EMBEDDING GIS IN THE LIBERAL ARTS CURRICULUM –

WHERE WE'RE AT IN YEAR 3 & WHERE WE'RE HOPING TO GO WITH THIS AT BUCKNELL

NEARC

May 22, 2012

Overview

- Who am I? What do I do?
- Evolving strategy
- Greasing the wheels
- Where we're at now
- What's next

Who am I? What do I do?

- GIS Specialist
  - New position at Bucknell
  - Work out of Library & IT Division
  - Integrate GIS & spatial thinking across the curriculum in teaching and research
    - Serve as a resource for faculty and students

Getting GIS in early…

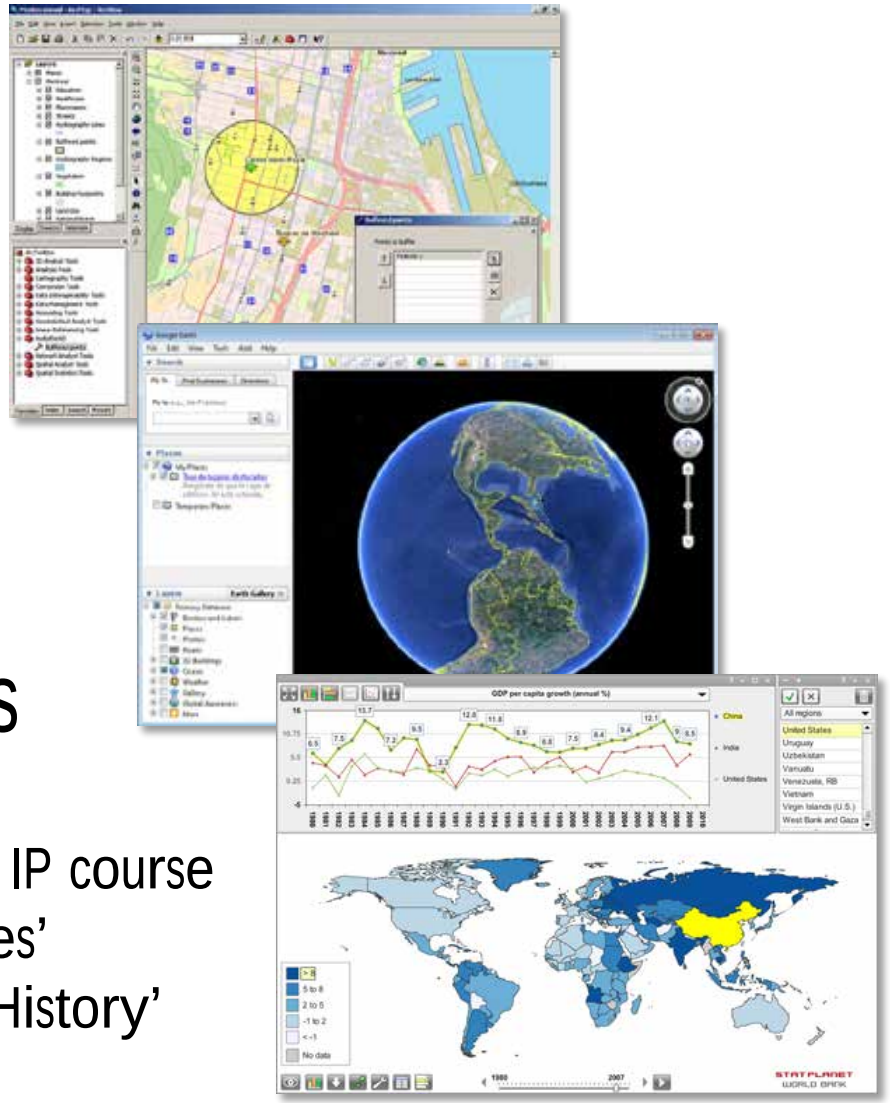
- Into courses required in 1st/2nd year:
  - Foundation seminars
  - Residential colleges
  - Transition to college workshops
  - Methods classes
  - Integrated perspectives (IP) courses
    - New requirement
    - Brand new courses
    - Interdisciplinary/holistic approach = perfect fit for GIS

Getting GIS in often…

- Into seminal learning experiences
  - Faculty-led student research
  - Independent student research
  - Independent study
  - Senior design courses
  - Honors theses
  - Service learning & community engagement

Getting GIS in ‘just the right amount’…

- ArcGIS
  - GEOG204, ENGR101, ENST302
- GoogleEarth/Maps
  - HUMN272, ENGL224, Environmental Residential College
- Data/Map Tools
  - RELI233, ECON312
- Custom web map apps
  - Still in the works
    - ‘New Orleans in 12 Movements’ IP course
    - HUMN 290, ‘Susquehanna Stories’
    - HIST275, ‘Mills, Milling & Local History’



Greasing the wheels

- Resources & incentives
  - Library & IT budget
    - ESRI site license
    - Stipends for course revision
    - GIS student assistants
  - 3 year Mellon grant (we're in year 2)
    - Stipends for faculty attending GIS workshops
    - Stipends for faculty who revise courses to include GIS
    - Stipends for student researchers to develop data for use in courses that integrate GIS
    - Stipends for student researchers to collaborate on faculty research projects
    - Money to buy data and/or pay consultants

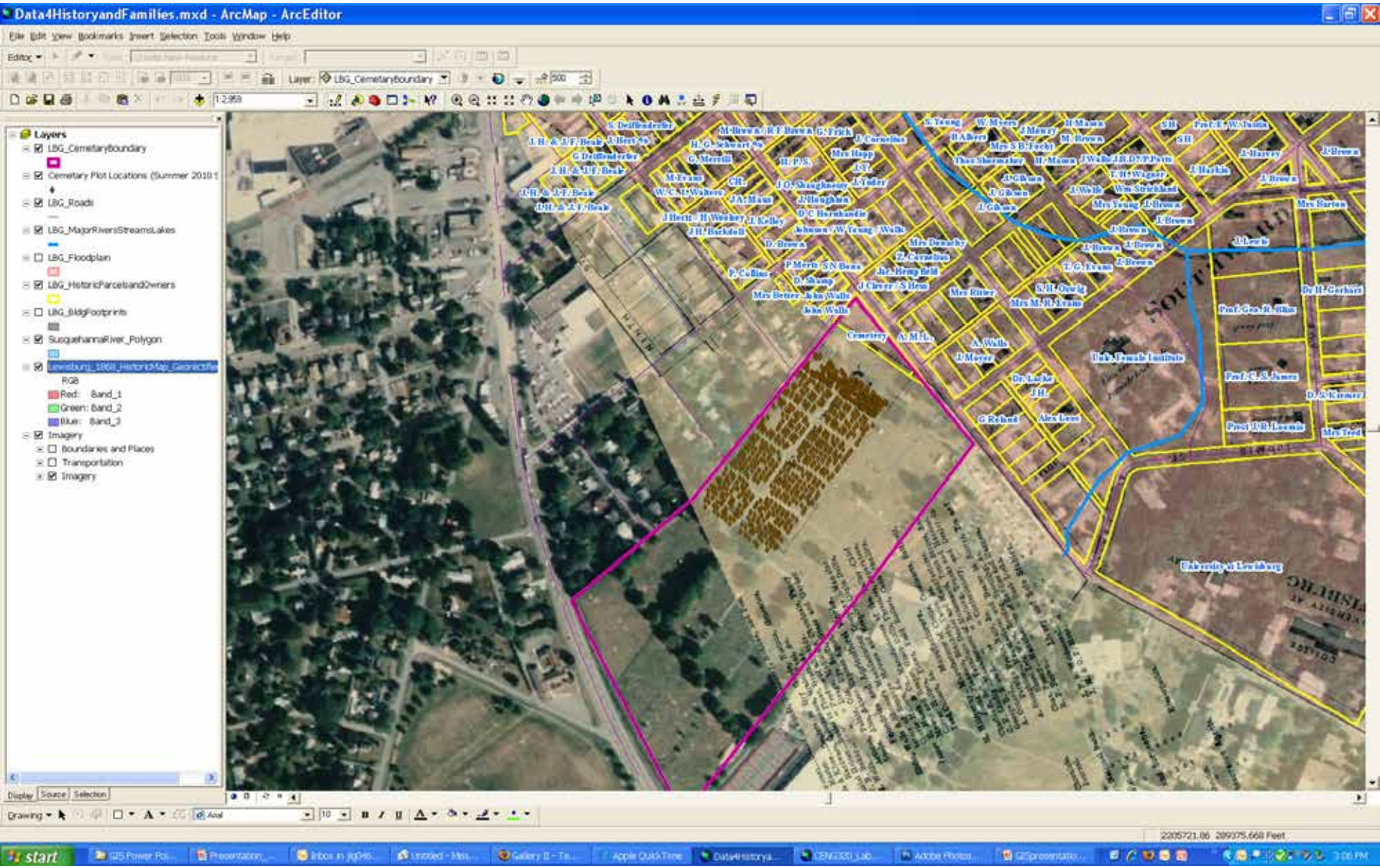
Where we're at now

- Snapshot of GIS in teaching & research

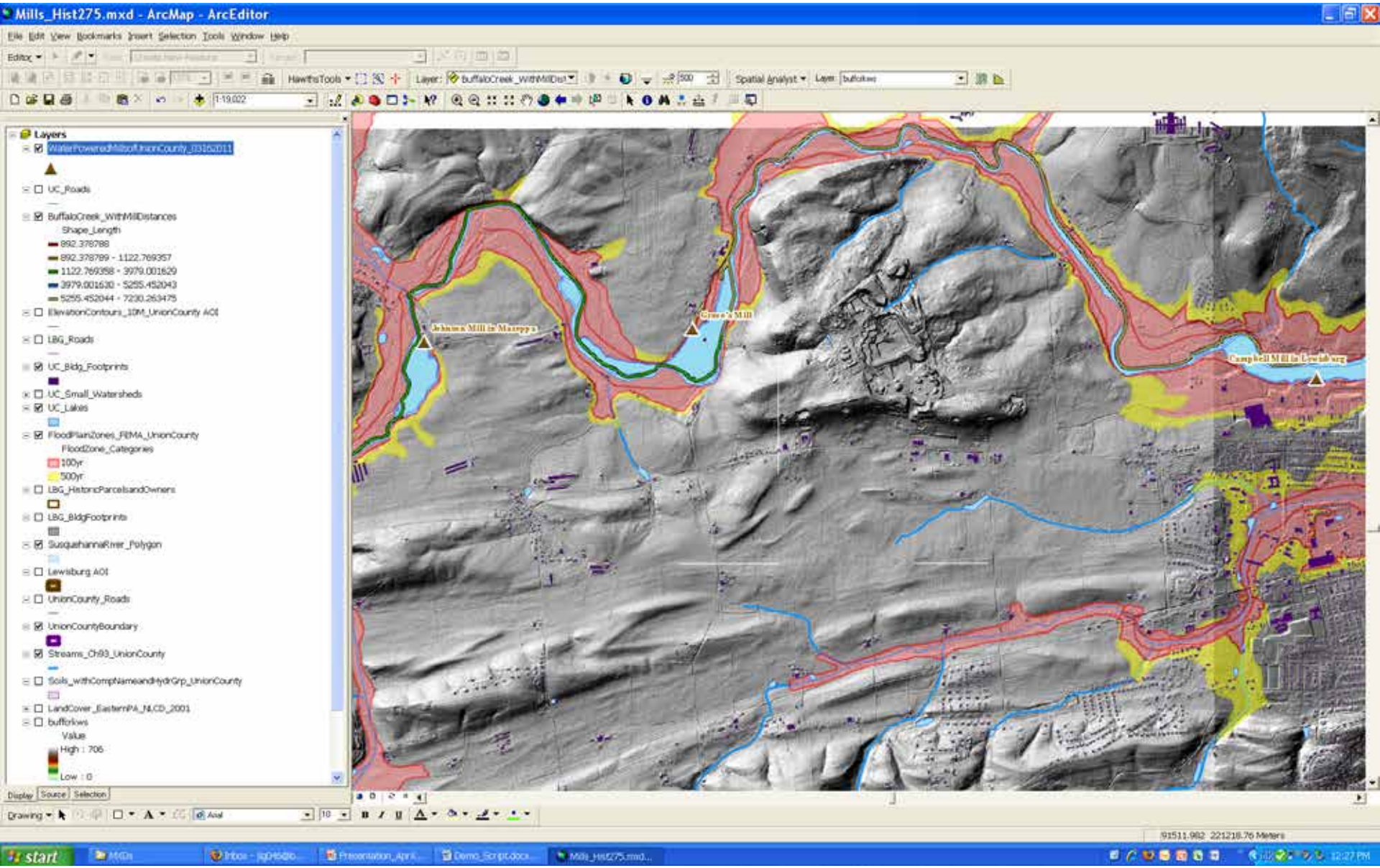
GIS in teaching across Bucknell

- BIOL 353 (Ecosystem Ecology)
- BIOL 415 (Conservation Biology)
- BOTS (Bucknell Semester on the Susquehanna)
- CENG 305 (GIS Applications for Engineering)
- CENG 320 (Water Resources Engineering)
- CENG 330 (Introduction to Transportation Planning)
- CENG 421 (Hydrology)
- CENG 42x (Groundwater Hydrology)
- CENG 422 (River Mechanics)
- CENG 432 (Urban & Regional Planning)
- CENG 490 (Senior Design)
- CSCI 361 (Software Engineering)
- ECON 102 (Methods)
- ECON 312 (Health Economics)
- ENGL 224 (Visions of the Susquehanna)
- ENGR 101 (Engineering Graphics)
- ENST 200 (Acquiring Environmental Knowledge)
- ENST 211 (Environmental Pollution & Control)
- ENST 302 (Environmental Research Methods)
- ENST 255 (Environmental Justice)
- FOUN "Families in History and History in Families"
- FOUN "Blue Highways" foundation seminar
- GEOG 101 (Introduction to Human Geography)
- GEOG 175 (Landforms of the World)
- GEOG 204 (Applied GIS)
- GEOG 257 (Global Environmental Change)
- GEOG 332 (Evolution, Ecology & Human Impact)
- GEOG 345 (Food & the Environment)
- GEOL 103 (Physical Environmental Geology)
- GEOL 230 (Environmental GIS)
- GEOL 310 (Applied Environmental Geomorphology)
- GEOL 320 (Flood Analysis)
- HIST 275 (Mills, Milling and Local History)
- HUMN 128 (Myth, Reason, Faith)
- HUMN 272: (Nature and Enlightenment)
- HUMN 290 (Susquehanna Country)
- HUMN 301 (Brain, Mind, and Culture)
- PHYS 147 (Energy & Sustainability)
- PSCI 140 (American Politics)
- RELI 233 (Global Feminism & Religion)
- UNIV 266 (Sustainable Building Design)
- WMST 233 (Global Feminism & Religion)
- Susquehanna Summer Writer's Institute
- Environmental Residential College

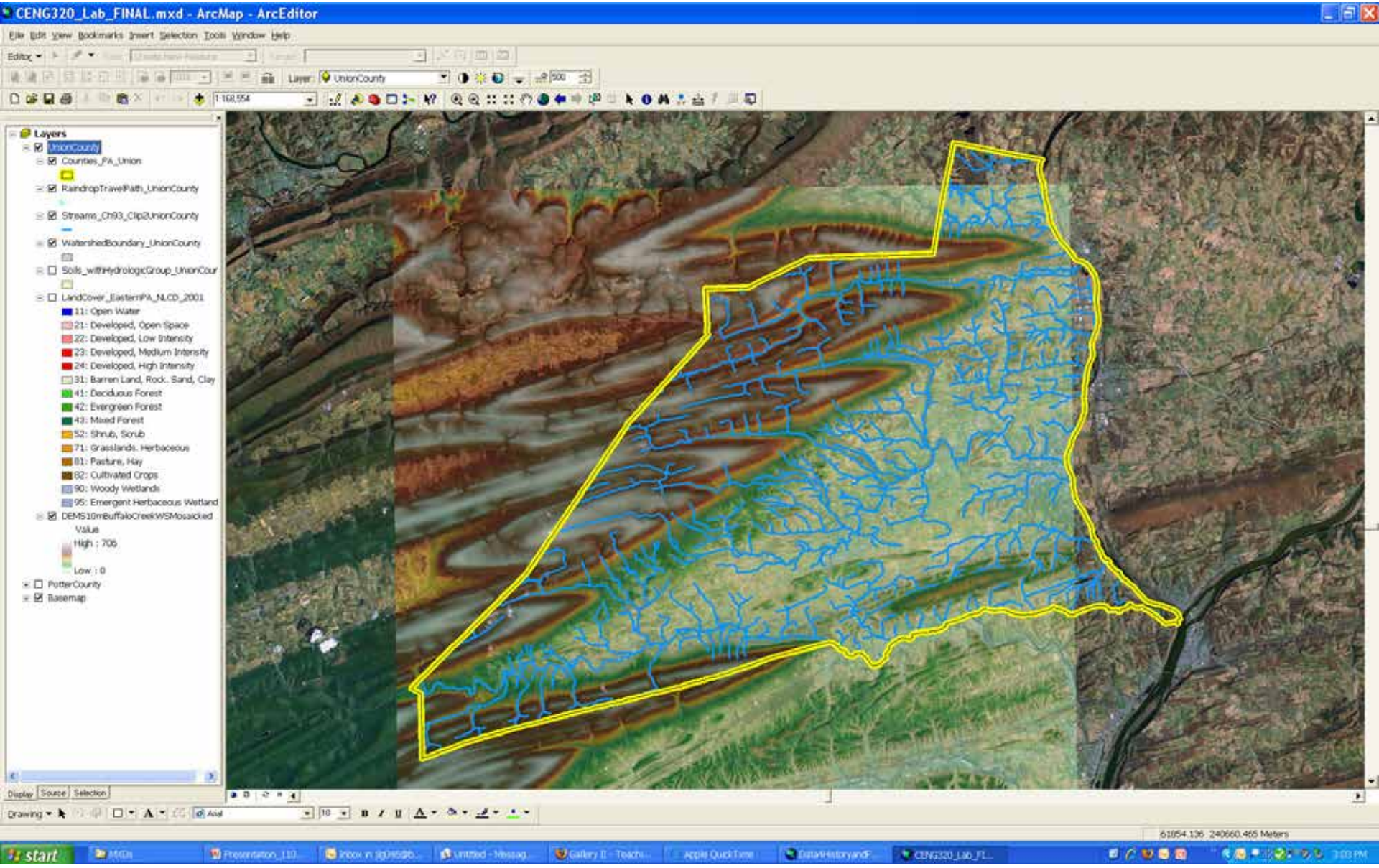
FOUN 091 – Families in History & History in Families



HIST 275 – Mills, Milling & Local History



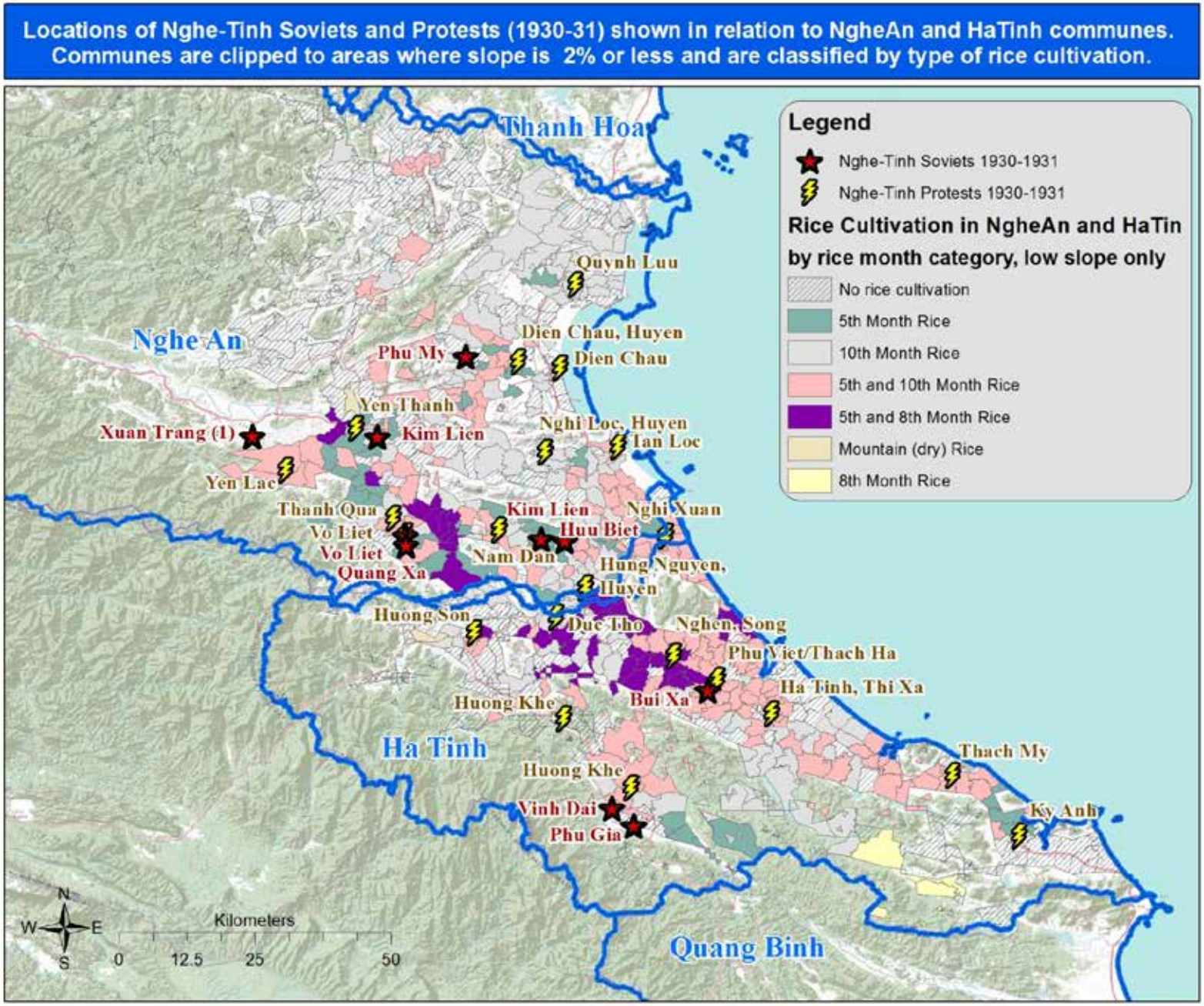
CENG 320 – Water Resources Engineering



GIS in research across Bucknell

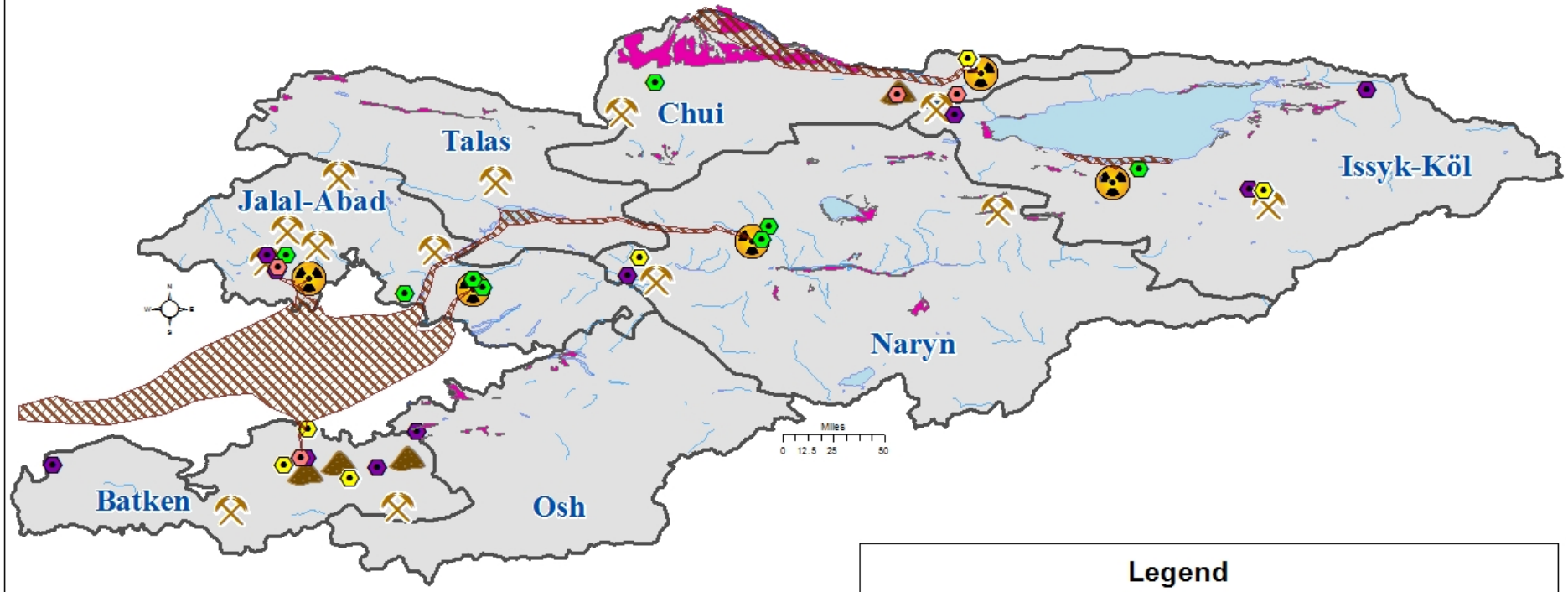
- Environmental activism in Kyrgyzstan (Amanda Wooden)
- Stories of the Susquehanna (Alf Siewers, Katie Faull, Ben Marsh, Duane Griffin)
- Susquehanna Valley Summer Writer's Institute (Alf Siewers, Amanda Wooden)
- Susquehanna River Initiative (Ben Hayes, Matt McTammany)
- Beaucarnot Diary (David Del Testa)
- Turtle Species Range Distributions (Tristan Stayton)
- Green Building (Beth Duckles)
- Inside Out (Coralyn Davis)
- China Network Analysis (Song Chen)
- Newt Species Ranges (Mizuki Takahashi)
- New Mexico Plutons (Chris Daniels)
- Campus Greening Initiative (Duane Griffin, Michelle Oswald)
- Sea Level Rise & Transportation Planning (Michelle Oswald)
- Local Mills (Tom Rich, David Del Testa)
- Hill Fort Viewshed Analysis (Kevin Daly)
- Fluvial environments (Matt McTammany)
- Bridge safety (Jessica Newlin)
- Bucknell Arboretum Project (Duane Griffin, Mark Spiro)
- Geisinger Obesity Project (Carl Milofsky)
- Miller Run Restoration Project (Matt McTammany, Craig Kochel, Dina El-Mogazi, Dennis Halley)
- Hidden Discrimination & GIS (Ben Marsh)
- Health Care Atlas (Amy Wolaver)
- John Smith Trail Initiative (Katie Faull, Alf Siewers)
- Lewisburg Genealogy (Marj Kastner)
- Mapping Tolstoy (Slava Yastremski)
- Marcellus Shale Initiative (Carl Kirby)
- Sudan Field Atlas Guide to Mammals (DeeAnn Reeder)
- Susquehanna Sustainability Indicators Project (Peter Wilshusen)
- Bat White-Nose Syndrome Arousal Study (DeeAnn Reeder)
- Frac Water Transport (Kevin Gilmore)
- Four Roads to Vietnamese History (David Del Testa)

Four Roads to Vietnamese History



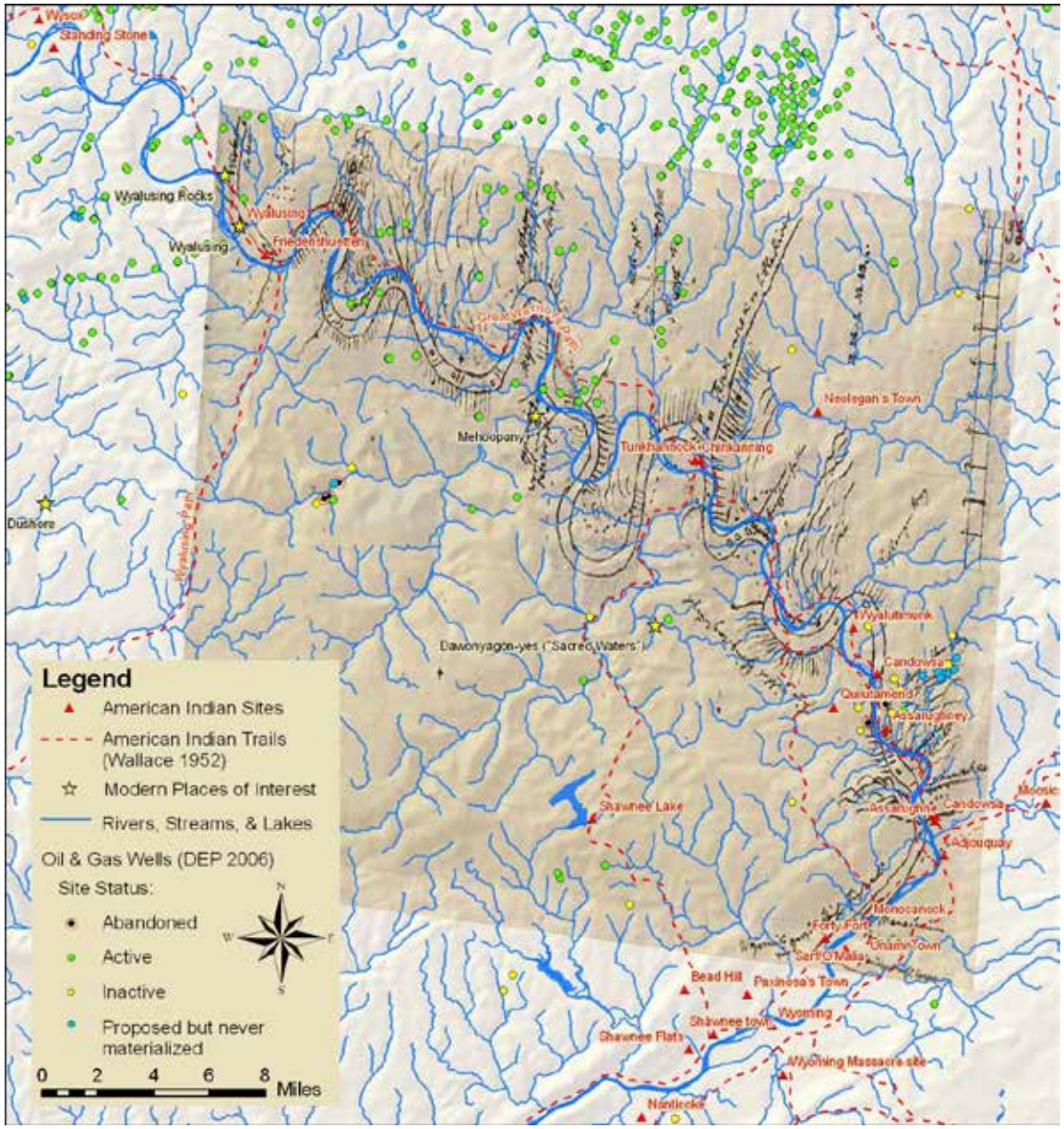
Environmental Activism in Kyrgyzstan

Environmental Hazards & Resources



From Wooden, Amanda E. "Another Way of Saying Enough: Environmental Concern and Population Mobilization in Kyrgyzstan." Working Paper. March 2012. Bucknell University. Basemap from DIVA-GIS. Data adapted from: Gosgeolagenstvo 2005 and Fluid et al., 2004 in Hutton, David, ed. 2007. Kyrgyzstan: Environment and Natural Resources for Sustainable Development. United Nations Development Programme in the Kyrgyz Republic, Bishkek; and The small atlas of emergencies forecasting and risk reduction on the territory of the Kyrgyz Republic. 2006. The Government of the Kyrgyz Republic, the Asian Disaster Reduction Center & the Ministry of Emergency Situations, Bishkek. Map created by Amanda Wooden & Janine Glathar

Stories of the Susquehanna

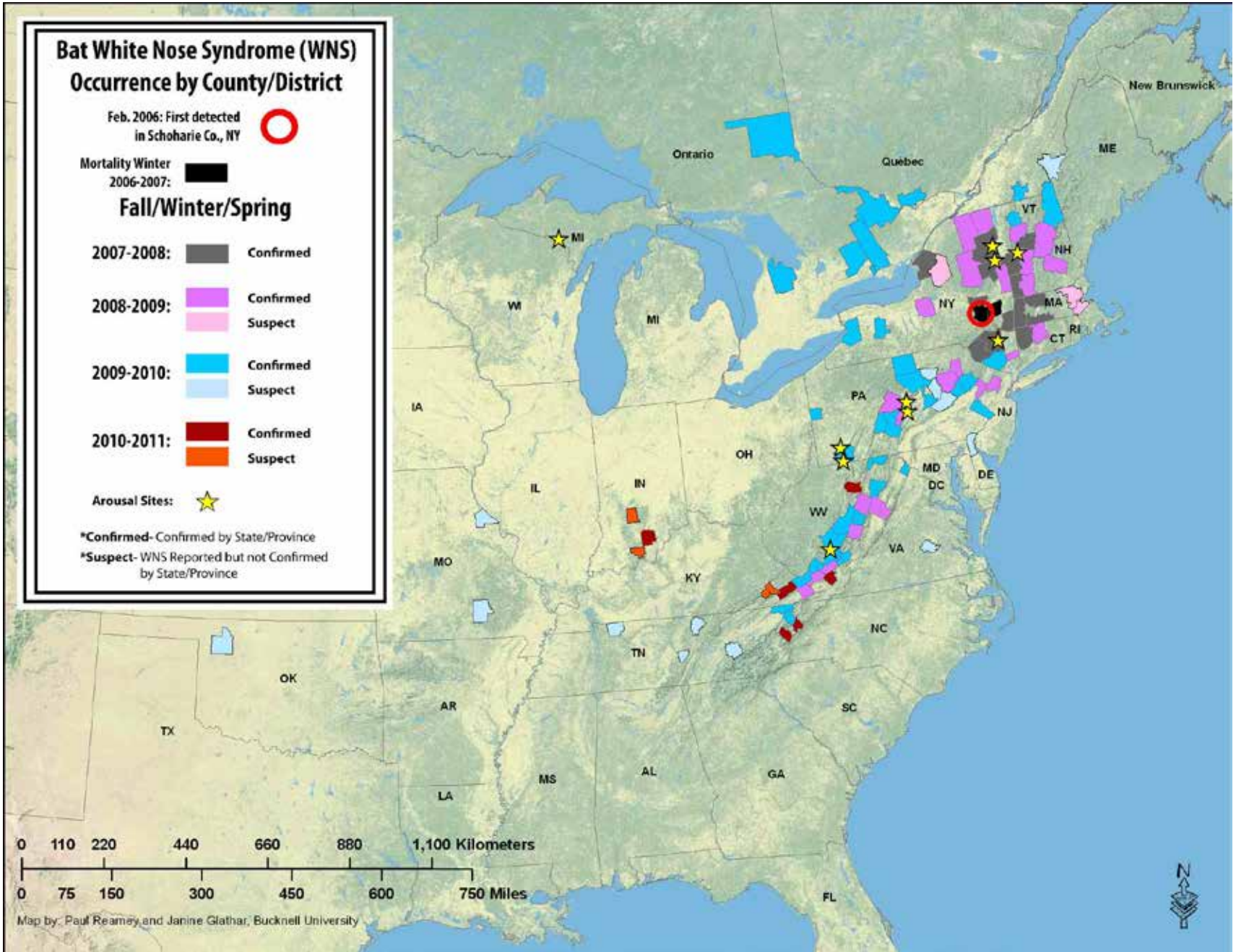


Incorporating Modern GIS Data

Layers:

- **American Indian sites, Wallace's Indian Paths, and streams**
- **Georeferenced German North Branch map**
- **Oil and Gas Wells (DEP GIS dataset, 2006) categorized by site status—Active, Inactive, Abandoned, Proposed but Never Materialized**

Bat White-Nose Syndrome Arousal Study



Where we're at now

- Sample of student & faculty pathways

Getting GIS into… the humanities

- Bethany Dunn, English/History ‘13
  - FOUN099, ‘Blue Highways’ (foundation seminar)
  - GIS/video project for Environmental Res College
  - GEOG204, Applied GIS
  - HUMN272, Nature & Human Enlightenment
  - Mellon-funded student research assistant collaborating with Prof. Katie Faull and Prof. Alf Siewers on research for ‘Stories of the Susquehanna’ project
  - HUMN290, Susquehanna Stories (IP course)
  - HIST000, Historical GIS (methods course)
  - Senior honors thesis?

Getting GIS into…the social sciences

- Jorge Vargas, Environmental Studies/Geography ‘12
  - Susquehanna Summer Writer’s Institute
  - Library & IT-funded GIS student assistant
  - ENST302, Environmental Research (methods course)
  - ENST255, Environmental Justice
  - GEOL230, Environmental GIS

Getting GIS into… science & engineering

- Rebekah Hupp, Civil Engineering ‘13
  - Engineering 101, Engineering Graphics
  - Geology 230, Environmental GIS
  - Engineering 320, Water Resources Engineering
  - Engineering 421, Hydrology
  - Engineering 490, Senior Design
  - McKenna-funded research assistant collaborating with Prof. Kevin Gilmore and I on using GIS to analyze potential air pollution impacts from frac water transport to Marcellus Shale wells in NE PA.

Embedded GIS: Amanda Wooden

- Year 1
  - GIS guest lecture in ENST 202 (GIS & Research Design)
  - Collaborated on mapping survey data on env. activism in Kyrgyzstan
    - Student research assistants supervised by GIS specialist
  - Presentation for faculty colloquium series
- Year 2
  - GIS guest lecture in ENST 202 (GIS & Research Design)
    - Added GIS lab: 'Human/Landscape Interaction: Marcellus Shale'
  - Collaborated on mapping survey data on env. activism in Kyrgyzstan
    - Added spatial analysis of survey data
    - Jointly-supervised student research assistants
  - GIS guest lecture in ENST 255 (GIS & Environmental Justice)
  - Susquehanna Valley Summer Writer's Institute
    - Web-based mapping application
  - Introductory GIS workshop
  - Multiple presentations & publications
    - Tenure year
- Year 3
  - All of the above
  - Collaborated on mapping survey data on env. activism in Kyrgyzstan
    - Moving towards faculty member as primary GIS research supervisor
  - Spatial Statistics workshop
  - Multiple presentations & publications

What's next

- I will get 2 pilot web map apps out this summer even if it kills me!
  - Teaching pilot - New Orleans IP course
  - Research pilot - 'Stories of the Susquehanna'
- Tighter integration with course materials
  - Meeting specific learning objectives
  - Pre/post evaluation and student evaluations
- Figuring out how to get
  - Assistant for me
  - Web developer for academic projects
  - Course releases for faculty

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