

# PESTICIDES REGISTRATION & WATER QUALITY



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# OUTLINE

- What is a Pesticide?
- Pesticide Registration
- Urban Water Quality Monitoring



# WHAT IS A PESTICIDE?

“Pesticide” means any substance or mixture of substances:

- intended for preventing, destroying, repelling or mitigating any pest;
- any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant; and
- any nitrogen stabilizer.
- It does not include multicellular biological controls such as mites, nematodes, parasitic wasps, snails or other biological agents not regulated as pesticides by the U.S. Environmental Protection Agency.



# WHAT ARE PESTICIDES?



Insecticides

Herbicides (includes algaecides)

Fungicides

Miticides

Rodenticides (rat & mouse baits)

Repellents (skin-applied, flea & tick, deer repellents)

Biological controls

Disinfectants/sanitizers

Plant & insect growth regulators

Wood preservatives

Plant incorporated protectants



No endorsement intended or implied

# PESTICIDE REGISTRATION

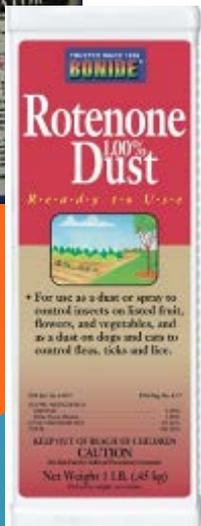
- **Maine law:** **ALL** pesticides distributed in Maine must be registered by the Board of Pesticides Control
- Most registered by the EPA
- Some exempt from federal registration, but not state registration [minimum risk/25(b)]
  - Exempt from toxicity & efficacy testing
  - Cannot make human health claims
  - NOT risk-free



# BEWARE OF FALSE & MISLEADING CLAIMS

- “Organic” pesticides – do not exist
- “Natural” - meaningless
- “Nontoxic” - “-cide” means to kill

“Organic” ≠ Safe  
Synthetic ≠ Highly toxic  
Natural ≠ Safe



Introducing...  
**ALL-NATURAL ORGANIC**  
**Earth Friendly™**  
Preemergence weed control  
and fertilizer  
for lawns and gardens



All pesticides have risks!!!

No endorsement intended or implied

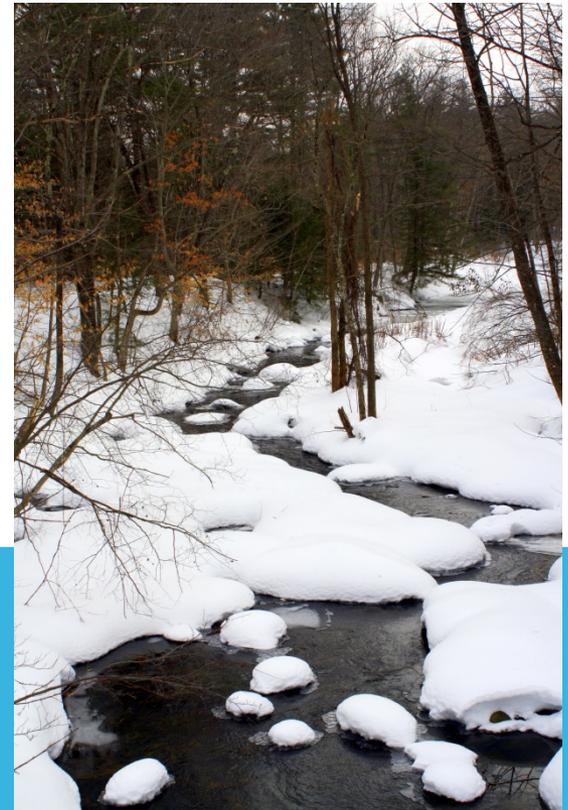
# URBAN WATER QUALITY MONITORING



# USGS NATIONAL WATER QUALITY ASSESSMENT

## Sampled urban streams

- Insecticides occurred more frequently in urban streams than they did in agricultural area streams
- Herbicides detected in 99% of urban stream samples
- Phosphorous found at same levels as in agricultural streams



# RESIDENTIAL PESTICIDE STUDIES 2003

**Objective:** Look for presence of homeowner use pesticides in surface water

## Penobscot River, Brewer

- 6 samples analyzed for 8 pesticides
- Dicamba: 1 sample
- 2,4-D: 1 sample

## Small streams in Augusta & Scarborough

- non-detect

## Friends of Casco Bay (FOCB)

- 10 samples analyzed
- Dicamba: 3 samples
- Propiconazole:
  - 2 samples
- Clopyralid: 1 sample

**All results below current aquatic life benchmarks**

Aquatic life benchmarks are estimates of concentrations below which pesticides are not expected to harm aquatic life.



# URBAN SEDIMENT SAMPLING

## 2007: Back Cove

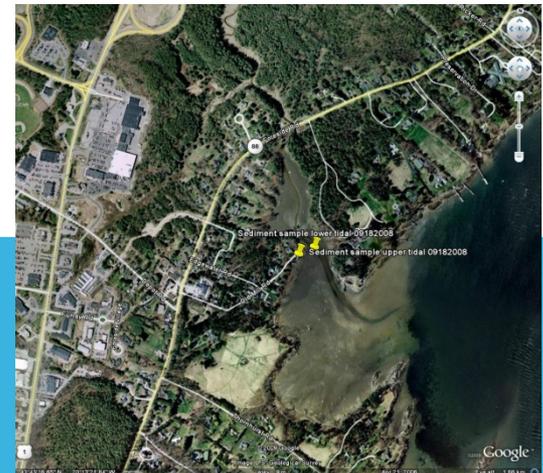
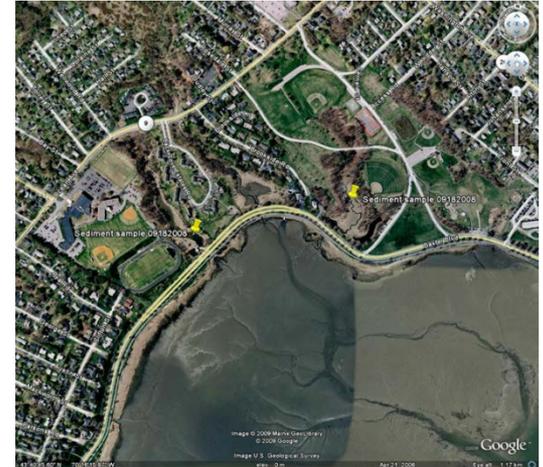
- Non-detect; protocol flawed

## 2008: Mussel Cove, Payson Park

### Creek, Back Cove Pumping Station

- Analyzed for 5 synthetic pyrethroids
- Bifenthrin detected in all 4 samples

**No aquatic life benchmarks for sediment**



# URBAN SEDIMENT SAMPLING CONT.

2009-2010: Portland/South Portland

6 samples each year

| Pesticide                | # of Detections 2009 | # Detections 2010 |
|--------------------------|----------------------|-------------------|
| Bifenthrin               | 5                    | 4                 |
| $\lambda$ -Cyhalothrin   | 4                    | 0                 |
| Permethrin               | 1                    | 1                 |
| Cypermethrin             | 4                    | 0                 |
| Sumithrin                | Not tested           | 6                 |
| Esfenvalerate            | 3                    | 1                 |
| Piperonyl butoxide (PBO) | Not tested           | 2                 |

# GULF OF MAINE COASTAL MONITORING PROJECT

Initiated in response to:

- CT study, *Health Assessment Monitoring of American Lobster in Long Island Sound*, conducted 2012
- Proposed bill in Maine to ban use of methoprene and resmethrin
- Studies confirming pesticides in water and sediments

Objective: To examine whether current pesticide residues have the potential to affect the lobster resource in Maine, directly or via impact on other marine organisms.



Photo courtesy of Gary Fish

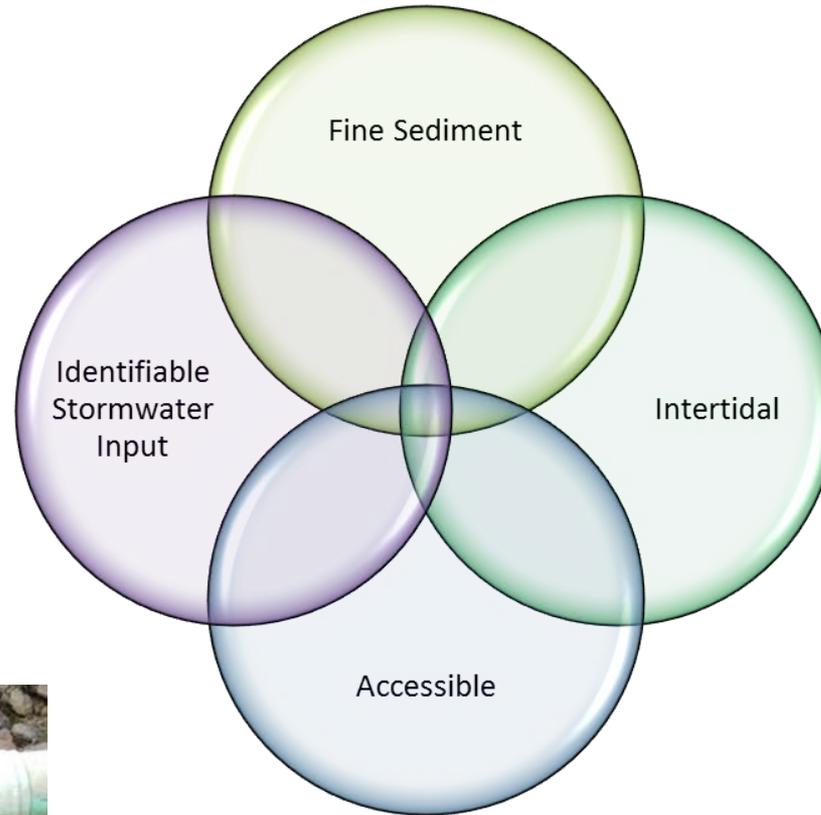
# GULF OF MAINE COASTAL MONITORING PROJECT

## 20 sites paired for stormwater and sediment sampling

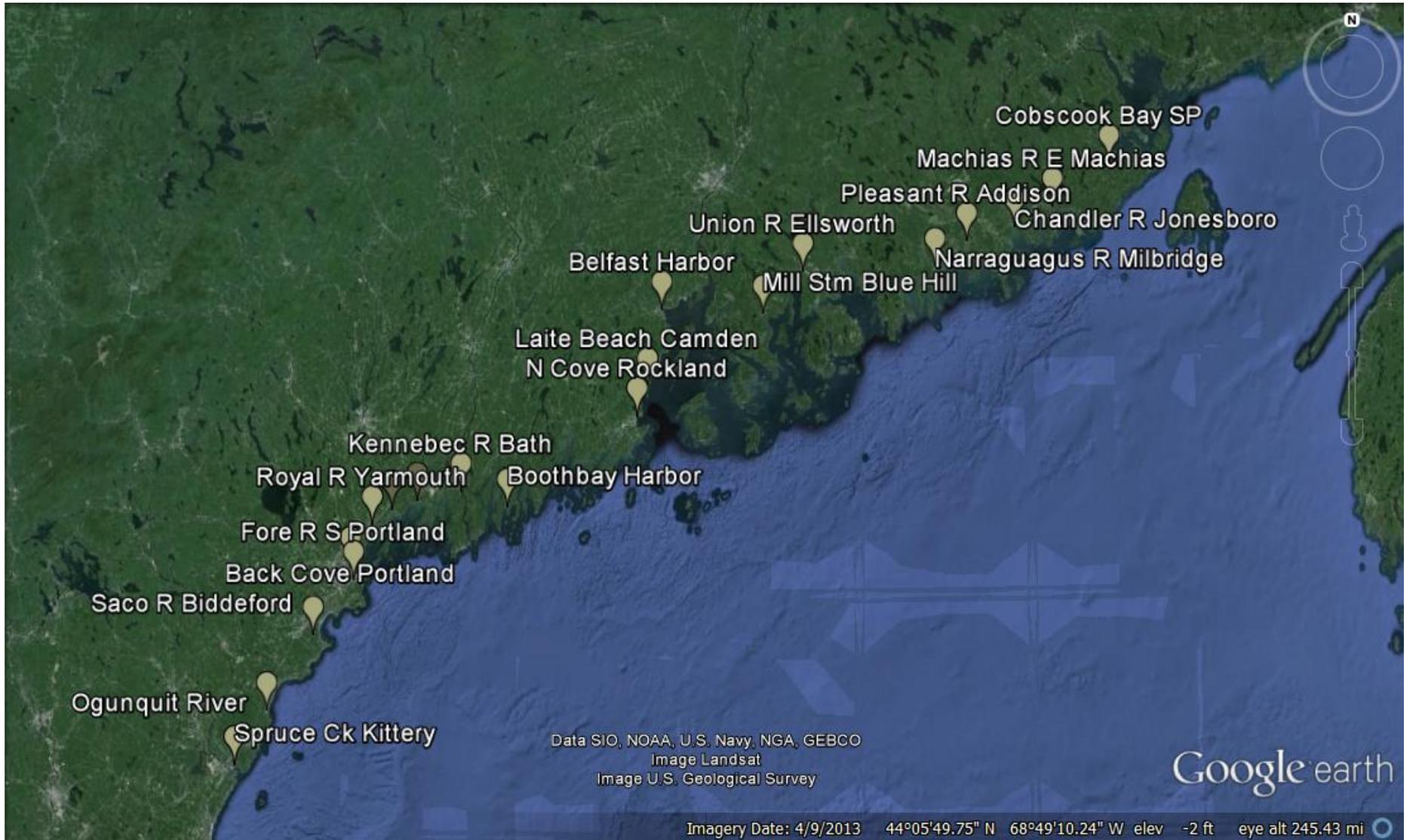
- Targeted sampling – most likely sites of contamination
- Somewhat spatial distribution statewide
- Representative of urban/suburban/rural landscapes
- Concentration of population or drainage from blueberry lands
- Tidal flats



# SITE CRITERIA



# 2014 SEDIMENT SAMPLING SITES

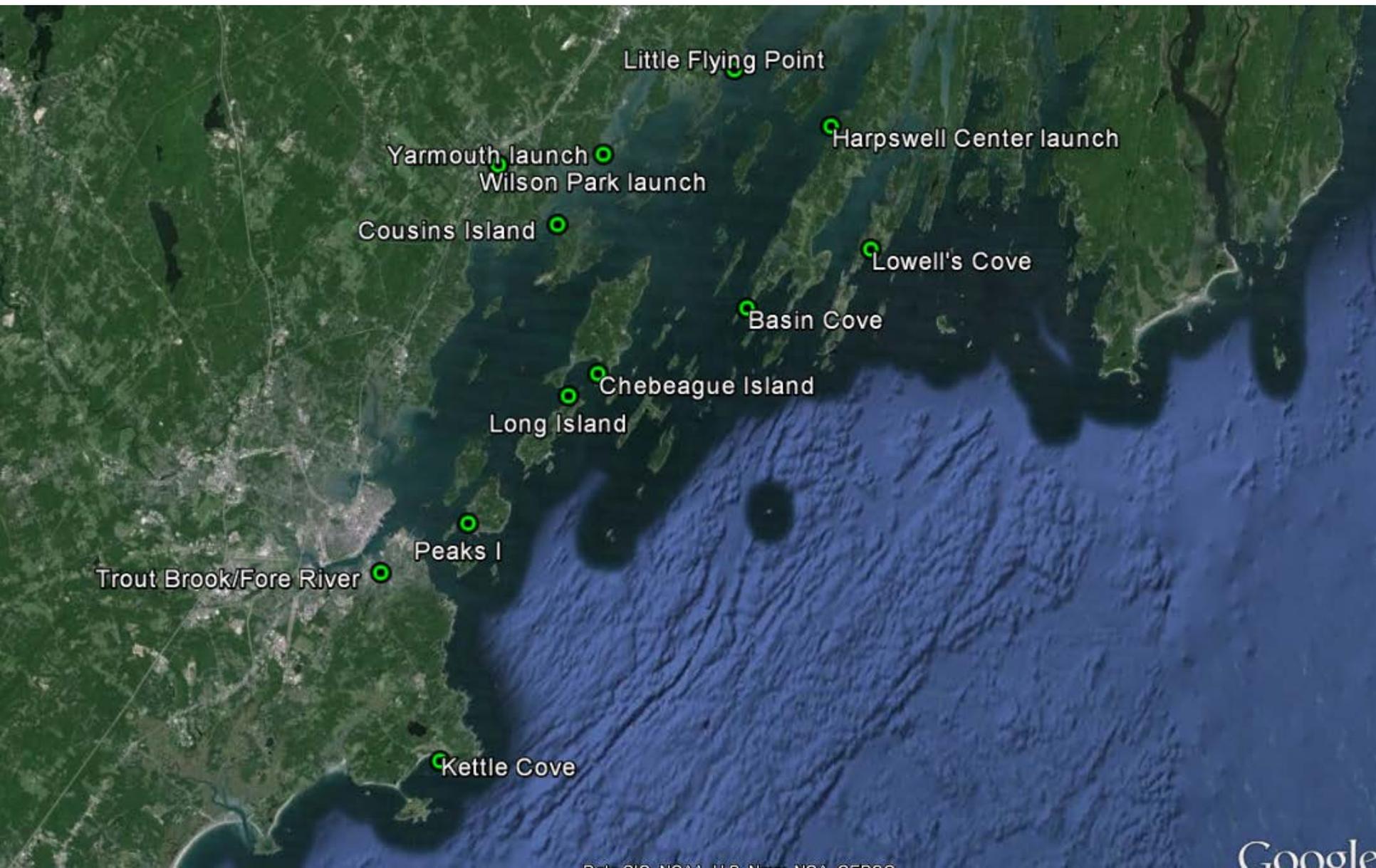


# GULF OF MAINE COASTAL MONITORING PROJECT 2015

- Targeted sampling – most likely sites of contamination
- Focused on Casco Bay
- Representative of urban/suburban/rural landscapes
- Similar to juvenile lobster habitat



# 2015 SEDIMENT SAMPLING SITES



# ANALYSES

Storm water analyzed for 101 active ingredients

Sediment analyzed for:

- Methoprene
- Fipronil
- Fipronil metabolites
- Pyrethrins
- Pyrethroids
- Piperonyl butoxide



# SEDIMENT RESULTS



## 2014

- ❖ Bifenthrin - 11 of 20 sites
- ❖ Cypermethrin - 1 of 20 sites

## 2015

- ❖ Bifenthrin - 7 of 14 sites
- ❖ Fenvalerate - 1 of 14 sites

# STORMWATER RESULTS, 2015

- ❖ 2,4-D\* - 2/5 sites
- ❖ Bentazon - 1 site
- ❖ Hydroxy-Atrazine\* - 1 site
- ❖ Fipronil \* - 4/16 sites
- ❖ Fipronil metabolites\* - 4/13 sites
- ❖ Hexazinone - 6 sites
- ❖ Imazapyr \* - 1/2 sites
- ❖ Imidicloprid \* - 3/11 sites
- ❖ MCPA - 1 site
- ❖ MCPP+ \* - 2/4 sites
- ❖ Metolachlor \* - 2 sites
- ❖ Prometon \* - 2 sites
- ❖ Propiconazole - 1 site
- ❖ Terbacil - 2 sites
- ❖ Triclopyr - 1 site

\*Active ingredients detected and number of detects in the Casco Bay sites

\*\* No exceedances of the EPA Aquatic Life Benchmarks

# CONCLUSIONS

- A variety of agricultural and residential use pesticides are found in stormwater and sediment.
  - Herbicides and insecticides commonly used in residential lawn care are found in streams and sediments.
  - New technology has led to very low detection limits, resulting in more detections than in past studies.
  - Concentrations in water are below human health advisories and aquatic life benchmarks.
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# CAVEATS

“No detection” does not mean the pesticide of interest was not present, only that the analysis was not of high enough resolution to detect it if it is present.

There are no aquatic benchmarks for sediments.

Pyrethroid concentrations are highest near sources of runoff from urban watersheds.

Bioavailability of pyrethroids in sediments is largely unknown.



# SUMMARY

- Only pesticides registered in the State of Maine can be distributed.
  - The terms “organic”, “natural”, and “nontoxic” are false and misleading when used to describe pesticides.
  - Minimum risk pesticides are not risk-free.
  - Insecticides and herbicides are frequently detected in urban streams and are usually related to lawn and garden use by homeowners.
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# Questions?

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