Teaching with GIS

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Introduction: The Power of GIS

John Snow Map

- A classic example of the use of location to draw inferences
- 1854 cholera outbreak in London
- Point data map indicated some spatial clustering
- Overlaying a map of water pump locations showed many cases were concentrated around a single pump

Teaching Spatial Thinking w/ Technology

"Combinatory play seems to be the essential feature in productive thought."

— Albert Einstein

GIS technology in the Curriculum: *a case study in International Area Studies*

Long-term goal

- Building toward a program specific course to
  - Prepare students before they go abroad to collect and analyze data
  - Support students in developing meaningful projects

Steps toward goal

1. Help faculty gain basic understanding of GIS to support students and enrich research
2. Offer classroom experiences that are relevant to the topic being explored
3. Offer students opportunities to begin building skills that complement their trajectory

Preparing IAS Faculty

Step 1. Prepare faculty with basic understanding of GIS practices to support students and enrich research:

- Faculty brown bags – conceptual discussions
  - Power of GIS
  - Applications
  - Examples
  - Their work
- Faculty workshops
  - 3 days – 3.5 hour – hands-on workshop
  - Data analysis and visualization
  - Combining geospatial data with digitized maps

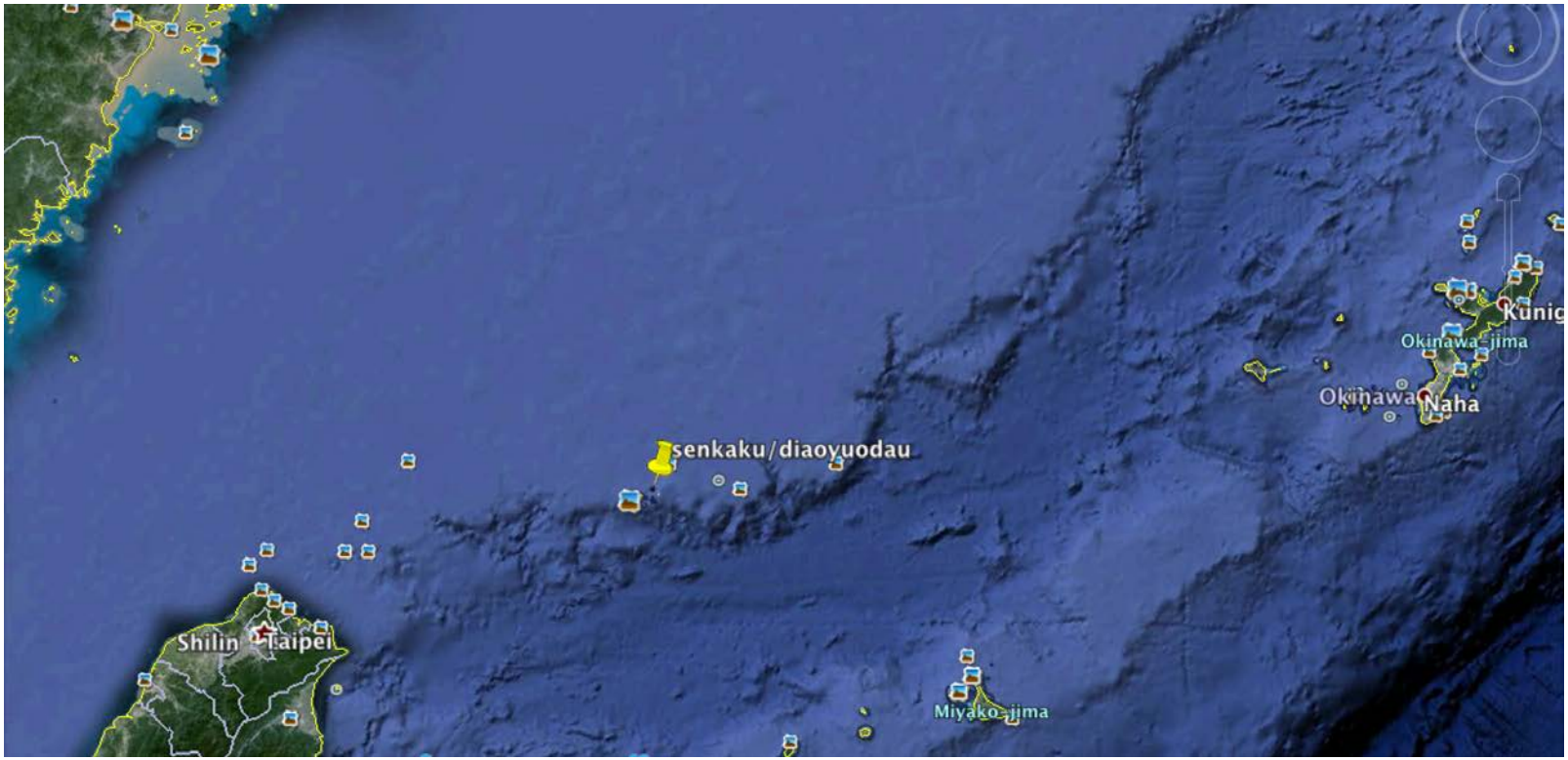
Applied to the IAS classroom

Step 2. Develop classroom experiences that apply to the topic they are engaged in. For example, working with Dr. Lori Watt, wanted her class to:

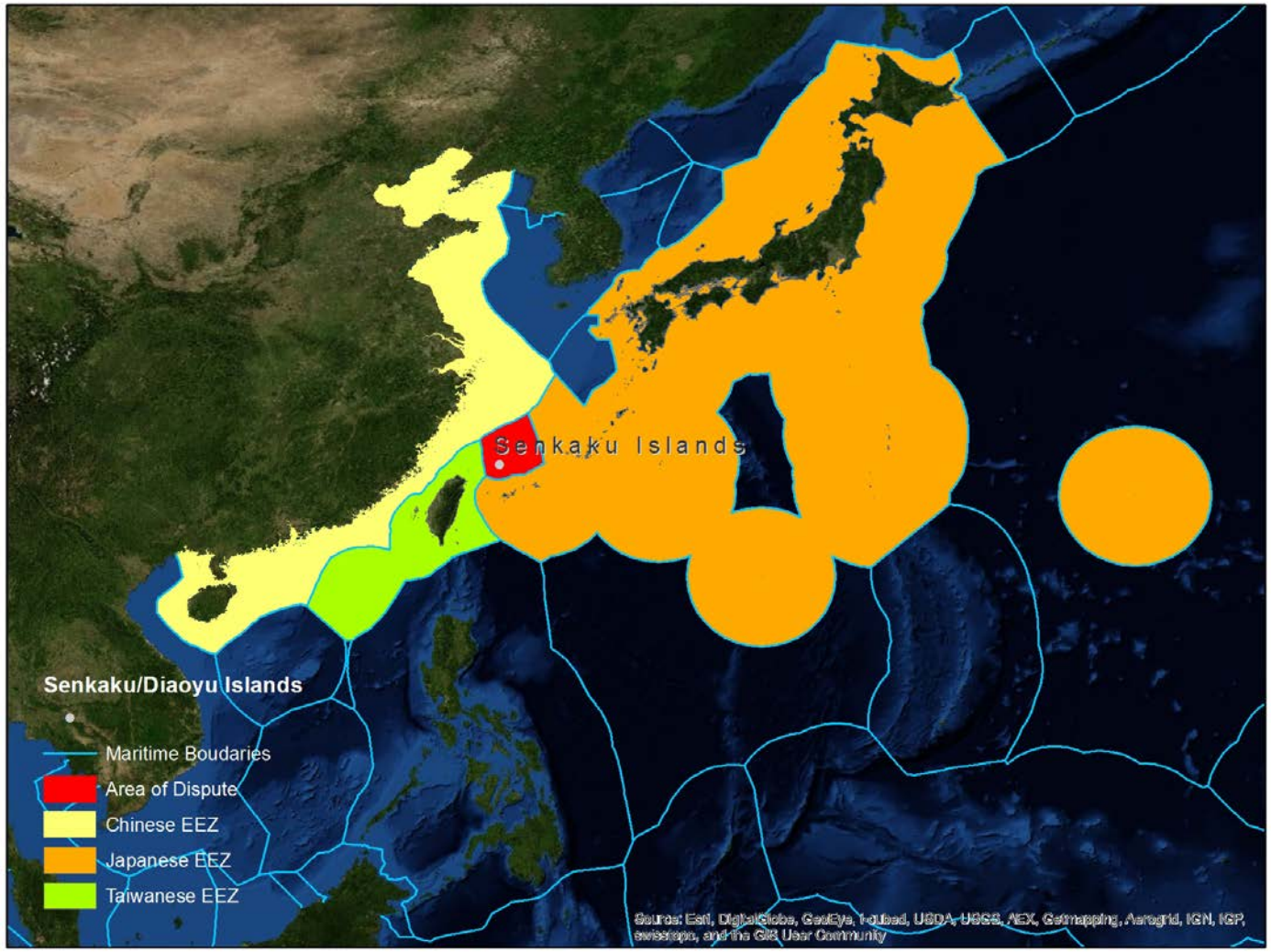
- Find data
- Visualize
- Analyze
- Communicate
- Inform decisions

Related to the disputed Senkaku/Diaoyu Islands

The Senkaku / Diaoyu Islands – tiny little islands under dispute



Building blocks: Working with IAS Students



WUSTL Schools incorporating GIS

From Dr. Watt –

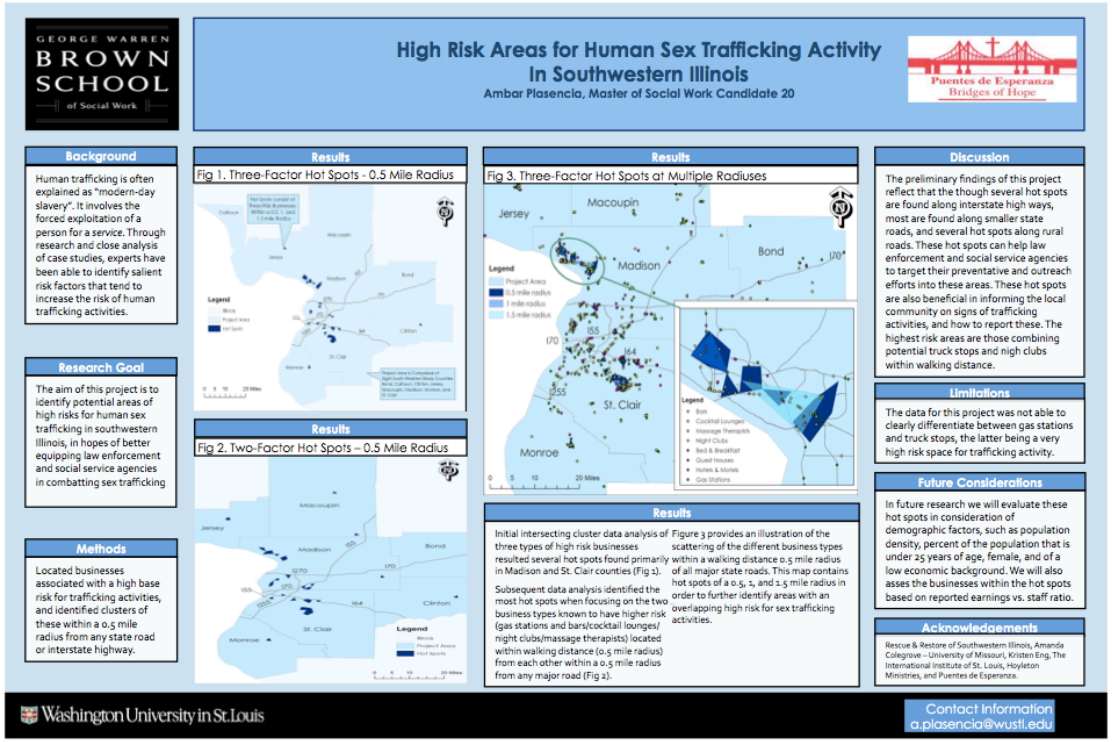
Maps make arguments. Using GIS opens a whole world of knowledge to students and ***the process of making maps helped them think about place****. After the class exercise half of the students developed mapping projects of their own…*

Skill-building Opportunities

Step 3: Offer students opportunities to begin building skills that complement their trajectory

- Brown bag – conceptual introduction
- Workshop series – 3 days – 2 hours – hands-on
- St. Louis OSM editathon
- IAS Ethnic restaurant editathon
  - Data collection
  - Sharing
  - Editing

Example: Brown School



GEORGE WARREN BROWN SCHOOL of Social Work

High Risk Areas for Human Sex Trafficking Activity In Southwestern Illinois

Ambar Plasencia, Master of Social Work Candidate 20

Puentes de Esperanza Bridges of Hope

Background

Human trafficking is often explained as "modern-day slavery". It involves the forced exploitation of a person for a service. Through research and close analysis of case studies, experts have been able to identify salient risk factors that tend to increase the risk of human trafficking activities.

Research Goal

The aim of this project is to identify potential areas of high risks for human sex trafficking in southwestern Illinois, in hopes of better equipping law enforcement and social service agencies in combatting sex trafficking

Methods

Located businesses associated with a high base risk for trafficking activities, and identified clusters of these within a 0.5 mile radius from any state road or interstate highway.

Results

Fig 1. Three-Factor Hot Spots - 0.5 Mile Radius

Results

Fig 2. Two-Factor Hot Spots – 0.5 Mile Radius

Results

Fig 3. Three-Factor Hot Spots at Multiple Radiuses

Initial intersecting cluster data analysis of three types of high risk businesses resulted several hot spots found primarily in Madison and St. Clair counties (Fig 1).

Subsequent data analysis identified the most hot spots when focusing on the two business types known to have higher risk (gas stations and bars/cocktail lounges/ night clubs/massage therapists) located within walking distance (0.5 mile radius) from each other within a 0.5 mile radius from any major road (Fig 2).

Figure 3 provides an illustration of the scattering of the different business types within a walking distance 0.5 mile radius of all major state roads. This map contains hot spots of a 0.5, 1, and 1.5 mile radius in order to further identify areas with an overlapping high risk for sex trafficking activities.

Discussion

The preliminary findings of this project reflect that the though several hot spots are found along interstate high ways, most are found along smaller state roads, and several hot spots along rural roads. These hot spots can help law enforcement and social service agencies to target their preventative and outreach efforts into these areas. These hot spots are also beneficial in informing the local community on signs of trafficking activities, and how to report these. The highest risk areas are those combining potential truck stops and nigh clubs within walking distance.

Limitations

The data for this project was not able to clearly differentiate between gas stations and truck stops, the latter being a very high risk space for trafficking activity.

Future Considerations

In future research we will evaluate these hot spots in consideration of demographic factors, such as population density, percent of the population that is under 25 years of age, female, and of a low economic background. We will also asses the businesses within the hot spots based on reported earnings vs. staff ratio.

Acknowledgements

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Washington University in St. Louis

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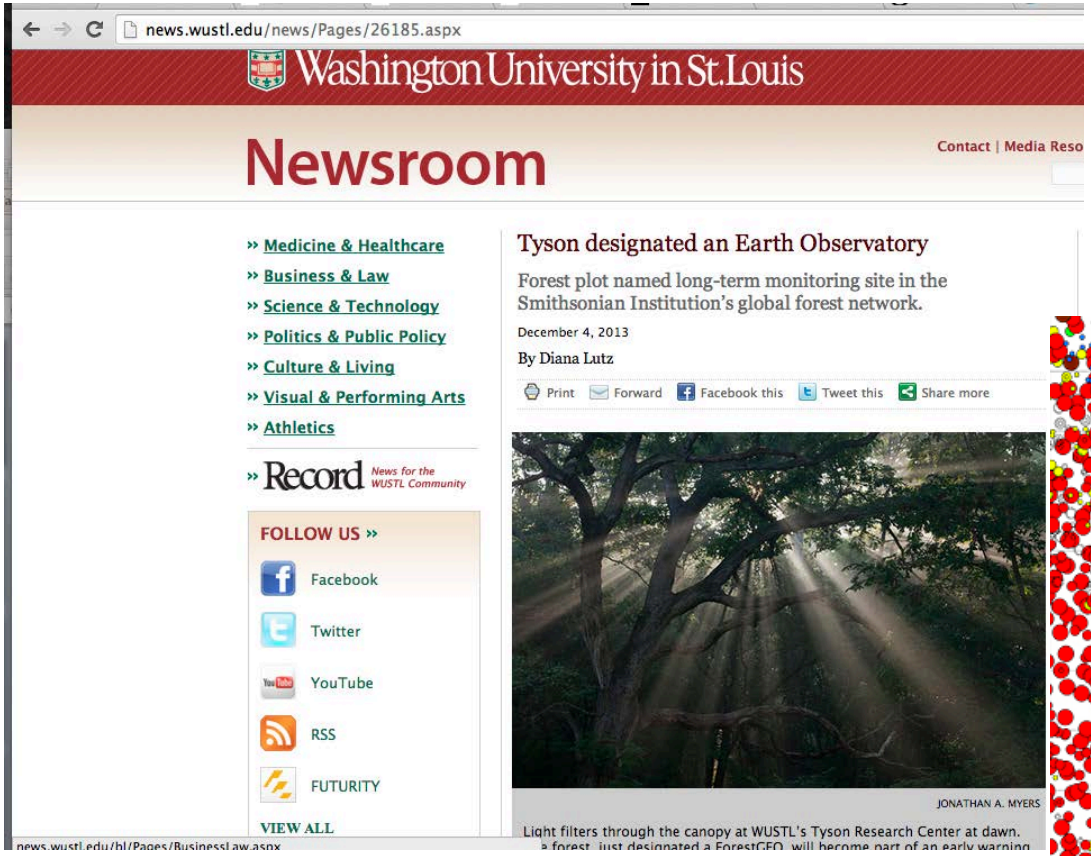
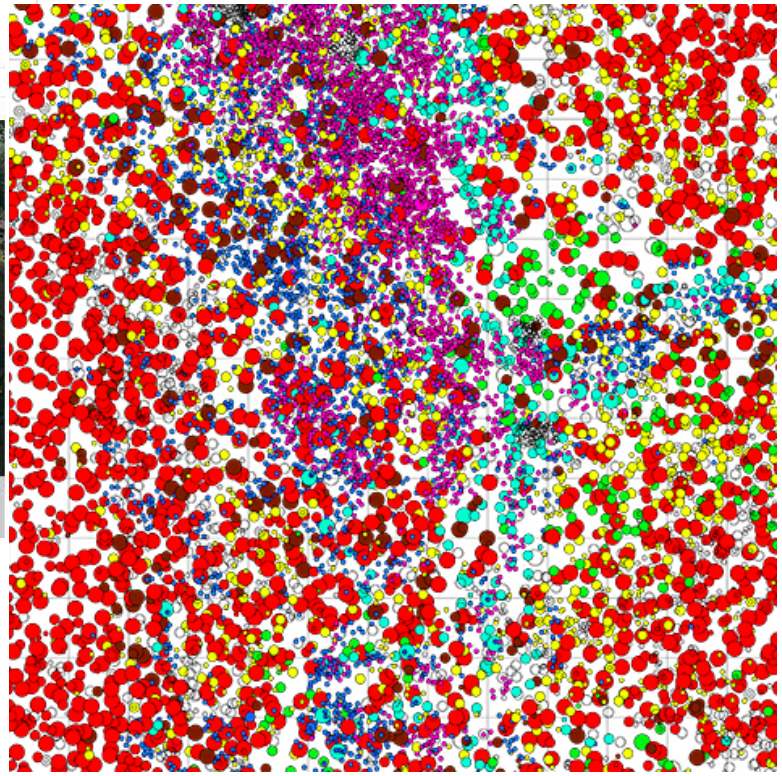
Example: Arts & Sciences

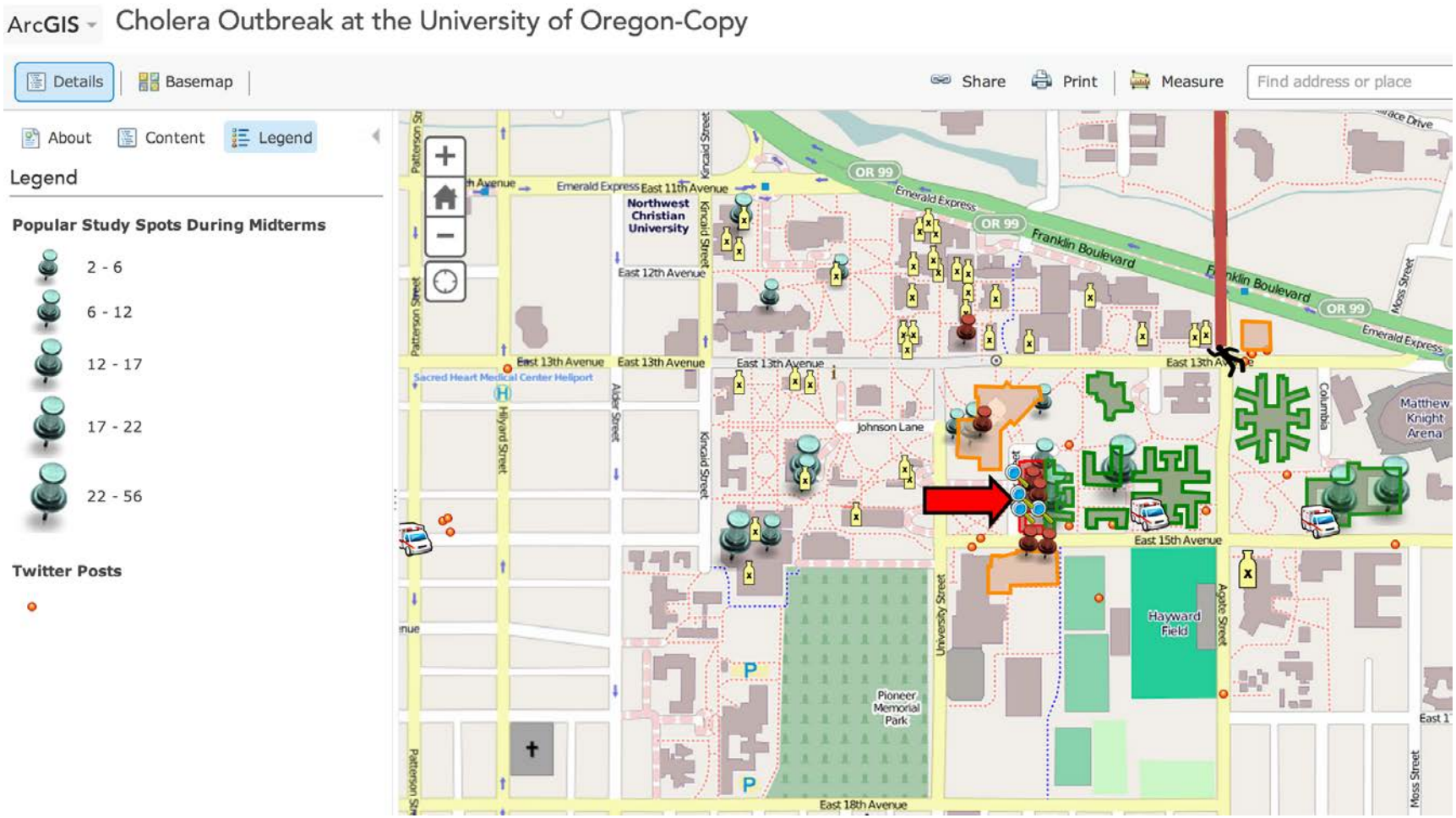




Example: Sam Fox

- Patty Heyda
- Gia Daskalakis
- Derek Hoeferlin
- Kees Lokman

Innovation in the classroom: Chris Bone & the University of Oregon Cholera Outbreak



Visit site

GIS at WUSTL in 2014

- ArcGIS Online being tested at WUSTL
- OpenStreetMaps on campus and beyond
- Scripting and GIS

Thank you! Thank you! Thank you!

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