

Field Procedures and Preliminary Results of Low Level Mercury Monitoring

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Objectives

- Gain experience in Ultra-Clean Method (ppt or ng/L) sampling protocols.
- Developed “improved” data on dissolved Hg concentrations in selected waterways, representing a range of land-use types.
- Consider the impact of elevated flow on dissolved Hg concentrations in selected waterways.

Background

- Existing Mercury Criteria for NJ Surface Waters
 - Human Health = 144 ppt (total recoverable)
 - Acute Aquatic Life = 2100 ppt (dissolved)
 - Chronic Aquatic Life = 12.0 ppt (total recoverable)
 - Previously proposed Wildlife Criteria = 0.53 ppt (total recoverable)
- Available laboratory reporting limits.
 - Previous ambient monitoring : 20 ppt / 40 ppt
 - This project : USGS Wisconsin Lab 0.04 ppt

Sampling Procedures and Equipment Used in the Mercury Synoptic Study



Low Level Mercury Sample Collection Required The Use Of “Clean Hands/Dirty Hands” Methods.

Polyethylene Suits And Particle Masks Were Required To Prevent Sample Contamination.

All Sample Containers And Filtering Equipment Was Pre-Cleaned, Double-Bagged And Quality Assured By USGS’ Wisconsin Water Science Center’s Mercury Laboratory.

All Equipment, Which Came In Contact With Samples, Was Made Of Teflon Or Polyethylene.

All Sampling Equipment Was Kept Inside The Processing Chamber To Prevent Possible Contamination From Air And Wind Borne Particles.

Gloves Were Changed Often, Especially When Handling Various Equipment.

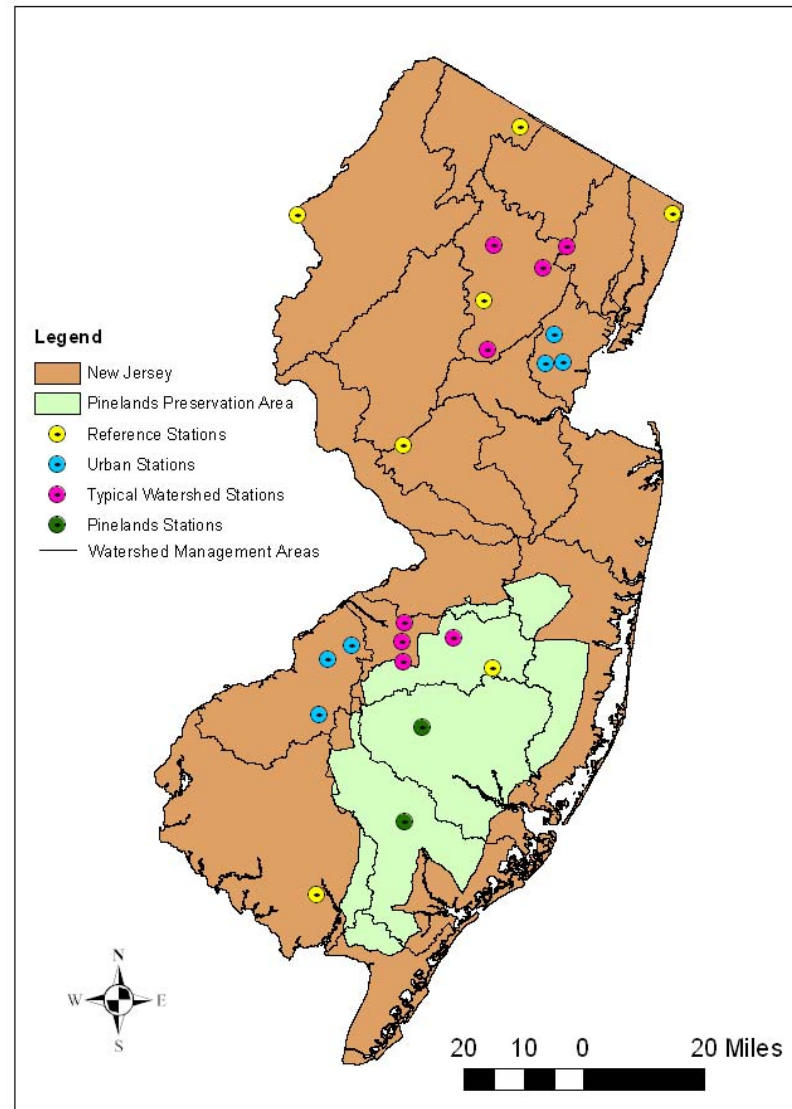
Field Blanks Were Taken Inside The Processing Chamber Prior To Sampling.



Project Design

Station Selection

**Stations
selected from
the existing
DEP / USGS
Ambient
Monitoring
Network**



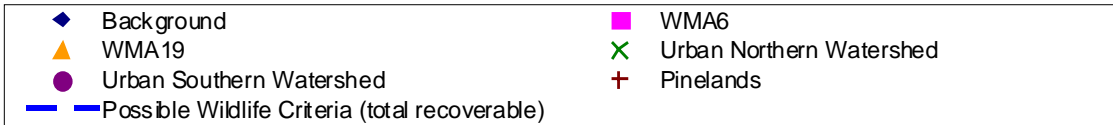
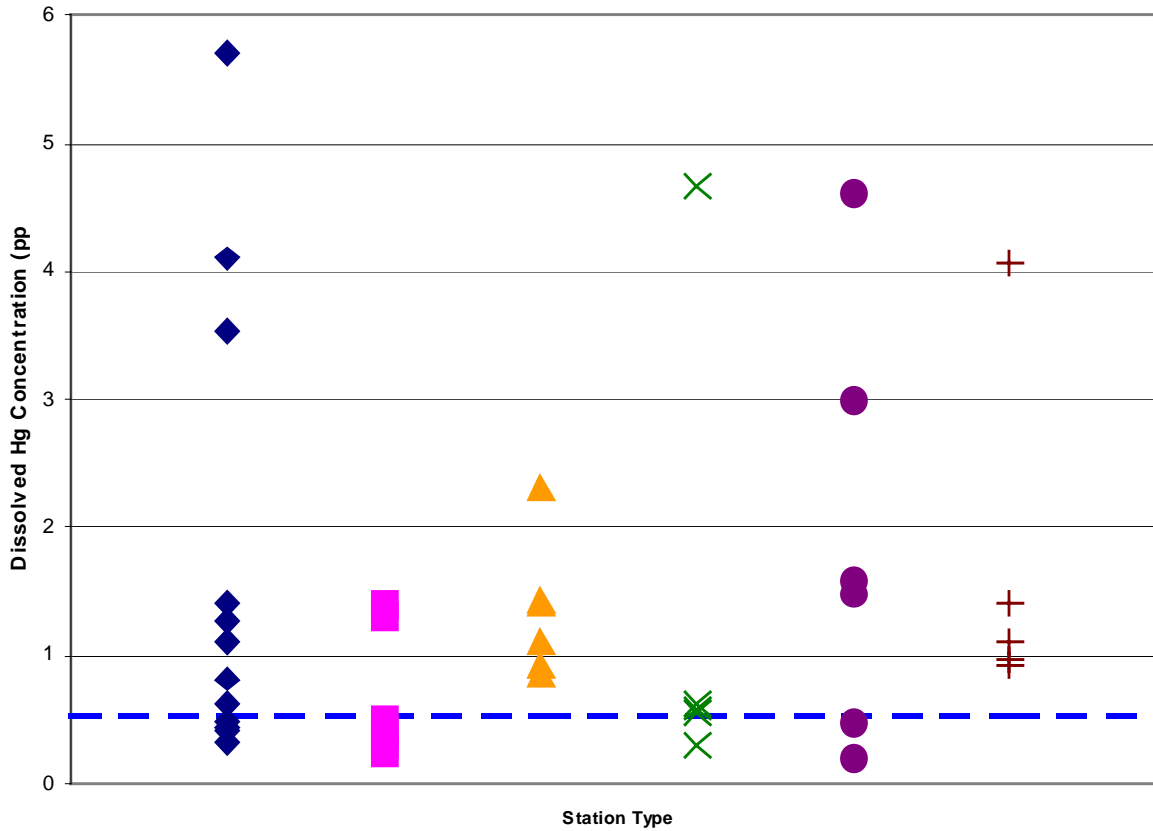
Results

- Blanks
 - 30 of 33 equipment blank results were at the laboratory reporting limit of 0.04 ppt.
 - The highest blank result was 1.04 ppt. Field notes indicate windy conditions during sample collection.
- Stream concentrations of dissolved Mercury ranged from 0.21 to 5.71 ppt, which is below existing surface water criteria.

Results

- Station type and station location were not good predictors of dissolved mercury concentrations.
- All data was within the range found at reference stations, regardless of station type.

Low Level Hg Results by Station Type



Summary Statistics

Minimum Value: 0.21 ppt
 Median Value: 0.96 ppt
 Maximum Value: 5.71 ppt

Potential Sources

1. Statewide median Hg concentration in rainfall = 11.5 ppt
2. General range of Hg concentrations in wastewater discharges = 3-30 ppt

Results

- Relatively high concentrations at some reference sites suggests that air deposition is a dominant factor effecting dissolved Hg concentrations in N.J.'s surface waters.
- Data suggests that higher Hg concentrations are associated with higher flow conditions.

What's Next?

- Determine methyl mercury concentrations in ambient waters.
- Determine total Hg/dissolved Hg ratios to develop locally representative translators.
- Consider limited implementation of low level Hg monitoring in routine ambient stream monitoring.

Further Information

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