Planning for Resilience during Blue and Gray Skies

Lawrence Frank, CFM, MRP
Technical Director, Land Planning Practice
ATKINS, Atlanta

Outline of presentation

1) Resilience background
2) Pre-disaster Resilience –(10 min)
a. ARC Extreme Weather and Durability Pilot Program
b. Boulder County DOT Resilience Assessment
c. FEMA Building Resilience Infrastructure and Communities (BRIC) Program
3) Post-disaster Resilience –(10 min)
a. Texas and USVI Infrastructure Resilient Rebuild after Hurricanes Harvey, Irma and Maria in 2017
b. Mexico Beach Resilient Rebuild after Hurricane Michael in 2018

Sustainable Master Plan & Site-Scale Design for Tybee Island, GA

LAND 4050: Region, Site, Place Design Studio V I Fall 2016

College of Environment & Design, University of Georgia

Georgia Geospatial Conference, October 2, 2018
Alison L. Smith, Associate Professor

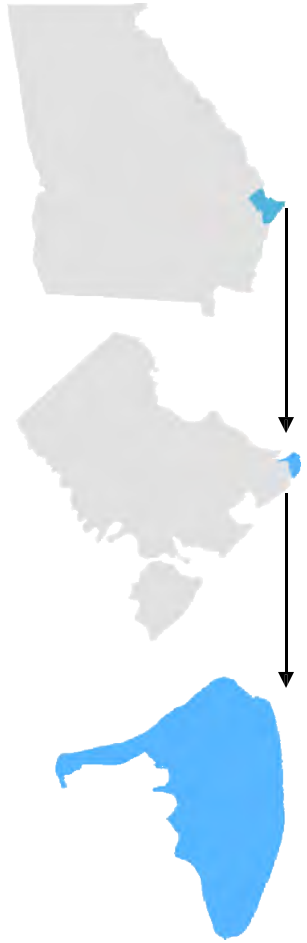
Project Purpose & Objectives

In partnership with the Georgia Conservancy, students in the fall 2016 LAND 4050: Region, Site, Place design studio were tasked with generating a general master plan and site-scale design for Tybee Island that seeks to create a sustainable, resilient landscape in the face of climate, development and tourist issues – one that balances conservation, recreation and development.

- Be informed by previous studies, existing conditions inventory and suitability analysis
- Acknowledge and enhance the existing resources and users (both full-time residents and tourist) that will interact with the site while balancing the needs of the Client, the ecological features and context of the site
- Adhere to the Georgia Conservancy's Coastal Vision & Policy: Coastal Vision & Policy:

  "A healthy, resilient and diverse coastal ecosystem that can endure natural and human disturbances, an economy that offers diverse options including healthy, sustainable nature-based businesses such as commercial fishing and recreation-based tourism, and responsible planning for growth and conservation of sensitive coastal lands."

  source: http://www.georgiaconservancy.org/coast



Who's Involved

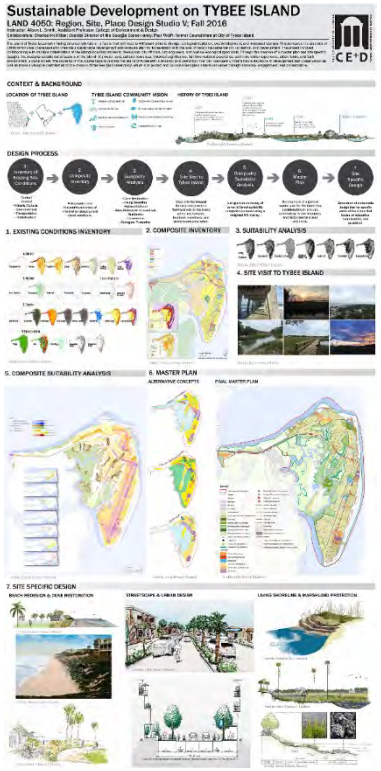
Studio/Design Team

- Alison L. Smith, Professor
- 16 Bachelor of Landscape Architecture (BLA) Students

Client/Stakeholders

- The Georgia Conservancy
  - Charles McMillan, Coastal Director
- Paul Wolff, Former Tybee Island Councilman/Resident
- Additional stakeholders of the island including
  - residents
  - developers
  - city officials
  - city engineers
  - marine/ecological specialists

PROCESS: Inventory + Analysis + Design



I. Inventory

Previous Studies
- Local Plans/Studies
- Regional Plans/Studies
- Coastal Island Case Studies

Existing Conditions Inventory: Student Groups
1. Context
2. Coastal Inventory
3. Historic/Cultural
4. Environmental
5. Transportation & Infrastructure

Composite Site Inventory

II. Analysis

Define Weighted Overlay Suitability Criteria

Suitability Analysis Maps for Site Use: *Student Groups*
1. Living Shorelines
2. Dune Restoration
3. Historic/Cultural
4. Bike/Pedestrian Connectivity
5. Residential
6. Commercial
7. Ecological Protection

2-Day Site Visit to Tybee Island

Guiding Principles/Site Program for Master Plan

Composite Suitability Analysis

III. Design

Alternative Concepts

Conceptual Design

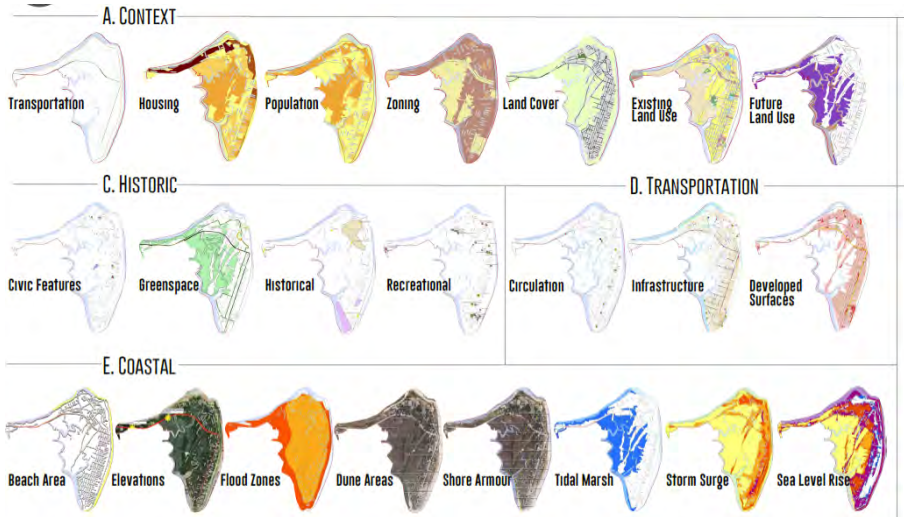
Master Plan

Site-Scale Design

Team work
Individual

PROCESS: **Inventory** Analysis Design

- Previous Studies Review
- Existing Conditions Inventory Maps
- Composite Site Inventory
- 2-Day Site Visit to Tybee Island

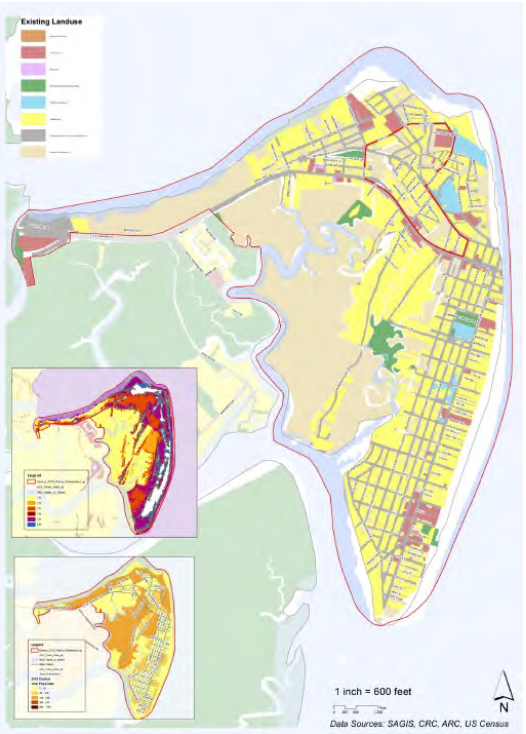


Existing Conditions Inventory

Maps created by all students. Graphic created by Ashley Plicher

Site Visit

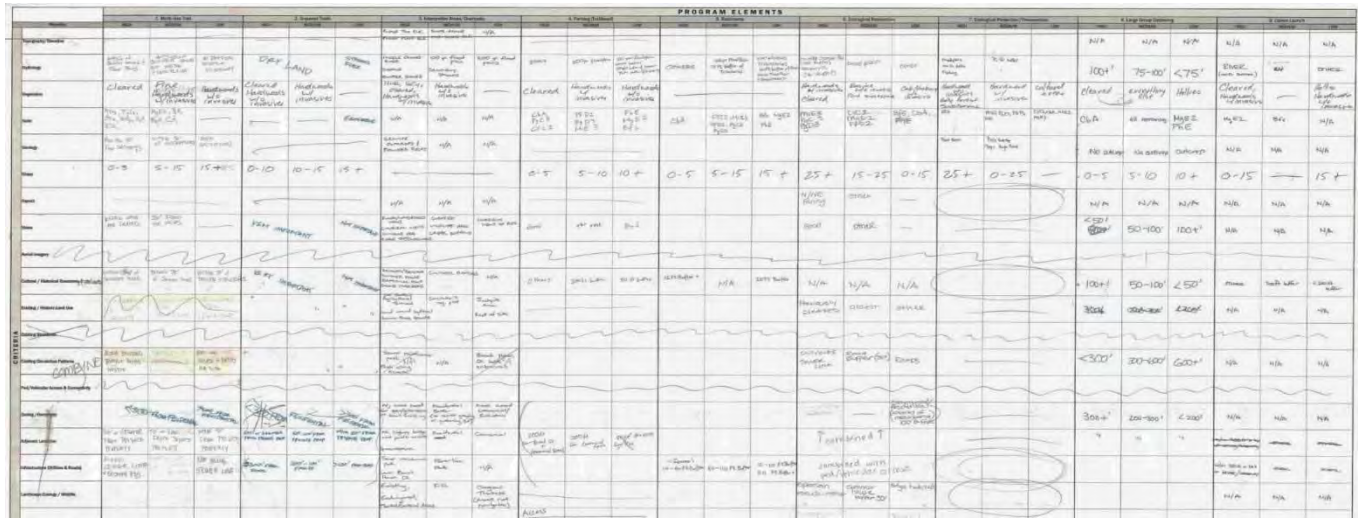
Credit: Katie Sewell

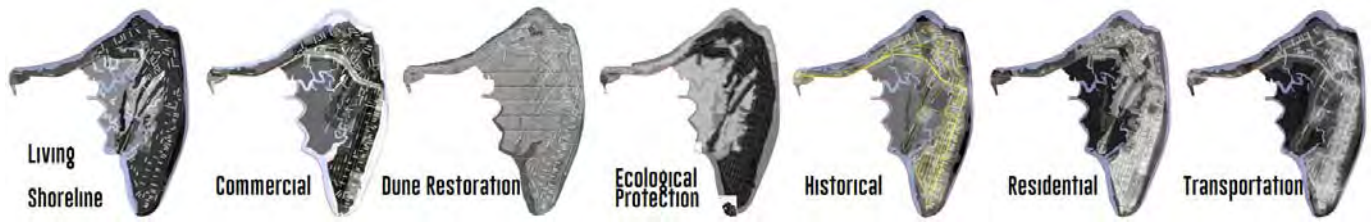


Composite Site Inventory

Credit: Olivia Lemieux

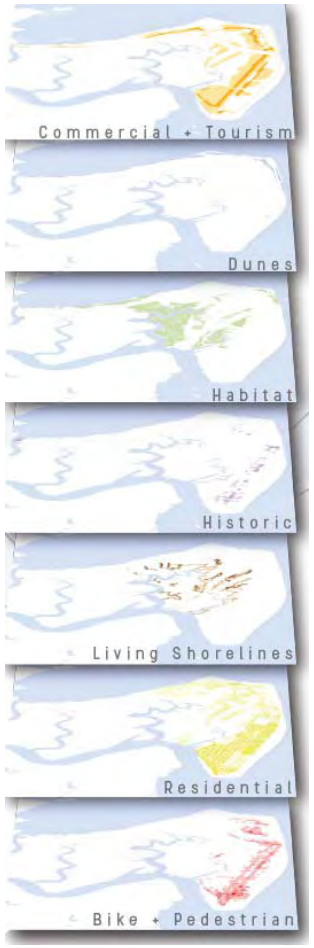
- Discussion with Client & Studio to identify site uses
- Define weighted overlay criteria. Research criteria rankings; rank each criteria high, medium or low
- Create suitability maps for each site use





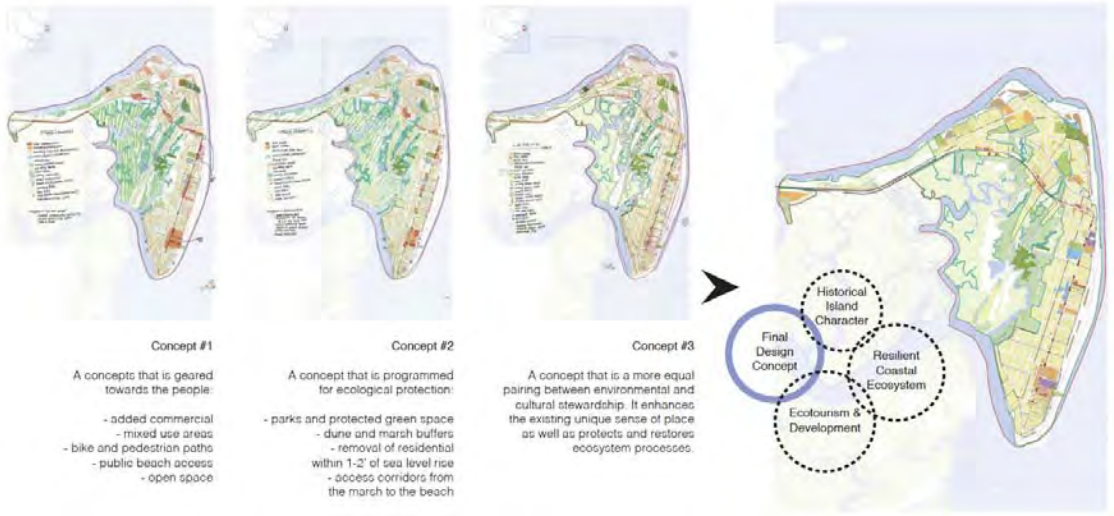
PROCESS: Inventory | Analysis + Design

- Develop Guiding Principles & Site Program for design
- Create Composite Suitability Analysis



Credit: Lauren Linnane

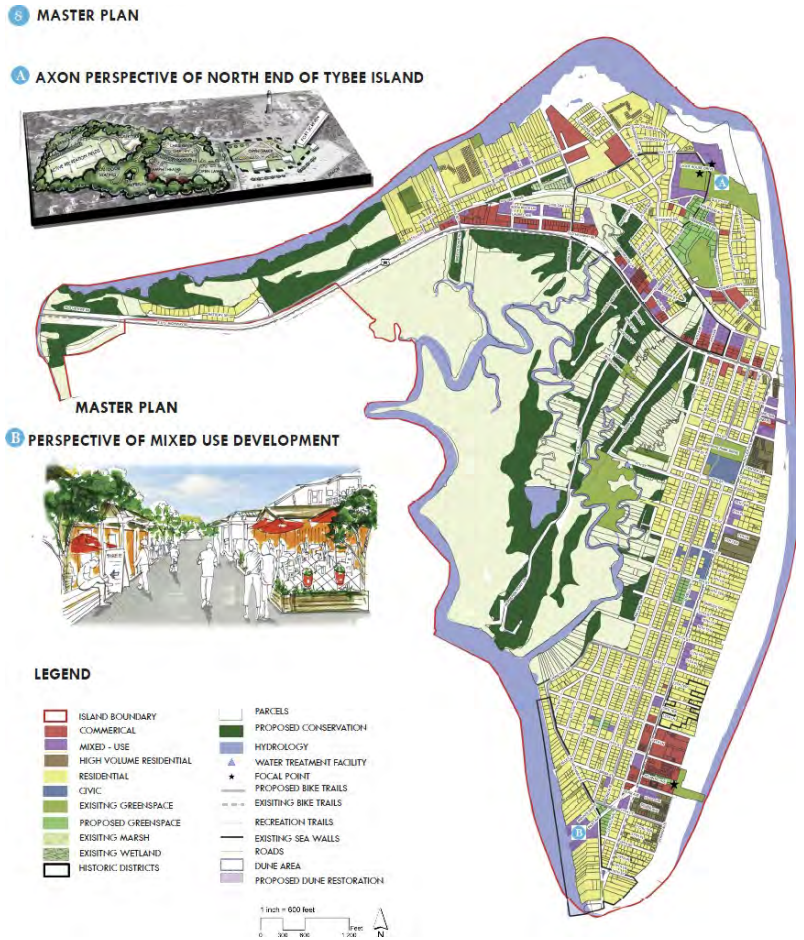
- Alternative Concepts and Conceptual Design for Master Plan & Site-Scale Design
- Master Plan & Site-Scale Design for Tybee Island
  - Balance the needs and vision of the Georgia Conservancy, the current and future users of the site, the ecological features and context of the site, the regulatory context of the site
  - Master Plan must be informed by previous studies, existing conditions inventory and suitability analysis
  - Site-Scale Design
    - Select a core area of your Master Plan that is 5-8 acres in size for site-scale design.
    - Site selection/design must be informed by Suitability Analysis and Master Plan



Conceptual Design & Master Plan

Credit: Katie Sewell

Site-Scale Design Locations



Master Plan

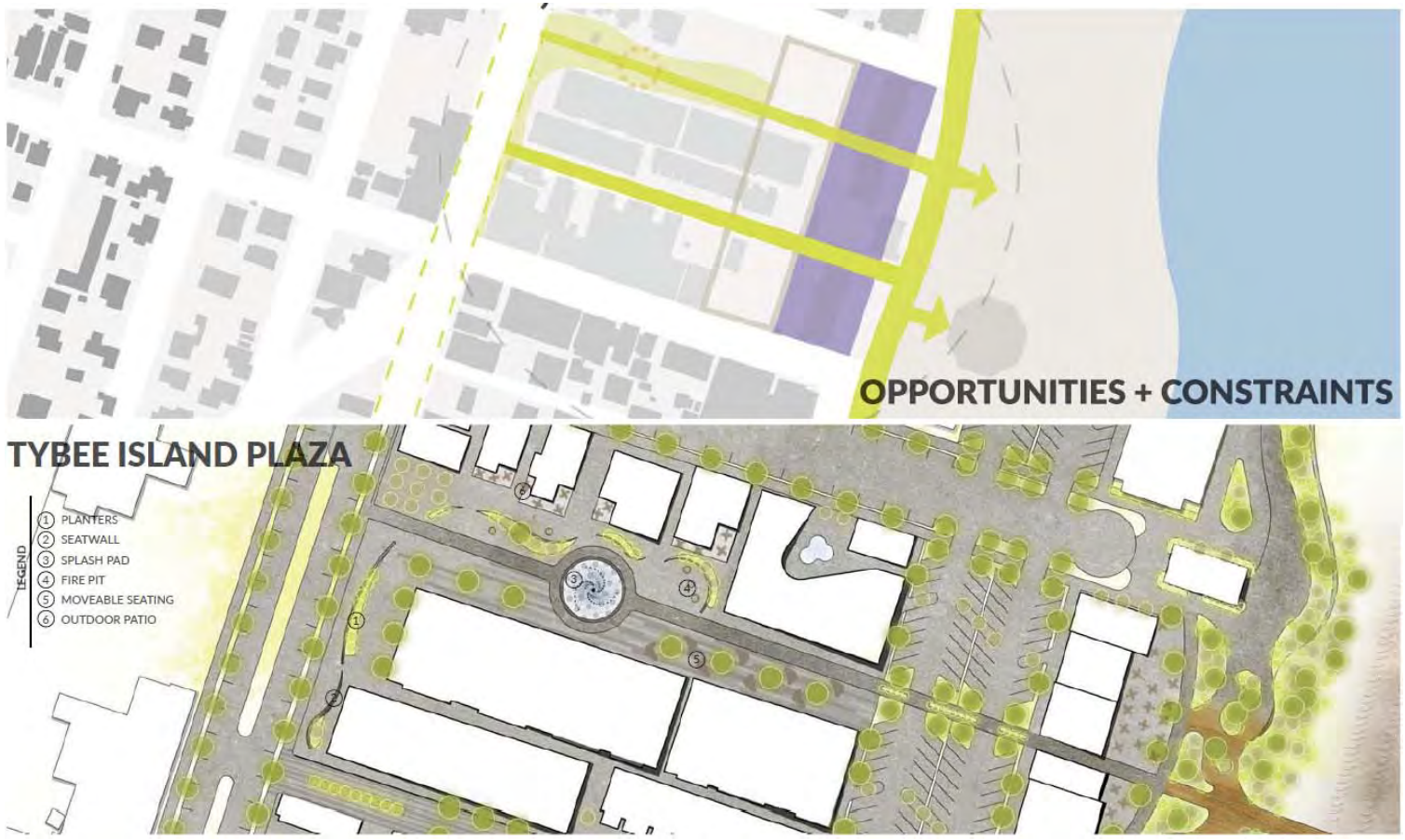
Credit: Juliette Swanson

Master Plan & Site-Scale Design

Credit: Katie Sewell

Credit: Katie Sewell

Site-Scale Design



Credit: LaurenLinnane

Site-Scale Design

Outstanding Student Project Award!

Award Category: Outstanding Student Project

Project Name: Tybee Island Master Plan

Award Winners: College of Environment + Design, University of Georgia, Georgia Conservancy

Summary of the Entry: Students in the Fall 2016 LAND 4050 class (Region, Site, and Place Studio in the College of Environment and Design at UGA) were tasked with creating a master plan and a site-scale design for Tybee Island. The project sought to create a sustainable, resilient landscape in the face of climate, development, and tourism challenges – a solution that balanced conservation, recreation, and development. The semester-long project involved collaborating with multiple stakeholders of the island including residents, developers, city officials, city engineers, and marine/ecological specialists. Professor Smith, a licensed Landscape Architect and AICP Certified Planner, uniquely ties landscape architecture with comprehensive planning throughout the studio in both design knowledge and technology. The master plan highlights a fresh approach to innovative planning measures for traditional problems.

https://georgiaplanning.org/archived-awards/2017-gpa-fall-chapter-awards/

Discussion, Lessons Learned & Future Strategies

Reflection on process and methods:

- A process facilitated by technology allowed for easy incorporation of GIS & geodesign methods into the studio.
    - The ability to go back and forth between computer and hand graphics throughout the project reinforced the cyclical nature of the design process
- The use of GIS and suitability analysis revealed areas highly suitable for certain uses that may not have been intuitively recognized using traditional methods.
- The strategic balance of group and individual work during the project allowed students to create a base map for design, built upon group efforts, that was specific to their goals for the project.
- Students were able to justify individual design decisions based on inventory and suitability analysis.

Lessons learned and future strategies:

- The level of GIS knowledge varied for each student in the studio which was challenging at times. Data preparation was extensive to ensure students with little knowledge of GIS could apply the concept of suitability analysis to inform design decisions.
- Providing students with a comprehensive framework for guidance will help facilitate a better understanding of the process and how each step is a part of the overall process. A future strategy is to incorporate *A Framework for Geodesign: Changing Geography by Design* by Carl Steinitz (and other text and studies) as a textbook to help overcome this challenge.

Acknowledgments

Special Thanks to:

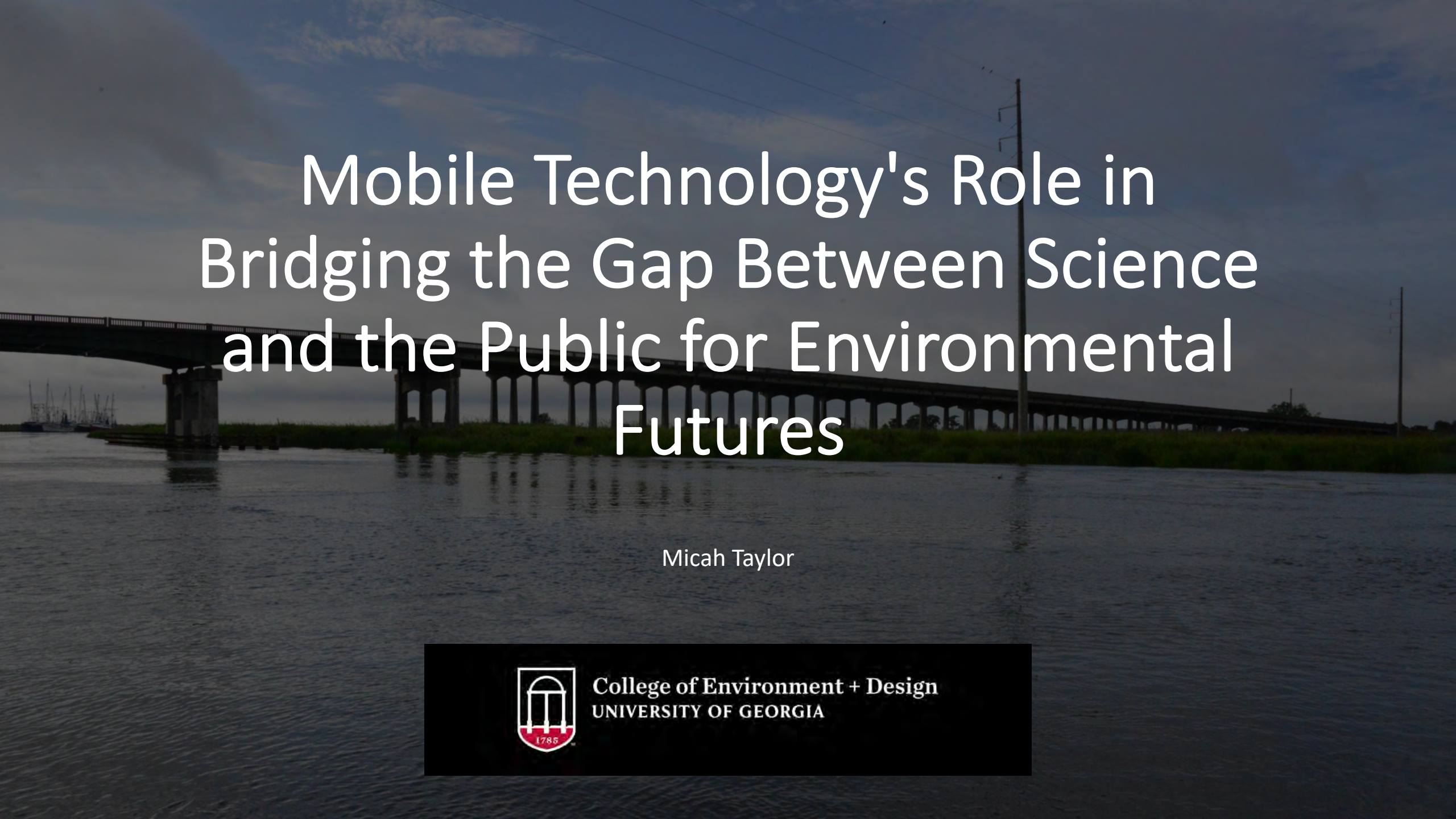
Charles McMillan, Coastal Director for the Georgia Conservancy

Paul Wolff, Former Tybee Island Councilman/Resident

Island Stakeholders

The students in LAND 4050 Nature & Sustainability Studio, Fall 2016 at the University of Georgia, College of Environment & Design:

Amber Beasley
Natasha Burr
Weston Cleveland
Jenna Dotson
Ali Haupt
Morgan Landers
Olivia Lemieux
Erin Liberatore
Lauren Linnane
Lesa Miller
Jillian Nance
Ashley Pilcher
Katie Sewell
Matthew Sinclair
Injae Song
Juliet Swanson



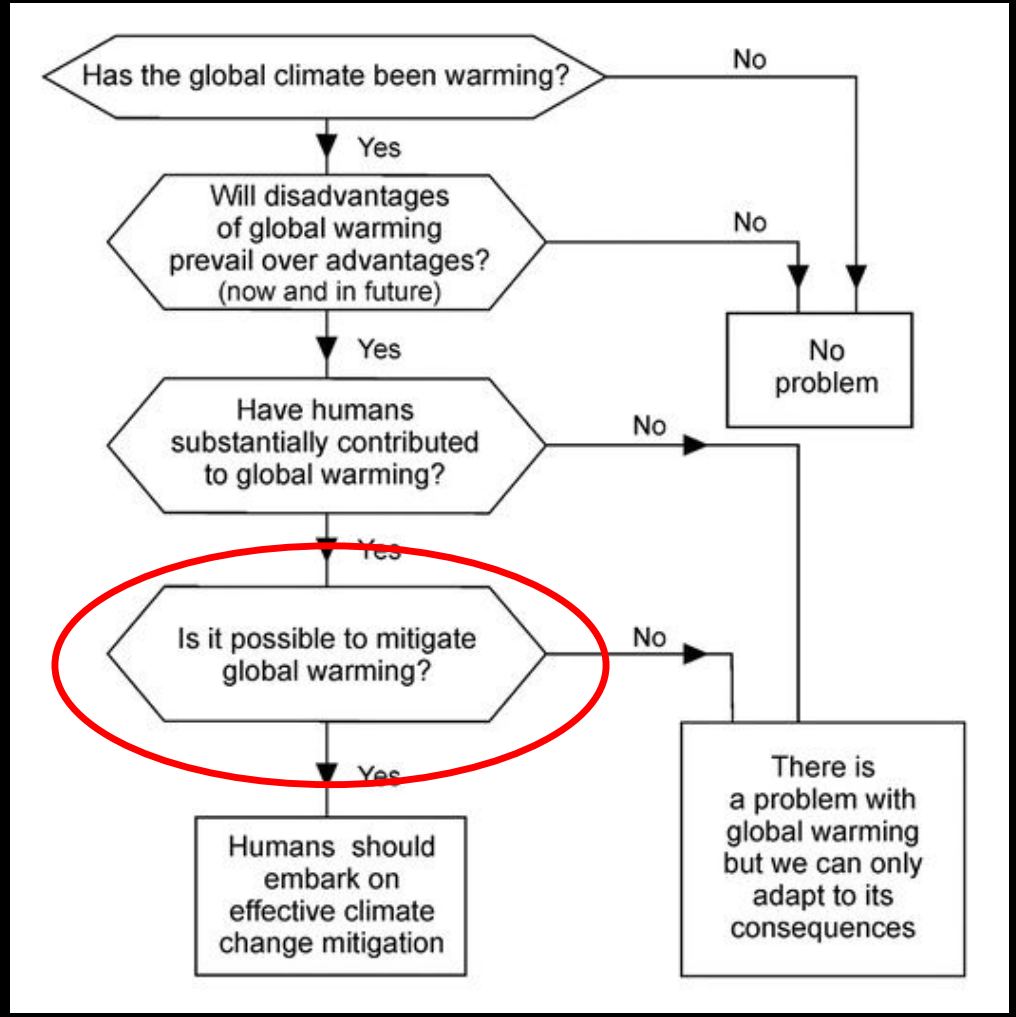
Mobile Technology's Role in Bridging the Gap Between Science and the Public for Environmental Futures

Micah Taylor

College of Environment + Design
UNIVERSITY OF GEORGIA

Future Environmental Issues

- Heat Death
- Food deserts
- Climate Plagues
- Unbreathable Air
- Perpetual War
- Economic Collapse
- Poisoned Oceans
- Sea-Level Rise



Wallace-Wells, David. 2017. "The Uninhabitable Earth." New York, July 10

…we will need a new way of thinking our collective existence…a new vision of who “we” are. We need a new humanism – a newly philosophical humanism, undergirded by renewed attention to the humanities.

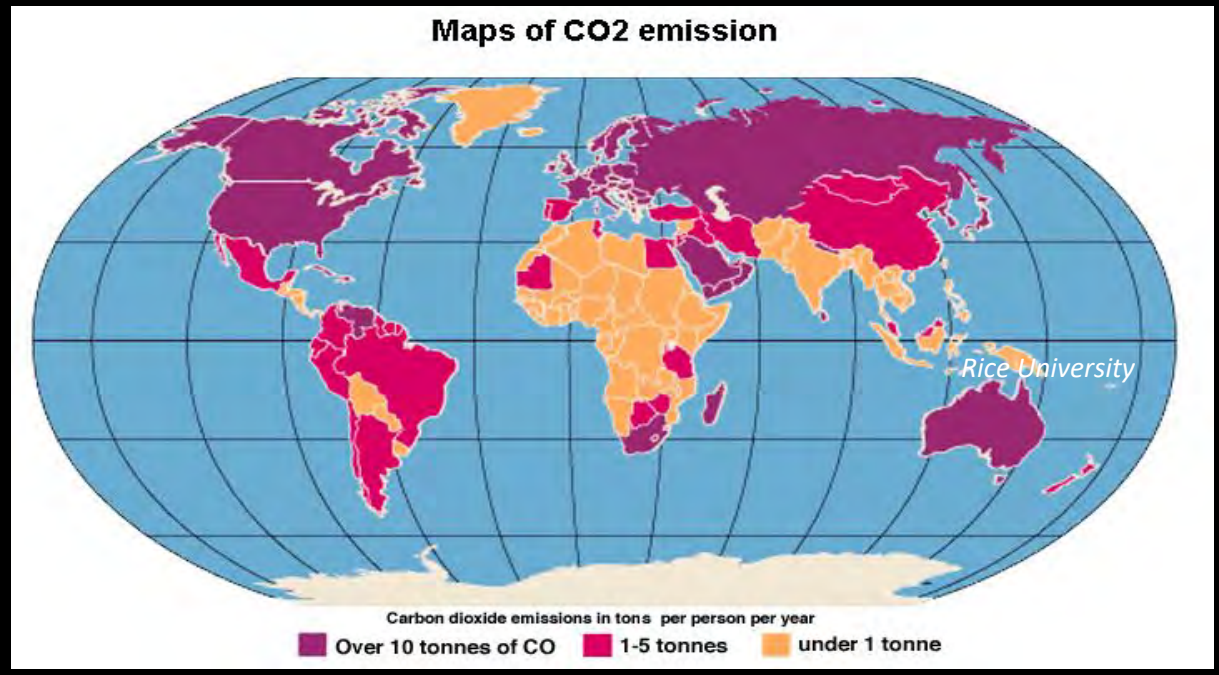
Scranton, Roy. 2015. Learning to die in the Anthropocene : reflections on the end of a civilization. San Franciso, CA: City Lights Books.

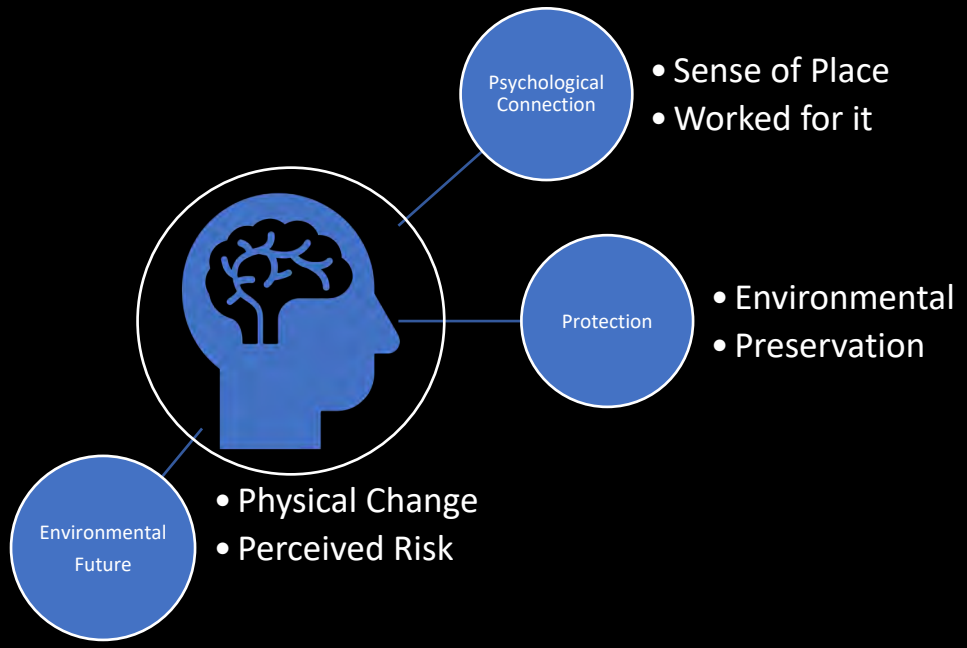
There is a need for more studies on the social basis for climate change asking why people hold the attitudes they do, rather than the dominant tendency to ask how to change attitudes and behavior.

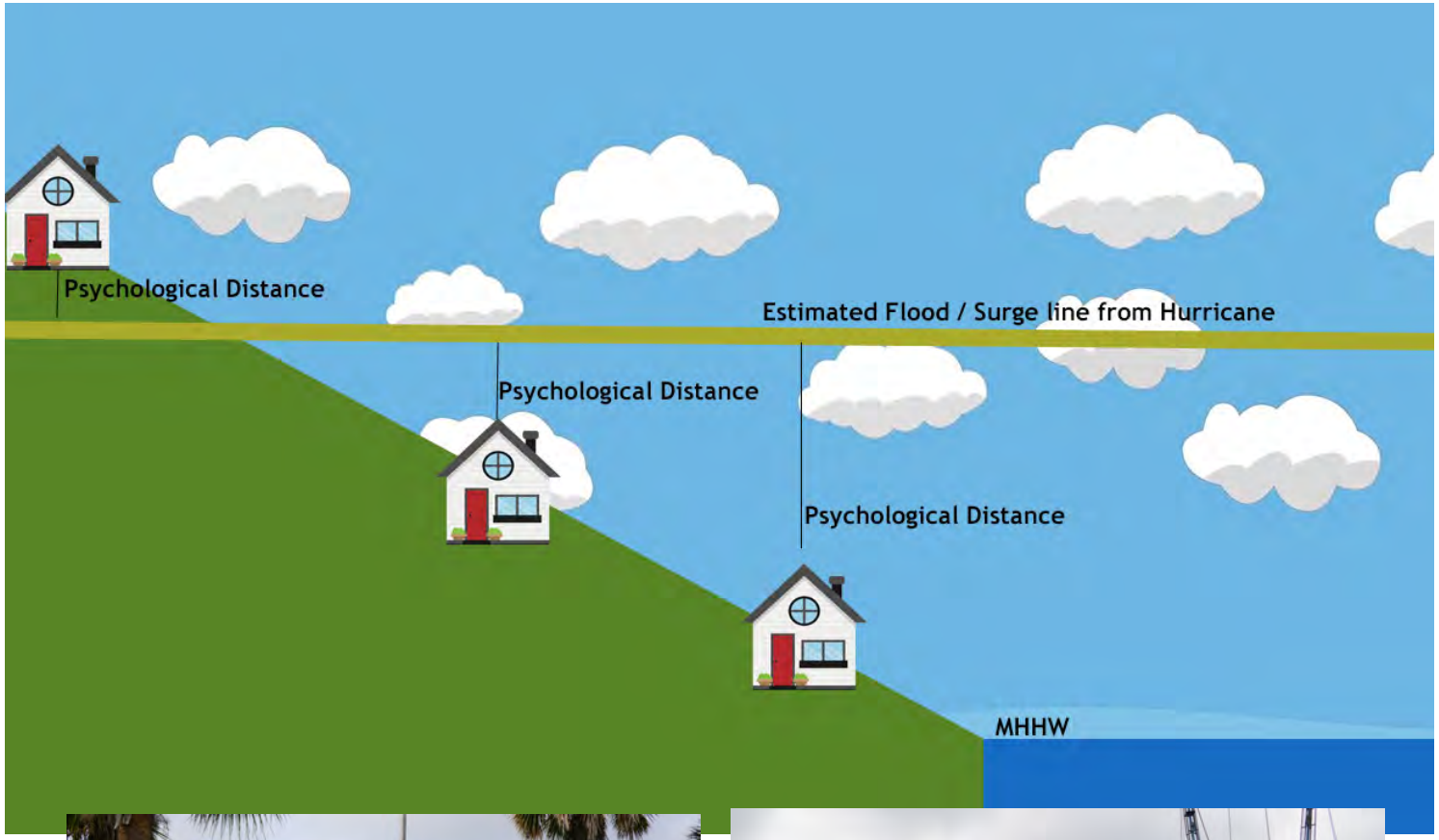
Kaltenborn, Bjørn P., Olve Krange, and Torvald Tangeland. 2017. "Cultural resources and public trust shape attitudes toward climate change and preferred futures—A case study among the Norwegian public." Futures 89:1-13. doi: https://doi.org/10.1016/j.futures.2017.04.005.

Climate X -Immanent social and ecological struggles that are happening all over the world mainly led by [disadvantaged (non-expert) groups] can be radicalized and unite those disparate struggles so they can become a different way of organizing the world.

Wainwright, Joel, and Geoff Mann. 2018. Climate leviathan : a political theory of our planetary future. London: Verso.







The Gap

- Psychological Distance
- Physical Distance
- Cultural Capital
- Connection to Place
- “Don’t Believe”

Kaltenborn, Bjørn P., Olve Krange, and Torvald Tangeland. 2017*. "Cultural resources and public trust shape attitudes toward climate change and preferred futures—A case study among the Norwegian public." Futures 89:1-13. doi: https://doi.org/10.1016/j.futures.2017.04.005*

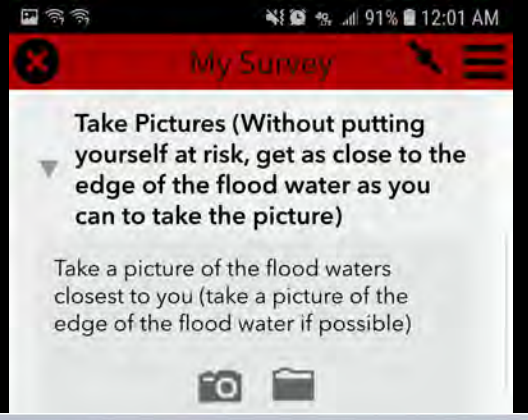
Milfont, Taciano L., Laurel Evans, Chris G. Sibley, Jan Ries, and Andrew Cunningham. 2014. "Proximity to Coast Is Linked to Climate Change Belief." *PLOS ONE 9 (7):e103180. doi: 10.1371/journal.pone.0103180.*

Relph, Edward C. 1976*. Place and Placelessness. London: Pion.*

Two Mobile Applications

Coastal AR application
Qualitative

Flood Data Collection (ArcGIS)
Quantitative




POKEMON GO IN REAL LIFE!
Press Esc to exit full screen
1:16
1:42

Darien

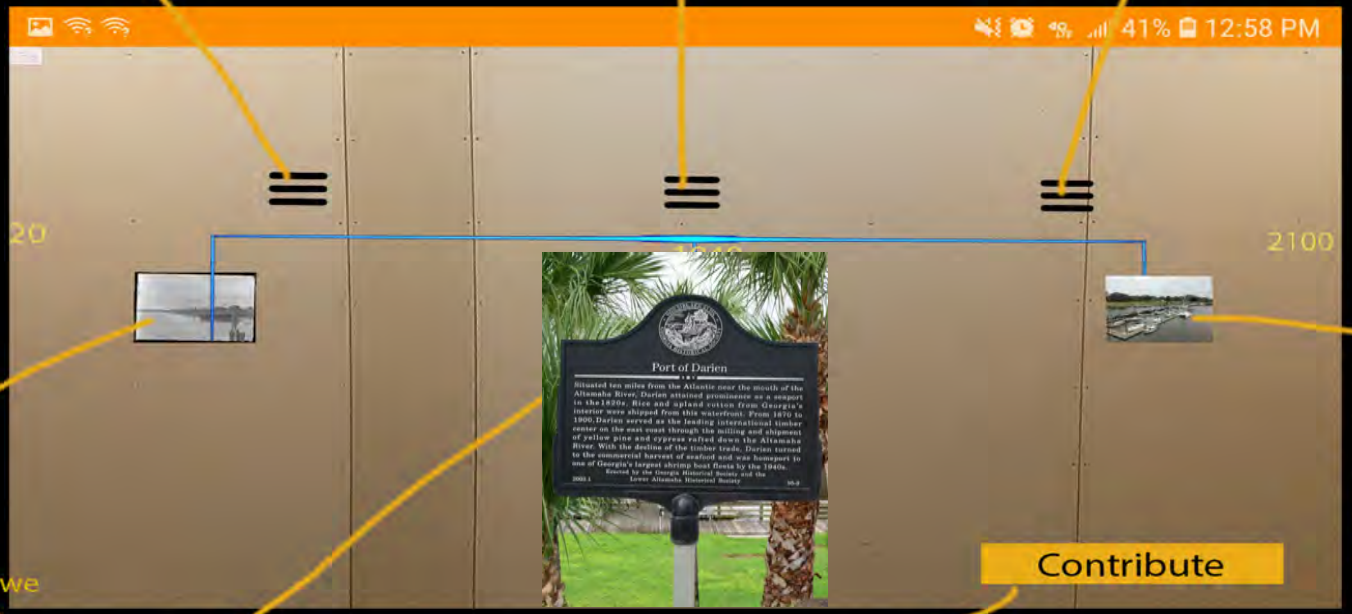
-Forts
-Ship Building/Supply
-Rice Cultivation
-Lumber
-Shrimp
-Tourism
-Jelly Ball

Content

This button should link to a list of user content about stuff in the past so other people can read/see/listen. This content can be pulled from the feature service

This button should link to a list of user content about stuff in the present so other people can read/see/listen. This content can be pulled from the feature service

This button should link to a list of user content regarding the outlook on the future so other people can read/see/listen. This content can be pulled from the feature service



This image should link to other historic images or website that we will implant in the code

This will be the historic marker (currently a printout of the header from the marker)

This image should llink to a full screen image (from our flikr) of the icon. It is a photo of our interpretation of this area in the future of sea-level rise

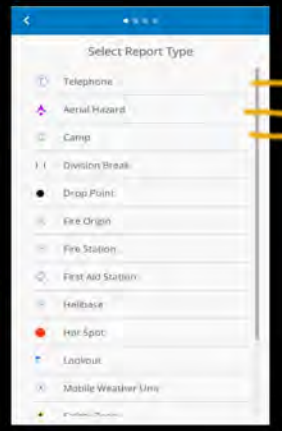
This button will open the first page of the contribution component (from the Qt app or ArcGIS API)of the app that writes to the ArcGIS online Feature Service.
discussed on the next page

This is a simple organization chart. The cosmetics, icons, and linked content wil likely change before the final application is launched.

Contribute

The opening page when the user clicks 'contribute'. Asking for a new or a draft contribution. Here is where we wil need to ask to use the GPS and ask what types of insights we are looking for.

These data colletion pages came straight from the 'Quick Report' code from ArcGIS App Studio (the qml based Qt project in the google drive) so the code to write to the feature layer should be in there.



The second page asks what type of contribution is this?
ex)past, present, future
or) environment, history,
or cutlutral.
We are still working this out although using past, prex, future will work with the timeline idea.

Past
Present
Future

Send to relative list on the AR timeline

The third page asks the user to put a pin on the map where the contributed insight has taken place. This should be optional in case they are talking about the sign they are standing at (in which case they dont need to mark it again) or they simply dont want to share the location.

The last page asks them to chosse their contribution type - text, image, or audio. I think we should strongly encourage audio. THIS CONTENT CAN LATER BE DIRECTED TO A HUMANITIES REPOSITORY if we figure out where and how.

The ArcGIS online Feature Service REST link in the email i sent

Sea-Level Rise and Storm Frequency Increasing

“Scientists have determined that global sea level has been steadily rising since 1900 at a rate of at least 0.04 to 0.1 inches per year.”
NOAA,
https://oceanservice.noaa.gov/facts/sealevelclimate.html

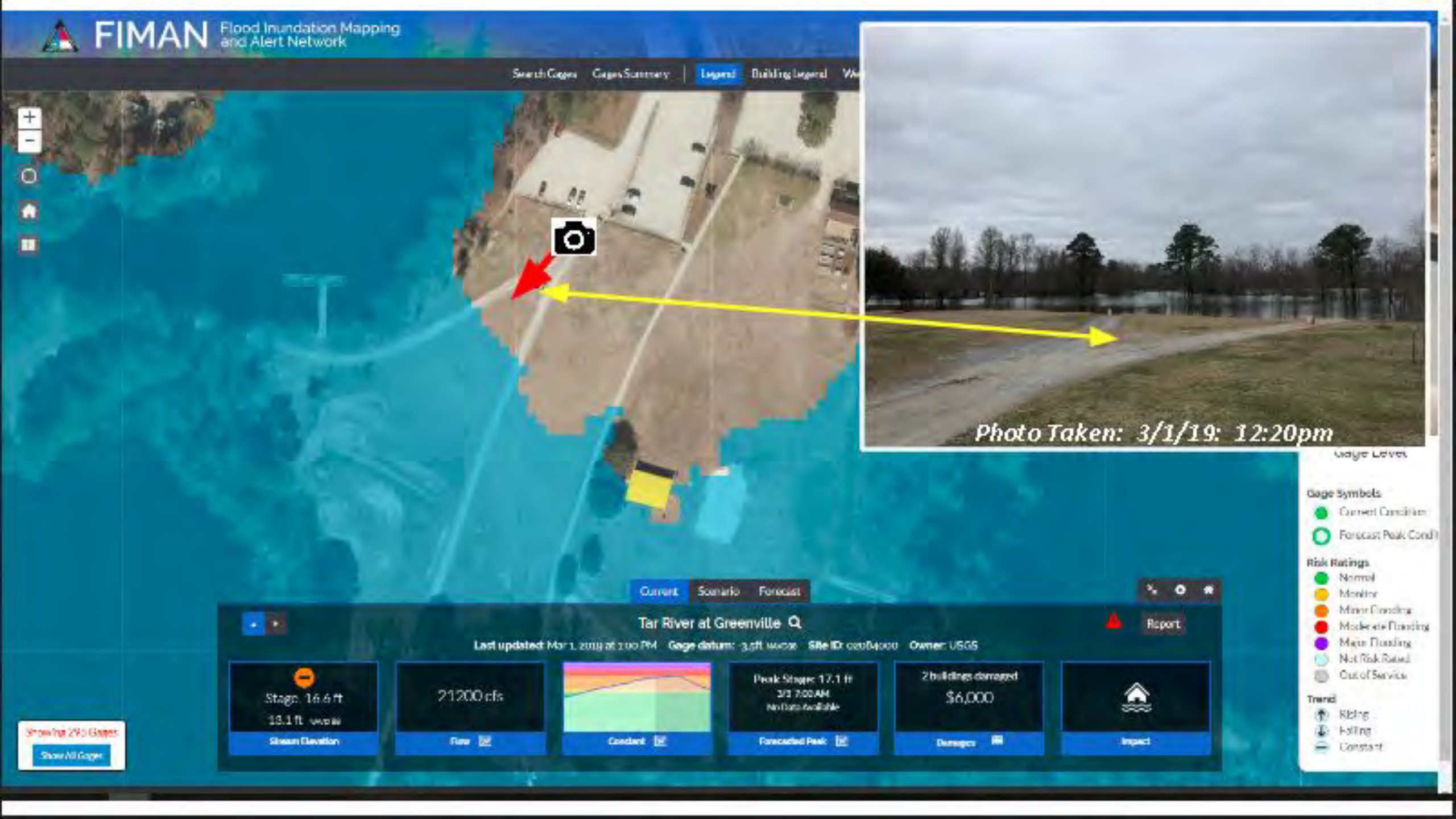
“We find that a 2100 SLR of 0.9m places a land area projected to house 4.2 million people at risk of inundation, whereas 1.8m affects 13.1 million people—approximately two times larger than indicated by current populations.”

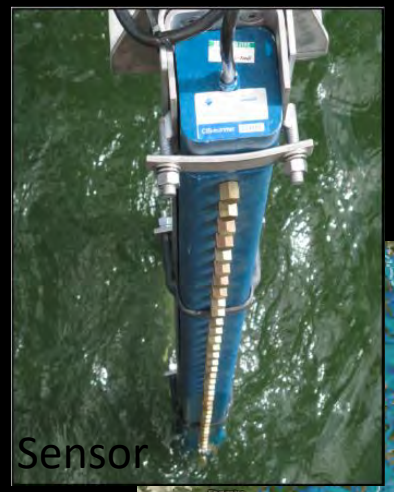
Hauer, Matt, Jason Evans, and Deepak Mishra. 2016.
Millions projected to be at risk from sea-level rise in the continental United States. Vol. 6

Seed, Stain, and Debris Lines

USGS Field Manual for Identifying and Preserving High-Water Mark Data

https://stn.wim.usgs.gov/FEV/#MatthewOctober2016

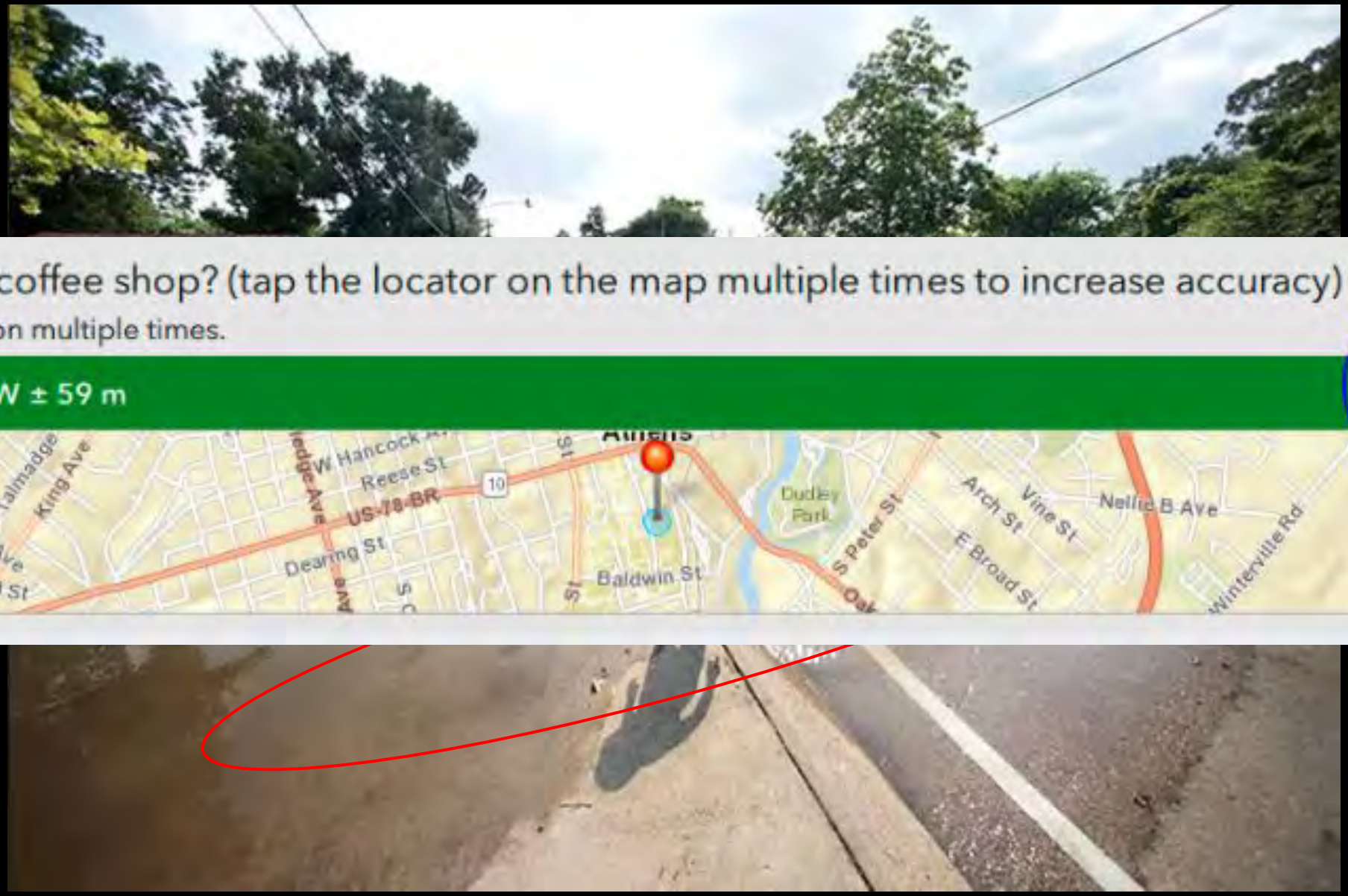

FIMAN
Flood Inundation Mapping and Alert Network
Search Gages
Gages Summary
Legend
Building Legend
Photo Taken: 3/1/19: 12:20pm
Current
Scenario
Forecast
Tar River at Greenville
Report
Stage: 16.6 ft
21200 cfs
Peak Stage: 17.1 ft
2 buildings damaged
$6,000
Gage Symbols
Risk Ratings
Normal
Minor Flooding
Moderate Flooding
Major Flooding
Trend
Rising
Falling
Constant



Authoritative
Flood Modeling
– The remote/static sensor

Non-Authoritative
Flood Validation and Supplement
-The Social Sensor

https://www.myajc.com/news/photos-hurricane-matthew-aftermath-georgia/irdDd3rvDtofi3EfZnwsPN/#xRq3gLz8QN-7RhVcOvrbEg



Mississippi, *The Guardian*

Validation – “X% of crowdsourced flood locations fell within the inundation area of the model”

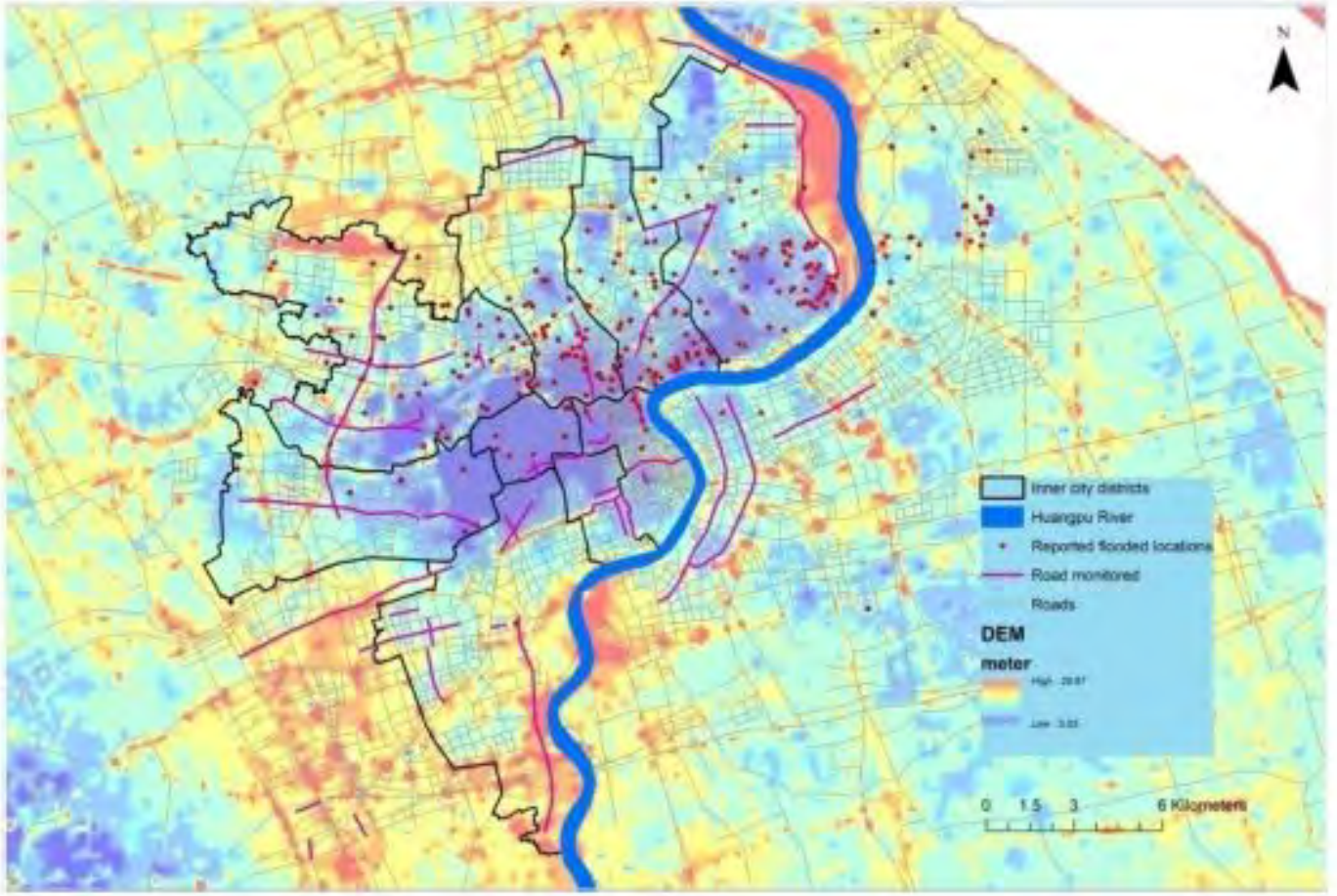


Figure 3. Roads where digital meters are installed by the government, and locations where local flood incidents were reported by the public during the 12 August 2011 event.

Yu, Dapeng, Jie Yin, and Min Liu. 2016. “Validating City-Scale Surface Water Flood Modelling Using Crowd-Sourced Data.” *Environmental Research Letters* 11 (12). https://doi.org/10.1088/1748-9326/11/12/124011.

Special thanks to…

- Brian Orland – UGA CED professor of GeoDesign
- Jingxian Li– UGA CED PhD Student
- Gretchen Bailey– UGA CED Master's Student of Landscape Architecture
- Meredith Welch-Devine – Graduate School / Anthropology
- Wilson Center for Humanities– Andrew Mellon Foundation Grant
- Adam Spickard – Technoke Mobile Development
- Residents and Businesses of Darien, Georgia

College of Environment + Design
UNIVERSITY OF GEORGIA

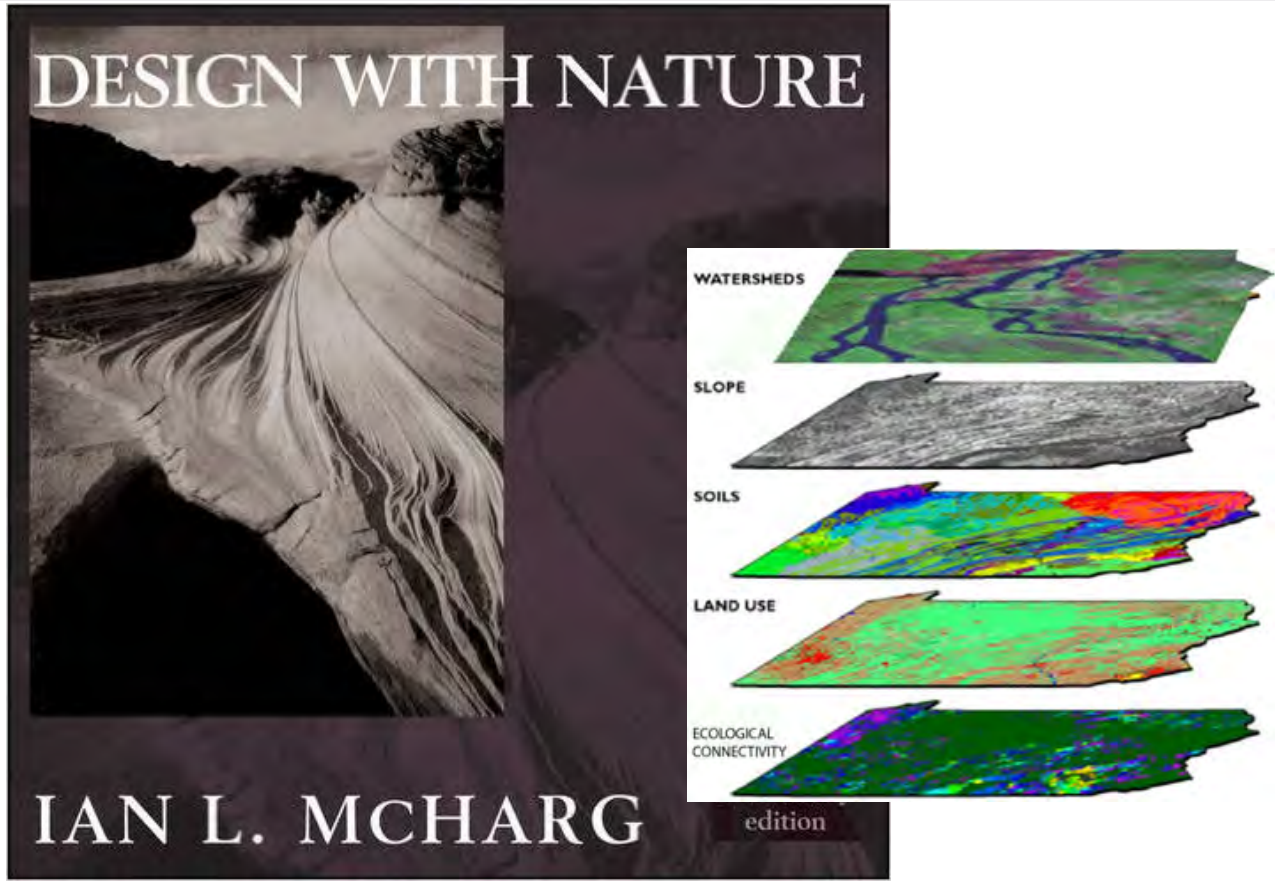
GIS and Geodesign for collaborative design and planning

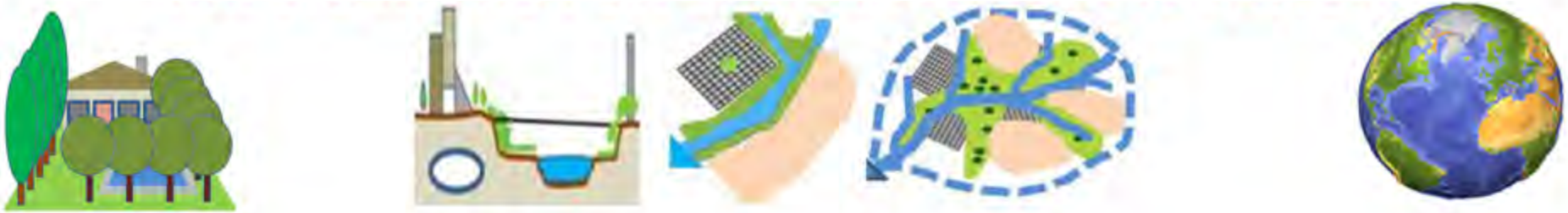
Georgia Planning Association Conference, October 3, 2019

Rosanna G. Rivero, Alison L. Smith, Lupita Mc Clenning
College of Environment & Design, University of Georgia

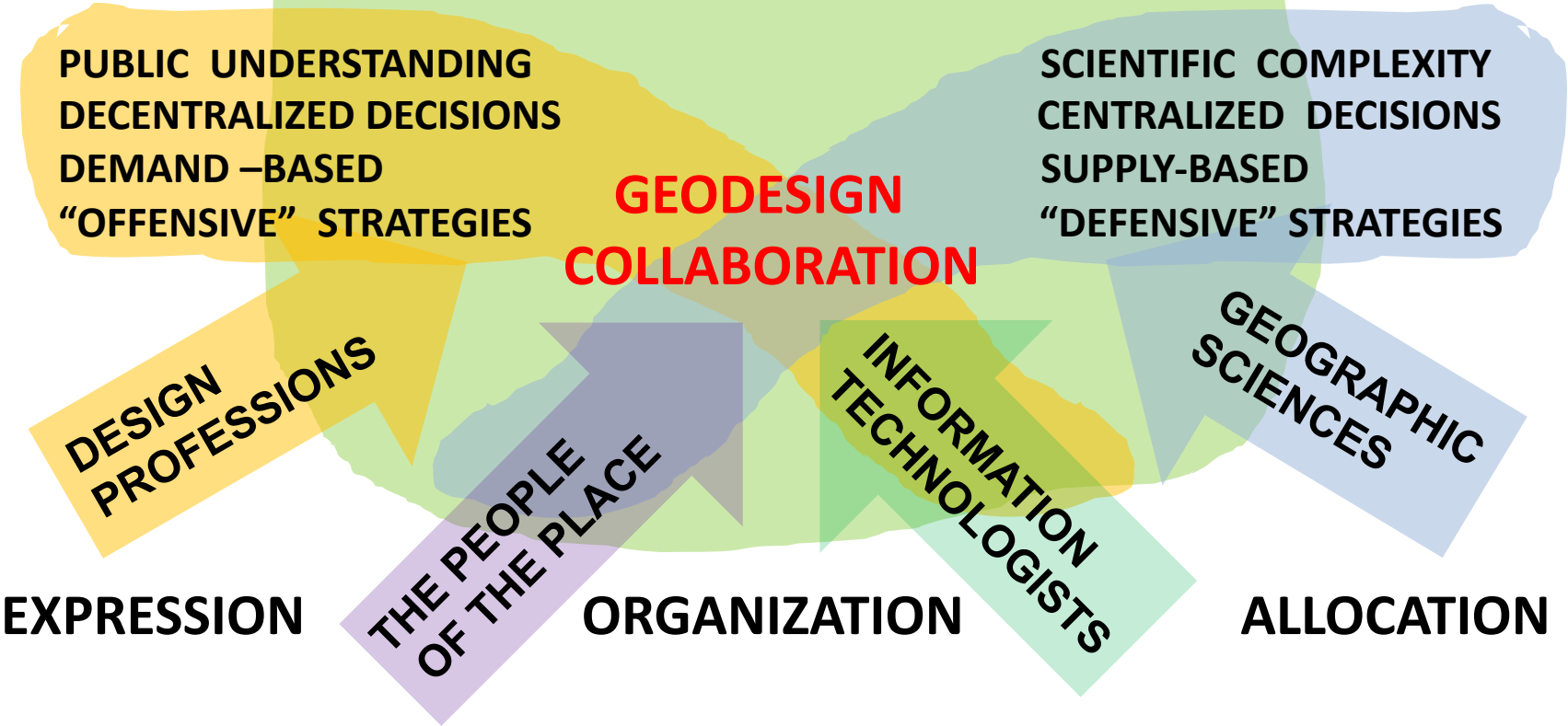
Geodesign and GIS

- Geodesign is a framework to facilitate the decision-making with mapping digital tools, in a collaborative and multidisciplinary environment. It relies on GIS for generating data and models that are used to envisioning, planning and designing the future of a region, a city, or a local landscape.





This is where I think collaboration in geodesign can be most significant.



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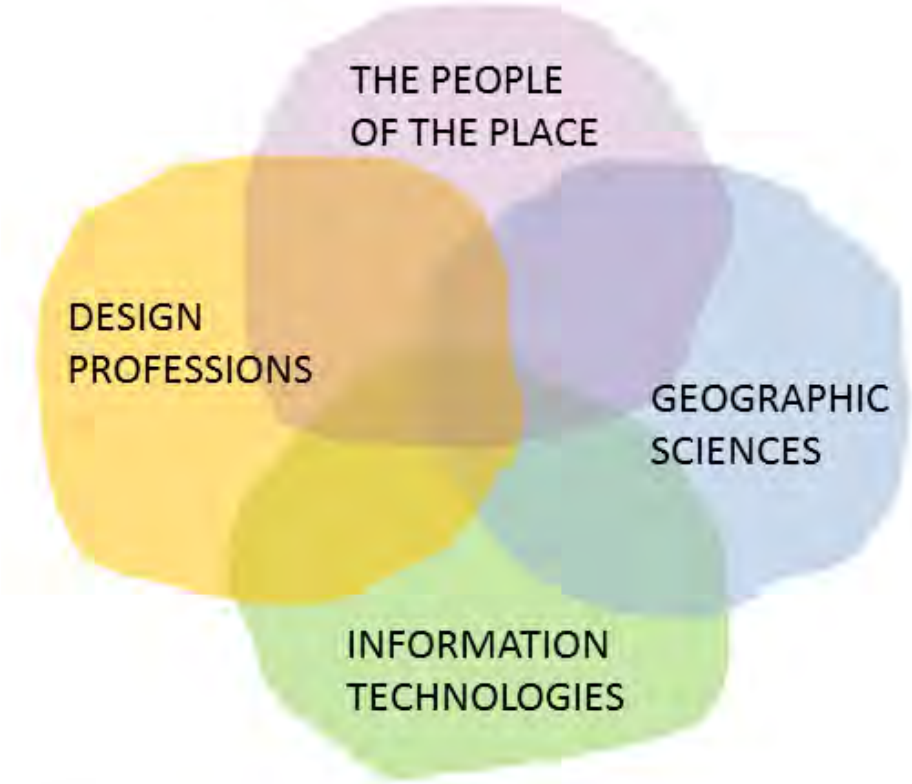
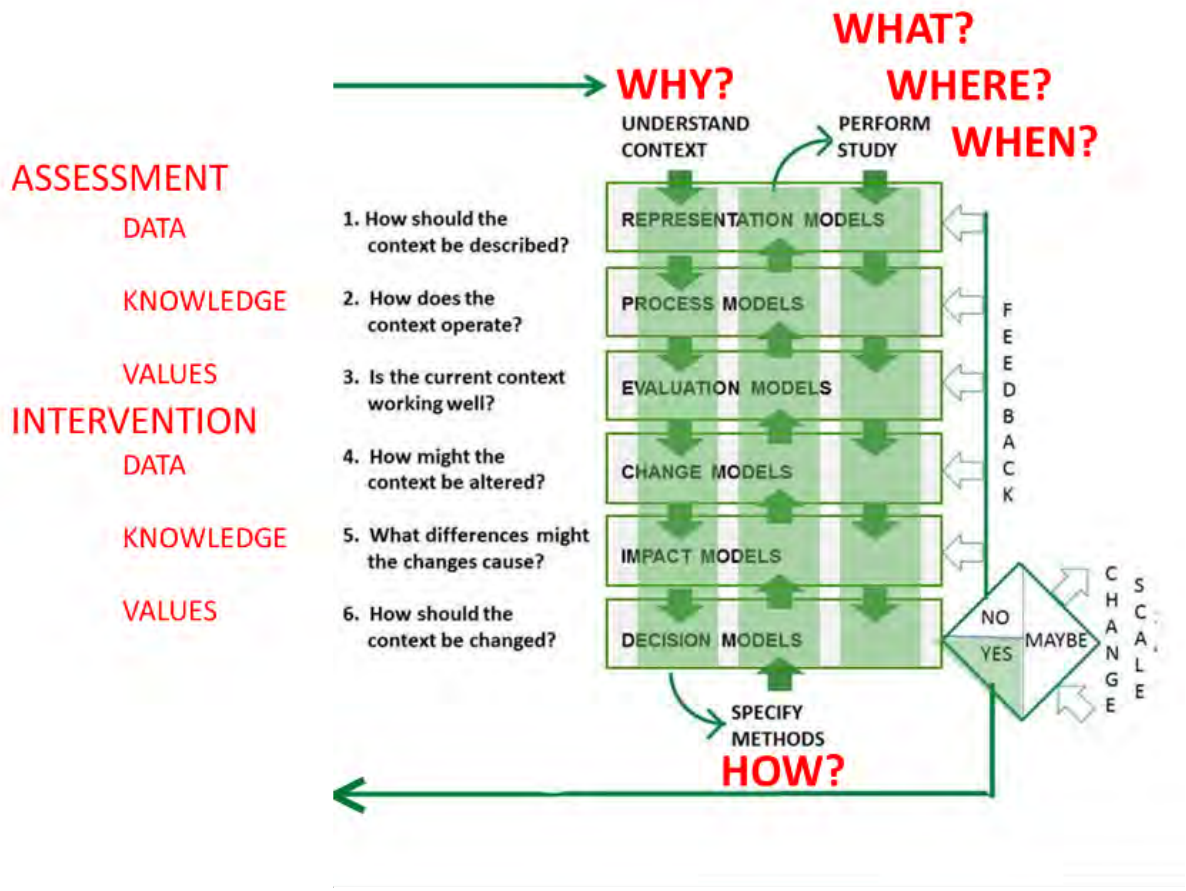
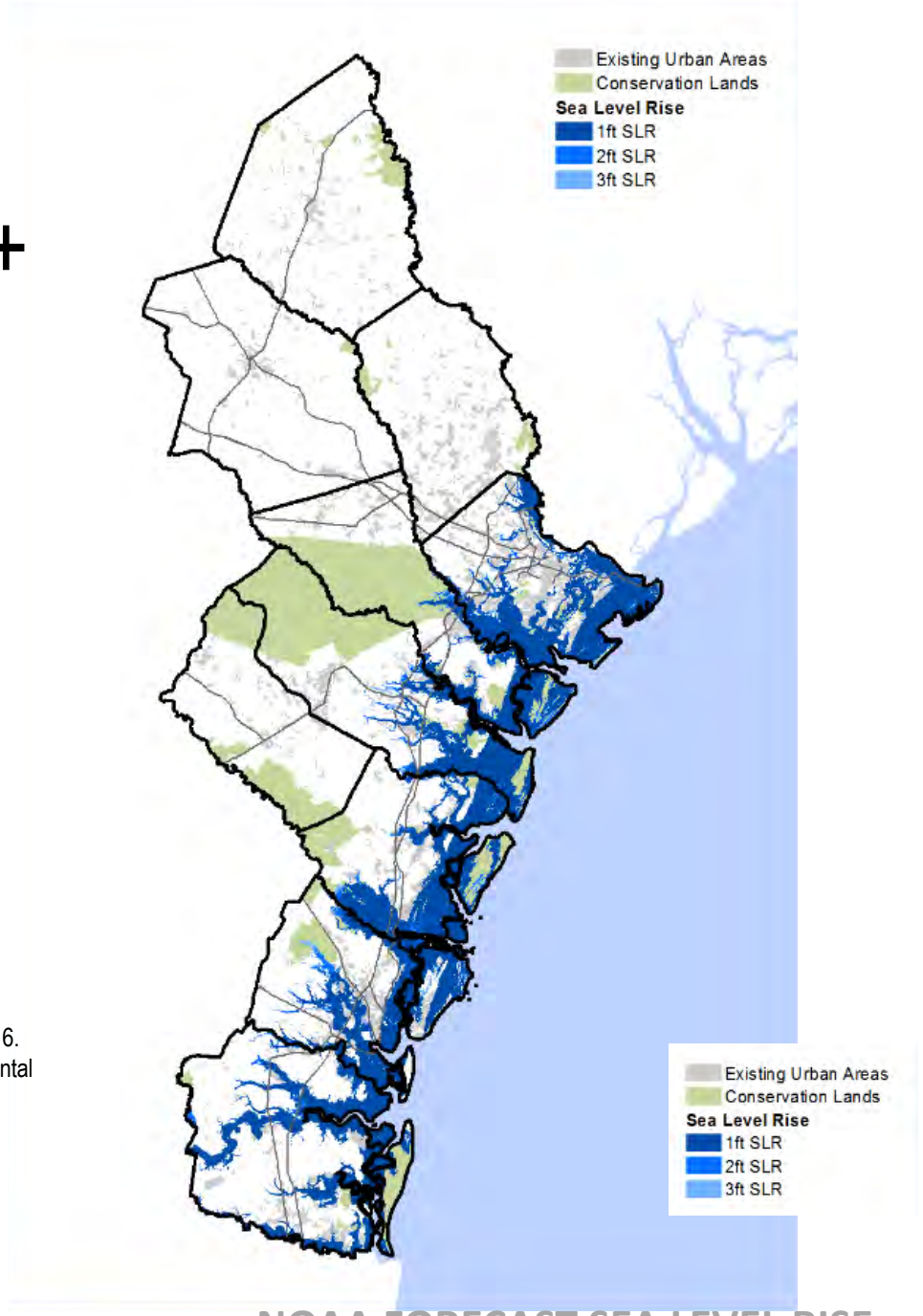
Steinitz' Geodesign Framework





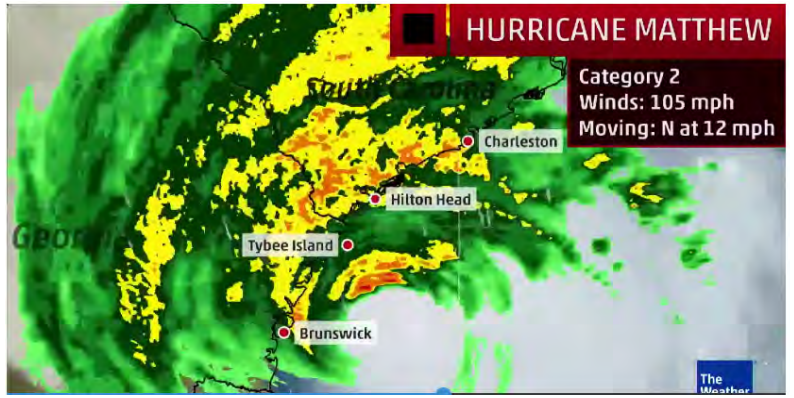
Sea Level Rise + Storm Surge

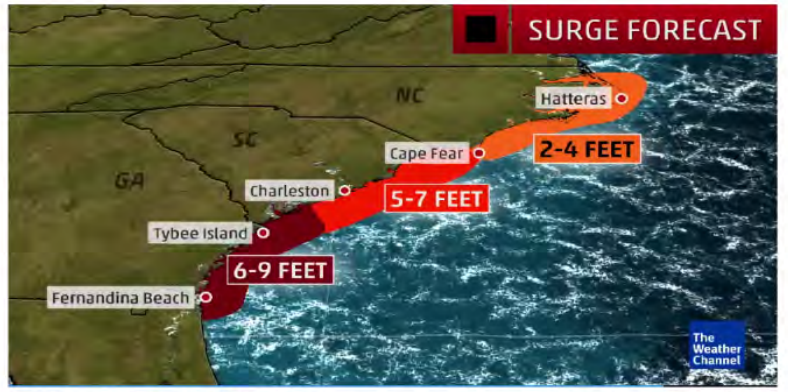
Population potentially displaced by a 3ft Sea Level Rise Scenario in Georgia:
90,000[(1)]
30% of expected population growth 2050



NOAA FORECAST SEA LEVEL RISE

October 8, 2016 storm surge





Darien, Georgia
(Photos: Russell Oliver)

Tybee Island
(photos Paul Wolf)

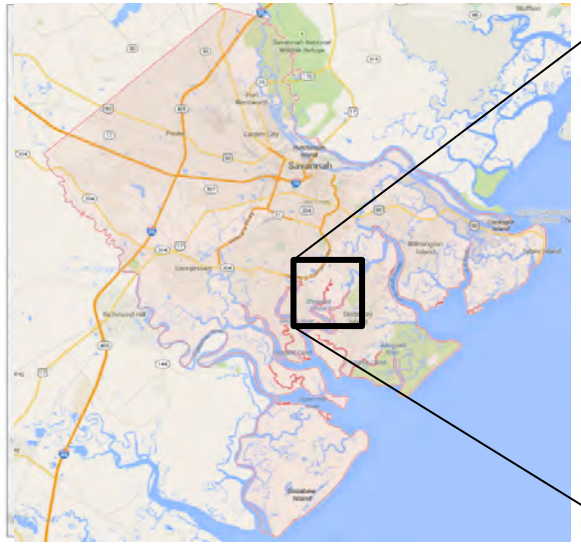
Hauer, Mathew E., Jason M. Evans, and Deepak R. Mishra. 2016. "Millions projected to be at risk from sea-level rise in the continental United States." *Nature Clim. Change*

UGA Geodesign Workshop: Jan 2015

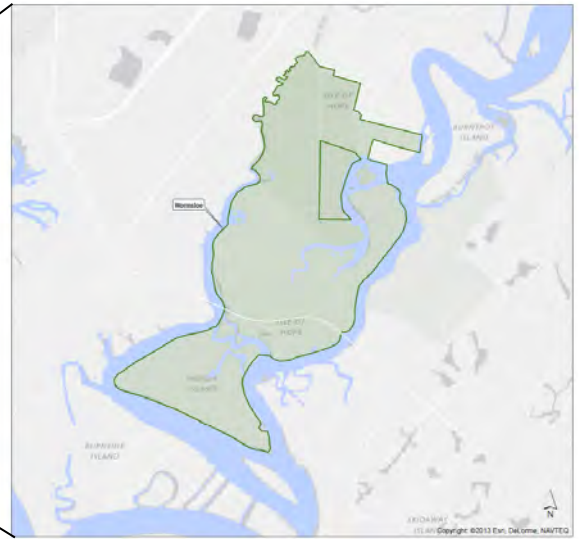
A 3-day workshop was initiated by Professor Carl Steinitz and Dan Nadenicek, Dean of the College of Environment and Design (CED), at the University of Georgia (UGA).

The issue at hand was to produce a single negotiated design, based on a series of constrains for long term future scenarios (2030 and 2050) for Chatham County, GA and the Wormsloe Historic Site.

Chatham County, Georgia, USA



Wormsloe State Park & Historic Site



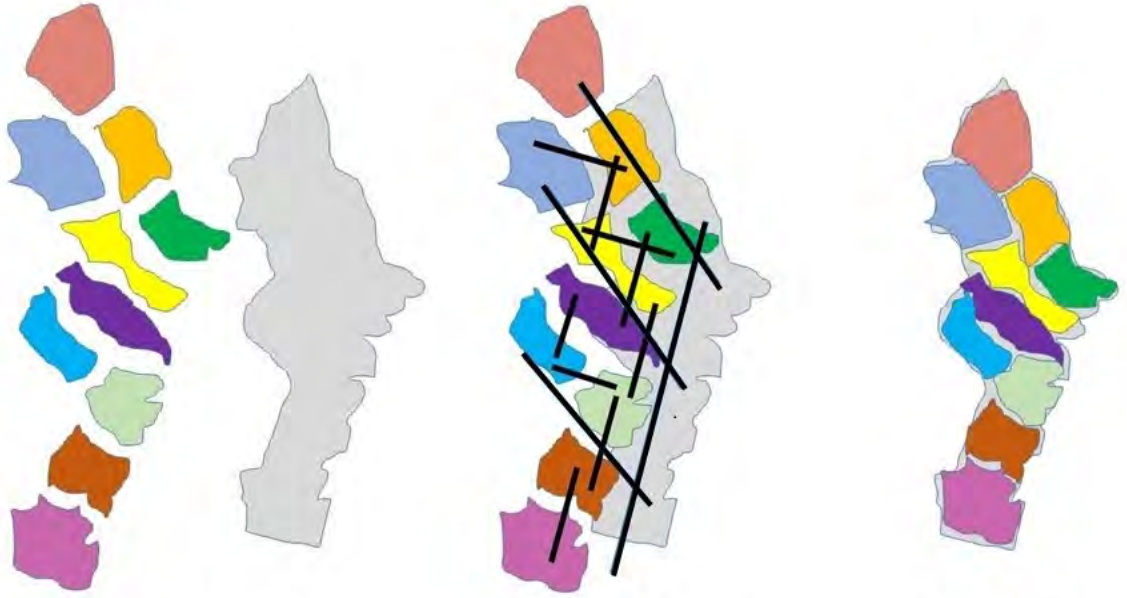
The Challenge: Can we come to one agreed design?

UGA Geodesign Workshop: April 2016

A 2-day workshop initiated by The Coastal Regional Commission of Georgia, Professor Carl Steinitz and Dan Nadenicek, Dean of the College of Environment and Design (CED), at the University of Georgia (UGA).

An experiment in multi-scale and multi-jurisdictional Geodesign dynamics for an alternative future for the coastal zone of Georgia.

10 Coastal Counties



INDEPENDENT ⟹ RELATED ⟹ INTEGRATED

Defining Region-wide Design Scenario for 2050

- 320,000 new people in the region.
- 95,000 people displaced by 3ft sea-level rise.

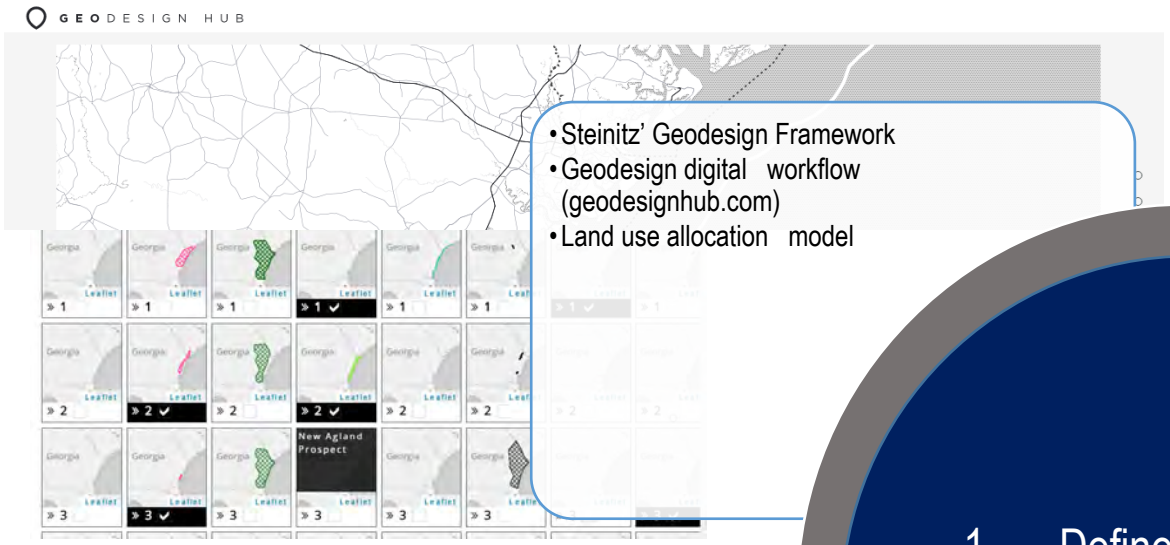
- 190,000 new housing units needed.
- 2,700 acres of new commercial development.
- 15,400 acres of new industrial development.
- 10,000 acres of new parks, recreation and conservation.
- 10,000 acres of new schools, municipal etc. development.

- The Port of Savannah doubles in capacity, creating an additional 3,000 jobs, needing 2,300 housing units.
- The Camden SpacePort proceeds, creating 2,500 jobs needing 1,900 housing units.

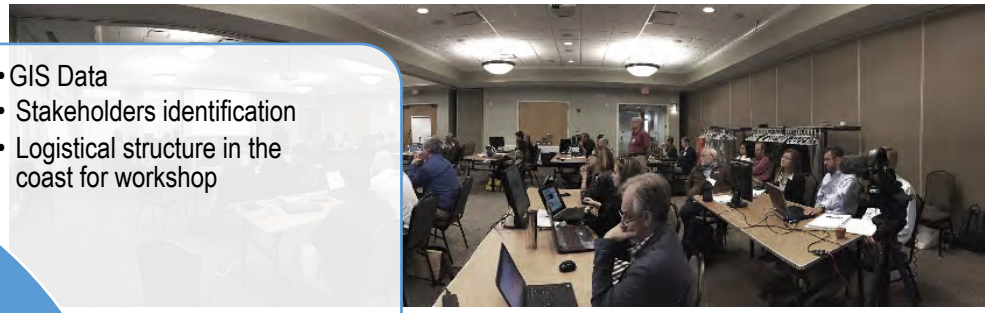
10 Coastal Counties

GRINFR HISCUL FOR AG UTIL TRANS LDH HDH COM IND

Workshop Planning Team

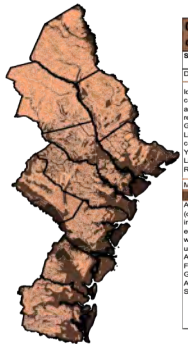


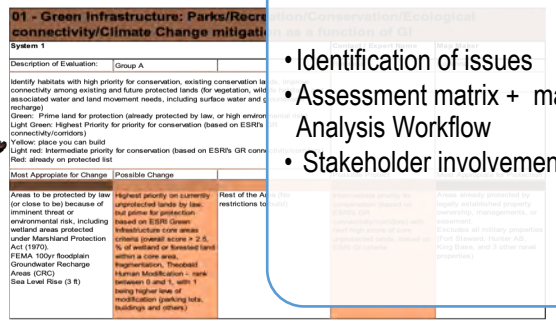
- Steinitz' Geodesign Framework
- Geodesign digital workflow (geodesignhub.com)
- Land use allocation model



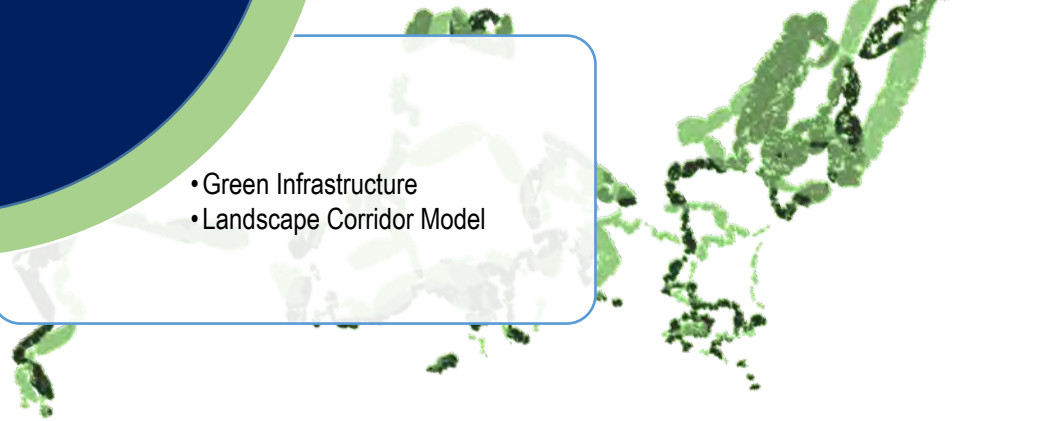
- GIS Data
- Stakeholders identification
- Logistical structure in the coast for workshop

1. Define study area and issues
2. Identify 10 Systems





- Identification of issues
- Assessment matrix + maps + GIS Analysis Workflow
- Stakeholder involvement



- Green Infrastructure
- Landscape Corridor Model

WORKSHOP PARTICIPANTS

Lupita McClenning Director of Planning, Coastal Regional Commission of GA

Sarah Ross, Director Center for Research & Education Wormsloe

Andrew Bailey, Jacobs Engineering, Atlanta

Gustavson, Nils, Liberty County Planning Commission

Jesse Wuest, Assistant Manager, Wormsloe

Fordham, Jennifer, Georgia Dept. of Community Affairs, Bullock

Jones, Melissa, Liberty County Planning Commission

Brian Orland, Professor of Geodesign, College of Environment and Design, UGA

Poon, Wincy, City of Hinesville

Hayes, Christa, Coastal Ecology Researcher

Kyler, David, Center for a Sustainable Coast

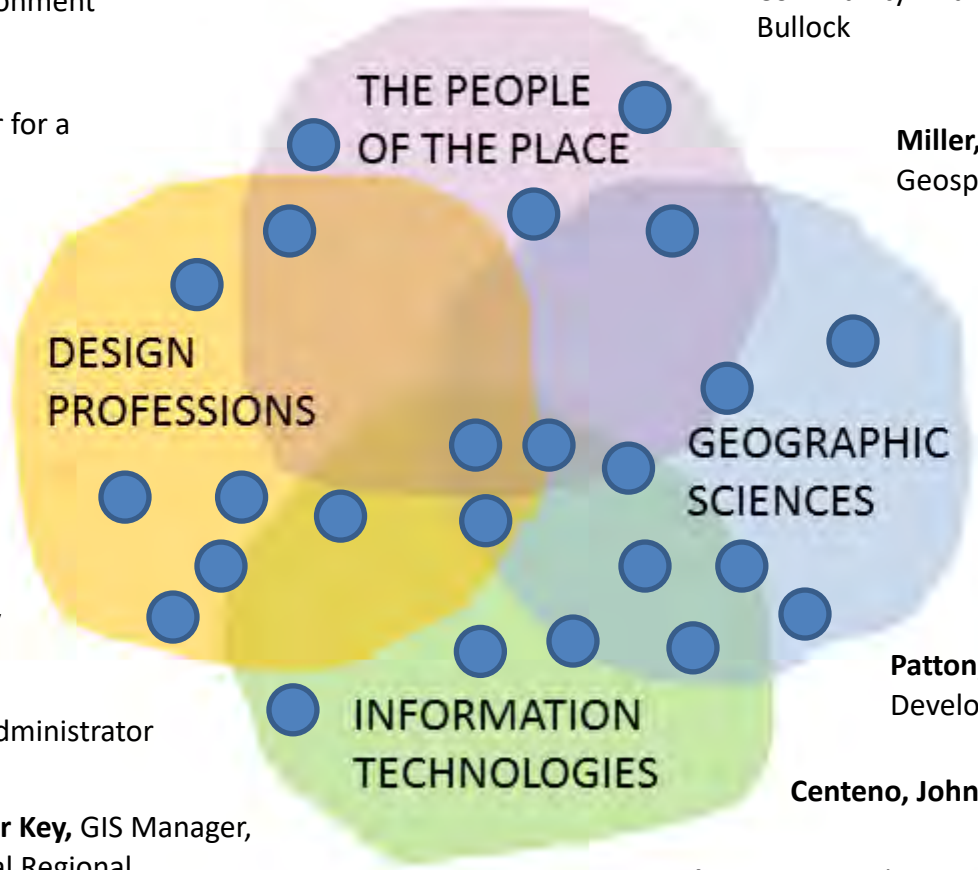
Greenway, Eric, Planning Director Bryan Co.

Miller, Susan, State of GA - Geospatial Information Officer.

Samson, Doug, Coastal Ecology Researcher

Lambert, Christi, The Nature Conservancy

Stephen Ramos, Academic, UGA, Planning.



VanParreren, Suzanne, Sapelo Island NERR

Rosanna Rivero, Landscape Architecture, College of Environment and Design, UGA

Avin, Uri, Professor, University of Maryland

Bursa, Karl, Glynn County - Director of Planning

Reams Dain, City of Pembroke - Planning and Zoning

McIntosh, Patty, City of Savannah – Planner, Chatham Cty

Washington, Clemontine, Mayor of Midway, Liberty Cty

Jennings, Tara, Coastal GA Indicators Coalition

Patton, Patrick, Building Development Inspector Garden City

McMillan, Charles, Georgia Conservancy-Coastal Director

Tibbs, Kyle, City Administrator Woodbine

Macleod, Kevin, SAGIS

Centeno, John, Glynn County

Russell, Madeleine, Georgia Sea Grant Marine Extension

Hunter Key, GIS Manager, Coastal Regional Commission

Nyers, Robert, Glynn County

Landon, Eric, Camden Co. Planning Director

Fulton, Lisa , CRC-Senior Planner/GIS Analyst

Sudanshu Panda, Academic, University of North Georgia

Wolven, Meizi, CRC - Grant Specialist

Alison Smith, Landscape Architecture, College of Environment and Design, UGA

Jon Calabria, Landscape Architecture, College of Environment and Design, UGA

Clay, Batoul, Students Geography

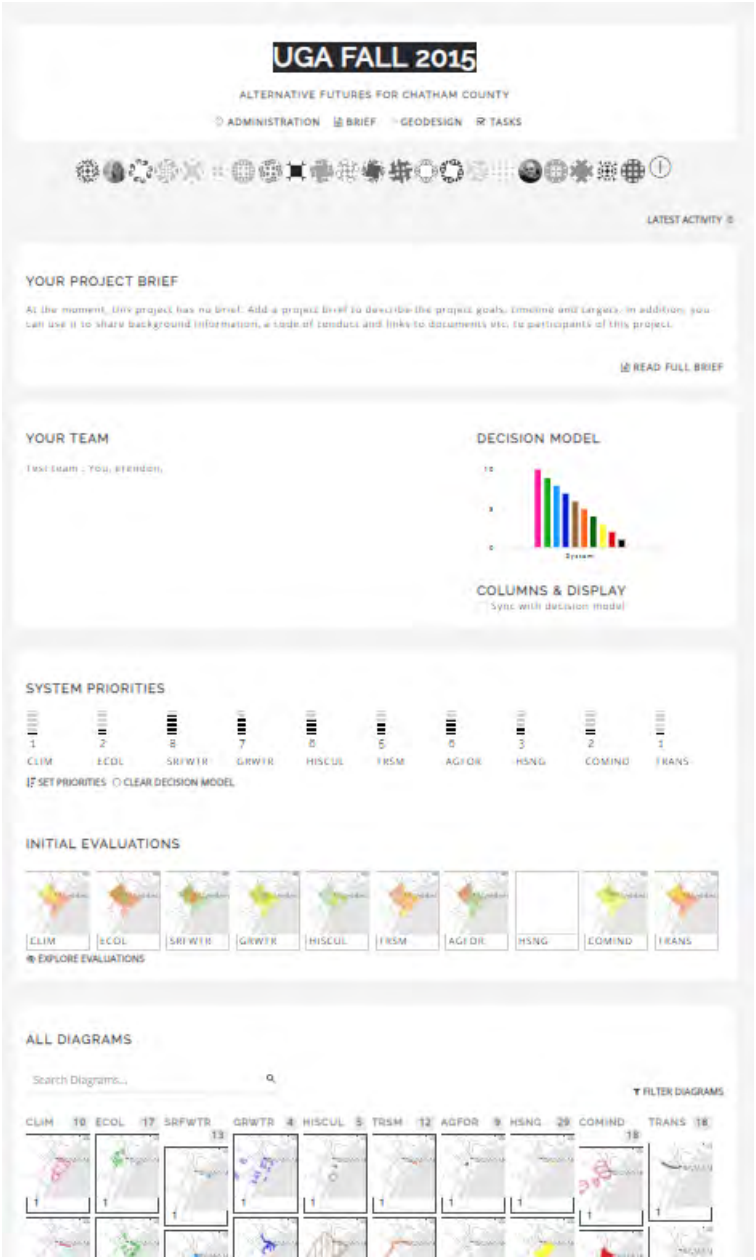
Westin, Lisa, Senior GIS Specialist, GA Dept. of Community Affairs

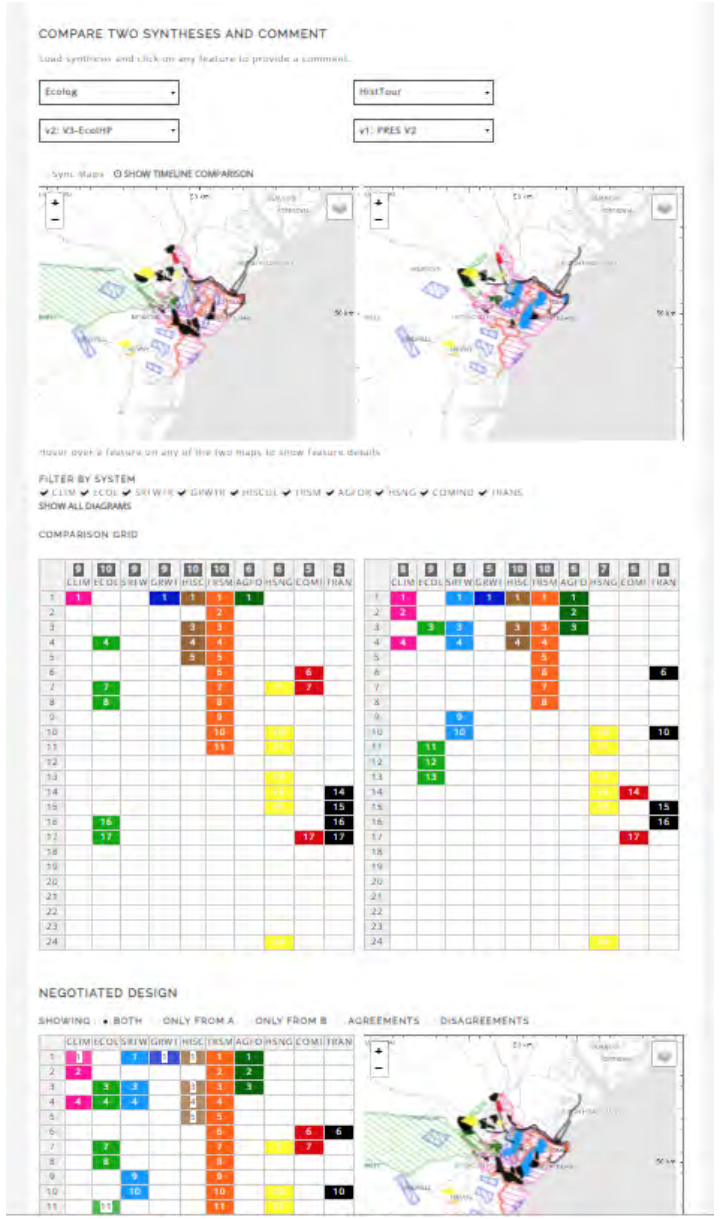
Walton, Margaret M. , Senior Planner II, Land Planning, Atkins

Software: Digital Workflow for Dynamic Geodesign Synthesis

Hrishi Ballal

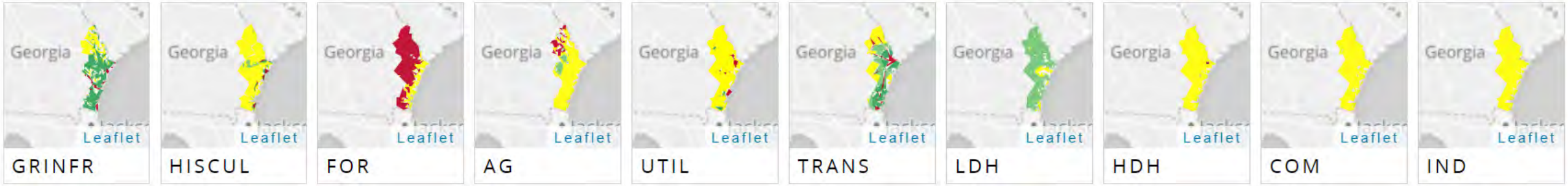
- a digital web based workflow to support the rapid creation of conceptual designs to address large and complex geodesign problems
- designed to foster collaboration between professionals during the early stages of design
- simple user interface easily incorporates existing and diverse data
- enables users to collaborate in person and/or over the internet in real time to produce designs and assess them.
- the tool is publically available and free to use for all at geodesignhub.com.





Data Preparation

Process for creating the 10 Evaluation Maps

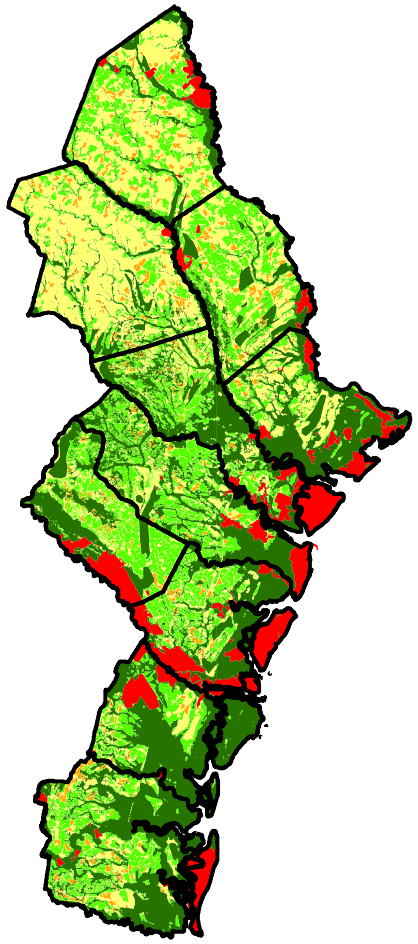


1. Define study area and issues
2. Identify 10 Systems
3. Identify “experts” to define Evaluation Map criteria for each system
4. Create a matrix for the10 systems to document model criteria, data needs, etc.
5. Collect GIS data needed for each system
6. Create Evaluation Maps for each system in GIS
7. Email Evaluation Maps (shapefiles) to Hrishi to upload into geodesignhub.com software

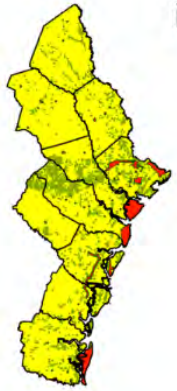
Create a matrix for the 10 Systems/Evaluation Maps

A matrix was created as a Google doc for the evaluation maps to identify the criteria to be considered, person responsible for identifying the criteria, data needs, sources, etc.

Each evaluation map uses five categories from “Most Appropriate Areas for Change” to Most Appropriate Areas for Protection”, with colors ranging from dark green to dark red.

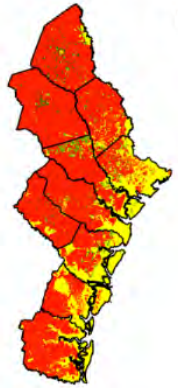


01 - Green Infrastructure: Parks/Recreation/Conservation/Ecological connectivity/Climate Change mitigation as a function of GI				
System 1			**Contact / Expert Name**	**Map Maker**
Description of Evaluation:	Group A		Rosanna	Rosanna
Identify habitats with high priority for conservation, existing conservation lands, improve connectivity among existing and future protected lands (for vegetation, wildlife habitats, and associated water and land movement needs, including surface water and groundwater recharge) Green: Prime land for protection (already protected by law, or high environmental risk) Light Green: Highest Priority for priority for conservation (based on ESRI's GR connectivity/corridors) Yellow: place you can build Light red: Intermediate priority for conservation (based on ESRI's GR connectivity/corridors) Red: already on protected list				
Most Appropiate for Change	Possible Change		Possible Protect	Most Appropiate for Protection
Areas to be protected by law (or close to be) because of imminent threat or environmental risk, including wetland areas protected under Marshland Protection Act (1970). FEMA 100yr floodplain Groundwater Recharge Areas (CRC) Sea Level Rise (3 ft)	Highest priority on currently unprotected lands by law, but prime for protection based on ESRI Green Infrastructure core areas criteria (overall score > 2.5, % of wetland or forested land within a core area, fragmentation, Theobald Human Modification - rank between 0 and 1, with 1 being higher leve of modification (parking lots, buildings and others)	Rest of the Area (No restrictions to build)	Intermediate priority for conservation (based on ESRI's GR connectivity/corridors) with next high score of core unprotected lands, based on ESRI GI criteria	Areas already protected by legally established property ownership, managements, or easement. Excludes all military properties (Fort Steward, Hunter AB, King Base, and 3 other naval properties)



02 - Historic/Cultural Protection

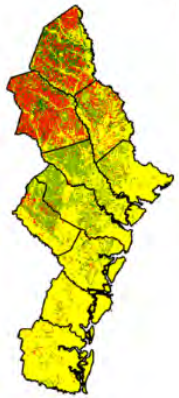
System 2			Contact / Expert Name	Map Maker
Description of Evaluation:	Group A		Brian	Alison/Rosanna
Dark red: things that already are protected Dark green: things that should be protected				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Areas of high historical and cultural protection not protected Plantations and other areas not protected Brian's input	Buffers for anything in dark red, buffers for dark green areas visual and other context protection ("visible" buffer 100 mile beyond extent of site or viewshed	Leave as-is compatible and contributing land uses	Archaeological Sites (from point density map) Scenic Highways	DNR Historic Sites, Historic Cemeteries http://georgiawiso.org/historic/african_americanficemeteries http://www.georgiastandscouncil.org/ National Register of Historic Places Viewsheds of all designated scenic routes Protect resources not currently under any protection status



HISTORY AND CULTURE

03 - Forestry

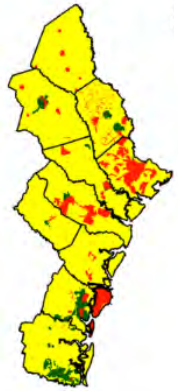
System 3			Contact / Expert Name	Map Maker
Description of Evaluation:	Group A		Jon	Alison/Rosanna
Look at this as an attractiveness model for commercial forestry, based on commercial feasibility and capability				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Not currently a forest use but in prime locations (prime ag soils)	Not currently a forest use but in areas of soils of statewide importance	Everything else is yellow		Existing forested areas (GAP, NLCD, PP) located within CRC ELU categories for Ag/Forest, Vacant/Undeveloped and Military Base areas



FORESTRY

04 - Agriculture

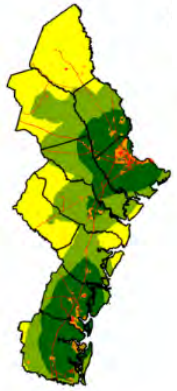
System 4			Contact / Expert Name	Map Maker
Description of Evaluation:	Group A		Jon / consult Dory or Elizabeth	Alison/Rosanna
Identify areas of high suitability for agriculture				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Not currently an agriculture use but in prime locations (prime ag soils	Not currently an agriculture use but in areas of soils of statewide importance	Everything else is yellow		Ex. agriculture (GAP, NLCD) located within CRC ELU categories for Ag/Forest, Vacant/Undeveloped and Military Base areas



AGRICULTURE

05 - Utilities

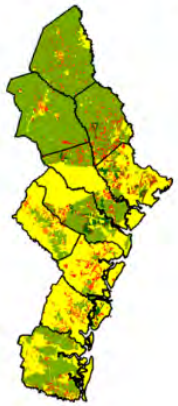
System 5			Contact / Expert Name	Map Maker
Description of Evaluation:	Group B		Jon	Alison
(Carl is treating water as a utility for industry and commercial, not as conservation, ground water recharge, energy, sewer, fiber optic – internet – broadband, sewer treatment service areas, where are the places you want to have sewer treatment services, where would you desalinate ocean water, where are low internet connectivity areas, where are the places to burn garbage and wood to make energy for the energy network?) Water service, sewer, electric, water collection service areas			Data Sewer service areas (polygons) Broadband	
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Partially Serviced Areas CRC Areas Requiring Special Attention: Areas in Need of Infrastructure		Everything else is yellow		Existing fully serviced areas: water, sewer,



UTILITIES

06 - Transportation (port, ships, air, roads and trucks)

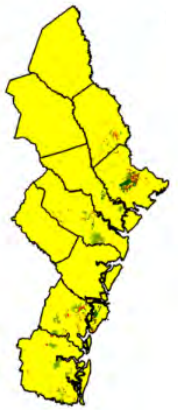
			Contact / Expert Name	Map Maker
Description of Evaluation:	Group B		Rosanna / Jack Crowley	Rosanna
Identify areas of increased connectivity between industrial and high density commercial and employment centers and areas suitable for multimodal and other transportation networks/facilities				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Proximity to hubs (confluence of 3 or more transportation modes (eg port, airport, railroad) + proximity to industrial parks, dense commercial areas, high tourism?	Proximity to hubs (2 modes) eg: railroad station and port)	Not capable	Secondary roads, small airports, others	Existing transportation infrastructure (ports, airports, railroads, roads, public)



TRANSPORTATION

07 - Housing – Lower density

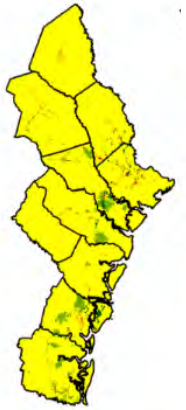
System 7			Contact / Expert Name	Map Maker
Description of Evaluation:	Group C		Alison	Alison
Email from Carl on 04.01.2016: for the main urban types—Ind, Comm, HDHS, and maybe LDHS—they have as level-5 criteria being on water and sewer serviced land and close to paved roads near interstate highway intersections (NOT the interstate highway itself which is not accessible) Lower Density Residential = less than or equal to 5 units per acre				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Zoning & FLU plan: Areas zoned or identified in the FLU plan as lower density residential but are not currently lower density residential AND are on water and sewer serviced land	Zoning & FLU plan: Areas zoned or identified in the FLU plan as lower density residential but are not currently lower density residential and not serviced	capable of supporting LDH but not zoned or planned for housing or serviced		Existing Lower Density Residential (less than or equal to 5 units per acre)



HOUSING, HIGHER DENSITY

08 - Housing – Higher density

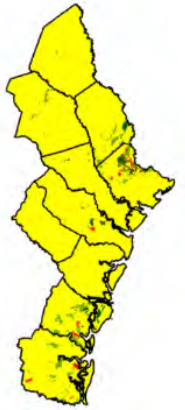
System 8			Contact / Expert Name	Map Maker
Description of Evaluation:	Group C		Alison	Alison
Email from Carl on 04.01.2016: for the main urban types—Ind, Comm, HDHS, and maybe LDHS—they have as level-5 criteria being on water and sewer serviced land and close to paved roads near interstate highway intersections (NOT the interstate highway itself which is not accessible) Higher Density Residential = greater than or equal to 5 units per acre				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Zoning & FLU plan: Areas zoned or identified in the FLU plan as higher density residential but are not currently higher density residential AND are on water and sewer serviced land	Zoning & FLU plan: Areas zoned or identified in the FLU plan as higher density residential but are not currently higher density residential and not serviced	capable of supporting HDH but not zoned or planned for housing or serviced		Existing Higher Density Residential (greater than or equal to 5 units per acre)



HOUSING, HIGHER DENSITY

09 - Commerce

System 9			Contact / Expert Name	Map Maker
Description of Evaluation:	Group C		Alison	Alison
Email from Carl on 04.01.2016: for the main urban types—Ind, Comm, HDHS, and maybe LDHS—they have as level-5 criteria being on water and sewer serviced land and close to paved roads near interstate highway intersections (NOT the interstate highway itself which is not accessible) Dark green: Feasible Light Green: Suitable				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Zoning & FLU plan: Areas zoned or identified in the FLU plan as commercial but are not currently commercial AND are on water and sewer serviced land	Zoning & FLU plan: Areas zoned or identified in the FLU plan as commercial but are not currently commercial and not serviced	capable of supporting commerce but not zoned or planned for housing or serviced		Existing Commercial



COMMERCE

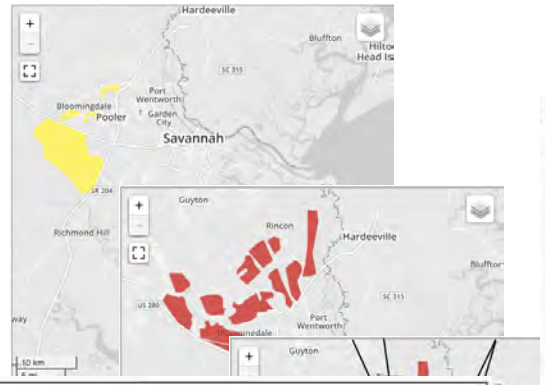
10 - Industry

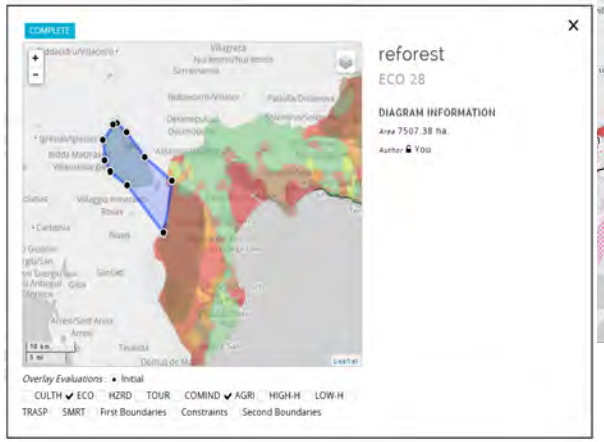
System 10			Contact / Expert Name	Map Maker
Description of Evaluation:	Group C		Alison	Alison
Email from Carl on 04.01.2016: for the main urban types—Ind, Comm, HDHS, and maybe LDHS—they have as level-5 criteria being on water and sewer serviced land and close to paved roads near interstate highway intersections (NOT the interstate highway itself which is not accessible)				
Most Appropriate for Change	Possible Change		Possible Protect	Most Appropriate for Protection
Zoning & FLU plan: Areas zoned or identified in the FLU plan as Industrial but are not currently Industrial AND are on water and sewer serviced land	Zoning & FLU plan: Areas zoned or identified in the FLU plan as Industrial but are not currently Industrial and not serviced	capable of supporting industry but not zoned or planned for housing or serviced		Existing Industrial

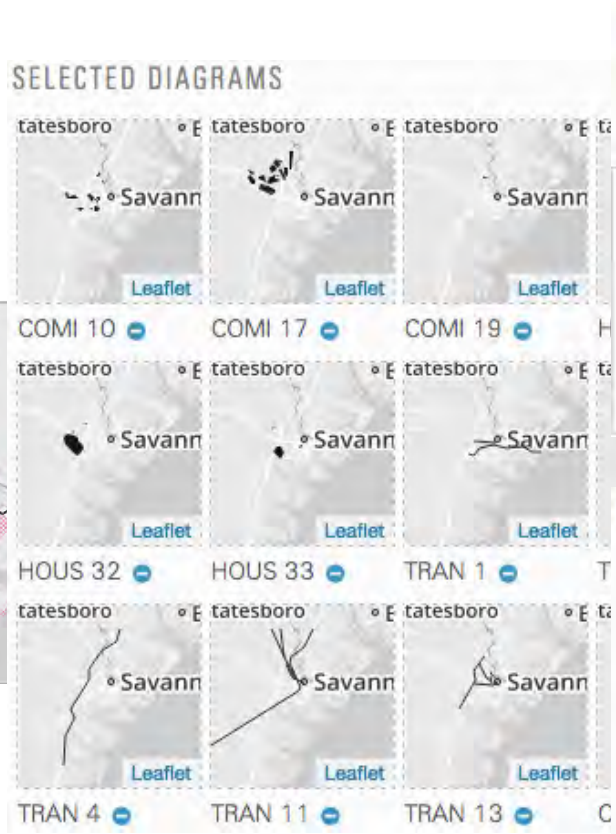
INDUSTRY

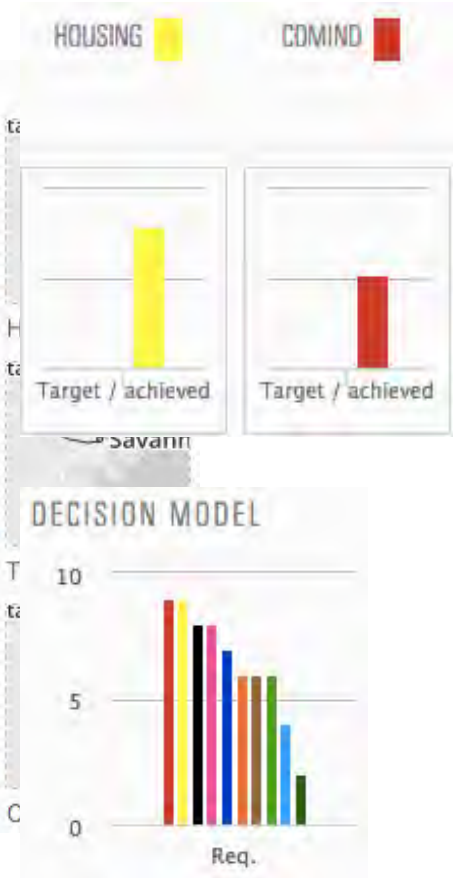
What people actually did

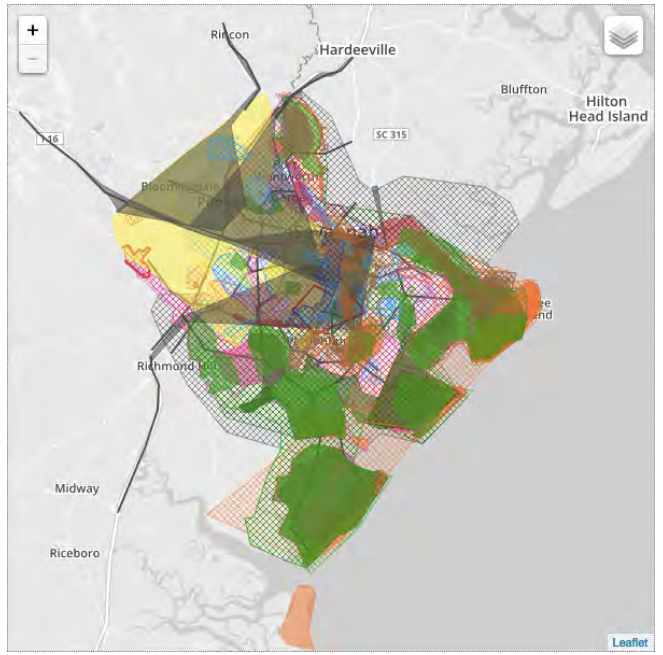
- Diagrams and array created by all participants











VERSIONS 1 AND 2 OF THE CHANGE DESIGNS

Note how different the Decision models and the Change designs are.

- All designs based on 2050 regional and county-specific forecasts
- Hrishi runs the allocation model on 3 designs (v2):
  - Combined 10 County individual designs
  - 2 Regional Team designs
- 3 designs sent to Ryan Perkl in Arizona to produce corridor modeling scenarios

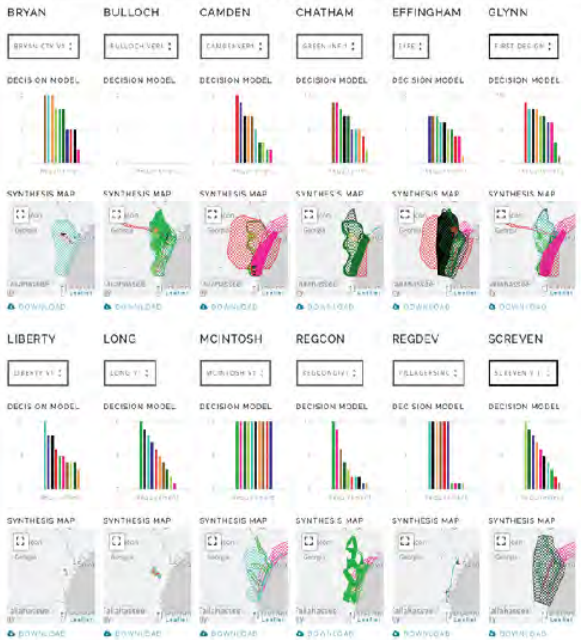
END OF DAY 1 OF THE WORKSHOP

Coastal Georgia Geodesign Workshop Process

Evaluation Maps

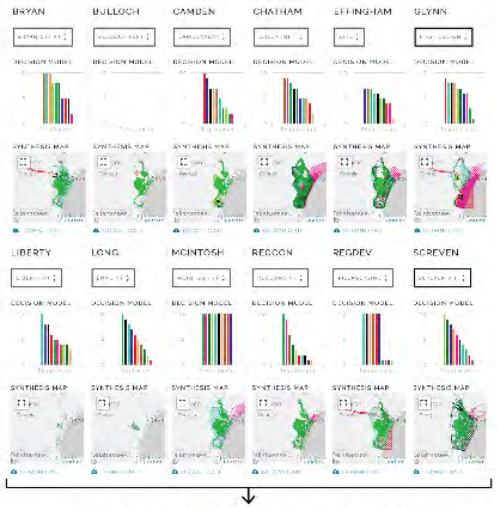
All Diagrams

Design Versions 1 & 2



Workshop Day 1

Final Design Versions



Regional Conservation & Development Team Negotiations and Results

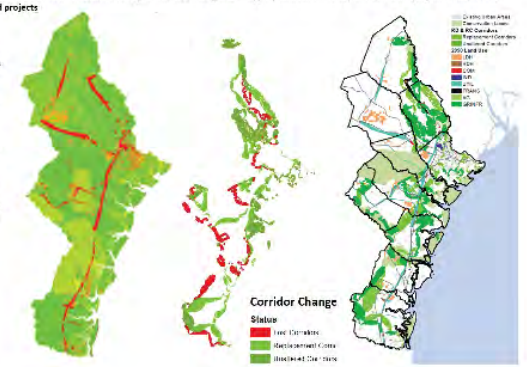
Regional Negotiations with County Teams

Workshop Day 2

Workshop Results

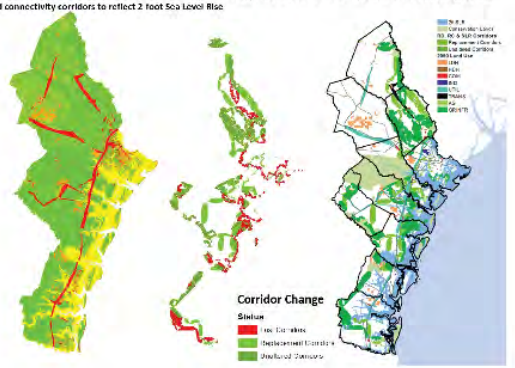
Future 2050 changes in Green Infrastructure connectivity based on existing land use, proposed connectivity corridors and projected future land use policies & allocated projects

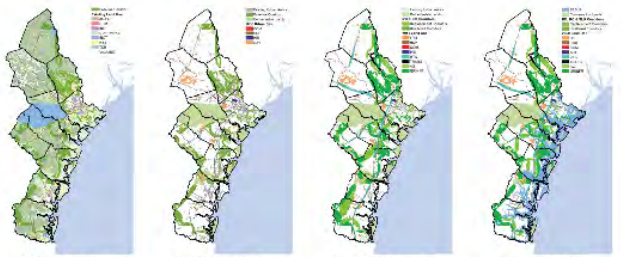
The majority of lost connectivity in this workshop example (dark red) results from proposed agricultural projects without proposed policies to manage agriculture in a manner compatible with Green Infrastructure objectives. Replacement corridors are proposed (bright green).



Future 2050 changes in Green Infrastructure connectivity based on existing land uses, projected future land use policies & allocated projects and new and revised proposed connectivity corridors to reflect 2 foot Sea Level Rise

There considerable loss of connectivity due to sea rise. Replacement corridors are proposed (bright green).





existing land use, protected areas and proposed connectivity corridors

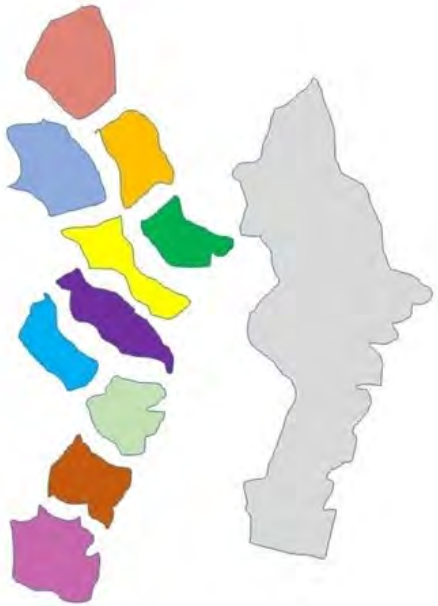
Protected areas and proposed connectivity corridors based on new land uses allocated to 2050

Revised agriculture and forestry policies replacement corridors

Replacement corridors revised again for Sea Level Rise

Workshop Day 1

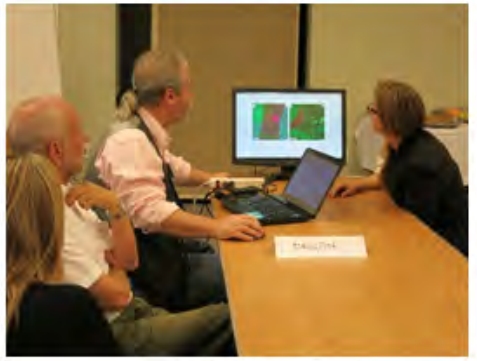
TEN COUNTY TEAMS MAKING VERSIONS 1 AND 2 OF THE CHANGE DESIGNS



VERSION 1

INDEPENDENT

Long



Bryan

McIntosh

Chatham

Camden

Liberty

VERSION 1

INDEPENDENT

VERSION 2

RELATED

VERSION 3

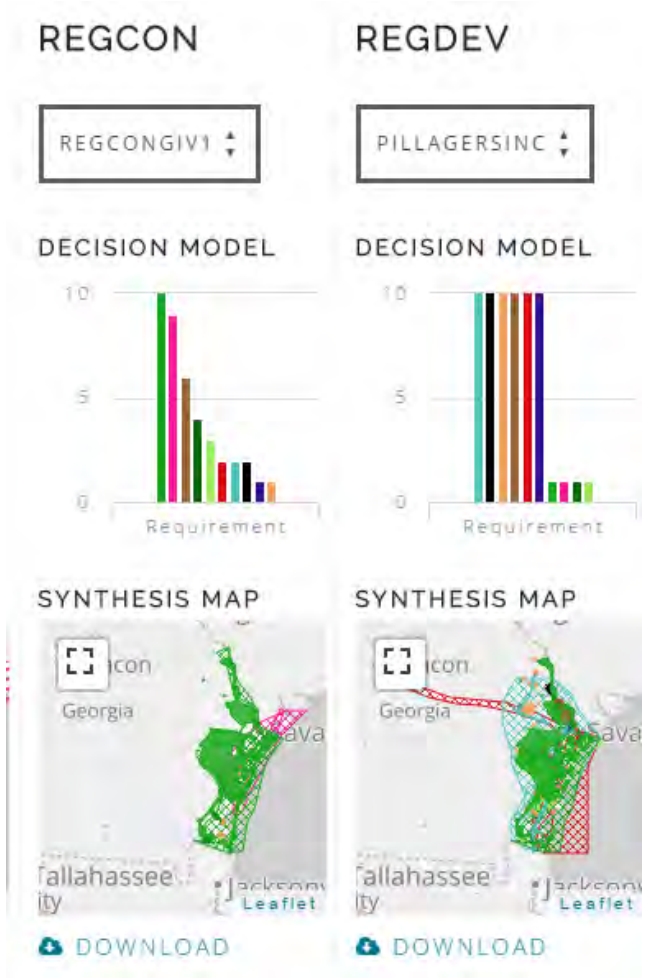
INTEGRATED

Glynn

Screven

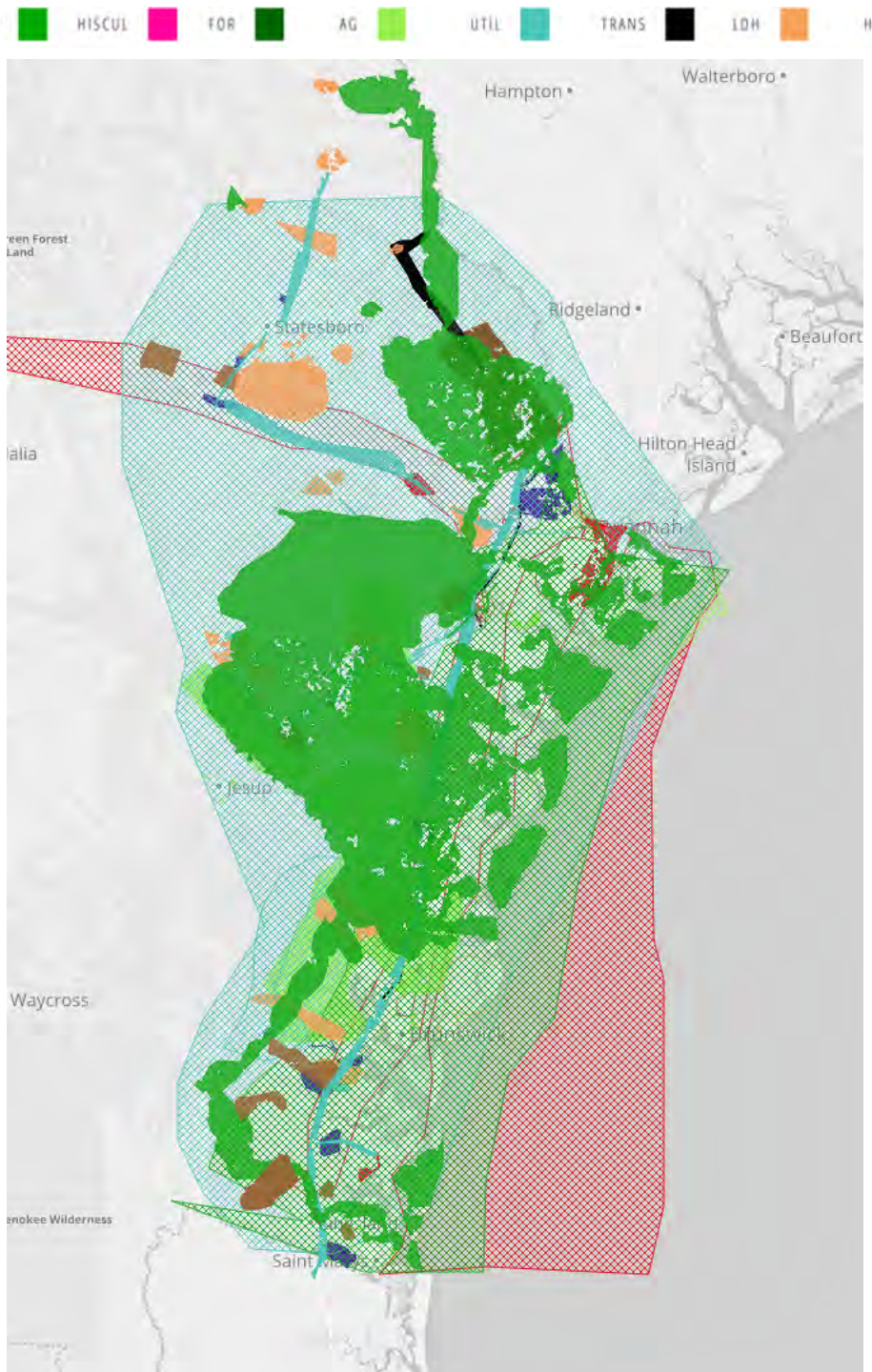
Effingham

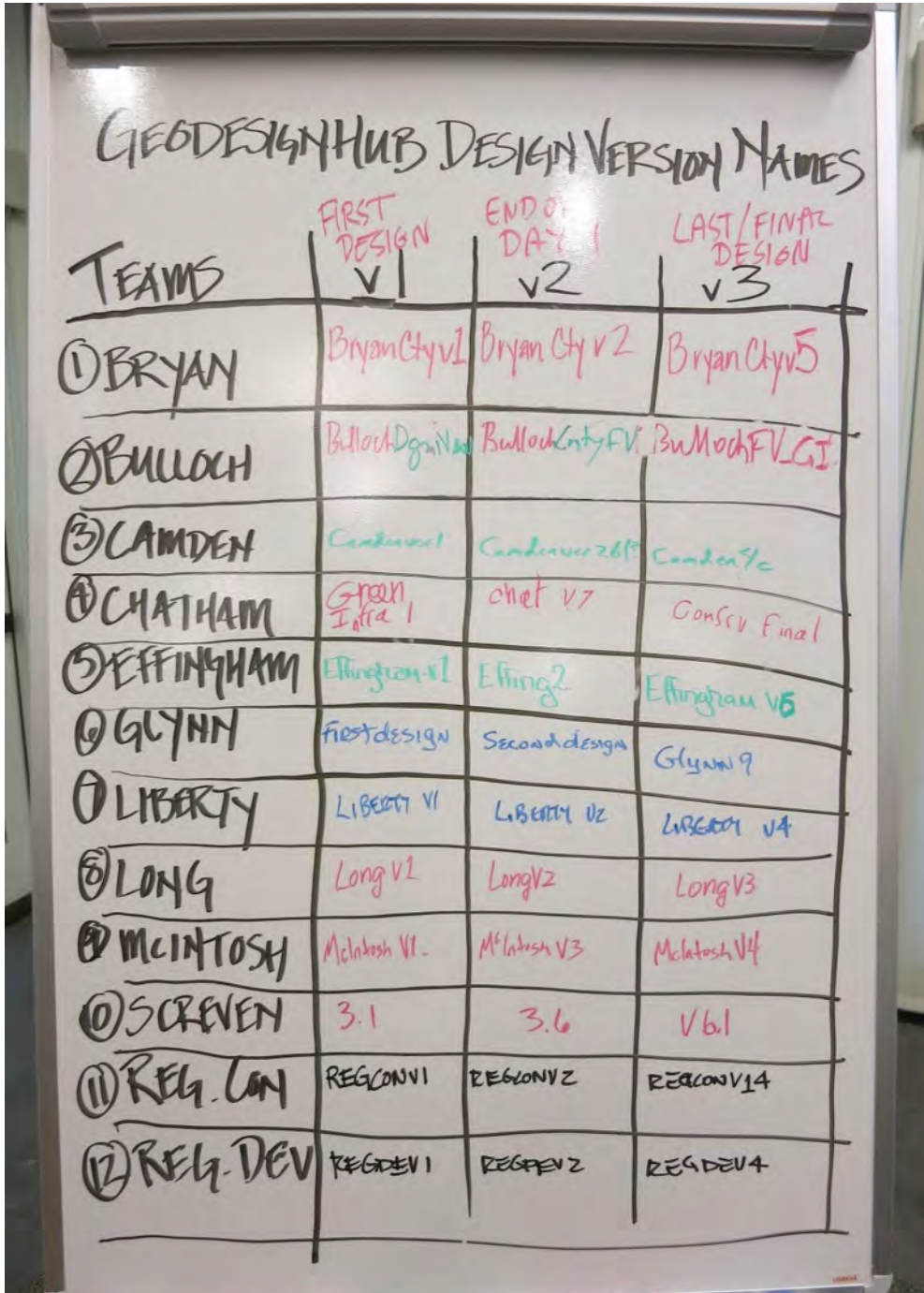
NEGOTIATION
BETWEEN
REGCON AND REGDEV



RESULT OF NEGOTIATION BETWEEN REGCON AND REGDEV

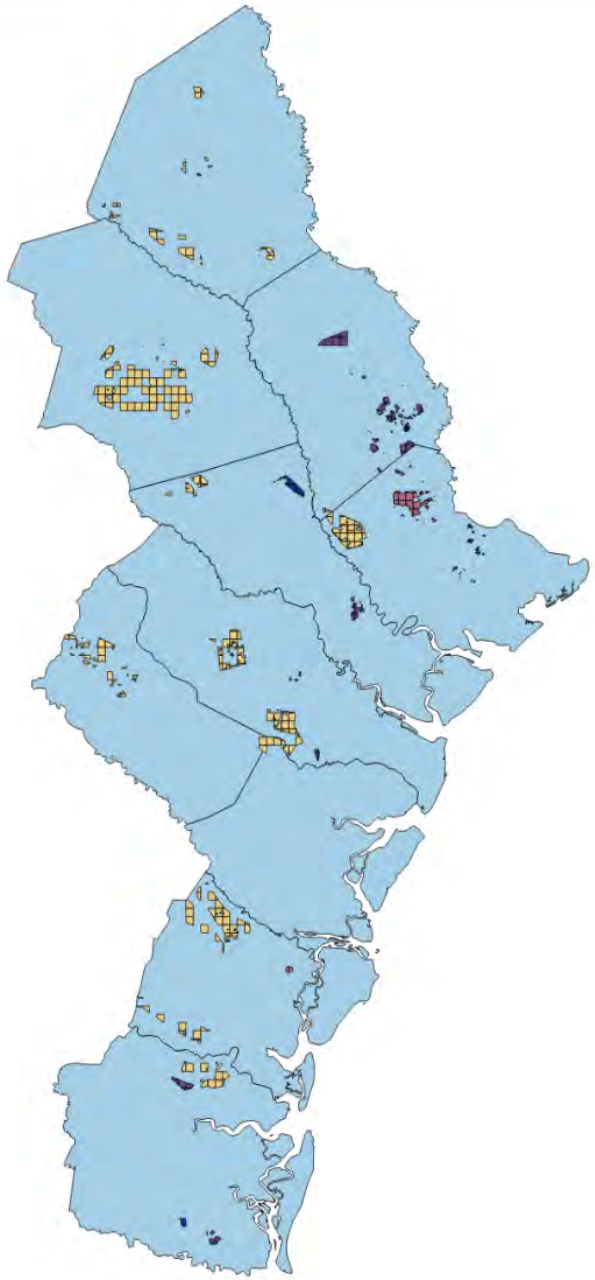
AND THE NEED TO NEGOTIATE WITH THE TEN COUNTY CHANGE TEAMS

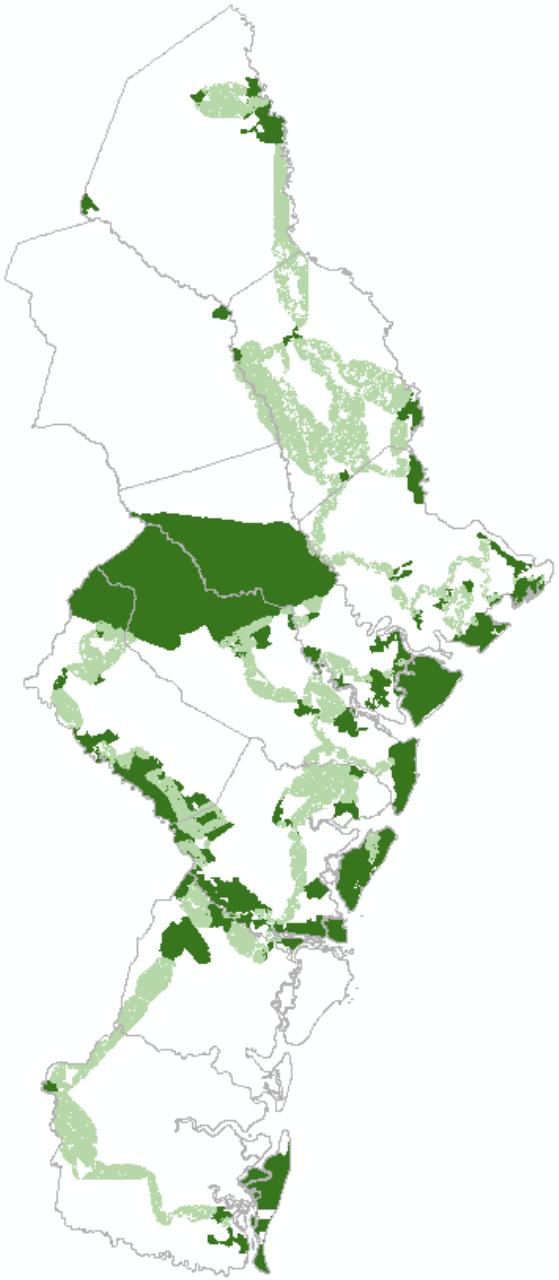




REGIONAL
URBAN LAND USES
ALLOCATION BASED ON
THE FINAL RESULT
OF NEGOTIATIONS
BETWEEN THE REGIONAL
CONSENSUS DESIGN
AND THE TEN COUNTY
CHANGE TEAMS
by the exogenous
Geodesignhub
allocation model

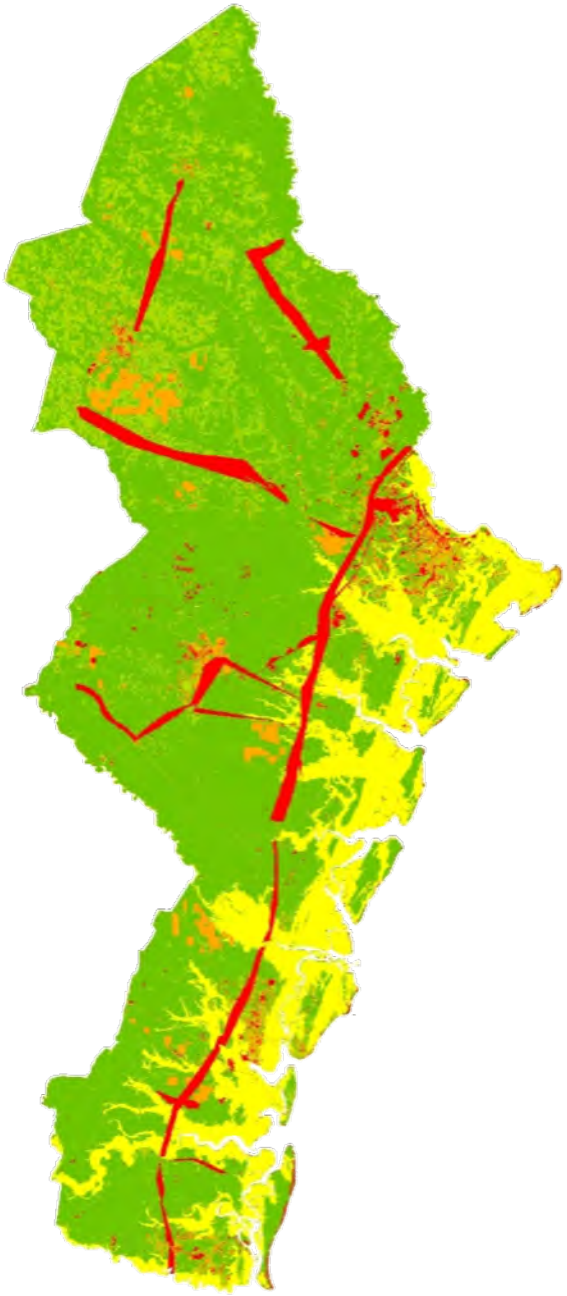
BASELINE CONTINUITY CORRIDORS
OF GREEN INFRASTRUCTURE
by the exogenous
landscape structure model of
Ryan Perkl, University of Arizona

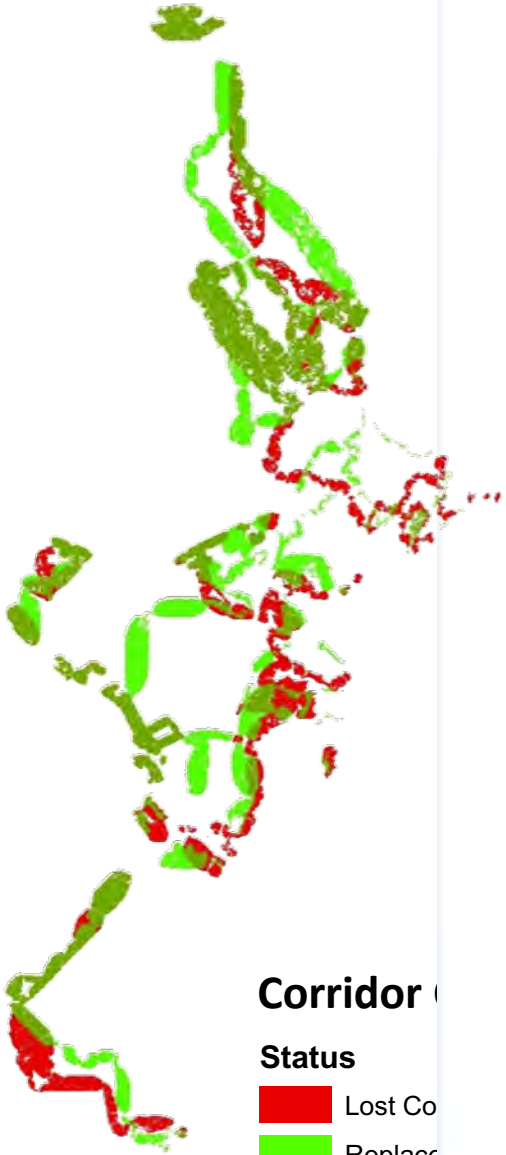


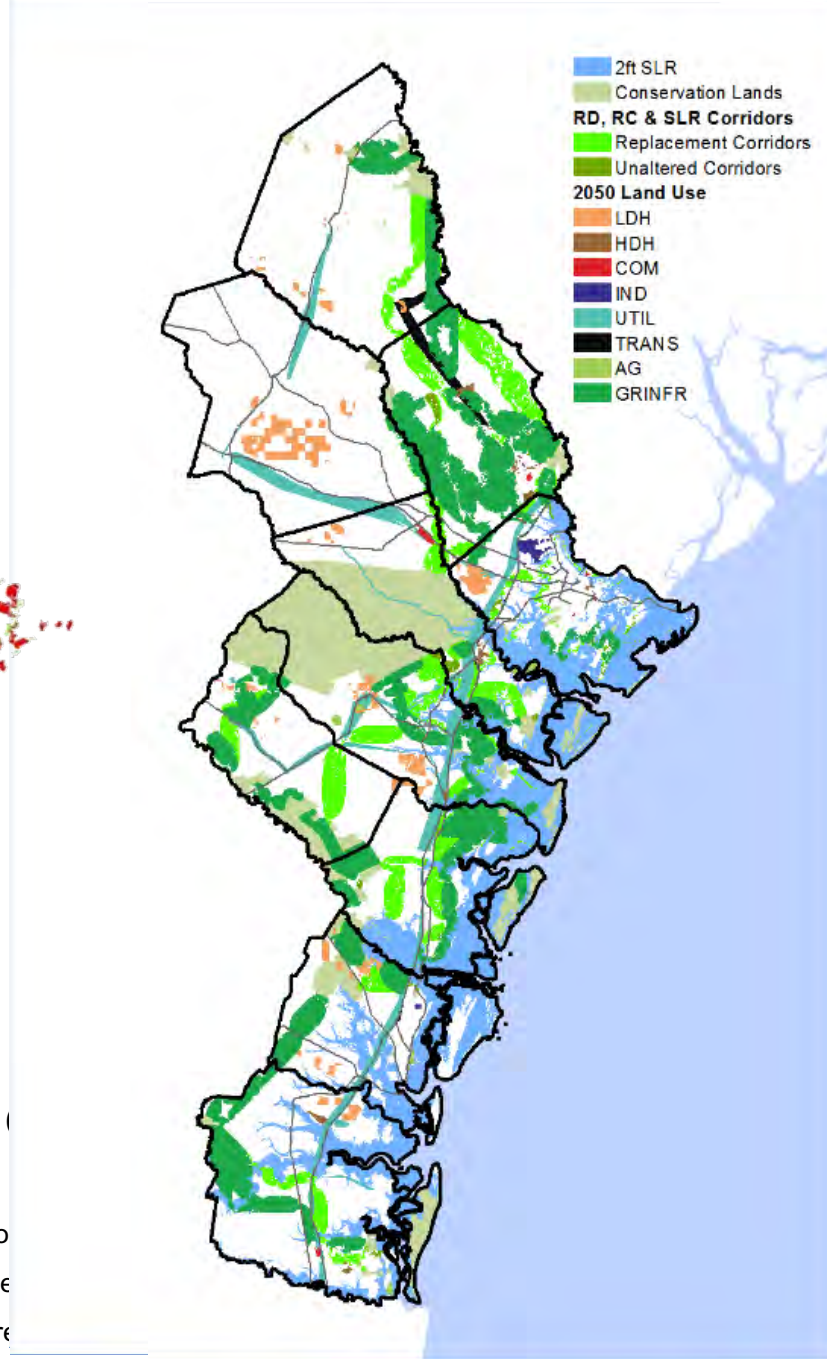


FUTURE CHANGES IN GREEN INFRASTRUCTURE CONNECTIVITY BY 2050 BASED ON EXISTING LAND USES, PROJECTED FUTURE LAND USE POLICIES AND ALLOCATED PROJECTS AND NEW AND REVISED PROPOSED CONNECTIVITY CORRIDORS TO REFELECT 2 FOOT SEA RISE.

There considerable loss of connectivity due to sea rise. Replacement corridors are proposed (bright green).







Conclusions

- Walker et al. (2002) point out how decisions are made in social-ecological systems, in many cases with limited resources and on imperfect knowledge.
- The idea of rapid responses, flexibility in the collaborative decision-making process, and Walker’s notion of imperfect knowledge is also the basis of Steinitz's collaborative geodesign (Steinitz, personal communication, 2016).
- With new digital tools, that are still in the process of development and refining, similar to the initial stages of GIS in the 1960s and the 1970s, the process of digitizing and drawing “on the fly”, as well as evaluating for performance of various scenarios, has improved greatly.
- In a geodesign process, the design is conceptualized as a collaborative process, where there are no “owners of ideas” and where the computers respond to changes in design as it is being built by various stakeholders. The workflow or the collaborative design process is streamlined allowing for more thinking and discussing time among participants.

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