Biological Implications of Pesticides in Small Urban Streams

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Study Purpose
Assess the biological effects of pesticides present in small streams
Analyze for over 150 different pesticides
Analyze for metals
Assess toxicity using 3 different test species
Develop effects thresholds
Seattle

Study Area
Laboratory Analyses
Pesticides

Dissolved insecticides (USGS schedule 2010)
Chlorinated insecticides (DDT) (Manchester)
Chlorinated herbicides (2,4-D)
Triazine compounds (atrazine)
Organophosphorus insecticides (Diazinon)
Glyphosate (Roundup)

Metals
## Threshold Effects Levels

<table>
<thead>
<tr>
<th>2,4-D</th>
<th>2,6 Dichlorobenzamide</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Nitrophenol</td>
<td>Bromacil</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>Carbofuran</td>
</tr>
<tr>
<td>Dicamba</td>
<td>Dichlobenil</td>
</tr>
<tr>
<td>Dichloroacetate</td>
<td>Diuron</td>
</tr>
<tr>
<td>Ethofumesate</td>
<td>MCPA</td>
</tr>
<tr>
<td>MCPP</td>
<td>Metolachlor</td>
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<tr>
<td>Metalaxyl</td>
<td>Napropamid</td>
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<tr>
<td>Pentachlorophenol</td>
<td>Prometon</td>
</tr>
<tr>
<td>Simazine</td>
<td>Tebuthiron</td>
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<tr>
<td>Trifluralin</td>
<td></td>
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</tbody>
</table>

Toxicity

Green algae *Selenastrum capricornutum*
Duck weed *Lemna minor*
Water flea *Ceriodaphnia dubia*
Results
Pesticides

Frequency of Detection All

N = 53
N = 32
Freq of Detection Baseflow

N = 21
Threshold Effects Levels Exceeded

Diazinon  7
Copper    3
Simazine  2
DDT       2
Lead      1
Malathion 1

Total  16
Observed Toxicity

47 % (25 times total)

59 % Storm (19)

29 % Baseflow (6)
What does it all mean?

Acute Toxicity was observed in 2 samples.

Toxicity was observed in 4 samples and thresholds were exceeded.

In an additional 4 samples no toxicity was observed, yet thresholds were exceeded.
Uncertainty

Toxicity was observed in 19 samples yet no thresholds were exceeded.

Chemicals not tested
  Other pesticides
  Surfactants
  Other chemicals
Other Issues

Mixtures

Test Durations
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