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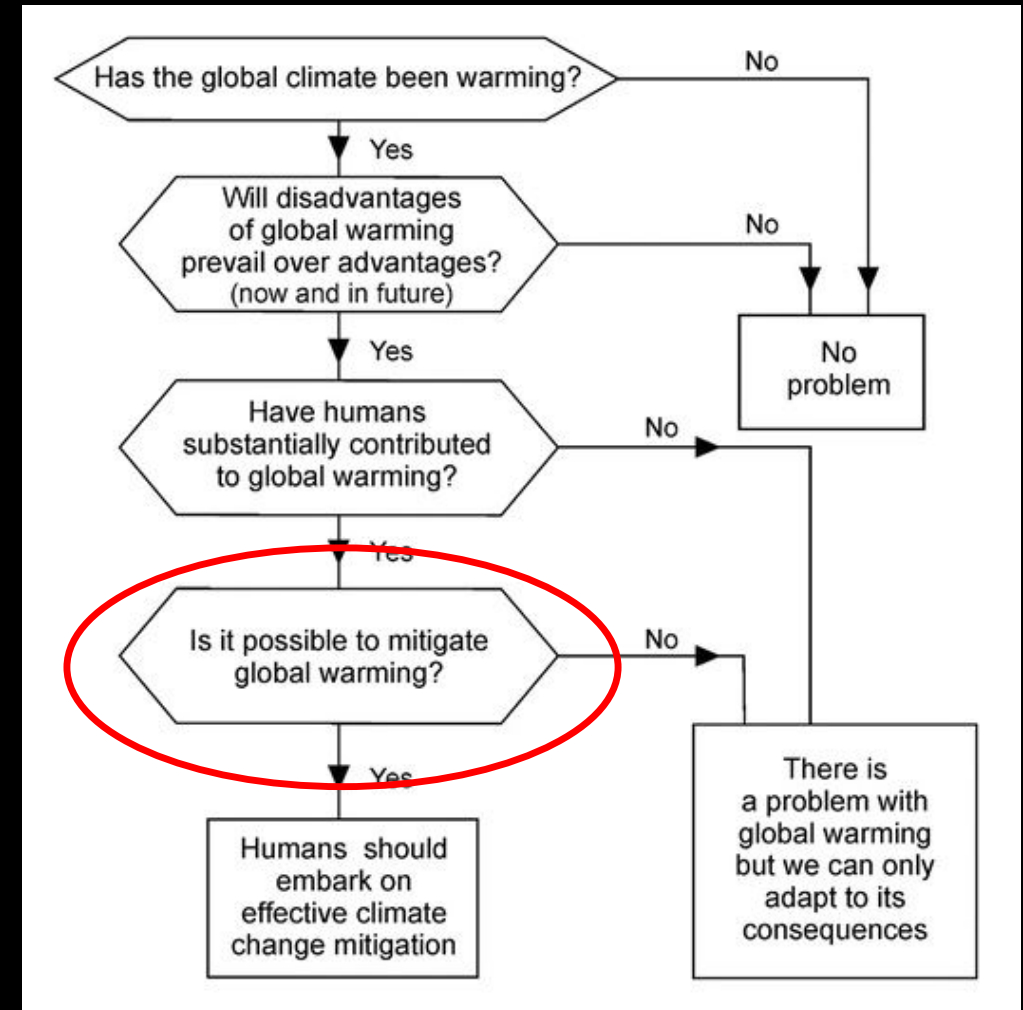
Micah Taylor

College of Environment + Design
UNIVERSITY OF GEORGIA
1785

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.
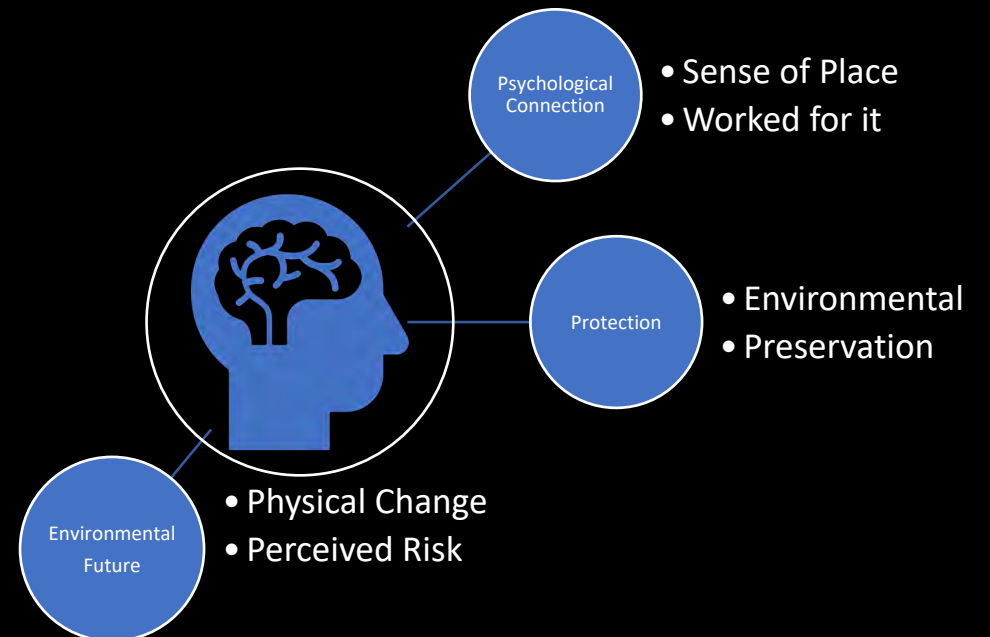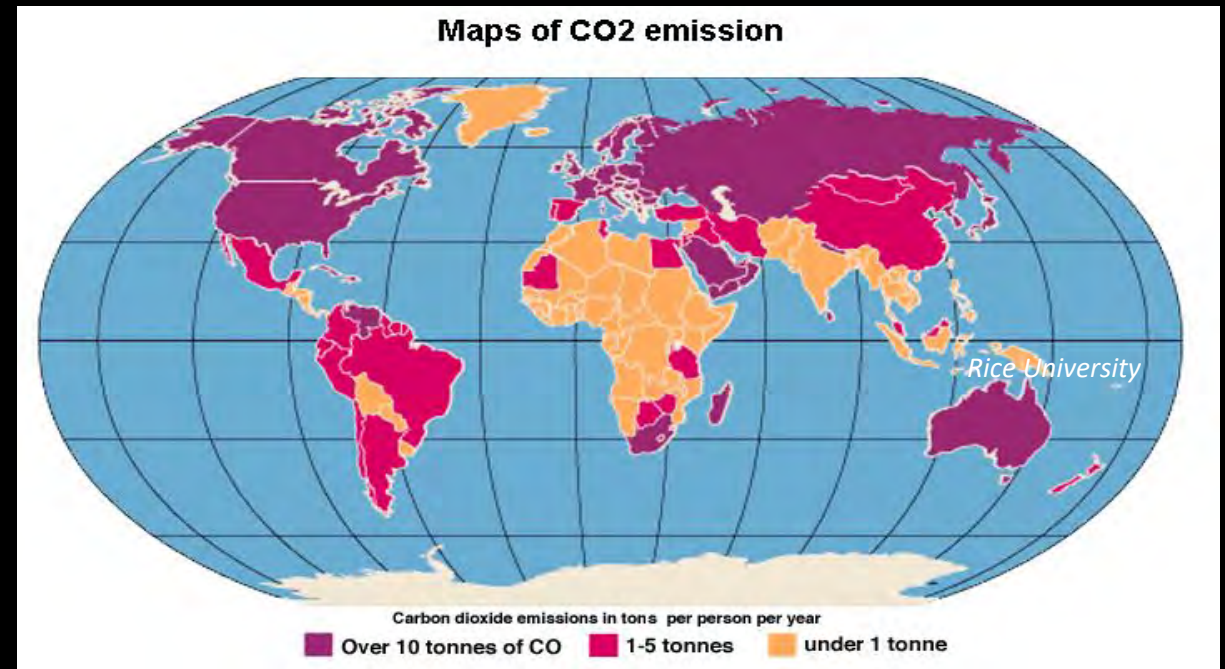
Scranton, Roy. 2015. Learning to die in the Anthropocene : reflections on the end of a civilization. San Franciso, CA: City Lights Books.
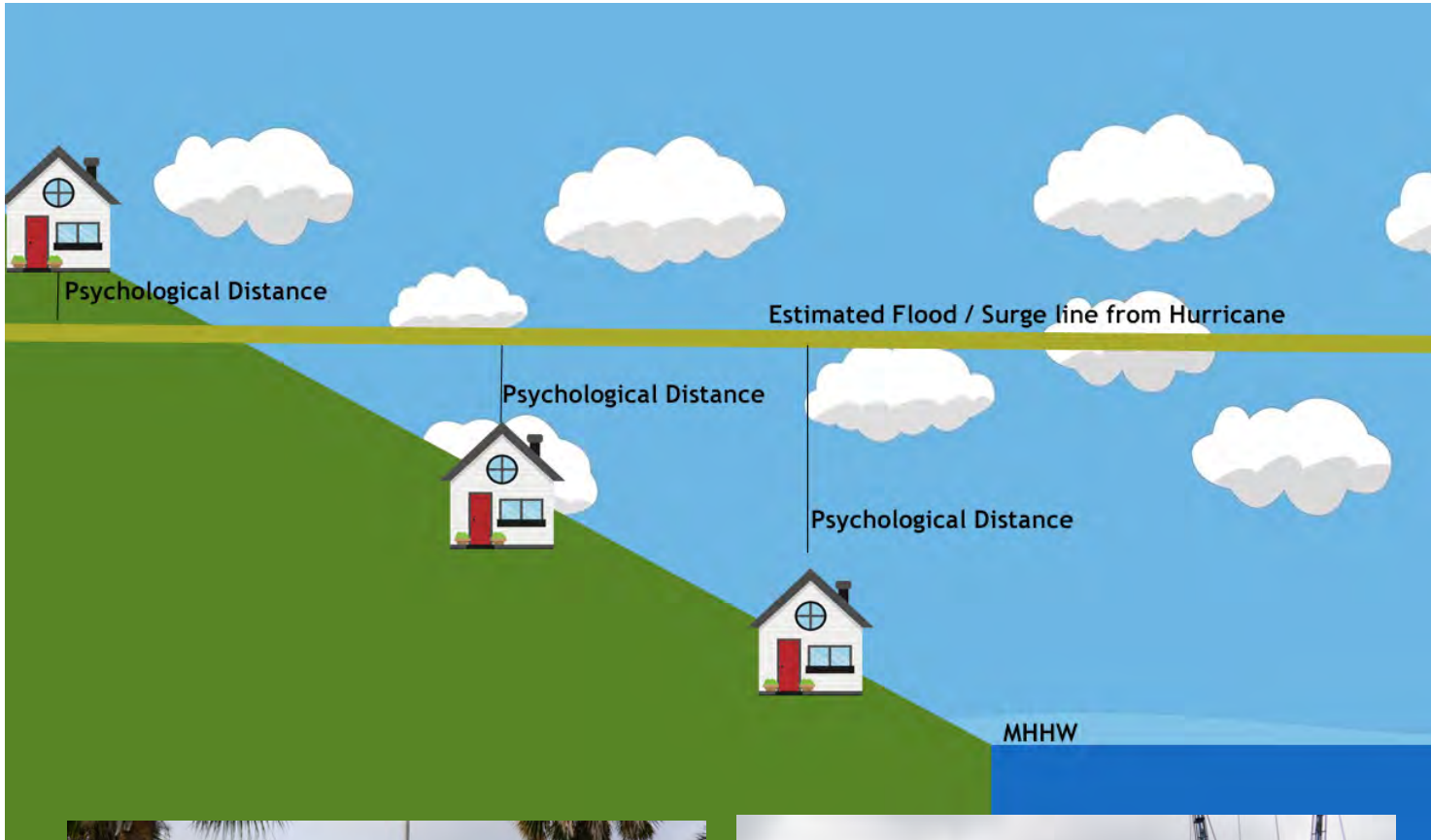
There is a need for more studies on the social basis for climate change asking why people hold the attitudes they do, rather than the dominant tendency to ask how to change attitudes and behavior.

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.

Maps of CO2 emission

Rice University

Carbon dioxide emissions in tons per person per year
Over 10 tonnes of CO | 1-5 tonnes | under 1 tonne

Psychological Connection
• Sense of Place
• Worked for it

Protection
• Environmental
• Preservation

Environmental Future
• Physical Change
• Perceived Risk

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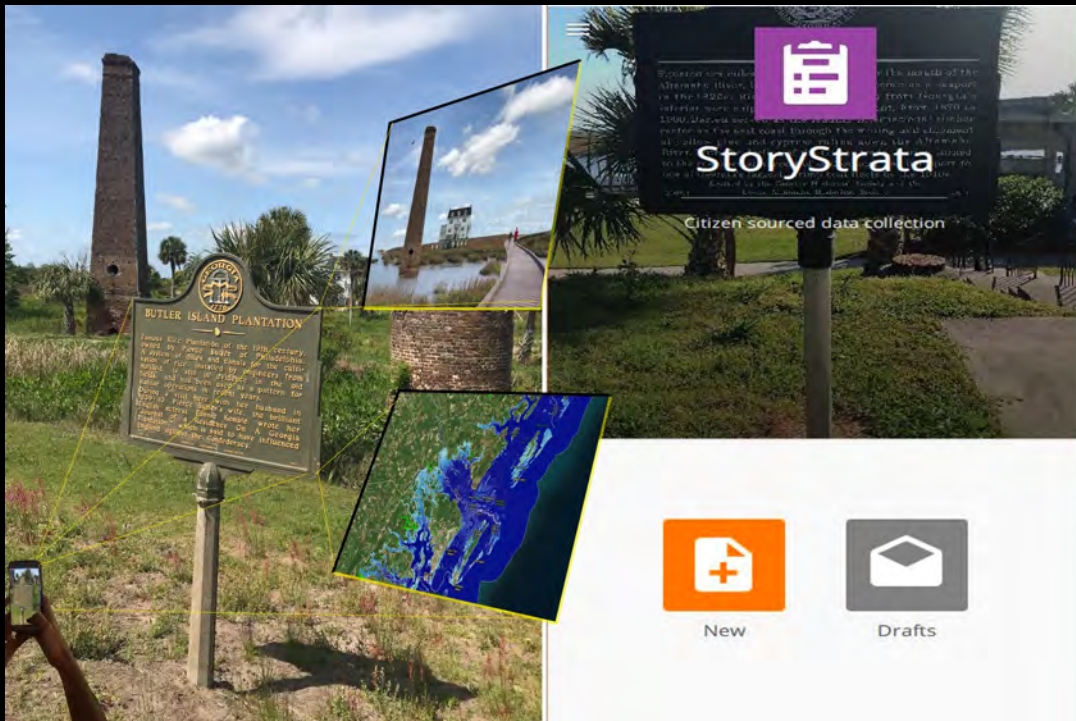
Milfont, Taciano L., Laurel Evans, Chris G. Sibley, Jan Ries, and Andrew Cunningham. 2014. "Proximity to Coast Is Linked to Climate Change Belief." *PLOS ONE 9 (7):e103180. doi: 10.1371/journal.pone.0103180.*

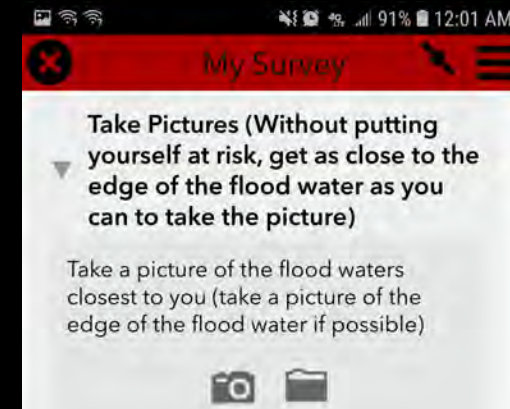*Relph, Edward C. 1976*. *Place and Placelessness. London: Pion.*

Two Mobile Applications

Coastal AR application
Qualitative

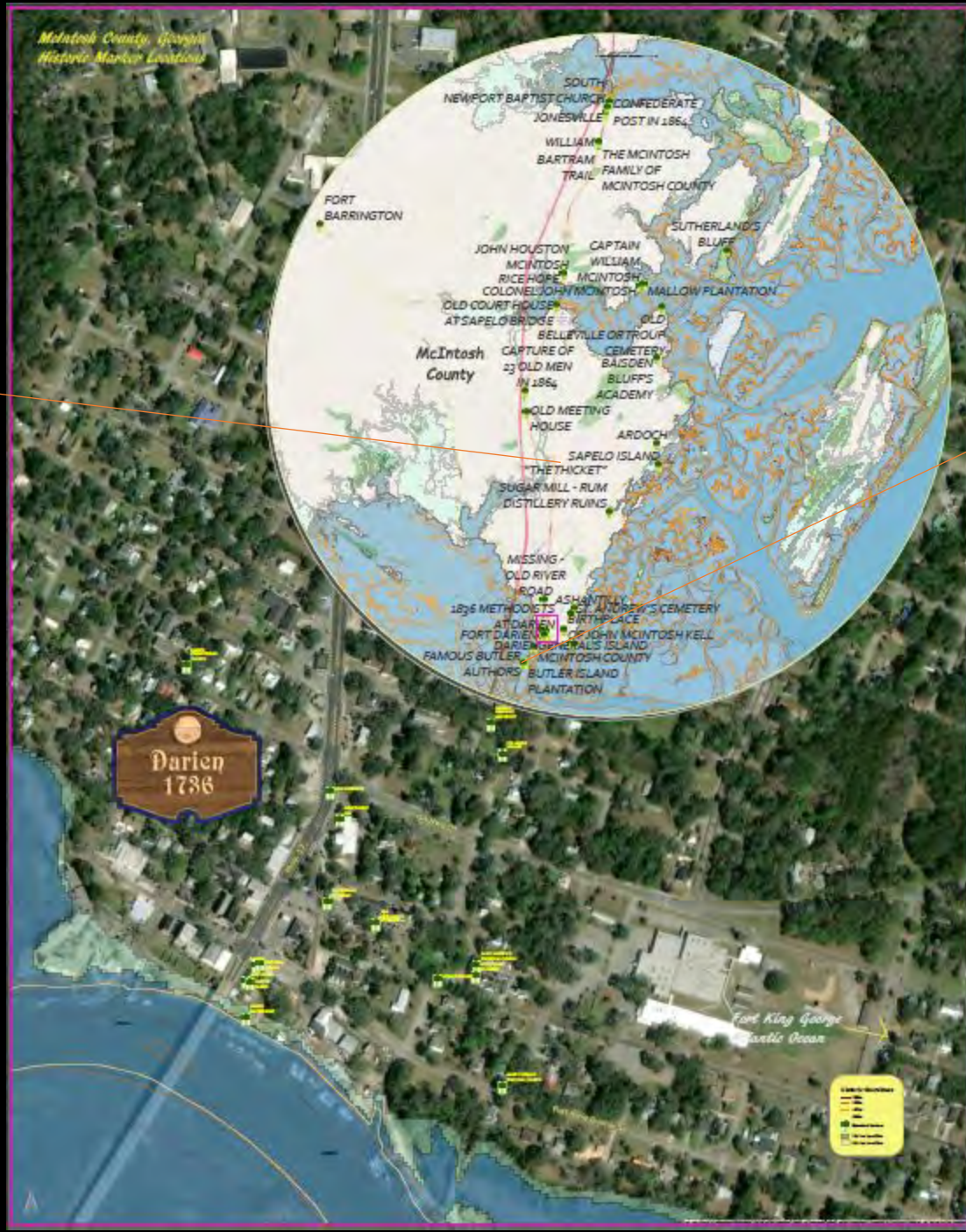**Flood Data Collection (ArcGIS)**
Quantitative

POKLMON GO IN REAL LIFL!

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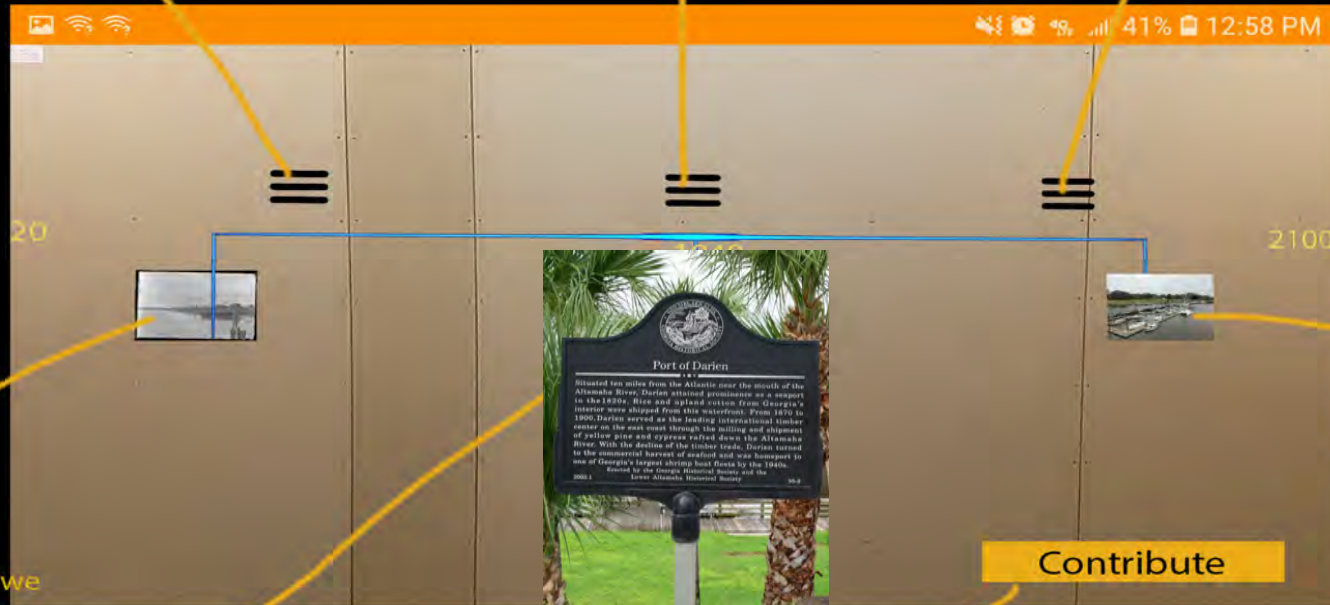- Tourism
- Jelly Ball

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

20   2100

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

Contribute

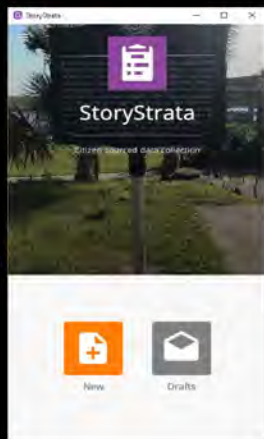This will be the historic marker
(currently a printout of the header
from the marker)

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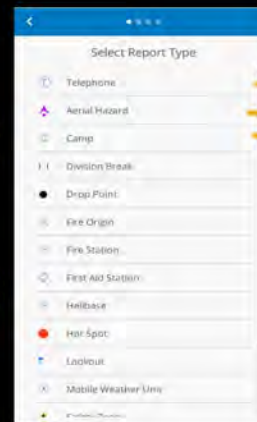
These data colletion pages came straight from the 'Quick Report' code from ArcGIS App Studio (the qml based Qt project in the google drive) so the code to write to the feature layer should be in there.

StoryStrata

Citizen sourced data collection

New   Drafts

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.

Select Report Type

Telephone
Aerial Hazard
Camp
Division Break
Drop Point
Fire Origin
Fire Station
First Aid Station
Helibase
Hot Spot
Lookout
Mobile Weather Unit

Past
Present
Future

Send to relative list on the AR timeline

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.

Add Location

Move map to refine location.

Darien

Licensed For Developer Use Only
Glynn County Georgia, Esri, HERE, Garm... Powered by Esri
31.368N 081.434W

Next

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 (io which case they dont need to mark it again) or they simply dont want to share the location.

Add Media

Add up to 6 attachments. Audio is limited to one. Large images will be resized to 1024 pixels.

Camera   Album   Audio

Next

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

Debris line

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

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

Unreliable: stain line

Good: seed line

FIMAN Flood Inundation Mapping and Alert Network

Search Gages   Gages Summary | Legend   Building Legend   We

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

Gage Level

Gage Symbols
- ● Current Condition
- ○ Forecast Peak Condt'n

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 🔍   ▲ Report

Last updated Mar 1, 2019 at 1:00 PM   **Gage datum:** -3.5ft NAVD88   **Site ID:** 0208400000   **Owner:** USGS

Stage: 16.6 ft	21200 cfs		Peak Stage: 17.1 ft	2 buildings damaged	
13.1 ft NAVD88			3/3 7:00 AM	$6,000	
			No Data Available		
Stream Elevation	Flow	Context	Forecasted Peak	Damages	Impact

Showing 293 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

twitter

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

© Esri contributors

Mississippi, *The Guardian*

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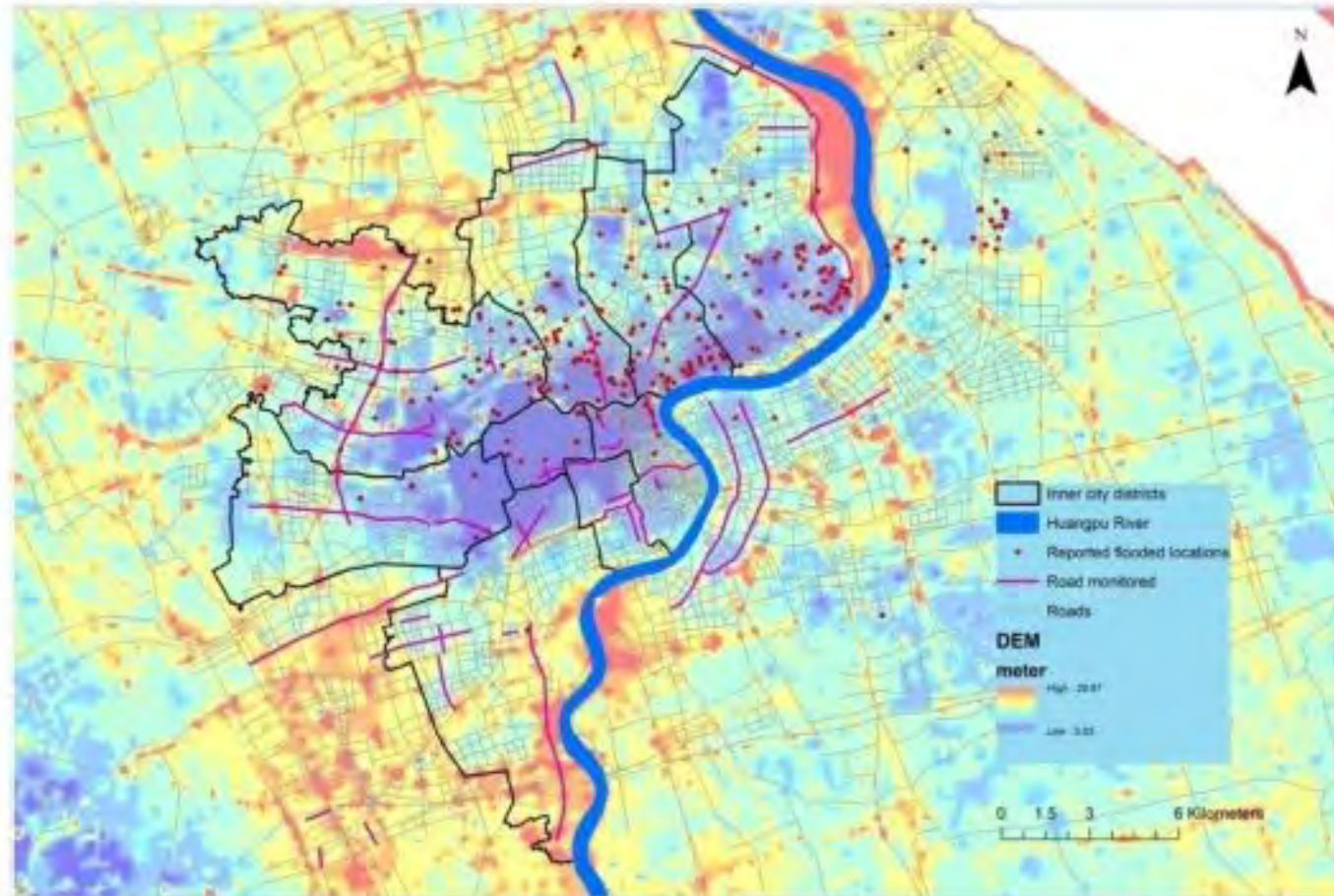

Figure 3. Roads where digital meters are installed by the government, and locations where local flood incidents were reported by the public during the 12 August 2011 event.

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