

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 20 16
College of Environment & Design, University of Georgia

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

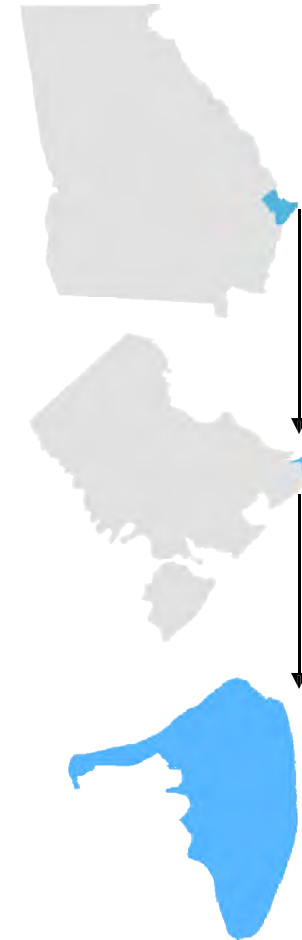
Project Purpose & Objectives

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:

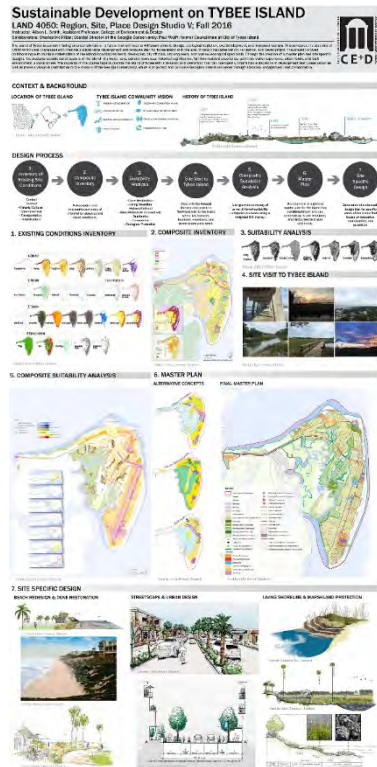
Inventory

+

Analysis

+

Design



I. Inventory

Previous Studies

- o Local Plans/Studies
- o Regional Plans/Studies
- o 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

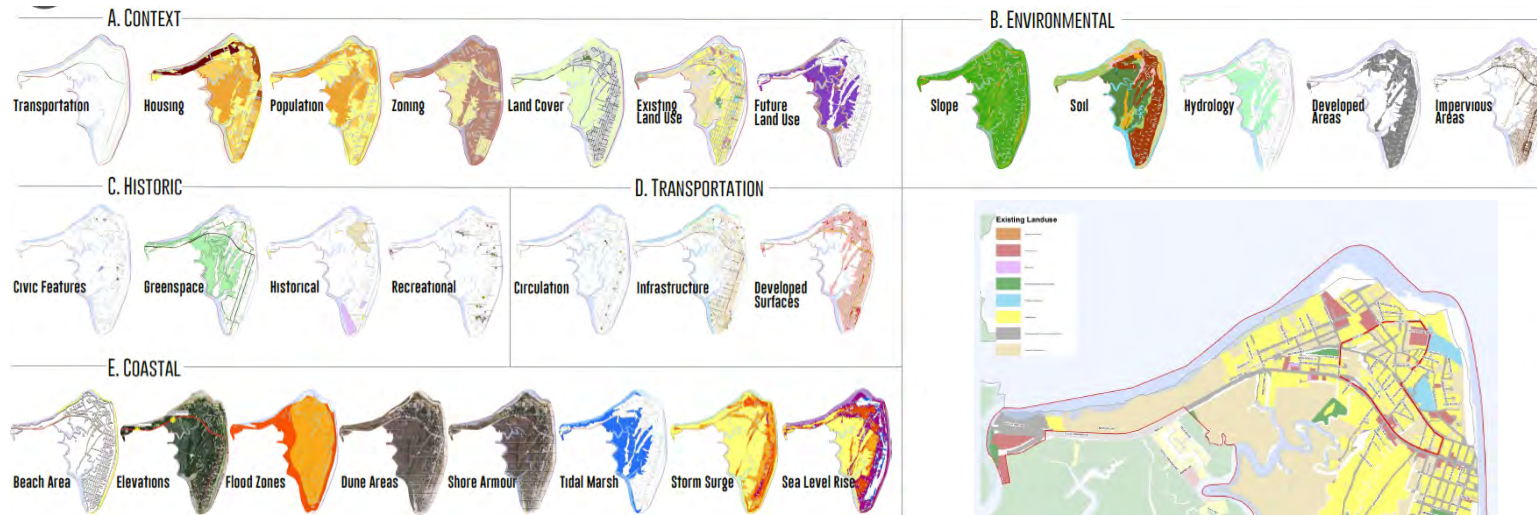
PROCESS:

Inventory

Analysis

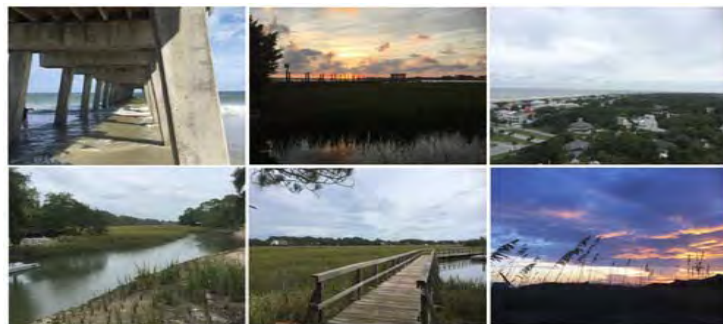
Design

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



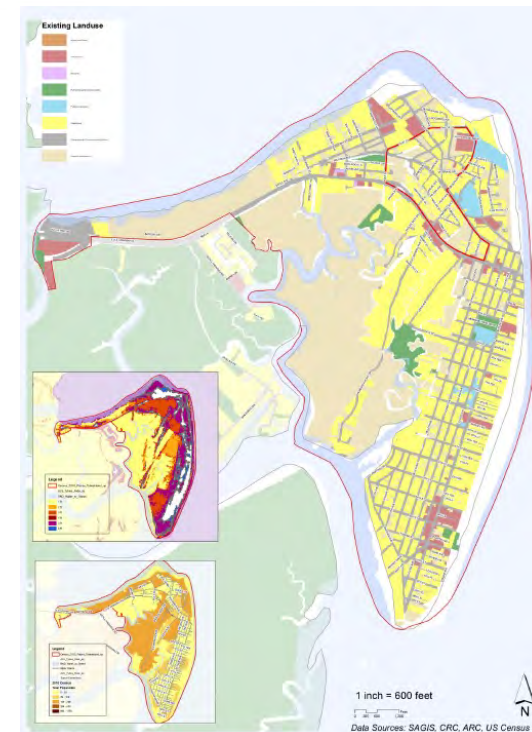
Existing Conditions Inventory

Maps created by all students. Graphic created by Ashley Plicher



Site Visit

Credit: Katie Sewell



Composite Site Inventory

Credit: Olivia Lemieux

PROCESS:

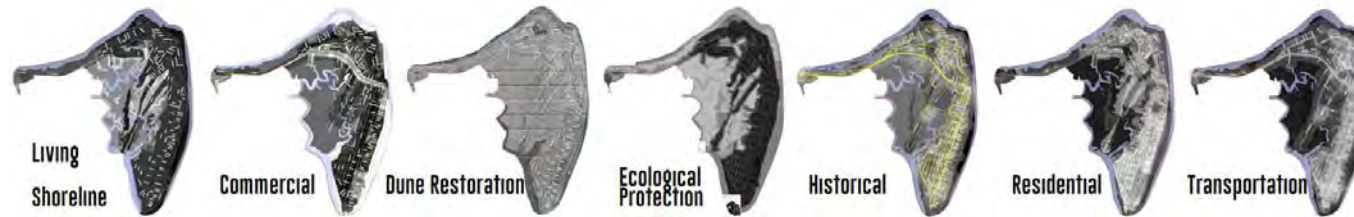
Inventory

Analysis

Design

- 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

Criteria	1. High Use Area		2. Medium Use Area		3. Low Use Area		4. Very Low Use Area		5. No Use Area		6. Other		7. Summary	
	Criteria	Ranking	Criteria	Ranking	Criteria	Ranking	Criteria	Ranking	Criteria	Ranking	Criteria	Ranking	Criteria	Ranking
Living Shoreline	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Commercial	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Dune Restoration	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Ecological Protection	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Historical	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Residential	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Transportation	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low



PROCESS:

Inventory

Analysis

+

Design

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



Credit: Lauren Linnane

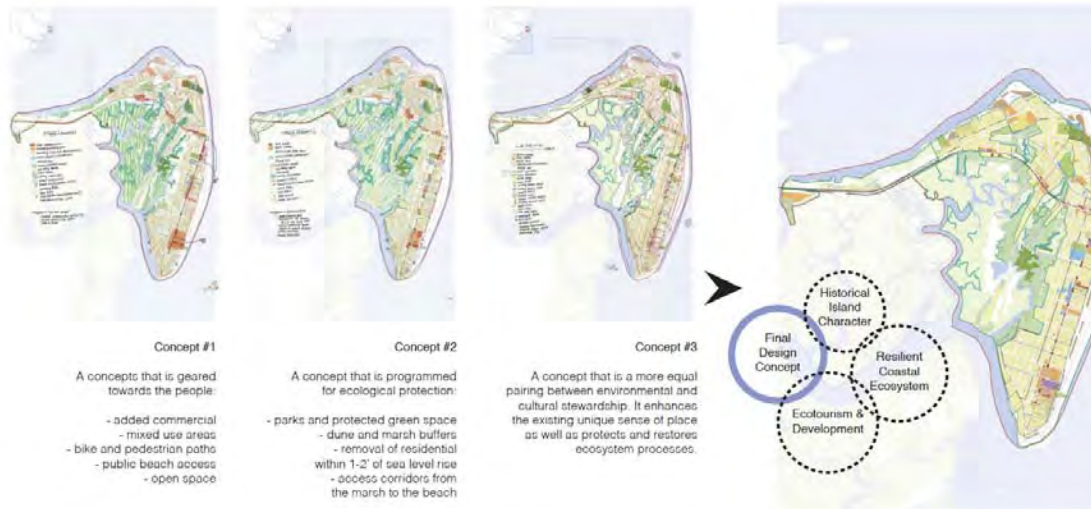
PROCESS:

Inventory

Analysis

Design

- 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

TYBEE ISLAND COMMUNITY VISION



- Preserve historic heritage
- Increase bike trails
- Stimulate economic growth
- Protect sea turtles

- Design with a conservation mindset
- Increase education opportunities
- Create a family-friendly environment
- Establish healthy dunes

MY GOALS

- Increase Conservation by 30%
- Preserve Historic Heritage
- Increase Mixed-Use Development
- Increase Ecological Protection

MIXED-USE DEVELOPMENT

- Push for more mixed-use zoning on Tybee Island to bridge the gap between Residential and Commercial, in addition, provide more job opportunities for locals
- Create an ordinance to regulate development in order to support the cultural heritage of Tybee
- Position mixed-use developments near historical areas such as the Lighthouse and Fort Screven



STORMWATER MANAGEMENT

- Place vegetative swales around the main streets to collect stormwater. Construct vegetative medians as well.
- Create rain gardens in medians of parking lots and remove the curbs.
- Find creative ways to use the stormwater in public areas such as stormwater parks, and rain gardens.



HISTORICAL PRESERVATION

- Provide tax/abate incentives for homeowners of historic homes, in order to push for a Tybee Island Historical Preservation Ordinance in order to preserve the island.
- Reduce zoning of R-2 that allow homeowners to build duplexes and increase Single-Family Residential Zoning. Connect Historic Areas especially at the North End of Tybee Island to increase the historical property value of the area.
- Provide public educational opportunities for ranch-style homeowners to learn more about the risk of flooding and how to protect their homes. Encourage developers to build new homes to be two-stories tall and to follow the guidelines of the Tybee Island Historic Society.



Educate the public on the risks of flooding and push to reduce the future building of ranch-style homes. Increase signage of all historical areas of Tybee and connect historical areas. Emphasize on building two-story homes that resemble the character of Tybee.

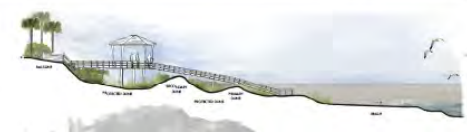
ECOLOGICAL - LIVING SHORELINES

- Establish living shorelines instead of bulkheads in needed areas verified on the master plan.
- Stimulate for all floating docks to be prohibited to create a better coastal environment.
- Educate public about living shorelines through informative infographics stationed near active sites.



ECOLOGICAL - DUNES

- Establish living shorelines instead of bulkheads in needed areas verified on the master plan.
- Stimulate for all floating docks to be prohibited to create a better coastal environment.
- Educate public about living shorelines through informative infographics stationed near active sites.



Master Plan

8 MASTER PLAN

A AXON PERSPECTIVE OF NORTH END OF TYBEE ISLAND



B PERSPECTIVE OF MIXED USE DEVELOPMENT



LEGEND

ISLAND BOUNDARY	PARCELS
COMMERCIAL	PROPOSED CONSERVATION
MIXED-USE	HYDROLOGY
HIGH VOLUME RESIDENTIAL	WATER TREATMENT FACILITY
RESIDENTIAL	FOCAL POINT
CIVIC	PROPOSED BIKE TRAILS
EXISTING GREENSPACE	EXISTING BIKE TRAILS
PROPOSED GREENSPACE	RECREATION TRAILS
EXISTING MARSH	EXISTING SEA WALLS
EXISTING WETLAND	ROADS
HISTORIC DISTRICTS	DUNE AREA
	PROPOSED DUNE RESTORATION

1 inch = 600 feet
0 300 600 900 1200

Credit: Juliette Swanson

TYBEE ISLAND, GEORGIA FUTURE LAND USE MASTER PLAN



Master Plan & Site-Scale Design

CENTER PARK AN EDUCATION & COMMERCIAL PARK

1 DESIGN CONCEPT

Center Park is an education and commercial park located on Center Street in the island of Tybee. The concept for the park is based on the overall site strategy. Center Park is an education and commercial park. The location of the park is to include the work about the majority of the island and also provide a space for public gathering. The commercial and work opportunities would be also seen by the location and the location is also seen by the location.



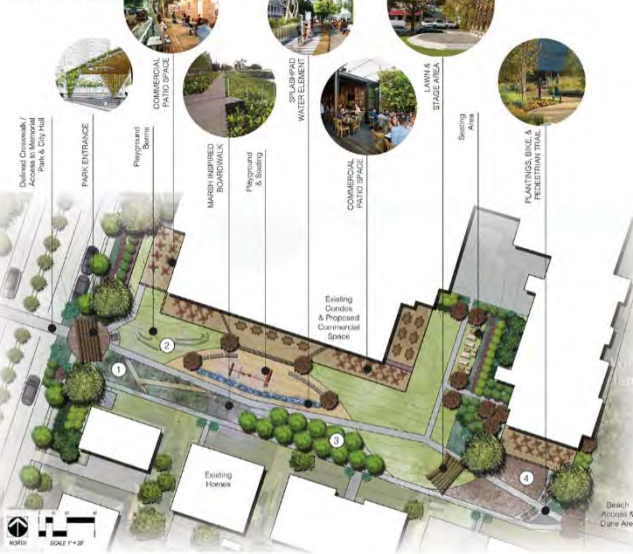
2 ALTERNATIVE CONCEPTS



3 SITE OPPORTUNITIES & CONSTRAINTS ANALYSIS



4 MASTER PLAN & DESIGN INSPIRATION



5 CENTER PARK AS AN ECOLOGICAL CROSS-SECTION OF TYBEE ISLAND



Credit: Katie Sewell

PROCESS:

Inventory

Analysis

Design

CENTER PARK AN EDUCATION & COMMERCIAL PARK

1 DESIGN CONCEPT

Center Park is an education and commercial park located on Center Street on the island of Tybee. The concept for the park is based on the mission of the Georgia Conservancy, which is to protect and conserve Georgia's natural resources through advocacy, engagement, and collaboration. The mission of the park is to educate its users about the ecology of the island while also providing a place for people to gather and play. The commercial and event planning opportunities created here also aim to increase tourism and contribute positively to the local economy.

Originally, Center Street was an access road to the beach lined with mostly residential condos, sparse vegetation, and an abundance of asphalt. In this design concept, the road has been removed to provide access to pedestrians and bicyclists only. Running from east to west, this linear park is a representation of an ecological section of the entire island - it begins with an interpretation of a 'salt tidal marsh', then 'freshwater slough', 'maritime forest', and finally a 'sandy beach'. Several paths meander through various nodes of activity including dynamic seating options, a traditional playground, a constructed wetland, and a small amphitheater area. Additionally, the original condo unit to the north has been converted into first-floor retail and restaurants that provide ample amounts of outdoor seating and interaction with the rest of the park.



2 ALTERNATIVE CONCEPTS



3 SITE OPPORTUNITIES & CONSTRAINTS ANALYSIS



5 CENTER PARK AS AN ECOLOGICAL CROSS-SECTION OF TYBEE ISLAND



4 MASTER PLAN & DESIGN INSPIRATION



Site-Scale Design

Credit: Katie Sewell

PROCESS:

Inventory

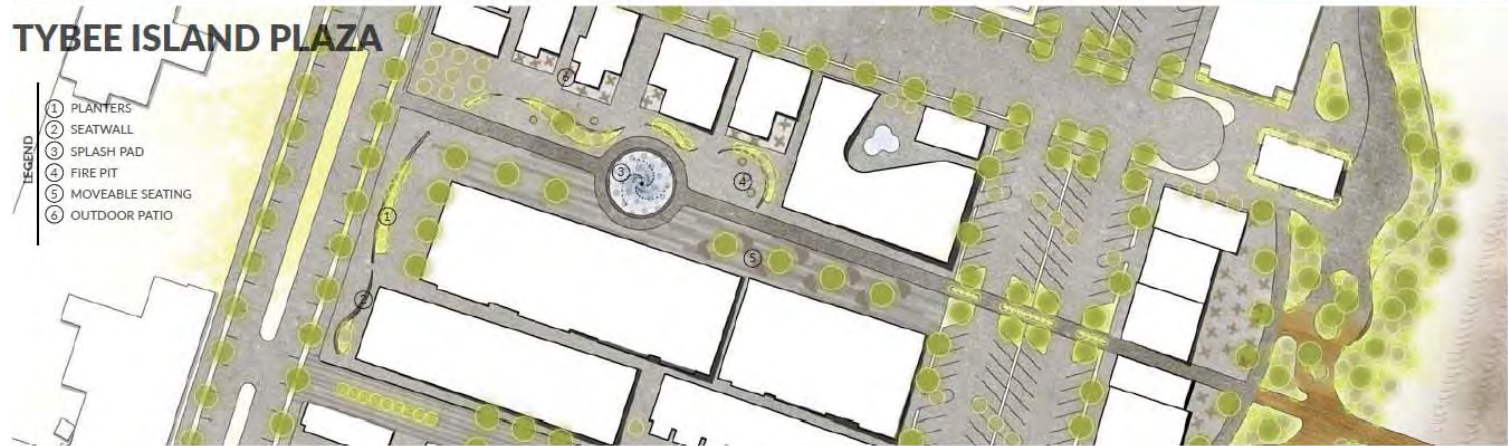
Analysis

Design



TYBEE ISLAND PLAZA

- LEGEND
- ① PLANTERS
 - ② SEATWALL
 - ③ SPLASH PAD
 - ④ FIRE PIT
 - ⑤ MOVEABLE SEATING
 - ⑥ OUTDOOR PATIO



Site-Scale Design

Credit: Lauren Linnane

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
Lesla 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

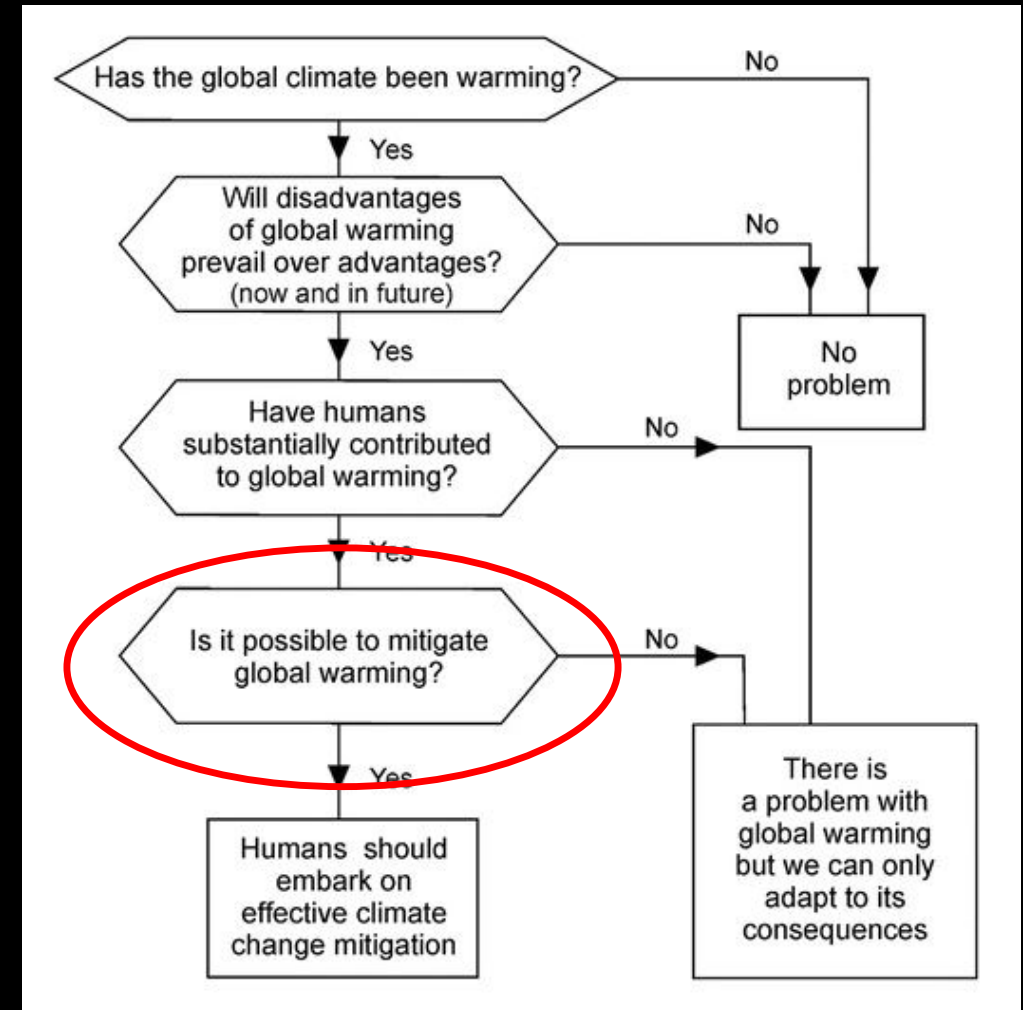
Micah Taylor



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



...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.

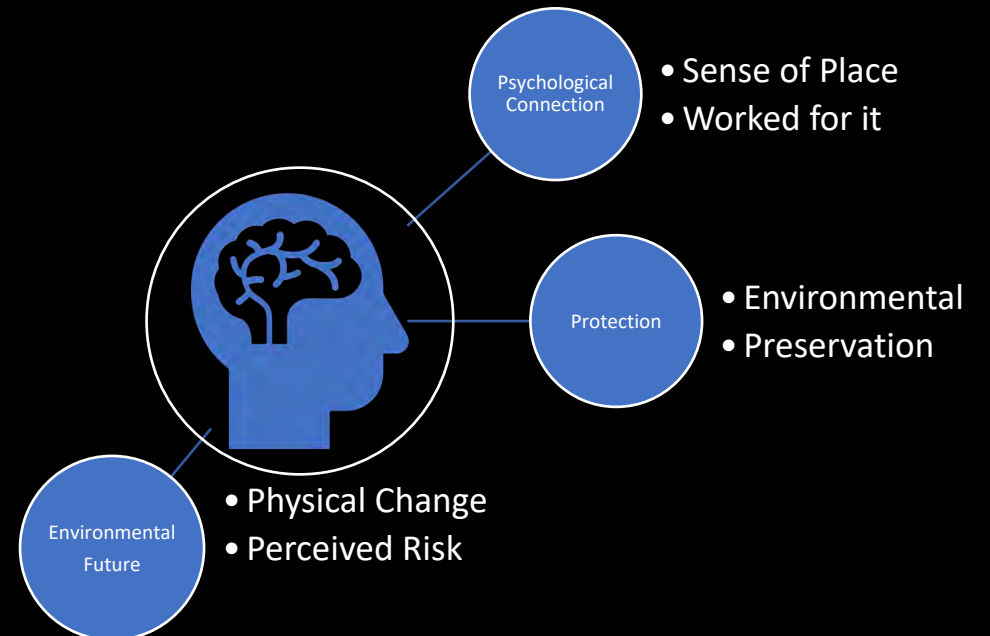
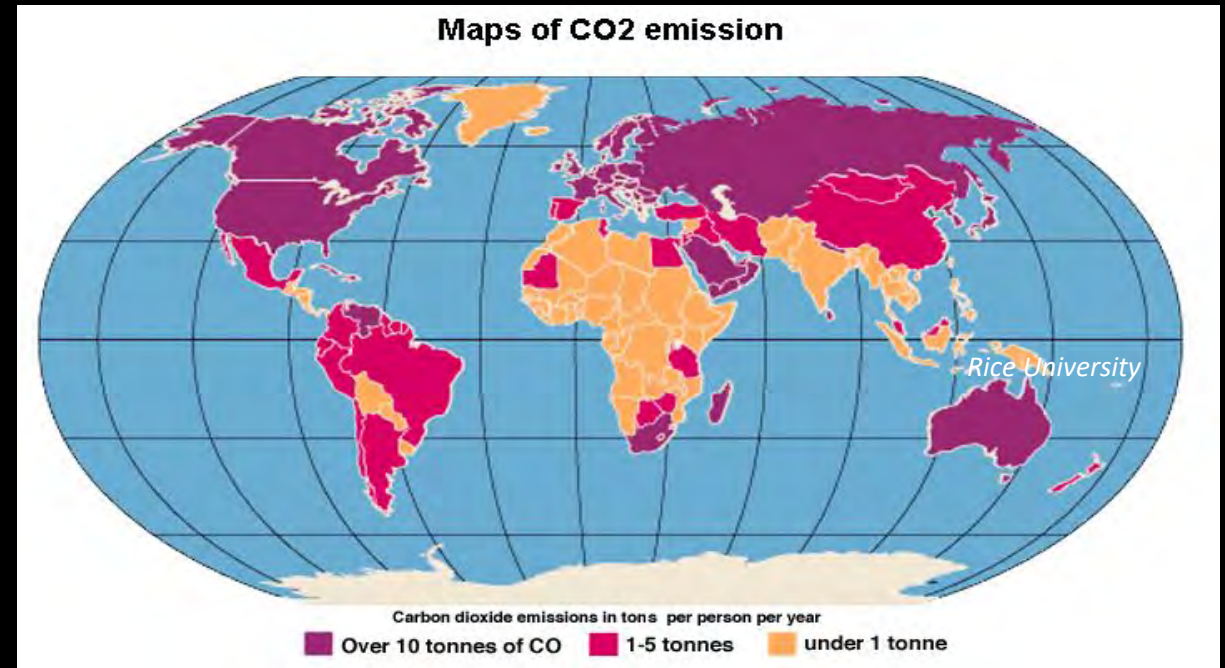
Scranton, Roy. 2015. *Learning to die in the Anthropocene : reflections on the end of a civilization*. San Francisco, CA: City Lights Books.

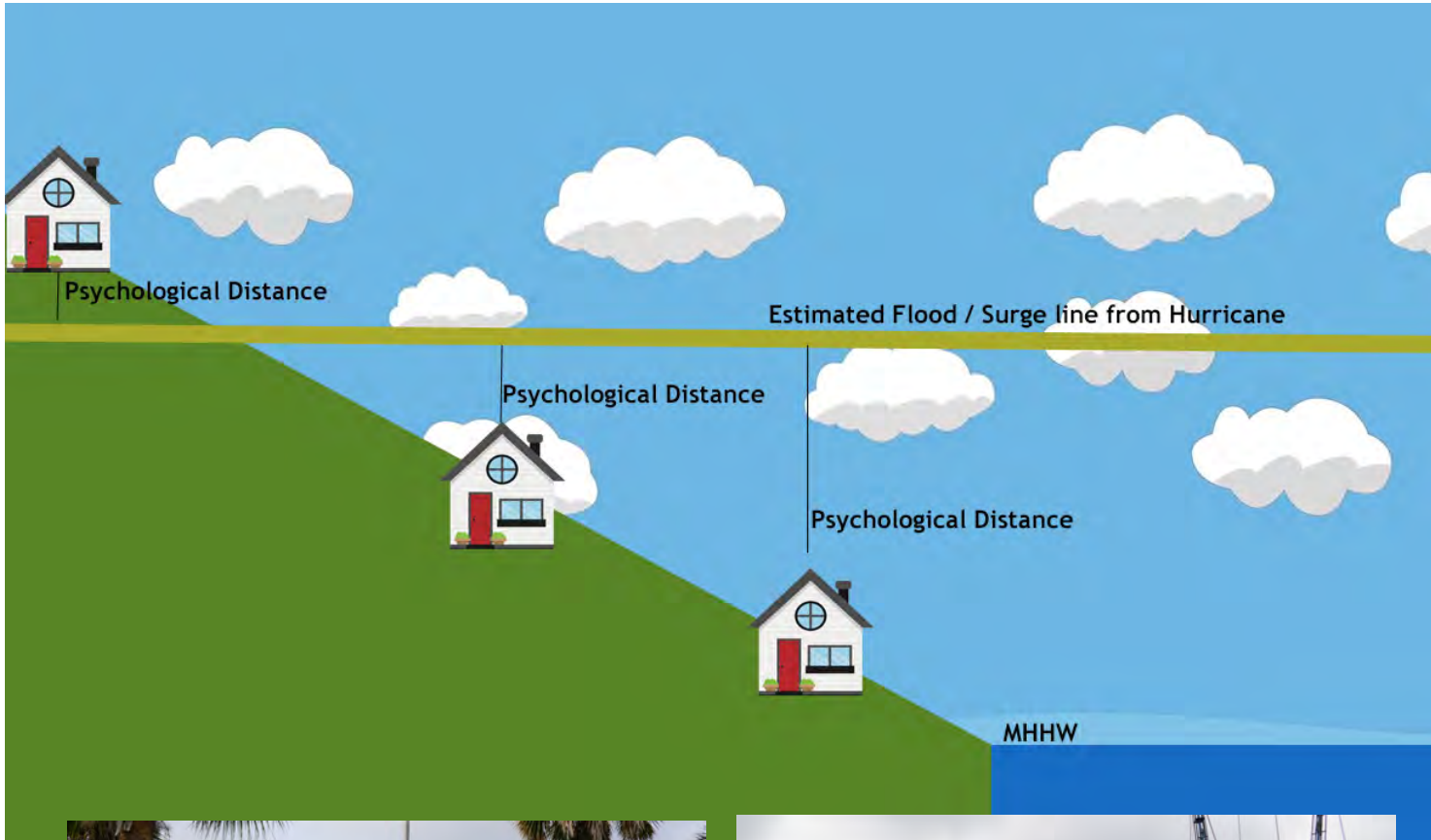
There is a need for more studies on the social basis for climate change asking why people hold the attitudes they do, rather than the dominant tendency to ask how to change attitudes and behavior.

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>

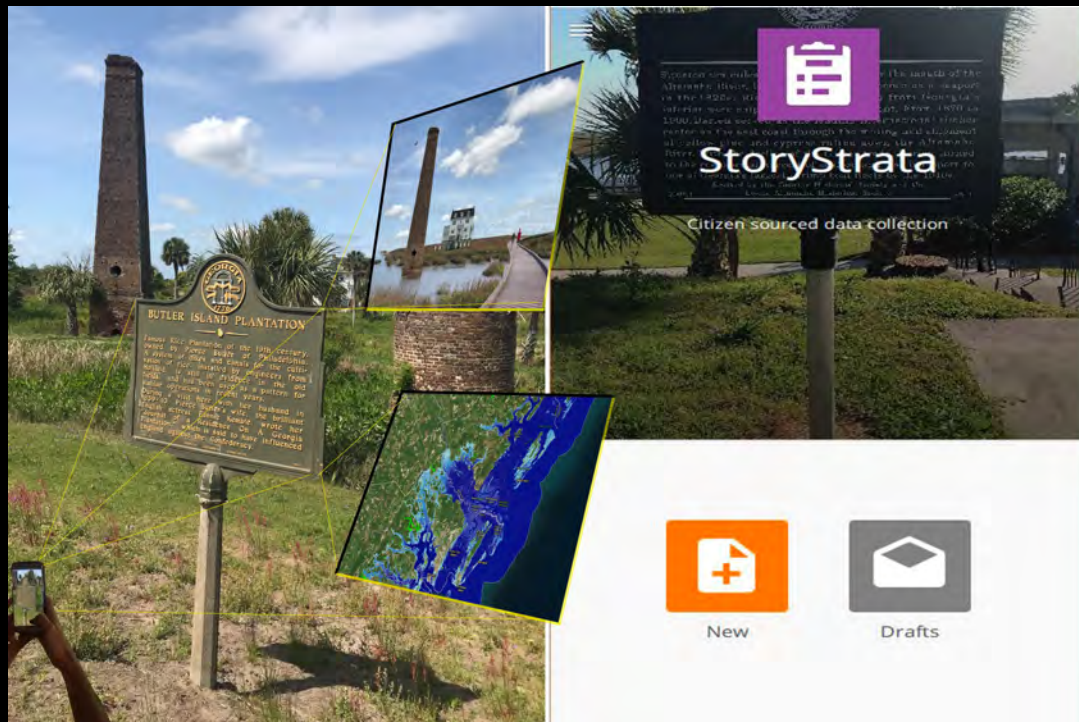
Milfont, Taciano L., Laurel Evans, Chris G. Sibley, Jan Ries, and Andrew Cunningham. 2014. "Proximity to Coast Is Linked to Climate Change Belief." PLOS ONE 9 (7):e103180. doi: [10.1371/journal.pone.0103180](https://doi.org/10.1371/journal.pone.0103180).

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

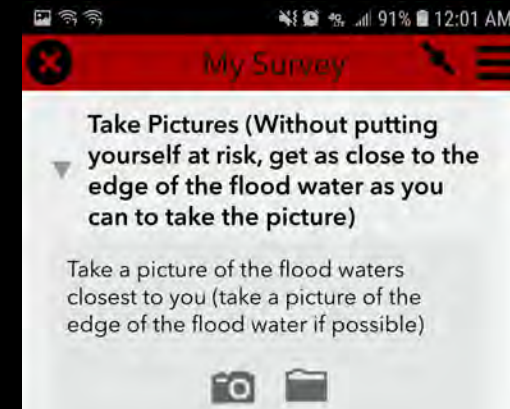


Two Mobile Applications

Coastal AR application *Qualitative*



Flood Data Collection (ArcGIS) *Quantitative*

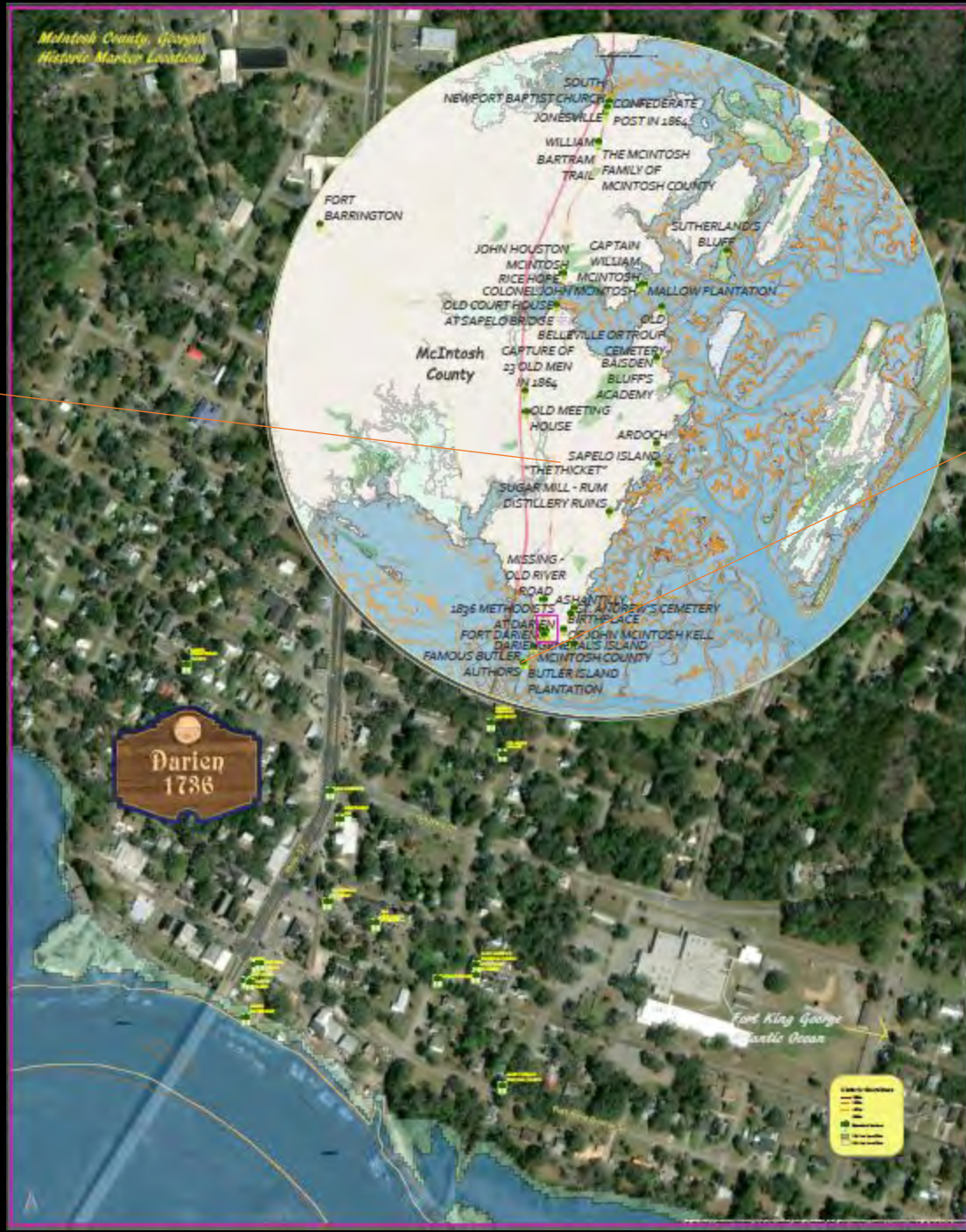


POKEMON GO IN REAL LIFE!

Press Esc to exit full screen

Darien

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



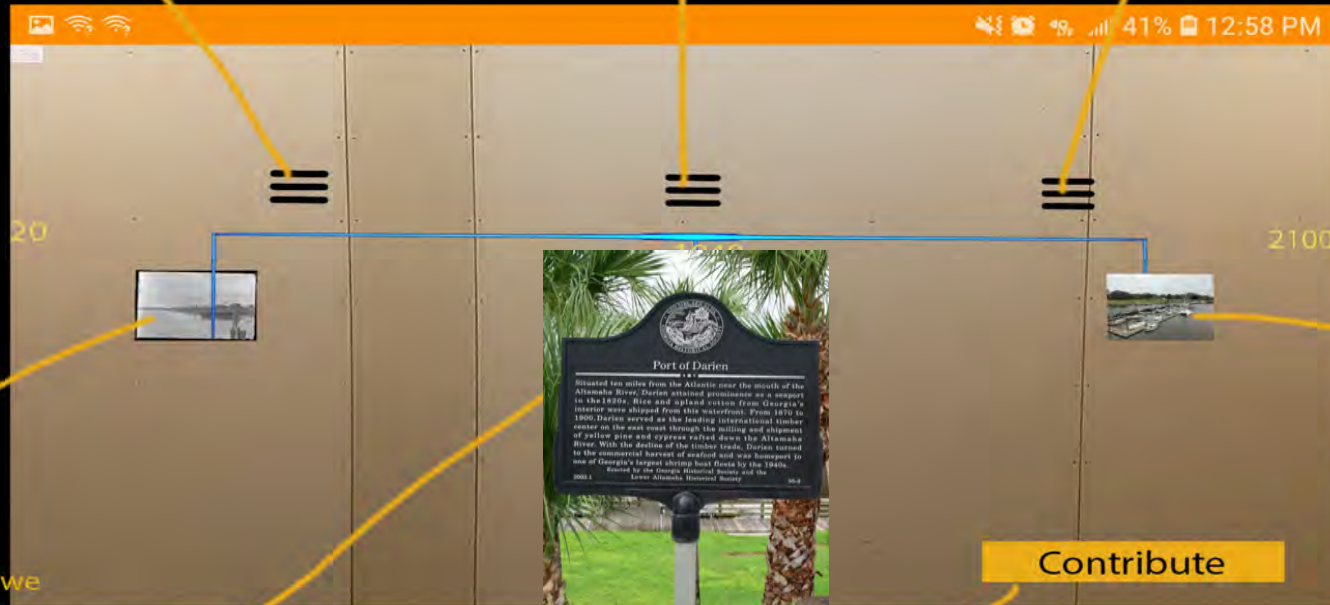
Content



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

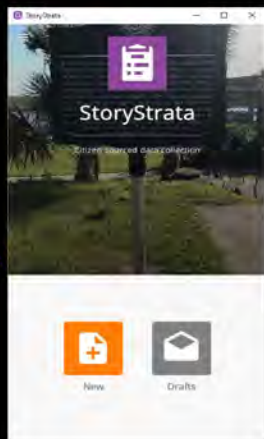
This will be the historic marker (currently a printout of the header from the marker)

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 will likely change before the final application is launched.

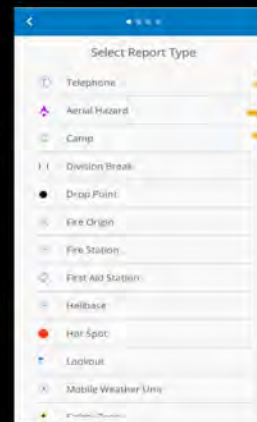
Contribute

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



These data collection 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 cutlural. 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 don't need to mark it again) or they simply don't want to share the location.



The last page asks them to choose 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>





Photo Taken: 3/1/19: 12:20pm

Gage Level

Gage Symbols

- Current Condition
- Forecast Peak Condition

Risk Ratings

- Normal
- Monitor
- Minor Flooding
- Moderate Flooding
- Major Flooding
- Not Risk Rated
- Out of Service

Trend

- ⬆️ Rising
- ⬇️ Falling
- ⬆️ Constant

Current Scenario Forecast

Tar River at Greenville

Last updated: Mar 1, 2019 at 1:00 PM | Gage datum: 3.0ft wveloc | Site ID: 02074000 | Owner: USGS

<p>Stage: 16.6 ft 18.1 ft wveloc</p> <p>Stream Elevation</p>	<p>21200 cfs</p> <p>Flow</p>	<p>Condition</p>	<p>Peak Stage: 17.1 ft 3/3 7:00 AM No Data Available</p> <p>Forecasted Peak</p>	<p>2 buildings damaged \$6,000</p> <p>Damage</p>	<p>Impact</p>
--	------------------------------	------------------	---	--	---------------

Showing 2/93 Gages

Show All Gages



Sensor



Drone Imagery



GIS Hydro Analysis

Authoritative
Flood Modeling
– The remote/static
sensor



Non-Authoritative
Flood Validation and
Supplement
-The Social Sensor



Reported Damage



Where is this coffee shop? (tap the locator on the map multiple times to increase accuracy)
tap the locator icon multiple times.

33°57'N 83°22'W ± 59 m



Mississippi, *The Guardian*

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

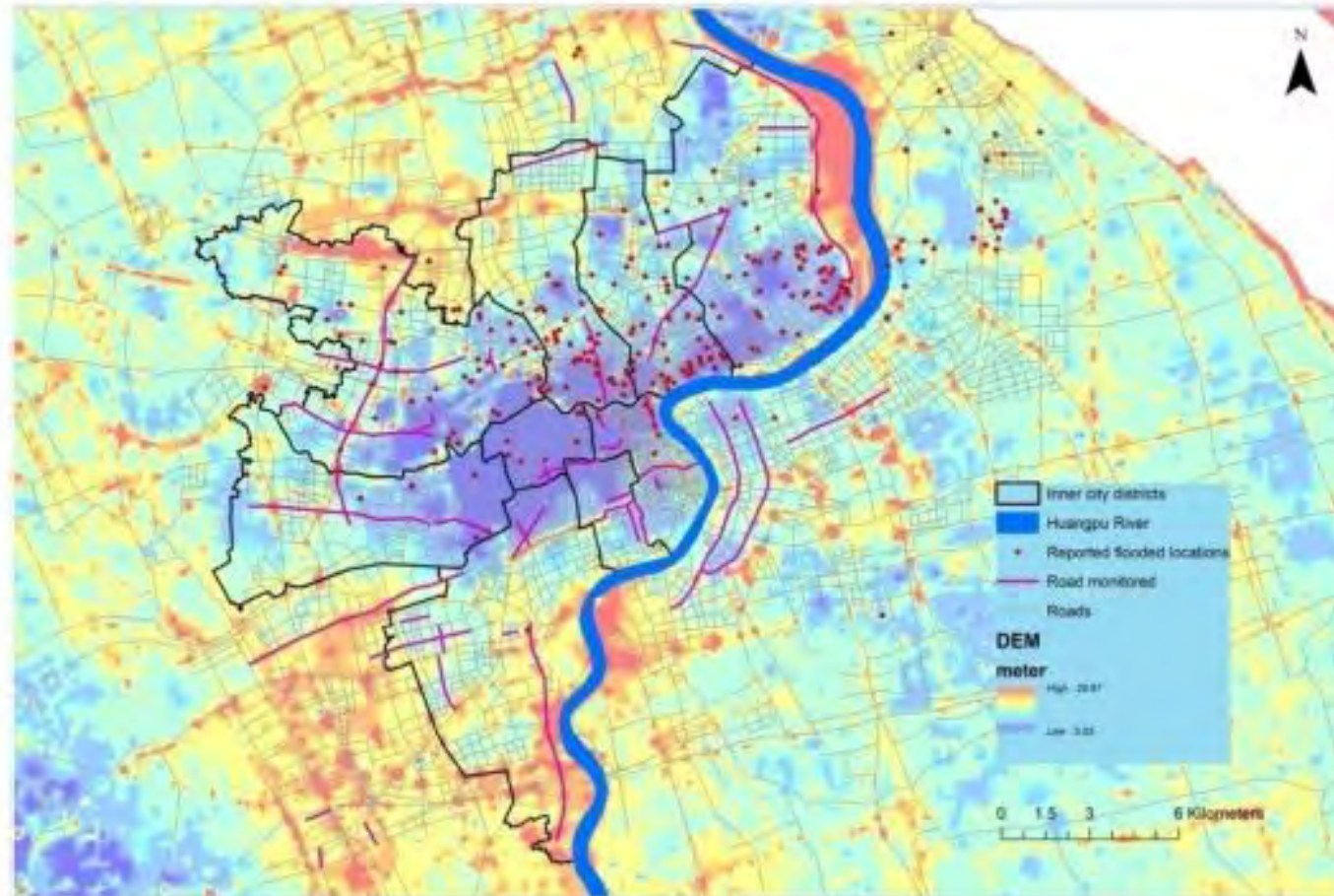


Figure 3. Roads where digital meters are installed by the government, and locations where local flood incidents were reported by the public during the 12 August 2011 event.

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



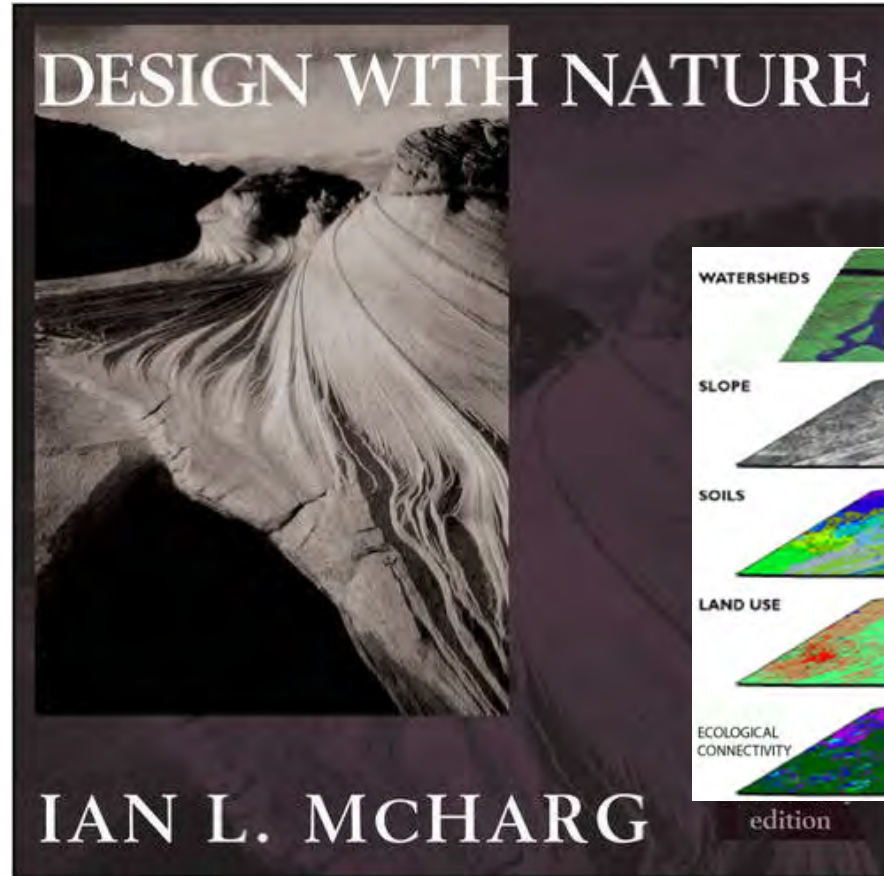
College of Environment + Design
UNIVERSITY OF GEORGIA

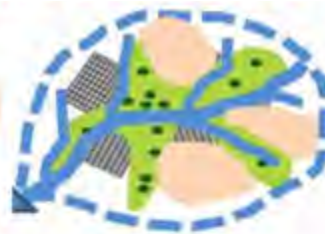
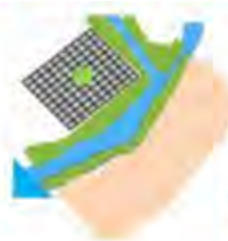
GIS and Geodesign for collaborative design and planning



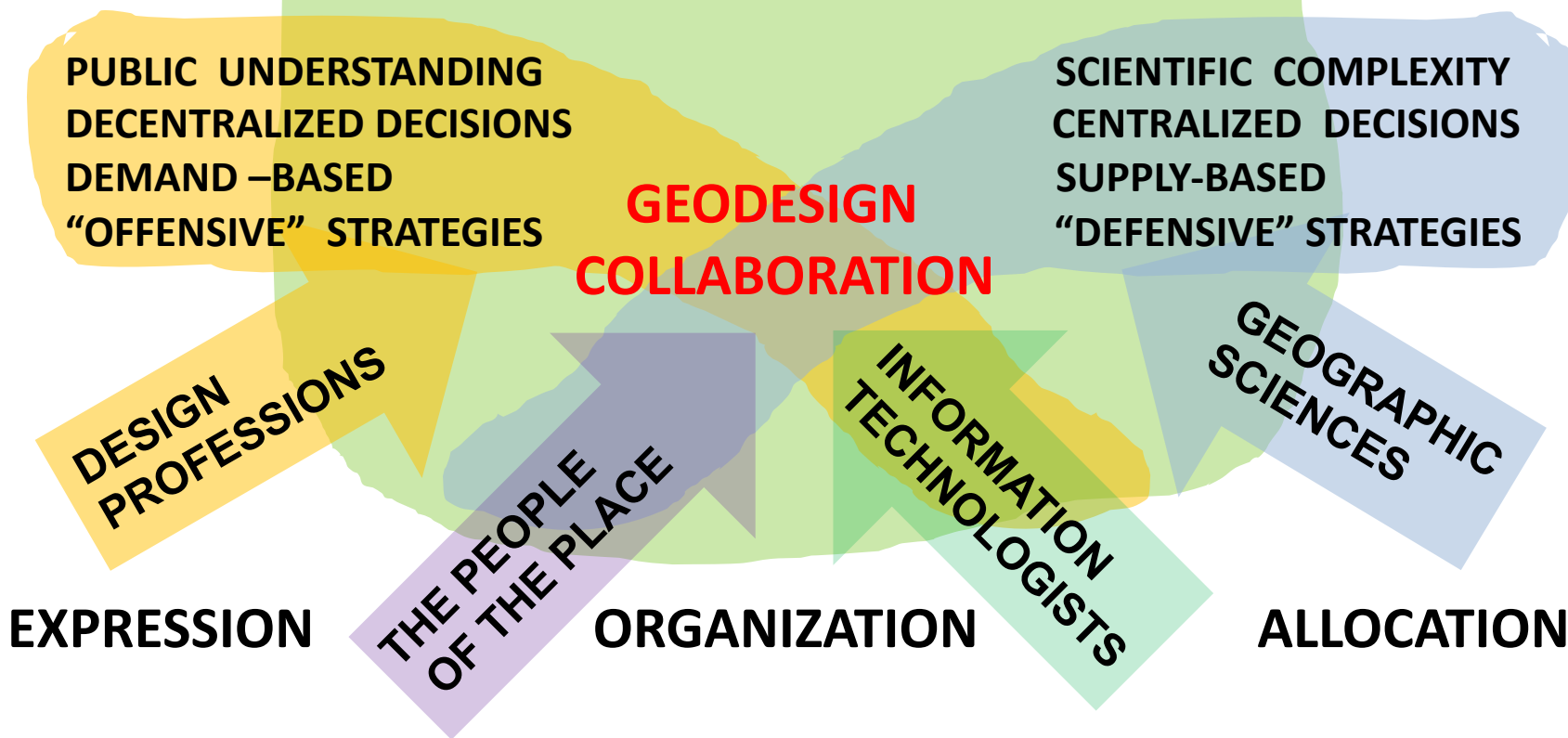
Geodesign and GIS

- 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.

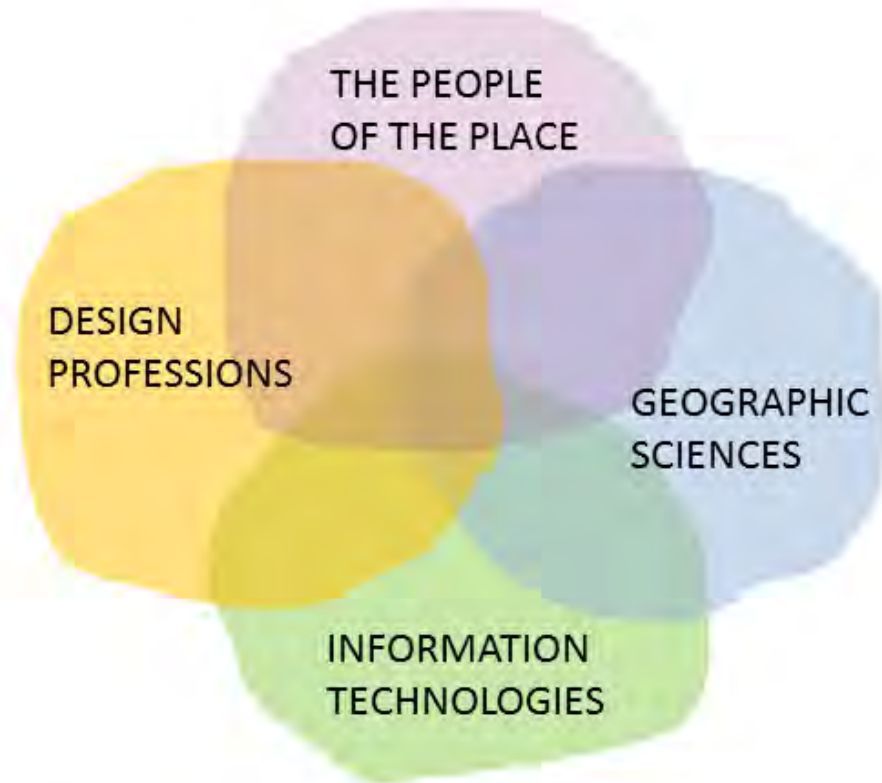




This is where I think collaboration in geodesign can be most significant.



Steinitz' Geodesign Framework



ASSESSMENT

DATA

KNOWLEDGE

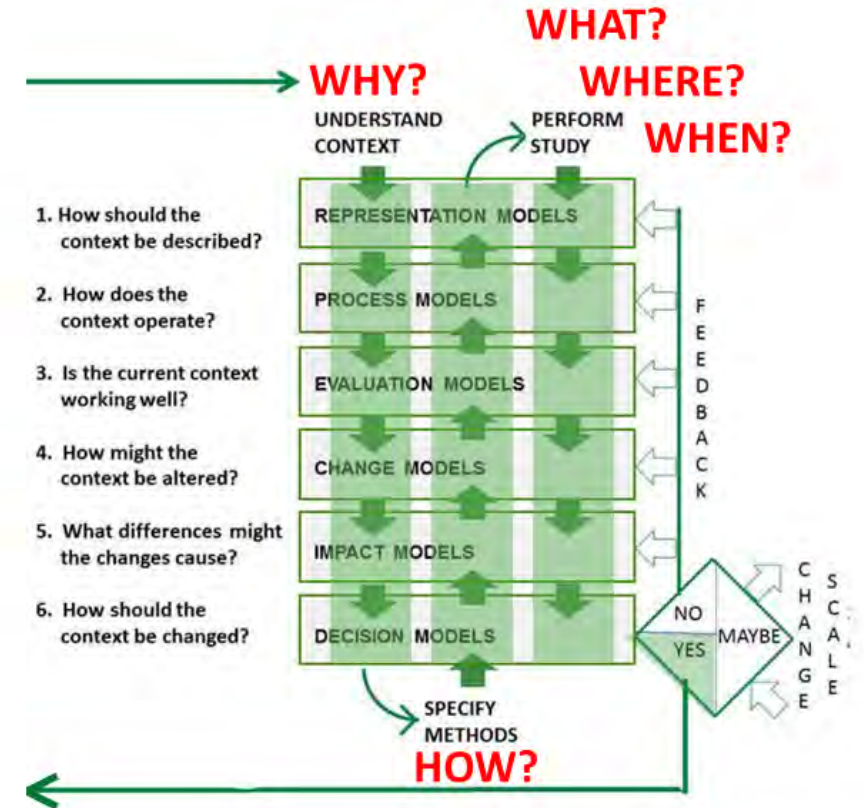
VALUES

INTERVENTION

DATA

KNOWLEDGE

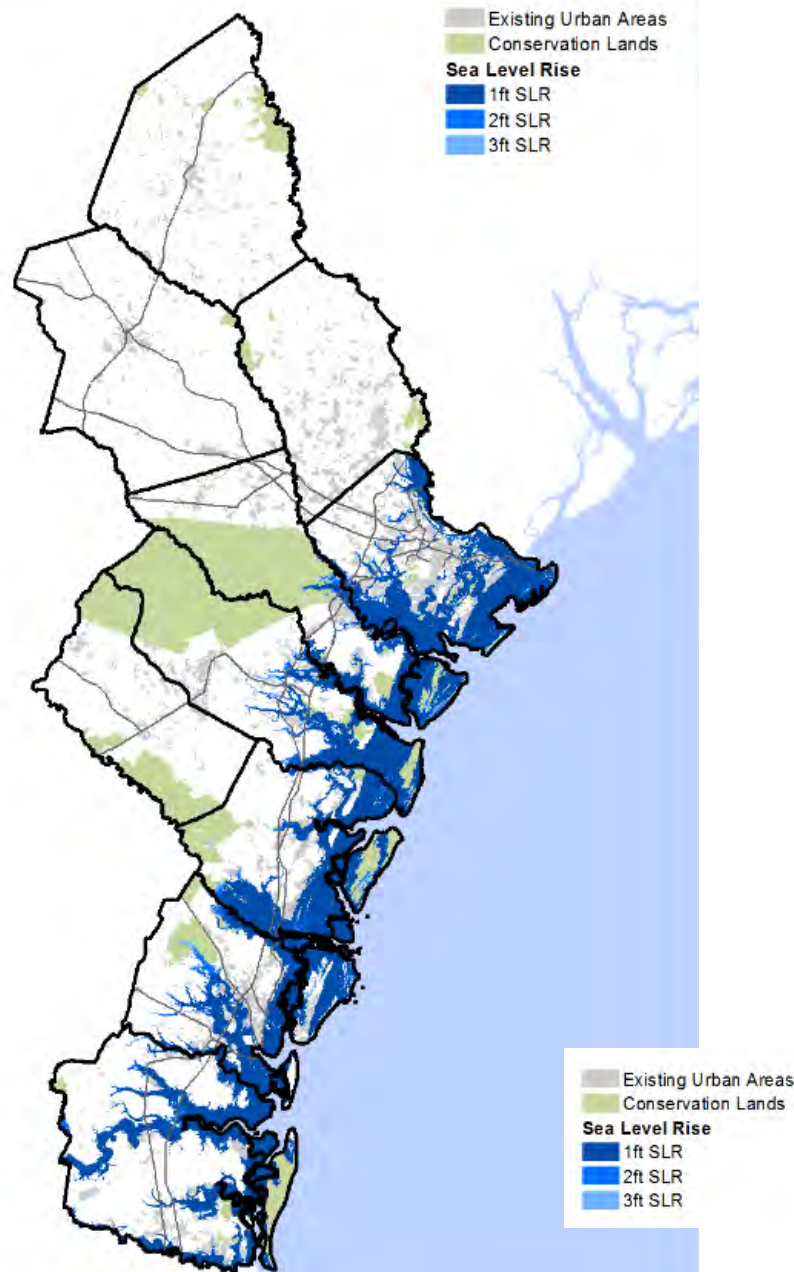
VALUES



Sea Level Rise + Storm Surge

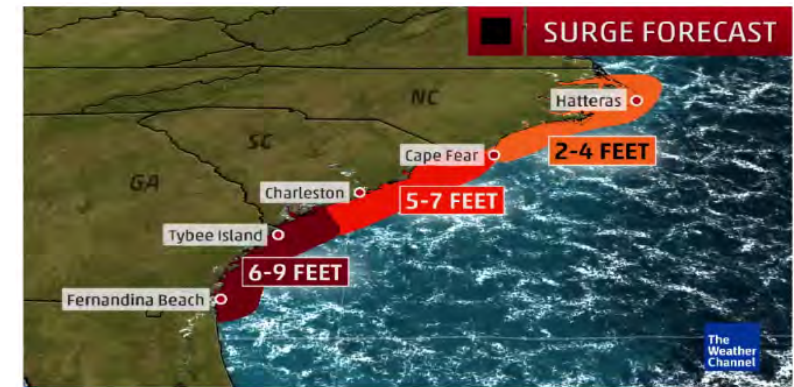
Population potentially displaced by a 3ft Sea Level Rise Scenario in Georgia:
 90,000⁽¹⁾
 30% of expected population growth 2050

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*



NOAA FORECAST SEA LEVEL RISE

October 8, 2016 storm surge



Happening Now: Eyewall Moves Ashore in South Carolina



Darien, Georgia
 (Photos: Russell Oliver)



Tybee Island
 (photos Paul Wolf)

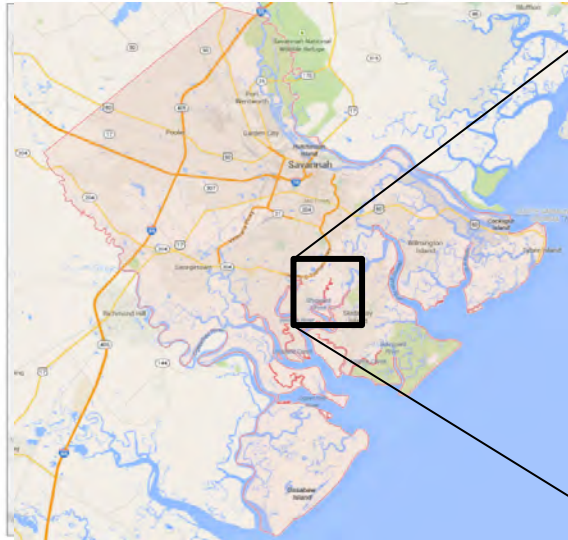


UGA Geodesign Workshop: Jan 2015

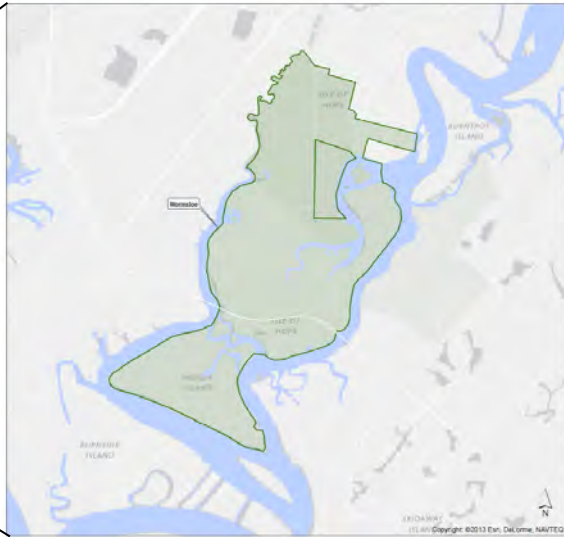
A 3-day workshop was initiated by Professor Carl Steinitz and Dan Nadenicek, Dean of the College of Environment and Design (CED), at the University of Georgia (UGA).

The issue at hand was to produce a single negotiated design, based on a series of constraints 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



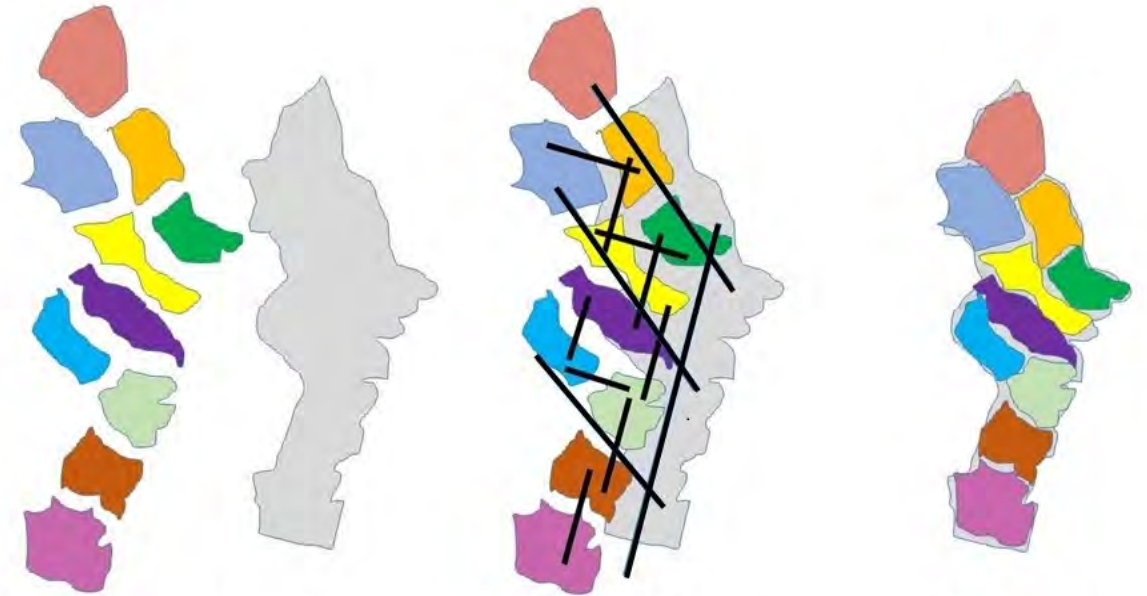
The Challenge: Can we come to one agreed design?

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.



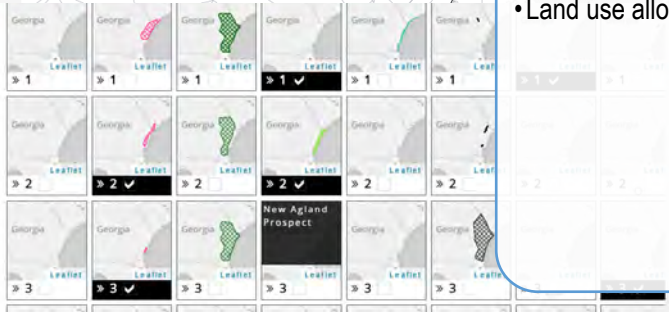
10 Coastal Counties

Workshop Planning Team

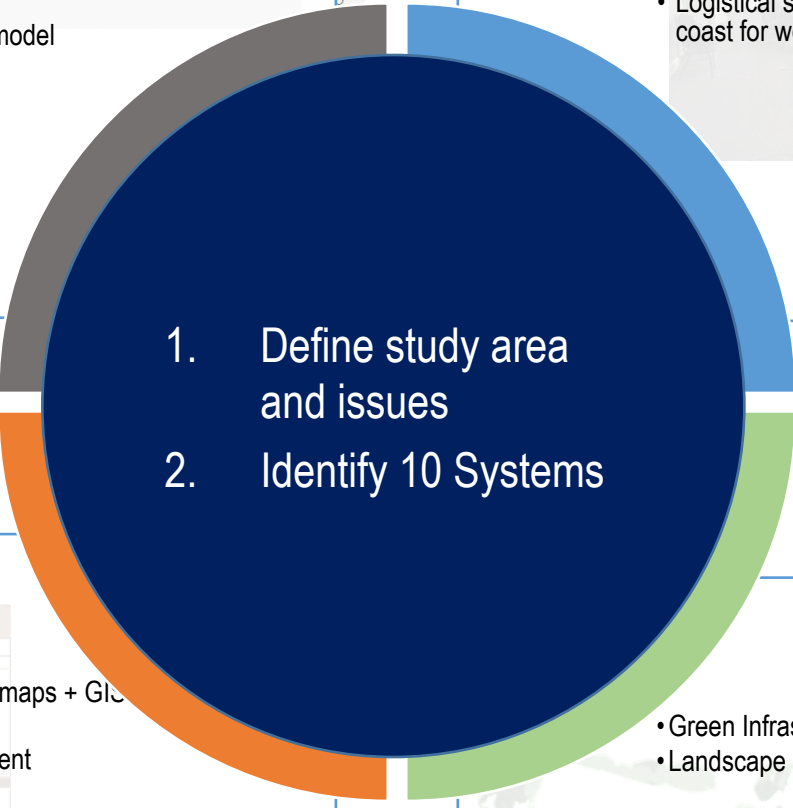
GEODESIGN HUB



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



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



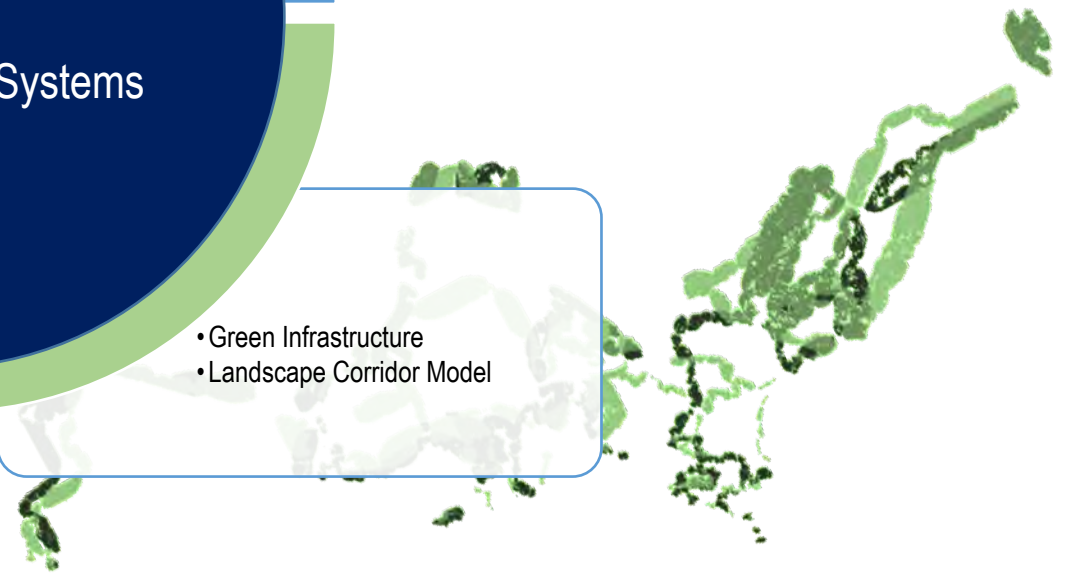
1. Define study area and issues
2. Identify 10 Systems

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

- Green Infrastructure
- Landscape Corridor Model



01 - Green Infrastructure: Parks/Recreation/Connectivity/Climate Change mitigation		Conservation and Ecological Resilience as a Function of GI	
System 1		Group A	
Description of Evaluation:			
Identify habitats with high priority for conservation, existing conservation land connectivity among existing and future protected lands (for vegetation, wild associated water and land movement needs, including surface water and recharge)			
Green: Prime land for protection (already protected by law, or high amenity)			
Light Green: Highest Priority for priority for conservation (based on ESR's connectivity/conditions)			
Yellow: place you can build			
Light red: Intermediate priority for conservation (based on ESR's GR connectivity/conditions)			
Red: already on protected list			
Most Appropriate for Change	Possible Change	Rest of the Area	Rest of the Area
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 (GRC) See Level Rise (3 ft)	Highest priority on currently unprotected lands by law, and prime for protection based on ESR's Green Infrastructure Core areas criteria (total score > 2.5, % of wetland or forested land within a core area, fragmentation, Threats: Human Modification - score between 0 and 1, with 1 being higher level of modification (parking lots, buildings and others)	Rest of the Area	Rest of the Area



WORKSHOP PARTICIPANTS

Gustavson, Nils, Liberty County Planning Commission

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

Jesse Wuest, Assistant Manager, Wormsloe

Lupita McClenning, Director of Planning, Coastal Regional Commission of GA

Sarah Ross, Director Center for Research & Education Wormsloe

Andrew Bailey, Jacobs Engineering, Atlanta

Hayes, Christa, Coastal Ecology Researcher

Kyler, David, Center for a Sustainable Coast

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

Jones, Melissa, Liberty County Planning Commission

Poon, Wincy, City of Hinesville

Samson, Doug, Coastal Ecology Researcher

Lambert, Christi, The Nature Conservancy

THE PEOPLE OF THE PLACE

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

Greenway, Eric, Planning Director Bryan Co.

VanParreren, Suzanne, Sapelo Island NERR

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

DESIGN PROFESSIONS

GEOGRAPHIC SCIENCES

Avin, Uri, Professor, University of Maryland

Bursa, Karl, Glynn County - Director of Planning

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

Washington, Clemontine, Mayor of Midway, Liberty Cty

INFORMATION TECHNOLOGIES

Reams Dain, City of Pembroke - Planning and Zoning

Jennings, Tara, Coastal GA Indicators Coalition

McMillan, Charles, Georgia Conservancy-Coastal Director

Tibbs, Kyle, City Administrator Woodbine

Patton, Patrick, Building Development Inspector Garden City

Macleod, Kevin, SAGIS

Russell, Madeleine, Georgia Sea Grant Marine Extension

Hunter Key, GIS Manager, Coastal Regional Commission

Centeno, John, Glynn County

Nyers, Robert, Glynn County

Sudanshu Panda, Academic, University of North Georgia

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

Landon, Eric, Camden Co. Planning Director

Fulton, Lisa, CRC-Senior Planner/GIS Analyst

Wolven, Meizi, CRC - Grant Specialist

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

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

Clay, Batoul, Students Geography

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.

UGA FALL 2015
ALTERNATIVE FUTURES FOR CHATHAM COUNTY
ADMINISTRATION BRIEF GEODESIGN TASKS

YOUR PROJECT BRIEF
At the moment, this project has no brief. Add a project brief to describe the project goals, timeline and targets. In addition, you can use it to share background information, a code of conduct and links to documents, etc. to participants of this project.

YOUR TEAM
Text team - You, stenden

DECISION MODEL
Bar chart showing system priorities.

COLUMNS & DISPLAY
Sync with decision model

SYSTEM PRIORITIES
CLIM: 1, ECOL: 2, SRWTR: 7, GRWTR: 8, HISCU: 5, TRSM: 6, AGFOR: 2, HSNG: 1, COMIND: 1, FRANS: 1

INITIAL EVALUATIONS
Grid of maps for different systems: CLIM, ECOL, SRWTR, GRWTR, HISCU, TRSM, AGFOR, HSNG, COMIND, FRANS.

ALL DIAGRAMS
Search Diagrams... FILTER DIAGRAMS

COMPARE TWO SYNTHESSES AND COMMENT
Load synthesis and click on any feature to provide a comment.

Ecolog: v2: V3-EcolHP, HistFour: v1: PRES V2

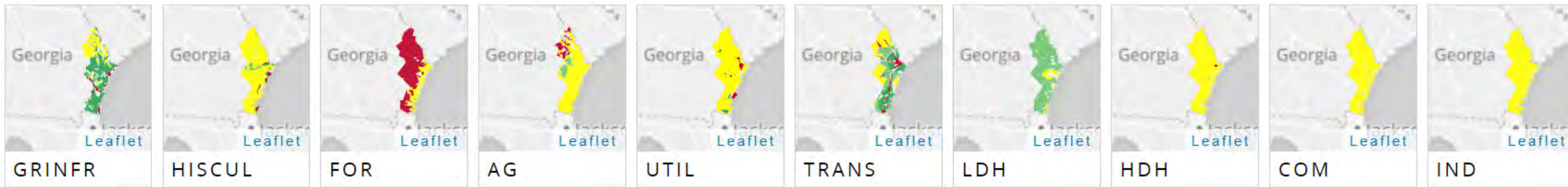
COMPARISON GRID

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3<td>3</td></td></td></td></td></td>	3 <td>3<td>3<td>3<td>3<td>3</td></td></td></td></td>	3 <td>3<td>3<td>3<td>3</td></td></td></td>	3 <td>3<td>3<td>3</td></td></td>	3 <td>3<td>3</td></td>	3 <td>3</td>	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td></td>	5 <td>5<td>5<td>5<td>5<td>5</td><td>5</td></td></td></td></td>	5 <td>5<td>5<td>5<td>5</td><td>5</td></td></td></td>	5 <td>5<td>5<td>5</td><td>5</td></td></td>	5 <td>5<td>5</td><td>5</td></td>	5 <td>5</td> <td>5</td>	5	5
6	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td></td>	6 <td>6<td>6<td>6<td>6<td>6</td><td>6</td></td></td></td></td>	6 <td>6<td>6<td>6<td>6</td><td>6</td></td></td></td>	6 <td>6<td>6<td>6</td><td>6</td></td></td>	6 <td>6<td>6</td><td>6</td></td>	6 <td>6</td> <td>6</td>	6	6
7	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td></td>	7 <td>7<td>7<td>7<td>7<td>7</td><td>7</td></td></td></td></td>	7 <td>7<td>7<td>7<td>7</td><td>7</td></td></td></td>	7 <td>7<td>7<td>7</td><td>7</td></td></td>	7 <td>7<td>7</td><td>7</td></td>	7 <td>7</td> <td>7</td>	7	7
8	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td></td>	8 <td>8<td>8<td>8<td>8<td>8</td><td>8</td></td></td></td></td>	8 <td>8<td>8<td>8<td>8</td><td>8</td></td></td></td>	8 <td>8<td>8<td>8</td><td>8</td></td></td>	8 <td>8<td>8</td><td>8</td></td>	8 <td>8</td> <td>8</td>	8	8
9	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td></td>	9 <td>9<td>9<td>9<td>9<td>9</td><td>9</td></td></td></td></td>	9 <td>9<td>9<td>9<td>9</td><td>9</td></td></td></td>	9 <td>9<td>9<td>9</td><td>9</td></td></td>	9 <td>9<td>9</td><td>9</td></td>	9 <td>9</td> <td>9</td>	9	9
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

NEGOTIATED DESIGN
SHOWING: BOTH, ONLY FROM A, ONLY FROM B, AGREEMENTS, DISAGREEMENTS

Data Preparation

Process for creating the 10 Evaluation Maps

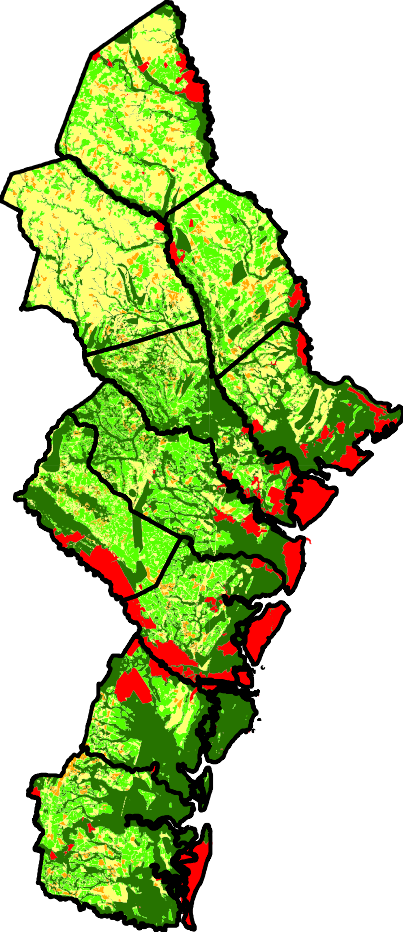


1. Define study area and issues
2. Identify 10 Systems
3. Identify “experts” to define Evaluation Map criteria for each system
4. Create a matrix for the 10 systems to document model criteria, data needs, etc.
5. Collect GIS data needed for each system
6. Create Evaluation Maps for each system in GIS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

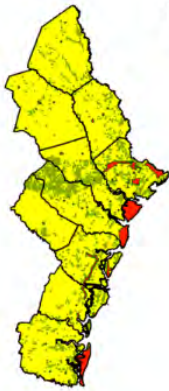
Create a matrix for the 10 Systems/Evaluation Maps

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.

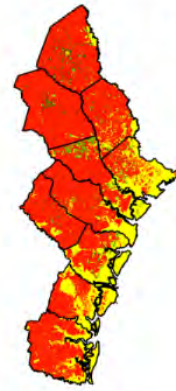


01 - Green Infrastructure: Parks/Recreation/Conservation/Ecological connectivity/Climate Change mitigation as a function of GI				
System 1			Contact / Expert Name	Map Maker
Description of Evaluation:		Group A	Rosanna	Rosanna
Identify habitats with high priority for conservation, existing conservation 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 Appropriate for Change	Possible Change		Possible Protect	Most Appropriate 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 level 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)



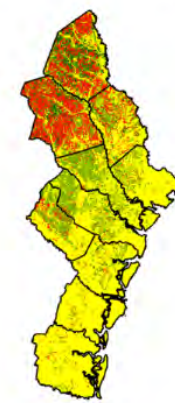
02 - Historic/Cultural Protection			
System 2		Contact / Expert Name	Map Maker
Description of Evaluation: Group A		Dian	Alicia/Rickanna
Look at this as an attractiveness model for commercial forestry, based on commercial feasibility and capability.			
Dark red: things that already are protected			
Dark green: things that should be protected.			
Most Appropriate for Change		Possible Change	Possible Protect
Areas of high historical and cultural protection not protected		Buffers for anything in dark red	Leave as-is compatible and combining land uses
Plantations and other areas not protected		Archaeological Sites (from port density map)	DMH Historic Sites, Historic Corridors
Biotic's small		Scenic Highways	http://geographic.org/historic/cultural/using-geographic-information-systems/
			http://www.geographicinformation.org/national-register-of-historic-places/
			Visions of all designated scenic views.
			Protected resources not currently under any protection status.

HISTORY AND CULTURE



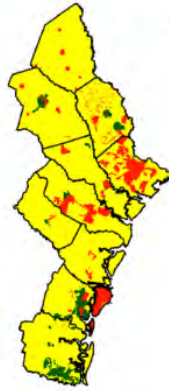
03 - Forestry			
System 3		Contact / Expert Name	Map Maker
Description of Evaluation: Group A		Jim	Alicia/Rickanna
Look at this as an attractiveness model for commercial forestry, based on commercial feasibility and capability.			
Dark green: things that should be protected.			
Most Appropriate for Change		Possible Change	Possible Protect
Not currently a forest use but in prime location (game ag soils)		Not currently a forest use but in areas of high of statewide importance	Everything else is yellow
Existing forested areas (GAP, NLCD, PP) located within DMH-ELU categories for Ag/Forest		Vacant/Underused and Military Base areas	

FORESTRY



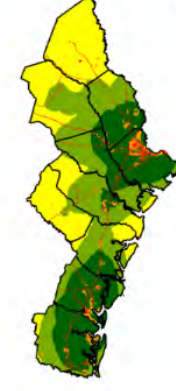
04 - Agriculture			
System 4		Contact / Expert Name	Map Maker
Description of Evaluation: Group A		Jim / Contact Day in Elizabeth	Alicia/Rickanna
Identify areas of high suitability for agriculture			
Most Appropriate for Change		Possible Change	Possible Protect
Not currently an agriculture use but in prime locations (game ag soils)		Not currently an agriculture use but in areas of body of statewide importance	Everything else is yellow
Existing forested areas (GAP, NLCD, PP) located within DMH-ELU categories for Ag/Forest		Vacant/Underused and Military Base areas	

AGRICULTURE



05 - Utilities			
System 5		Contact / Expert Name	Map Maker
Description of Evaluation: Group B		John	Alicia
(Call treating water as a utility for industry and commercial, not as conservation, ground water recharge, energy, scenic, that etc. -> include sewer treatment services, where are the places you want to have sewer treatment services, where would you dislimate ocean water where are low interest connectivity areas, where are the places to burn garbage and need to make energy for the energy network?)			
Most Appropriate for Change		Possible Change	Possible Protect
Water service, sewer, electric, water collection service areas		Reverse service areas (polygons) (Boundary)	Most Appropriate for Protection
Partially Served Areas		DMH Areas Requiring Special Attention: Areas in Need of Infrastructure	Existing fully serviced areas (water, sewer, electric)

UTILITIES



06 - Transportation (port, ships, air, roads and trucks)			
System 6		Contact / Expert Name	Map Maker
Description of Evaluation: Group B		Rickanna / Jack Crowley	Rickanna
Identify areas of increased connectivity between industrial and high density commercial and residential centers and areas suitable for multimodal and other transportation networks/utilities.			
Most Appropriate for Change		Possible Change	Possible Protect
Primarily to hubs (confluence of 1 or more transportation modes (log port, airport, railroad) a primarily industrial parks, dense commercial areas, high density?		Primarily to hubs (2 modes) eg (air/rail station and port)	Not capable
Secondary roads, small airports, others		Existing transportation infrastructure (ports, airports, railroads, roads, public)	

TRANSPORTATION



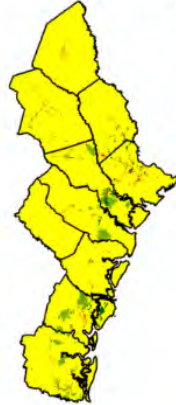
07 - Housing - Lower density			
System 7		Contact / Expert Name	Map Maker
Description of Evaluation: Group C		Alicia	Alicia
Email from Carl on 04.01.2016: for the main urban types--incl. Comm, HDHS, and maybe LDHS--they have as level-5 criteria being on water and sewer serviced land and close to paved roads near interstate highway intersections (NOT the interstate highway itself which is not accessible).			
Most Appropriate for Change		Possible Change	Possible Protect
Lower Density Residential - less than or equal to 5 units per acre		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	capable of supporting LDM but not zoned or planned for housing or serviced
Existing Lower Density Residential (less than or equal to 5 units per acre)			

HOUSING, LOWER DENSITY



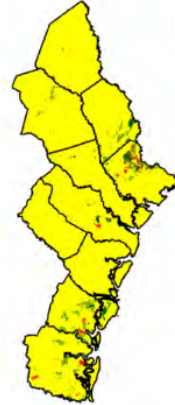
08 - Housing - Higher density			
System 8		Contact / Expert Name	Map Maker
Description of Evaluation: Group C		Alicia	Alicia
Email from Carl on 04.01.2016: for the main urban types--incl. Comm, HDHS, and maybe LDHS--they have as level-5 criteria being on water and sewer serviced land and close to paved roads near interstate highway intersections (NOT the interstate highway itself which is not accessible).			
Most Appropriate for Change		Possible Change	Possible Protect
Higher Density Residential - greater than or equal to 5 units per acre		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	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		Alicia	Alicia
Email from Carl on 04.01.2016: for the main urban types--incl. 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
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

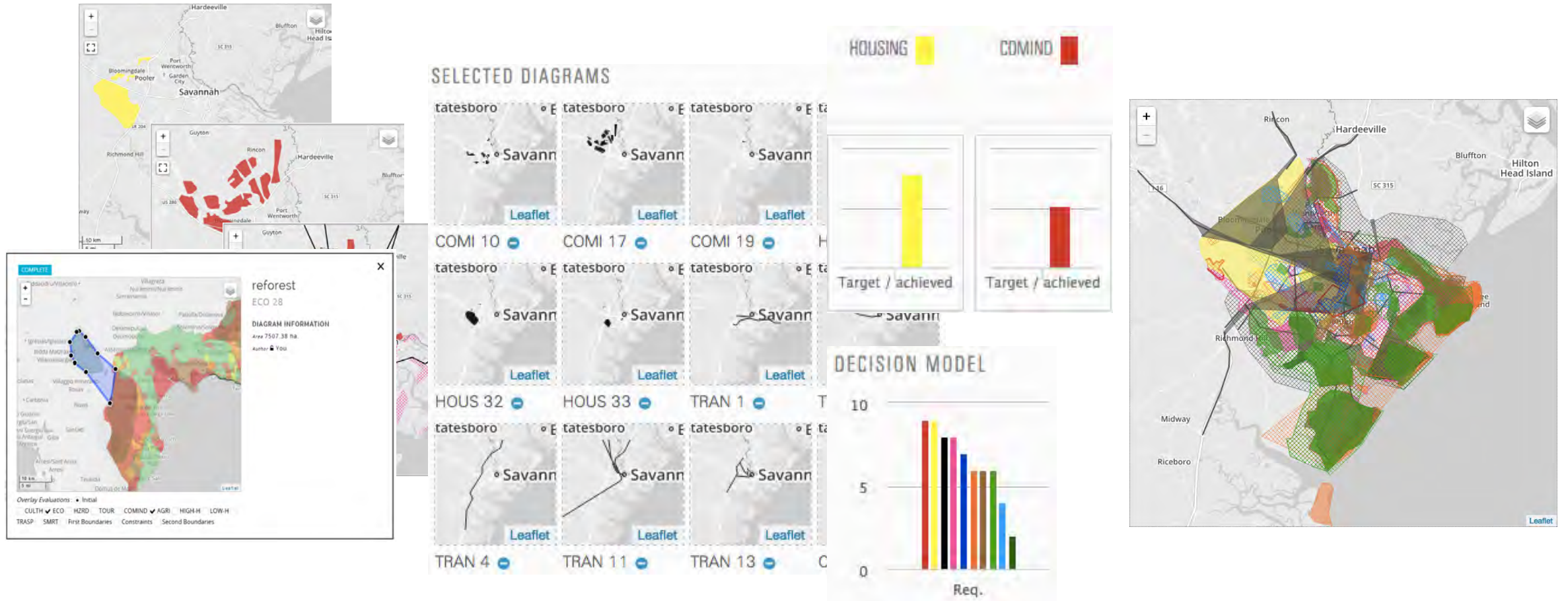


10 - Industry			
System 10		Contact / Expert Name	Map Maker
Description of Evaluation: Group C		Alicia	Alicia
Email from Carl on 04.01.2016: for the main urban types--incl. Comm, HDHS, and maybe LDHS--they have as level-5 criteria being on water and sewer serviced land and close to paved roads near interstate highway intersections (NOT the interstate highway itself which is not accessible).			
Most Appropriate for Change		Possible Change	Possible Protect
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 Perki 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

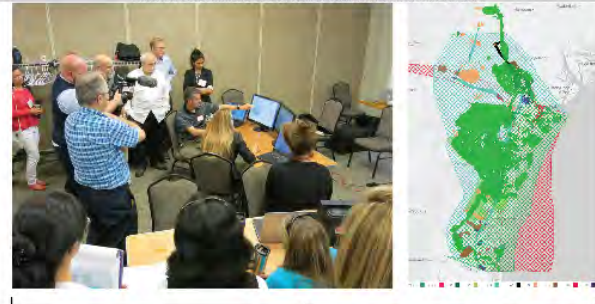


WORKSHOP DAY 1

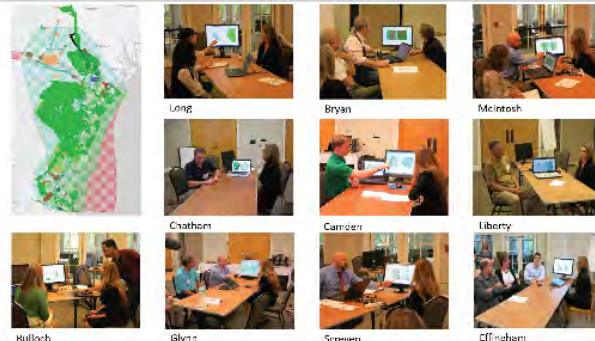
FINAL DESIGN VERSIONS



REGIONAL CONSERVATION & DEVELOPMENT TEAM NEGOTIATIONS AND RESULTS



REGIONAL NEGOTIATIONS WITH COUNTY TEAMS

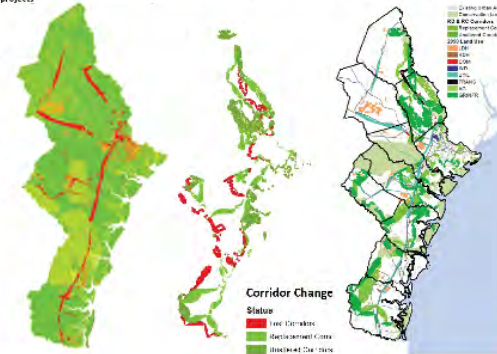


WORKSHOP DAY 2

WORKSHOP RESULTS

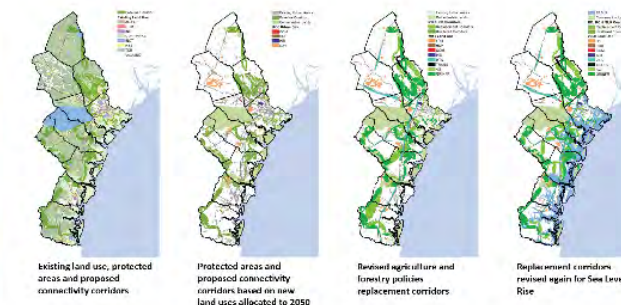
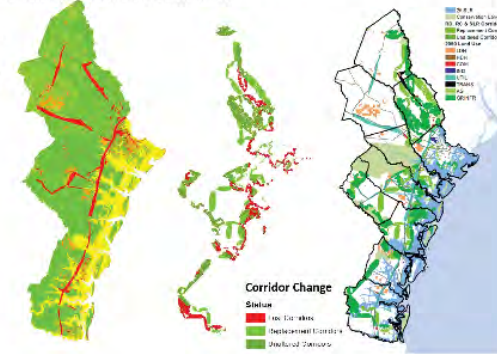
Future 2050 changes in Green Infrastructure connectivity based on existing land use, proposed connectivity corridors and projected future land use policies & allocated projects

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

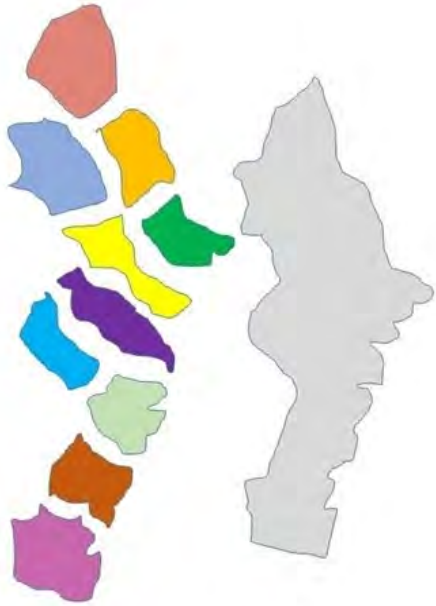
There is considerable loss of connectivity due to sea rise. Replacement corridors are proposed (bright green).



existing land use, protected areas and proposed connectivity corridors. Protected areas and proposed connectivity corridors based on new land uses allocated to 2050. Revised agricultural land and forestry policies replacement corridors. Replacement corridors revised again for Sea Level Rise.

Workshop Day 1

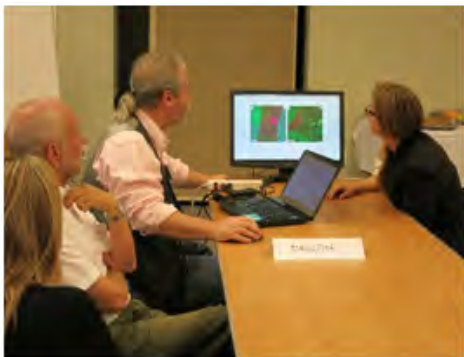
TEN COUNTY TEAMS MAKING VERSIONS 1 AND 2 OF THE CHANGE DESIGNS



VERSION 1
INDEPENDENT



Long



Bryan



McIntosh



Chatham



Camden



Liberty



VERSION 1
INDEPENDENT



VERSION 2
RELATED



VERSION 3
INTEGRATED



Glynn

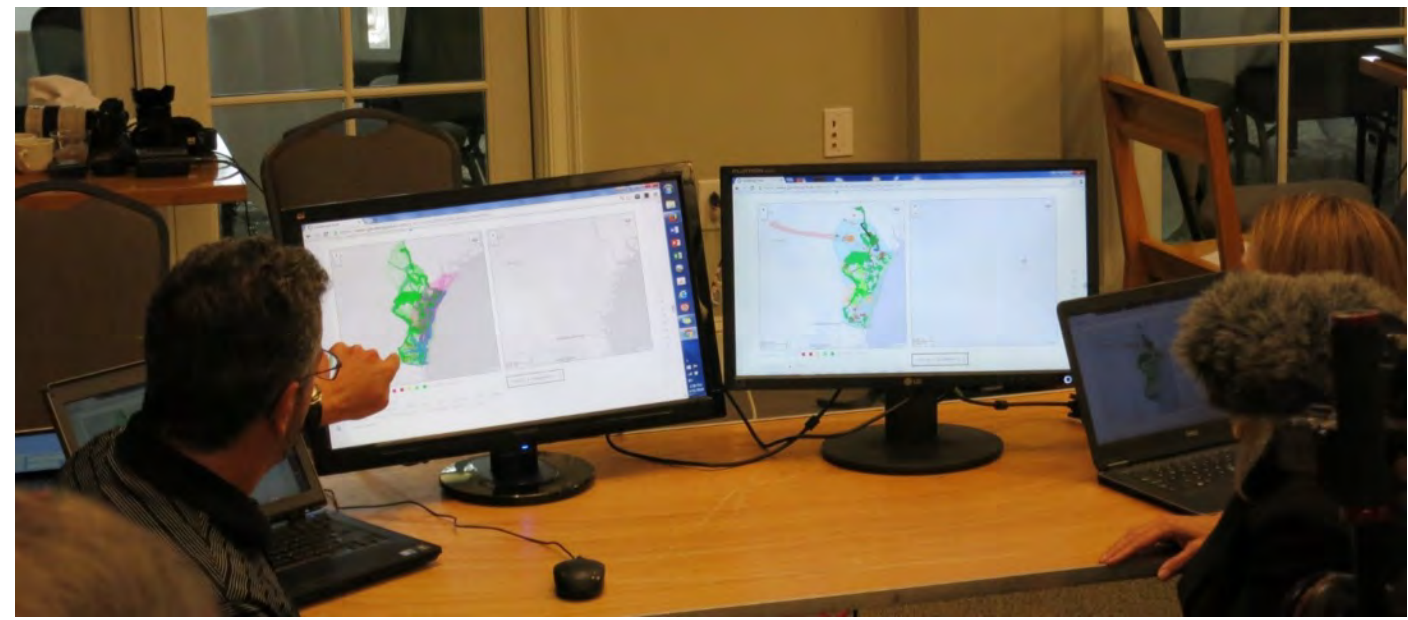
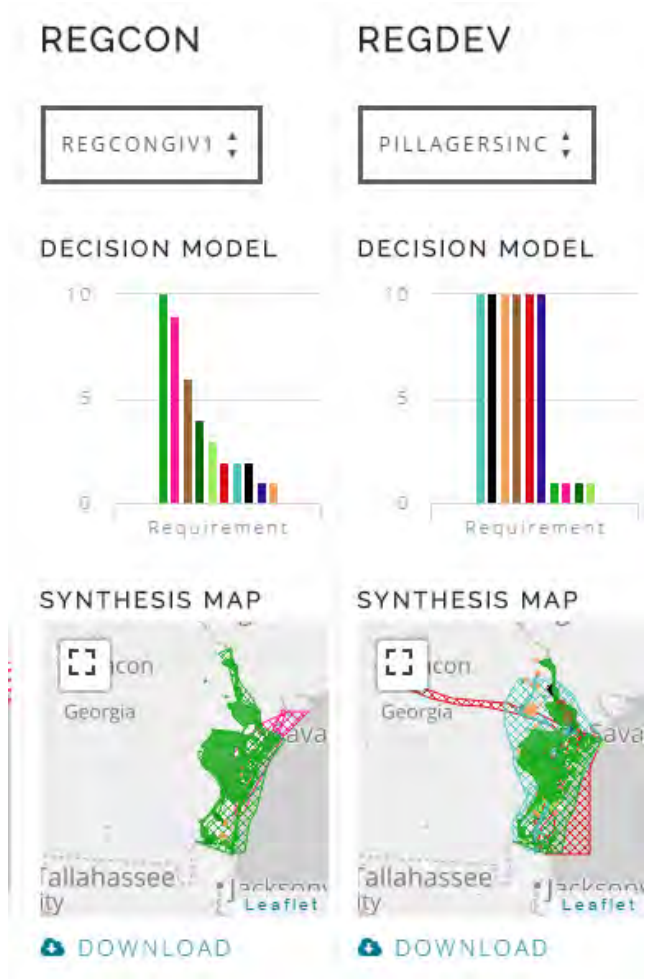


Screven



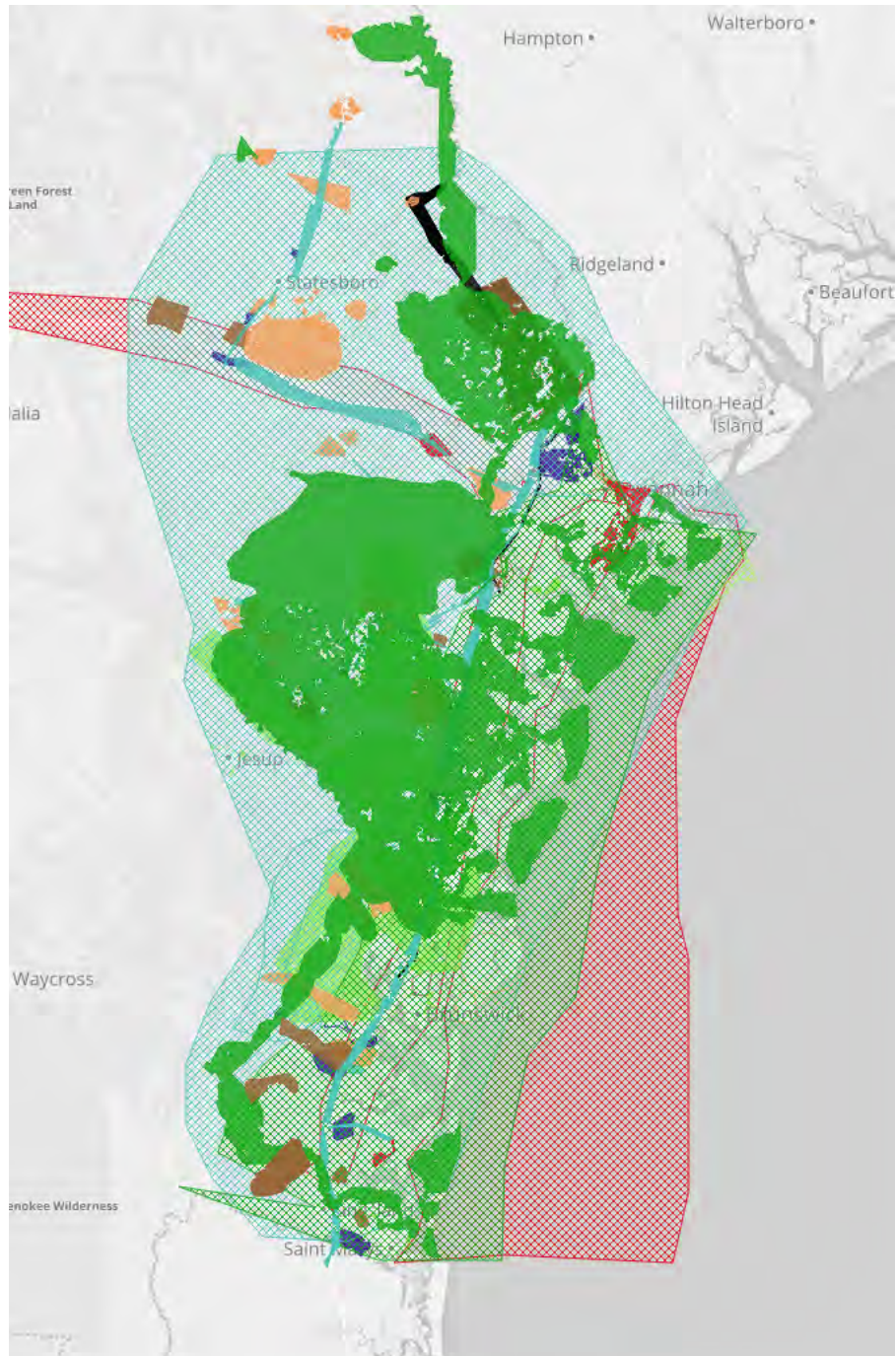
Effingham

NEGOTIATION BETWEEN REGCON AND REGDEV



RESULT OF
NEGOTIATION
BETWEEN
REGCON AND REGDEV

AND THE NEED TO
NEGOTIATE WITH
THE TEN COUNTY
CHANGE TEAMS



GEODESIGN HUB DESIGN VERSION NAMES

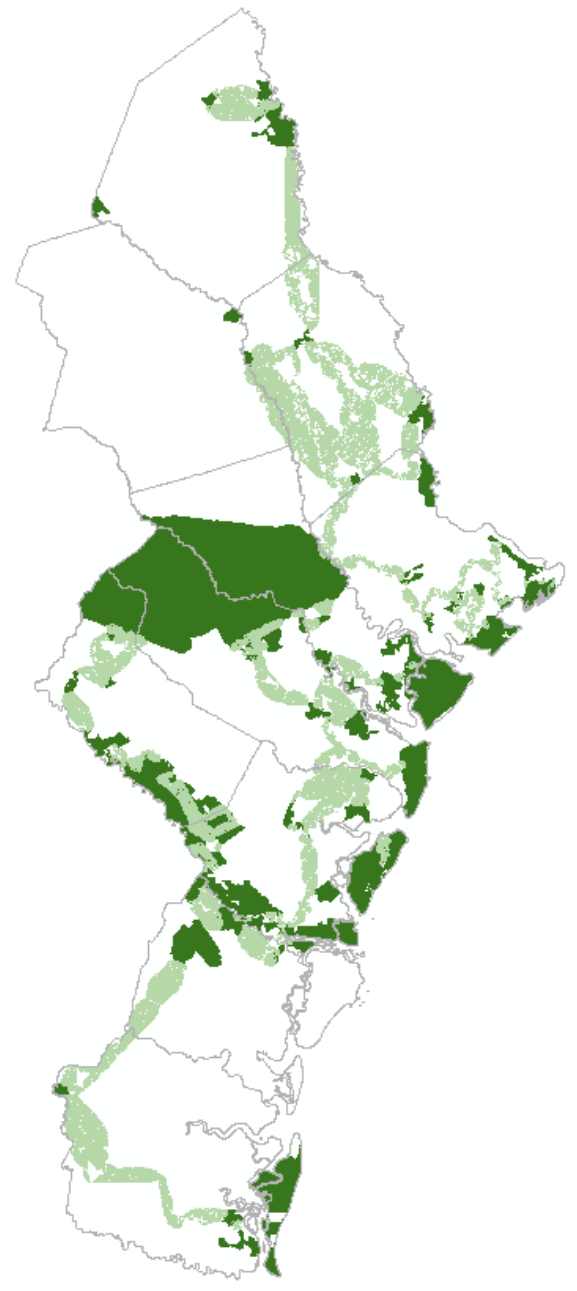
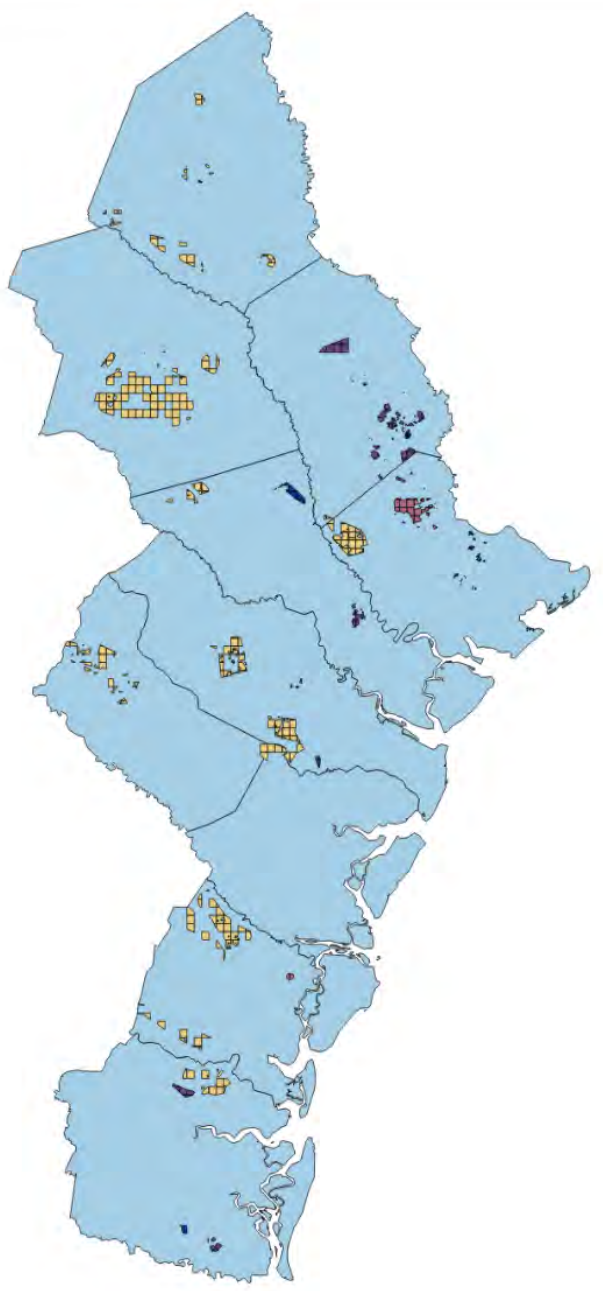
TEAMS	FIRST DESIGN v1	END OF DAY 1 v2	LAST/FINAL DESIGN v3
① BRYAN	Bryan Cty v1	Bryan Cty v2	Bryan Cty v5
② BULLOCH	Bulloch Dgn v1	Bulloch Cnty v1	Bulloch FV v1
③ CAMDEN	Camden v1	Camden v2	Camden v3
④ CHATHAM	Green Infra 1	chert v1	Consrv Final
⑤ EFFINGHAM	Effingham v1	Effing 2	Effingham v5
⑥ GLYNN	first design	second design	Glynn 9
⑦ LIBERTY	LIBERTY v1	LIBERTY v2	LIBERTY v4
⑧ LONG	Long v1	Long v2	Long v3
⑨ MCINTOSH	McIntosh v1	McIntosh v3	McIntosh v4
⑩ SCREVEN	3.1	3.6	v6.1
⑪ REG. CON	REGCON v1	REGCON v2	REGCON v14
⑫ REG. DEV	REGDEV 1	REGDEV 2	REGDEV 4

Layers Panel

- Commerce-op OGRGeoJSON Polygon
- HD Housing-op OGRGeoJSON Polygon
- Industry-op OGRGeoJSON Polygon
- LD Housing-op OGRGeoJSON Polygon
- county-boundaries-simplified OGRGeoJSON MultiPolygon

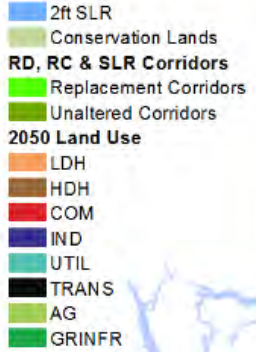
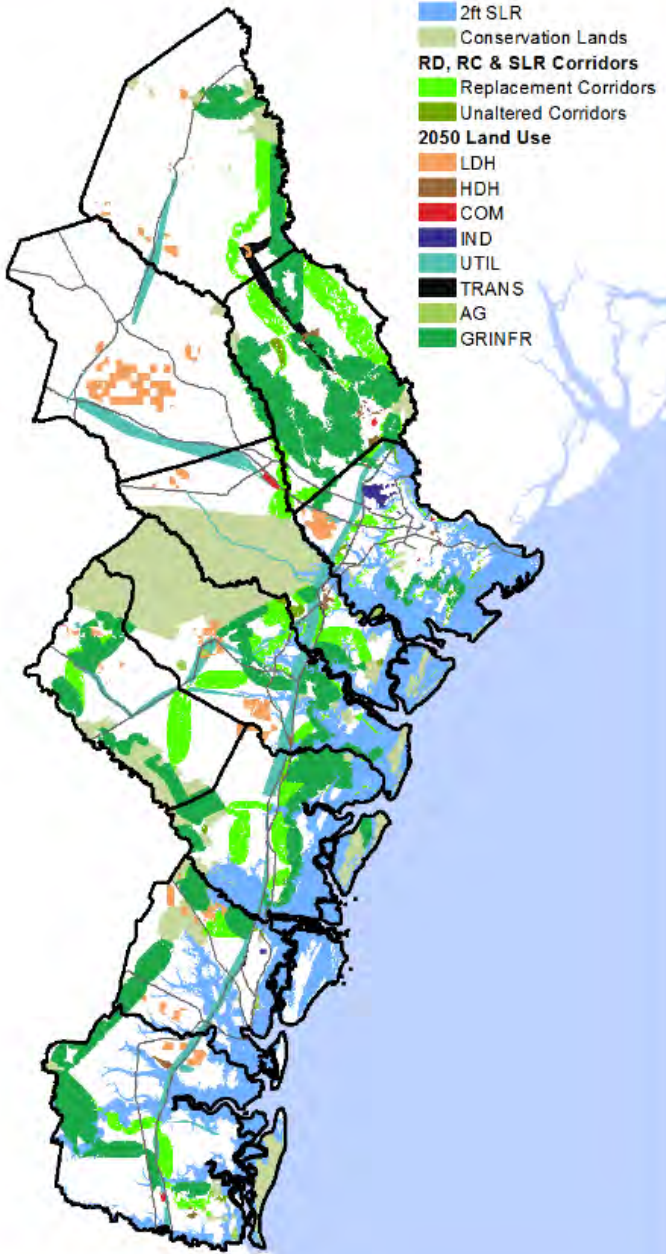
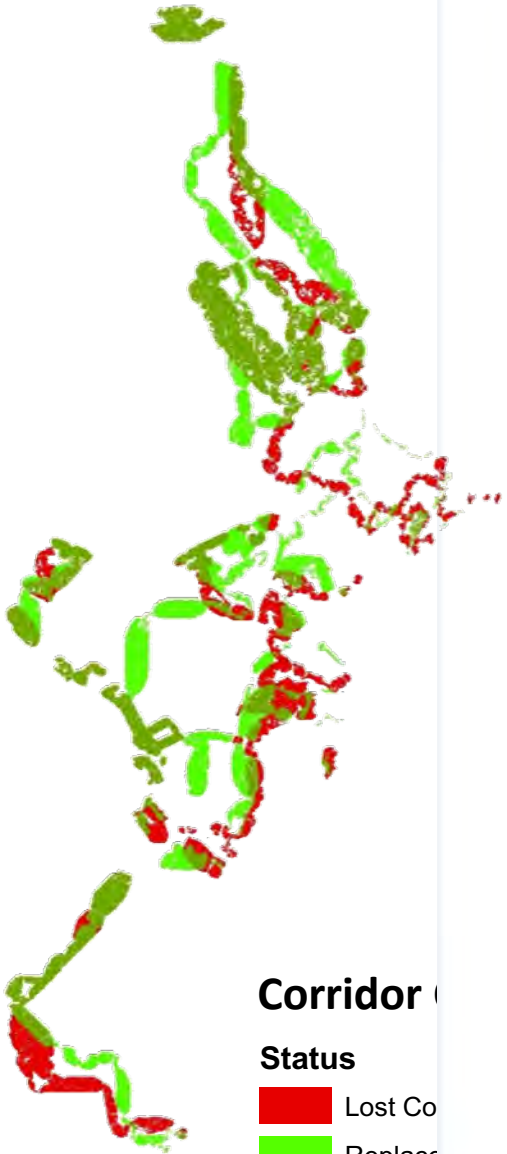
**REGIONAL
URBAN LAND USES
ALLOCATION BASED ON
THE FINAL RESULT
OF NEGOTIATIONS
BETWEEN THE REGIONAL
CONSENSUS DESIGN
AND THE TEN COUNTY
CHANGE TEAMS
by the exogenous
Geodesignhub
allocation model**

**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 REFLECT 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.

Acknowledgment



Rosanna Rivero, Alison Smith, Brian Orland, Jon Calabria,
College of Environment and Design, University of Georgia, US

Hrishikesh Ballal, Carl Steinitz, *Geodesignhub.com*

Ryan Perkl, *ESRI (formerly Arizona State University)*

Lupita McClenning and Hunter Key, *Coastal Regional Commission of Georgia*

