USGS–EPA Collaboration
Temperate Plains Synoptic
EPA Level 3 Ecoregions

TPS Region
TPS – goals and approach

- Geographic distribution and seasonal changes in nutrient and contaminant stressors
  - Contaminants and nutrients in water over seasonal index period (NAWQA)
  - Contaminants in sediment (NAWQA)
  - Toxicity of sediment and water at all sites (CERC)

- Relations between chemical condition and ecological condition: relative risk from stressors, contaminant-specific risk
  - Ecological sampling at all sites (NRSA/States)

- Spatially explicit predictions of stressors and ecological responses
  - Stats and modeling (all)
TPS outcome –1

- Broad parametric and seasonal/temporal coverage of contaminant occurrence in the region
  - Seasonal occurrence of nutrients and 200+ pesticides in water
  - Occurrence of metals, pesticides, chlorinated and brominated compounds, and PAHs in sediment
  - Toxicity of sediments and water at all sites
TPS outcomes – 2

- Improved understanding of contaminant occurrence in relation to explanatory variables
- Improved predictive models of contaminant occurrence
TPS outcomes – 3

- Status of ecological condition of streams in the region
- Improved understanding of relations between contaminants stressors and ecological condition of streams
Collaborating on design

- **USGS/NAWQA needs sites that are:**
  - Distributed across stressor gradients to assess effects and make predictions
  - Easily accessible for weekly sampling (bridges)
  - Some targeted sites for additional objectives

- **EPA/NRSA needs sites that are:**
  - Randomly selected to allow regional inferences about conditions
  - Limited access is OK (single sample)
Site selection

- Match our sampling to NRSA at 50-60 sites
  - Follow EPA random site pull
  - Use our site criteria to match as many sites as possible
  - Coordinate recon with States to finalize sites during summer 2012

- Fill in gaps and address NAWQA objectives with additional 40-50 sites, adding:
  - Reference sites
  - Urban sites, including many EUSE and USBS sites (Milwaukee)
  - Local priority sites
Urban land use

Site targets versus land use
2008 NRSA site distribution

Percent of watersheds or sites

% urban in watershed

NRSA 2008

USGS targets

ag and ref

lt urban

15

dense urban

15

83%

70
Toxicity-Weighted Use (TWU)

(1) Agricultural use

(2) Pesticide Toxicity Index:

\[
\text{TWU}_{\text{taxon}} = \sum_p \left( \text{Use}_p / \text{MTC}_{p, \text{taxon}} \right)
\]

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>MTC _{cladocerans}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorpyrifos</td>
<td>0.275</td>
</tr>
<tr>
<td>Atrazine</td>
<td>20,000</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>7.85</td>
</tr>
<tr>
<td>etc…</td>
<td></td>
</tr>
</tbody>
</table>