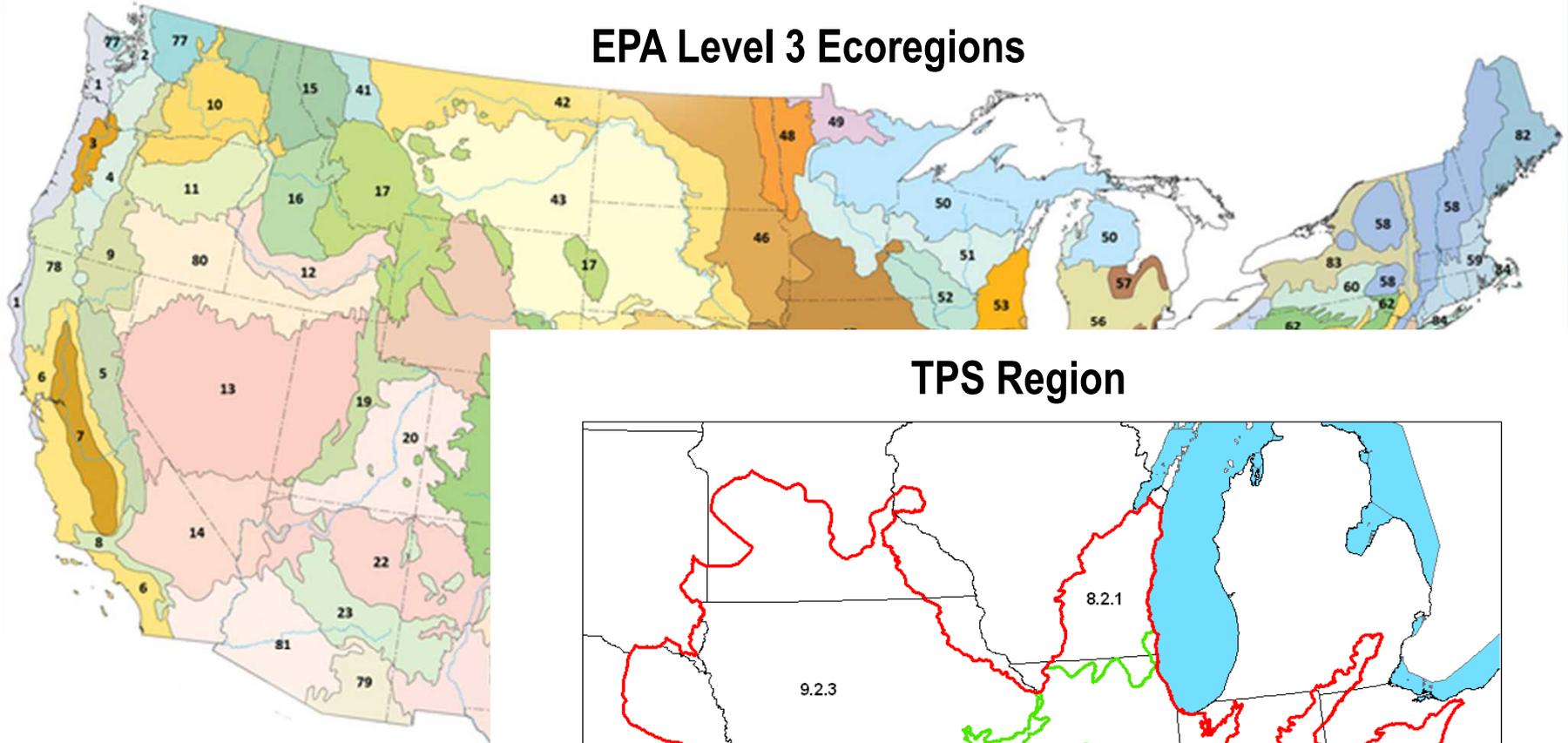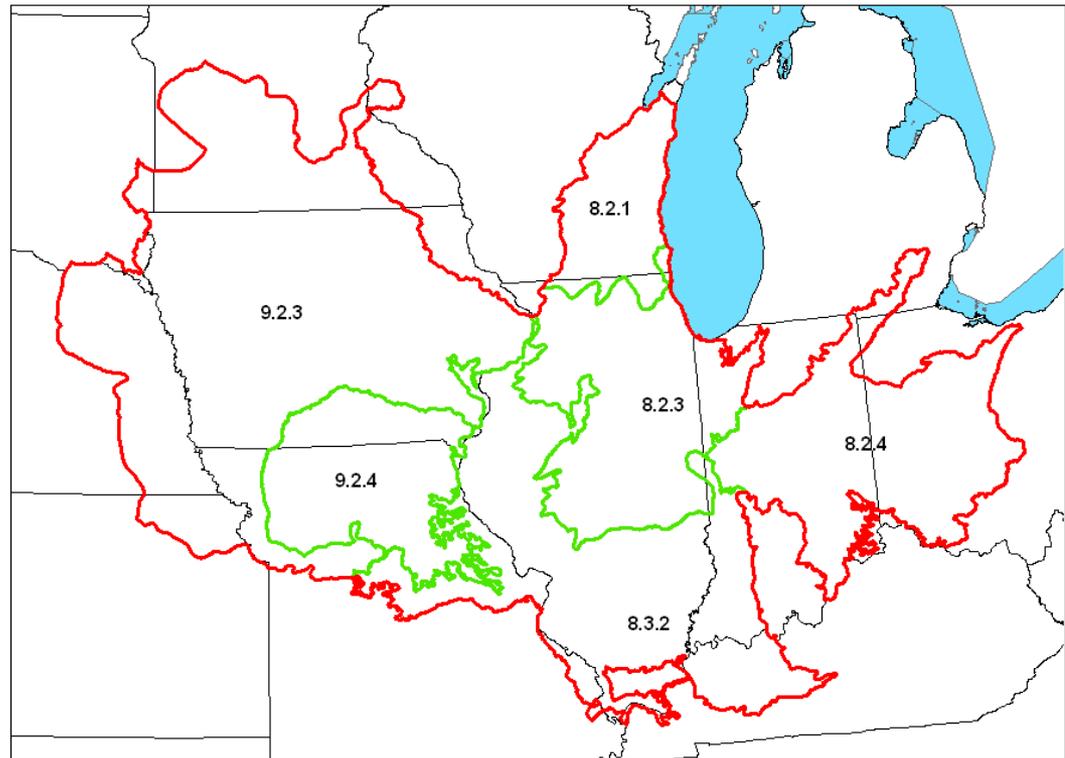# USGS–EPA Collaboration
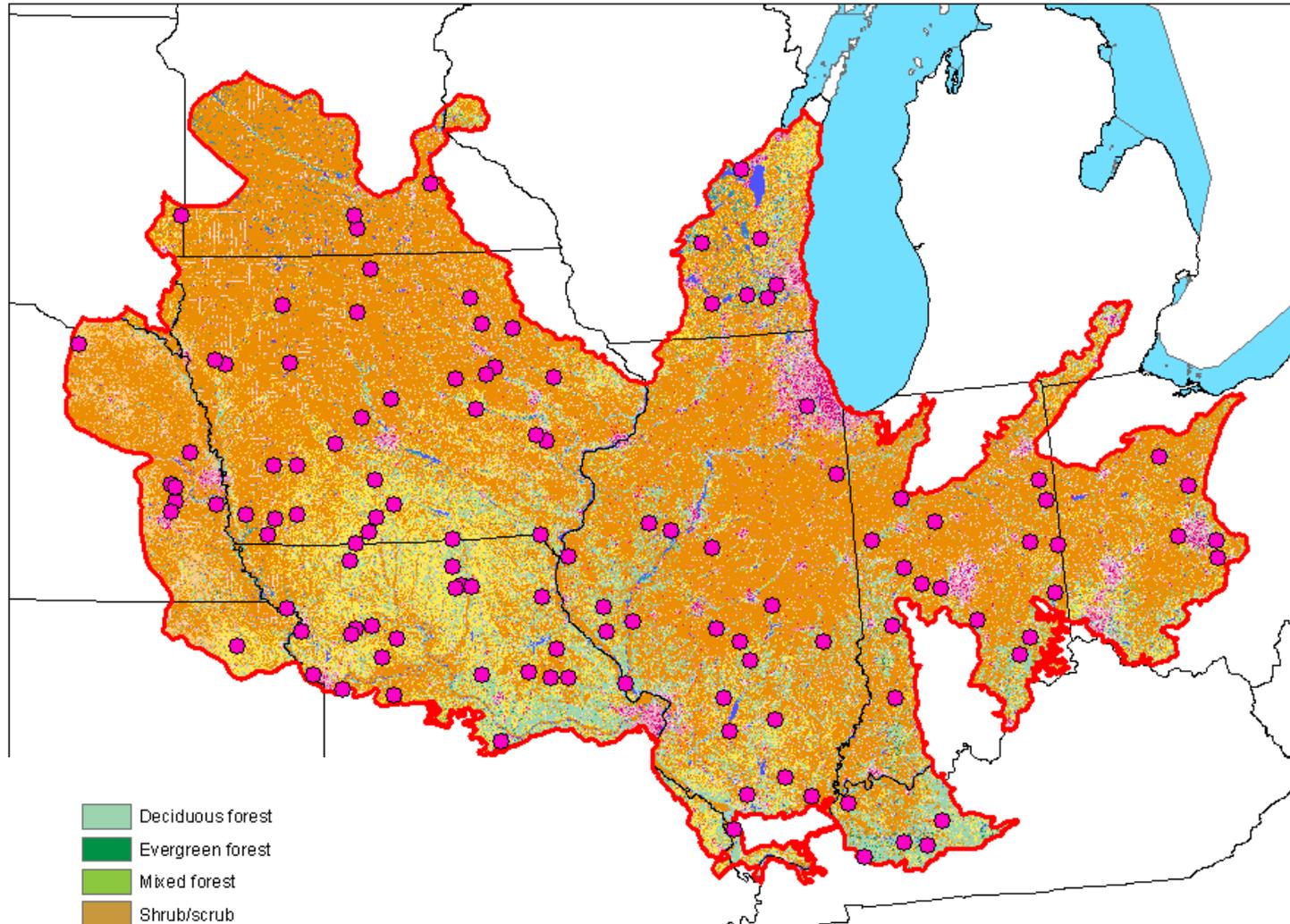## Temperate Plains Synoptic

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**
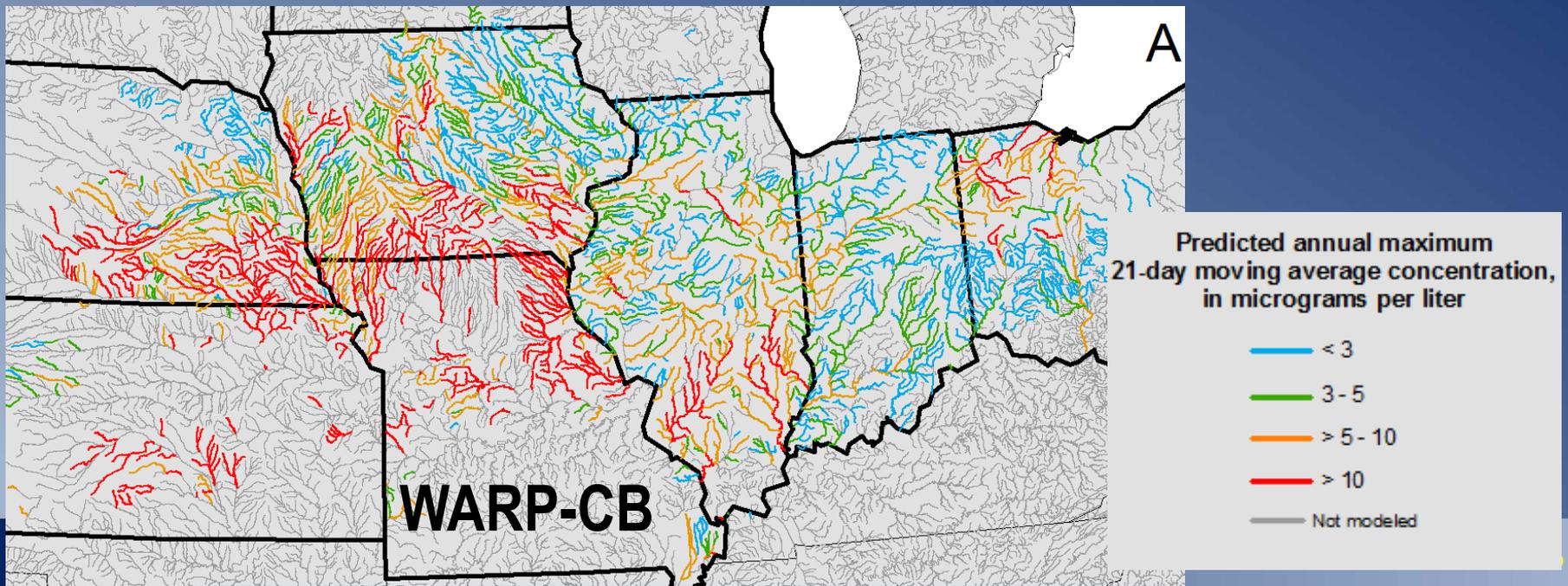  - **Stats and modeling (all)**

# 2008/09 NRSA sites



EXPLANATION

- EPA NARS Sites
- States
- Open water
- Perennial ice/snow
- Developed, open space
- Developed, low intensity
- Developed, medium intensity
- Developed, high intensity
- Barren land
- Deciduous forest
- Evergreen forest
- Mixed forest
- Shrub/scrub
- Grassland/herbaceous
- Pasture/hay
- Cultivated crops
- Woody wetlands
- Emergent herbaceous wetlands

4

# 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**



Predicted annual maximum 21-day moving average concentration, in micrograms per liter

— < 3
— 3 - 5
— > 5 - 10
— > 10
— Not modeled

WARP-CB

A

# TPS outcomes – 3

- ❑ **Status of ecological condition of streams in the region**
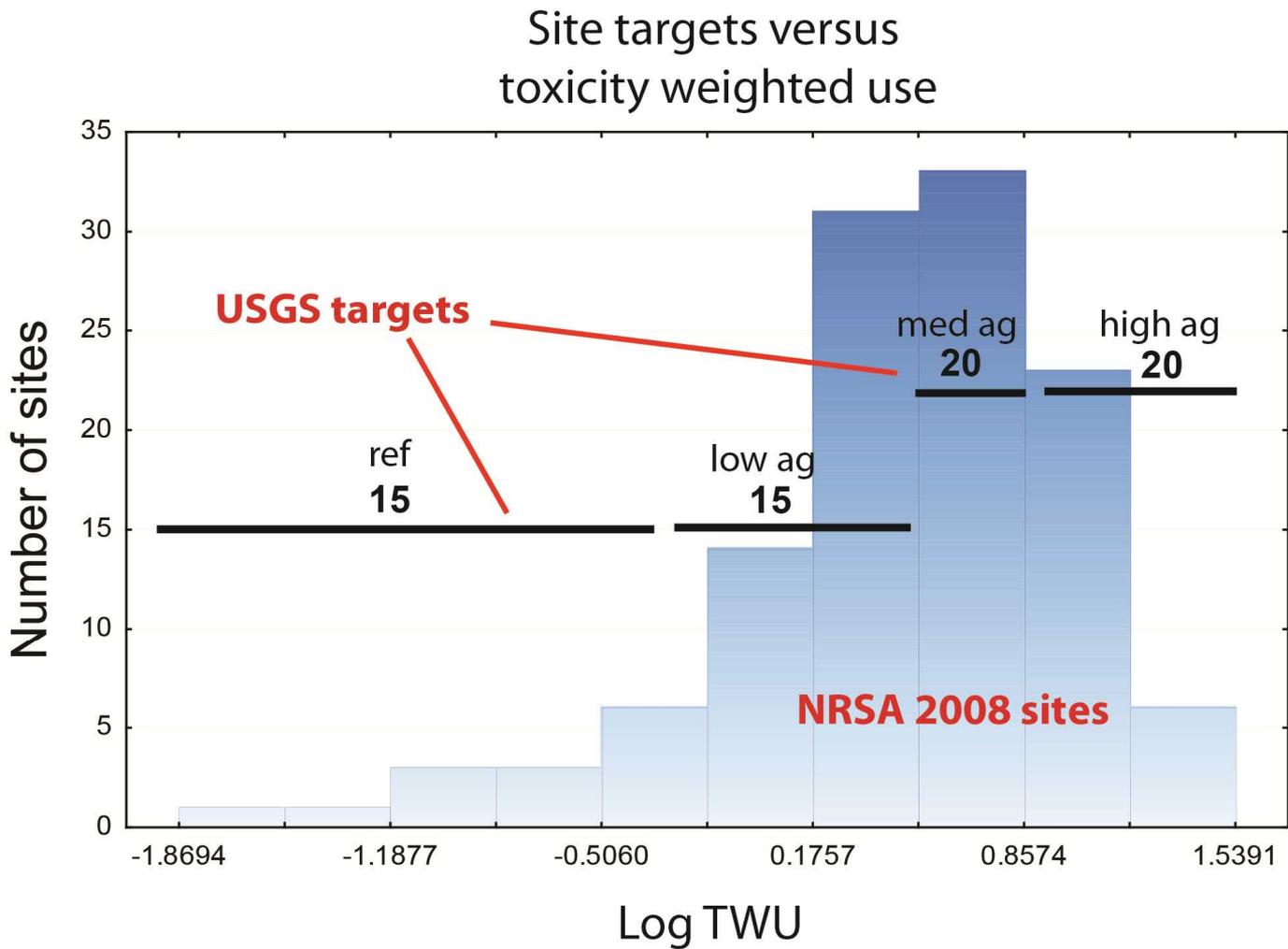- ❑ **Improved understanding of relations between contaminants stressors and ecological condition of streams**

≋**USGS**

# 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**
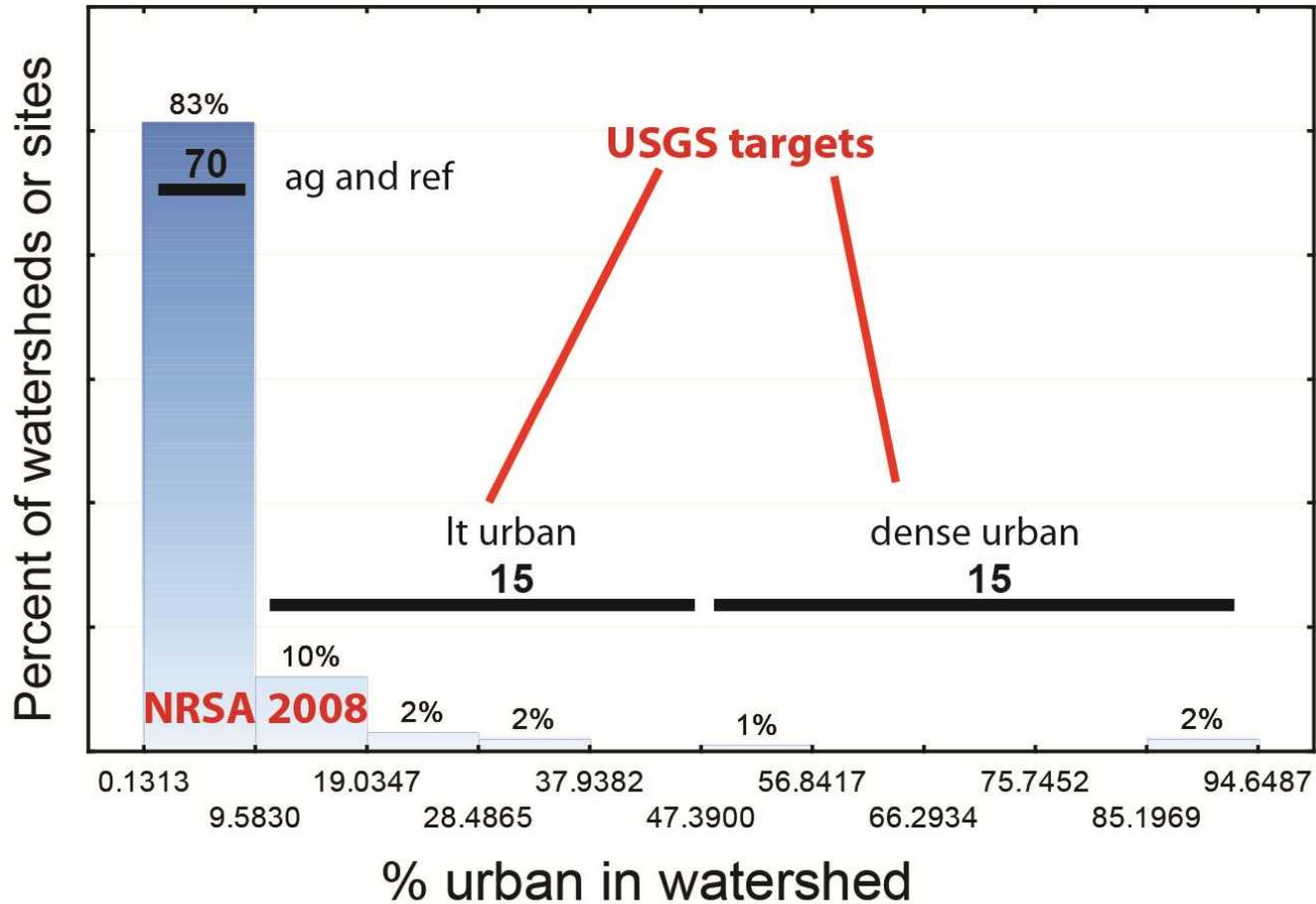- ❑ **Limited access is OK (single sample)**

**≋USGS**

# 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**
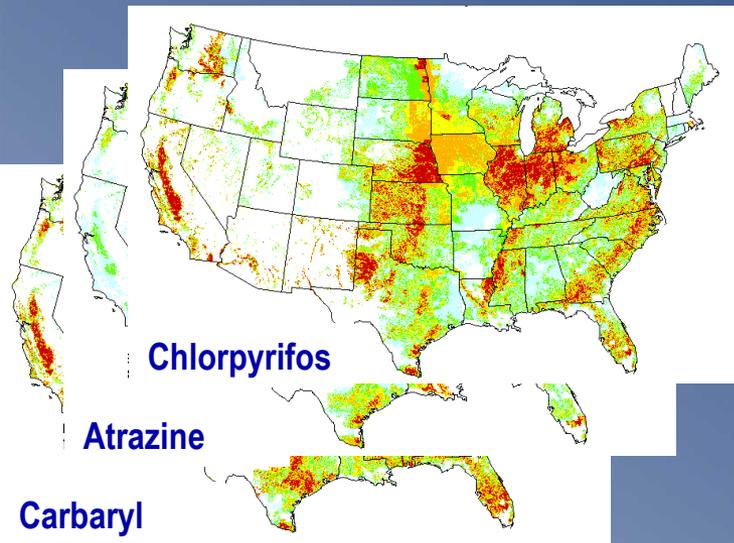
**≋USGS**

# Ag Land Use Gradient

# Urban land use



Site targets versus land use
2008 NRSA site distribution

# Toxicity-Weighted Use (TWU)

## (1) Agricultural use



**Chlorpyrifos**

**Atrazine**

**Carbaryl**

## (2) Pesticide Toxicity Index:

| Pesticide: | MTC $_{cladocerans}$ |
|---|---|
| Chlorpyrifos | 0.275 |
| Atrazine | 20,000 |
| Carbaryl | 7.85 |
| etc… | |

$$TWU_{taxon} = \sum_p (Use_p / MTC_{p,taxon})$$