CDC

many voices-one vision

Environmental Public Health Tracking Conference

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Land Use Mapping as an Environmental Public Health Tracking Tool

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Identifying the Gap & Taking Action

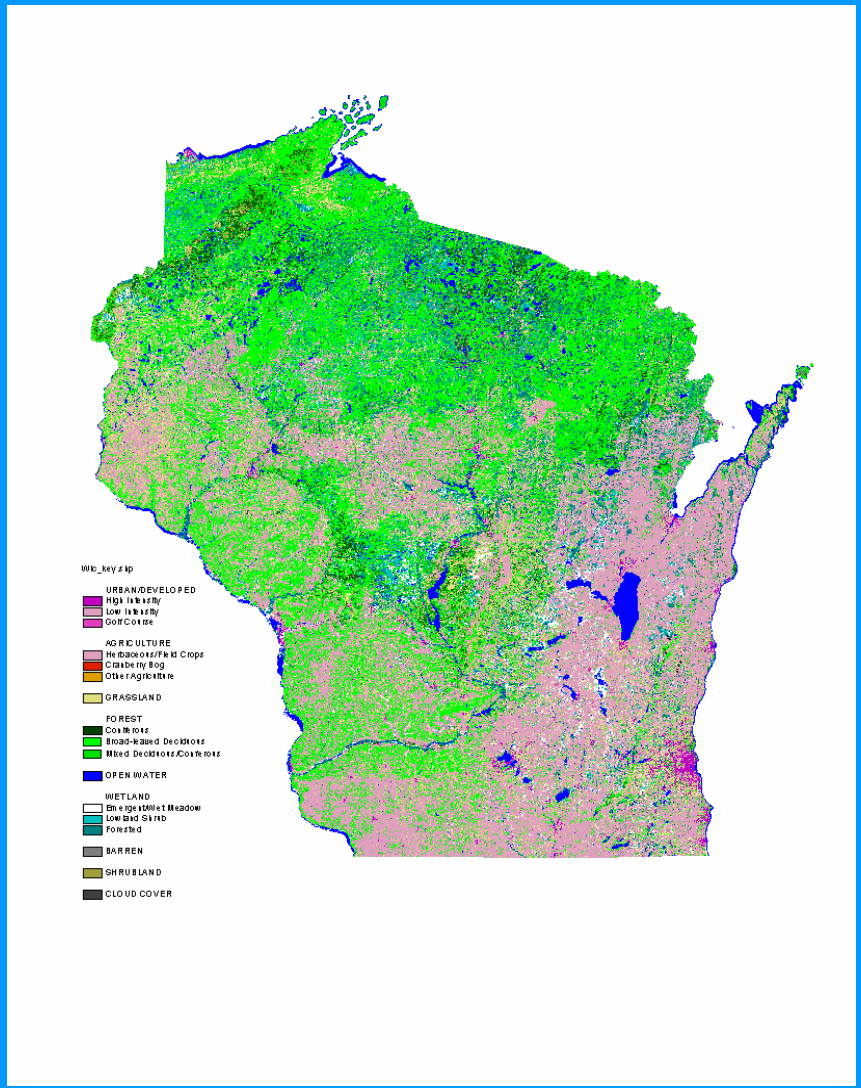
- Land Cover Mapping in Wisconsin
  - What gaps that we can now consider filling have existed all along?
    - Scarcity of information about local environments to inform responses to environmental hypotheses
    - Lack of data on proximity of known or suspected hazards
    - No quantitative index of land cover change over time
  - Integration of health and environmental data targeted in state health plan for 2010

The Tracking Solution

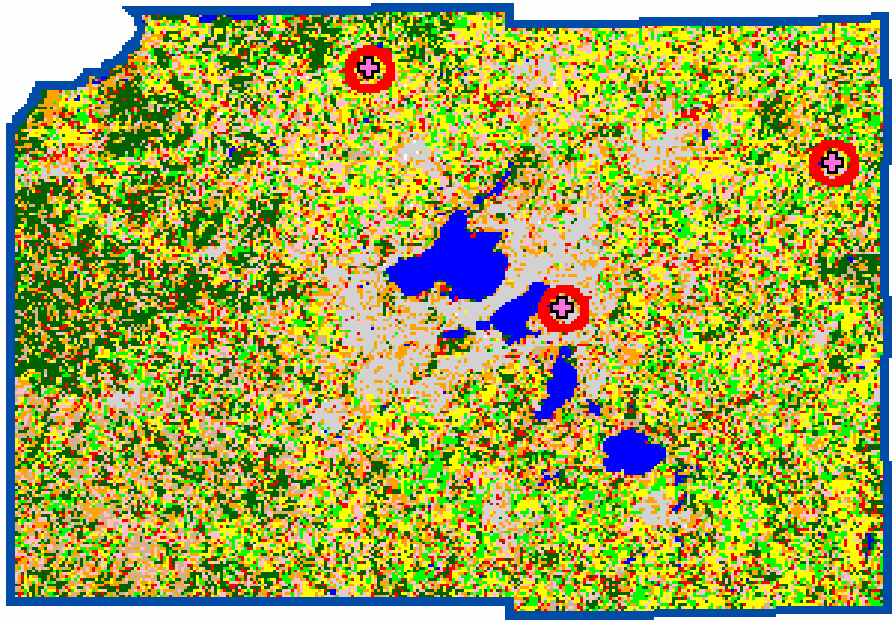
- What made this happen in Wisconsin?
  - Historical collaboration between agencies
    - DNR, DATCP and DHFS on water standards
    - DNR and DATCP on GIS
  - History of collecting land cover data
  - Adequate GIS capability in both agencies
  - Federal funding to start the conversation

Progress in Closing the Gap

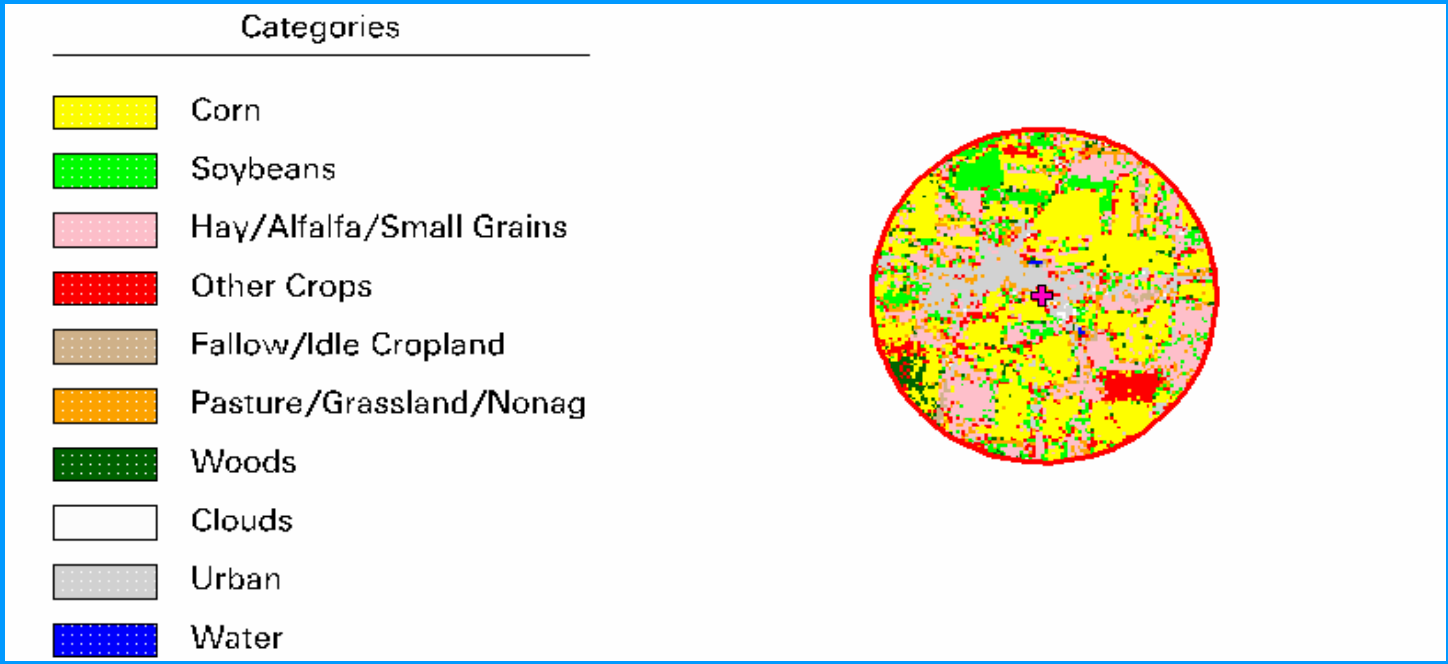
- Land cover data collected from satellite photographs
  - Resolution is 30 meters
  - Data from 1992-1993
  - 17 land cover types Represented
    - level of urbanization
    - forest land
    - field crops
    - water & wetlands
    - cloud cover



Identification of Points of Interest



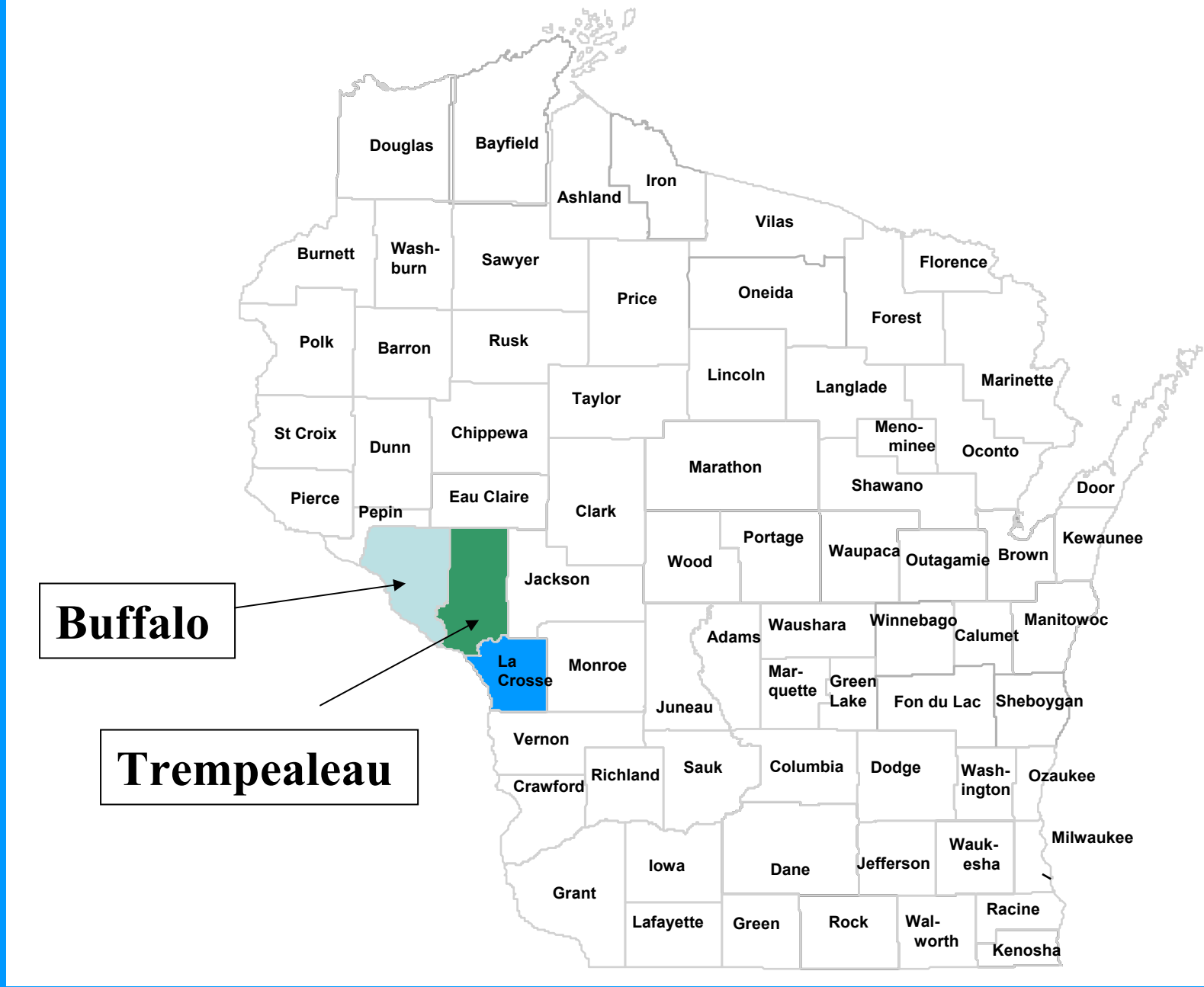
Classification of Land Cover of Area Surrounding a Point of Interest



Category	Acreage	Percent of total acreage
Corn	707.6	35.2%
Soybeans	234.6	11.7%
Hay/Alfalfa/Small Grains	449	22.4%
Other Crops	187.2	9.3%
Fallow/Idle Cropland	18.7	0.9%
Pasture/Grassland/Nonag	148.1	7.3%
Woods	71.8	3.6%
Clouds	8	0.3%
Urban	181.7	9.0%
Water	1.6	0.0%

Land Cover and Health Outcomes Investigation of sample hypothesis

- How does variability in land cover relate to asthma mortality in rural Wisconsin?
  - Identify target geographic region
  - Assign comparison population
  - Extract address information from death certificates
  - Map case and control addresses
  - Extract and analyze resulting land cover profiles


Douglas
Bayfield
Iron
Ashland
Vilas
Florence
Burnett
Wash-
burn
Sawyer
Price
Oneida
Forest
Polk
Barron
Rusk
Lincoln
Langlade
Marinette
Taylor
St Croix
Dunn
Chippewa
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Oconto
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Portage
Waupaca
Outagamie
Brown
Kewaunee
Wood
Jackson
Adams
Waushara
Winnebago
Calumet
Manitowoc
La
Crosse
Monroe
Mar-
quette
Green
Lake
Fon du Lac
Sheboygan
Juneau
Vernon
Richland
Sauk
Columbia
Dodge
Wash-
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Ozaukee
Crawford
Milwaukee
Iowa
Dane
Jefferson
Wauk-
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Grant
Racine
Lafayette
Green
Rock
Wal-
worth
Kenosha
Buffalo
Trempealeau

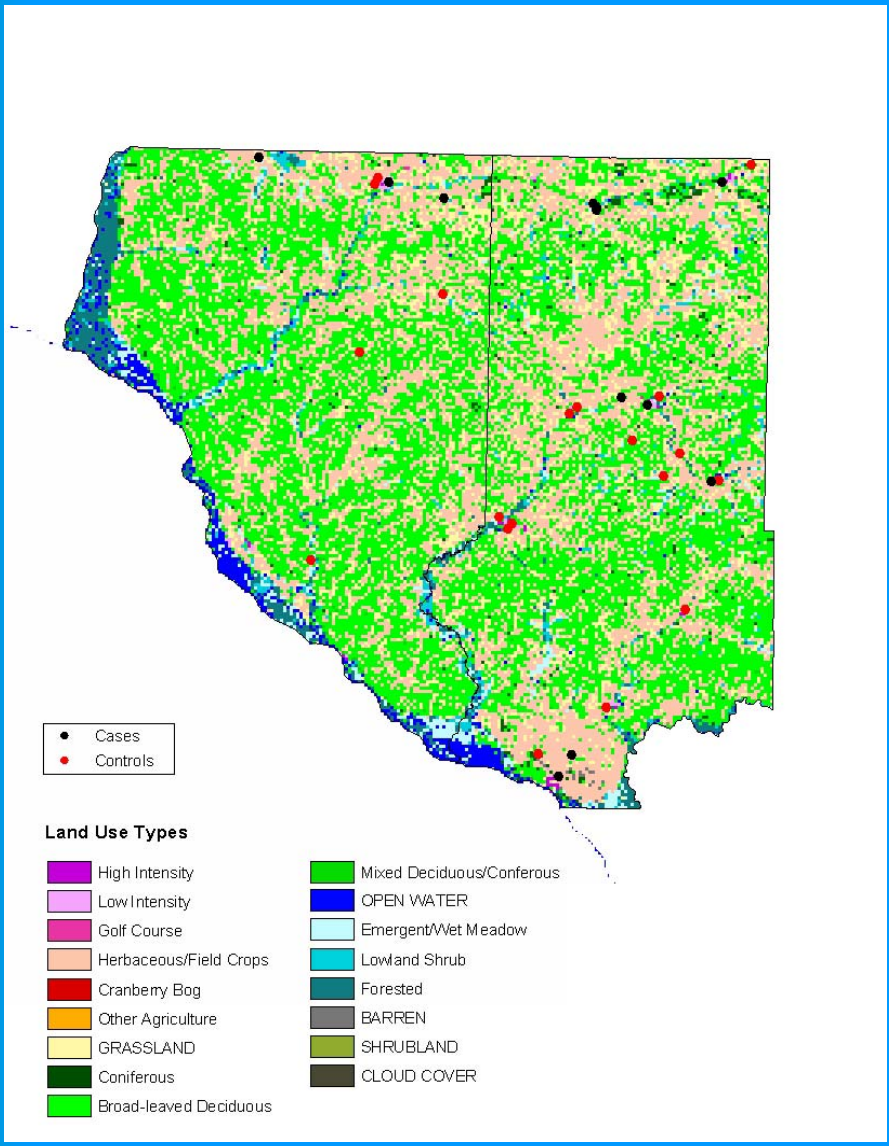
Health Outcome Records

- Asthma mortality (1990-2001)
  - 21 recorded deaths in target counties in 12 years
    - 2000 population = 40,800
    - Covers 1419 square miles
- Control population
  - Motor vehicle crash deaths in target counties over same period (n = 89)
  - 42 selected randomly for address extraction

Geocoding Addresses

- Address information on death certificates
  - Recorded on death cert, but not keyed
  - Abstracted by review of microfilm records
- 35 of 63 addresses yielded successful address matches (56%)
  - Specific to address or ‘unknown street side’
- Use of ‘mailing address’ problematic in rural areas
- Relationship to date of record

Asthma Mortality and Land Cover



- Radius of one mile selected for analysis
- Three levels of specificity available for defining land cover categories
  - Highly-specific maps have lower precision
  - Moderate level of specificity selected

Asthma Mortality and Land Cover
Asthma Deaths

Land Cover Category	Cases (%)	Controls (%)
Herbaceous/ Field Crops	47.0	36.3
Broad-Leaved Deciduous Forest	20.1	29.5
Grassland	15.9	16.0
Low-Intensity Urban	5.3	5.4
High-Intensity Urban	2.7	2.9

Conclusions

- No clear relationship between land cover and death from asthma vs. motor vehicle crash
- Combined analysis with environmental and atmospheric data may be more useful
- Age of population may be an important determinant of who lives where

Stakeholder Reactions

- DNR & DATCP: Increased interest in assessing relevance of various types of data to human health
- Bureau of Health Information supportive
- Environmental groups extremely interested in results
  - provide visual depiction of the impact of a real or perceived health problem
  - risk communication issues will need to be addressed

Next Steps

- Use new land cover map (April ‘04) to identify areas with land use changes
- Develop platform for integrating environmental data
- Continue improvement in ability to obtain geographically-specific addresses
- Develop framework to assure confidentiality of health outcome data
- Address risk communication needs