before that time, have often not received a comprehensive New York State review, or received only a very limited review of a subset of products. The New York State review, embodied in NYSDEC's existing pest management regulatory program, has proven effective at preventing products which pose unreasonable adverse effects from being registered and used in the State. DEC's enhanced pesticide registration program relies on the New Active Ingredient (NAI) and Major Change in Labeling (MCL) review process. During the process, pesticide registrants work with DEC to implement feasible and effective resolutions of any environmental concerns identified during NYSDEC's review. For example, some pesticides may be registered for use in New York State with restrictions for use on Long Island if the chemical poses a leaching risk for Long Island's vulnerable groundwater system. In this way, the current regulatory process effectively allows the availability of pesticide products needed by the user community.

4.2 USEPA PRODUCT REGISTRATION OVERVIEW

All pesticide products must be registered or exempted by the United States Environmental Protection Agency (USEPA) before they may be sold or distributed in the United States. A pesticide product is comprised of a distinct combination of active and inert ingredients and includes specific labeling instructions. During the registration process the USEPA examines the ingredients of a pesticide; the site or crop on which it is to be used; the amount, frequency and timing of its use; and storage and disposal practices. Every pesticide product is assigned a unique USEPA Registration Number which must appear on the product's label. Once registered, a pesticide may not legally be used unless the use is consistent with the approved directions for use on the pesticide's label or labeling. Pesticide products can only bear labeling that has been reviewed and approved by the USEPA and conform to the provisions set forth in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

4.3 NEW YORK STATE PRODUCT REGISTRATION OVERVIEW

Registration of individual pesticide products is also required in every state. Every pesticide product which is distributed, sold, offered for sale or used in New York State must be registered by the NYSDEC.

There are two basic types of FIFRA Section 3 pesticide product registration applications in New York State; "routine" and "non-routine."

4.3. A. Scope of NYSDEC Product Registration Reviews

The NYSDEC reviews approximately 1,600 new product applications, 6,500 product renewals, and 2,600 revised label applications per year. The bulk of the NYSDEC's workload involves the review and registration of routine product applications. All New York State accepted labels are posted online via the Cornell University Cooperative Extension Pesticide Management Education Program (PMEP) Product, Ingredient, and Manufacturer System (PIMS) (http://pims.psur.cornell.edu/).

Routine pesticide products are those that contain active ingredients with labeled use patterns and application rates that are similar to currently registered pesticide products. Examples of routine pesticide product applications are those that are for new products containing active ingredients that are already in currently registered products along with renewals and revised labels for currently registered products. Routine applications are reviewed to ensure that their product labeling meets Federal and State labeling requirements. New York State is one of the only entities that conduct an extensive side-by-side label review of the USEPA stamped "ACCEPTED" labeling and the proposed final product container labeling. NYSDEC also conducts a comprehensive review of the appearance of the final product labeling. This includes, but is not limited to, the overall presentation and intent of the labeling, formatting of the labeling, legibility, graphics, labeling color, marketing statements, and product names. The USEPA and most states do not review final product container labeling. The NYSDEC is nationally recognized for the high level of label review expertise and ability to apply FIFRA and 40 CFR labeling requirements and standards to proposed final container labels.

Non-routine pesticide products contain new active ingredients (NAI) and/or represent major changes in labeling (MCL). An NAI is an active ingredient that has not been previously registered in New York State. MCL is the term given to a pesticide product which results in a major change in the use pattern for the active ingredient, increases the application rate, and/or any other change which significantly increases the potential exposure of any non-target organism or which increases the potential for a significant impact to humans, property or the environment, including water resources. NAI and MCL product applications undergo an extensive review and will be discussed in greater detail. In addition, there are several other types of non-routine product applications, FIFRA Section 24(c) Special Local Need, FIFRA Section 5 Experimental Use Permit and FIFRA Section 18 Emergency Exemption; however, only a few are received per year.

4.3. B. NYSDEC Product Registration and Renewals

Pesticide products are registered to a specific company, or registrant, that submits the application and maintains the registration in New York State. A registrant is assigned one expiration date on which all of their New York State registered products will expire, unless they are renewed. Currently, there are approximately 1,250 companies that maintain the registration of approximately 13,000 pesticide products in New York State. The registration period in New York State is two years, and within the two years, the Department has quarterly renewal cycles. The number of companies renewing products throughout the eight renewal cycles is divided equally, for the most part.

Expiration dates are randomly assigned and are based on when a company first registered a product in New York State. Since expiration dates are assigned to companies regardless of the type of product they register or the chemical composition of the individual products, similar products with identical active ingredients registered by different companies would have different expiration dates and would be renewed at different times.

According to 6NYCRR Part 326.24(a) applicants for renewal must file an application with the Department at least thirty days prior to the registration expiration date as shown on the registration certificate. If a complete renewal application is on file with the Department on or before the registration expiration date, the pesticide product registration will continue in effect until a registration renewal decision is issued and takes effect. Please see Chapter 6 and information regarding the State Administrative Procedures Act (SAPA).

4.4 NEW YORK STATE MANDATED TIMEFRAMES

All New York State product registration reviews are based on applications submitted to the Department. The legislatively mandated timeframes for all applications, reviews and registration decisions are depicted in the Table 4.1. Timeframes are based on the date an application is received by the Department.

Currently, pesticide product applications are classified broadly as new active ingredient or major change in labeling with no distinction as to the type of product being submitted for review and registration. The U.S. EPA has implemented a program which allows for expedited reviews for certain products which meet the criteria for Reduced Risk. Registrants prepare justifications for U.S. EPA consideration to classify a specific active ingredient and a specific use as being Reduced Risk. The U.S. EPA Reduced Risk classification indicates that the active ingredient and specific use is considered "reduced risk" when compared to a previous formulation or other existing products. A pesticide product classified as Reduced Risk by the U.S. EPA may still raise concerns for registration in New York State, such as potential to impact groundwater resources. However, a reduced risk program in New York State may be a way to provide an incentive to develop new, lower risk pesticide products.

TABLE 4.1
NYSDEC PRODUCT REGISTRATION REVIEW – LEGISLATIVELY MANDATED TIMEFRAMES

Registration Type	Completeness Determination	Registration Decision*
New Active Ingredient (AI)	60 days, written notice to applicant	150 days + 30 days, if applicant requests decision
Major Change in Labeling (MCL)	60 days, written notice to applicant	150 days + 30 days, if applicant requests decision
AI already registered (New and Renewal)	60 days, written notice to applicant	90 days + 30 days, if applicant requests decision
Revised labeling,	60 days, written notice to applicant	30 days + 30 days, if applicant requests decision

amendment		
Revised labeling, notification	30 days	Automatically deemed accepted on 31st day after receipt, unless determination is made that amendment application is required
Special Local Need Registration	60 days, written notice to applicant	60 days + 10 days, if applicant requests decision
Experimental Use Permit	60 days, written notice to applicant	60 days + 30 days, if applicant requests decision
Section 18 Emergency Exemption	Filed with NYSDEC at least 105 days before decision is needed. 30 days to determine completeness.	Files with EPA at least 60 days before decision is needed.

4.5 NYSDEC REGISTRATION DECISION PROCESS FOR NAIS AND MCLS

4.5. A. Background on and Evolution of NYSDEC Product Registration Process

The State's Pesticide Product Registration Section was established on January 4, 1993 as a result of the 1992 pesticide fee bill (Chapter 67 of the Laws of 1992). Environmental Conservation Law Section 33-0701 requires that all pesticide products prior to sale, offer for sale, use or distribution must be registered with DEC. The 1992 fee bill also prescribed specific time frames for pesticide registration reviews and provided for the establishment of the Pesticide Product Registration Section. Prior to the 1992 fee bill, no new active ingredients or major changes in labeling were being registered for use, so no new chemistries or products could legally enter the state. A six-year backlog of applications existed before the Section was established.

The USEPA routinely registers new active ingredients that are appropriate for use in some, but not all, areas of the country. For example, they may register a pesticide product whose use is appropriate in areas with thick impermeable till soils, but is not appropriate in areas with permeable soils and near-surface aquifers. Thus, a federally registered product could cause serious contamination in some areas of the country. The USEPA, therefore, relies on states to be vigilant and innovative in identifying vulnerable areas and tailoring registration decisions to protect their own environmental resources while allowing for new, innovative and safer chemistries to be available to the pesticide users in the state.

In New York State, there is no attempt to duplicate the USEPA's review, but rather the NYSDEC reviewers expand upon USEPA's reviews and identify situations and circumstances where local conditions might not be protected by the broad criteria used by the federal government. New York State registrations are not based entirely on the results of the USEPA technical reviews, and some risks judged important in New York State are not considered in the USEPA review. The USEPA weighs the risks of using a particular pesticide against possible advantages in a cost-benefit analysis. The parameters that result in a favorable cost benefit on a

national scale may be unfavorable on a local scale. New York State evaluates each product for risks to human health, groundwater and non-target organisms. The advantages identified in a cost-benefit analysis are secondary to the protection of human health, groundwater and non-target organisms; however, the NYSDEC does consider the potential benefits of new, safer product chemistries to control pests as part of their registration review.

Throughout the years, as new scientific information and better assessment and analytical methods and models have become available, they have been incorporated into the State's registration review process. For new active ingredients in the same chemical families as previously registered products, reviewers evaluate information on human health, groundwater, and non-target organisms from use of previously registered products. For major changes in label where the registrant is adding a new use pattern or increasing the application rate, all available information from the previously registered product is again scrutinized. New York State requires that registrants submit copies of their Adverse Effects Reports required under FIFRA Section 6(a)(2). These reports are used to monitor for any negative impacts reported by users of pesticide products and are utilized in the reviews. The State's registration review process also utilizes the Internet as a tool for searching for additional information regarding an active ingredient that may not have been included in the registration application.

4.5.B. Current Product Registration Process

NYSDEC requires the submission of a complete data package in support of the application for registration of an NAI or MCL. A complete application includes all USEPA registration review documents prepared or solicited by the USEPA in its review, analysis and evaluation of an application to register a pesticide product, including all data evaluation record reports, branch reviews, comment and decision-making documents and correspondence with the registrant. The USEPA requires certain studies to be performed by the registrant, based on the product's use patterns. The USEPA reviews the studies, and develops a Data Evaluation Record report (DER) for each study. In addition, the USEPA produces an Environmental Fate and Effects Division Ecological Risk memo which summarizes all of the study results and discusses the data and data gaps, if any, for the active ingredient and/or end use product.

New York's product registration review is an intensive process involving cautious, conservative approaches in the evaluation of potential adverse effects to health, ecological resources, and water resources of the state. NYSDEC has 60 days to perform a completeness determination on a NAI or MCL application. If any information is missing, a letter is sent to the registrant requesting the information, or a justification as to why the information is missing or unavailable. The registrant has 45 days to respond to the NYSDEC. Once any additional information is received, it undergoes another completeness determination. Once an application is deemed complete, a letter is sent to the registrant and the NYSDEC has 150 days to issue a registration decision on the application.

During the 150 days, a technical review of the application is performed. Technical staff reviews each applicable DER, noting whether or not the USEPA found the study acceptable. If the study was unacceptable, they review the reasons; in most cases, it is a paperwork issue that was subsequently cleared up, and the data is valid for use.

The State's registration process also involves review by the Bureau of Toxic Substance Assessment of the New York State Department of Health (NYSDOH) Center for Environmental Health, which evaluates human health risks posed by the use of the product, and assists the Department in making decisions on pesticide registration. The intent of NYSDOH's review is to reduce risks to public health from the use of pesticides by assessing exposures and risks and recommending ways to reduce those risks. The goals of this review are to ensure that any pesticides registered in the State do not pose significant risks to public health from occupational and residential exposure or other sources, such as food, water, or air when used as labeled.

The Department's Division of Fish, Wildlife and Marine Resources' Bureau of Habitat (BOH) is also involved in the State's registration process. The BOH evaluates the potential effects of product use on non-target organisms and endangered species in New York State. They evaluate and identify the risks posed by use of the product and, if needed, recommend ways to reduce those risks.

The State's groundwater quality assessment review of the environmental fate data builds on the FIFRA Section 3 review by evaluating the potential impacts of product use on groundwater quality under New York State conditions, such as those that exist on Long Island. The environmental fate studies used to evaluate impacts to groundwater include:

Hydrolysis
Photodegradation in Water
Photodegradation on Soil
Aerobic Soil Metabolism
Anaerobic Soil Metabolism
Anaerobic Aquatic Metabolism
Aerobic Aquatic Metabolism
Adsorption/Desorption Mobility
Column Leaching Mobility
Field Dissipation Studies

This evaluation provides information that is used to assess and develop conditions for use of the product and treats all groundwaters as potential sources of drinking water. The groundwater assessment is designed to be conservative to ensure that potential water quality impacts are minimized to the maximum extent practicable and to clearly demonstrate that the proposed use of the product will not violate State or federal standards or guidance values for groundwater.

If it appears that the product's characteristics indicate that it might leach to groundwater, have an adverse impact to non-target organisms, or raise concerns regarding potential human health impacts, a technical issues letter is sent to the registrant. This letter advises the registrant of the issues found during the NYSDEC's technical review, and requests any additional information that would support a registration decision. The registrant may also request a meeting to discuss the technical issues with NYSDEC staff.

If any one of these three reviews determines that an unreasonable impact could occur to groundwater, human health or non-target organisms from the labeled use of the new active ingredient or major change in label, the NYSDEC has the right to deny the registration of the

product. However, if the three reviews determine that there is no unreasonable impact to groundwater, human health or non-target organisms, if the composition of the pesticide is such as to warrant the proposed claims for it, and if the pesticide and its labeling and other material required to be submitted comply with the requirements of Article 33 of the ECL, then the NYSDEC will register the product for use in New York State.

4.5. C. Review Process for Potential Groundwater Impacts

In order to understand how the pesticide pollution prevention Strategy will be used to enhance the protections of groundwater resources on Long Island, it is essential to understand what safeguards are already being used to protect groundwater as part of the State's registration program. This section of the Strategy provides a detailed overview of the State's current groundwater assessment process.

In addition to reviewing the environmental fate studies required by EPA, staff also reviews groundwater monitoring data, if available in the registration application, but it is rare to have groundwater monitoring data available for new active ingredients. (In those situations, the NYSDEC uses LEACHP computer modeling as an additional tool to help determine the potential impact of the use of the product in vulnerable areas.) While the Department has always used LEACHP worst-case modeling as a tool in the registration decision-making process, in more recent years, NYSDEC has used even more conservative criteria when evaluating potential use on Long Island due to increased concerns over potential detection of any active ingredient in the groundwater.

4.5.C.1. LEACHP Modeling

The NYSDEC always models "worst-case" parameters to ensure that the results are as conservative as possible. The model incorporates a soil profile based on the Riverhead sandy soil of Long Island and 10-year rainfall data set from JFK Airport. Chemical-specific parameters used in the model include:

- solubility of the product,
- maximum yearly application rate,
- half-life of the product as found in aerobic metabolism soil studies, and
- adsorption-desorption coefficient (a measure of how tightly the product binds to the organic carbon in the soil profile).

The half-life and the adsorption-desorption data are taken from the studies based on soils with a pH and percent of organic matter most similar to that of the Riverhead soil profile.

The pesticide is then modeled as a "bare-ground" application; the output is not corrected for foliar uptake, interception by thatch, or photolysis from the plant or soil. New York State assumes 100% of the applied product reaches the soil surface and is available to leach. The model projects the amount of leachate that moves through the soil column beneath the application area and is available to reach groundwater.

The same modeling process is applied to any degradates that were found at 10% or more of the application rate in the aerobic metabolism study.

A document is prepared which summarizes all of the studies and data results, and, if there was no groundwater data, computer modeling projections. Review staff sends this document to the project manager with a recommendation regarding whether or not the product has characteristics that would allow it to leach to groundwater when used as labeled.

New York State considers all groundwater on Long Island, which is a sole source drinking water aquifer system, as either a current or potential source of drinking water. This Strategy seeks to preserve the viability of all of Long Island's groundwater for that purpose. Factors used for pesticide product registration decisions of New Active Ingredients and Major Changes in Label are summarized in Figure 4.1.

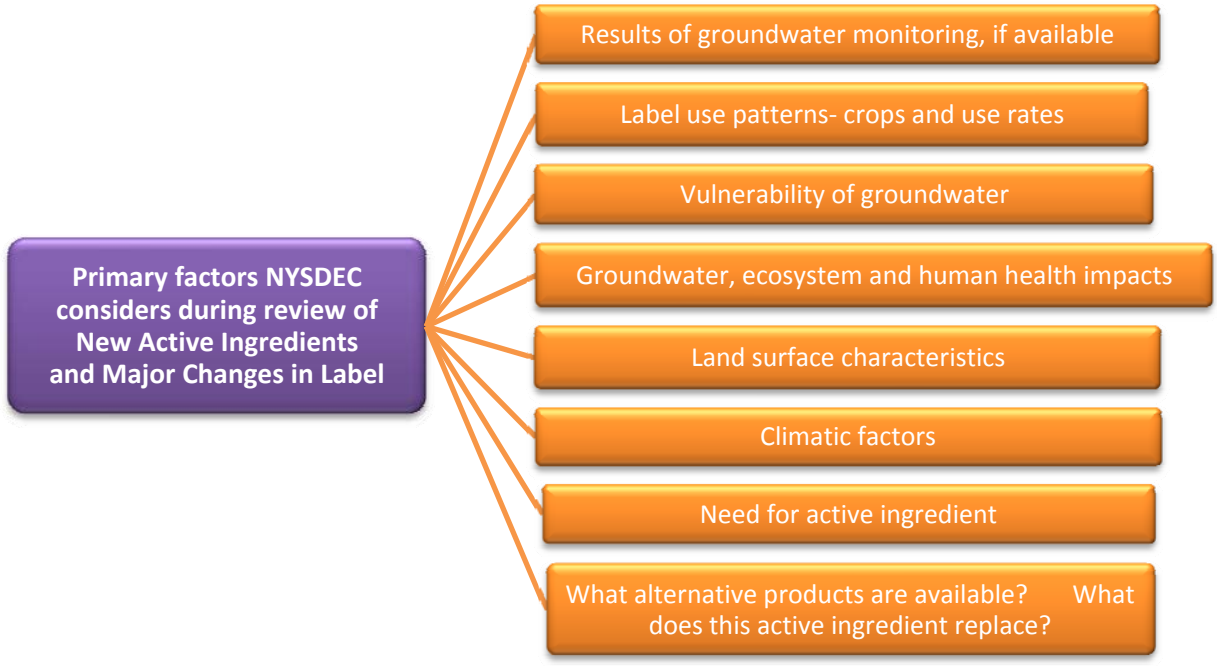


Figure 4.1: Primary Factors NYSDEC Considers as Basis for the Registration of a New Active Ingredient or Major Change in Label

4.5. D. Factors Considered During Product Registration

The NYSDEC reviews all information submitted in support of an application and determines whether the product, when used as labeled, is likely to result in adverse effects on the health of workers or the general public, the fish and wildlife resources, or the ground and surface water of New York State. If concerns are identified during the review process, the registrant is notified. If the concerns can be mitigated through revisions of the product labeling, the registrant has the option of pursuing those changes with the USEPA. For example, the addition of the statement: "Not for sale, use or distribution in Nassau and Suffolk Counties, New York" might address NYSDEC's concerns regarding potential impact on the groundwater resources of Long Island. The NYSDEC does not have the authority to require a registrant to change its product labeling in order for a product to be registered in New York State. However, the NYSDEC is not required

to register a product if the concerns identified in the registration review process are not mitigated. In such cases, NYSDEC will issue an unfavorable registration decision and deny the registration of the product in New York State. See Legal Authority and Enforcement in Chapter 6 for more information.

Based on issues raised during the technical review, the NYSDEC and the registrant may work together to agree on the following steps in order to mitigate concerns:

- Withdraw registration application,
- Deny registration,
- Reduce application rates,
- Reduce number of applications,
- Limit application methods,
- Add personal protective equipment,
- Add buffer zones,
- Limit sites of application,
- Require new studies, or
- Designate product as "NYS Restricted Use".

4.6 REGISTERED AND RESTRICTED PESTICIDE PRODUCTS IN NYS

The specific restrictions and prohibitions established in connection with the NYSDEC NAI and MCL registration review process are applied to all future products registered with the same active ingredient and/or use pattern. In part, registration actions are designed to protect the quality of surface water and groundwater on Long Island. As of June 2012, there were 13,688 pesticide products registered for use in New York State. In general, NYSDEC registration decisions are made on a statewide basis. About 1,700 products have New York State-specific language and/or use restrictions placed on them. Due to the high vulnerability of Long Island groundwater to contamination through its recharge zone, pesticides that could readily enter the Long Island aquifer system are prohibited from distribution or use in Nassau and Suffolk counties. Of the approximately 1,700 restricted pesticides, 361 are strictly prohibited from use in Nassau and Suffolk counties. Any registered pesticide product that is prohibited from distribution and use in Nassau and Suffolk counties will include a statement to that effect on the label. Another 145 are registered for use on Long Island only when used in accordance with specific label conditions. Based on the specific pesticide product characteristics or findings regarding these products, protective conditions such as the following are developed and enforced:

- Use for ornamentals in enclosed structures only,
- No use within 100 feet of coastal marshes,
- 25-foot buffer strip to coastal marsh,
- Use limited to onions and strawberries,
- No soil injection,
- No aerial application,
- No use on golf courses or sod farms,

- Reduced rates of application, and
- Maximum annual/seasonal quantity.

In response and as a result of the pollution prevention efforts of the Strategy, additional labeling modifications and reference to Best Management Plans will be explored.

4.6. A. Research to Support Pesticide Product Sale, Distribution and Use on Long Island

The Department currently uses very conservative parameters during the new active ingredient and major change in labeling extensive review process. As a result, many pesticide products containing new active ingredients or representing major changes in labeling are not registered for use on Long Island if there is an indication that there is a potential for leaching. If there is a specific need for such a product or if the registrant wants to amend the label to allow use on Long Island, "pilot trial" or research may be conducted in order to gather relevant, meaningful, real-world scientific data to support the use. Such "pilot trials" may be conducted in conjunction with Cornell University and/or Cornell Cooperative Extension, and the pesticide registrant, and with the appropriate Department approval.

Chapter 5. EXISTING POLLUTION PREVENTION PROGRAMS AND ACTIVITIES

5.1 INTRODUCTION

The Strategy provides an overall structure for prevention and response efforts related to the impact of pesticides on the quality of surface water and groundwater on Long Island. Preventive actions are those which may directly or indirectly reduce the potential for pesticides to contaminate surface water and groundwater, regardless of whether a pesticide has been detected in Long Island's water resources.

This chapter describes a host of measures that have been or can be employed to prevent contamination of Long Island's water resources by currently used pesticides. Two broad categories of prevention measures are addressed in this chapter - regulatory and non-regulatory.

The actions proposed in the Strategy have been developed to potentially supplement some of the programs and measures summarized below. As the Strategy is implemented, it is expected that some of these programs and activities will indeed be utilized. As it becomes apparent what programs complement the Strategy's goal of protecting Long Island's groundwater and surface water resources from pesticide-related contamination while continuing to meet pest management needs, the Department may perform an assessment of these programs to further improve their overall contribution to the Strategy.

5.2 THE NATURE OF PREVENTIVE MEASURES

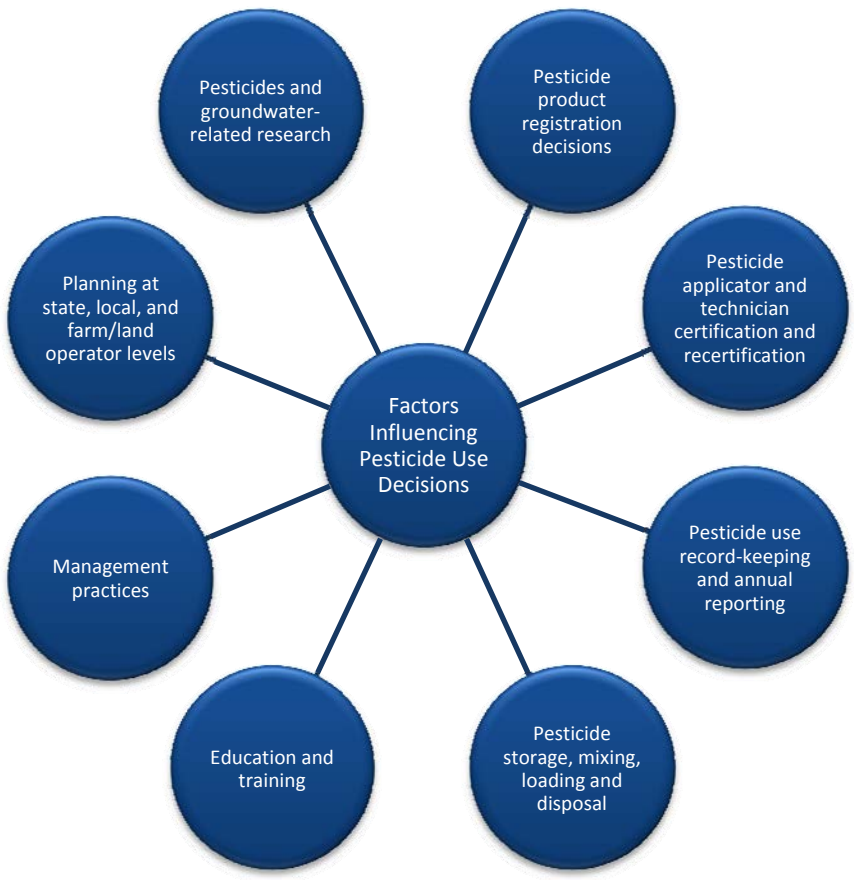
Preventive measures may be employed on a proactive basis to help prevent contamination or on a responsive basis, to reduce or eliminate further contamination from a pesticide already detected in the water resource. Best management practices can be utilized regardless of whether a pesticide has already been detected in water resources. New York's overall prevention effort includes activities which support the development, communication or implementation of preventive approaches (e.g., education, planning and coordination among involved entities).

The Strategy focuses on proactive preventive measures as the primary means to support improved pesticide use decisions all the way from the review of an application for New York State pesticide product registration, to the disposal of empty pesticide containers. Such decisions are made primarily by regulatory agencies, as well as occupational users and homeowners who use a pesticide to manage a pest problem. Improved decisions about pesticide use help protect water quality, by influencing what products and strategies are used to manage pests, ranging from the lawn dandelion to the farm field of cauliflower. The primary factors that can influence pesticide use decisions are summarized in Figure 5.1.

5.3 NON-REGULATORY POLLUTION PREVENTION MEASURES

There are a host of non-regulatory, pollution prevention actions that have been or can be utilized to prevent or reduce potential impacts of pesticide use, as shown in Figure 5.3.

FIGURE 5.1 FACTORS INFLUENCING PESTICIDE USE DECISIONS



5.3.1. Education and Training

Education and training are an integral part of most pesticide and water quality management activities, and are critical to effectively preventing pesticide-related contamination of Long Island's surface water and groundwater. It is essential to understand and share information on matters such as the adverse impact of pesticides on water quality and pesticide and water quality management strategies in order to prevent such contamination and achieve proper management and protection of these water resources.

A range of public and private entities provide education and training relative to pesticides and water quality management, including the NYS Department of Environmental Conservation (NYSDEC), Cornell University, Cornell Cooperative Extension, and such private course sponsors as the Nassau-Suffolk Landscape Gardeners' Association, Inc., Professional Pesticide Applicators of Long Island, Inc., Long Island Pest Control Association, Inc., and regional pesticide distributors.

5.3.A. New York State Department of Environmental Conservation Outreach

On Long Island, the Department's outreach efforts focus attention on the regional groundwater situation, and NYSDEC personnel work to inform the general public and regulated community

about the importance of preventing further pesticide-related contamination of that underground resource.

Since NYSDEC is the state agency responsible for regulating the distribution and use of pesticides, compliance assistance, public outreach activities, and enforcement of New York State's pesticide-related laws, rules and regulations, the Division of Materials Management, Bureau of Pest Management personnel engage in outreach activities that provide information to pesticide users by:

- making presentations to the professional pest management community, including those involved with the production of food crops, and other occupational pesticide users,
- participating in events where occupational pesticide users and others assemble for educational purposes (including such regional annual conferences and trade shows as those sponsored by Cornell Cooperative Extension of Suffolk County, Nassau-Suffolk Landscape Gardeners' Association, Inc., Long Island Pest Control Association, Inc., Professional Certified Applicators of Long Island, Inc., and Neighborhood Network, Inc.),
- developing informational brochures, fact sheets, and presentations on pest management, Integrated Pest Management (IPM), pesticide use, and best management practices (BMPs). This is sometimes done in conjunction with the NYSDOH, Cornell University, Cornell Cooperative Extension of Suffolk County, or pesticide product manufacturers, registrants, and sub-registrants, and distributing these as appropriate,
- maintaining current and useful information on the NYSDEC website, and
- assisting training course sponsors who develop and provide certification, recertification, and other training courses.

5.3.A.2. Cornell University, PMEP and Cornell Cooperative Extension of Suffolk County

Cornell University's Pesticide Management Education Program (PMEP) provides a gateway to resources on various topics related to pesticides management and surface water and groundwater protection strategies. The PMEP website[38] contains information on many pesticide use and regulatory requirements as well as links to other educational materials. Fact sheets on groundwater are also posted.[39]

PMEP also conducts statewide training for certification and recertification of pesticide applicators. PMEP has conducted a series of training sessions entitled "Groundwater and Pesticides Information" directed at Cooperative Extension staff, NYSDEC staff and others involved in pesticide applicator training.

Cornell Cooperative Extension of Suffolk County works closely with programs and departments at Cornell University. Cooperative Extension of Suffolk County, however, is the locally based component of Cornell University, which is actively conducting pollution prevention programs on Long Island. The Agriculture Program is dedicated to supporting the economic viability of agriculture while working to preserve and protect our water resources. A major emphasis of

[38] The PMEP website[38] http://pmep.cce.cornell.edu/ provides access to information on pesticide/groundwater/soil interaction, application techniques, pesticide issues, toxicology, pesticide certification information, pesticide active ingredient/New York State product registration data, pest management recommendations, and federal and New York State pesticide-related laws, rules and regulations, as well as links to other educational materials.
[39] PMEP posts groundwater fact sheets at http://pmep.cce.cornell.edu/facts-slides-self/Factsheets.aspx

Cooperative Extension's programming is devoted to research and educational extension of alternative strategies for pest management. Producers commonly adopt these best management practices once their effectiveness has been demonstrated, often shown with on-farm demonstrations.

Cornell Cooperative Extension publishes educational documents that relate to pesticides and water quality, available on their website or through their publications center, such as *Pesticides and Groundwater - A Guide for the Pesticide User*.[40]

5.3.A.3. New York State Water Resources Institute

The New York State Water Resources Institute (WRI) at Cornell University (http://wri.eas.cornell.edu) has developed educational computer tutorials for pesticide applicators and farmers. A joint effort by the WRI and NYSDEC produced a brochure in August 2004 entitled *Water Quality Protection Tips for Professional Applicators, Pesticide Application and Water Quality*. It contains water quality protection tips for professional applicators,[41] and a slide set and script for training pesticide applicators entitled *Protecting New York's Waters, Water Quality and Pesticides Training for Pesticide Applicators and Technicians*.[42]

5.3.A.4. Private Course Sponsors

Many private entities (trade organizations, pesticide businesses, pesticide distributors, individuals, and others) provide training and educational opportunities for pesticide applicators. Many courses are offered each year and, after approval by NYSDEC, these courses provide continuing education credits to applicators that successfully complete them.

5.3.A.5. EXtension TOXicology NETwork (EXTOXNET)

Information regarding pesticide toxicology can be accessed through the EXtension TOXicology NETwork (EXTOXNET) at the following website: http://extoxnet.orst.edu, or by telephoning the National Pesticide Information Center (800) 858- 7378. It is a source of objective, science-based information about pesticides that is developed by toxicologists and chemists within the Extension Service of Cornell University and a number of other land-grant universities.

5.3.B. Management Practices

Management practices for pesticide users can be pesticide-specific or general in nature. Their objective is to improve the manner in which pesticides are used and managed and thereby prevent or minimize the impact of pesticides on the environment. Education and outreach events

[40] Cornell Cooperative Extension publications are listed at http://www.cce.cornell.edu/store/customer/home.php. *Pesticides and Groundwater - A Guide for the Pesticide User* can be viewed at http://psep.cce.cornell.edu/facts-slides-self/facts/pest-gr-gud-grw89.aspx and *Pesticide Management for Water Quality - Principles and Practices* (Van Es and Trautmann, 1990) can be viewed at http://psep.cce.cornell.edu/facts-slides-self/facts/pestmgt-water-qual-90.aspx .

[41] The brochure, *Water Quality Protection Tips for Professional Applicators*, and other brochures are accessible through the NYSDEC website at http://www.dec.ny.gov/chemical/8531.html.

[42] NYS Water Resources Institute and the NYS Department of Environmental Conservation, *Protecting New York's Waters, Water Quality and Pesticides Training for Pesticide Applicators and Technicians*, December 2000, http://psep.cce.cornell.edu/Tutorials/Tutorials-Slides.aspx.

often provide excellent opportunities to disseminate and even implement best and alternative management practices.

5.3.B.1. Best Management Practices

Pesticide-specific best management practices can be implemented by wide range of pesticide users, or in some cases by a particular set of pesticide users. Such practices are developed as the need arises, to serve as preventive measures in the absence of the detection of pesticide in water resources, or to prevent further contamination when a pesticide is detected. For example, in 2004, best management practices were developed by the NYSDEC, Cornell Cooperative Extension of Suffolk County, and Bayer CropScience for certain uses of the insecticide imidacloprid on Long Island.[43]

The New York State Nonpoint Source Management Practices Task Force was established by the NYSDEC to identify candidate management practices for all land uses contributing to nonpoint source pollution. Subsequently, management practice subcommittees, developed catalogues of management practices. One such catalogue, the *Agricultural Management Practices Catalogue for Nonpoint Source Pollution Prevention and Water Quality Protection in New York State* (3rd rev. May 1996),[44] addresses pesticides relevant to groundwater concerns. It includes assessments of agricultural management practice effectiveness, advantages, disadvantages, cost, operation and maintenance issues, and other concerns.

5.3.B.2. Integrated Pest Management (IPM)

Integrated Pest Management (IPM) is a systematic approach to managing pests which focuses on long-term prevention or suppression with minimal impact on human health, the environment and non-target organisms. IPM incorporates all reasonable measures to prevent pest problems by properly indentifying pests, monitoring population dynamics, and utilizing cultural, physical, biological or chemical pest population control methods to reduce pests to acceptable levels. The New York State IPM (NYSIPM) Program, which is implemented by the Cornell College of Agriculture and Life Sciences, provides education and facilitates implementation of IPM in four major commodity production areas: vegetables, dairy/field crops, fruit, and ornamentals, and in community IPM. New York State budget funds have been appropriated annually for the NYSIPM Program, and provided to Cornell under contracts or agreements with the NYSDEC and NYS Department of Agriculture and Markets. The mission of the NYSIPM Program is to develop sustainable ways to manage pests and helps people use methods that minimize environmental, health, and economic risks.

In general, IPM takes into account:

- current pest control practices and environmentally-preferable alternatives to those practices,
- pest priorities,
- socio-economic factors affecting IPM adoption, and
- strategies for IPM practices, education/technology transfer/outreach, and agricultural and urban pest management.

[43] The imidacloprid best management practice documents can be viewed at the following Cornell Cooperative Extension of Suffolk County website: http://ccesuffolk.org/best-management-practices-for-long-island-ny/.
[44] The Catalogue is accessible at http://www.nysl.nysed.gov/scandoclinks/ocm36966918.htm.

Examples of IPM activities which could contribute to Long Island groundwater protection include:

- continued coordination and facilitation of IPM activities through an IPM specialist on Long Island,
- continuation of the electronic communication system for growers (weather data, pest predictions, and management recommendations), through web-based resources such as the Network for Environmental and Weather Applications (NEWA), and
- conducting on-site IPM demonstration projects as resources allow.

5.3.B.3. NYSDEC Environmental Benefit Projects

An Environmental Benefit Project ("EBP"), is a project undertaken as part of a civil settlement of claims of violation of environmental laws or regulations that partially compensates for the environmental insult associated with an alleged violation, either at the offending facility or in the surrounding area. EBPs produce additional environmental and public health protection or improvements in the community where the insult occurred. An example is the *CleanSweepNY* pesticide collection and disposal EBP, which includes the construction and installation of pesticide handling facilities. EBPs are adopted in accordance with the NYSDEC's *CP-37 Environmental Benefit Projects Policy*, which can be found at:
http://www.dec.ny.gov/regulations/64596.html

5.3.B.4. Long Island Agricultural Pesticide Handling Facilities Environmental Benefit Projects

Long Island Agricultural Pesticide Handling Facilities Environmental Benefit Projects (LIAPHF EBPs) resulted in the construction of pesticide handling facilities at agricultural establishments engaged in the production of agricultural plants in Nassau and Suffolk Counties for the purpose of protecting Long Island's vulnerable sole source drinking water aquifer system from releases of pesticides associated with certain pesticide handling activities. These EBPs include the following activities:

- mixing pesticides, loading or filling pesticide containers, mixing equipment, loading equipment, or application equipment,
- transferring pesticides between containers, mixing equipment, loading equipment, and/or application equipment,
- rinsing (including triple-rinsing) or washing of pesticide containers, mixing equipment, or application equipment,
- disposing of pesticides or pesticide containers,
- handling opened containers of pesticides, and
- cleaning, adjusting, handling, or repairing the parts of mixing, loading, or application equipment that may contain pesticide residues.

Pesticide handling facilities are generally intended to contain and collect pesticide-related spills, rinsates, and washwaters, and allow for their lawful reuse (recycling) and/or disposal.

5.3.B.5. CleanSweepNY – NYSDEC Environmental Benefit Project, Pesticide Collection and Disposal

Pesticides which are obsolete and/or improperly packaged or handled pose a significant hazard to the surface waters, groundwater, and soils of New York State. Therefore, proper disposal of unwanted pesticides is an important management practice.

CleanSweepNY is an EBP that was initiated by the NYS Department of Environmental Conservation's Bureau of Pest Management. It is an effort to safely and economically dispose of

canceled, unwanted, unusable, or otherwise obsolete pesticides and other select chemicals from agricultural or non-agricultural business operations. *CleanSweepNY* also provides for the disposal of pesticides, cleaning products, and laboratory class chemicals, as well as elemental mercury, and mercury-containing devices such as thermometers and manometers from schools and other entities.

CleanSweepNY collection events do not target the general public since home and garden pesticides are accepted in Household Hazardous Waste (HHW) collection programs. Commercially applied or larger quantities of pesticides are usually excluded from local HHW collections. In New York State there is a backlog of demand for safe, lawful, and affordable disposal of obsolete pesticide products and other chemicals.

In almost every year since the first event took place on Long Island in calendar year 2002, *CleanSweepNY* events have been held in several areas of New York State. Under this program, as of the fall of calendar year 2013, statewide, more than 1.2 million pounds of unwanted pesticides and other hazardous chemicals have been collected and properly disposed and approximately 4,500 pesticide containers have been collected for recycling. For more information about *CleanSweepNY*, go to the following Internet website: http://www.cleansweepny.org.

Based on the success of the *CleanSweepNY* program and since its overall goal is consistent with the Strategy's goal, the Department is evaluating ways to expand the *CleanSweepNY* program. This could potentially involve regular scheduling of the pesticide collection events along with increased advertising to promote participation and the proper disposal of pesticides at these collection events.

5.3.B.6. Pesticide Plastics Recycling

The first pesticide plastics recycling program in New York State was on Long Island. The Long Island Cauliflower Association (LICA) implements the plastic pesticide container recycling program on Long Island in conjunction with the Ag Container Recycling Council (ACRC). The ACRC is a voluntary industry funded product stewardship program that oversees the collection and recycling of pesticide containers nationwide. Farmers, nurseries, vineyards, and commercial applicators can drop off triple rinsed pesticide containers for free at the LICA facility in Riverhead. The program collects about 28,000 pounds of plastics annually. The collected plastic is crushed, baled and shipped primarily to a processing facility in Texas where it is used to produce field drain tile. For more information about ACRC and the recycling of pesticide containers, go to http://www.acrecycle.org/home.

Figure 5.2: Empty pesticide containers stored at Long Island Cauliflower Association

5.3.B.7. Be Green Organic Yards NY

On June 7, 2010, NYSDEC announced the *Be Green Organic Yards NY* initiative. NYSDEC's *Be Green* program is designed to promote recognition of organic landscaping practices and organic service providers. Consumers will be able to find lawn and landscape businesses that provide organic services by looking for the *Be Green* logo. Qualified businesses can use the *Be Green* logo to advertise their organic services. NYSDEC will work with:

- qualified trainers to offer courses in *Be Green* organic principles,
- lawn companies, landscapers and arborists to be tested to verify their knowledge of organic practices, and
- eligible organic service providers and course providers to enter into Be Green Service Mark agreements to use the *Be Green* logo when advertising organic services.

The goal of *Be Green* is to help create an organically managed landscape for people, pets, wildlife and plants. The *Be Green* program recognizes that public demand for all types of organic landscaping services is on the rise as people continue to be concerned about the amounts and types of chemicals used in everyday tasks.

Consumers will be able to search a list of these *Be Green* Businesses on NYSDEC's website at http://www.dec.ny.gov/public/65071.html. Consumers will have assurance that a *Be Green* Business will not engage in practices or use products that are considered by NYSDEC to be inconsistent with organic principles.

5.3.B.8. Neighborhood Network Organic Landscaper Certification Program

The Neighborhood Network is a Long Island-based environmental organization that wrote and advocated for the 48-Hour Pesticide Notification Law, which was adopted in New York State in 2000, with opt-in provisions for counties. The 48-Hour Pesticide Notification Law requires commercial lawn pesticide applicators to supply written notice of the application to the occupants of neighboring properties. (For information on the Neighborhood Network, visit http://neighborhood-network.org/organization/about.htm.)

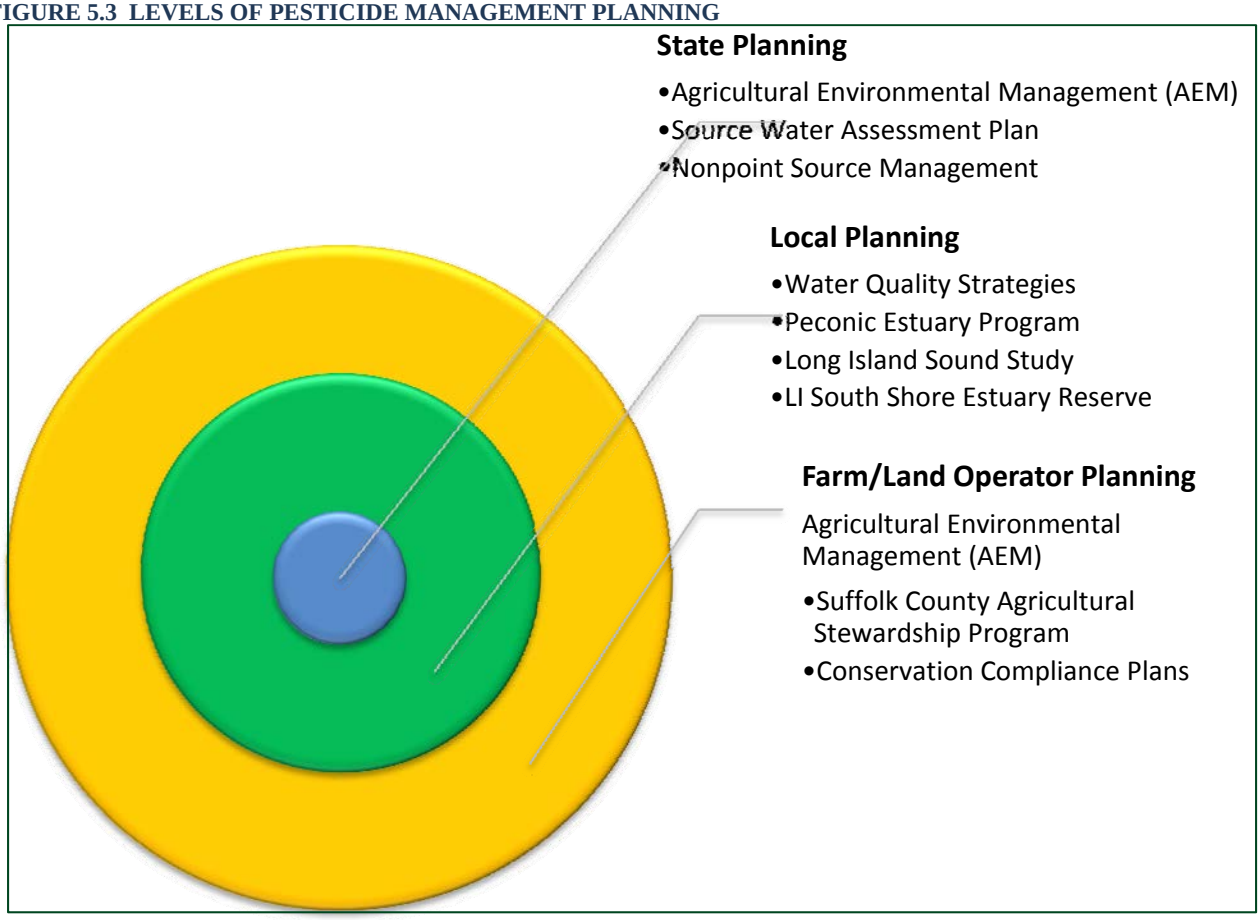
The organization holds an annual Organic Turf and Tree Show to promote businesses on Long Island that provide less-toxic services and to provide professionals with the latest information for establishing healthy turf without relying upon chemical pesticides.
The Neighborhood Network's Organic Landscaper Listing Program identifies pest management professionals who:

- meet specific education and training requirements in organic horticulture methods through the Organic Turf Trade Show, Nature Lyceum, Soil Food Web classes, or equivalent,
- demonstrate knowledge via a questionnaire/exam in the use of organic pest management methods,
- sign a contract to comply with the Neighborhood Network's standard for organic horticulture that includes lists of permitted and prohibited products and practices, and
- operates transparently by agreeing to the possibility of inspections to ensure compliance.

5.3.B.9. Planning at State, Local and Farm/Land Operator Levels

Planning for proper pesticide use and water quality management is an important component of preventive action. Planning can take many forms and be conducted at several levels: state, local and entity-specific (e.g., farms, vineyards, golf courses). However, as shown in Figure 5.3, pesticide management planning is interconnected at all levels regardless of the level at which specific planning is initiated, and planning at each level affects planning and actions at the other levels. The more significant planning opportunities and efforts involving Long Island are highlighted in this section.

FIGURE 5.3 LEVELS OF PESTICIDE MANAGEMENT PLANNING



5.3.B.10. Agricultural Environmental Management (AEM)

Agricultural Environmental Management (AEM) is a program developed by farmers, federal, state and local governments, and farm conservation professionals to enhance the protection and improvement of important environmental resources such as the New York State's groundwater resources, rivers, lakes, streams, freshwater wetlands, and tidal wetlands, while maintaining a healthy agricultural economy. Since its formal inception in 2000, the AEM program has grown to include nearly 8,000 farms statewide.

The essence of AEM is a five-step ("five-tiered") environmental assessment, planning and implementation process that farmers undertake voluntarily, with the help and support of a team of agricultural and environmental professionals from agricultural agencies and private industry. The AEM tiered approach takes place on the farm, with the farmer as the decision maker. Core members of the local working group - "the County Project Team" - work with the farmer to carry out the tiered approach. Qualified private consultants may also be used at appropriate points in the process.

The New York State Soil and Water Conservation Committee (NYSSWCC) is responsible for planning, coordinating and setting policy for the AEM program statewide. The Suffolk County Soil and Water Conservation District (SCSWCD) is tasked by the NYSSWCC with implementing the AEM tiered approach to Conservation Planning or Whole Farm Planning and is responsible for creating and implementing the County's AEM plans.

5.3.B.11. Suffolk County Agricultural Stewardship Program

The Suffolk County Agricultural Stewardship Program was established in response to growing concerns about nitrate levels and pesticide residues in Long Island's surface waters and groundwater. Cornell Cooperative Extension, the coordinating agency of the Stewardship Program, works together with Suffolk County Soil and Water Conservation District (SCSWCD) and USDA Natural Resource Conservation Service (USDA-NRCS) to protect the Long Island sole source aquifer system while at the same time preserving the region's viable and sustainable agricultural industry. By taking a proactive approach and helping growers evaluate their farm management practices, they are working to stay ahead of the curve and to prevent the need for future regulatory controls. Through a variety of services, the Stewardship Program works with local growers to incorporate better management practices that protect the quality of Long Island groundwater resources and maintain and improve crop production.

5.3.B.12. Source Water Assessment Program (SWAP) Plan

As stated on New York State Department of Health (NYSDOH) Source Water Assessment Program (SWAP) websites,[45] NYSDOH is responsible for developing New York's SWAP Plan and ensuring that assessments are completed for all public water systems. The Safe Drinking Water Act requires that each source of water used by a public water system be evaluated to identify possible contaminant threats to the source water quality. This evaluation is called a Source Water Assessment.[46] NYSDOH developed New York's SWAP Plan, which was approved by the USEPA in November 1999, and a detailed work plan was developed by the Long Island SWAP Steering Committee. Source Water Assessments were completed in New York State in 2003.

Source water assessments were performed for all public water supplies in Nassau and Suffolk Counties by a contracted engineering firm. The Long Island Source Water Assessment (LISWA) Report summarizes the results of the assessments for 938 community and 418 non-community wells serving public water supplies on Long Island. The report showed source water recharge areas, time of travel for these public water supply wells, and land uses within the source water

[45] The NYSDOH SWAP Plan is accessible at http://www.health.ny.gov/environmental/water/drinking/swapp.pdf. and a fact sheet on the program is available at http://www.health.ny.gov/environmental/water/drinking/li.htm.
[46] Personal communication from Lloyd R. Wilson, NYSDOH to Vincent A. Palmer, NYSDEC, 11-05-10.

recharge areas. It also assessed susceptibility of the wells to various contaminants associated with each type of land use. Pesticides comprised one of the four types of contamination assessed in the report. The other three were microbials, nitrates, and volatile organic compounds (VOCs).

The LISWA Report found that in Suffolk County, where significant tracts of agricultural land are farmed, approximately 10 percent of the public water supply wells were rated as medium-high or greater for susceptibility to pesticides. The high susceptibility rating is because it is known that pesticides are used in the recharge areas of the wells, and that many of these wells are relatively shallow meaning there is less of a barrier to protect groundwater. Most of these wells are located in agricultural areas in central Suffolk County, or on eastern Long Island's North Fork.[47] The public water suppliers are required to routinely monitor their finished water for the presence of pesticides. Should pesticides be found, water suppliers may need to consider not using the contaminated well or providing treatment.

5.3.B.13. Conservation Compliance Plans

The USDA (primarily the Natural Resources Conservation Services [NRCS]) has a lead responsibility, under provisions of the 1990 Farm Bill (Food, Agriculture, Conservation and Trade Act of 1990), to ensure conservation compliance by farmers who are eligible for USDA farm program benefits. The development and implementation of conservation plans for highly erodible crop land is required of farmers participating in most USDA programs. Soil erosion control practices may have indirect consequences on pesticide leaching to groundwater (increased infiltration, macropores as preferential flow channels, potential alterations in pesticide use). The New York State Nonpoint Source Management Program, with its Coordinating Committee, provides a forum for assessing these issues, exchanging information, and ensuring compatibility of the pesticide/groundwater strategy and the conservation planning process.

5.3.B.14. Local and Regional Water Quality Strategies

In general, many of the programs described in this chapter are implemented at the state level. However, regional and local scale programs are also important to the protection of Long Island's groundwater resources. For example, the Suffolk County Agricultural and Farmland Protection Board established the Pesticide/Groundwater Working Group to develop a Long Island Stewardship Program. Proposed objectives of that program include:

- design effective and practical Best Management Practice Guidelines for Long Island growers,
- promote efficient and environmentally responsible production,
- provide educational and cost sharing opportunities to improve stewardship of agricultural inputs that are specifically oriented to Long Island conditions and cultural practices, and
- develop and implement non-chemical pest management alternatives.

That initiative produced a Final Report "A Strategy to Develop and Implement the Suffolk County Agricultural Stewardship Program, A Report of the Agricultural Environmental Management Task Force for Nitrogen and Pesticide Load Reduction."[48]

[47] Long Island Source Water Assessment Executive Summary. http://www.nassaucountyny.gov/agencies/health/Docs/PDF/LIEXEC.PDF.

[48] "A Strategy to Develop and Implement the Suffolk County Agricultural Stewardship Program, A Report of the Agricultural Environmental Management Task Force for Nitrogen and Pesticide Load Reduction", May 26, 2004. http://www.lifb.com/FARMINGONdd/Stewardship/tabid/72/Default.aspx).

5.3.B.15. Nonpoint Source Management and Related Initiatives (County Water Quality Strategies)

The New York State Nonpoint Source Management Program, under the direction of NYSDEC, has initiated other efforts that contribute to the pesticide-related surface water and groundwater protection methods presented in this Strategy, in addition to development of the *Agricultural Management Practices Catalogue for Nonpoint Source Pollution Prevention and Water Quality Protection in New York State* (3rd rev. May 1996).[49] A significant initiative under that program is the establishment of County Water Quality Coordinating Committees and development of County Water Quality Strategies. Agricultural issues are one of the major concerns of these strategies. Key participants in the committees generally include personnel from County Soil and Water Conservation Districts, Cornell Cooperative Extension, the USDA Natural Resources Conservation Service, and other entities. County water quality strategies may include consideration of comprehensive watershed planning and wellhead protection. Wellhead protection planning and implementation conducted by towns and municipalities may address pesticide issues through education and technical assistance efforts.

5.3.B.16. Peconic Estuary Program Comprehensive Conservation and Management Plan (CCMP)

The Peconic Estuary is one of 28 designated "Estuaries of National Significance" under USEPA's National Estuary Program. Formally convened in 1993 at the request of the Governor of New York State, the goal of the Peconic Estuary Program (PEP) and its Management Conference was to seek to advance protection and restoration of the estuary system. The PEP, an innovative partnership of local, federal and New York State agencies, citizens, environmental user groups, businesses, industries and academic institutions, is presently in the process of implementing a watershed based Comprehensive Conservation and Management Plan (CCMP) that was approved by the USEPA Administrator with the concurrence of the Governor. Implementation of the Peconic CCMP requires the aforementioned stakeholders to work together to carry out nutrient, pathogen, and toxic management, habitat and living resource, and critical land protection initiatives.

Figure 5.4 Map of Peconic Estuary (yellow line indicates estuary)

The CCMP includes a variety of toxic management actions to address point and nonpoint discharges to the Peconic Estuary. As described in the CCMP, "the proposed actions call for remediation at specific sites, enforcement of existing and new regulations, pollution prevention programs, research, and monitoring." The CCMP also addresses educational programs to enhance public awareness of toxics issues. Pesticide-related management, monitoring and educational elements could be included as part of the Post-CCMP Management Actions.[50]

[49] The Catalogue is accessible at http://www.nysl.nysed.gov/scandoclinks/ocm36966918.htm.
[50] The CCMP can be viewed through a link at http://www.peconicestuary.org/. For information about the estuary see http://www.dec.ny.gov/lands/31842.html.

5.3.B.17. New York State Seagrass Task Force

Acknowledging the importance of seagrass and the necessity to protect and restore this valuable natural resource, Chapter 404 of the Laws of 2006, enacted on July 26, 2006, established a New York State Seagrass Task Force chaired by NYSDEC. Chapter 285 of the Laws of 2008 extended the life of the Task Force one additional year to January 1, 2010. The final report was released in December 2009.

With regard to pesticides, the task force recommended that the coastal watershed use of pesticides and herbicides proven to be toxic to seagrass and species dependent on seagrass resources, be banned or restricted to ensure the protection of New York State seagrass resources. They also recommend that pesticides and herbicides and the concentrations at which they are toxic or sublethal to seagrass and seagrass habitat be identified.

5.3.B.18. Pesticides and Groundwater Research

New and ongoing research, on subjects such as pesticides, groundwater and soils, can contribute to the prevention of pesticide contamination of groundwater through the application of research results in the manufacture, registration and use of pesticides as well as in groundwater protection measures. Two areas of pesticide research that are especially important to groundwater protection are:

- pesticide efficacy - directed toward determining the minimum effective application rates, and
- pesticide degradation, migration through soils, persistence in different groundwater systems, and favored flow paths (macropores, channels).

Modeling predictions of pesticide movement and persistence can enhance groundwater vulnerability assessments. A key research need is investigation of variability with respect to pesticide residue levels over small changes in time, depth and lateral distance within groundwater. Regarding efficacy, product formulations and application methodologies need to be studied to determine the most efficient techniques to deliver the pesticide to target organisms, thus minimizing off target movement of the pesticide. When necessary, NYSDEC requests efficacy data from registrants, because it is useful to support decisions of the state's product registration program. Research in pesticides and related fields is provided by:

- Pesticide product registrants - a principal source of pesticide research in the nation. Registrants should place special emphasis on efficacy and environmental fate research and share the results of that research with institutions and federal and state agencies. A closer research partnership between registrants and federal and state agencies is necessary.
- New York State College of Agriculture and Life Sciences at Cornell University and its affiliated research stations (e.g., the Long Island Horticultural Research and Education Center).
- The Long Island Groundwater Research Institute[51] - a multi-disciplinary center which combines expertise and resources of the Department of Earth and Space Sciences, the

[51] For more information about the Long Island Groundwater Research Institute, see http://www.somas.stonybrook.edu/institutes/ligri.html.

Department of Applied Mathematics and Statistics, and the Marine Sciences Research Center of the University at Stony Brook, for improving understanding of groundwater hydrology and chemistry. The Institute coordinates and expands the potential for research by faculty, staff and students in groundwater hydrology. The Institute maintains communication with groundwater professionals in the government and private sector on Long Island.

5.4 REGULATORY PREVENTIVE MEASURES

5.4.A. Pesticide Product Registration Decisions

NYSDEC's pesticide product registration process is the principal existing regulatory effort that helps prevent or minimize potential pesticide contamination. The product registration process is more fully described in Chapter 4.

As previously mentioned, as of June 2012, there were 13,688 pesticide products registered for use in New York State, 361 of which are strictly prohibited from any use in Nassau and Suffolk Counties and another 145 of which are conditionally permitted for use on Long Island only when they are used in compliance with specific conditions. These actions help protect water quality on Long Island. Any use of these pesticides in contravention of such unique label directions would constitute an unlawful act, subject to administrative, civil, and criminal sanctions depending on the circumstances involved.

5.4.B. Applicator and Technician Certification, Recertification and Recordkeeping

Pesticide applicator and technician certification, recertification, training, recordkeeping, and annual pesticide use reporting requirements (and relevant exceptions) are described in ECL Article 33 and 6 NYCRR Part 325.[52] Certification is required for the commercial application of pesticides including commercial applicators and technicians using restricted use, general use, and unclassified pesticides, and for private applicators, who apply restricted use pesticides for the purpose of producing an agricultural commodity. The categories and subcategories of certification used in New York State are specified in 6 NYCRR 325.16.[53]

In New York State, individuals may qualify for certification examination through verifiable pesticide application experience, or by successfully completing certification preparatory coursework. Certain requirements must be met for certification including training in various aspects of pesticide use and handling, and successful completion of at least two examinations designed to verify one's competence in the safe, lawful, and effective use of pesticides. Once certified, applicators must be recertified in each pesticide category or subcategory generally every three years, which can be achieved by accumulating the specific number of continuing education credits assigned to each category/subcategory of certification or by successfully passing a recertification exam for each category or subcategory. With regard to education and training designed to meet certification and recertification education requirements, New York State regulations (6 NYCRR 325.18) require that pesticide training courses be approved by the NYSDEC prior to the course being offered. In addition, individuals conducting certification and

[52] For additional information about statutory and regulatory certification requirements, see http://www.dec.ny.gov/chemical/298.html.
[53] 6 NYCRR 325 can be found at http://www.dec.ny.gov/regs/4424.html#14549 and 325.17 (which can be found at http://www.dec.ny.gov/regs/4424.html#14548).

recertification training courses must possess appropriate credentials recognized by the NYSDEC, or have at least three years of verifiable experience as a certified pesticide applicator. Approved recertification training courses are assigned credit hours by NYSDEC toward pesticide applicator certification and recertification.[54]

New and updated training manuals prepared by Cornell University Pesticide Management Education Program in cooperation with NYSDEC staff include a component on water quality protection when using and handling pesticides. Questions on groundwater information are included in updated certification exams. NYSDEC pesticide program staff conducts outreach programs, presentations and other efforts at numerous pesticide applicator training programs throughout the year. Recordkeeping and annual reporting requirements regarding commercial and private application of pesticides are contained in ECL 33-0905.4 and 33-1205.1 and 325.25.[55]

5.4.C. Pesticide Storage, Mixing, Loading and Disposal

NYSDEC regulations and policies which address pesticide storage, mixing/loading, and disposal, are summarized in Table 5.1.

Table 5.1 NYSDEC Regulations and Policies Relating to Pesticide Storage, Mixing, Loading, and Disposal[56]

Subject of Regulation or Policy	Regulation	Policy
Pesticide storage - Covered in general in regulation and the policy provides pesticide storage guidelines for registered businesses, commercial permit holders, wholesalers and distributors, private pesticide applicators and others.	6 NYCRR Part 326 Registration and Classification of Pesticides	*PES 05 03 Pesticide Storage Guidelines*
Pesticide bulk storage and mixing. Storage of larger quantities of pesticides is covered in the regulations. The policy provides guidelines for business commercial permit holders, restricted use wholesalers, and pesticide applicators.	6 NYCRR Parts 595-599 Hazardous Substances/Water	*PES 05 03 Pesticide Storage Guidelines*
Pesticide mixing areas Covered in regulation; the policy on storage also addresses mixing/loading.	6 NYCRR Part 325 Application of Pesticides	*PES 05 03 Pesticide Storage Guidelines*
Anti-siphon devices - The regulation contains a definition of anti-siphoning devices and a requirement that all equipment containing pesticides and drawing water from any water source have an effective anti-siphon device to help contain pesticides, and prevent their backflow into and contamination of the water supply. The policy provides guidelines on such devices.	6 NYCRR Part 325 Application of Pesticides	PES-05-07 Backflow Prevention Devices

[54] The NYSDEC posts a listing of approved training courses in a searchable database at the following website: http://coursecalendar.psur.cornell.edu/

[55] Recordkeeping and annual reporting requirements in ECL 33-0905.4 and 33-1205.1 and 325.25 can be found at http://www.dec.ny.gov/regs/4424.html#14540).

[56] Regulations and policies referenced in Table 10 can be accessed at http://www.dec.ny.gov/regulations/regulations.html.

Disposal of pesticides and pesticide containers. Regulations provide requirements for disposal of such materials.	6 NYCRR Parts 325, 360, 364, 371-373 (Various Solid Wastes and Hazardous Wastes)	

5.4.D. Nassau County Toxic and Hazardous Materials Storage, Handling and Control

Article 11 of the Nassau County public health code, captioned *Toxic and Hazardous Materials Storage, Handling and Control*,[57] also requires county registration of storage tanks, both above and underground, drum storage areas or other storage vessels that contain chemical substances that can contaminate groundwater.

5.4.E. Suffolk County Toxic and Hazardous Materials Storage and Handling Controls

Article 12 of the Suffolk County sanitary code, captioned *Toxic and Hazardous Materials Storage and Handling Controls*,[58] requires toxic and hazardous material storage facilities to be registered with the County Department of Health Services. Registration is a process of informing the county of the existence of storage tanks, both above and underground, drum storage areas or other storage vessels that contain chemical substances that can contaminate groundwater. (Note: Storage of pesticides not intended for resale is not covered under Article 12.)

5.4.F. Suffolk County Pesticide Phase-Out Law

The Suffolk County Code Chapter 647 - Pest Control, passed in 1999, became effective on January 1, 2000. This Suffolk County Pesticide Phase-Out Law was designed to phase out the use of pesticides on County-owned properties and in County buildings by July 1, 2003. The law prohibits any Suffolk County department or agency, or any pesticide applicator employed by a Suffolk County or agency as a contractor or subcontractor for pest control purposes, from applying the following pesticides on Suffolk County property (as owner or tenant):

- any pesticide classified as Toxicity Category I by the United States Environmental Protection Agency,
- any pesticide classified as a known, likely, or possible carcinogen by the United States Environmental Protection Agency, except as provided for in Section 380-3 of the Suffolk County Pesticide Phase-Out Law,
- any pesticide classified as Toxicity Category II by the United States Environmental Protection Agency,
- any pesticide classified as restricted use by the United States Environmental Protection Agency or the New York State Department of Environmental Conservation, except as provided for in Section 380-3 of the Suffolk County Pesticide Phase-Out Law, or
- any pesticide on County property (as owner or tenant), except as provided for in Sections 380-3 of the Suffolk County Pesticide Phase-Out Law.

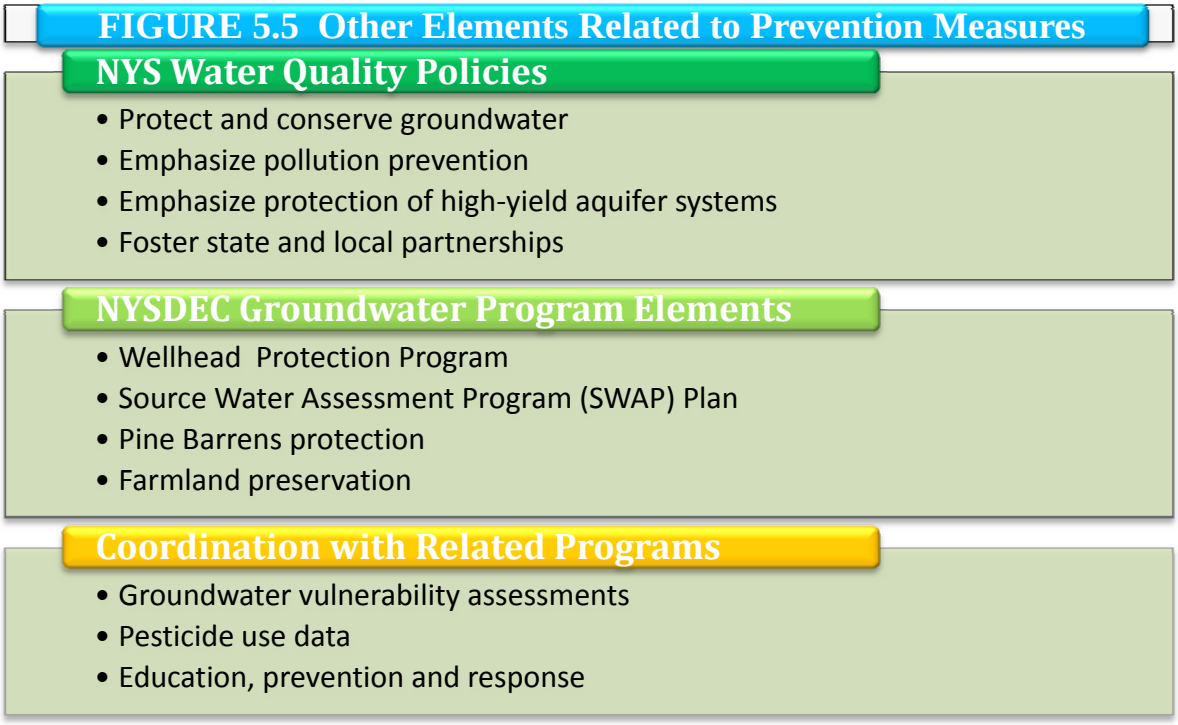
[57] See http://www.nassaucountyny.gov/agencies/Health/Docs/PDF/Ordinance.pdf.
[58] See http://www.suffolkcountyny.gov/health/eq_article12.pdf and http://www.co.suffolk.ny.us/departments/healthservices/environmentalquality/pollutioncontrol/Registration%20of%20Toxic%20and%20Hazardous%20Materials.aspx.

5.4.G. Town of Islip Pesticide Ban

In August of 2010, the Town of Islip banned the use of pesticides on all town property, including its 106 parks, and facilities that the public uses on a daily basis. The town law requires the use of specific groundskeeping products on all of its properties except in those instances in which a golf course is involved or instances in which the town parks, recreation and cultural affairs commissioner declares an emergency. Just as the Suffolk County Pesticide Phase-Out Law relates to county-owned properties only, the Town of Islip ban on pesticide use relates to town-owned properties only.[59]

5.5 RELATIONSHIP OF PREVENTION MEASURES TO EXISTING PROGRAMS AND ACTIVITIES

The preventive measures in the Strategy are intertwined with groundwater and pesticides management approaches and policies of other programs and activities, which are summarized in Figure 5.5.



5.5.A. New York State Groundwater Management Program

This Strategy is consistent with major policies of the State Groundwater Management Program, which recommended key policies and program initiatives endorsing geographic targeting and critical protection areas on Long Island (1986) and Upstate New York (1987). Principal and primary aquifers were defined and mapped, through a cooperative program with the United States Geological Survey. These concepts were forerunners of the Safe Drinking Water Act's

[59] Town of Islip Town Code, Ch. 7, adopted August 17, 2010, http://www.townofislip-ny.gov/e-services/town-code.

Wellhead Protection Program, which is a pollution prevention program designed to protect groundwater sources which are relied upon by public drinking water systems.

The Strategy reflects the NYSDEC Groundwater Management Program's basic water quality policies, which:

- Protect and conserve groundwater for a best usage as drinking water supply.
- Emphasize pollution prevention.
- Emphasize protection of critical high yielding aquifer systems.
- Foster a state and local partnership.

Other elements of New York State's groundwater program will be coordinated through efforts such as:

- Wellhead Protection Program efforts which address pesticide use will focus primarily on management practices, agricultural environmental management, Integrated Pest Management, whole farm planning and related individual farm approaches, education, and related efforts.
- The Final SWAP Plan (discussed earlier in this chapter) and the Long Island Source Water Assessment Report, which summarize the results of the assessments for over 1,000 wells serving public water supplies on Long Island.
- Clean Water State Revolving Fund has supported the acquisition of pine barrens to protect groundwater recharge areas (Pine Barrens Wilderness and Water Protection Preserve).

5.5.A.1. Groundwater Vulnerability Assessments

Groundwater vulnerability assessments include both regional-scale and landscape-scale approaches. The application of these vulnerability assessments to different elements of the Strategy (prevention, response, monitoring) will depend on the nature of the activity. In general, regional-scale assessments could potentially be applied to Long Island-wide management concerns, and the landscape-scale assessments could be applied to site-specific (individual farm or pesticide user) management concerns.

The greatest potential uses of the vulnerability assessments would be in programs and activities related to nonpoint source management (management practices, whole farm planning, local water quality strategies, etc.), integrated pest management, and other comparable elements. Regional vulnerability assessments could have potential applications in setting priorities for several management elements described in this chapter (e.g., education, management practice promotion and assessment, Integrated Pest Management [IPM], and county water quality strategies). The most direct application of vulnerability assessments will be at the site-specific, pesticide user level. Landscape-scale assessment should be employed in the preparation of whole farm plans, farmstead assessments, integrated crop management planning and in IPM planning at the farm level. They may also be employed in the development of county water quality strategies or local wellhead protection plans. Vulnerability assessments could also potentially be used to interpret results of monitoring (evaluating validity of the vulnerability map) and to consider potential responses or the need for investigation of comparable areas.

The SWAP, discussed earlier in this chapter, designates the recharge areas associated with public water supply wells. The program includes a review of factors such as travel time and land use to estimate relative susceptibility of each public well system to pesticide contamination. The understanding gained under the SWAP will allow managers to better target areas of specific pesticide use (residential, agricultural, recreational, commercial, industrial, institutional, rights-of-way) for educational and voluntary management approaches. Also, the groundwater models developed under the program can be useful for tracking the source of contamination. Information developed under the SWAP could be used to geographically target specific areas for particular protection activities.

If feasible and if appropriate, groundwater vulnerability assessments could be utilized in training and education programs associated with the pesticides regulatory program (e.g., applicator training), in workshops (e.g., train-the-trainer sessions, etc.), and as part of other information dissemination processes. The principal uses would be to convey methods for assessing groundwater vulnerability within individual farms or specific areas, and to describe the important factors affecting pesticide leaching and groundwater impacts.

5.5.A.2. Pesticide Use Data

Pursuant to ECL 33-1205 and 6 NYCRR 325.25, commercial pesticide applicators and technicians, and private pesticide applicators are required to maintain specific records of pesticide use. In addition, commercial applicators must file certain use records with the Department. Data management systems for commercial applicator pesticide records derived from Pesticide Reporting Law requirements (ECL Article 33, Title 12 – Pesticide Sales and Use Data Base and Recordkeeping and Reporting) are currently maintained by NYSDEC.[60]

Pesticide use information can be utilized in a comparable manner to vulnerability assessments. Pesticide use assessments may also include those based on surveys of selected pesticide users and statistical interpretation of results, and information about land use associated with certain pesticides. Land use information may be derived from agricultural census and statistical data, aerial photography interpretation, or other sources. Site specific pesticide management elements at the farm or pesticide-user level may rely on those use records already required to be maintained, supplemented by other information retained by the user or landowner.

Cornell's Pesticide Management Education Program (PMEP) has developed a series of detailed pesticide use assessments for New York, with support from the USDA National Agricultural Pesticide Impact Assessment Program (NAPIAP). This program is designed to develop information and analyze pesticide use and impacts of pesticide regulations on agricultural products, product prices, and environmental issues. In recent years, the program focus has changed from a conventional pesticide orientation to an increased emphasis on non-chemical alternatives and integrated pest management methodologies. Examples of pesticide use assessments for New York State include dairy, field and forage production systems, cabbage, and vegetables.

[60] Information about the Pesticide Reporting Law and the data submitted in connection with that law is available at the following website: http://www.dec.ny.gov/chemical/27506.html.

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Chapter 6. LEGAL AUTHORITY AND ENFORCEMENT

6.1 INTRODUCTION

This Chapter briefly summarizes:

- NYSDEC statutory and regulatory authority, the registration of pesticides, and the overall authority of other state agencies; and
- NYSDEC enforcement of New York State's pesticide-related laws, rules and regulations.

6.2 STATUTORY AND REGULATORY AUTHORITY

Overall authority is provided to the NYSDEC under Article 3 of the Environmental Conservation Law (ECL) (General Functions, Powers, Duties, and Jurisdiction), for general functions, several of which are related to the Strategy, including:

- water resource protection,
- prevention of pollution through the regulation of storage, handling, transport and disposal of substances which may cause or contribute to pollution,
- regulation of the use, storage and disposal of pesticides,
- inspections and investigations,
- undertaking studies or analyses with the cooperation of public and private agencies,
- adoption of rules, regulations, policies and procedures, and
- coordination with other federal and state agencies.

Specific authority for the regulation of pesticides is found at Article 33 of the ECL.

The primary rules and regulations relating to pesticides include Parts 320-329 of Title 6 of the New York Codes, Rules and Regulations (6 NYCRR).[61] Those regulations cover such subjects as application of pesticides; classification of pesticides (restricted use v. general use); registration of pesticides; certification of occupational pesticide users; collection of pesticide sales and use data; and aquatic insect, vegetation, and undesirable-fish control.

6.3 REGISTRATION OF PESTICIDES

This Strategy focuses on pollution prevention approaches to reducing the use of pesticides and protecting water quality on Long Island. The registration of pesticides is a regulatory action, but it is also recognized as a key pollution prevention measure, particularly at the point of initial registration. The NYSDEC's general authority to register pesticides is found at ECL Article 33, Title 7 and 6 NYCRR Part 326.

ECL §33-0303(3)(d) allows the Commissioner, after a hearing, to promulgate a list of restricted use pesticides and permitted uses subject to appropriate conditions to fully protect the public interest. ECL §33-0303(3)(e) allows the Commissioner, after a hearing, to adopt regulations related to the time, place, manner and method of application of pesticides, which encompass all reasonable factors necessary to prevent damage or injury to health, property and wildlife.

[61] Text of 6 NYCRR Parts 320-329 pesticides regulations can be accessed at http://www.dec.ny.gov/regs/2491.html.

Related regulatory authority is found at 6 NYCRR 326.23(e), stating the NYSDEC has the authority to place any conditions on the registration of any product that are deemed necessary to prevent damage or injury to health, property or wildlife. Conditions may include, but are not limited to: (1) the submission of additional data; (2) classification of restricted use; (3) recordkeeping or reporting requirements; and (4) any other use conditions deemed necessary. Examples of restricted use pesticides and types of conditions placed on pesticides can be found at 6 NYCRR 326.2. Compliance with the conditions of the registration is required for the continued registration of the pesticide 6 NYCRR 326.23(f).

The denial of a registration is governed by ECL §33-0711. If a pesticide does not warrant the proposed claims or if the label does not comply with the provisions in ECL Article 33, the registrant shall be notified of such deficiency. If the necessary corrections are not made by the registrant and the application is refused, the registrant may file a petition requesting that the matter be referred to an advisory committee or file objections and request a public hearing in accordance with ECL §33-0717. For the denial of an initial application to register a pesticide, the applicant has the burden of proof, which is a preponderance of evidence, to demonstrate that its proposal will be in compliance with applicable laws and regulations.

Pesticides have a two year registration cycle. The renewal of a pesticide registration is governed by 6 NYCRR 326.24. In accordance with SAPA §401(2), if a complete application for pesticide product registration renewal is on file with the Department on or before the expiration date, the pesticide product registration will continue until a registration renewal decision is issued and takes effect. In addition to the general requirements for renewal, the NYSDEC has the authority at 6 NYCRR 326.14(h) to request information at any time which is deemed necessary to support the continued registration of any pesticide product. Examples of such information include but are not limited to: product effectiveness data, indoor air residues, and surface residues. Making changes to a registered product at the time of renewal was also contemplated by the *Final Programmatic Environmental Impact Statement* (FPEIS) *on Pesticide Registration and Classification Program of the New York State Department of Environmental Conservation* which was released on December 8, 1982. The FPEIS states the Commissioner has the same authority and scope of review upon renewal as it does upon initial registration, which clearly allows the NYSDEC to modify a registration as needed. For denial of an application to renew a pesticide registration, the permittee still has the burden of proof to demonstrate that the permitted activity is in compliance with all applicable laws and regulations. However, a demonstration by the permittee, that there is no change in permitted activity, environmental conditions or applicable law and regulations constitutes a prima facie case for the permittee (6 NYCRR 624.9(b)(3)). The NYSDEC has existing authority to take action on a currently registered pesticide at any point during the registration cycle through cancellation, suspension and emergency rulemaking. ECL §33-0713 governs the cancellation of a registration. The Commissioner may cancel the registration of a pesticide whenever it does not appear that the article or its labeling or other material required to be submitted complies with Article 33. Notice must be provided to the registrant and the cancellation will become effective 30 days after service of the notice unless the registrant: makes the necessary corrections; files a petition for the matter to go before an advisory committee; or files objections and requests a public hearing. A cancellation may be initiated at any time during the registration cycle.

Active ingredients may be present in a dozen to several hundred products with different renewal dates. If there is concern with an active ingredient, attempts to address those concerns during the time of renewal for each product would allow some products to remain in commerce while other products were being phased out. To address the matter most efficiently with all affected parties, the NYSDEC would contact all affected registrants to discuss the NYSDEC's concerns with the active ingredient and attempt to remedy the problem either through conditions placed on the products or by a voluntary change in label language.

ECL §33-0719 governs the suspension of a pesticide registration. The Commissioner may, by Order, suspend the registration of a pesticide immediately when he finds that such action is necessary to prevent an imminent hazard to the public or any other non-target organism. The registrant will receive prompt notice and have the opportunity to have the matter go before an advisory committee or to an expedited hearing.

ECL §33-1301.1a provides the Department with the ability to stop the sale or use of a pesticide if the characteristics associated with it differ from the conditions under which it was registered. This provision may be enforced at the point of sale or use of the pesticide. The use of this provision will not immediately impact the State registration status of the pesticide, but would make its sale or use illegal.

SAPA §202(6) gives NYSDEC the authority to immediately adopt a rule, without going through all the necessary steps for a standard rulemaking, when the rule is necessary to preserve public health, safety or general welfare and if a standard notice of rulemaking would be contrary to public interest. The rule is only valid for 90 days and each re-adoption will be in effect for 60 days. The emergency rule allows immediate action while giving the NYSDEC time to do a full rulemaking.

Before the NYSDEC makes a decision to cancel or suspend a registration, or undergoes an emergency rulemaking, proper sampling, studies, and documentation should already be in place to support that decision. Any cancellation or suspension of a product will be in effect for all of New York State, not just Suffolk and Nassau counties. If a specific active ingredient is targeted, each product that contains that active ingredient will need to be addressed. As mentioned previously, it would be most efficient and fair to address them together. However, a denial, cancellation or suspension affords each registrant a right to request a hearing or request the matter be referred to an advisory committee.

Table 6.1 summarizes the New York State and federal authorities related to registration of pesticides.

Table 6.1
NYSDEC AND USEPA PESTICIDE REGISTRATION AUTHORITIES

NYSDEC Authority	USEPA Authority
6 NYCRR 326.14(h) The Department may request, at any time, information deemed necessary to support the continued registration of any pesticide product. ▪ The Department can request information from one product or several products if an active ingredient is the concern. ▪ This request can be made at any time during the 2 year registration cycle or at the time of renewal. ▪ The Department can use the findings from an evaluation of such information to initiate a cancellation proceeding.	FIFRA §3(c)(2)(B) & 40 CFR 155.48 If the Administrator determined that additional data are required to maintain in effect an existing registration of a pesticide, the Administrator shall notify the existing registrants of the pesticide to which the determination relates and provide a list of such registrants to any interested party.
6 NYCRR 326.23(c) When a pesticide registration application is complete, the Department will review submitted data to evaluate the potential for adverse impacts to human health and the environment when the product is used according to label directions. The commissioner will weigh the potential for human health and ecological risks against the potential benefits that could accrue from the use of the product when making a decision whether or not to approve a registration.	FIFRA §3 40 CFR 152.112 EPA will register pesticides and make it unlawful to distribute, sell, or use unregistered pesticides in order to prevent unreasonable adverse effects on the environment. EPA must determine, among other items, whether the product will perform its intended function without unreasonable adverse effects on the environment and when used in accordance with common practice, will not generally cause unreasonable adverse effects on the environment.
6 NYCRR 326.23(e) The Commissioner may place any conditions on the registration of any product that are deemed necessary to prevent damage or injury to health, property and wildlife. ▪ Submission of additional data ▪ Classifying the pesticide as Restricted Use ▪ Recordkeeping and reporting requirements ▪ Other conditions deemed necessary ▪ If a condition is related to pesticide use, it will require a change to the pesticide label. Since the Department is preempted by	40 CFR 152.115(c) The Agency may establish, on a case-by-case basis, other conditions applicable to registrations issued under FIFRA §3(c)(7)-New Active Ingredient

Table 6.1
NYSDEC AND USEPA PESTICIDE REGISTRATION AUTHORITIES

NYSDEC Authority	USEPA Authority
FIFRA §24(b) from requiring any changes to an EPA approved label, either the registrant must voluntarily agree to change their label or the registration must be denied or cancelled.	
ECL 33-0301. *Declaration of Policy and Purpose* The purpose of Article 33 is to create a balance between the use of pesticides, which are valuable, important and necessary to welfare, health and economic well-being of the people of the State and ensuring properly used pesticides will prevent injury to health, property and wildlife.	
ECL 33-0303(3). *Powers and Duties* The Commissioner, after a hearing, is authorized to promulgate a list of pesticides highly toxic to man; promulgate a list of restricted use pesticides and permitted usages; and promulgate regulations that detail the methods to be used in the application of pesticides. ▪ The Commissioner can ban highly toxic pesticides via rulemaking. ▪ Pesticides can be classified as restricted use via rulemaking. ▪ Methods of pesticide application can be promulgated via regulation.	FIFRA§3(d) As part of the registration process, EPA can classify a pesticide as general use or restricted use.

Table 6.1
NYSDEC AND USEPA PESTICIDE REGISTRATION AUTHORITIES

NYSDEC Authority	USEPA Authority
ECL 33-0711. *Denial* The Commissioner may deny a registration if the pesticide does not warrant the proposed claims for it or if the pesticide and its labeling and other material required to be submitted do not comply with provisions of Article 33. ▪ This process can be used at the time of initial registration or upon renewal of a pesticide product. ▪ Denial can be based upon any of the following: • False claims are being made; • There are issues with the label such as misbranding or the label submitted to the Department does not match the label filed with EPA; or • The pesticide or the submitted material does not comply with Article 33, which is intended to create a balance between the use of pesticides and the prevention of injury to health, property and wildlife.	FIFRA §3(c)(6) 40 CFR 152.118 Factors for Denial: ▪ Composition does not warrant the proposed claims. ▪ Label or other material submitted doesn't comply with FIFRA. ▪ Unreasonable adverse impacts on the environment when performing intended function or when used in accordance with widespread and commonly recognized practice.
ECL 33-0713. *Cancellation* The Commissioner may cancel a product registration whenever it does not appear that the article or its labeling or other materials required to be submitted complies with Article 33. ▪ This process can be used at any time during the 2 year registration cycle of a pesticide product. ▪ Action is taken on a pesticide product, not an active ingredient. ▪ A proceeding can be initiated if: • False claims are being made; or • There are issues with the label such as misbranding or the label submitted to the Department does not match the label filed with EPA; or • The pesticide or the submitted material does not comply with Article 33.	FIFRA §6(b) Factors for Cancellation: ▪ Pesticide, labeling or other material required to be submitted does not comply with the provisions of FIFRA. ▪ When the pesticide is used in accordance with widespread and commonly recognized practice, it generally causes unreasonable adverse impacts on the environment

Table 6.1
NYSDEC AND USEPA PESTICIDE REGISTRATION AUTHORITIES

NYSDEC Authority	USEPA Authority
ECL 33-0714. *Water Quality Monitoring* The Department, in coordination with other parties, shall conduct a water quality monitoring program on Long Island to understand health and environmental impacts of pesticide use in the State. The data is used in making registration decisions, reviewing suspensions and cancellations and assessing the status, trends, and health impacts of any pesticide contamination of ground and surface waters on LI and throughout the State.	
ECL 33-0719. *Suspension* The Commissioner may, by Order, suspend the registration of a pesticide immediately when he finds that such is necessary to prevent an imminent hazard to the public or any other non-target organism. ▪ This process can be used at any time during the 2 year registration cycle of a pesticide product. ▪ An imminent hazard to the public must be present- DOH would need to make such determination. ▪ An imminent hazard to a non-target organism must be present.	FIFRA §6(c) Factor for Suspension: Action is necessary to prevent an imminent hazard during the time required for cancellation or change in classification proceedings.
SAPA 202(6) *Emergency Rulemaking* The Department must determine that immediate adoption of a rule is necessary for the preservation of the public health, safety or general welfare and that compliance with normal rulemaking procedures would be contrary to the public interest. The Department has used this rulemaking power to cancel pesticide product registrations.	

6.4 SUMMARY OF PRIMARY ENFORCEMENT MECHANISMS

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)[62] authorizes several roles for the states (under conditions set by that law), such as primary enforcement responsibility for pesticide use violations, regulation of the distribution and use of federally registered pesticides, and state registration for additional uses of federally registered pesticides to meet special local needs. Several other federal environmental protection acts contain provisions relevant to elements of the Long Island Strategy (e.g., Clean Water Act, Safe Drinking Water Act). NYSDEC is the New York State agency assigned primary responsibility for enforcing certain elements of FIFRA and many other related Federal environmental laws. The NYS Department of Health (NYSDOH) is assigned primary responsibility for enforcing certain elements of the Safe Drinking Water Act.

Enforcement of New York State's pesticide-related laws, rules and regulations, as well as water quality standards, is an important component of managing pesticide use on Long Island and protecting surface waters and groundwater from potential pesticides contamination. NYSDEC enforcement actions related to pesticides and the Strategy would be conducted within the Department's existing pesticide enforcement framework, resources, and capabilities. A summary of NYSDEC's primary pesticides enforcement mechanisms is presented below.[63]

Article 71 ("Enforcement") of the ECL provides NYSDEC with the authority to enforce many aspects of pesticides management, such as pesticide distribution and use, and water quality-related matters. Enforcement of 6 NYCRR Parts 320-329 occurs under the framework of Article 71 of the ECL and other NYSDEC documents, which establish related policies and procedures.[64] Enforcement of pesticide product use restrictions or prohibitions is essential to water quality protection. New York State registration of pesticides is conducted under the authority of Title 7 of Article 33 of the ECL and 6 NYCRR Part 326. NYSDEC's pesticide product registration process is critical to management of pesticide use and is a major proactive step in water quality protection on Long Island. It is only through this process that the state can ultimately restrict or prohibit use of pesticide products that might degrade surface water and groundwater quality on Long Island or other areas of New York State. Necessary revisions of pesticide product labels are made through the USEPA label amendment process.

As mentioned in Chapter 4, as of June 2012, there were 13,688 pesticide products registered for use in New York State. Enforceable restrictions and prohibitions are established in connection with the NYSDEC pesticide product registration process. About 1,700 products have New York State-specific language and/or use restrictions placed on them. Of the approximately 1,700 restricted pesticides, 361 are strictly prohibited from use in Nassau and Suffolk counties.

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[62] FIFRA can be accessed at http://www.epa.gov/pesticides/regulating/laws.htm.

[63] Although each of the major NYS programs involved in elements of the LI Strategy include enforcement mechanisms, an exhaustive description of enforcement regarding pesticides management, public water supplies, and prevention of water pollution is beyond the scope of this report.

[64] [4]The NYSDEC Pesticide Enforcement Guidance Memorandum can be viewed at the following website: http://www.dec.ny.gov/regulations/25241.html. Information about the NYSDEC Civil Penalty Policy and other enforcement-related documents can be viewed at the following website: http://www.dec.ny.gov/regulations/2379.html. Other State entities would need to be contacted directly for information regarding associated enforcement mechanisms if that information is not available on their websites.

Another 145 are registered for use on Long Island only when used in accordance with specific label conditions. These pesticide product registration decisions are designed to protect the quality of surface water and groundwater on Long Island. Since the NYSDEC does not have the ability to require a change to an EPA-approved label, adding any restrictive or prohibiting language is only accomplished through a process involving negotiations with the pesticide product registrants to assure that the NYSDEC's concerns are addressed on the label.

Table 6.2: Summary of NYSDEC Statutory Authority Pertinent to Elements of the LI Strategy under the Environmental Conservation Law of New York State[65]

Article 15 Water Resources	**Article 17 Water Pollution Control**	**Article 27 Collection, Treatment and Disposal of Refuse and Other Solid Waste**	**Article 33 Pesticides**	**Article 37 Substances Hazardous to the Environment** **Article 40 Hazardous Substances Bulk Storage Act**	**Article 71 Enforcement**
Authority to conserve waters for public beneficial uses, establish reasonable standards of purity and quality for such waters and require use of all known available and reasonable methods to prevent and control pollution, and undertake comprehensive planning for the protection of water resources. Authorizes DEC Commissioner to require, by a rule, a permit for the application or introduction of a pesticide directly to surface waters of the State.	Authority to prevent and control pollution of waters (including groundwater) of the state, including point source and nonpoint sources.	Authority to regulate storage, transport, treatment and disposal of solid and hazardous wastes, including disposal of pesticides and pesticide containers.	Authority to regulate distribution, sale, use, and transportation of pesticides. Jurisdiction in these matters vested exclusively in the DEC Commissioner. Authority to promulgate rules pertaining to pesticides, including reporting regulated pesticide activities and conducting pesticide monitoring on Long Island.	Authority to promulgate a list of substances hazardous to the environment and to regulate the storage and discharge of such substances. Authority regarding such bulk storage.	Authority for enforcement relevant to ECL Articles 33, 15, 27, 37, and 40. Allows for DEC actions, such as investigations, and civil and criminal sanctions.

[65] Table 6.2 provides a brief statement of the statutory authority in certain Articles of the ECL pertinent to elements of the LI Strategy. Specific language of Articles 15, 33 and 71 pertinent to the pesticides program, can be viewed at the following website: http://www.dec.ny.gov/regulations/40195.html. http://public.leginfo.state.ny.us/menuf.cgi.

6.5 OTHER STATUTORY AUTHORITIES OF THE DEPARTMENT AND OTHER AGENCIES

Several other articles of the ECL provide more specific authority for certain activities addressed in the Strategy. A very brief summary of those authorities is included in Table 6.2. A number of New York State laws relate to the roles of other state agencies and institutions reflected in the Long Island Strategy. Their statutory authority is summarized in Table 6.3.

Table 6.3: Summary of Statutory Authority of Other Involved New York State Agencies Pertinent to Elements of the LI Strategy[66]

NYS Public Health Law Articles 11 and 2	***NYS Agriculture and Markets Law Articles 2 and 11***	***NYS Soil and Water Conservation Districts Law***
Article 11 provides authority to the NYS Department of Health (DOH) to make rules and regulations for protection from contamination of any or all public water supplies. Article 2 provides for the functions, powers and duties of the DOH, including regulation of the sanitary aspects of water supplies (drinking water quality standards).	Article 2 provides for general powers and duties of the Department of Agriculture and Markets including aid in the promotion and development of the state's agricultural resources, collection and dissemination of agricultural data and statistics, provision for operation of the NYS Soil and Water Conservation Committee, and establishment and implementation of a program for integrated pest management (IPM). Article 11 provides more specific authority for establishment of an IPM program.	The Soil and Water Conservation District (SWCD) Law establishes the NYS Soil and Water Conservation Committee and provides authority to approve and coordinate the programs of NYS's Soil and Water Conservation Districts.

[66] Table 8 provides a brief statement of the statutory authority expressed in NYS statutes pertinent to elements of the LI Strategy. Language of the statutes referenced in the Table 7 can be accessed at the following website: http://public.leginfo.state.ny.us/menuf.cgi.

APPENDIX A

PESTICIDE-RELATED CHEMICALS DETECTED IN LONG ISLAND GROUNDWATER 1996-2010

Results of Water Quality Monitoring by United States Geological Survey (USGS), Suffolk County Department of Health Services (SCDHS), and Suffolk County Water Authority (SCWA)

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APPENDIX A PESTICIDE-RELATED CHEMICALS DETECTED IN LONG ISLAND GROUNDWATER 1996-2010 BY USGS, SCDHS, AND SCWA

The two tables in this Appendix identify 117 pesticide-related chemicals detected in Long Island's sole source drinking water aquifer system by the Suffolk County Department of Health Services (SCDHS), Suffolk County Water Authority (SCWA), and United States Geological Survey (USGS) between the years 1996 and 2010.

- The first table identifies 61 pesticide-related chemicals associated with 47 active ingredients currently registered for distribution and use in Nassau and Suffolk counties, New York, while the second table identifies 56 chemicals associated with 35 active ingredients that are not currently registered for such Long Island distribution and use.
- The left column presents a sequential numbering of chemicals. A total of 117 chemicals are represented by 61 identified in the first table combined with 56 identified in the second table. Green shading is used in cells in the left column to identify 11 chemicals that have been detected only by the USGS.
- The center column identifies 82 parent active ingredients, 47 of which are currently registered for distribution and use in Nassau and Suffolk counties, New York, and 35 of which are not.
- The right column identifies 35 pesticide-related chemicals in the form of degradates (breakdown products), a carrier, and an impurity, 14 of which are associated with active ingredients currently registered for distribution and use in Nassau and Suffolk counties, New York, and 21 of which are associated with active ingredients which are not.
- Please note that common chemical trade names shown and are included for informational purposes only.
- Long Island water quality monitoring is addressed in Chapter 3.
- Detailed water quality monitoring data, from monitoring conducted by Suffolk County and the U.S. Geological Survey, are available at ftp://ftp.dec.ny.gov/dshm/pesticid/liwaterqualitydata.docx. Datasets in that document indicate minimum, maximum and median concentration levels of pesticides and degradates detected from about 1997 to 2011.

Identification of 61 Pesticide-Related Chemicals Detected in Long Island Groundwater Between 1996 and 2010 and Associated with 47 Parent Active Ingredients Currently Registered for Distribution and Use in Nassau and Suffolk Counties, New York		
	Parent Active Ingredient	**Degradate, Carrier, Impurity**
1	**Arsenic** Inorganic arsenicals such as chromate copper arsenate (CCA), ammoniacal copper arsenate (ACA), and ammoniacal copper zinc arsenate (ACZA) are used as wood preservatives, herbicides, soil sterilants, insecticides, fungicides, and rodenticides. Organic arsenicals such as monosodium methanearsonate (MSMA), disodium methanearsonate (DSMA), calcium acid methanearsonate (CAMA), and cacodylic acid and its sodium salt are used as herbicides, insecticides, defoliants, and soil sterilants on agricultural crops, in forestry, on residential and other lawns and turf, and in non-crop areas such as rights of way, drainage ditch banks, fence rows, and storage yards.	
2	**Atrazine (*AAtrex*, *Atrazine*)** (CAS Reg. No. 1912-24-9) Triazine herbicide used to control broadleaf and grassy weeds in agricultural crops, including corn, sorghum, and turf grass sod. Used for selective weed control in Christmas tree farms as well as for nonselective control of vegetation in noncrop land.	
3	↘ Atrazine Degradates ⟶	**Deethylatrazine a.k.a. 2-Chloro-4-isopropylamino-6-amino-S-triazine (CIAT)** (CAS Reg. No. 6190-65-4)
4	Deisopropylatrazine may also be a degradate of Simazine listed below.	**Deisopropylatrazine a.k.a. 2-chloro-6-ethylamino-4-amino-s-triazine (CEAT)** (CAS Reg. No. 1007-28-9)
5		**Didealkylatrazine** (No CAS Reg. No.)
6		**Hydroxyatrazine a.k.a. 2-Hydroxy-4-isopropylamino-6-ethylamino-s-triazine (OIET)** (CAS Reg. No. 2163-68-0)
7	**Azoxystrobin (*Heritage*, *Quadris*)** (CAS Reg. No. 131860-33-8) Preventive and curative systemic fungicide used for several diseases on many agricultural crops and ornamental plants.	
8	**Bentazon (*Basagran*)** (CAS Reg. No. 25057-89-0) Herbicide for postemergent control of selected broadleaf weeds and sedges in agricultural crops, including beans, clover grown for seed, corn, peas, peppermint, and spearmint.	

	Parent Active Ingredient	Degradate, Carrier, Impurity
9		**Bis(2-ethylhexyl) phthalate (DEHP)** (CAS Reg. No. 117-81-7) DEHP is used as a pesticide carrier. It is also widely used as a plasticizer for polyvinyl chloride (PVC) and other polymers including rubber, cellulose, and styrene.
10	**Bromacil (*Hyvar, X, XL*)** (CAS Reg. No. 314-40-9) Herbicide for general weed or brush control in noncrop areas; particularly useful against perennial grasses.	
11	**Bromoxynil (phenol) (*Brominal, Buctril*)** (CAS Reg. No. 1689-84-5) Nitrile herbicide used for postemergent control of annual broadleaved weeds. Especially effective in the control of weeds in cereal, corn, onions, mint, turf, on non-cropland, and non-residential turf.	
12	**Carbaryl (*Sevin*)** (CAS Reg. No. 63-25-2) Carbamate insecticide used on citrus, pome, stone and berry fruits, forage, field and vegetable crops, nuts, lawns, ornamental plants, shade trees, poultry and pets, indoor use.	
13	**Chlorothalonil (*Bravo*)** (CAS Reg. No. 1897-45-6) Broad spectrum organochlorine (chlorinated isophthalic acid derivative) fungicide used to control a wide variety of fungal diseases on agricultural crops and noncrop plants.	
14	**Chloroxylenol** (CAS Reg. No. 88-04-0) Antimicrobial agent used to control bacteria, algae and fungi in adhesives, emulsions, paints and wash tanks, and to sanitize bathroom premises, diaper pails, laundry equipment, human bedding and pet living quarters in households, hospitals and other institutions.	
15	**2,4-D (2,4-Dichlorophenoxyacetic acid)** (CAS Reg. No. 94-75-7) Chlorinated phenoxy herbicide and plant growth regulator (includes parent acid as well as salt, amine and ester derivatives) used for postemergent weed control in agricultural crops, primarily corn, and in noncrop settings including turf.	
16	**Diazinon (*Spectracide, AG500*)** (CAS Reg. No. 333-41-5) Organophosphate insecticide used on many agricultural crops, including field, fruit, and vegetable (including seed treatment), and nonfood crops (ornamentals); forestry (including Christmas tree farms); greenhouse food crops (vegetable bedding plants and ornamentals); animal premises; lawns and turf; domestic outdoor and indoor, (household); commercial indoor (including food handling establishments and processing plants)	

	Parent Active Ingredient	Degradate, Carrier, Impurity
17	**Dicamba (*Banvel*)** (CAS Reg. No. 1918-00-9) Benzoic acid herbicide used on agricultural crops, including corn, asparagus, and agricultural seed crops. Noncrop sites, forest lands, lawns and ornamental turf.	
18	**Dichlobenil (*Casoron*)** (CAS Reg. No. 1194-65-6) Selective benzonitrile herbicide used to control weeds in ornamentals, nurseries, fruit orchards, vineyards, forest plantations, public green areas, and for total weed control (industrial sites, railway lines, etc. under asphalt).	
19	↘ Dichlobenil Degradate ⟶	**2,6-Dichlorobenzamide** (CAS Reg. No. 2008-58-4)
20	**Dichlorvos (*DDVP, Dichlorvos, Vapona*)** (CAS Reg. No. 62-73-3) Organophosphate insecticide. A contact and stomach poison that also acts as a fumigant for control of household and public health pests, stored product insects, mosquitoes, mushroom flies, aphids, spider mites, caterpillars, thrips, white flies in greenhouse crops, and outdoor fruit and vegetables.	
21	**Diethyltoluamide (*DEET*)** (CAS Reg. No. 134-62-3) Multipurpose insect repellent registered for direct application to human skin, clothing, household pets, tents and bedrolls and screens.	
22	**Dimethazone a.k.a. Clomazone (*Strategy, Command*)** (CAS Reg. No. 81777-89-1) Herbicide used to control weeds on agricultural crops, including beans, cabbage, cucumbers, melons, mint, peas, peppers, soybeans, squash, and sweet potatoes.	
23	**Diuron (*Karmex*)** (CAS Reg. No. 330-54-1) Urea herbicide used to control a wide variety of annual and perennial broadleaf and grassy weeds on numerous agricultural crops including vegetables and ornamental crops, and in noncrop sites including industrial sites, rights-of-way, and around farm buildings.	
24	↘ Diuron and Propanil Degradate ⟶	**3,4-Dichloroaniline (DCA)** (No CAS Reg. No.)
25	**Endosulfan** (CAS Reg. No. 115-29-7) Chlorinated hydrocarbon (organochlorine) insecticide and acaricide of the cyclodiene subgroup which acts as a contact poison in a wide variety of insects and mites on agricultural crops. Also used as a wood preservative.	

	Parent Active Ingredient	Degradate, Carrier, Impurity
26	Endosulfan (*Thiodan*) Degradate ⟶	**Endosulfan Sulfate** (CAS Reg. No. 1031-07-8) ENDOSULFAN NOTE: Technical-grade endosulfan contains at least 94% of two pure isomers, α- and β-endosulfan. The α- ("I") and β-isomers ("II") of endosulfan are present in the ratio of 7:3, respectively. Endosulfan sulfate is a reaction product found in technical endosulfan; it is also found in the environment due to photolysis and in organisms as a result of oxidation by biotransformation.
27	**Ethofumesate (*Poaconstrictor, Prograss, Thrasher*)** (CAS Reg. No. 26225-79-6) Herbicide used on ornamental turf such as golf courses, sod farms, parks, cemeteries and residential or commercial lawns, and after overseeding specific grasses for the control and/or suppression of annual grasses and broadleaf weeds. Has both preemergent and early (two-leaf stage) postemergent activity.	
28	**Fenarimol (*Rubigan*)** (CAS Reg. No. 60168-88-9) Pyrimidine fungicide used on turf grasses, ornamentals, and fruit crops.	
29	**Fipronil** (CAS Reg. No. 120068-37-3) Broad-spectrum phenylpyrazole insecticide used in agricultural and non-agricultural settings.	
30	↘ Fipronil Degradate ⟶	**Fipronil sulfide** (CAS Reg. No. 120067-83-6)
31	**Fluoride** (CAS Reg. No. 7681-49-4) Potential sources include insecticidal fluorine compounds such as sodium fluoaluminate or sodium aluminofluoride (*Kryocide*) used on food crops and ornamentals, including potatoes to control Colorado potato beetle under a FIFRA Sec. 18 exemption. Also sodium fluoride used as a wood preservative. Also present in toothpaste, mouthwash and water.	
32	**Hexazinone** (CAS Reg. No. 51235-04-2) Triazine herbicide used in agricultural and non-agricultural areas to control a broad spectrum of weeds on ornamental plants, forest trees and other non-crop areas. Used for pre-emergent, postemergence, layby, directed spray and basal soil applications.	

	Parent Active Ingredient	Degradate, Carrier, Impurity
33	**Imidacloprid (*Admire, Merit, Provado*)** (CAS Reg. No. 138261-41-3) Systemic neonicotinoid insecticide with soil, foliar and seed uses to control sucking insects, some chewing insects including aphids, thrips, whiteflies, termites, turf insects, soil insects, some beetles, and as a topical treatment to control fleas on pets. May be applied to structures, crops, soil, and as a seed treatment. Most commonly used on maize, potatoes, vegetables, sugar beets, fruit, and turf, and is especially systemic when used as a seed or soil treatment. Used to control Asian longhorned beetle (*Anoplophora glabripennis*).	
34	↘ Imidacloprid Degradate ⟶	**Imidacloprid Urea** (CAS Reg. No. not assigned)
35	**Iprodione (*Chipco 26019*)** (CAS Reg. No. 36734-19-7) Dicarboximide contact fungicide used to control a wide variety of crop diseases on vegetables, ornamentals, pome and stone fruit, root crops, and sunflowers. Used as a post-harvest fungicide and seed treatment.	
36	↘ Iprodione Degradate ⟶	**3,5-Dichloroaniline** (CAS Reg. No. 626-43-7)
37	**Malathion** (CAS Reg. No. 121-75-5) Non-systemic, wide spectrum insecticide used to control sucking and chewing insects on fruits and vegetables. Used to control mosquitoes, flies, household insects, animal parasites (ectoparasites), and head and body lice.	
38	↘ Malathion Degradate ⟶	**Malaoxon** (CAS Reg. No. 1634-78-2)
39	**Mecoprop (MCPP)** (CAS Reg. No. 93-65-2) Selective hormone-type phenoxy herbicide applied postemergence on ornamentals and turf to control surface creeping broadleaf weeds.	
40	↘ MCPP Degradate ⟶	**4-Chloro-2-methylphenol** (No CAS Reg. No.)
41	**Metalaxyl (Ridomil)** (CAS Reg. No. 57837-19-1) Systemic, benzenoid fungicide used as a foliar spray for crops, as a soil treatment to control soil-borne pathogens, and as a seed treatment to control downy mildews.	
42	**Methiocarb (*Mesurol*)** (CAS Reg. No. 2032-65-7) Insecticide, acaricide and molluscicide used to control snails, slugs, spider mites and insects on lawns, turf and ornamentals, around building foundations, and in gardens.	

	Parent Active Ingredient	Degradate, Carrier, Impurity
43	**Methomyl (*Lannate*)** (CAS Reg. No. 16752-77-5) N-methyl carbamate insecticide used on field, vegetable, orchard crops, and sod farms.	
44	**Metribuzin (*Sencor*)** (CAS Reg. No. 21087-64-9) Selective triazinone herbicide used to control broadleaf weeds and grassy weed species on a wide range of sites including vegetable and field crops, turf grasses (recreational areas), and non-crop areas.	
45	**Napropamide (*Devrinol*)** (CAS Reg. No. 15299-99-7) Selective systemic amide herbicide applied to soils to control a number of annual grasses and broad-leaved weeds where vegetables, fruit trees and bushes, vines, strawberries, sunflowers, and mint or other crops are grown.	
46	**Oxadiazon (*Ronstar*) ()** (CAS Reg. No. 19666-30-9) Oxadiazole herbicide used for preemergent control of grasses, broadleaves, vines, brambles, brush, and trees.	
47	**Pentachloronitrobenzene (*Quintozene, PCNB*)** (CAS Reg. No. 82-68-8) Organochlorine fungicide used as a seed dressing or soil treatment to control a wide range of fungi species in such crops as potatoes, onions, lettuce, tomatoes, tulips, garlic, and others.	
48	↘ Pentachloronitrobenzene Impurity ⟶ Depending on the producer and the manufacturing procedure, PCNB impurities can include hexachlorobenzene, pentachlorobenzene, and tetrachloronitrobenzene.	**Pentachlorobenzene** (CAS Reg. No. 608-93-5)
49	**Piperonyl butoxide (PBO)** (CAS Reg. No. 51-03-6) Piperonyl butoxide is a synergist added to a wide variety of more than 1,500 pesticide products used to control many different types of flying and crawling insects and arthropods, although there are no products that contain only PBO. It lacks pesticidal effects on its own, but is added to other pesticides to enhance the pesticidal properties of those other pesticides, including pyrethrins, pyrethroids, rotenone, and carbamates.	
50	**Prometon (*Pramitol*)** (CAS Reg. No. 1610-18-0) Triazine herbicide used to control the emergence of most annual and many perennial broadleaf weed and grasses in non-agricultural areas.	
51	**Propamocarb hydrochloride (*Banol, Previcur*)** (CAS Reg. No. 25606-41-1) Fungicide used to control *Pythium* spp. and *Phytophthora* spp. on turf, outdoor woody and herbaceous ornamentals.	

	Parent Active Ingredient	**Degradate, Carrier, Impurity**
52	**Propiconazole (*Banner, Banner Maxx*)** (CAS Reg. No. 60207-90-1) Triazole systemic foliar fungicide with a broad range of activity that is used on grasses grown for seed, corn, and fruit crops.	
53	**Propoxur (*Baygon*)** (CAS Reg. No. 114-26-1) Carbamate insecticide used in fruit, maize, vegetables, ornamentals, and to control ants, roaches and hornets in and around residences and commercial food handling establishments.	
54	**Siduron (*Tupersan*)** (CAS Reg. No. 1982-49-6) Phenylurea herbicide used to control annual grasses, annual weeds, barnyardgrass, bermudagrass, crabgrass, and foxtail on golf courses, sod farms, and residential turf.	
55	**Simazine (*Princep*)** (CAS Reg. No. 122-34-9) Selective chlorinated triazine systemic herbicide applied to soil to control most annual grasses and broadleaf weeds before they emerge or after removal of weed growth.	
56	**Terbacil (*Sinbar*)** (CAS Reg. No. 5902-51-2) Selective uracil herbicide used to control broadleaf weeds in agricultural crops.	
57	**Triadimefon (*Bayleton*)** (CAS Reg. No. 43121-43-3) Triazole fungicide used to control powdery mildews, rusts and other fungal pests on cereals, fruits, vegetables, turf, shrubs and trees.	
58	**Triadimenol (*Baytan*)** (CAS Reg. No. 55219-65-3) Fungicide/seed treatment/protectant used to control seed- and soil-borne diseases and to provide early season control of foliar diseases.	
59	**Trichlorfon (*Dylox*)** (CAS Reg. No. 52-68-6) Systemic insecticide used on golf course turf, home lawns, ornamental shrubs and plants, and ornamental and bait fish ponds to control insects.	

	Parent Active Ingredient	Degradate, Carrier, Impurity
60	**Triclosan** (CAS Reg. No. 3380-34-5) Antimicrobial agent (pesticide) used to control the growth of bacteria fungi, and mildew in commercial applications and textile manufacturing. Also contained in consumer products (i.e., over-the-counter drugs such as antibacterial soap and some toothpaste) regulated by the Food and Drug Administration (FDA) under the Federal Food, Drug, and Cosmetic Act (FFDCA).	
61	**Vinclozolin (*Touche, Curalan*)** (CAS Reg. No. 50471-44-8) Dicarboximide non-systemic pesticide used to control several species of fungi in vines (such as grapes), strawberries, vegetables, fruit and ornamentals. Also used on turf grass.	

Identification of 56 Pesticide-Related Chemicals Detected in Long Island Groundwater Between 1996 and 2010 and Associated with 35 Active Ingredients Not Currently Registered for Use In Nassau and Suffolk Counties, New York		
	Parent Active Ingredient	**Degradate, Inert, Impurity**
1	**Acetochlor (*Harness*)** (CAS Reg. No. 34256-82-1) Chloroacetanilide herbicide used for control of most annual grasses and certain broadleaf weeds and yellow nutsedge in agricultural crops, including corn and potatoes.	
2	**Alachlor (*Lasso*)** (CAS Reg. No. 15972-60-8) Chloroacetanilide herbicide used for control of many annual grasses and certain broadleaf weeds in agricultural crops, including soybeans, corn, dry beans, and sunflowers.	
3	↘ Alachlor Degradates ⟶	**Alachlor ethanesulfonic acid (ESA)** (No CAS Reg. No. assigned)
4		**Alachlor oxanilic acid (OA)** (No CAS Reg. No. assigned)
5	**Aldicarb (*Temik*)** (CAS Reg. No. 116-06-3) Carbamate insecticide used to control a variety of pests on agricultural crops. Long Island potato growers targeted the Colorado potato beetle (*Leptinotarsa decemlineata*) and golden nematode (*Globodera rostochiensis*).	
6	↘ Aldicarb Degradates ⟶	**Aldicarb sulfone a.k.a. Aldoxycarb** (CAS Reg. No. 1646-88-4)
7		**Aldicarb sulfoxide** (CAS Reg. No. 1646-87-3)
8	Pesticide/antioxidant inert ingredient in pesticide formulas ⟶	**Butylated hydroxytoluene** (BHT) (CAS Reg. No. 128-37-0)
9	**Cadmium (*CADDY*)** Heavy metal fungicide used on golf course tees and greens.	
10	Questionable pesticidal relation ⟶	**Caffeine** (CAS Reg. No. 58-08-2)
11	**Carbofuran** (CAS Reg. No. 1563-66-2) Carbamate systemic insecticide/nematicide used on a wide variety of fruit and field crops, including potatoes, corn and soybeans, and ornamentals.	
12	↘ Carbofuran Degradate ⟶	**3-Hydroxycarbofuran** (CAS Reg. No. 16655-82-6)

	Parent Active Ingredient	Degradate, Inert, Impurity
13	**Carbon Disulfide (*Vertifume*)** (CAS Reg. No. 75-15-0) Insecticide, nematicide and fungicide used as a fumigant soil disinfectant.	
14	**Chlordane (*Gold Crest C-100*)** (CAS Reg. No. 57-74-9) Chlorinated cyclodiene termiticide used subsurfacely for termite control, and above ground structural application for control of termites and other wood-destroying insects.	
15	**Chlorfenvinphos** (CAS Reg. No. 470-90-6) Organophosphate insecticide and acaricide/miticide used on agricultural crops.	
16	**Cyanazine (*Bladex*)** (CAS Reg. No. 21725-46-2) Triazine herbicide used as a preemergent and postemergent to control annual grasses and broadleaf weeds, primarily on corn.	
17	**Dacthal (DCPA, Dimethyl tetrachloroterephthalate)** (CAS Reg. No. 1861-32-1) Phthalate/chlorinated benzoic acid preemergent herbicide used to control annual grasses and certain annual broadleaf weed species in a wide range of vegetable crops.	
18	↘ Dacthal Degradate ⟶	**Tetrachloroterephthalic acid (TCPA)** (CAS Reg. No. 2136-79-0)
19	**1,2-Dibromo-3-chloropropane (DBCP)** (CAS Reg. No. 96-12-8) Halogenated organic soil fumigant (nematicide) registered for use on more than 40 agricultural crops.	
20	**1,2-Dibromoethane a.k.a. Ethylene dibromide (EDB) (*Dowfume*)** (CAS Reg. No. 106-93-4) Halogenated organic liquid soil fumigant (insecticide, nematicide) used as a soil and post-harvest fumigant for agricultural crops.	
21	**1,2-Dichlorobenzene (o) (*DowTherm E*)** (CAS Reg. No. 95-50-1) Halogenated organic insecticide and fumigant, and used to manufacture herbicides.	
22	**1,4-Dichlorobenzene (p) a.k.a. Paradichlorobenzene** (CAS Reg. No. 106-46-7) Halogenated organic solid insecticide used for moth and carpet beetle control inside of airtight spaces (closets, chests, and garment bags) in homes, to kill lice and mites on birds in cages, to repel commensal rodents.	

	Parent Active Ingredient	Degradate, Inert, Impurity
23	**1,2-Dichloroethane a.k.a. Ethylene dichloride (*Dowfume*)** (CAS Reg. No. 107-06-2) Halogenated organic liquid insecticide fumigant used on agricultural crops.	
24	**1,2-Dichloropropane** (CAS Reg. No. 78-87-5) Halogenated organic liquid soil fumigant, nematicide, and impurity.	
25	**cis-1,3-Dichloropropene (*Telone*)** (CAS Reg. No. 542-75-6) Halogenated organic liquid fumigant for preplant treatment of soil to control plant parasitic nematodes, including golden nematode (*Globodera rostochiensis*) and symphlans, and to manage soil-borne diseases in agricultural cropland. Typically applied to soils prior to planting by underground injection at a depth of 12–18 inches.	
26	↘ cis-1,3-Dichloropropane Degradate ⟶	**1,1-Dichloropropene** (CAS Reg. No. 563-58-6)
27	**Dieldrin** (CAS Reg. No. 60-57-1) Organochlorine insecticide used as a contact and stomach poison to control soil insects, public health insects, termites, and many other pests.	
28	**Dimethyl disulfide** (CAS Reg. No. 624-92-0) Soil fumigant.	
29	**Dinoseb (*Premerge, Dinitro*)** (CAS Reg. No. 88-85-7) Nitrophenolic herbicide. The phenol form is used as a general contact herbicide in orchards, vineyards, forage legumes, and for killing potato vines and desiccating seed crops to facilitate harvest. The ammonium salt is used as a selective contact herbicide in alfalfa, clover, birdsfoot trefoil, onions, garlic, peas, and small grains. Alkanolamine salts are applied to kill germinating seeds contained in the upper soil surface layers in preemergence treatments, and in early postemergence and directed sprays in numerous agricultural crops.	
30	**Diphenamid (*Dymid, Enide*)** (CAS Reg. No. 957-51-7) Amide herbicide for control of annual grasses and broadleaf weeds in tomatoes, peppers, potatoes, soybeans, strawberries, blackberry and raspberry (nonbearing), apple and peach trees, cherry trees (nonbearing), and ornamental plants.	
31	Disulfoton (*Di-Syston*) Degradate ⟶	**Disulfoton sulfone** (CAS Reg. No. 2497-06-5)

	Parent Active Ingredient	Degradate, Inert, Impurity
32	**Ethyl dipropylthiocarbamate (EPTC) (*Eptam*)** (CAS Reg. No. 759-94-4) Selective thiocarbamate herbicide used in preemergent control of certain annual grasses, broadleaf weeds and perennial weeds on field, vegetable, orchard, ornamental, and noncrop sites.	
33	**Fenuron** (CAS Reg. No. 101-42-8)	
34	**Gamma-BHC (Lindane, gamma-hexachlorocyclohexane) (*Lindane*)** (CAS Reg. No. 58-89-9) Organochlorine insecticide used on ornamentals and trees (especially borers), seed treatments, and livestock pests.	
35	Heptachlor Degradate ⟶ Technical-grade heptachlor was the form of heptachlor used most often as a pesticide. Heptachlor epoxide is a by-product of heptachlor, and was not manufactured and was not used as an insecticide like heptachlor. Approximately 20 percent of heptachlor is changed within hours into heptachlor epoxide in the environment.	**Heptachlor epoxide** (CAS Reg. No. 1024-57-3)
36	**Hexachlorobutadiene** (CAS Reg. No. 87-68-3) Hexachlorobutadiene is used as a pesticide, insecticide, herbicide, algicide and chemical intermediate The primary source of hexachlorobutadiene is inadvertent production as a waste by-product of the manufacture of certain chlorinated hydrocarbons, such as tetrachloroethylene, trichloroethylene, and carbon tetrachloride.	
37	**Isofenphos (*Oftanol*)** (CAS Reg. No. 25311-71-1) Organophosphate insecticide used on turf and ornamental trees and shrubs to control white grubs, mole crickets, and other insects (mostly subterranean species).	
38	**Kelthane (*Dicofol*)** (CAS Reg. No. 115-32-2) Acaricide/miticide used as a foliar spray on agricultural crops and ornamentals, and in or around agricultural and domestic buildings for mite control.	
39	**Methoxychlor** (CAS Reg. No. 72-43-5) Organochlorine insecticide used to control many species of insects on fruit and shade trees, vegetables, home gardens, and around farm buildings	
40	Fumigant Degradate ⟶	**Methyl sulfide a.k.a dimethyl sulfide** (CAS Reg. No. 75-18-3)

	Parent Active Ingredient	Degradate, Inert, Impurity
41	**Metolachlor (*Dual, Pennant, Bicep*)** (CAS Reg. No. 51218-45-2) Chloroacetamide broad spectrum herbicide used for general weed control in many agricultural food and feed crops, and on lawns and turf, ornamental plants, trees, shrubs and vines, rights of way, fencerows and hedgerows, and in forestry.	
42	↘ Metolachlor Degradates ⟶	**Metolachlor ESA (CGA-354743)** (CAS Reg. No. 171118-09-5)
43		**Metolachlor metabolite (CGA-37735)** (CAS Reg. No. 97055-05-5)
44		**Metolachlor metabolite (CGA-40172)** (CAS Reg. No. 131068-72-9)
45		**Metolachlor metabolite (CGA-41638)** (CAS Reg. No. 65513-61-3)
46		**Metolachlor metabolite (CGA-67125)** (No CAS Reg. No.)
47		**Metolachlor OA (CGA-51202)** (CAS Reg. No. 152019-73-3)
48	Methyl Parathion Degradate ⟶	**4-Nitrophenol** (CAS Reg. No. 100-02-7)
49	**Norflurazon (*Solicam*)** (CAS Reg. No. 27314-13-2) Selective pyridazinone preemergent herbicide used to control germinating annual grasses and broadleaf weeds in fruits, vegetables, other crops, and various nonagricultural and industrial areas.	
50	**Oxamyl (*Vydate*)** (CAS Reg. No. 23135-22-0) Carbamate systemic and contact insecticide/acaricide and nematicide used on many agricultural crops, including cucumbers, eggplants, garlic, muskmelon (including cantaloupe and honeydew melon), onion (dry bulb), pears, peppers, peppermint, potatoes, pumpkins, spearmint, squash, sweet potatoes, tomatoes, watermelons.	
51	**Pentachlorophenol** (CAS Reg. No. 87-86-5) Biocide used to control microorganisms, and as a wood preservative to protect wood from decay and insect attack.	
52	Questionable Degradate ⟶	**Perchlorate** (CAS Reg. No. 14797-73-0)
53	**Prometryn (*Caparol*)** (CAS Reg. No. 7287-19-6) Substituted thiomethly triazine herbicide used to control annual grasses and broadleaf weeds in food and feed crops.	

	Parent Active Ingredient	Degradate, Inert, Impurity
54	**Propachlor (*Ramrod*)** (CAS Reg. No. 1918-16-7) Herbicide used to control grasses and broadleaf weeds.	
55	**Tebuthiuron (*Spike*)** (CAS Reg. No. 34014-18-1) Nonselective, soil-activated herbicide used to control broadleaf and woody weeds, grasses and brush on feed crop sites (pasture and rangeland) and a variety of non-food crop sites including airports and landing fields, outdoor industrial areas, non-agricultural rights-of-way, fencerows, hedgerows, uncultivated areas/soils, and under paved roads and sidewalks in areas where no future landscaping is planned.	
56	Soil Fumigant/Nematicide Impurity ⟶ TCP has been used in the production of pesticides, and as an industrial solvent and cleaning and degreasing agent.	**1,2,3-Trichloropropane (TCP)** (CAS Reg. No. 96-18-4)

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APPENDIX B

SUMMARIES OF LONG ISLAND WATER QUALITY MONITORING DATA FOR METALAXYL, IMIDACLOPRID, AND ATRAZINE

Maps Provided by the Suffolk County Department of Health Services (SCDHS) and Charts Based on Data Provided by SCDHS of Water Quality Monitoring Conducted by SCDHS 2001-2010

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The following charts present a summary of data supplied by the Suffolk County Department of Health Services based on monitoring SCDHS conducted. The graphical representations of the detections of each active ingredient correspond with each map and with the water quality monitoring data tables available at ftp://ftp.dec.ny.gov/dshm/pesticid/suffolkdata.pdf.

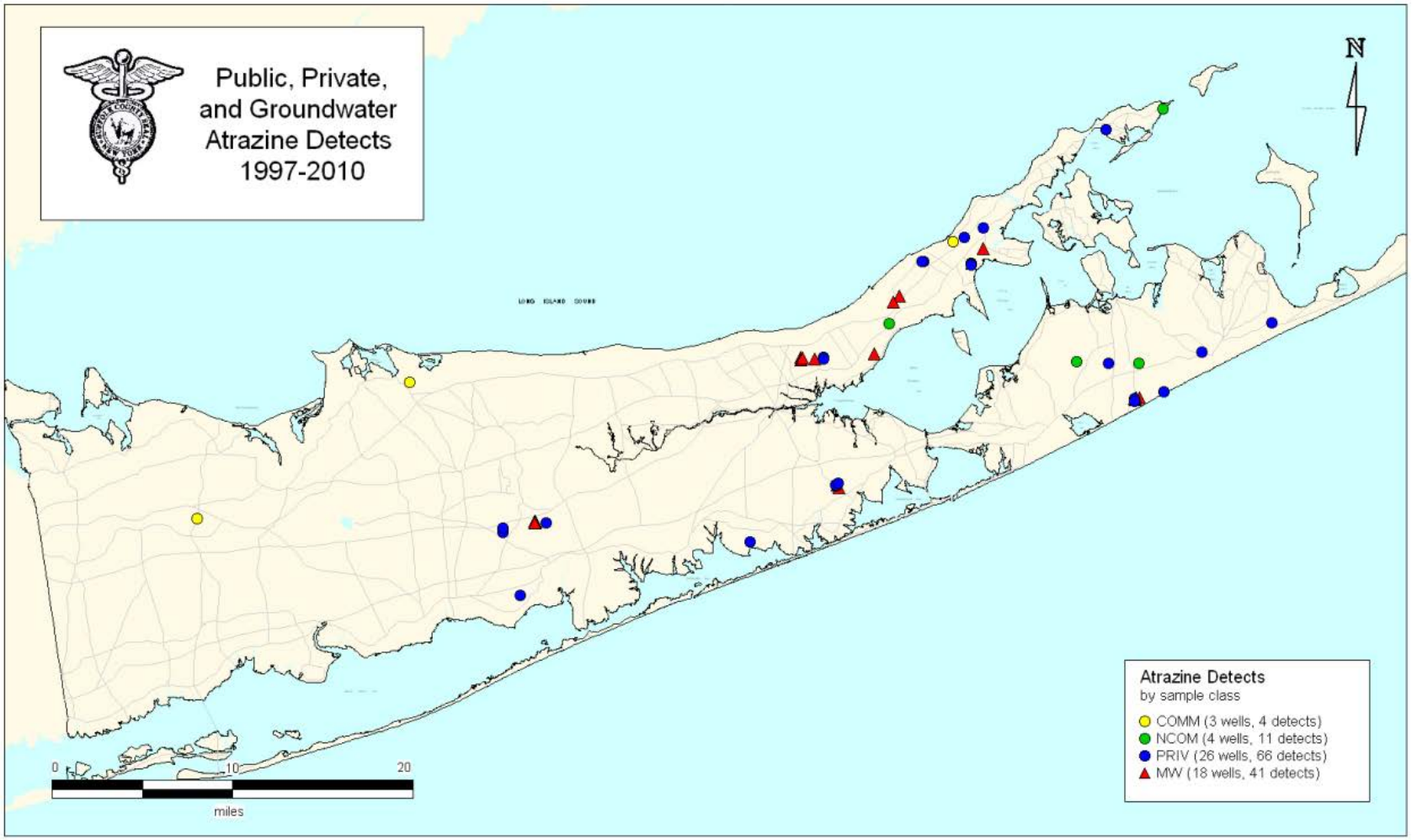
The categories of graphical representations include:
Private water supplies,
Public water supplies, and
Groundwater supplies.

Applicable Unidentified Organic Contaminants (UOC) or Maximum Contaminant Level (MCL) associated with certain types of monitoring and pesticides are indicated.

NYSDEC SUMMARIES OF LONG ISLAND WATER QUALITY MONITORING DATA 2001-2010

TABLE OF CONTENTS

Atrazine Detections – Map of Detection Sites (1997-2010)



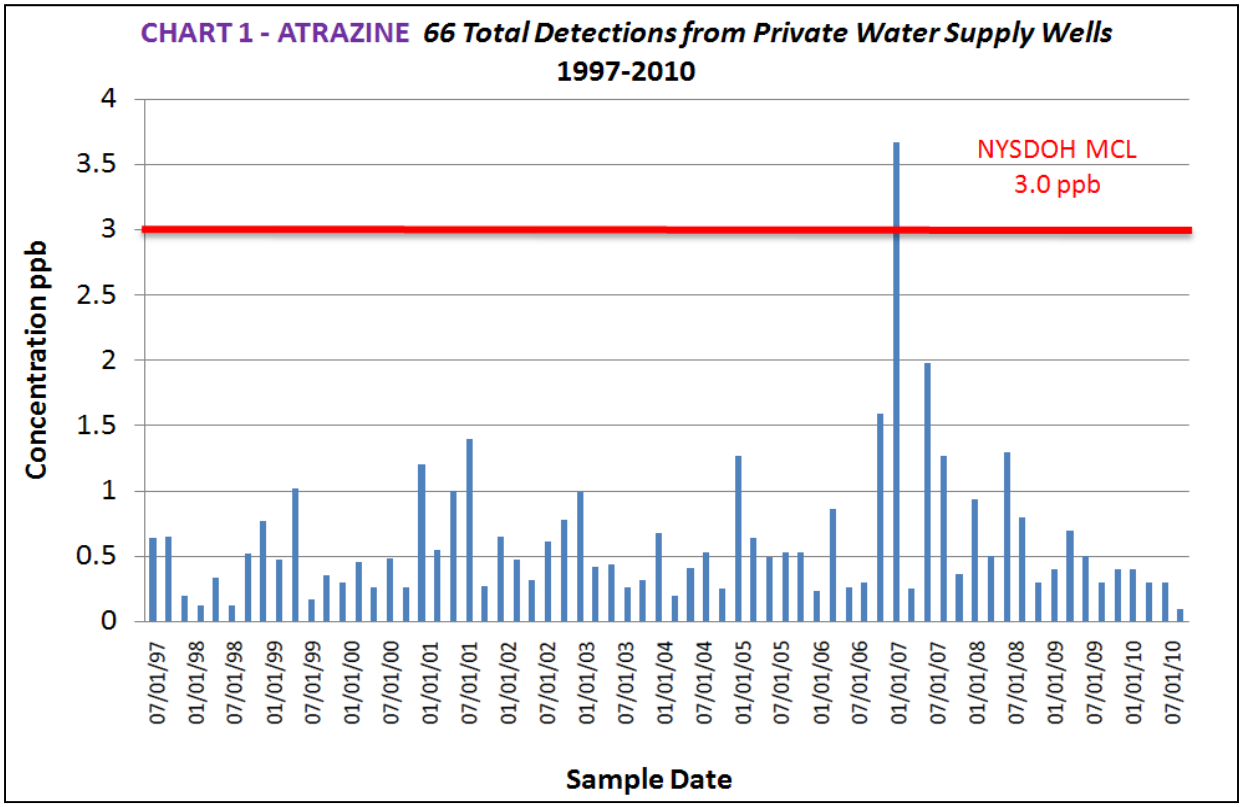


CHART 1 - ATRAZINE 66 Total Detections from Private Water Supply Wells
1997-2010
NYSDOH MCL
3.0 ppb
Concentration ppb
4
3.5
3
2.5
2
1.5
1
0.5
0
07/01/97
01/01/98
07/01/98
01/01/99
07/01/99
01/01/00
07/01/00
01/01/01
07/01/01
01/01/02
07/01/02
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01/01/09
07/01/09
01/01/10
07/01/10
Sample Date

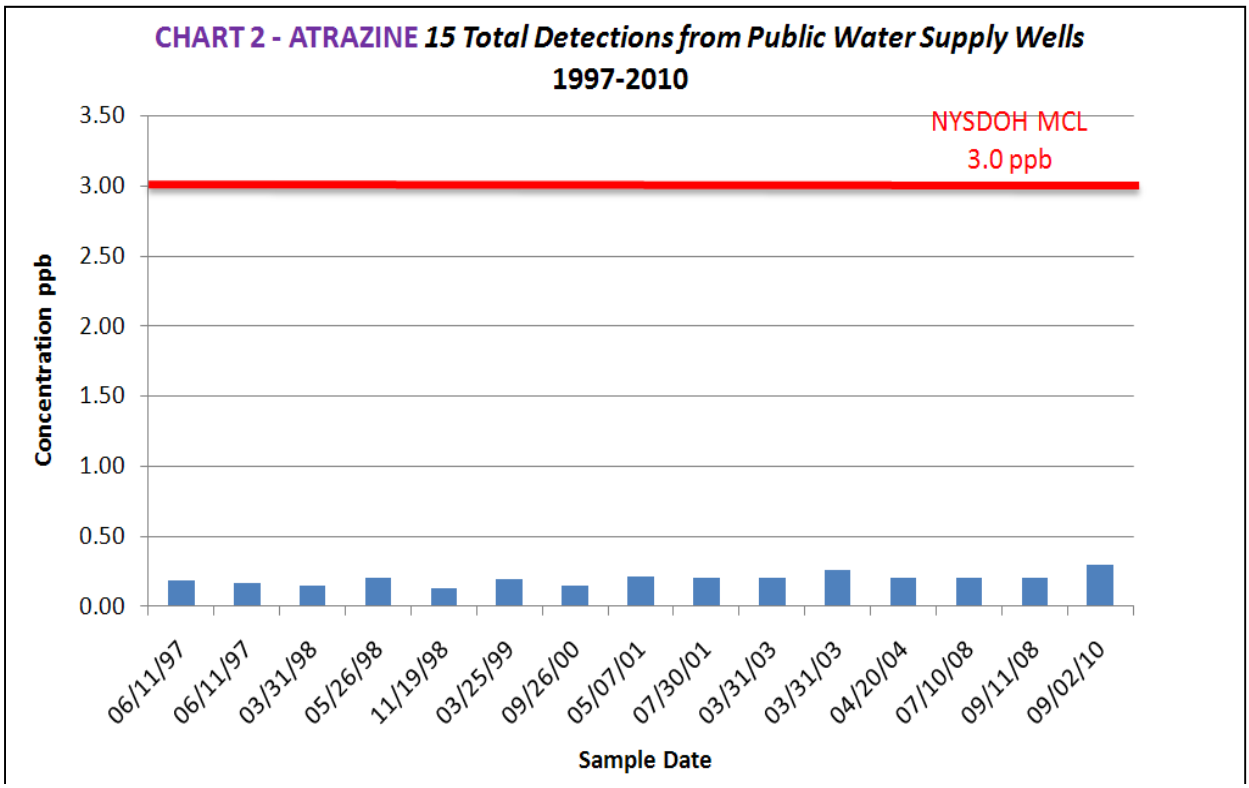


CHART 2 - ATRAZINE 15 Total Detections from Public Water Supply Wells
1997-2010
NYSDOH MCL
3.0 ppb
Concentration ppb
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
06/11/97
06/11/97
03/31/98
05/26/98
11/19/98
03/25/99
09/26/00
05/07/01
07/30/01
03/31/03
03/31/03
04/20/04
07/10/08
09/11/08
09/02/10
Sample Date

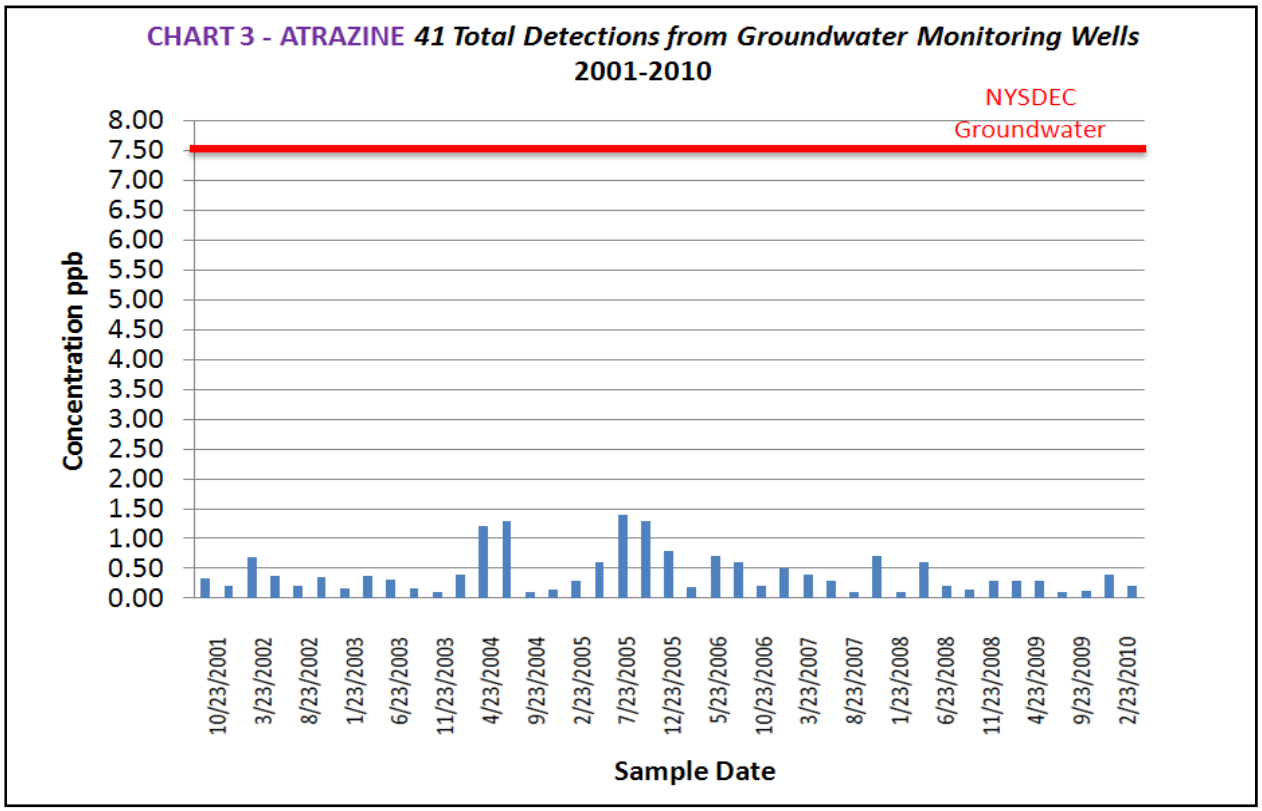
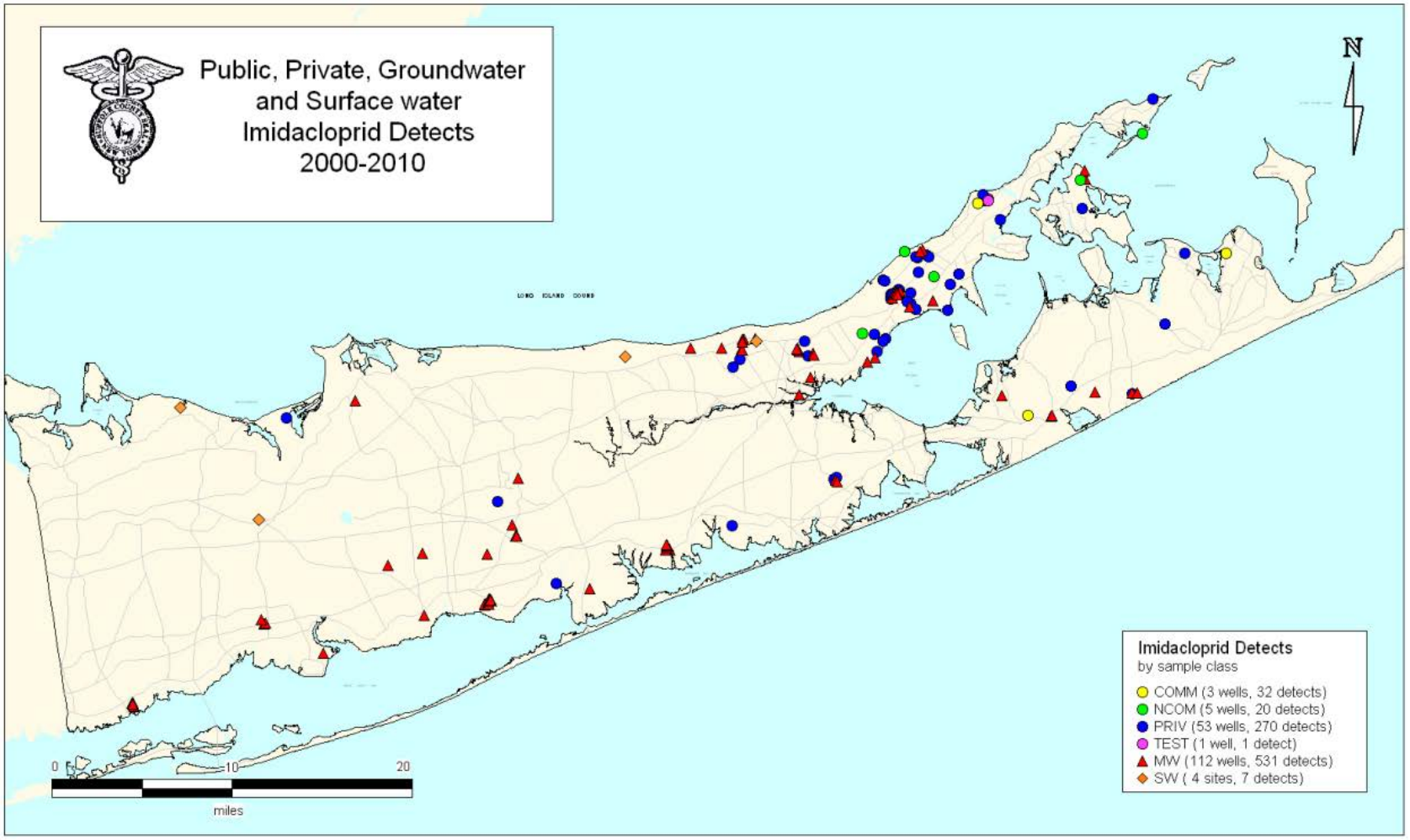


CHART 3 - ATRAZINE 41 Total Detections from Groundwater Monitoring Wells
2001-2010
NYSDEC
Groundwater
Concentration ppb
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
10/23/2001
3/23/2002
8/23/2002
1/23/2003
6/23/2003
11/23/2003
4/23/2004
9/23/2004
2/23/2005
7/23/2005
12/23/2005
5/23/2006
10/23/2006
3/23/2007
8/23/2007
1/23/2008
6/23/2008
11/23/2008
4/23/2009
9/23/2009
2/23/2010
Sample Date

Imidacloprid Detections – Map of Detection Sites (2000-2010)



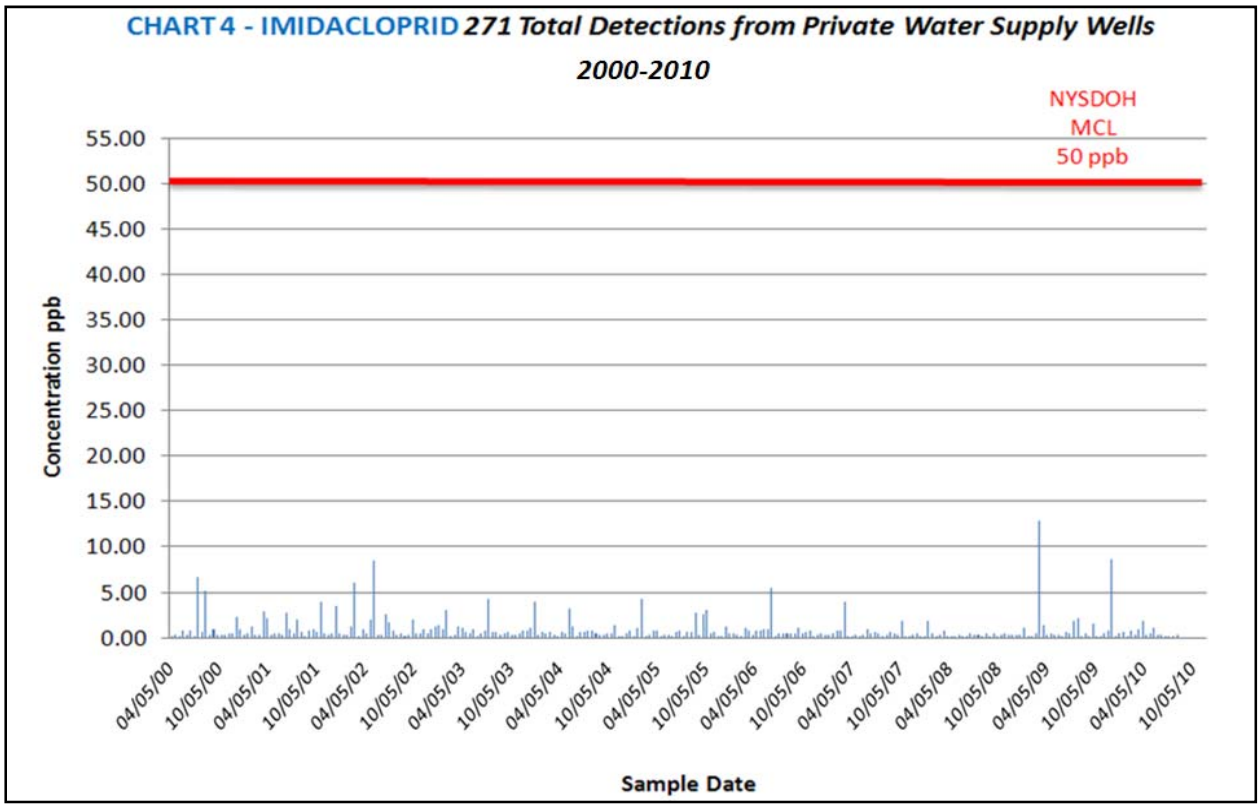


CHART 4 - IMIDACLOPRID 271 Total Detections from Private Water Supply Wells
2000-2010
NYSDOH
MCL
50 ppb
55.00
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Concentration ppb
04/05/00
10/05/00
04/05/01
10/05/01
04/05/02
10/05/02
04/05/03
10/05/03
04/05/04
10/05/04
04/05/05
10/05/05
04/05/06
10/05/06
04/05/07
10/05/07
04/05/08
10/05/08
04/05/09
10/05/09
04/05/10
10/05/10
Sample Date

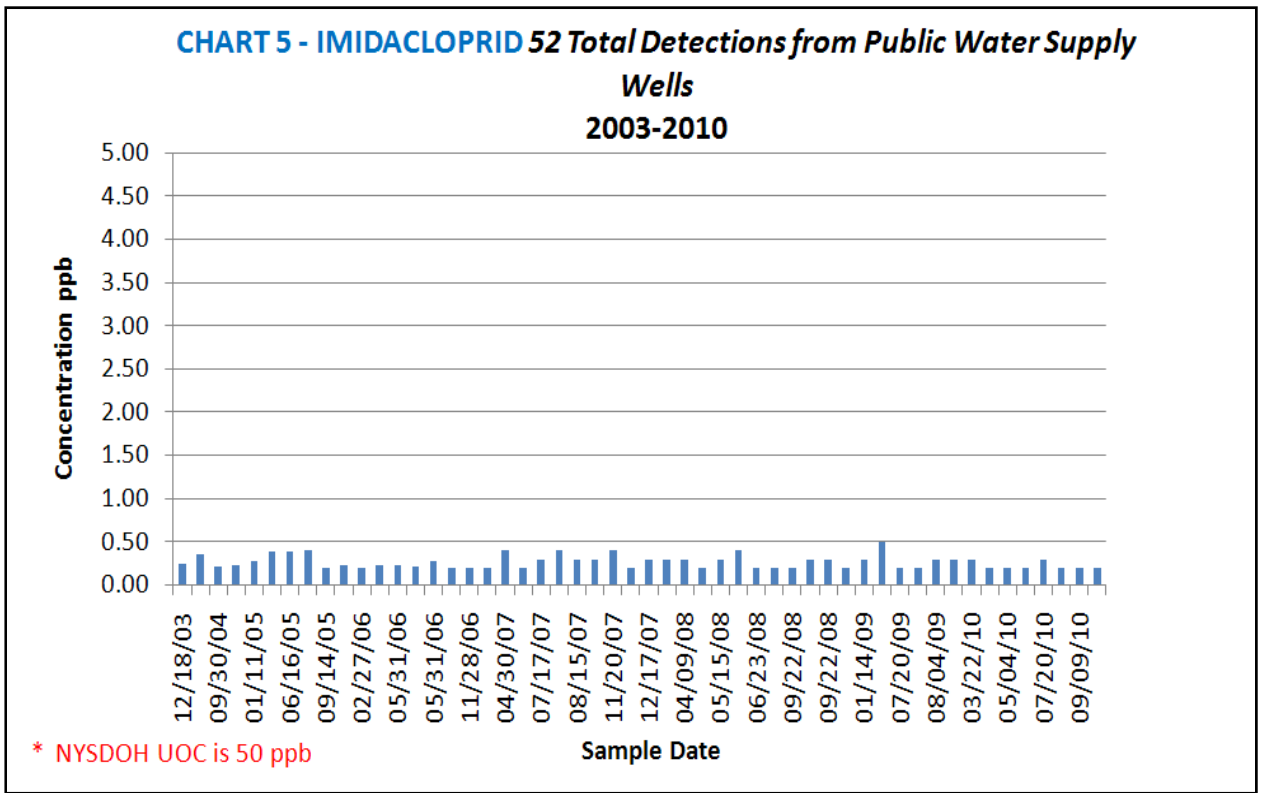


CHART 5 - IMIDACLOPRID 52 Total Detections from Public Water Supply Wells
2003-2010
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Concentration ppb
12/18/03
09/30/04
01/11/05
06/16/05
09/14/05
02/27/06
05/31/06
05/31/06
11/28/06
04/30/07
07/17/07
08/15/07
11/20/07
12/17/07
04/09/08
05/15/08
06/23/08
09/22/08
09/22/08
01/14/09
07/20/09
08/04/09
03/22/10
05/04/10
07/20/10
09/09/10
* NYSDOH UOC is 50 ppb
Sample Date

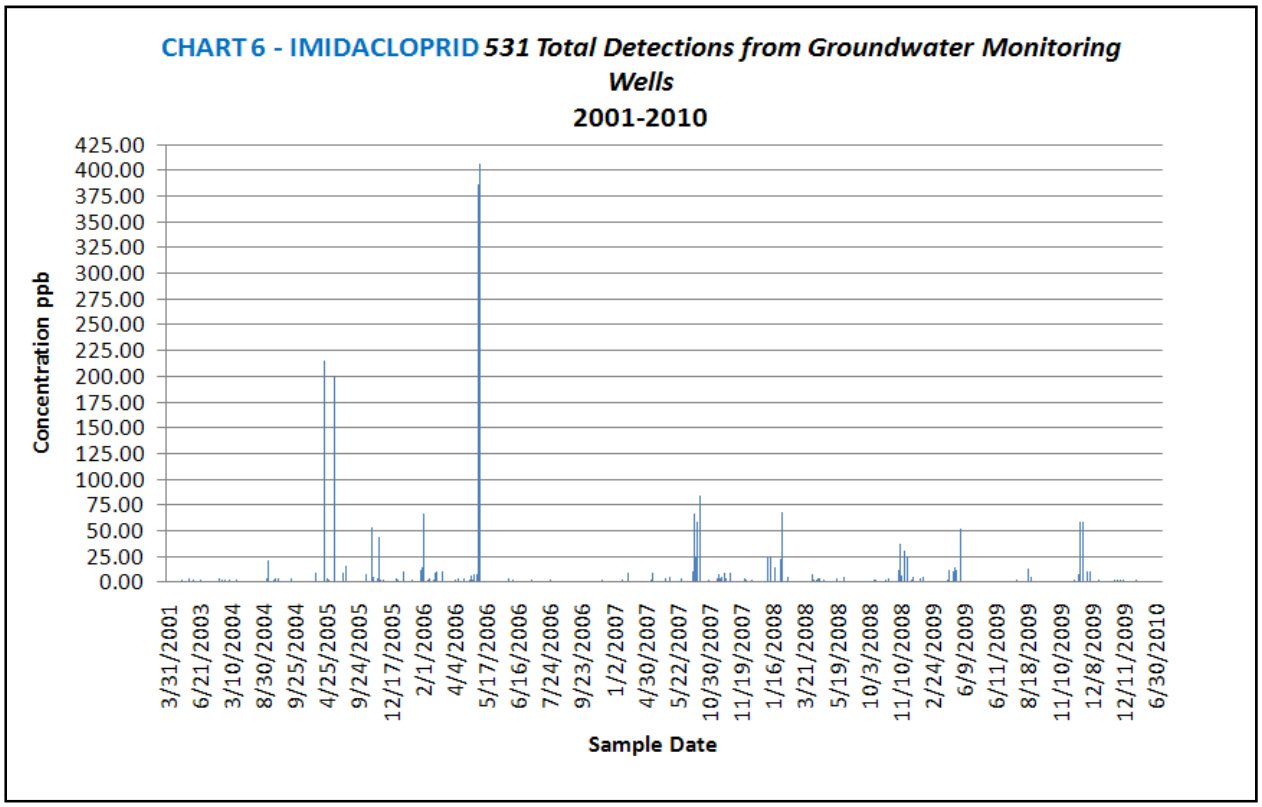


CHART 6 - IMIDACLOPRID 531 Total Detections from Groundwater Monitoring Wells
2001-2010
Concentration ppb
425.00
400.00
375.00
350.00
325.00
300.00
275.00
250.00
225.00
200.00
175.00
150.00
125.00
100.00
75.00
50.00
25.00
0.00
3/31/2001
6/21/2003
3/10/2004
8/30/2004
9/25/2004
4/25/2005
9/24/2005
12/17/2005
2/1/2006
4/4/2006
5/17/2006
6/16/2006
7/24/2006
9/23/2006
1/2/2007
4/30/2007
5/22/2007
10/30/2007
11/19/2007
1/16/2008
3/21/2008
5/19/2008
10/3/2008
11/10/2008
2/24/2009
6/9/2009
6/11/2009
8/18/2009
11/10/2009
12/8/2009
12/11/2009
6/30/2010
Sample Date

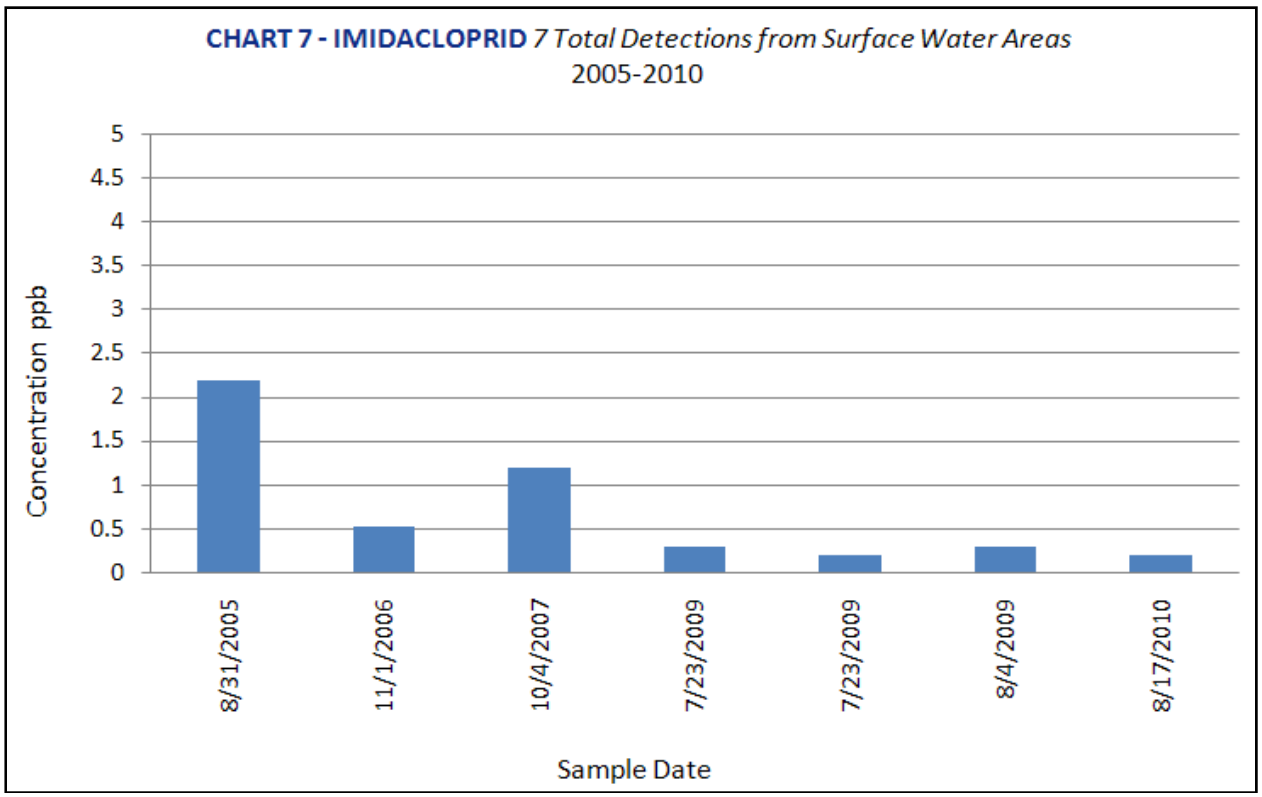
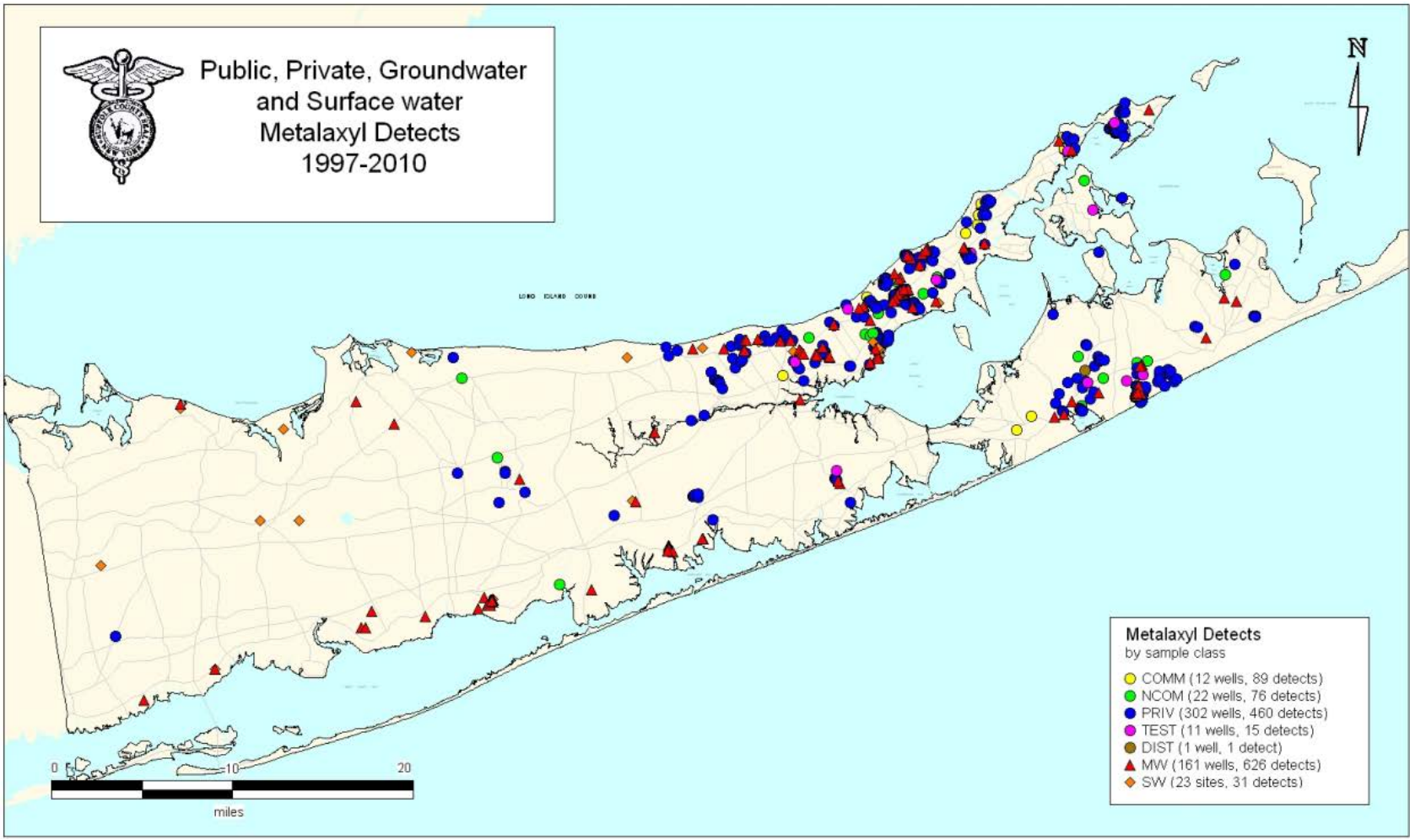


CHART 7 - IMIDACLOPRID 7 Total Detections from Surface Water Areas
2005-2010
Concentration ppb
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
8/31/2005
11/1/2006
10/4/2007
7/23/2009
7/23/2009
8/4/2009
8/17/2010
Sample Date

Metalaxyl Detections – Map of Detection Sites (1997-2010)



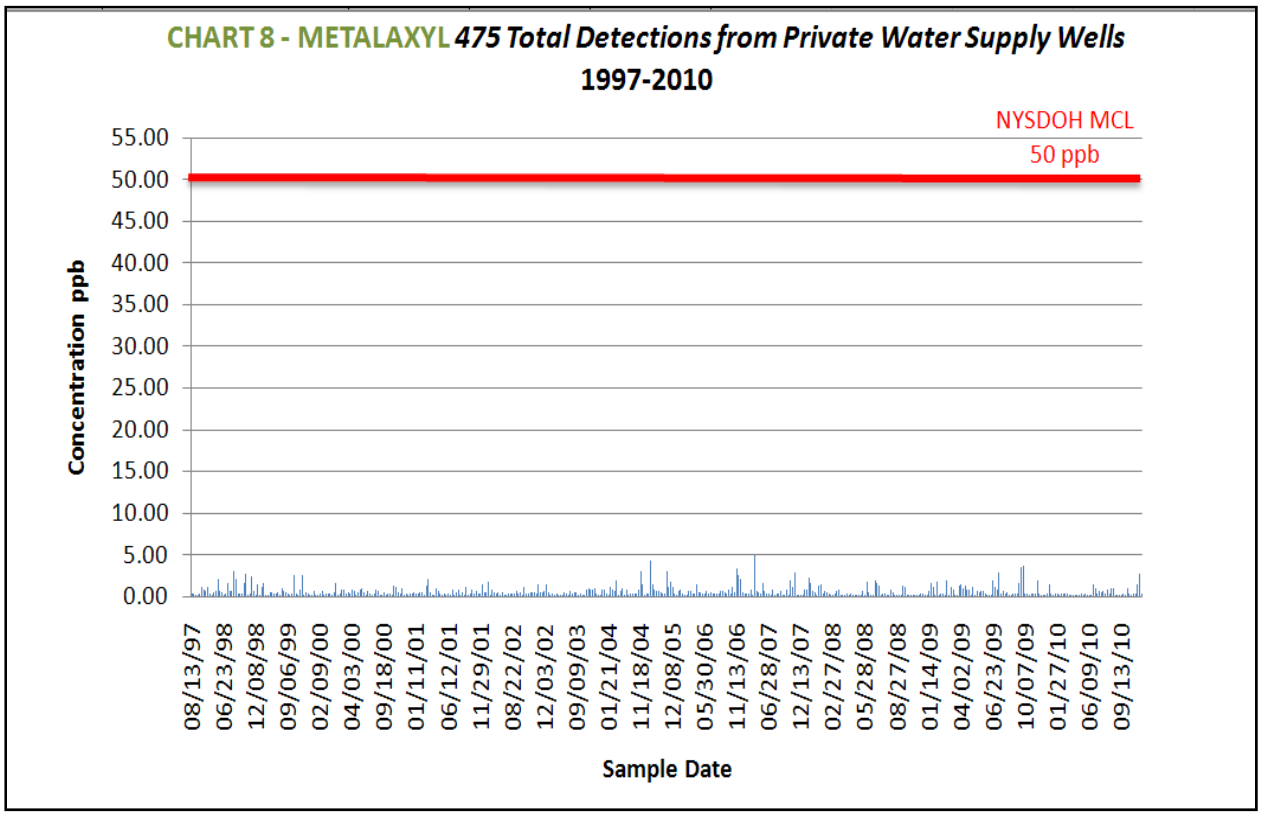


CHART 8 - METALAXYL 475 Total Detections from Private Water Supply Wells
1997-2010
NYSDOH MCL
50 ppb
Concentration ppb
55.00
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
08/13/97
06/23/98
12/08/98
09/06/99
02/09/00
04/03/00
09/18/00
01/11/01
06/12/01
11/29/01
08/22/02
12/03/02
09/09/03
01/21/04
11/18/04
12/08/05
05/30/06
11/13/06
06/28/07
12/13/07
02/27/08
05/28/08
08/27/08
01/14/09
04/02/09
06/23/09
10/07/09
01/27/10
06/09/10
09/13/10
Sample Date

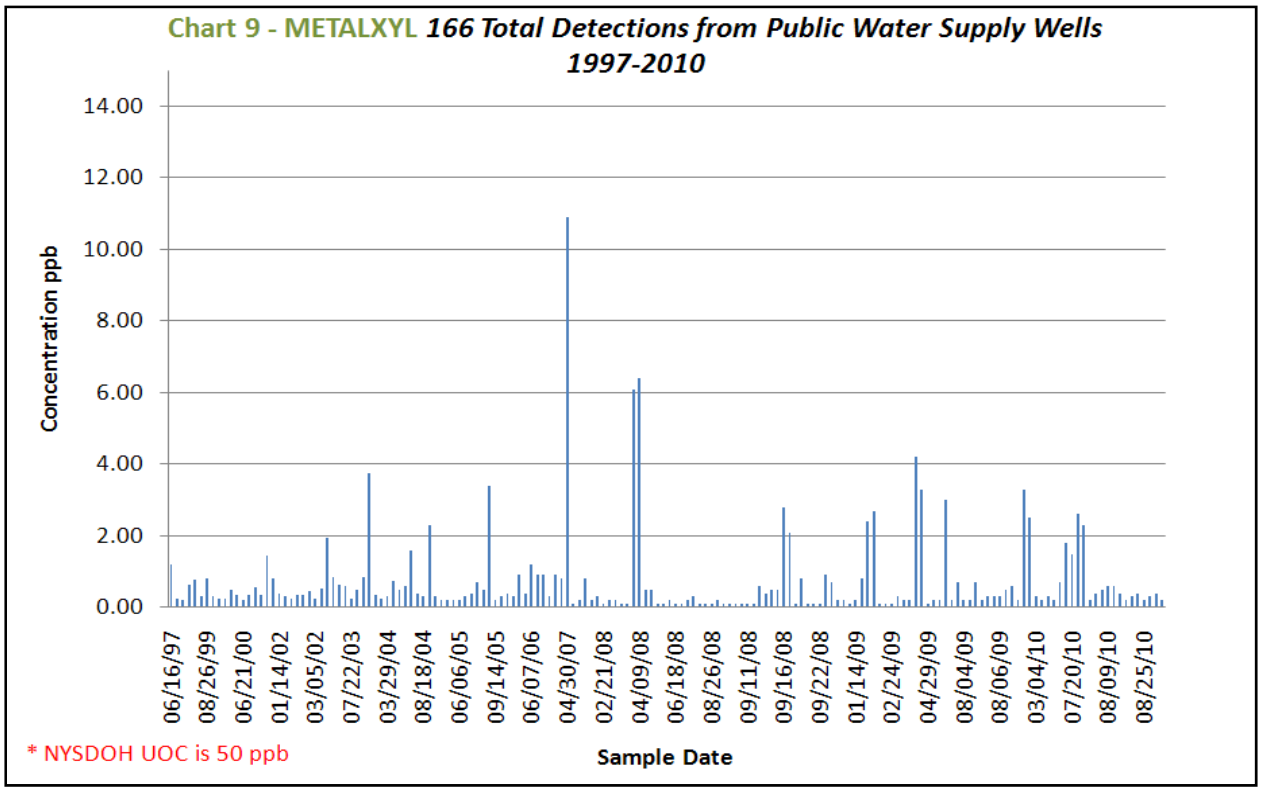


Chart 9 - METALXYL 166 Total Detections from Public Water Supply Wells
1997-2010
Concentration ppb
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
06/16/97
08/26/99
06/21/00
01/14/02
03/05/02
07/22/03
03/29/04
08/18/04
06/06/05
09/14/05
06/07/06
04/30/07
02/21/08
04/09/08
06/18/08
08/26/08
09/11/08
09/16/08
09/22/08
01/14/09
02/24/09
04/29/09
08/04/09
08/06/09
03/04/10
07/20/10
08/09/10
08/25/10
* NYSDOH UOC is 50 ppb
Sample Date

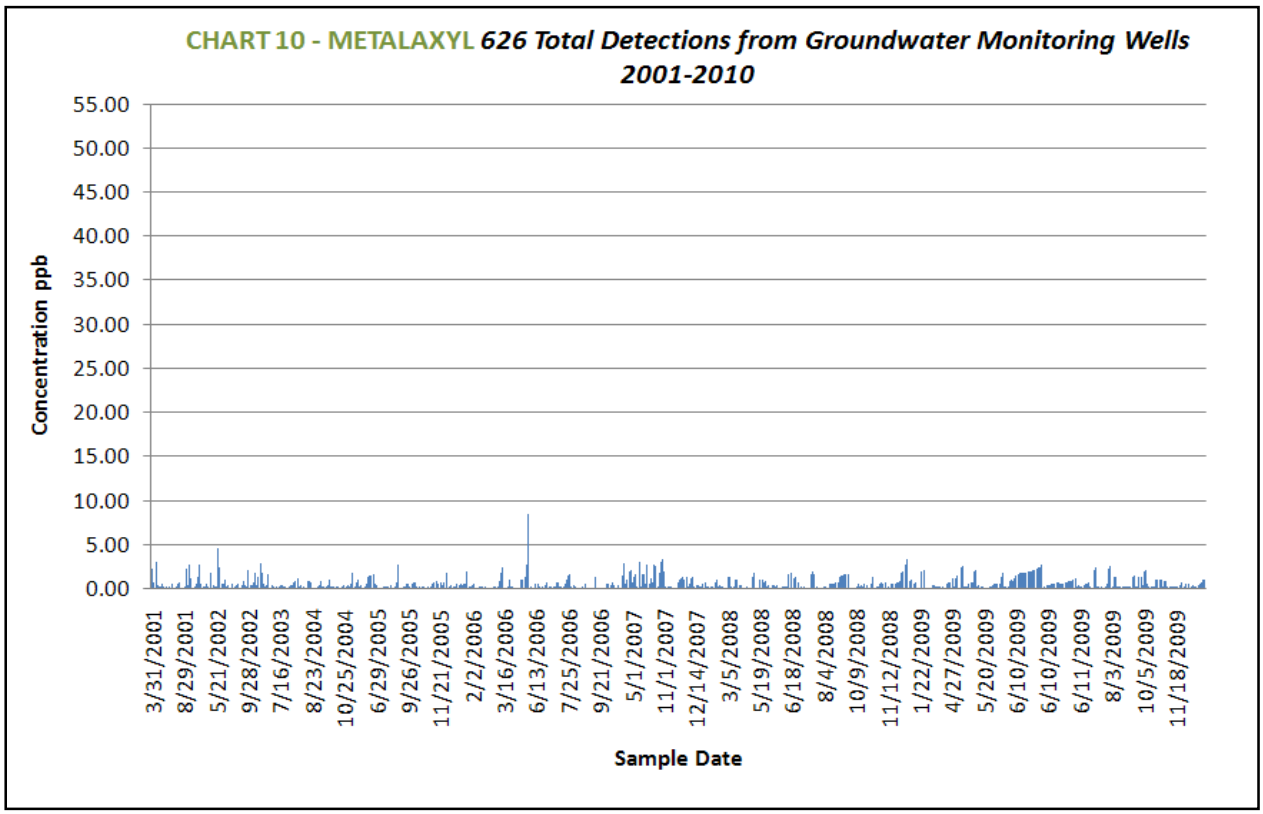


CHART 10 - METALAXYL 626 Total Detections from Groundwater Monitoring Wells
2001-2010
Concentration ppb
55.00
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3/31/2001
8/29/2001
5/21/2002
9/28/2002
7/16/2003
8/23/2004
10/25/2004
6/29/2005
9/26/2005
11/21/2005
2/2/2006
3/16/2006
6/13/2006
7/25/2006
9/21/2006
5/1/2007
11/1/2007
12/14/2007
3/5/2008
5/19/2008
6/18/2008
8/4/2008
10/9/2008
11/12/2008
1/22/2009
4/27/2009
5/20/2009
6/10/2009
6/10/2009
6/11/2009
8/3/2009
10/5/2009
11/18/2009
Sample Date

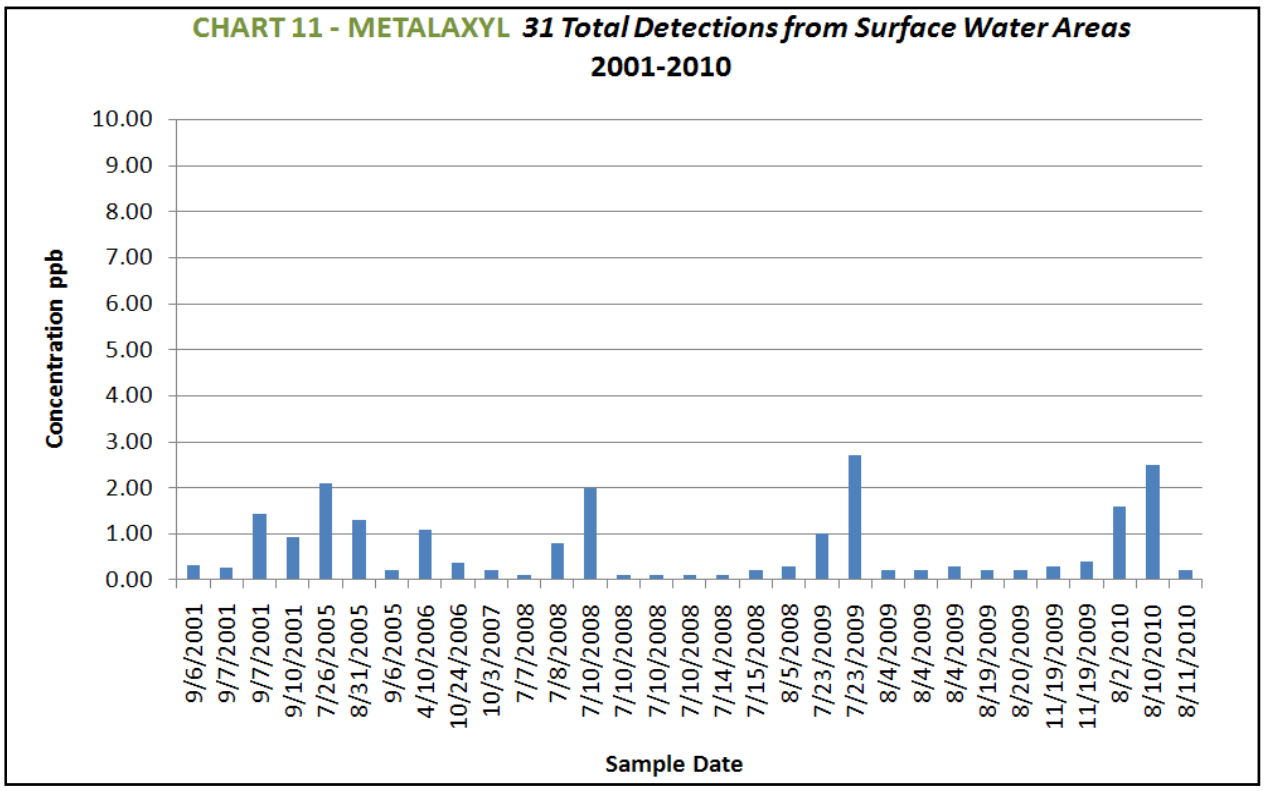


CHART 11 - METALAXYL 31 Total Detections from Surface Water Areas
2001-2010
Concentration ppb
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
9/6/2001
9/7/2001
9/7/2001
9/10/2001
7/26/2005
8/31/2005
9/6/2005
4/10/2006
10/24/2006
10/3/2007
7/7/2008
7/8/2008
7/10/2008
7/10/2008
7/10/2008
7/10/2008
7/14/2008
7/15/2008
8/5/2008
7/23/2009
7/23/2009
8/4/2009
8/4/2009
8/4/2009
8/19/2009
8/20/2009
11/19/2009
11/19/2009
8/2/2010
8/10/2010
8/11/2010
Sample Date

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APPENDIX C

TECHNICAL REVIEW AND ADVISORY COMMITTEE (TRAC) DESCRIPTION

AND

ONGOING PEST MANAGEMENT OUTREACH AND EDUCATION EFFORTS

NOTE: Information provided in this appendix supplements information provided in Chapters 3 and 4 of the Strategy.

TECHNICAL REVIEW AND ADVISORY COMMITTEE (TRAC)

Composition: DEC will convene, approximately six months after this Strategy is finalized, a TRAC to pool expertise of State and local government agencies as well as statewide and local public service and academic entities closely involved with pesticide regulation and water quality monitoring for Long Island:

- New York State: DEC (Chair), Department of Health, Department of Agriculture and Markets, Cornell University.
- Local Entities: Suffolk County Department of Health Services, Suffolk County Water Authority, Suffolk County Soil and Water Conservation District, Nassau County Health Department, Nassau County Soil and Water Conservation District, Cornell Cooperative Extension of Suffolk County

After 5 years, Department and involved participants assess ongoing need for TRAC.

Primary purposes:

- Assist DEC in investigation and assessment of active ingredients (AIs), identified and ranked by the Department (potential contaminants detected in Long Island groundwater)
- Consider factors such as groundwater monitoring data, exceedances of chemical-specific water quality standards, potential for human exposure, human health risks, existing needs for effective and lower-risk pest management alternatives
- Advise DEC regarding potential and feasible response actions to prevent further pesticide-related impacts to the Long Island aquifer while meeting pest management needs. (Scope of response actions - see P2 measures in Information Box ES-1.)

The following general approach is recommended for the activities and actions to be taken by DEC and the TRAC:

Pesticides to be Considered:

- DEC will rank and refer to the TRAC for evaluation, active ingredients and pesticide degradates for evaluation, based on water quality monitoring factors such as the concentrations, timing, and number and distribution of locations at which the contaminant has been detected, and its potential or estimated rate of migration.
- All pesticide products associated with a targeted active ingredient or pesticide degradate and the use patterns relevant to the potential contamination will be included in TRAC review.
- In cases where the contaminant selected for review is a pesticide degradate, all related contaminants (parent active ingredients and any degradates) will be included in a single review (i.e., imidacloprid and its degradates imidacloprid guanidine, imidacloprid olefin, and imidacloprid urea).

Factors to be Considered by the TRAC:

- The TRAC will review available information compiled by DEC as well as other sources, such as groundwater monitoring data, evaluations of such data, registered pesticide labeling, methods of application, associated pest management needs and alternative management options relating to the relevant pests and selected pesticide. All relevant aspects of pesticide-related detections will be considered, particularly exceedances of a chemical-specific drinking water standard, groundwater standard, groundwater guidance values, federal health advisory levels, or other existing designated value.
- The TRAC will consider existing uses of and needs for each pesticide under review and identify actions most likely to prevent further pesticide-related impacts to Long Island's drinking water aquifer while meeting those pest management needs.

Potential Response Actions:

- Based on the findings of the reviews, the TRAC will submit recommendations for response actions to Department for consideration. These could include best management practices for relevant use patterns involving those products, suggestions for other feasible alternative management methods for pests targeted on the involved product labels, recommendations for education and outreach, or other steps.

TRAC Meetings and Communications:

- DEC will convene the first TRAC meeting within six months after the Strategy is finalized.
- To address current priority pesticides, DEC expects to arrange TRAC meetings on a regular basis for up to two years after the initial meeting (e.g., on a quarterly basis), depending upon the contaminants to be considered.
- Thereafter, DEC will schedule TRAC meetings based on the need to consider further contaminants on a schedule determined by the Department.
- It is recommended that the TRAC operate for 5 years, after which time the Department and the agencies involved would evaluate the role, responsibilities, and resource commitments of the TRAC and each members' involvement. If it is determined that the TRAC should continue, then the Department would specify the time frame and any changes in its operation.
- DEC will establish a list serve of TRAC members for sharing monitoring data and other information and TRAC members will communicate by e-mail, telephone, and other effective means as circumstances warrant.
- Operation of the TRAC will be an open process. Meetings will be opened to the public and relevant materials will be posted on a designated webpage.

ONGOING PEST MANAGEMENT OUTREACH AND EDUCATION EFFORTS

Outreach to Stakeholders and the Public on the Long Island Strategy

It will be important to inform stakeholders of the Strategy (e.g., water consumers, local governments on Long Island, pesticide applicators, pesticide product registrants, etc.) to ensure its successful implementation. Only if stakeholders are informed about the Strategy can it serve as a framework for benefits which accrue from protecting water quality while continuing to meet critical pest management needs. Therefore, outreach will be conducted on the completed draft and final Strategy, such as:

- Information about the Strategy and related outreach will be available on the Department website.
- DEC held public information meetings on the draft Strategy in Nassau and Suffolk counties and published notice of the meetings in the *Environmental Notice Bulletin* and potentially in publications of involved associations.
- The Department will reach out to involved organizations to expand information dissemination on the Strategy through the organizations' communication channels (e.g., websites, newsletters).

Ongoing Outreach and Education Activities

Outreach and education regarding pesticide and pest management and water quality are provided by a number of governmental and non-governmental entities. Outreach also includes information regarding pollution prevention elements addressed in this Strategy, such as nonpoint source management and integrated pest management (IPM). Education is provided through a variety of mechanisms, including training courses, staff presentations, compliance assistance, website postings, and printed materials. Outreach activities of the primary entities are summarized below.[67]

State Agency Outreach and Education

DEC

As the lead State agency regulating pesticides, the Department conducts many forms of pesticide and pest management-related outreach and education, through the Division of Materials Management in Albany and in the nine DEC Regional Offices. [68]

Department Pesticide Control Specialists on Long Island (Region 1), and in all Regional Offices, provide information on a local level on many pesticide management matters, such as pesticide use restrictions for water quality protection which are communicated to user groups in the affected area. DEC outreach and education includes:

- Pesticides program staff training sessions for certified applicators and technicians,

[67] See Component 2 of this Plan for a summary of the overall roles of entities involved in pesticide management and water quality on Long Island.
[68] For more information about the NYSDEC pesticides program, see http://www.dec.state.ny.gov/chemical/298.html.

- Staff presentations, workshops and meetings with pesticide applicators and user groups, pesticide product registrants, and others regarding these matters,
- Pesticides compliance assistance regarding State pesticide laws and regulations,
- Information on registered pesticides through the New York State Pesticide Product, Ingredient and Manufacturer System (PIMS) databases and staff answers to questions on information in that database,
- Brochures and other printed materials on IPM, pesticides, and pest management, and
- Detailed website outreach resources.

The DEC Division of Water (DOW) provides information about groundwater in general and specifically about the Long Island aquifers[69], watershed management and assessments, water quality standards and guidance, oceans and estuaries and other subjects. DOW also manages the New York State Nonpoint Source (NPS) Management Program, which includes the NPS Management Plan and produces publications (e.g., Management Practices catalogue) and conducts special projects on these subjects.[70]

NYS Department of Health

The NYS Department of Health (NYSDOH) oversees and conducts public notification for significant detections of pesticides in water supplies. Key responsibilities are assigned to local health departments and water suppliers with oversight and policy direction from NYSDOH (e.g., Suffolk County Department of Health Services would advise of detections above the reference point). For individual private supplies, the well owner will be notified regardless of the level of detection. NYSDOH determines the appropriate notification if a public health threat is indicated. In addition, the NYSDOH Bureau of Water Supply Protection prepared the Source Water Assessment Plan (SWAP). The program under that Plan focuses on assessing the susceptibility of public water systems to contamination. Information collected is used to direct local and state protection efforts and oversight of public drinking water systems.[71]

NYS Department of Agriculture and Markets

The mission of the NYS Department of Agriculture and Markets, Division of Land and Water Resources includes development and implementation of environmental stewardship programs on farms to help protect water resources from pollution. The Department provides staff, office space and administrative support for the NYS Soil and Water Conservation Committee (S&WCC). The S&WCC and its network of district staff also provide outreach at the local level.

Agriculture and Markets also administers New York State funds for the S&WCC's Agricultural Nonpoint Source Abatement and Control Program, chairs the Agricultural Environmental Management (AEM) Steering Committee and administers New York State farmland protection programs. The S&WCC is responsible for the AEM program and the S&WCC and the Soil and Water Conservation District staff disseminates information.[72]

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[69] NYSDEC online information on Long Island aquifers can be found at http://www.dec.ny.gov/lands/36183.html.
[70] For more information about the NYSDEC DOW, see (http://www.dec.state.ny.us/website/dow/index.html.
[71] NYSDOH makes available information about the Source Water Assessment Plan and Program as well as other source water information at http://www.health.state.ny.us/nysdoh/water/swap.htm.
[72] For more information about the Department, S&WCC, and AEM, see http://www.agmkt.state.ny.us/.

Nassau and Suffolk Counties

At the local government level, Suffolk and Nassau counties' county water quality coordinating committees and watershed protection committees have important roles regarding information dissemination on groundwater protection, water quality, and pesticides.[73]

Federal Government

The U.S. Environmental Protection Agency (USEPA) provides many forms of outreach and education on water quality at the national level, beyond the scope of this document, as well as outreach regarding Long Island. USEPA maintains extensive resources online regarding groundwater and water quality in general as well as on Long Island, including a report on the Nassau-Suffolk Aquifer System and an explanation of the federal water quality standards.[74] USEPA is a partner in the Long Island Sound Study (LISS) and maintains information on and links to LISS and "Sound Health 2010, Status and Trends in the Health of Long Island Sound."[75]

The U.S. Geological Survey (USGS) has published numerous assessments of pesticides in water resources for New York State and the rest of the nation. The USGS maintains an online publication search engine, in which information on Long Island water resources and other areas of the State can be found.[76]

Other Entities Conducting Outreach and Education

Cornell University**,** through its New York State College of Agriculture and Life Sciences Pesticide Management Education Program (PMEP) [77] disseminates information to pesticide applicators and others on subjects related to this Strategy by:

- Serving as a pesticide information center for Cornell Cooperative Extension field staff, growers, commercial applicators, pesticide formulators/distributors, and private citizens,
- Developing training manuals for pesticide applicators,
- Offering training for pesticide applicators,
- Providing online information to the regulated community, such as a calendar of available recertification courses and the New York State Pesticide Product, Ingredient and Manufacturer System (PIMS) databases (funded by DEC as a search system for pesticide product information).

The NYS Integrated Pest Management (NYSIPM) Program at Cornell provides information on IPM through meetings and brochures and other printed materials, to growers, golf courses, vineyards, schools, municipalities and homeowners on IPM and pest management. NYSIPM also

[73] For more information about Suffolk and Nassau County programs, see http://www.co.suffolk.ny.us/
[74] A link to the USEPA Nassau-Suffolk Aquifer System report is on the NYSDEC website at http://www.dec.ny.gov/lands/36183.html. Other USEPA information on Long Island water resources can be found at http://www.epa.gov .
[75] For information on "Sound Health 2010", visit http://longislandsoundstudy.net/ .
[76] The USGS online search engine for New York State can be found at http://ny.cf.er.usgs.gov/biblio/search_biblio.cfm.
[77] For information about PMEP, see http://pmep.cce.cornell.edu.

develops and makes available Organic Guides for Fruits, Vegetables and Dairy.[78] The NYSIPM Program also provides online resources and a publication list.[79]

Additionally, Cornell Cooperative Extension produces written information on pest management, such as "Lawn Care without Pesticides" (Information Bulletin 248). The document is a detailed manual entitled for homeowners on practices for lawn maintenance and pest management without pesticides.[80]

Other entities provide information on pest management, pesticides use, and water quality:

- Professional pesticide applicator associations,
- Advocacy groups, many of which have public education training missions, and hold trainings and/or maintain online information,
- regional planning agencies, and task forces and committees with a water quality focus, and the Non-point Source Committee, and
- Community Water Systems (Annual Water Quality Reports).

Certified Pesticide Applicator Training

An essential element of pesticide pollution prevention is providing education and training to pesticide applicators regarding pesticides and water quality. New York State requires that private applicators be certified to apply "restricted use" pesticides and commercial applicators be certified to apply "restricted" and "general use" pesticides. Under New York State regulation, applicators must pass a DEC-monitored exam and complete DEC-approved training (to which DEC has assigned credits) to be certified or recertified.

As of June 2012, over 4,700 individuals on Long Island were certified by DEC to apply pesticides. This includes certified commercial applicators and technicians, certified private applicators (growers), and aquatic antifouling paint applicators. This regulated community needs to be aware of pesticides regulatory requirements and the relationship of pesticides application to groundwater on Long Island. The core sources of such information for applicators are certification and recertification training and training manuals.

Overall, applicator training is conducted on Long Island by PMEP/Cornell Cooperative Extension (CCE), private course sponsors, and DEC staff. Key to applicator training is the use of the *Pesticide Applicator Training Core Manual* and more than two dozen Pesticide Safety Training Manuals containing information tailored to a specific type of pesticide use by commercial and private applicators.
Examples include use of antifouling paints, termite control, agricultural plants, and sewer line root control. PMEP has had the central role in developing and updating the manuals, which are available from Cornell University for a fee. Examples of topics covered in PMEP/CCE training and/or manuals for pesticide applicators include pest management, pest and crop information, groundwater protection, integrated pest management, federal and State pesticide laws and

[78] For information on NYSIPM Organic Guides for Fruit, Vegetables and Dairy, see http://nysipm.cornell.edu/organic_guide/.
[79] http://www.nysipm.cornell.edu/.
[80] To view the Lawn Care without Pesticides manual, visit http://ecommons.cornell.edu/handle/1813/3574.

regulations, pesticide application technology, endangered species protection, pesticide efficacy, worker safety, labels, and many others.