

The background features a dark blue gradient with faint, light-colored circular patterns and numbers. The numbers include 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, and 260, arranged in a circular fashion. There are also dashed lines and arrows pointing in various directions, suggesting a technical or scientific theme.

GIS AND COMMUNITY ENGAGEMENT: SOCIO.SPATIAL APPROACHES TO RESEARCH AND POLICY

DR. SHEILA LAKSHMI STEINBERG
BRANDMAN UNIVERSITY – CHAPMAN UNIVERSITY SYSTEM

GIS DAY PRESENTATION-UNIVERSITY OF KANSAS,
NOVEMBER 15, 2017

WHAT IS GIS?

- **Geographic Information Systems**
- A GIS is designed to store, manipulate, analyze, and output map-based information (Steinberg & Steinberg 2015: 5).
- A methodological data collection, analysis and communication tool
- Computerized mapping

GIS ENABLES INTERDISCIPLINARY THINKING

- Ability to integrate different disciplines and approaches together.
- Useful for solving problems.
- Enables the consideration of qualitative data in a powerful geographic format.

IMAGES OF GIS IN ACTION



Data Sheet

Survey Number: 294

Street Address: 325 Burnaby Court

City, State: Charleston, SC

Age of respondent: 37

Gender of respondent: Male

Highest level of education: B.A.

Number of adults living in household: 2

Profession of respondent: Bank Teller

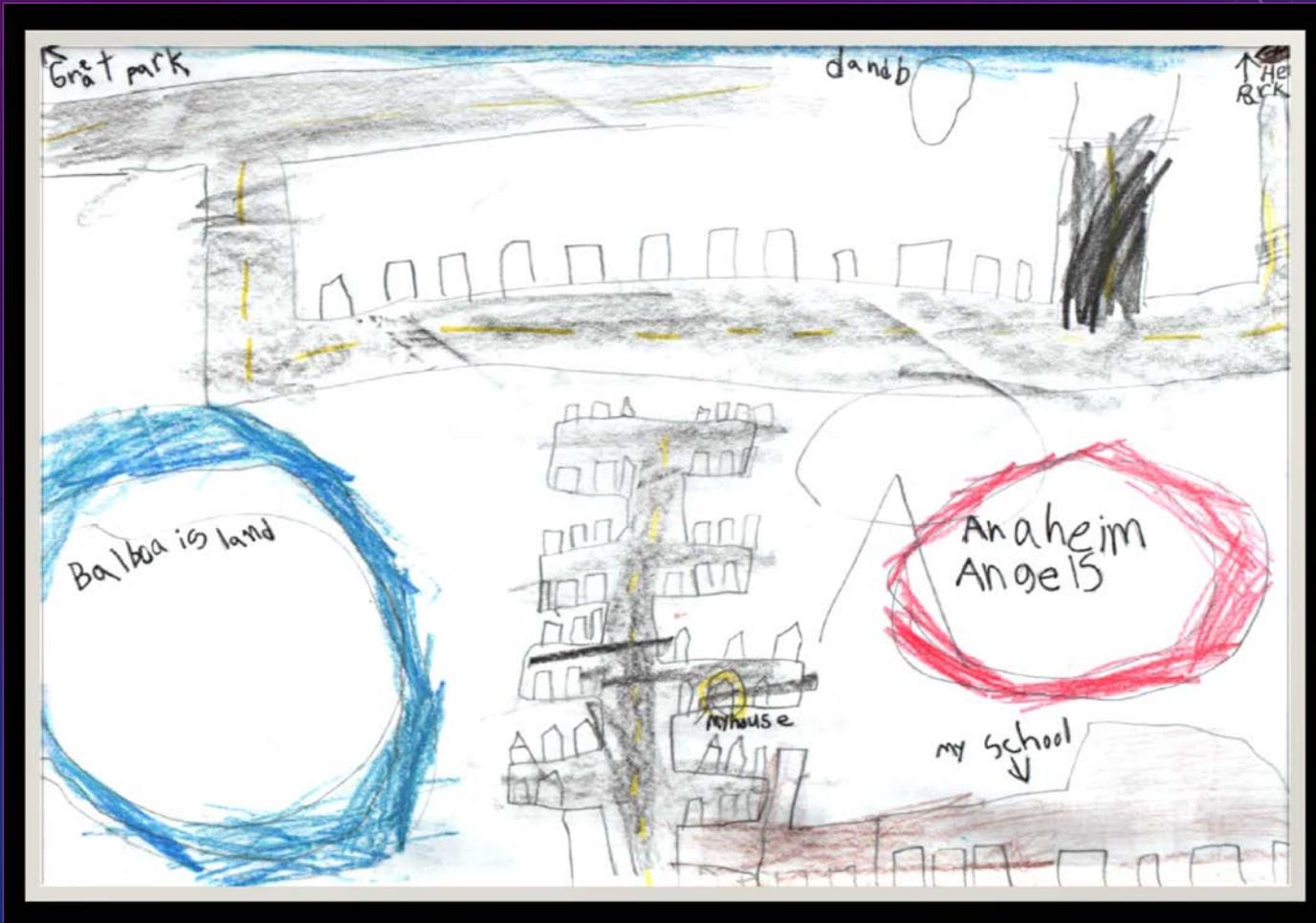
Annual Household Income: \$86,000

Number of children under 18: 3

TWO IMPORTANT CONCEPTS: *SPACE* AND *PLACE*

- **Space** is the distance between places.
- **Place** is a meaningful location (Cresswell 2004).
 - * *A location that has some importance and this can vary by individuals, groups and societies that inhabit a place.*

THINKING SPATIALLY ABOUT PLACE

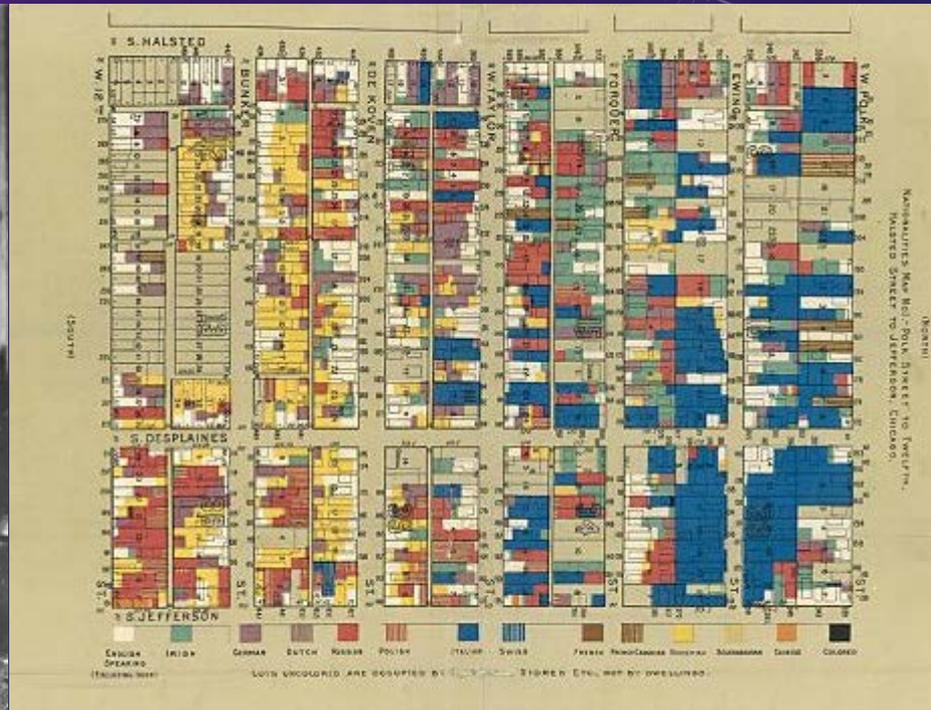


SOCIOSPATIAL

- An integrated examination of space, place and social indicators in a holistic fashion (Steinberg and Steinberg 2009; 2015).
- A main methodological aspect of sociospatial thinking is QUALITATIVE RESEARCH METHODS.

HISTORIC EXAMPLE OF SOCIOSPATIAL THINKING (1895)

FLORENCE KELLY HULL HOUSE, CHICAGO, ILLINOIS



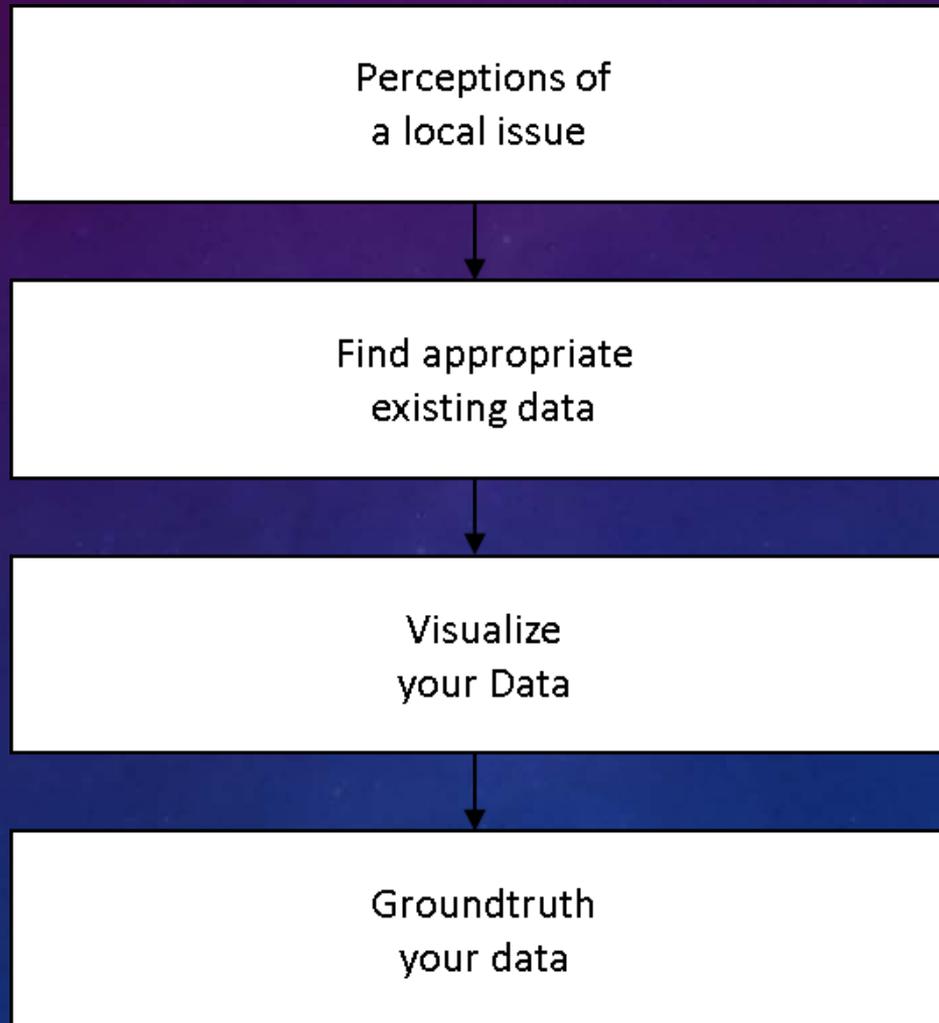
EXAMPLES OF HISTORICAL PROBLEMS SOLVED USING SOCIO.SPATIAL THINKING-FLORENCE KELLY HULL HOUSE, CHICAGO, IL U.S.A.

- Among the Hull House Settlement research projects were a series of detailed studies of neighborhoods. These settlements were home to many recent immigrants to Chicago.
- The majority of these individuals emigrated from central, southern, and eastern Europe.
- Map on previous slide originally appeared in “Hull-House Maps and Papers” and shows the nationalities of residents of the neighborhoods bordered by Polk, Twelfth, Halsted, and Jefferson Streets. Hull House Map (Nationalities), 1895, Northwestern University.

SOCIOSPATIAL APPROACH FOR QUALITATIVE METHODOLOGIES

- Ethnography
- Case studies
- Oral history
- Participant observation
- Evaluation research
- Interviews

SIMPLE SOCIOSPATIAL THINKING



GROUNDED THEORY

- Glaser and Strauss (1967)
- Inductive research approach
- Characterized by the sequencing of data collection followed by theory generation
- Strong connection to the reality that the data represent

STEPS FOR SOCIO.SPATIAL GROUNDED THEORY:

- 1) Determine a topic of interest.
- 2) Determine a geographic location of interest.
- 3) Collect the data (qualitative, spatially linked and social data).
- 4) Geocode the data.
- 5) Ground truth the data.
- 6) Analyze the data and look for spatial and social patterns.
- 7) Generate theory (spatial and social).



1) DETERMINE TOPIC OF INTEREST

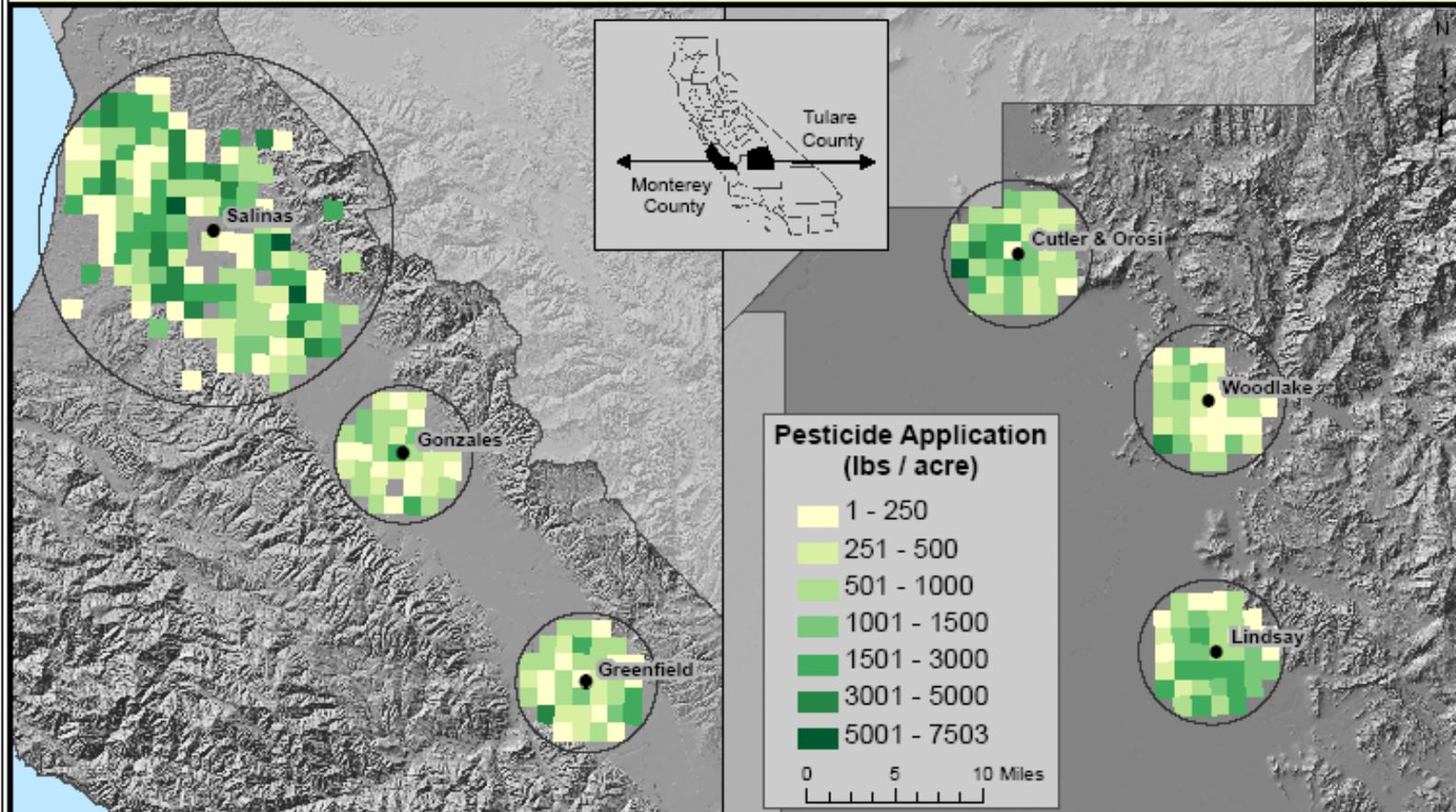
- What is the risk of pesticide exposure to school kids in agricultural communities?
- Where are pesticides of concern located?
- Who is being affected by these pesticides?
- What organizations are involved with Poder Popular's work on pesticide health?

2) DETERMINE GEOGRAPHIC LOCATION OF INTEREST



STUDY AREA

Reported Pesticide Application Rates Surrounding Poder Popular Communities of Monterey and Tulare County



Total Pounds of Active Ingredients Applied Per Acres Treated

Salinas	210,733	Cutler & Oroquieta	45,933
Gonzales	19,668	Woodlake	28,111
Greenfield	27,087	Lindsay	37,525

Source Data:
State of California-
Department of Pesticide Regulation
2005 Pesticide Use Database
1999 Public Land Survey
cslr@nr.gov
Information obtained through multiple sources.
Not responsible for errors.



3) COLLECT THE DATA



MULTIPLE RESEARCH METHODS

- Qualitative Key Informant Interviews
- Mapping of Environmental Data: State Pesticide Database
- Mapping Sociodemographic data U.S. Census Data
- Field Work-Data from Community Meetings
- Public Participation Mapping (PPGIS)

PUBLIC PARTICIPATION GIS (PPGIS)

1. On-the-ground knowledge of the region and its needs
2. Interacting with GIS technologies and analysts to meet those needs
3. Returning those GIS products for future use in directing policy change



"How many people really are hurt? We don't know; we don't know. We don't know those people who are hurt immediately... Pesticides have been related to much more long term effects, such as Parkinson's, infertility, etc. We need a breakthrough that can only come through research."

-Quote from community member in agricultural worker pesticide study

4) GEOCODE THE DATA:



Zip_Code	Respondent	Question_1	Question_2	Question_3	Question_4
55113	A	4	3	5	5
55401	B	2	4	3	3
55112	C	5	4	4	5

Zip_Code, Respondent, Question_1, Question_2, Question_3, Question_4

55113, A, 4, 3, 5, 5

55401, B, 2, 4, 3, 3

55112, C, 5, 4, 4, 5

Using GPS, geocoding of addresses or other spatial information

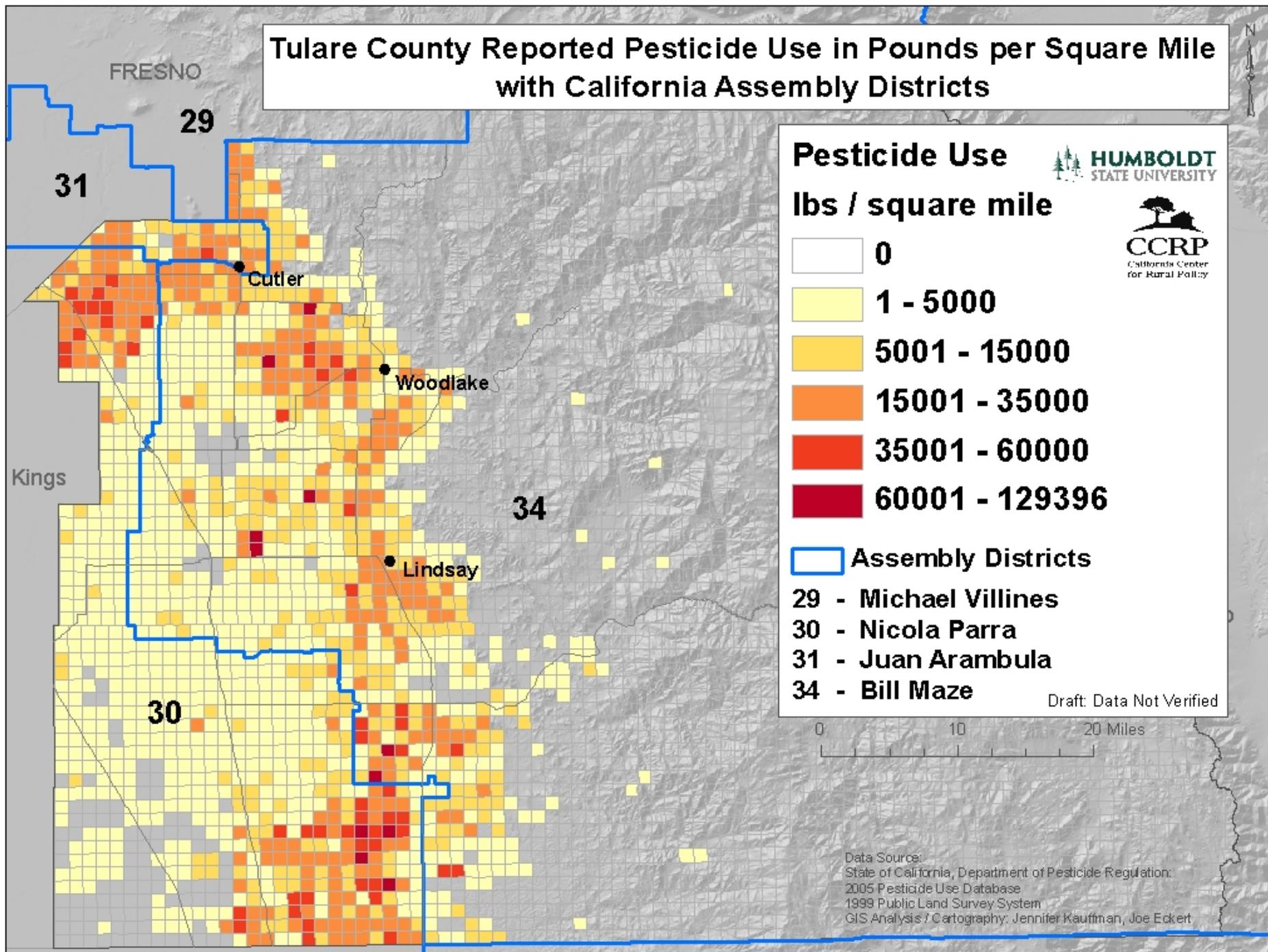
- By hand, or using mobile devices with programs such as the Esri Collector app or Survey 123

5) GROUND TRUTH THE DATA



- Ensures that what is represented in your map or in your data file matches reality through on the ground field observation and/or comparison of mapped data with other sources (e.g. other maps, verbal accounts and or aerial photos).

Tulare County Reported Pesticide Use in Pounds per Square Mile with California Assembly Districts





PESTICIDES AFFECT COMMUNITIES

"Even if they aren't working in the fields they are affected by the fields because the town is surrounded by fields. Everybody fits the guise of being a farm worker because you are getting what is going on in the field. The communities are getting 95% of the crap that comes off of the fields."

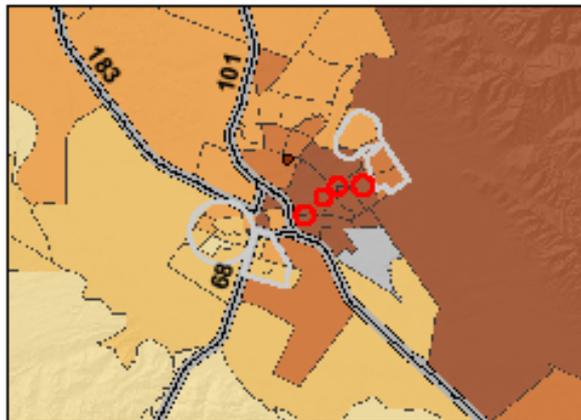
-Quote from community member in agricultural worker pesticide study

Public Participatory Geographic Information Systems Data (PPGIS) with 2000 U.S. Census Bureau Data by Block



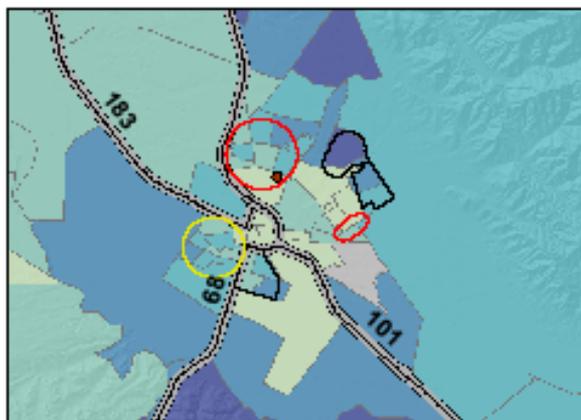
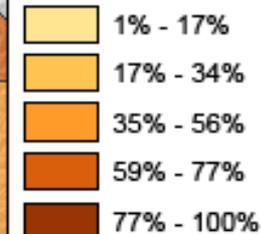
Salinas, CA

Gonzales, CA



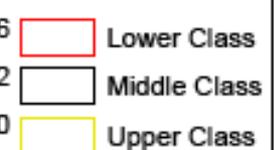
**Percentage of Latinos
in Total Population**

**PPGIS Ethnicity
Data**



**Median Household
Income in 1999**

**PPGIS Income
Data**



Source Data:
U.S. Census Bureau: 2000 Census Summary File 3
2005 NAIP Imagery
2007 PPGIS events

Information obtained through multiple sources
Not responsible for errors
GIS Analysis / Cartography: Jennifer Kauffman, Joe Eckert

STEP 6) ANALYZE THE DATA

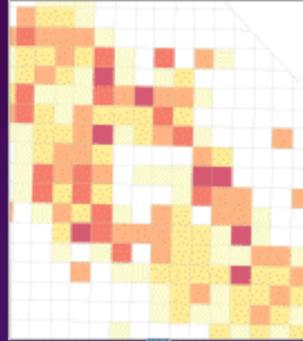
(LOOK FOR SPATIAL AND SOCIAL PATTERNS)



NAIP Imagery



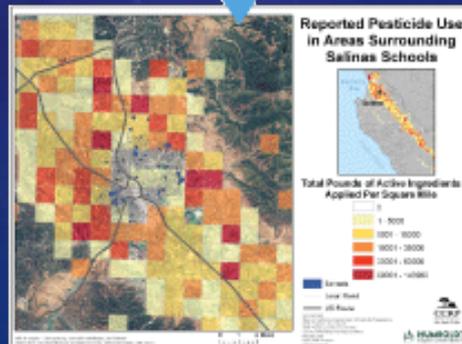
Pesticide Use Data



GIS Data



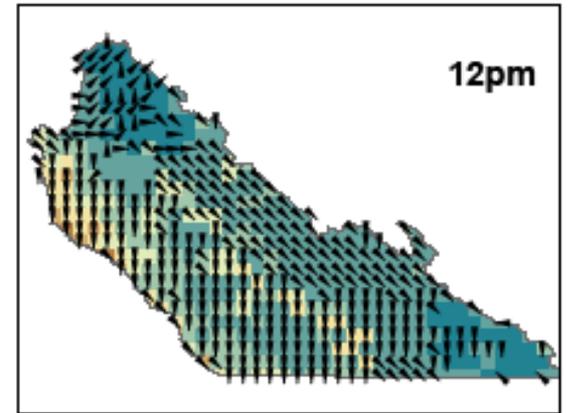
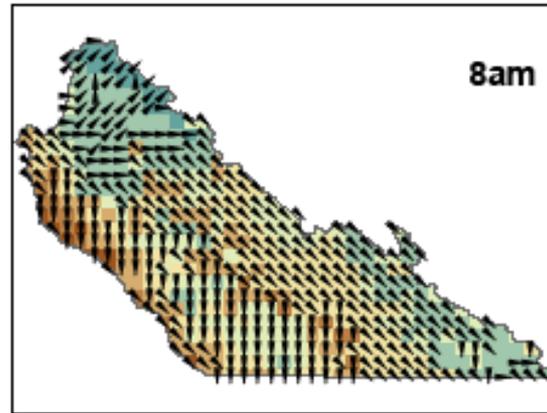
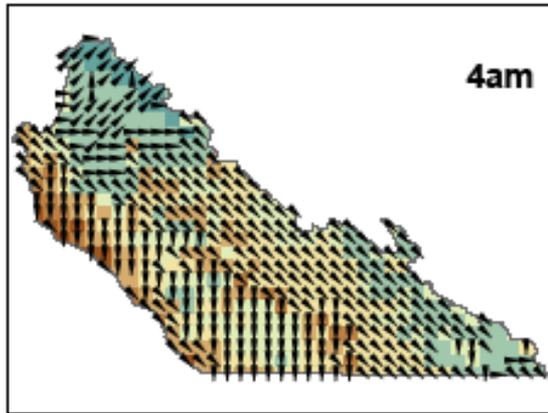
PPGIS Exercise



Final Analysis

Weekly Prevailing Wind Direction and Wind Speed by Time of Day

July 1-7, 2006 Monterey County, CA

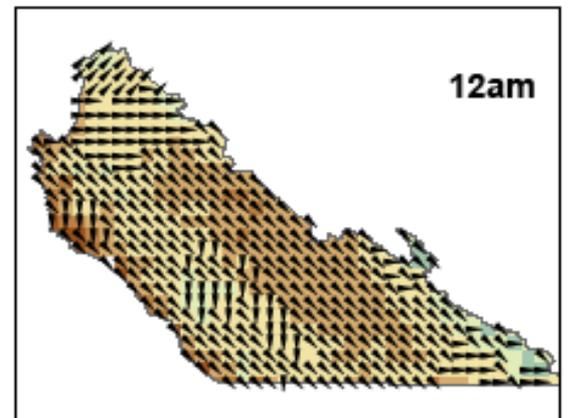
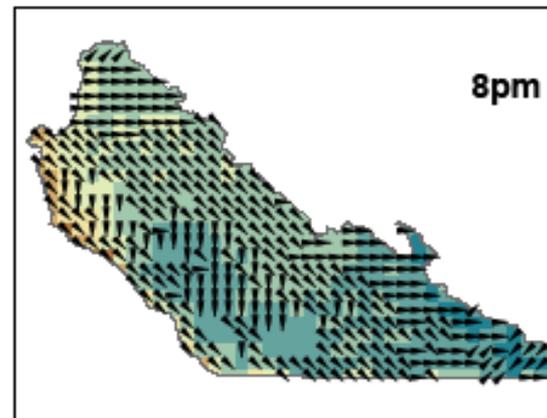
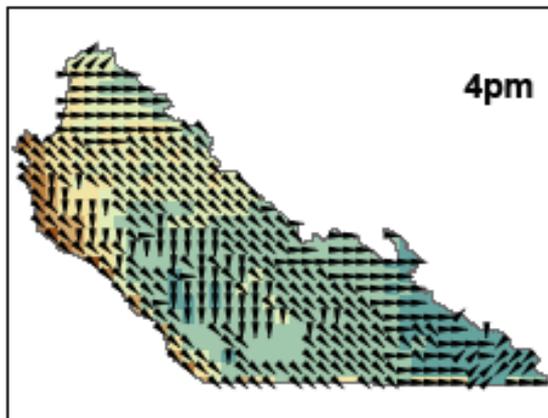


Wind Direction

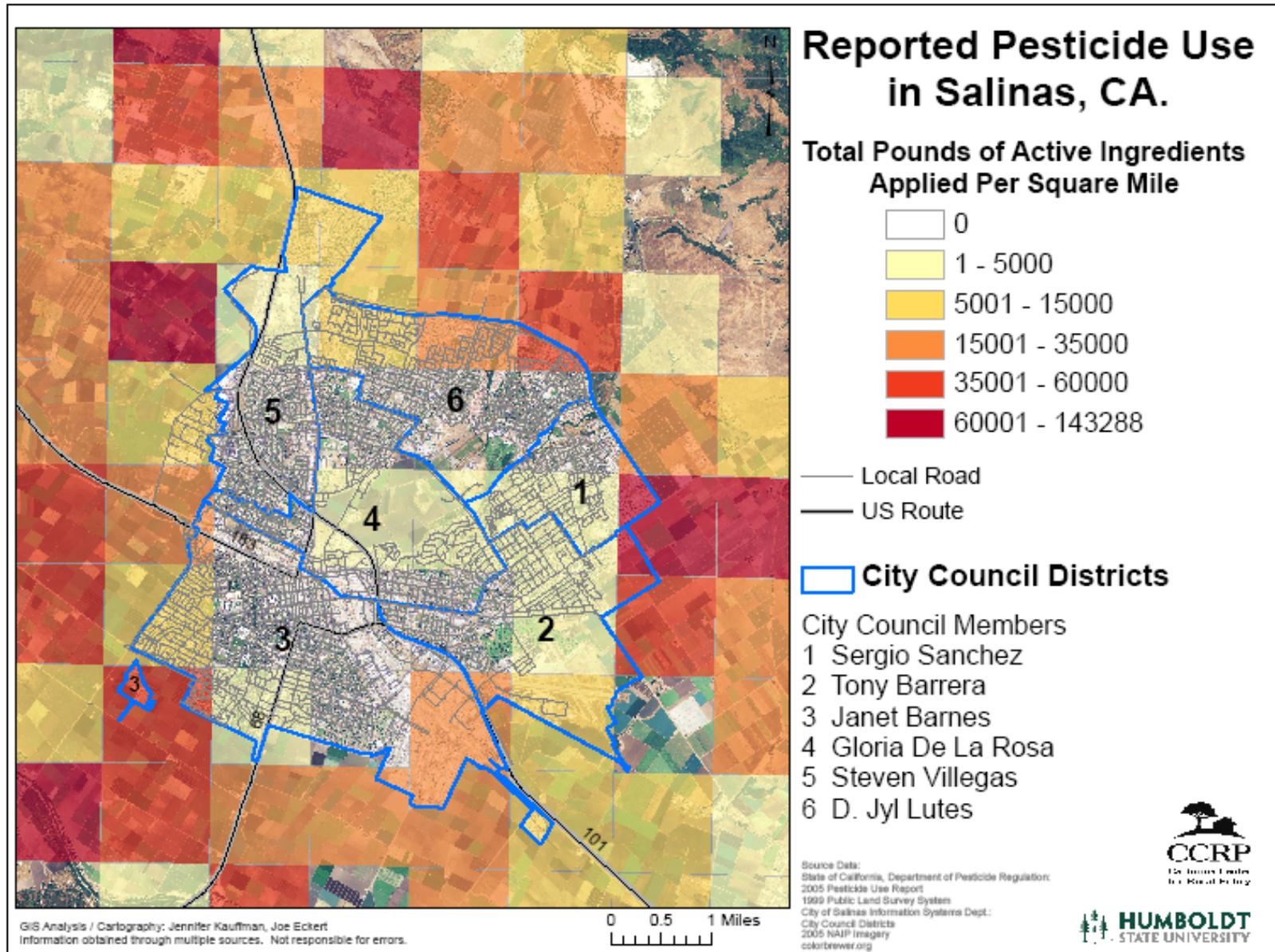
↓ South ↙ Southwest ← West ↖ Northwest ↑ North ↗ Northeast → East ↘ Southeast

No direction marker indicates there was not a prevailing wind direction at that location and time.

Wind Speed (miles/hour)

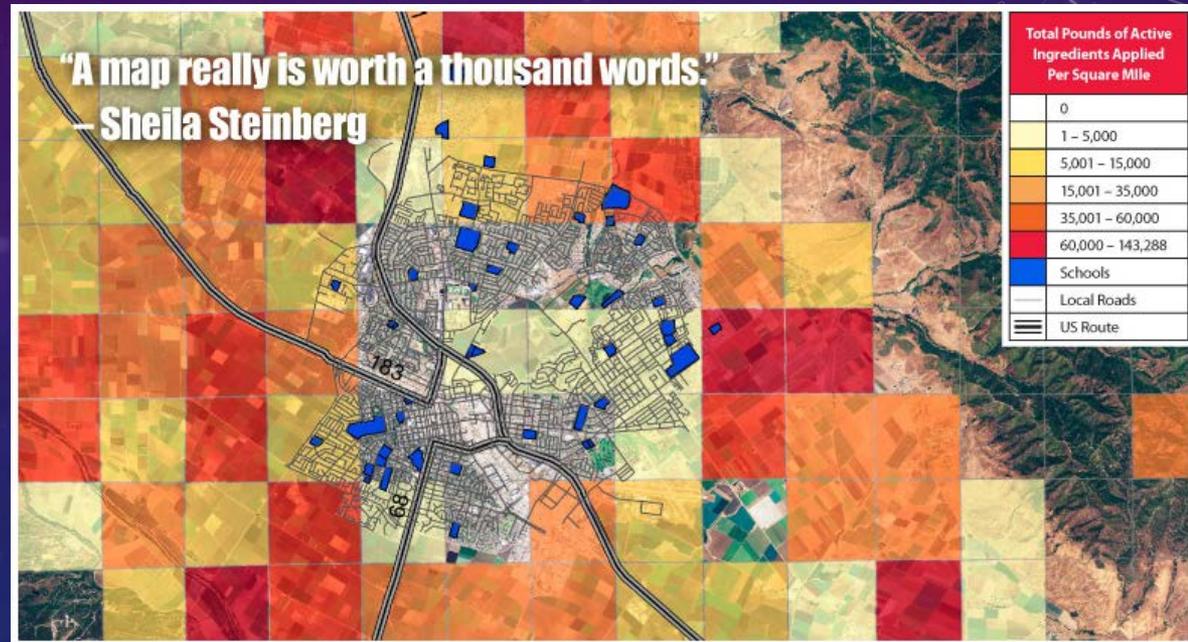


WHERE ARE PESTICIDES LOCATED?



7) GENERATE THEORY

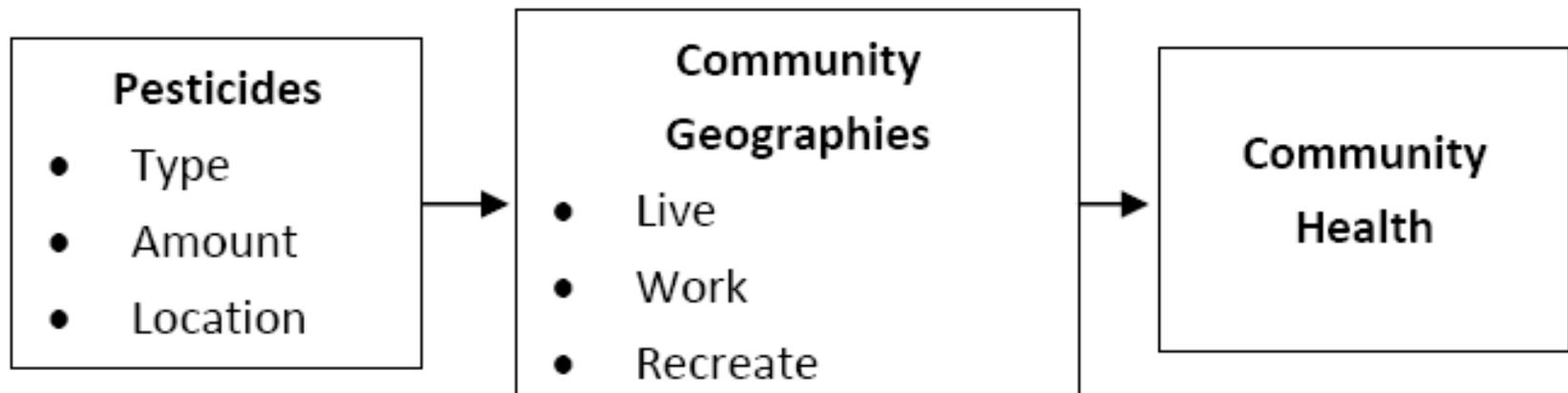
- A number of schools are located in areas of significant risk of pesticide drift and exposure.



THEORETICAL FRAMEWORK

Final Conceptual Model

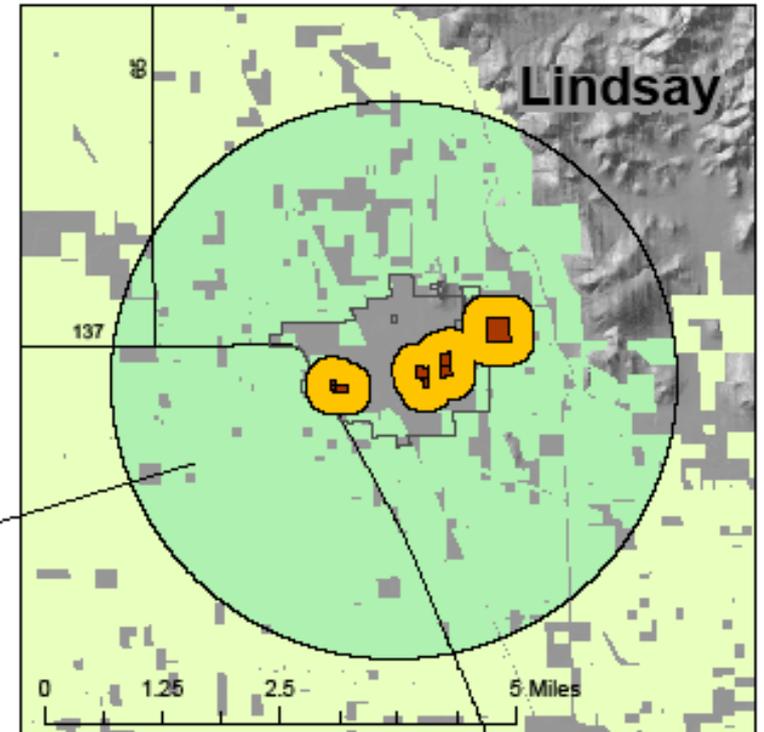
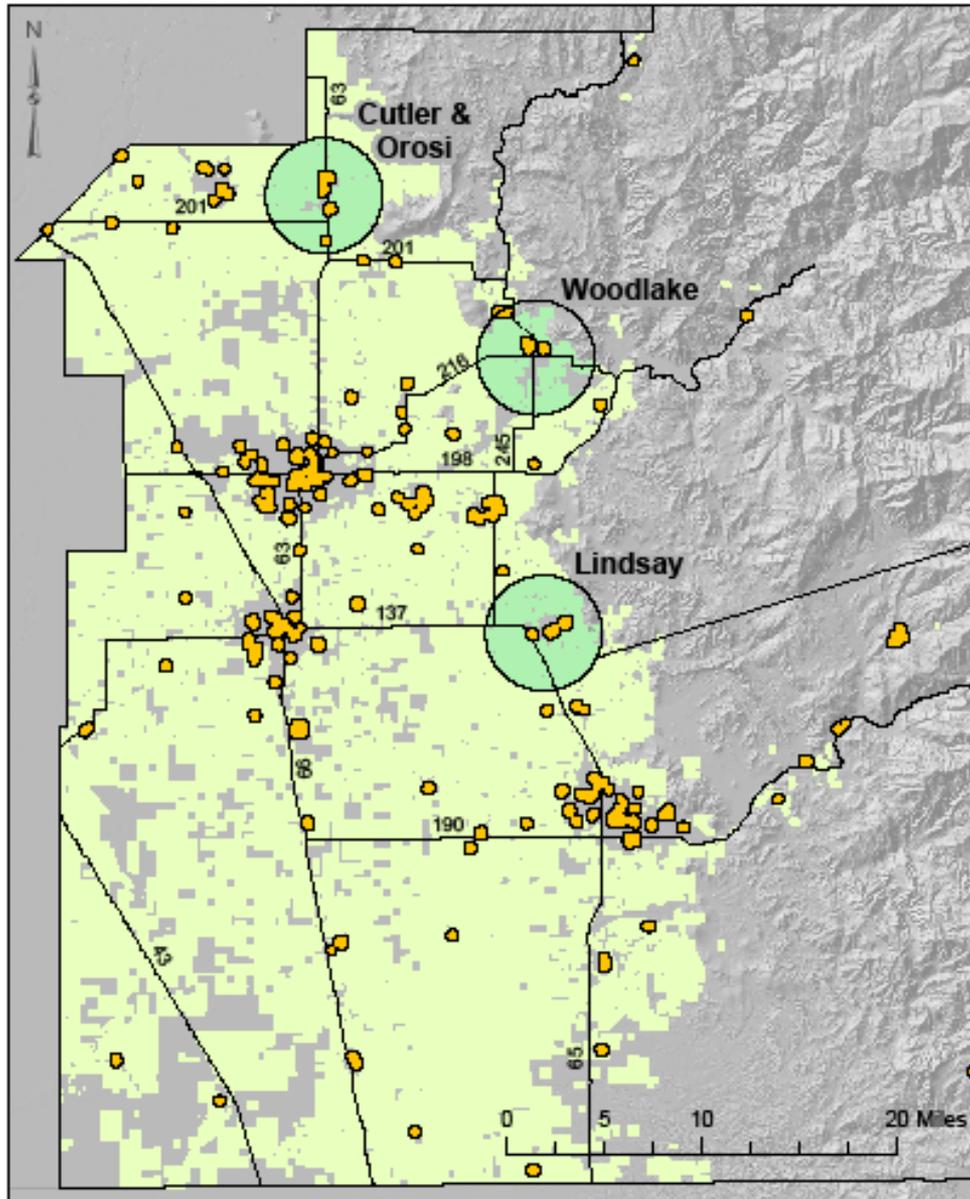
Our final model replaces agricultural worker geographies and health with community geographies and community health.



POLICY IMPLICATIONS

- Develop Pesticide Free Agricultural Zones around schools, to benefit both growers and the community
 - Tax Incentives or easements
- Increase communication between agencies and community regarding pesticide use
- Ensure that community members know who to alert when they observe unlawful pesticide use or drift
- Ensure the safety of farm workers who report unlawful & inappropriate use of pesticides

1/4 Mile Buffer Zones for Tulare County Schools



Current Agricultural Land Lost to 1/4 Mile Buffer Zones

	Tulare County	Cutler & Orosi 3 mile radius	Woodlake 3 mile radius	Lindsay 3 mile radius
Acres of Ag. Land	5,611,049	14,417	8,985	12,594
Acres within School Buffers	35,420	264	208	279
% of acreage lost to buffers	0.63%	1.83%	2.31%	2.22%

- Agricultural Land (Crops, Vineyards, and Orchards)
- Agricultural Land within 3 mile Radius of Poder Popular Communities
- 3 Mile Radius from Center of Poder Popular Community
- 1/4 mile buffer around Schools
- Lindsay City Limit
- Schools
- Major Road

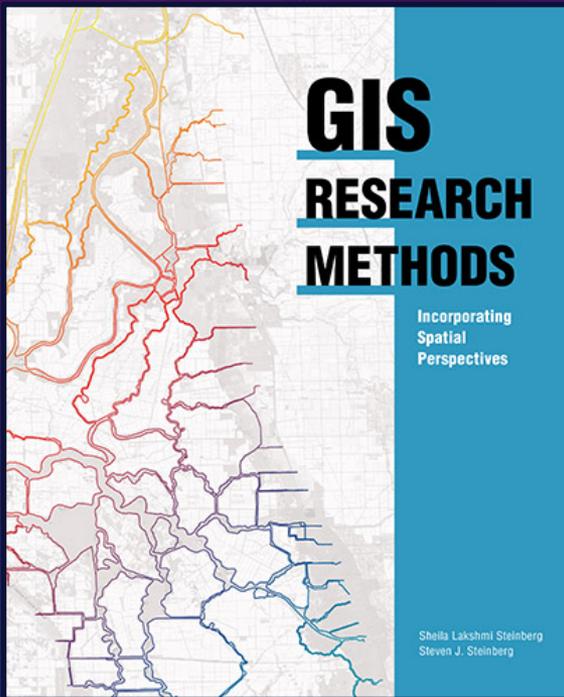
THE POWER OF SOCIO.SPATIAL GROUNDED THEORY

1. Enables understanding of real world problems
2. Gives local communities a voice and role in defining problems and issues (as identified by the people who experience them)
3. Adapt to changes in the physical and social environment
4. Draw on existing community strengths (**human capital, social capital, understanding of place**)
5. Enables development of policy rooted in local culture, practice and empirical analysis

CONCLUSION

- Integrating GIS into education and planning helps to create multiple place-based interdisciplinary views of a situation/problem/issue
- Enables one to see the “big picture”
- Fosters better decision-making and REACTION to change
- Focuses where the geography of action (space, time and place) should occur.

GIS RESEARCH METHODS: INCORPORATING SPATIAL PERSPECTIVES



Esri Press (2015)

Dr. Sheila Lakshmi Steinberg

Professor, Social Sciences

Brandman University

Chapman University System

Irvine, California

ssteinbe@brandman.edu

Follow us on Twitter:

[@steinbergspace](https://twitter.com/steinbergspace)



THANK YOU!!!

The background features a vertical gradient from dark purple at the top to deep blue at the bottom. It is filled with a field of small, light-colored stars. Several technical-style circular graphics are overlaid: a large circular scale with numerical markings (0, 90, 180, 270) and arrows is in the top right; a smaller circular graphic with arrows is in the bottom right; and another circular graphic is in the top left. A faint dotted line runs diagonally across the right side of the image.