

10 Cities Project Water Quality Results

SURFACE WATER & SEDIMENT
TESTING CONDUCTED IN 2019
FOR 10 CITIES IN MAINE

Project history

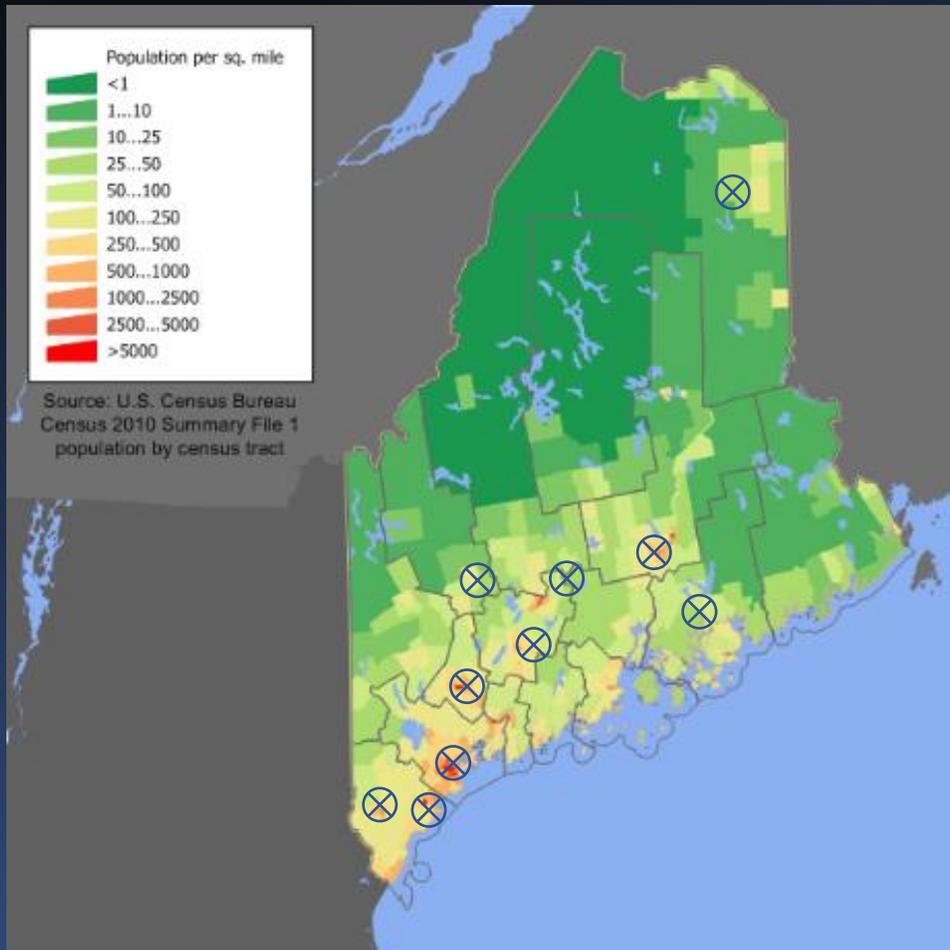
- March 8th 2019 proposed 10 Cities WQ Project to the board

Project 2: 2019 Ten Cities Project

The objectives of this study are to:

- Assess the occurrence of pesticides in surface water and sediment in urban waters along a population gradient of the 10 largest Maine cities.
- Establish the feasibility of implementing passive sampling techniques for future BPC water quality sampling by comparing passive sampling results to our traditional grab samples.
- Establish a baseline for future trend studies of pesticide contamination in urban waters of Maine's ten largest cities.

Sampling activities Summer 2019



| Population Centers* | Waterbody | Population† |
|--|--------------------|-------------|
| Portland / South Portland | Fore River | 91,196 |
| Lewiston-Auburn (Durham) | Androscoggin River | 59,647 |
| Bangor / Brewer / Orono (Hampden) | Penobscot River | 42,521 |
| Biddeford / Saco | Saco River | 39,759 |
| Sanford | Mousam River | 20,798 |
| Augusta | Kennebec River | 19,136 |
| Waterville (Sidney) | Kennebec River | 15,722 |
| Presque Isle | Aroostook River | 9,692 |
| Ellsworth | Union River | 7,741 |
| Farmington | Sandy River | 7,741 |

*Locations in parentheses indicate actual sampling location.
†Population data from 2010 US Census

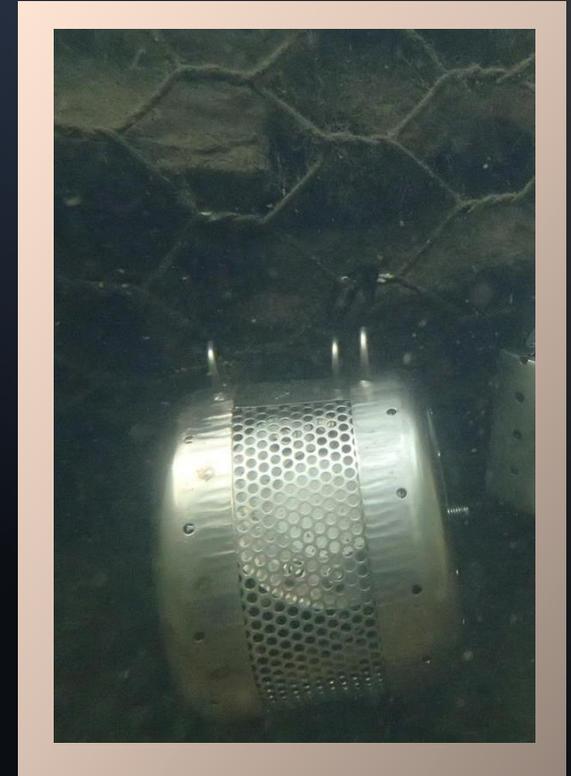
Selected cities are marked with an 'X' in a circle on the map above.

At each city:

- Grab samples



- Passive sampler



A quick detour:

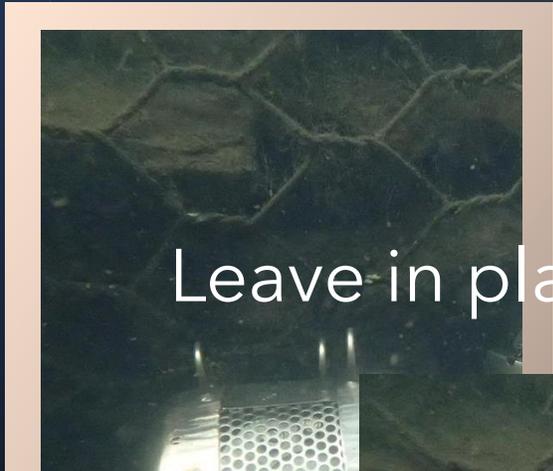
What is a passive sampler?

Leave in place for 3 - 4 weeks



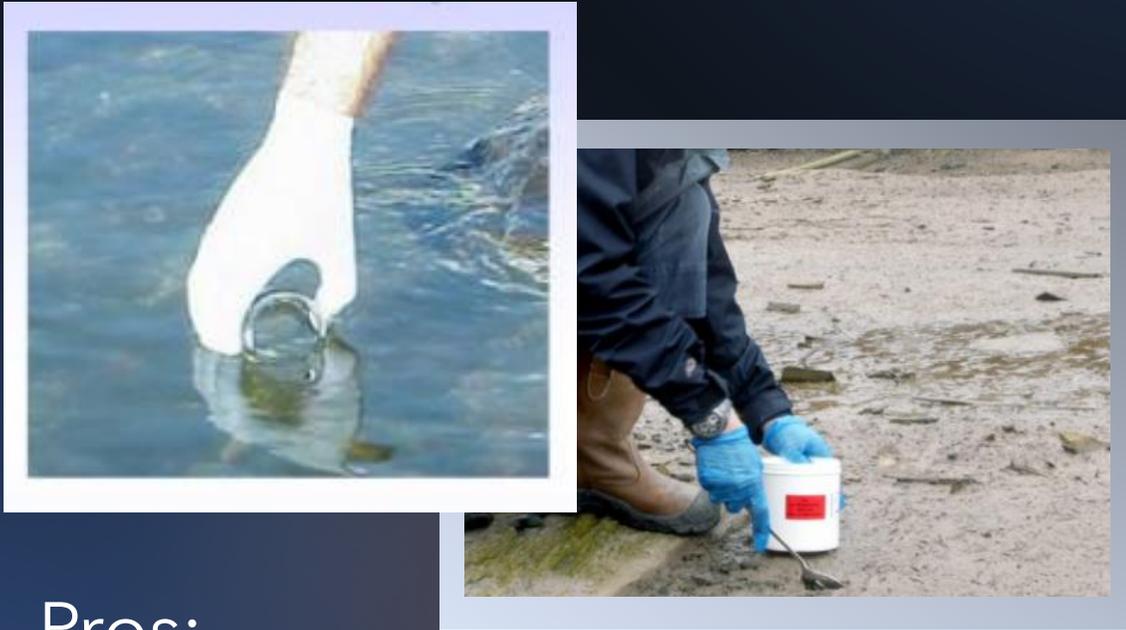
Fancy plastic

In an expensive metal housing



At each city:

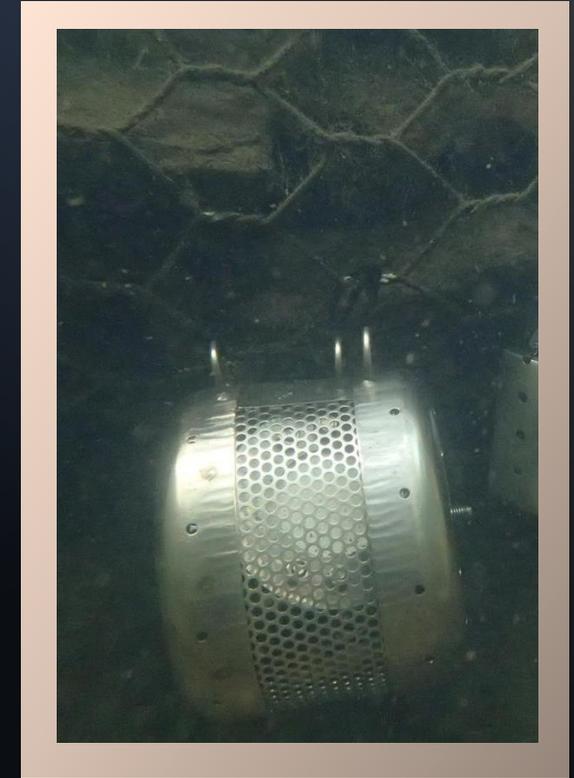
- Grab samples



Pros:

provides concentrations

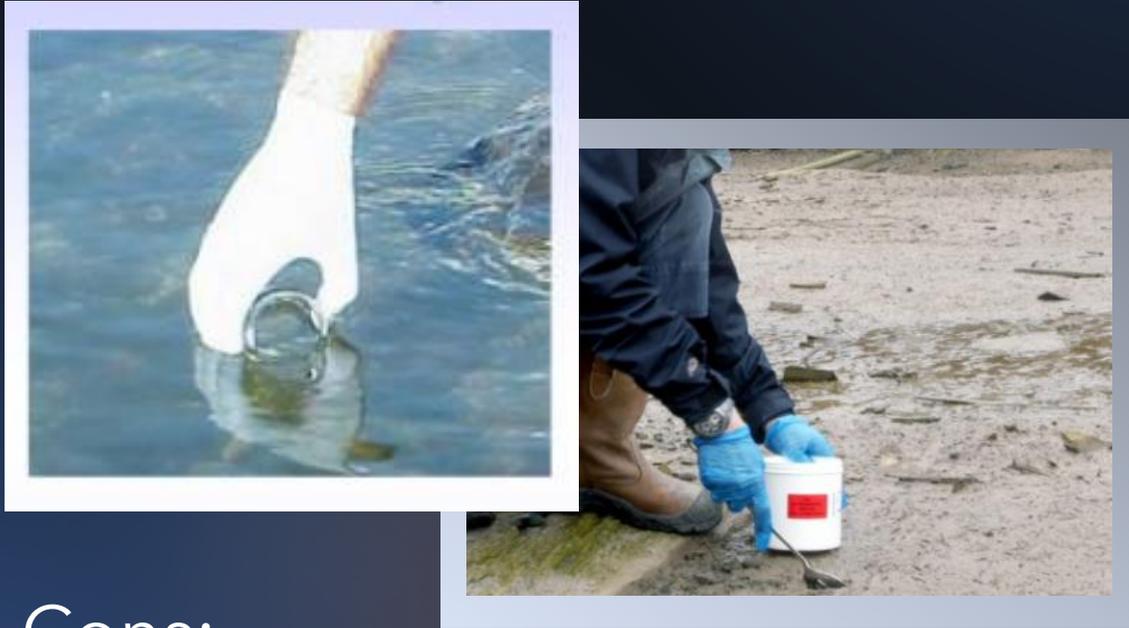
- Passive sampler



captures daily changes

At each city:

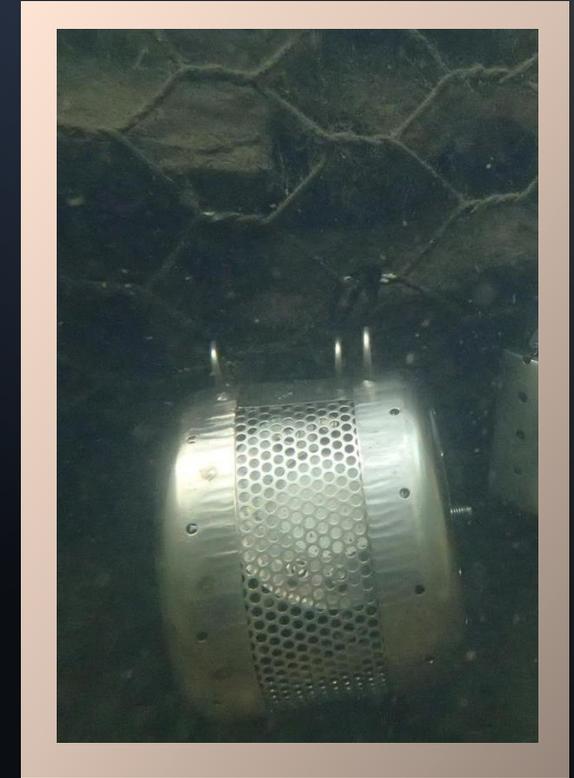
- Grab samples



Cons:

only captures snapshot
in time

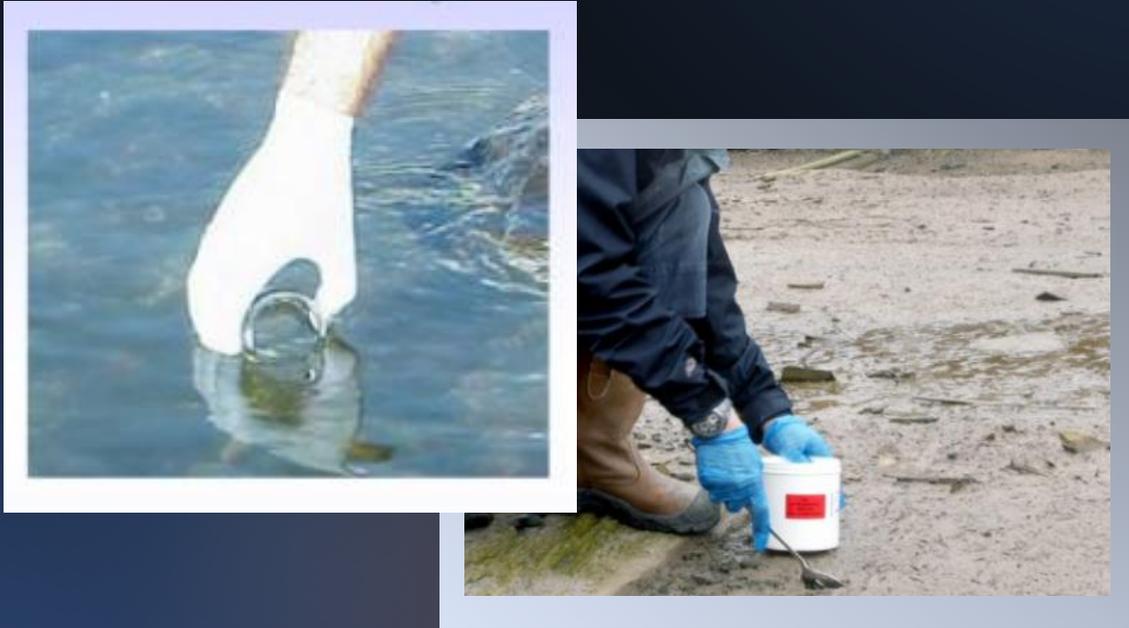
- Passive sampler



doesn't give
concentrations*

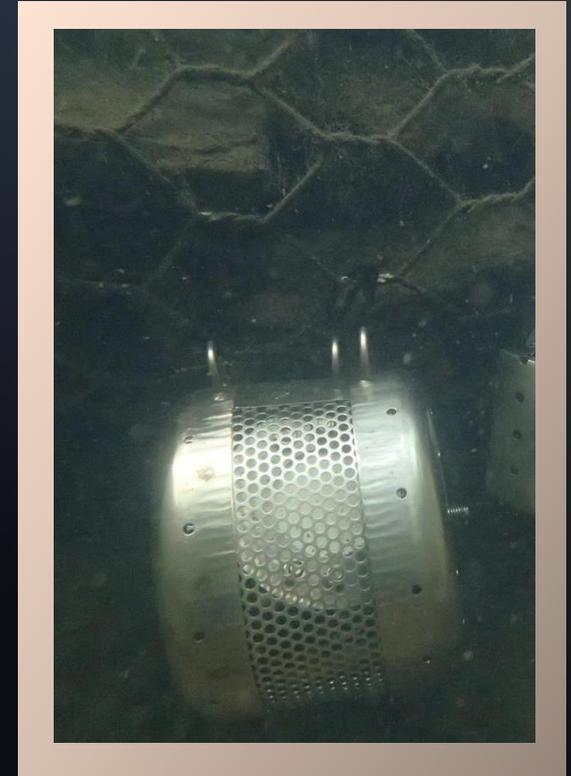
At each city:

- Grab samples



5- water grab samples
1- sediment sample

- Passive sampler



1- POCIS sampler

Grab sample results

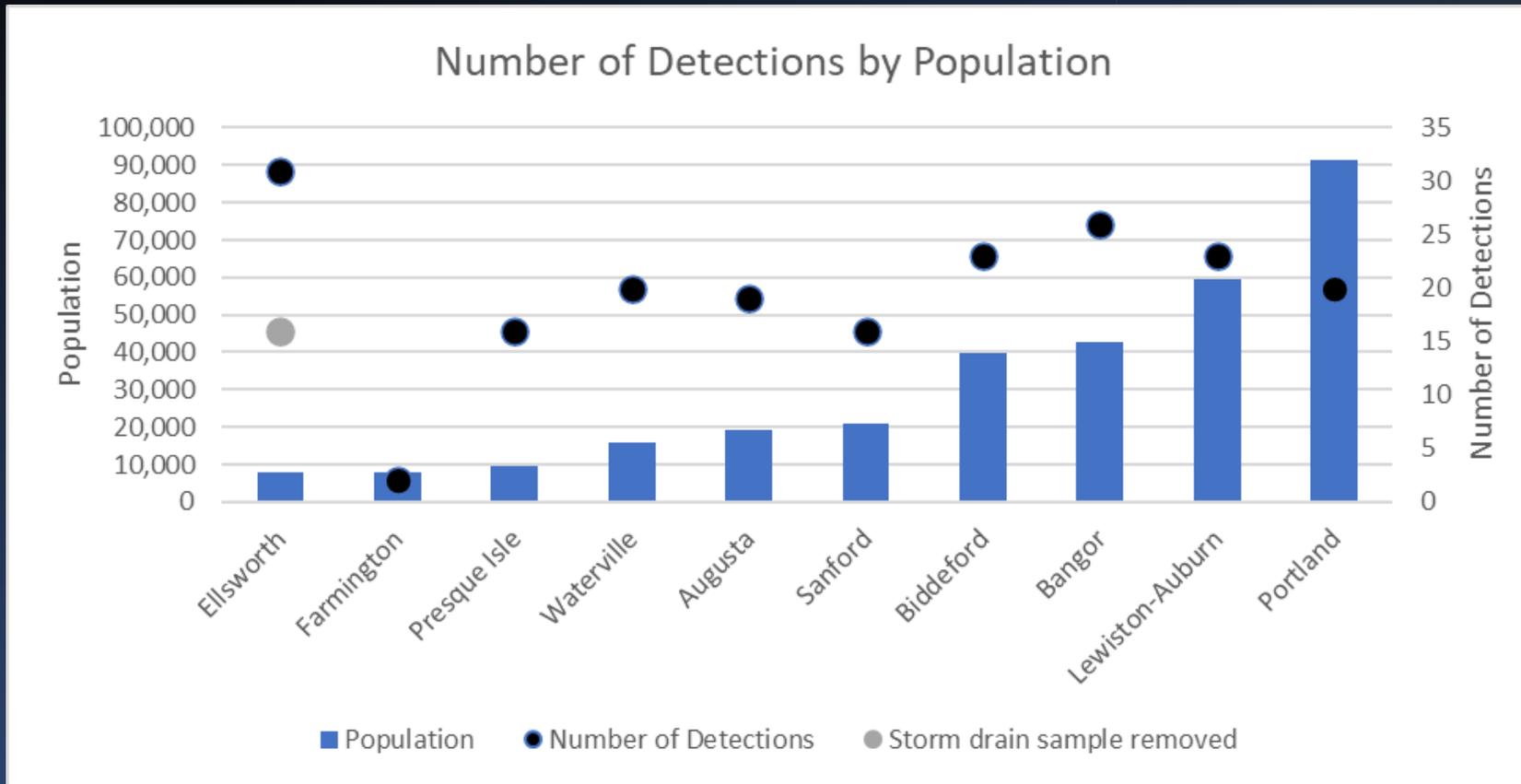


Figure 2. Number of analyte detections in surface water grab samples across the range of population centers. Bars represent the number of residents. Circles represent the number of times all of the samples from a city detected a pesticide. Five samples were taken at each city location. The gray circle represents the Ellsworth totals with a grab sample removed, see text for discussion.

Passive sampling (POCIS) results

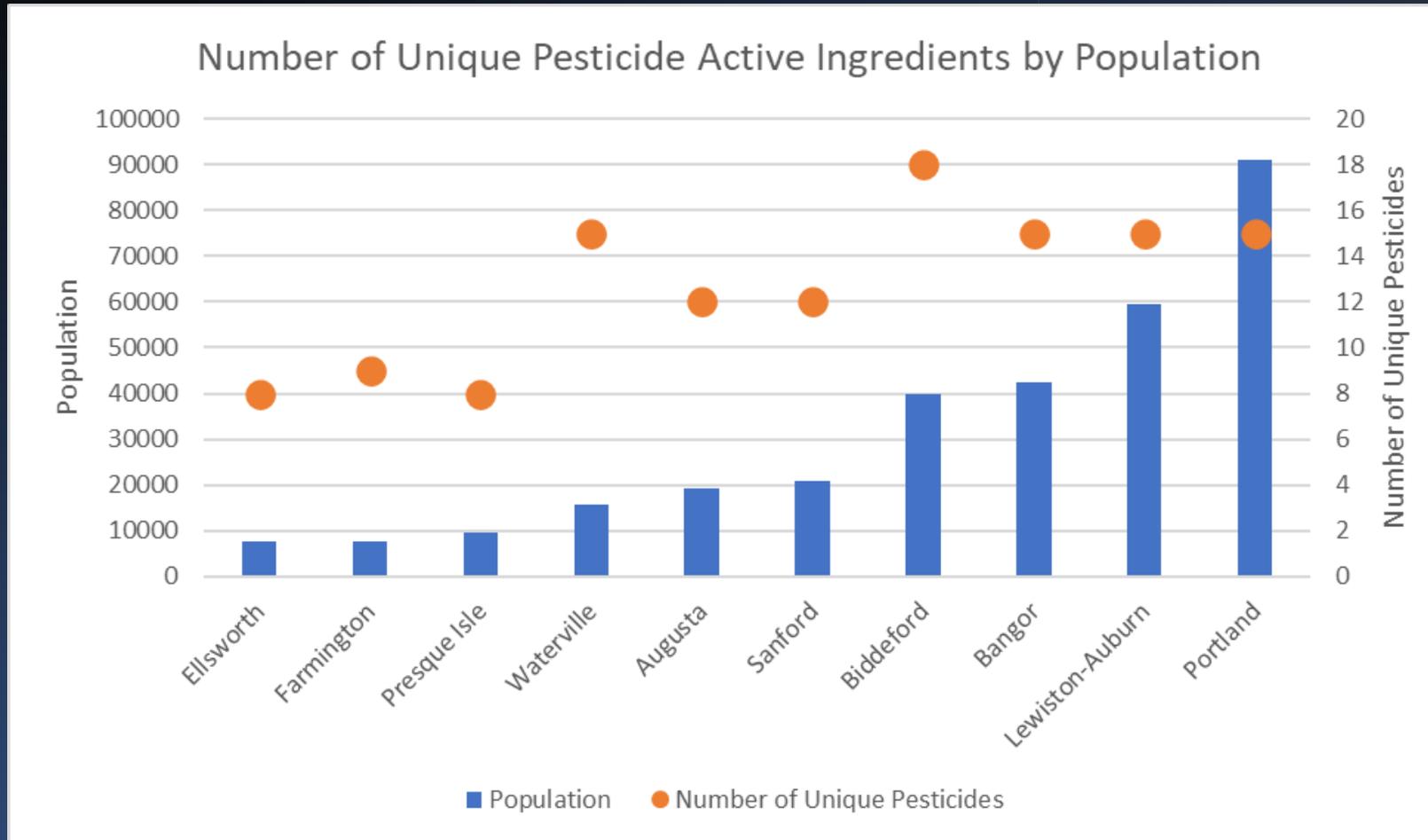


Figure 3. Number of unique pesticide products identified in surface water by passive sampling across the range of population centers. Bars represent the number of residents. Orange circles represent the number of different types of pesticides present. One POCIS sampler was used in each city, where it was deployed for one month.

Quick results summary

- No glyphosate
- Sediments contained only bifenthrin*
- All locations contained pesticides (range 8 to 18)
(out of 77 pesticides + 25 degradates)
- Variety of pesticides increases with population
- Out of 6,300 tests, two samples present over threshold values (bifenthrin & imidacloprid)
- Both methods helpful & work well together

