2018 NEW JERSEY SUSTAINABILITY SUMMIT

Welcome to

Mapping a Path to Sustainability

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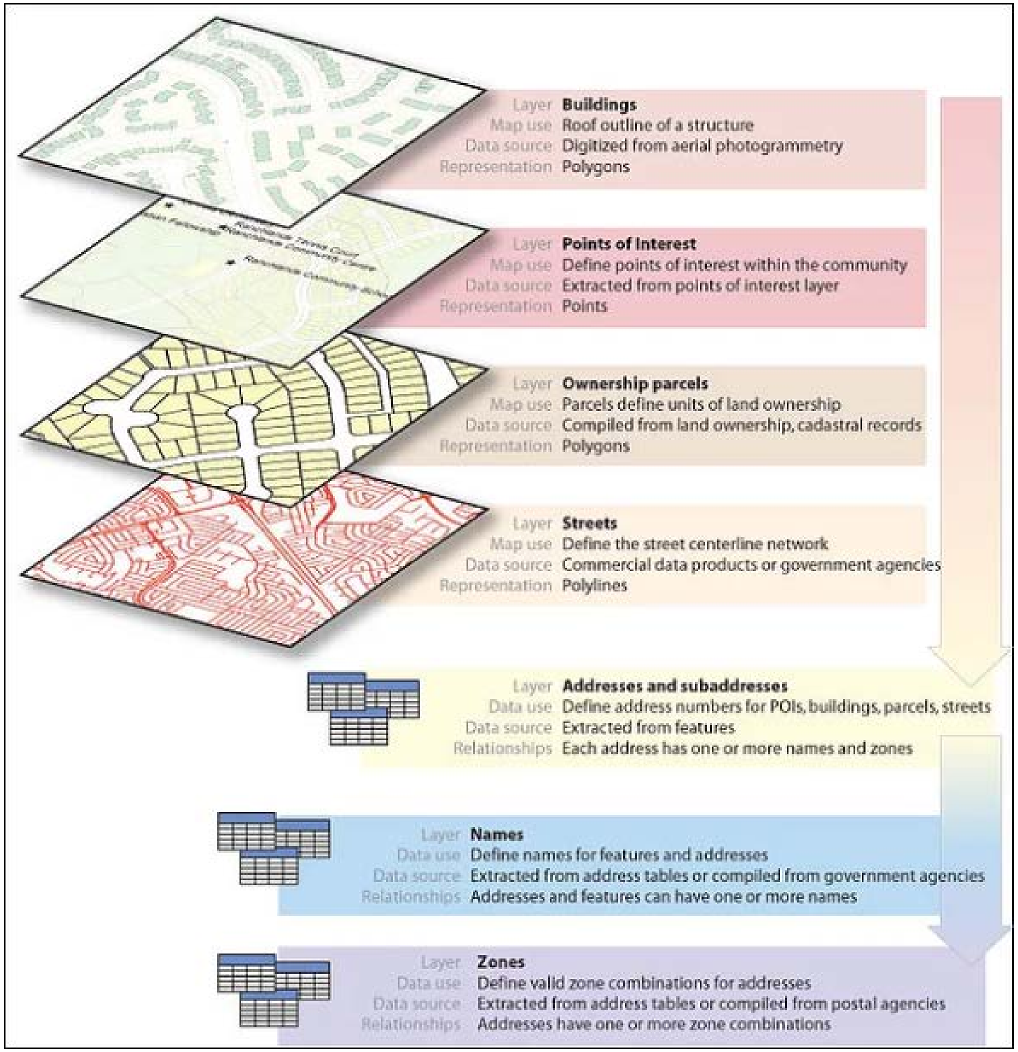
WiFi network: Guest-at-TCNJ3 | username: guest2344 | password: naranyru

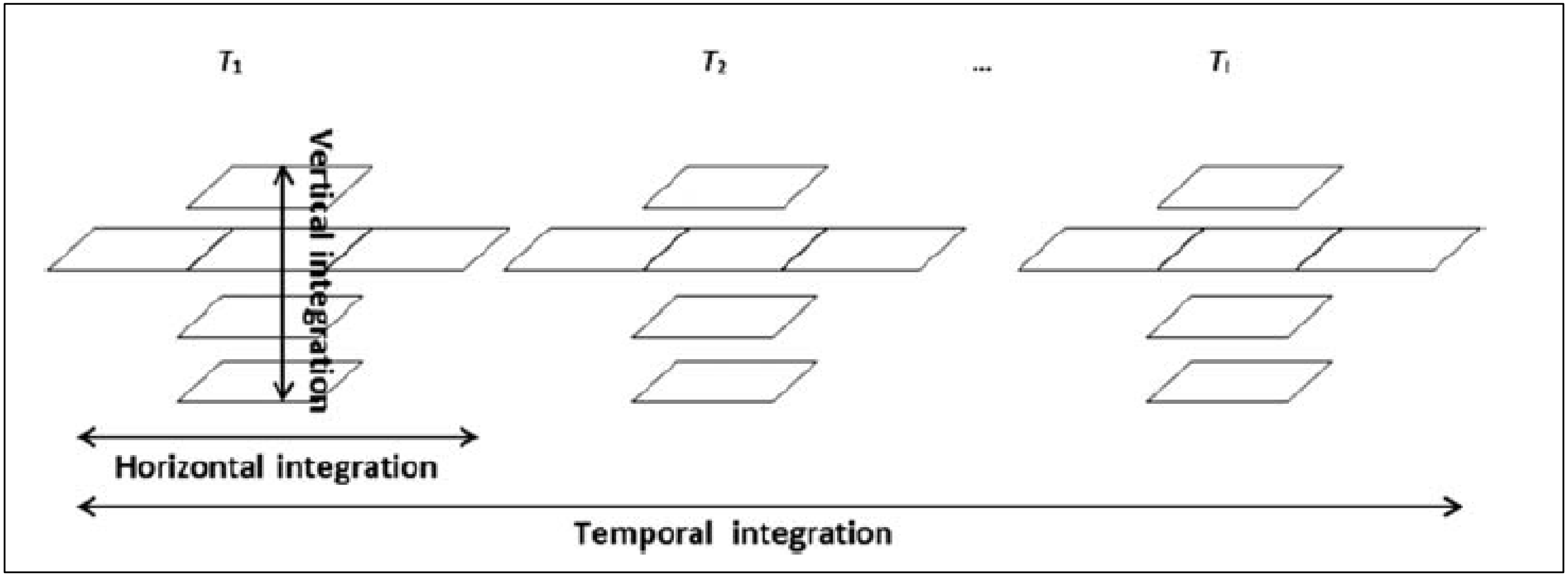
Today's Panelists

- ***Tony O'Donnell**, Economist, Sustainable Jersey*
- ***Susan Mania,** Creative Assets Inventory Consultant for Hunterdon County*
- ***Zachary Christman**, Ph.D., Director GIS Program, Rowan University*
- ***John Hasse**, Associate Professor, Rowan University Department of Geography*

GIS is Information Rich

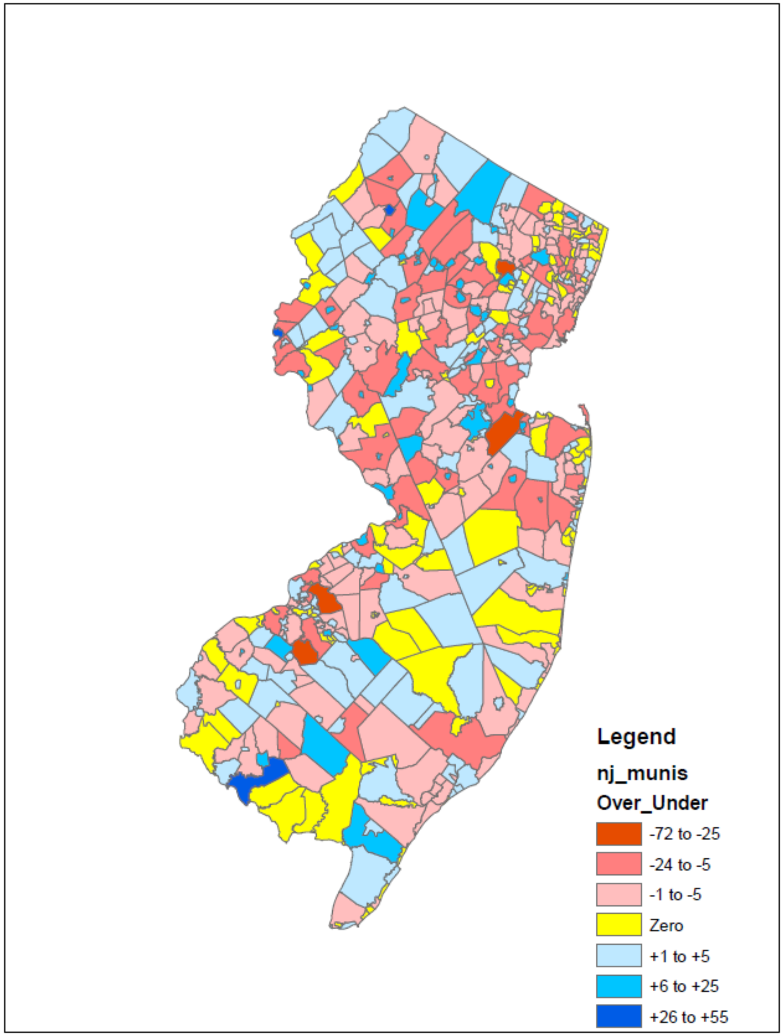


Comparisons across Space & Time

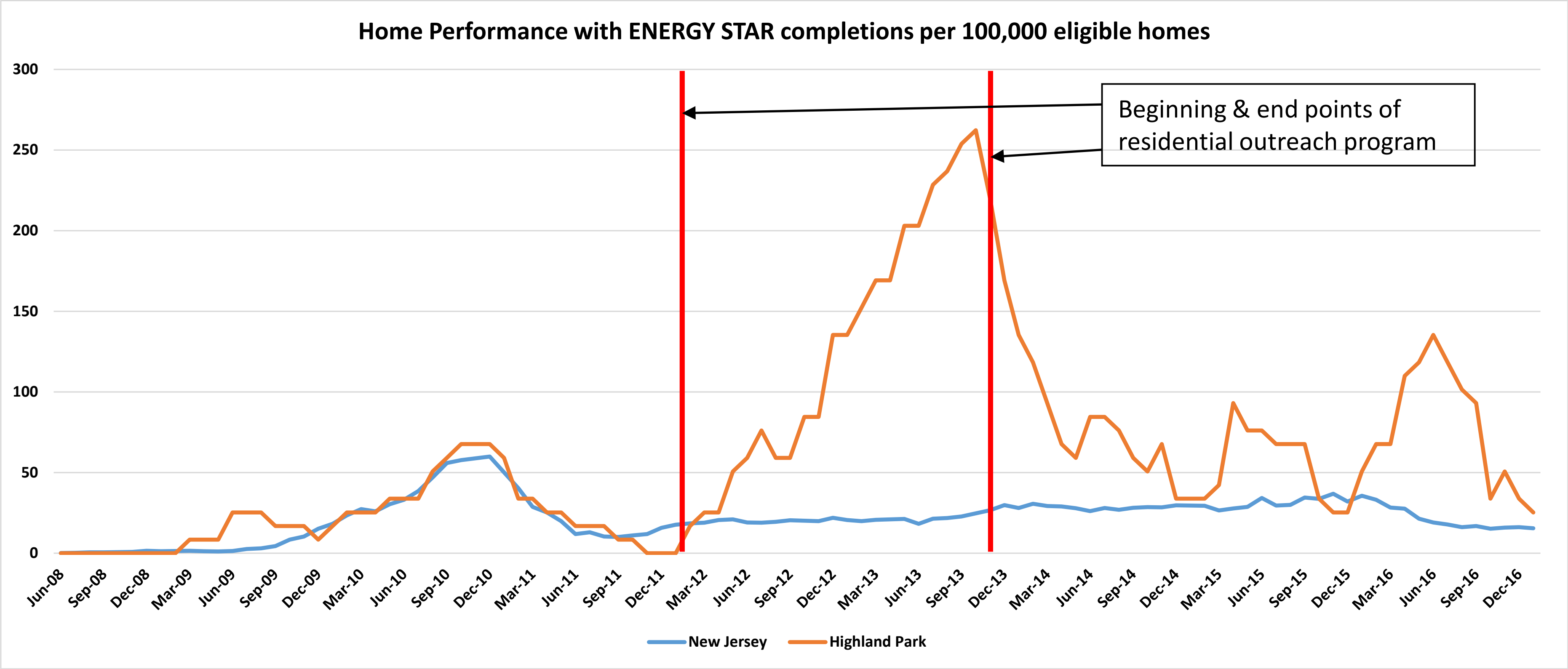


Gold Star Standard data

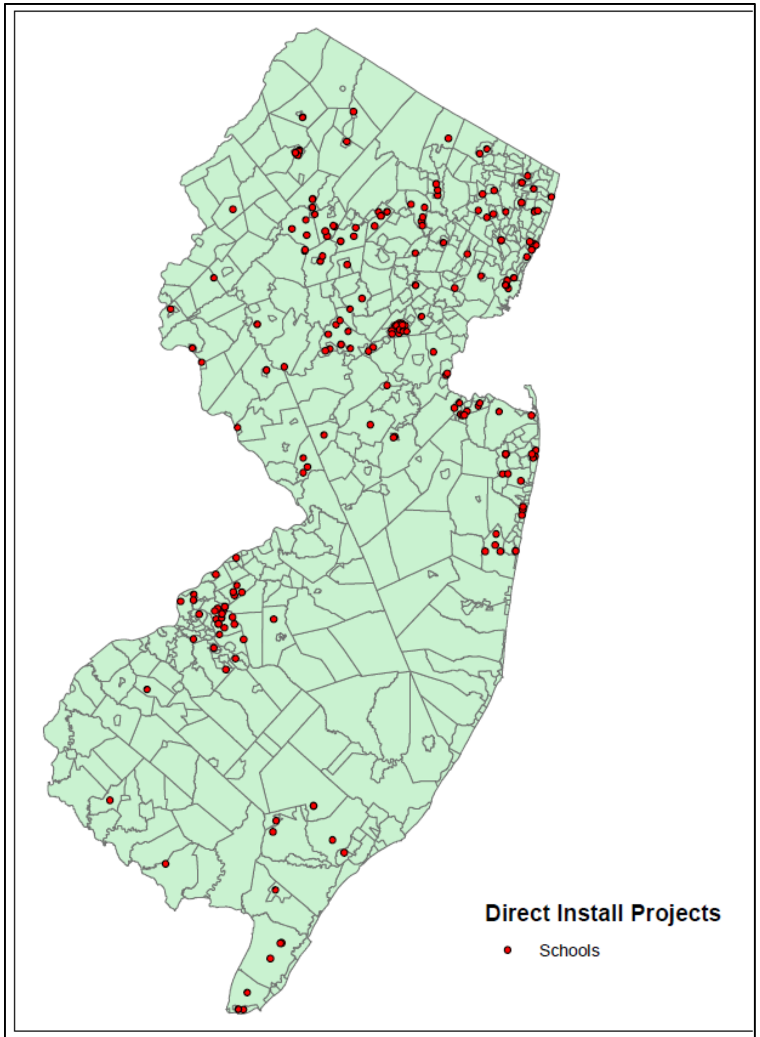
- Successfully used GIS to analyze error rates in data on NJ Clean Energy Program offerings
- Data originally compiled by Zip Code
- Converting from Zip Code to municipality leads to large errors
- By geocoding individual projects, we were able to identify the magnitude of the errors
- Corrected data highlighted the success of past campaigns by Green teams

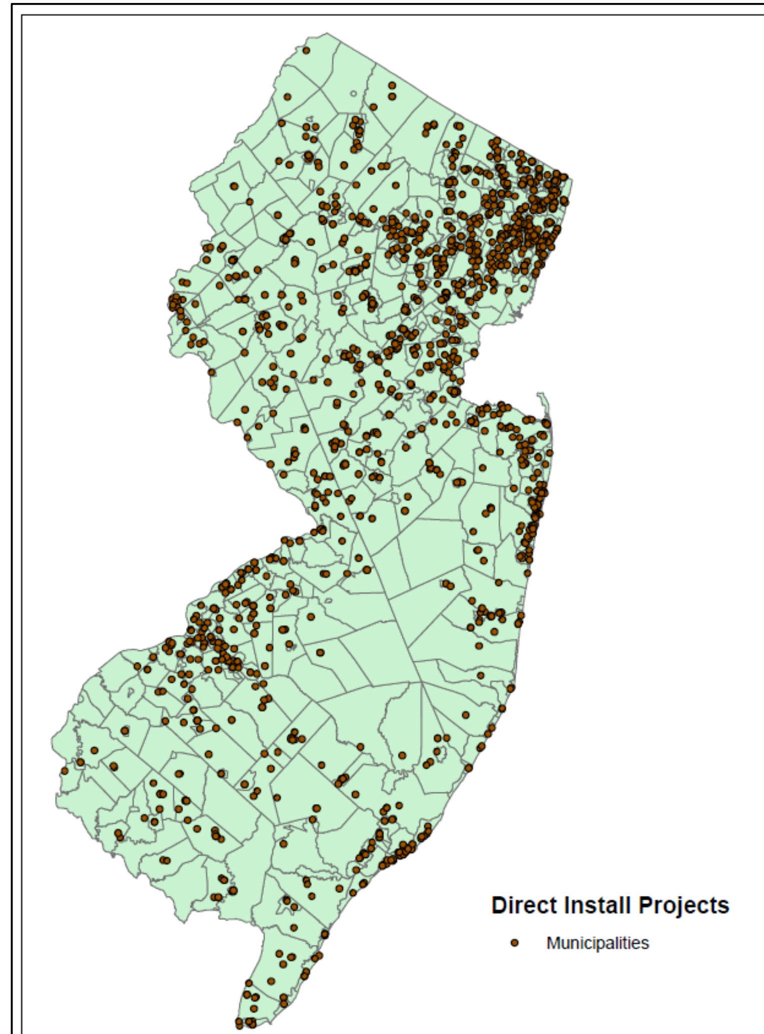


Highland Park Residential Energy Outreach Program history



Identifying Potential for Commercial Outreach Campaigns





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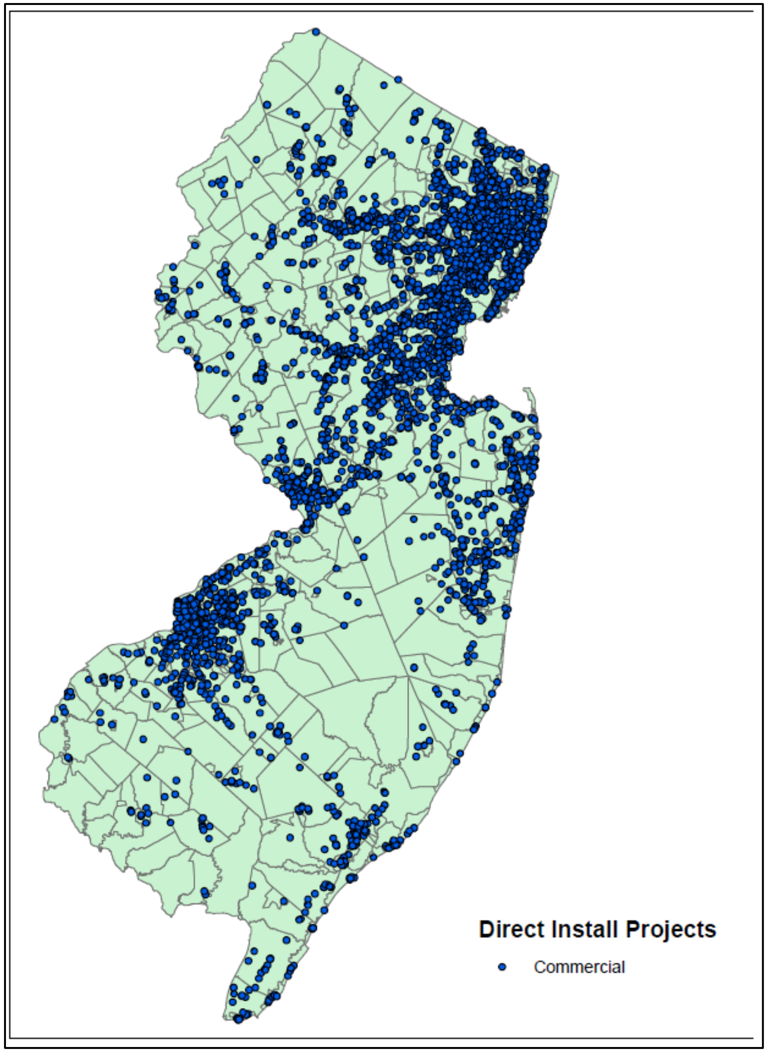
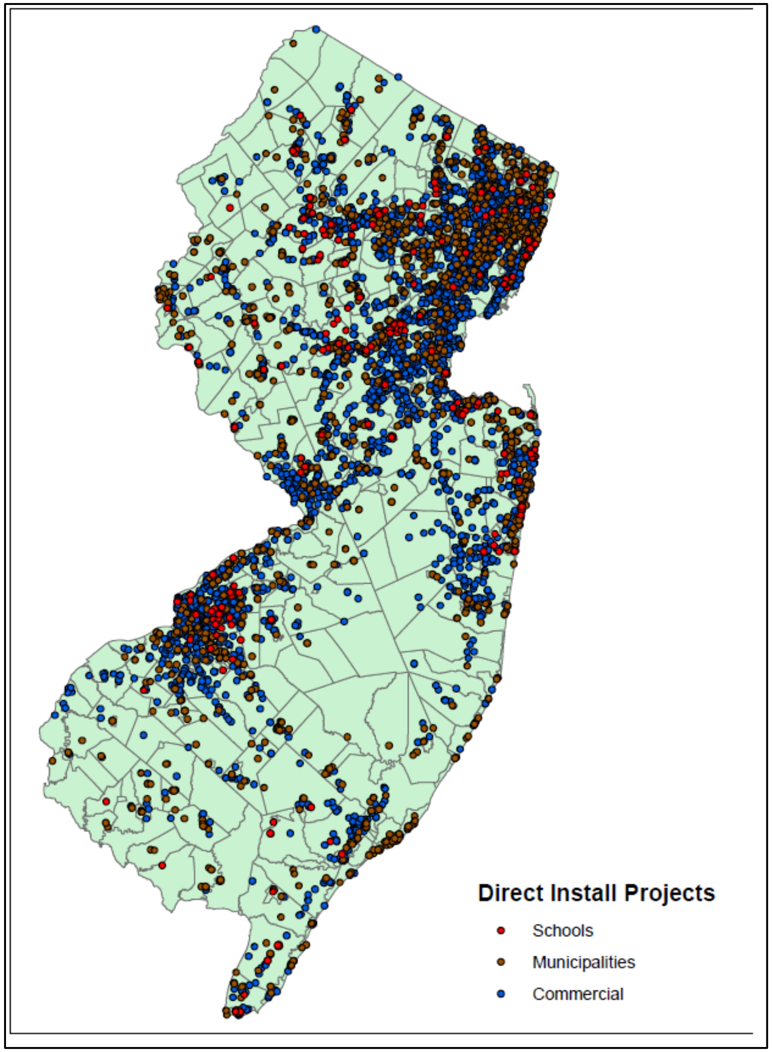
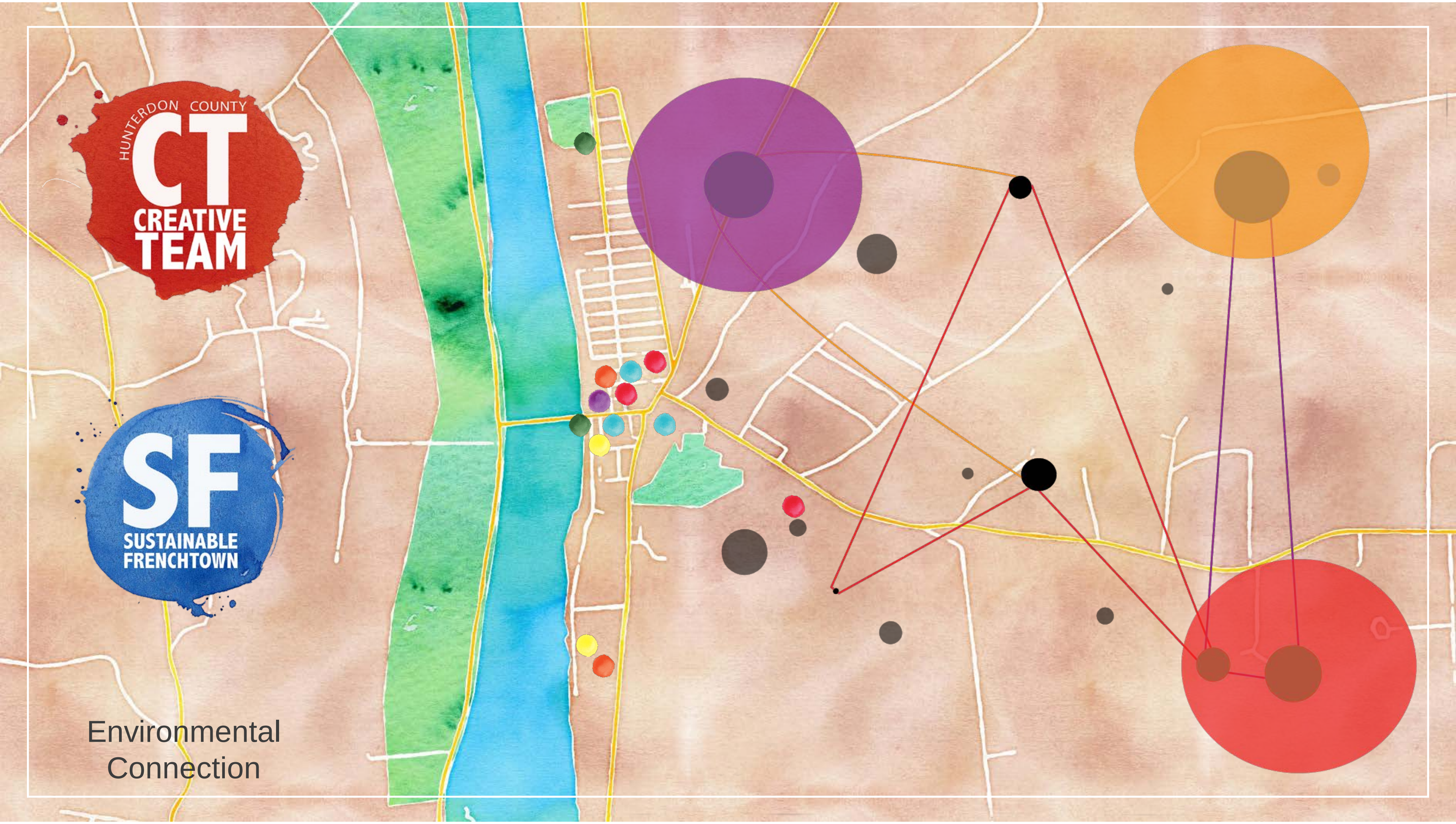


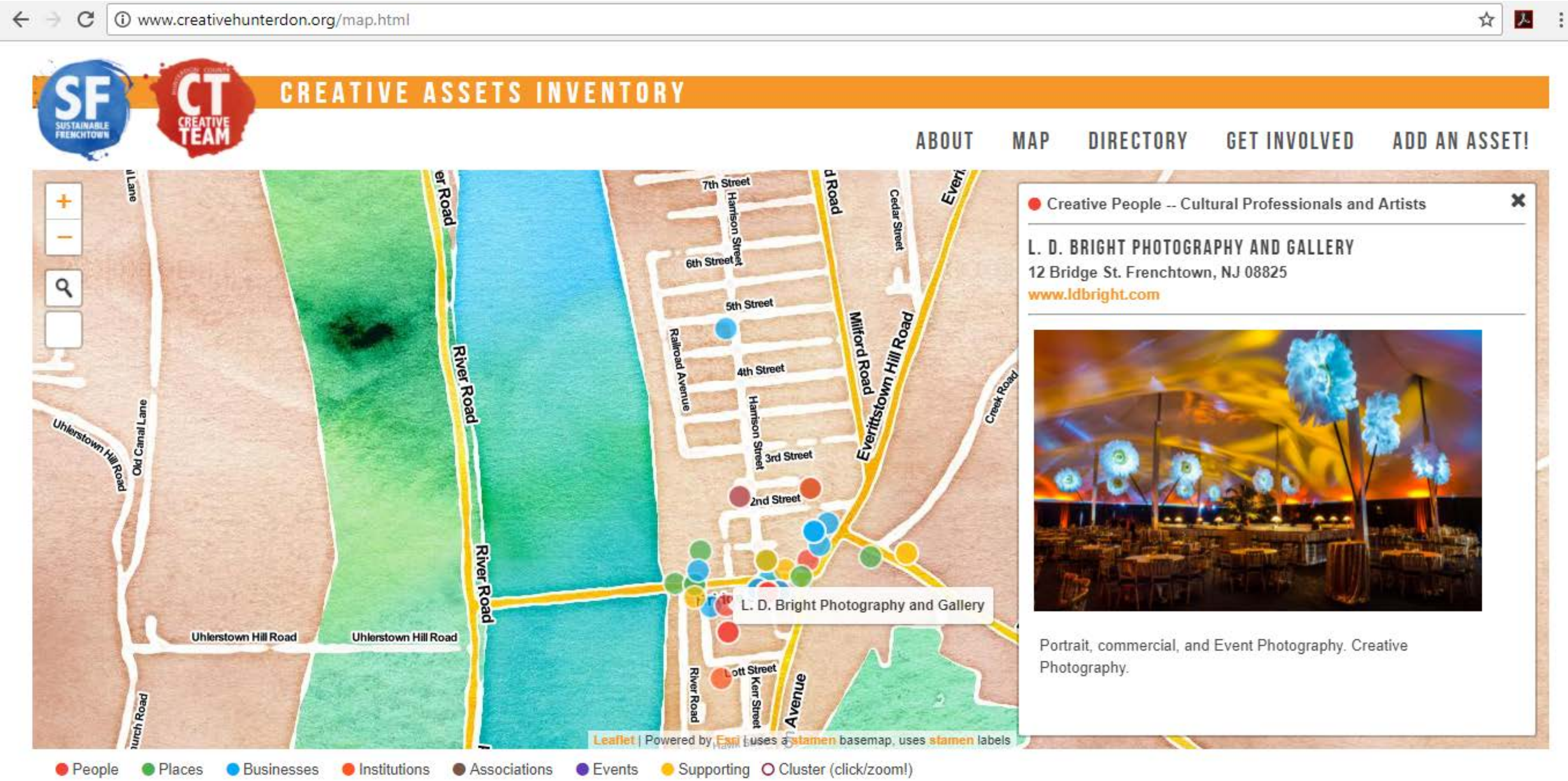


Hunterdon County Creative Assets Inventory




product
design
A Creative Community.


BUSINESSES
PEOPLE
Associations
PLACES
EVENTS
ORGANIZATIONS
SUPPORTING
RESOUCES
ASO
frenchtown
HOME
HARDWARE
&
OUTDOORS


www.creativehunterdon.org/map.html
SF SUSTAINABLE FRENCHTOWN
CT CREATIVE TEAM
CREATIVE ASSETS INVENTORY
ABOUT
MAP
DIRECTORY
GET INVOLVED
ADD AN ASSET!
Creative People -- Cultural Professionals and Artists
L. D. BRIGHT PHOTOGRAPHY AND GALLERY
12 Bridge St. Frenchtown, NJ 08825
www.ldbright.com
Portrait, commercial, and Event Photography. Creative Photography.
L. D. Bright Photography and Gallery
7th Street
6th Street
5th Street
4th Street
3rd Street
2nd Street
Harrison Street
Railroad Avenue
Milford Road
Everittstown Hill Road
Cedar Street
Creek Road
River Road
Uhlerstown Hill Road
Old Canal Lane
Kerr Street
Leaflet | Powered by Esri | uses a stamen basemap, uses stamen labels
People
Places
Businesses
Institutions
Associations
Events
Supporting
Cluster (click/zoom!)

ASSETS ENTERED SO FAR:155

CREATIVE PEOPLE -- CULTURAL PROFESSIONALS AND ARTISTS

CULTURAL INDUSTRIES AND BUSINESSES

2D-3D INC.

441 Barbertown Point Breeze Rd, Flemington, New Jersey, 08822

www.2D-3Dinc.com

The business of artist John Spears. Site specific commission two dimensional art for health facilities, corporate and public buildings. See web sites for images and installations. Current local public works can be seen at the HMC Hunterdon Cancer Center, the County Justice Center and the new Platform One restaurant in Flemington. Also see video link at the bottom of the home page on the web sites to a retrospective show at the Beaver Brook Concourse Center.

ACT 2 BOOKS USED, FINE & RARE BOOKS


We need space
11 PEOPLE
3 ORGANIZATIONS
2 businesses
2 events


We HAVE IMPACT
46 ASSETS
EMPLOY 279
PEOPLE


We need
TO BE
SEEN
“there are People in the Woodwork, peeking out their heads.”
“a little hidden.”
“I need more contact with other artists.”
“I would love to become integrated in the community.”
“more artists should be exposed to the world.”

“Marvelous mix of eclectic artists +
CREATIVE Powerhouses
“richly creative community”
“GREAT PLACE FOR
INSPIRATION + NEW IDEAS”
We love
Being
here.
“FOSTERS CREATIVE
ENDEAVORS”
“AWESOME AND BECOMING A
MECCA”
“a perfect place To create +
thrive.”

Geographic Information Systems & Social-Environmental Systems
(from the perspective of Higher Education)

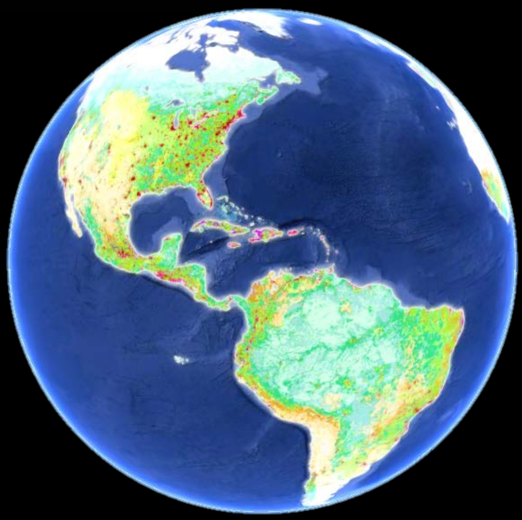
Zachary Christman, Ph.D.

Department of Geography, Planning, and Sustainability

School of Earth and Environment

Rowan University, Glassboro, NJ



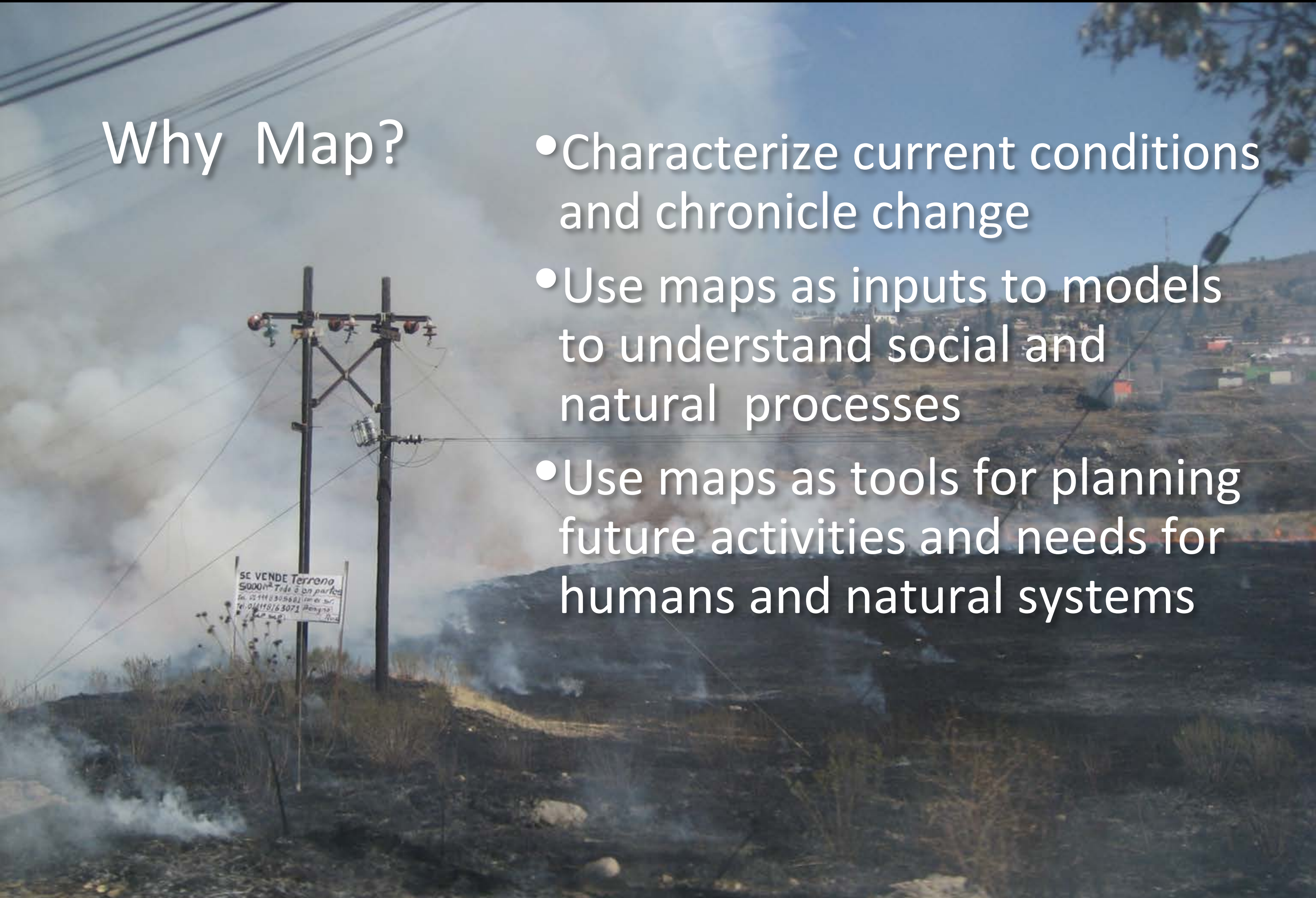



I. Mapping Social-Environmental Systems
II. A few stories of the things I've done
III. Department and School at Rowan University

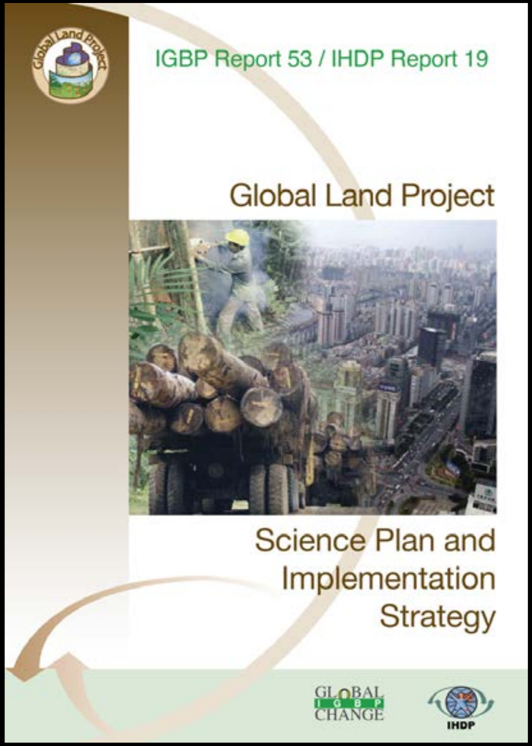
I. What Can Mapping Social-Environmental Systems Do For [Me|Us|Them|There]?

Why Map?

- Characterize current conditions and chronicle change
- Use maps as inputs to models to understand social and natural processes
- Use maps as tools for planning future activities and needs for humans and natural systems



National and International Agendas



- How do **changes** in land management **decisions** and **practices** affect biochemistry, biodiversity, biophysical properties, and disturbance regimes of terrestrial and freshwater **ecosystems**?
- How do **changes** in ecosystem **structure** and **functioning** affect the **delivery** of ecosystem **services**?
- How do **people respond** at various **scales** and in different **contexts** to changes in ecosystem service **provision**?
- How do the **vulnerability** and **resilience** of land **systems** to **hazards** and **disturbances** vary in response to changes in human-environment **interactions**?

What to ask about social-environmental systems?

Geographic Information Systems

- How is information spatial?
- What insights are revealed through cartography and spatial analysis?
- How can these insights best be communicated to a chosen audience?

Geographic Information Science

- What is the relationship between modeled information and reality?
- Do we have the right models and tools to encode and analyze this situation?

Remotely Sensed Earth Observations

- What is the scalar relationship between the observation and the phenomenon?
- What factors are missing from the observed proxies?

Field & Virtual Observations

- How can we evaluate models against on-the-ground experience?
- How can we get a representative sample to ensure appropriate use?

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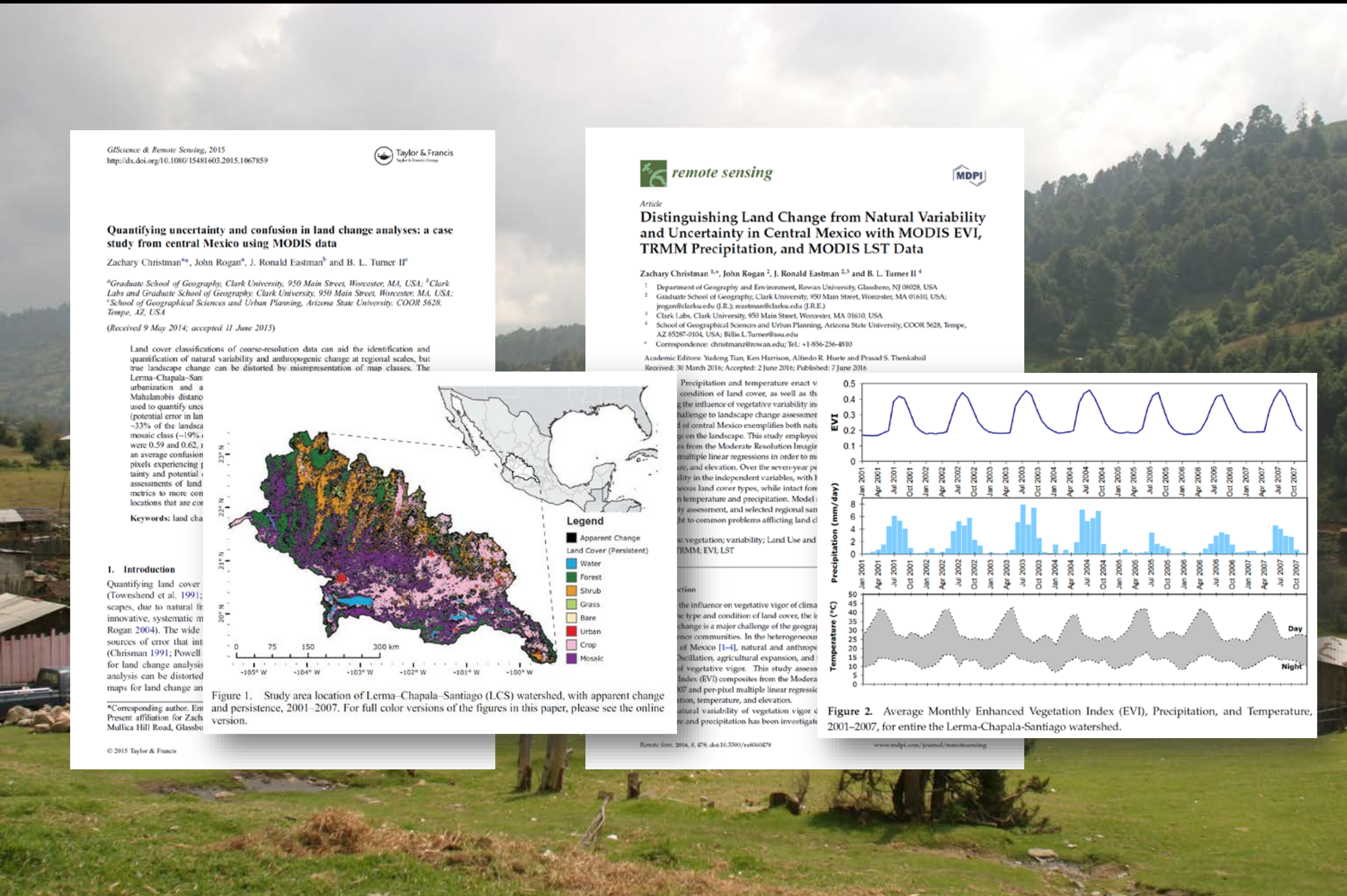
II. Me and a few stories of the things I’ve done, with GIS, related to Sustainability


Model Landscape Conditions & Change
Estimate Human Impacts & Vulnerability
Engage Practitioner Communities

Sustainability as monitoring landscape change & identifying natural or human forces


GIScience & Remote Sensing, 2015
http://dx.doi.org/10.1080/15481603.2015.1067859
Taylor & Francis
Quantifying uncertainty and confusion in land change analyses: a case study from central Mexico using MODIS data
Zachary Christman, John Rogan, J. Ronald Eastman and B. L. Turner II
(Received 9 May 2014; accepted 11 June 2015)
1. Introduction
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remote sensing
MDPI
Article
Distinguishing Land Change from Natural Variability and Uncertainty in Central Mexico with MODIS EVI, TRMM Precipitation, and MODIS LST Data
Zachary Christman, John Rogan, J. Ronald Eastman and B. L. Turner II
Received: 30 March 2016; Accepted: 2 June 2016; Published: 7 June 2016
Remote Sens. 2016, 8, 478; doi:10.3390/rs8060478
www.mdpi.com/journal/remotesensing
Legend
Apparent Change
Land Cover (Persistent)
Water
Forest
Shrub
Grass
Bare
Urban
Crop
Mosaic
0 75 150 300 km
Figure 1. Study area location of Lerma–Chapala–Santiago (LCS) watershed, with apparent change and persistence, 2001–2007. For full color versions of the figures in this paper, please see the online version.
EVI
Precipitation (mm/day)
Temperature (°C)
Day
Night
Figure 2. Average Monthly Enhanced Vegetation Index (EVI), Precipitation, and Temperature, 2001–2007, for entire the Lerma-Chapala-Santiago watershed.

Sustainability as Evaluating Natural and Social Impacts & Responses to Environmental Disturbances

B23C-0406

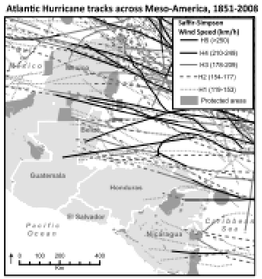
Quantifying vegetative variability and patterns of landscape change in the Mexican Yucatán Peninsula before, during, and after Hurricane Dean, August, 2007

Zachary Christman[1], Laura Schneider[1], John Rogan[2]

1 Rutgers University Department of Geography, Piscataway, New Jersey, USA

2 Clark University Graduate School of Geography, Worcester, Massachusetts, USA

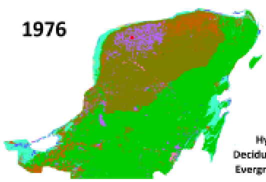
Introduction and Study Area

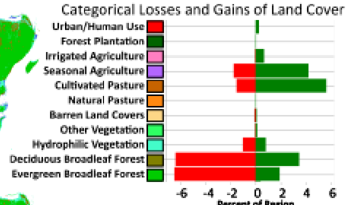


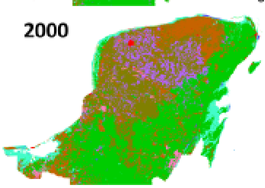
This study evaluates changes in land cover and condition in the Mexican Yucatán Peninsula, with specific focus on the regional conditions surrounding Hurricane Dean, which struck the peninsula as a category 5 hurricane on August 21, 2007. Hurricane Dean was the strongest storm of the 2007 Atlantic hurricane season, with sustained winds exceeding 280 km/h upon landfall. The Yucatán peninsula of Mexico is a landscape subject to frequent tropical storm events (Boose et al. 2003), and prior to Hurricane Dean, at least 4 other major hurricanes and numerous smaller storms have made landfall in this region. Hurricane Dean passed directly across the Mesoamerican Biological Corridor, between the National Biosphere Reserves of Sian Ka'an and Calakmul.

The study area was defined as the corridor between these reserves along the path of Dean, covering approximately 26,870 km of southern Quintana Roo and southeastern Campeche, near the Mexico/Guatemala border. Land cover across the region is a mixture of semi-subsistence agriculture, pasture, and tropical semi-deciduous forests, and land use practices are typically smallholder agriculture under communal management, with increasing mechanization and privatization across the region (Turner II et al. 2007; Vester et al. 2007).

Recent Land Change across the Yucatán Peninsula







Land Cover Maps from the Mexican National Institute of Statistics and Geography (INEGI) and the Center for Investigations in Environmental Geography (CIGA) of the National Autonomous University of Mexico (UNAM), after Mas et al. (2004)

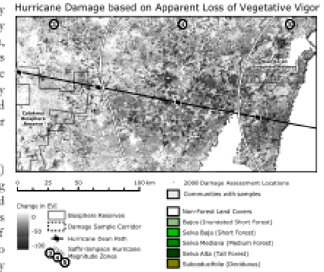
From 1976 to 2000, the Yucatán Peninsula has been subjected to a variety of changes to both natural and anthropogenic land covers. In addition to the expansion of urban centers across the peninsula, there has been loss of forest cover in exchange for increased cultivated pastures and agricultural uses. Further, a pattern of increased deciduous activity in the broadleaf forest has expanded across the region, marked by seasonal loss of leaf cover, especially in response to drought stress. Overall, more than 32% of this landscape experienced a categorical change in land cover during this 24-year period, with dramatic changes in the southeastern state of Quintana Roo, near the city of Chetumal.

Rapid Reconnaissance Mapping and Image Evaluation

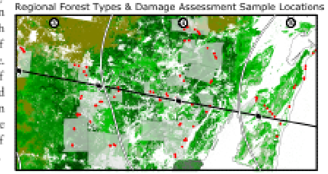
Damage to forest resulting from Hurricane Dean was directly evaluated through *in situ* visual observations conducted between May and August 2008, approximately 7-8 months after Hurricane Dean, near the peak of expected forest productivity. Ninety-three field plots were defined by a 250 x 250m perimeter (analogous to one coarse-resolution pixel), located in the center of a relatively contiguous forest stand. Canopy cover, tree damage assessment, and general site characteristics were recorded in four intra-plot linear transects.

Using coarse-resolution Enhanced Vegetation Index (EVI) composites from the Moderate Resolution Imaging Spectroradiometer (MODIS) products MOD13Q1 (Terra) and MYD13Q1 (Aqua), we sought to characterize post-storm impacts upon vegetative vigor using linear differencing. Sequences of MODIS Terra and Aqua EVI composite products were vetted to select an appropriate combination of pre- and post-hurricane imagery to best represent storm damage. To avoid issues of sensor calibration differences and changing diurnal atmospheric effects associated with cloud and air humidity involved in hurricane events, only pairs of images from the same MODIS platform were used to assess damage. Damage map accuracy was evaluated through a simple percentage of sites of agreement and disagreement between the ground plots and the map. The most accurate damage map was derived from pre-hurricane image date 217 (5 August 2007) and post-hurricane image date 249 (6 September 2007), with an overall agreement of 91.4% between the ground reference locations and the damage map.

Hurricane Damage based on Apparent Loss of Vegetative Vigor



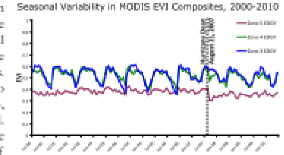
Regional Forest Types & Damage Assessment Sample Locations



Characterizing Variability Before and After the Storm

Across the region, 83% of the study area pixels experienced a net decrease in EVI between pre- and post-storm conditions, with a majority of these locations demonstrating 15-50% net loss of EVI during this period. All hurricane wind speed zones demonstrated an immediate loss of vegetative vigor, with greatest decreases in regions under category 5 wind conditions. Especially notable is an immediate loss of vegetative vigor from August to September of 2007, especially in comparison to a "normal year" (e.g. 2006), as forests in this region do not normally lose greenness during this period. Examination of the temporal sequences of EVI composites demonstrate the regular pattern of forest greening during the wet season with loss of greenness during the dry seasons of December to May. This regular pattern is sharply interrupted in August 2007, following the storm, and net impacts over the year demonstrate that not only was there an immediate loss in vegetative vigor, but the forests of the interior Yucatan failed to reach their normal maxima.

Seasonal Variability in MODIS EVI Composites, 2000-2010



Hurricane Wind Zone	Immediate Post-Storm Change				Impact over the year			
	"Normal Year"		Hurricane Dean		"Normal Year"		Hurricane Dean	
	2006 AUG to SEPT		2007 AUG to SEPT		2006 (MAX-MIN)		2007 (MAX-MIN)	
	ΔEVI	% Δ	ΔEVI	% Δ	ΔEVI	% Δ	ΔEVI	% Δ
5	0.008	2.40%	-0.16	-32.98%	0.183	13.60%	0.224	45.06%
4	-0.023	-1.10%	-0.141	-14.68%	0.293	40.80%	0.265	57.68%
3	0.004	2.20%	-0.086	-8.39%	0.154	40.90%	0.237	35.78%

Impacts by Forest Type and Condition

Forest Type	All points	Zone 3	Zone 4	Zone 5
Bajos (Inundated Short Forest)	-37.00%	-15.90%	-49.50%	-46.20%
Selva Baja (Short Forest)	-35.00%	-26.90%	-33.30%	
Selva Mediana (Medium Forest)	-31.30%	-21.70%	-41.00%	-38.50%
Selva Alta (Tall Forest)	-28.40%	-22.10%	-29.00%	
Subcaducifolia (Deciduous Forest)	-13.50%	-13.90%	-12.00%	-45.50%

Further exploring this effect, our project has attempted to update land cover maps across the region to the level of forest type, and have prepared a preliminary map of forest type using Landsat ETM+ imagery from 2009-2010. Average loss of vegetative vigor was extracted from plot locations based upon differencing from pre- and post-Hurricane conditions and stratified by forest type and wind speed zone. In comparison to the MODIS EVI composite series, the pattern of apparent loss of vegetative vigor demonstrated an inverse relationship to forest stand height. Notably, the variable impacts by storm with strength also relate to the prevalence of each forest type by zone, with taller-stature forests (Selva Mediana and Alta) containing more biomass, but these types are primarily located inland, where wind speeds were lower and topographic effects are somewhat more pronounced. Initial results also demonstrate that semi-deciduous forests, known as subcaducifolia, experienced the least loss of vegetative vigor in the post-storm context, which may imply the resilience of these forest types to natural disturbance events.

Conclusions and Ongoing Research Efforts

Results from this study demonstrate the effectiveness of MODIS standard vegetation products for the detection and quantification of post-disturbance loss of vegetative vigor through linear differencing. These variable effects have a directly relationship to storm intensity and forest stature, and show some relation to a seasonal deciduous pattern of leaf loss in the tropical dry forest. Efforts are underway to refine the 2009-2010 land cover map to incorporate non-forest classes and to quantify the magnitude and extent of seasonal deciduous effects. The Environmental Disturbance in the Greater Yucatán (EDGY) project is now investigating the regrowth and resilience of forested ecosystems with ongoing field revisit plots, as well as relating the impact of Hurricane Dean on forest ecosystems to human livelihoods and communities across the region.

References

Extended explanation on methodology and results pertaining to EDGY project research can be found in:

Rogan, J., L. Schneider, Z. Christman, M. Millones, D. Lawrence, B. Schmook. 2011 in press. Hurricane Disturbance Mapping using MODIS EVI Data in the South-Eastern Yucatán, Mexico. *Remote Sensing Letters*, 2(3): 259-267.

Vandecar, K., D. Lawrence, D. Richards, L. Schneider, J. Rogan, and B. Schmook. 2011 in press. Response of dry tropical forest to Hurricane Dean in the southern Yucatán Peninsula: Species-level impacts. *Biotropica*

Other cited works:

Boose, E. R. et al. 2003. Geographical and historical variation in hurricanes across the Yucatán Peninsula. ed. M. F. A. Gómez-Pompa S. L. Fedick & J. J. Jiménez-Osornio, 495-516. New York: Food Products Press.

Mas, J.-F. et al. 2004. Assessing land use/cover changes: a nationwide multidate spatial database for Mexico. International Journal of Applied Earth Observation and Geoinformation 5 (4):249-261.

Turner, II, B. L. et al. 2001. Deforestation in the southern Yucatán peninsular region: an integrative approach. *Forest Ecology and Management* 154 (3):353–370.

Vester, H. F. M. et al. 2007. Land change in the southern Yucatan and Calakmul Biosphere Reserve: Effects on habitat and biodiversity. *Ecological Applications* 17 (4):989-1003.

Acknowledgements

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EDGY Environmental Disturbance in the Greater Yucatán

http://landchange.rutgers.edu

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Sustainability as how a "Green City" is experienced differently by residents, Philadelphia

Applied Geography 35 (2012) 257–264

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journal homepage: www.elsevier.com/locate/apgeog

Tree-lined lanes or vacant lots? Evaluating non-stationarity between urban greenness and socio-economic conditions in Philadelphia, Pennsylvania, USA at multiple scales

Hamil Pearsall [a,*], Zachary Christman [b]

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[b] Department of Geography and Environment, Rowan University, 201 Mullica Hill Road, Glassboro, NJ, USA

Keywords:
Geographically weighted regression
NDVI
Vacant land
Urban ecology
Philadelphia

A B S T R A C T

This paper investigates the non-stationary relationship between metrics of urban greenness and socio-economic conditions across Philadelphia, Pennsylvania, U.S.A. at multiple scales using Ordinary Least Squares (OLS) and Geographically Weighted Regression (GWR) techniques. The analysis integrates environmental data on vegetation cover, using Normalized Difference Vegetation Index (NDVI) values derived from 30 m/pixel Landsat Thematic Mapper imagery, with land use data derived from the 2000 City of Philadelphia Licenses and Inspections Department Vacancy Survey and socioeconomic data at the U.S. Census Tract level from the 2000 U.S. Census. City-wide OLS, sub-city zone OLS and local GWR models were developed by regressing mean NDVI against three independent variables for each Census Tract: population density, median household income, and percentage of vacant lots. These models indicate that the strength and nature of the relationship among the variables varies spatially, with highly localized relationships not evident with the global regression models alone. Results suggest that while wealth is a strong predictor of vegetation vigor in some neighborhoods in Philadelphia, this relationship changes drastically across a heterogeneous urban environment. This paper contributes to the growing body of academic research on GWR and the urban ecology of dynamic urban human-environmental contexts.

Introduction

The quantified relationship between urban vegetation and the socio-economic conditions of residents has been a longstanding topic of interest, with renewed attention in the context of urban greening programs and a shifting urban population. Previous research on the relationship between urban vegetation cover and socio-economic variables suggests the comparison of remotely sensed metrics of greenness with socioeconomic variables can yield novel insights regarding the relationship of urban denizens to their surrounding environmental conditions (Gatrell & Jensen, 2002; Mesev & Longley, 1999), and that increased vegetative vigor implies favorable social conditions (Jensen, Gatrell, Boulton, & Harper, 2004; Landry & Chakraborty, 2009; Li & Weng, 2007; Lo & Faber, 1997; Pozzi & Small, 2001). Many of these studies conclude that green vegetation may be a useful indicator of wealth in an area; however, most of these studies are conducted in a single location (e.g. Terre Haute, Indiana), and the applicability of these findings to different cities remains an area for further research (Lafary, Gatrell, & Jensen, 2008). This paper evaluates the relationship between vegetation and socio-economic conditions in the context of a diverse and heterogeneous city in the United States, Philadelphia, Pennsylvania, where vacant lots resulting from dramatic population decline and a growing esthetic for green urban infrastructure contribute to increasing vegetation cover (Nowak, Hoehn III, Crane, Stevens, & Walton, 2007).

This study employs three different approaches, including a city-wide Ordinary Least Squares (OLS) regression, a sub-city zone OLS regression, and a local regression technique, Geographically Weighted Regression (GWR), to assess non-stationarity in this relationship across Philadelphia, Pennsylvania at multiple scales. Geographically Weighted Regression (GWR) has been widely employed to highlight spatially varying relationships, capturing local variations in a way that global regression techniques, such as Ordinary Least Squares regression, may obscure (Ogneva-Himmelberger, Pearsall, & Rakshit, 2009; Ogneva-Himmelberger,

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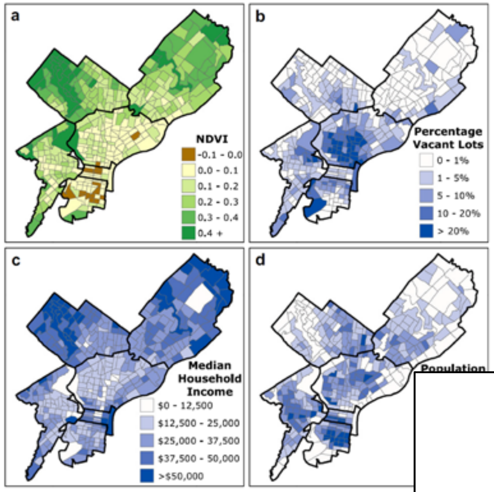


Fig. 2. Vegetation and social variables across Philadelphia, including a) NDVI b) Percentage vacant lots c) Median house

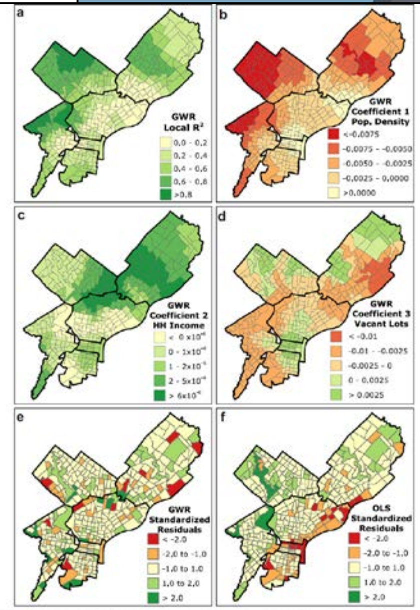
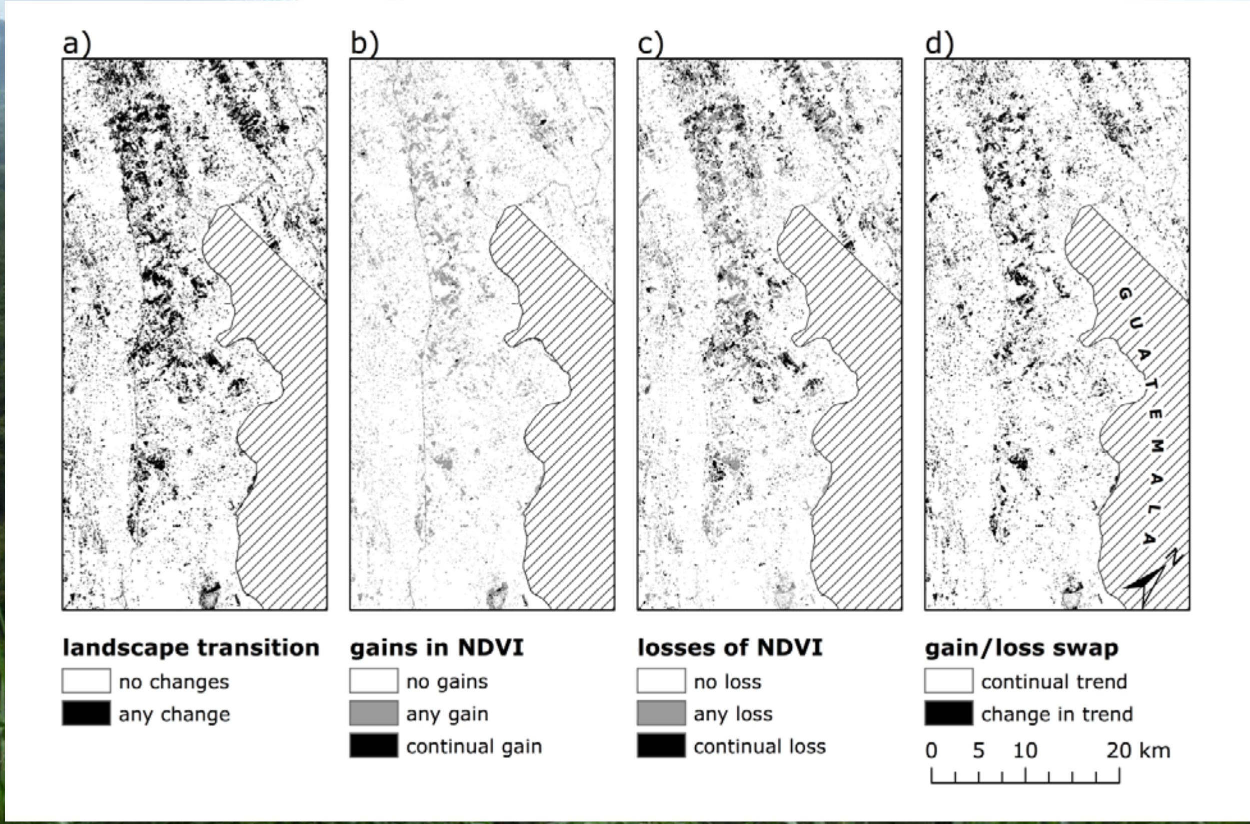


Fig. 3. Spatially-explicit GWR results, including a) Local R^2 b) GWR coefficient 1, population density, c) GWR coefficient 2, median household income and d) GWR coefficient 3, percentage of vacant lots e) GWR standardized residuals, and f) City-wide OLS standardized residuals.

Sustainability as Diversification of Livelihood Strategies from pressures of Environmental & Economic Change


a)
b)
c)
d)
GUATEMALA
N
landscape transition
no changes
any change
gains in NDVI
no gains
any gain
continual gain
losses of NDVI
no loss
any loss
continual loss
gain/loss swap
continual trend
change in trend
0 5 10 20 km

Sustainability as how social and environmental context influences health and wellbeing

- health
- outlook
- networks
- roles
- experiences

Elders

Older NJ folks

Superstorm Sandy

Context
- walkability
- neighborhood disorder

ies

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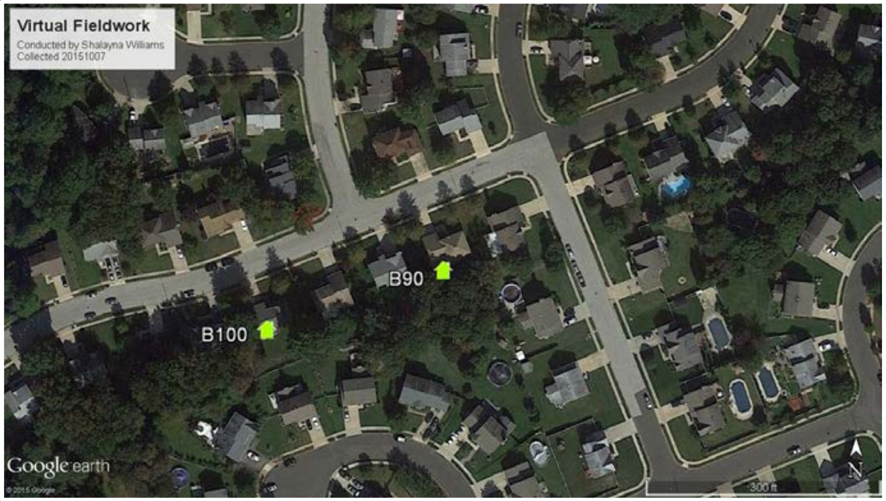
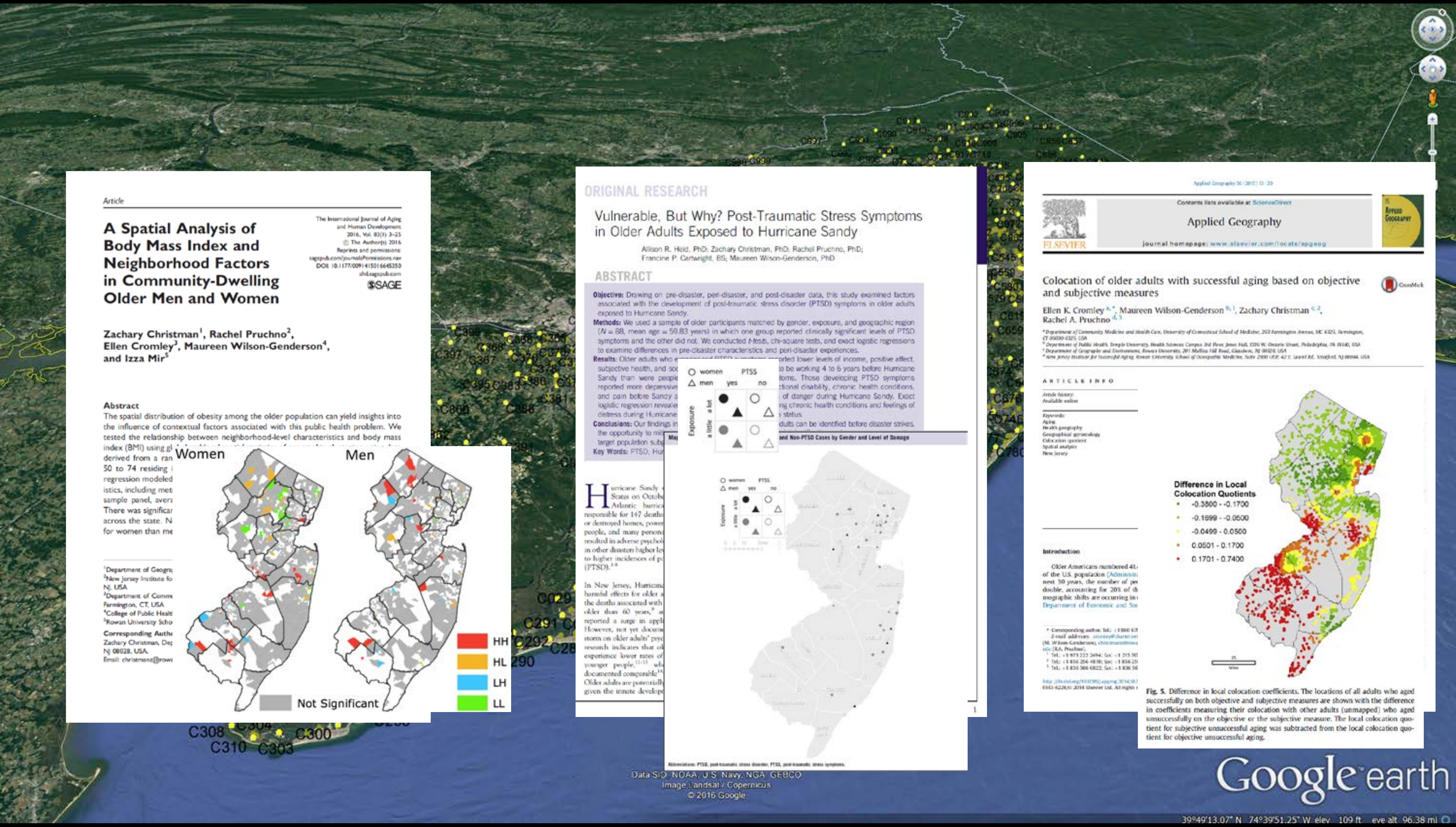


Ongoing **R**esearch on **A**ging in **N**ew **J**ersey:
Bettering **O**pportunities for **W**ellness in **L**ife



Article
A Spatial Analysis of Body Mass Index and Neighborhood Factors in Community-Dwelling Older Men and Women
Zachary Christman[1], Rachel Pruchno[2], Ellen Cromley[3], Maureen Wilson-Genderson[4], and Izza Mir[5]
Abstract
The spatial distribution of obesity among the older population can yield insights into the influence of contextual factors associated with this public health problem. We tested the relationship between neighborhood-level characteristics and body mass
Women
Men
HH
HL
LH
LL
Not Significant
ORIGINAL RESEARCH
Vulnerable, But Why? Post-Traumatic Stress Symptoms in Older Adults Exposed to Hurricane Sandy
Allison R. Heid, PhD; Zachary Christman, PhD; Rachel Pruchno, PhD; Francine P. Cartwright, BS; Maureen Wilson-Genderson, PhD
ABSTRACT
Objective: Drawing on pre-disaster, peri-disaster, and post-disaster data, this study examined factors associated with the development of post-traumatic stress disorder (PTSD) symptoms in older adults exposed to Hurricane Sandy.
Methods: We used a sample of older participants matched by gender, exposure, and geographic region (N = 88, mean age = 59.83 years) in which one group reported clinically significant levels of PTSD symptoms and the other did not. We conducted t-tests, chi-square tests, and exact logistic regressions to examine differences in pre-disaster characteristics and peri-disaster experiences.
women
men
PTSS
yes
no
Exposure
a lot
a little
Applied Geography
Colocation of older adults with successful aging based on objective and subjective measures
Ellen K. Cromley, Maureen Wilson-Genderson, Zachary Christman, Rachel A. Pruchno
Difference in Local Colocation Quotients
-0.3800 - -0.1700
-0.1699 - -0.0500
-0.0499 - 0.0500
0.0501 - 0.1700
0.1701 - 0.7400
Fig. 5. Difference in local colocation coefficients. The locations of all adults who aged successfully on both objective and subjective measures are shown with the difference in coefficients measuring their colocation with other adults (unmapped) who aged unsuccessfully on the objective or the subjective measure. The local colocation quotient for subjective unsuccessful aging was subtracted from the local colocation quotient for objective unsuccessful aging.
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
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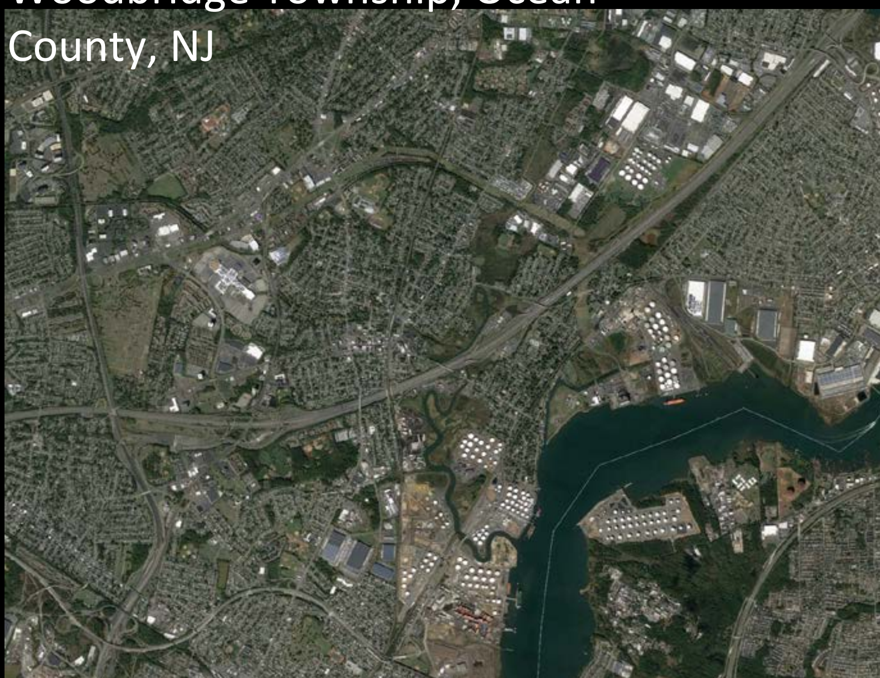
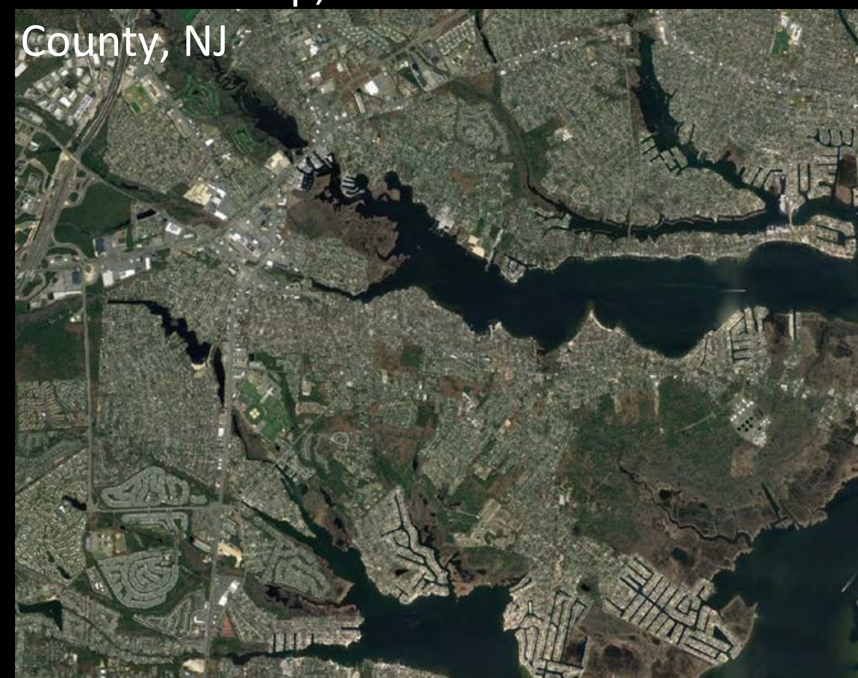
Google earth
39°49'13.07" N 74°39'51.25" W elev 109 ft eye alt 96.38 mi

Sustainability as how communities can be better prepared for the next disaster event

Woodbridge Township, Ocean County, NJ

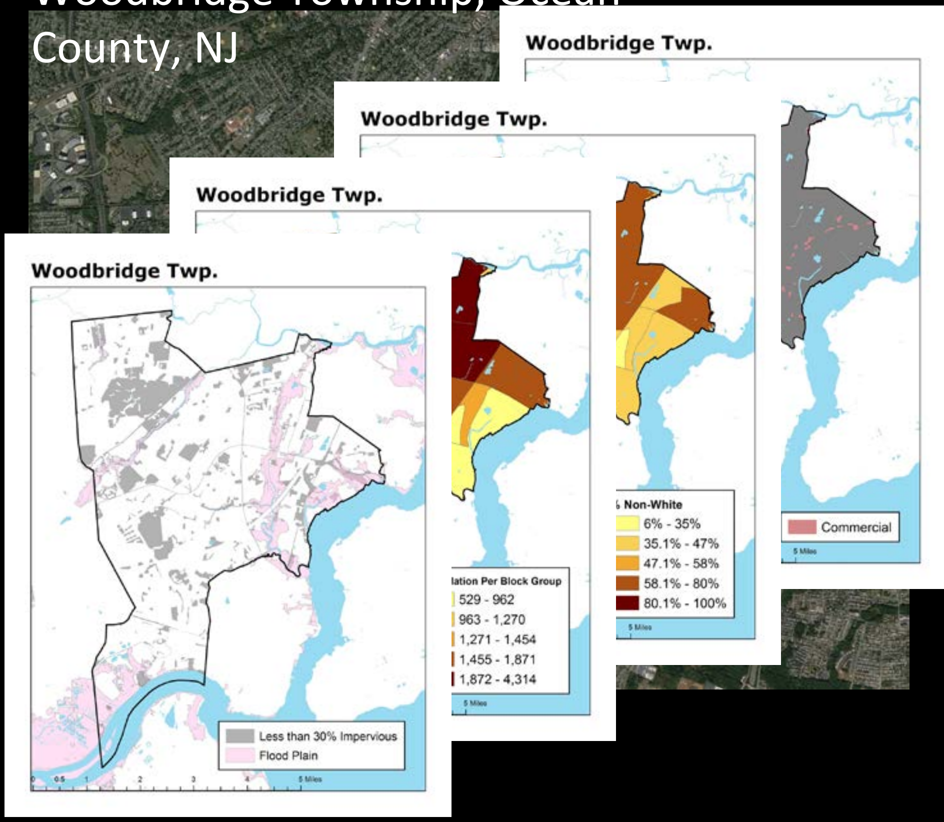


Brick Township, Monmouth County, NJ

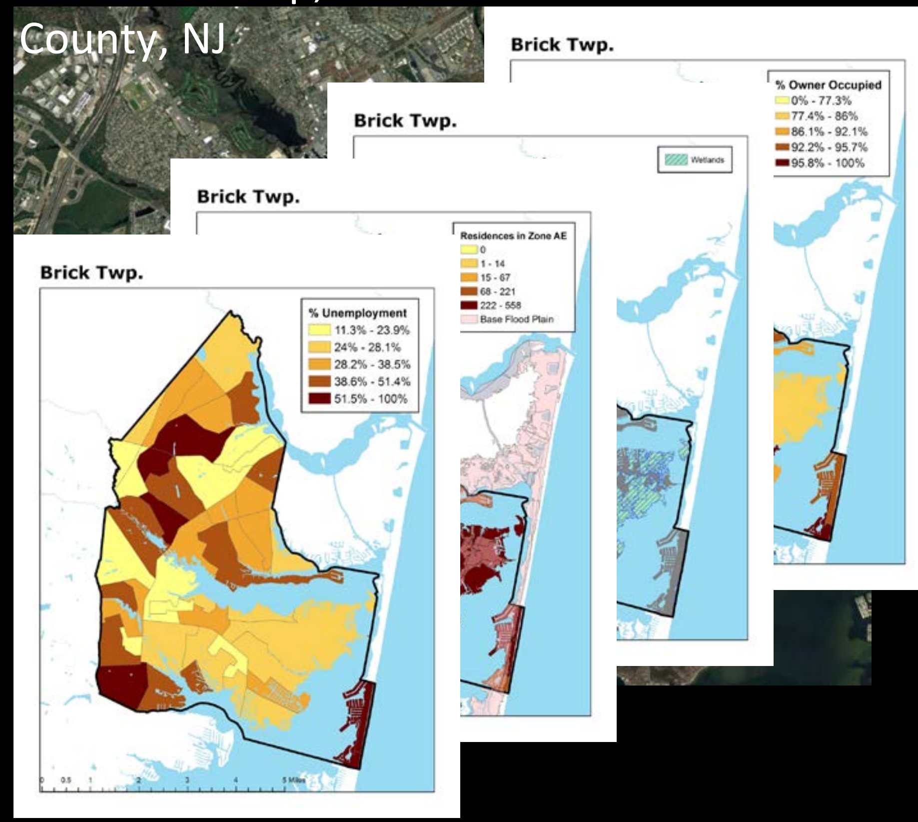


Sustainability as how communities can be better prepared for the next disaster event

Woodbridge Township, Ocean County, NJ



Brick Township, Monmouth County, NJ



III. The Department of Geography, Planning, and Sustainability, of the School of Earth and Environment, Rowan University

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Department of Geography, Planning, and Sustainability

The Department of Geography Planning & Sustainability (GPS) is a dynamic department composed of our faculty, staff, and students. Our faculty are an energetic group who value both student learning and innovative scholarly and applied research.

The Department currently has about 200 majors spread among our degree programs in *Geography*, *Environmental & Sustainability Studies*, *Geographic Information Science*, and *Community and Environmental Planning*.

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Sustainability & Human Experience

Chuck McGlynn, PhD
Sustainability and Water Resources

Mahbubur Meenar, PhD
Sustainable Planning & Public Engagement

Kevin Keenan, PhD
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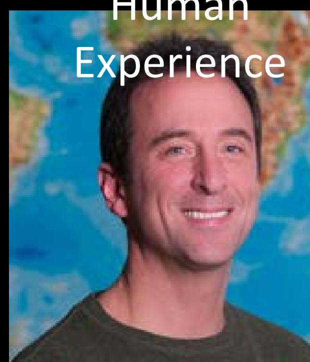
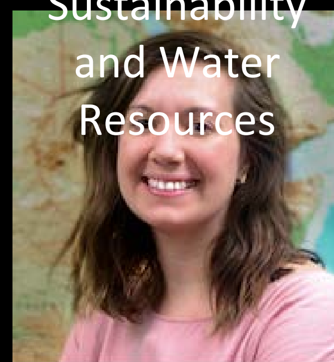
Technology & Sustainability



Rich Federman
Physical & Human Geography



Megan Bucknum-Ferrigno
Sustainable Cities & Food Systems

Zachary Christman, PhD
Environmental Change & Human Outcomes

New guy in Environmental GIS

Program Name	Major	Minor	Certificate (CUGS)
Environmental & Sustainability Studies	BA - ESS	Minor - ESS	CUGS - Environmental Policy & Economics CUGS - Environmental Humanities
Community & Environmental Planning	BS - CEP	Minor - CEP	CUGS - Sustainable Urbanism
Geographic Information Science	BS - GIS	Minor - GIS	CUGS - Geographic Information Systems and Science
Geography	BA - GEOG	Minor - GEOG	
Environmental Science		Minor - Environmental Science	
Geoscience		Minor - Geoscience	
Sustainable Built Environments		Minor - Sustainable Built Environments	
Global Issues		Minor - Global Issues	
Applied Geographic Knowledge and Skills		Minor - Applied Geographic Knowledge	
Geographic Education	Dual Major - Geography & Education		

Things I want you to know:

1. Our students are **versatile**: they combine programs to achieve niche skills and perspectives
2. We have an "experiential learning requirement" (a.k.a. **internship program**)
3. We are **big**, and growing: more than 200 majors in our department, plus new programs in Geology and Environmental Science

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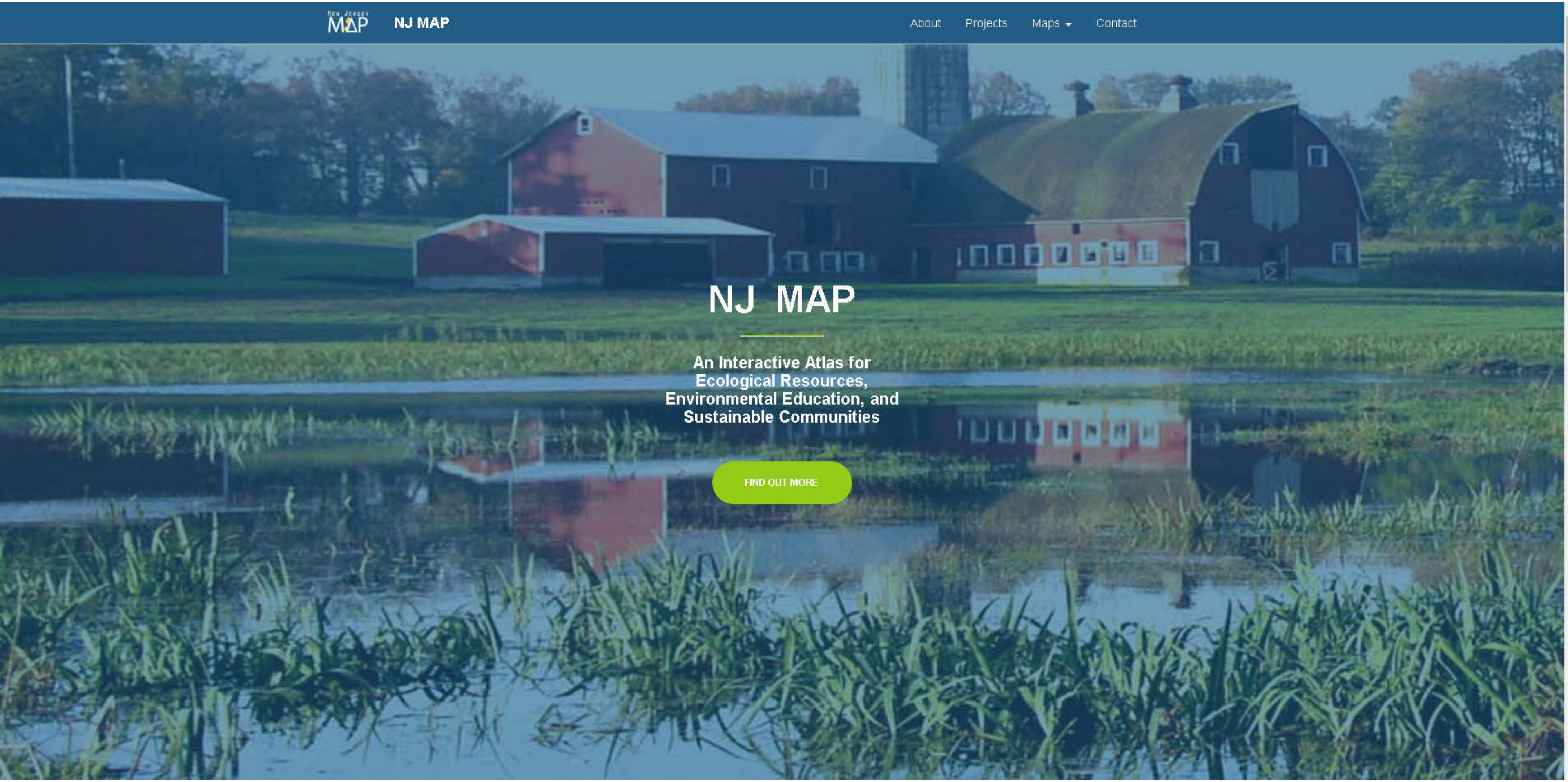
NJ Map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An Interactive Atlas for
Ecological Resources,
Environmental Education, and
Sustainable Communities
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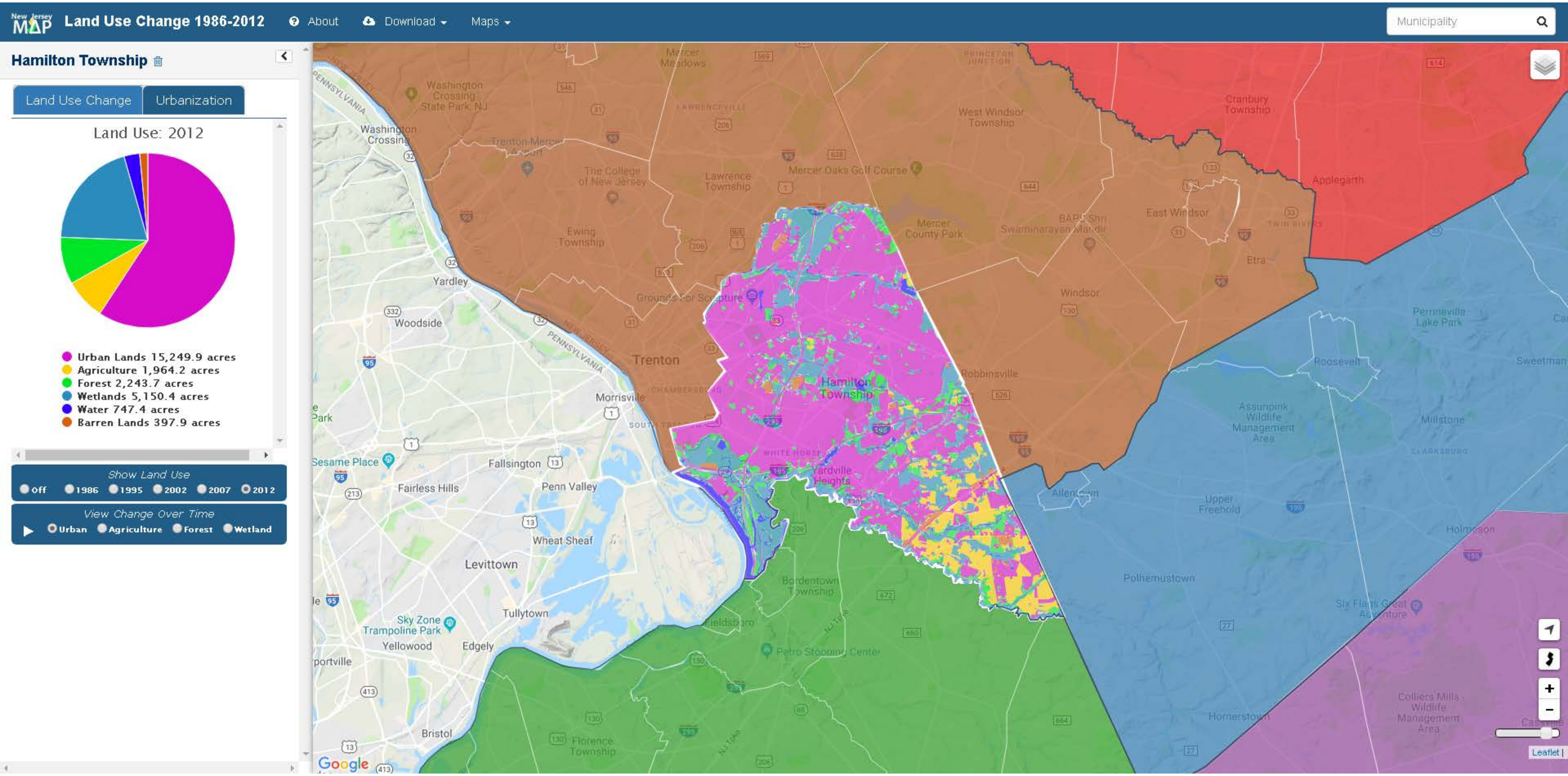
About NJ Map

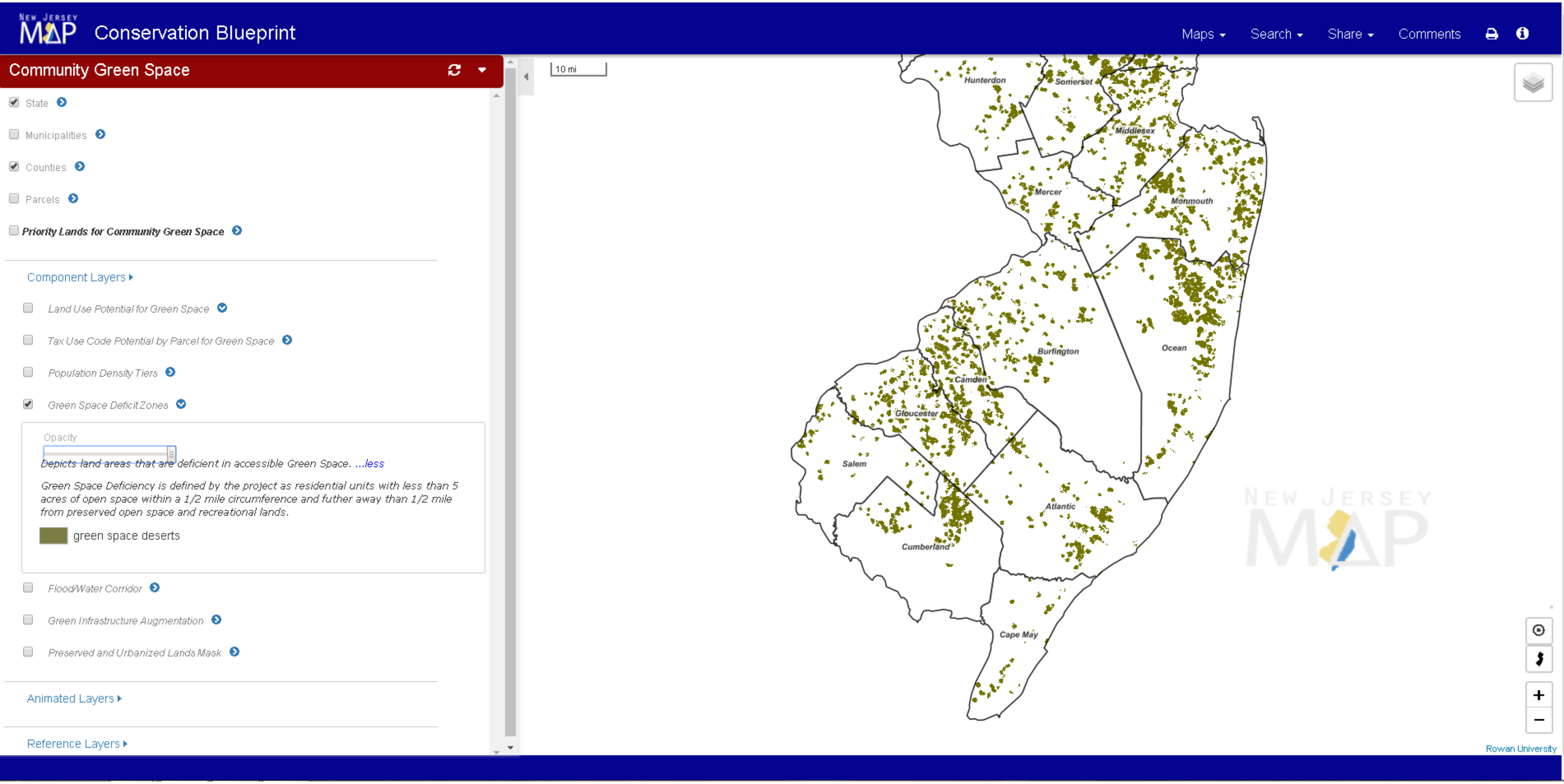
NJ MAP is a publicly accessible, municipally-focused portal that takes a thematic approach to data visualization. NJ MAP is intended to serve municipal stakeholders involved environmental, land use and sustainability decision making.

- Sustainable Jersey Green Teams
- Municipal planning boards
- Environmental commissions
- Land trusts
- Watershed organizations
- Concerned citizens

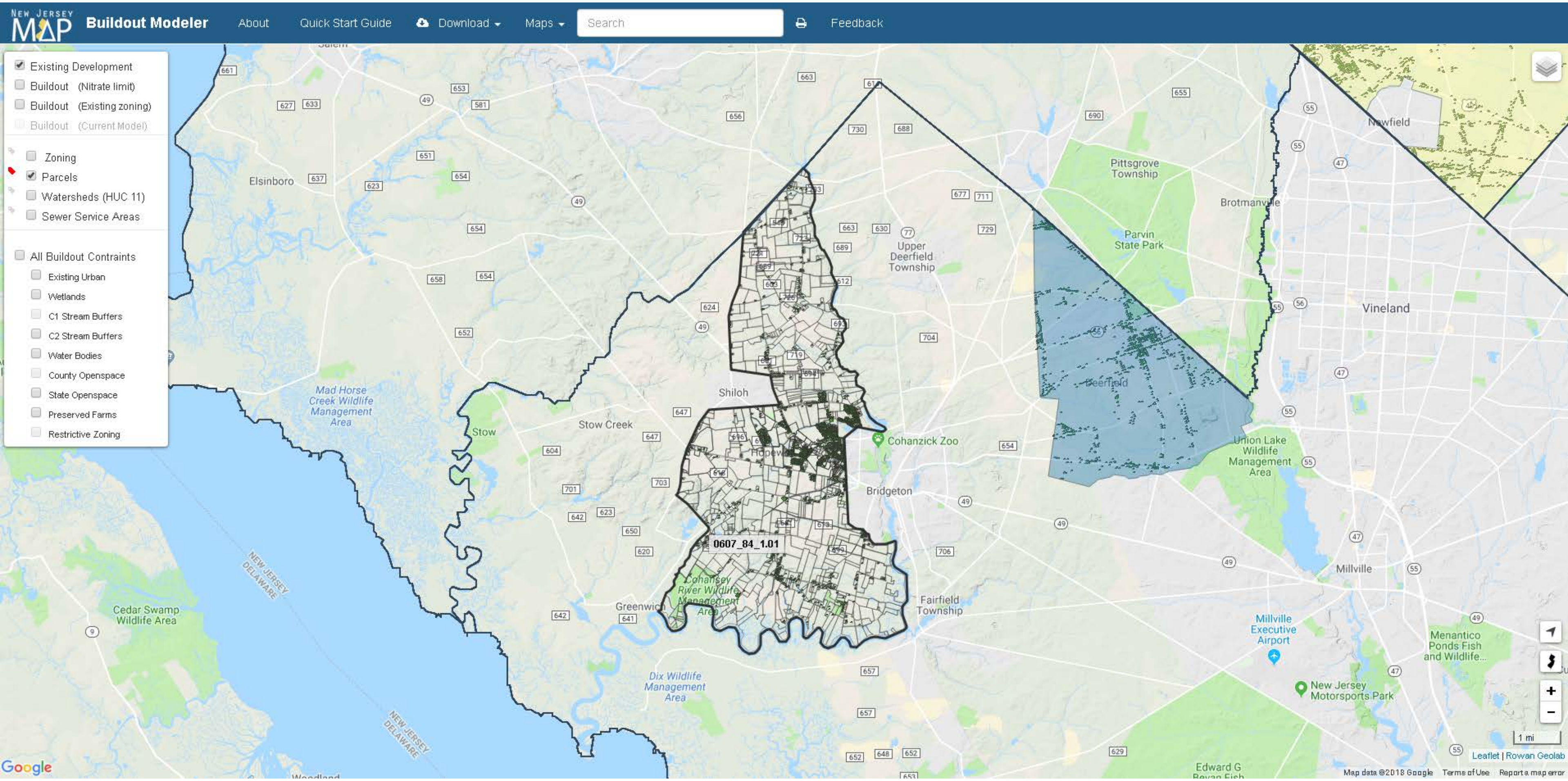
Municipal Land Use Dashboard



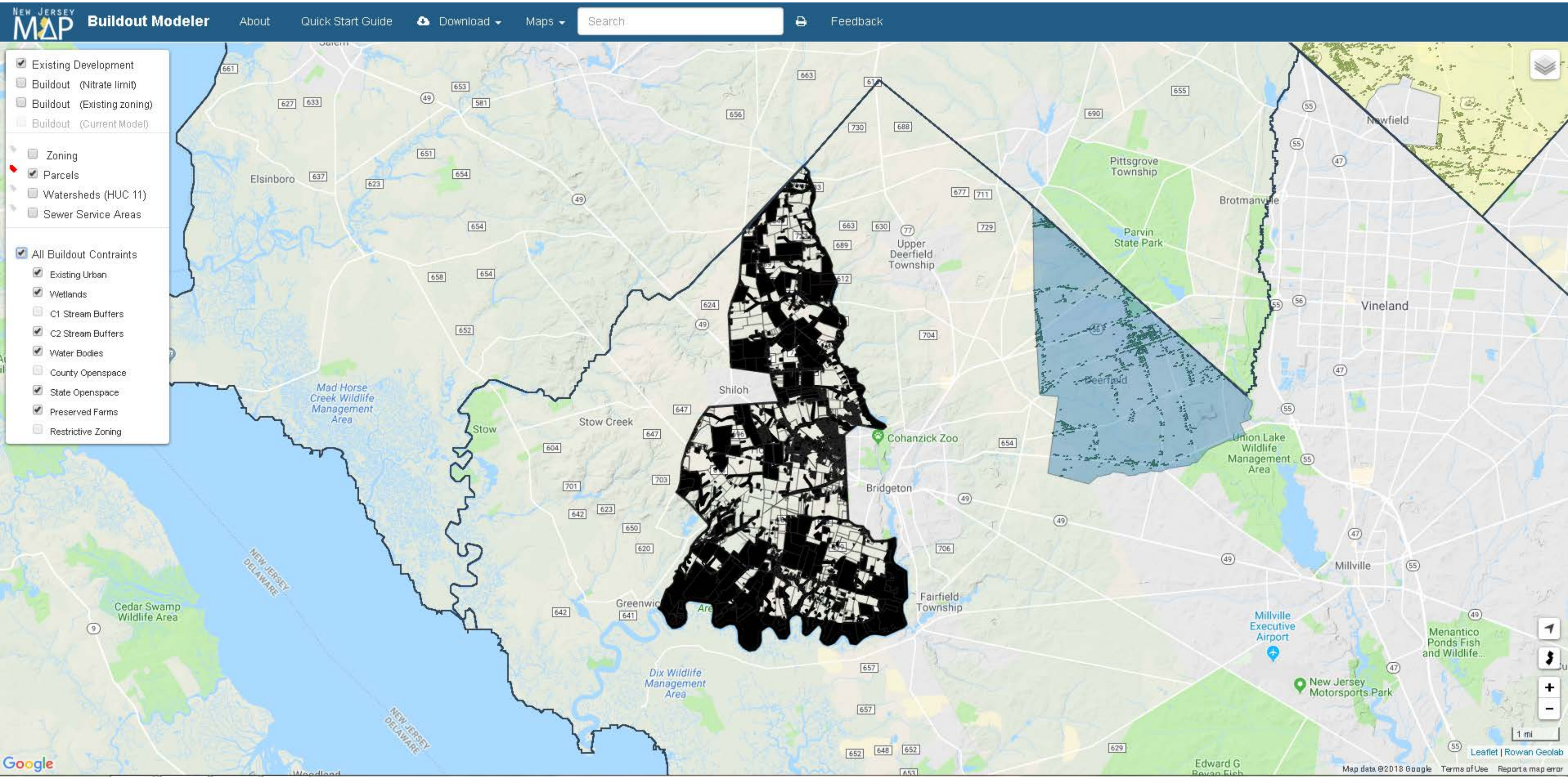
Conservation Blueprint



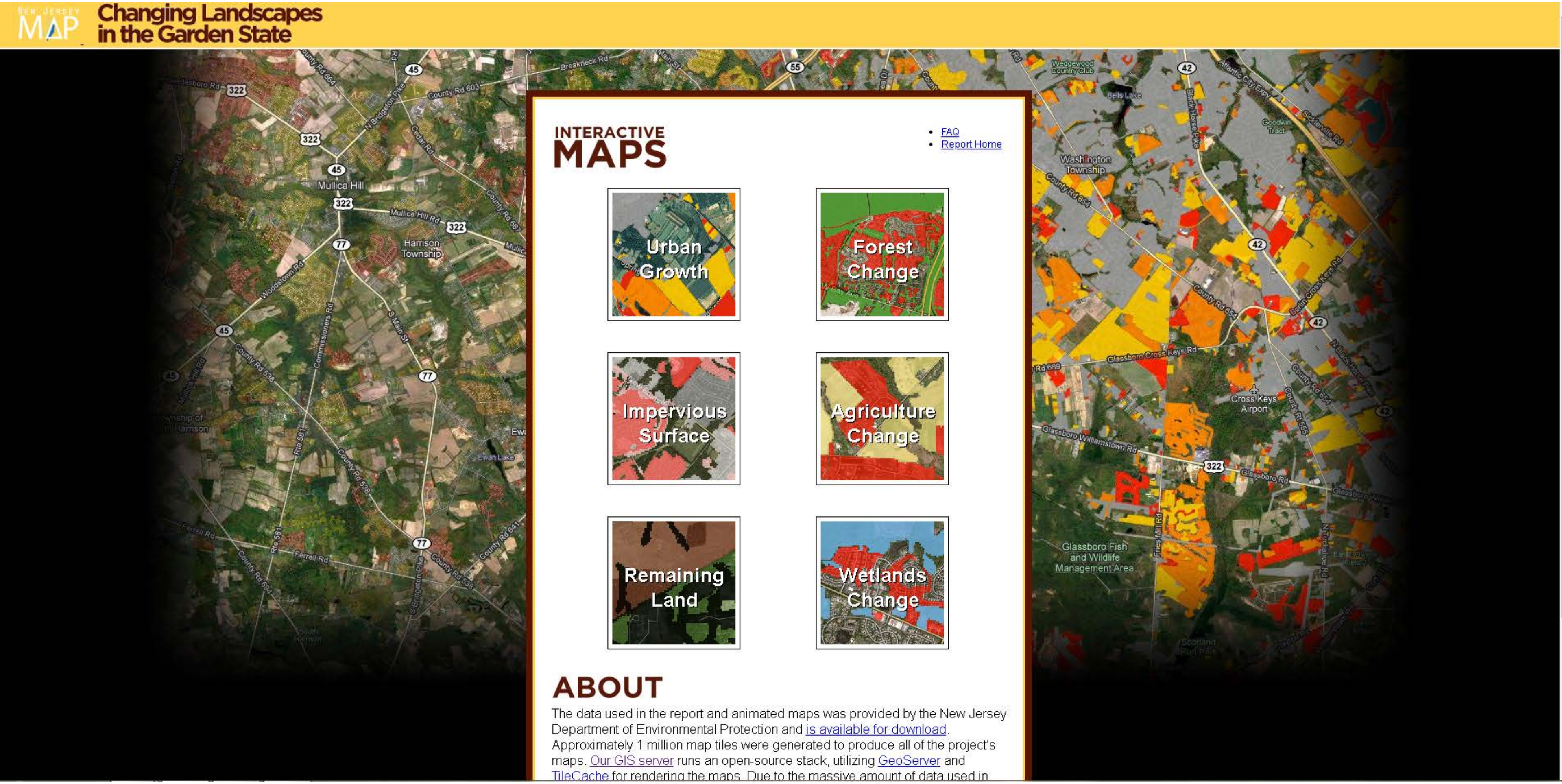
Municipal Buildout Modeler



Municipal Buildout Modeler



Land Change Viewer



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