

Salt Marsh & Blueprint 2.0

Amy Keister

7/19/2015



SOUTH ATLANTIC
LANDSCAPE CONSERVATION COOPERATIVE



**LANDSCAPE CONSERVATION
COOPERATIVES**

Intro to the South Atlantic LCC

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What is the South Atlantic LCC?

A **forum** in which federal and state agencies, non-profits, businesses and communities work together to develop a **shared vision** of landscape sustainability,

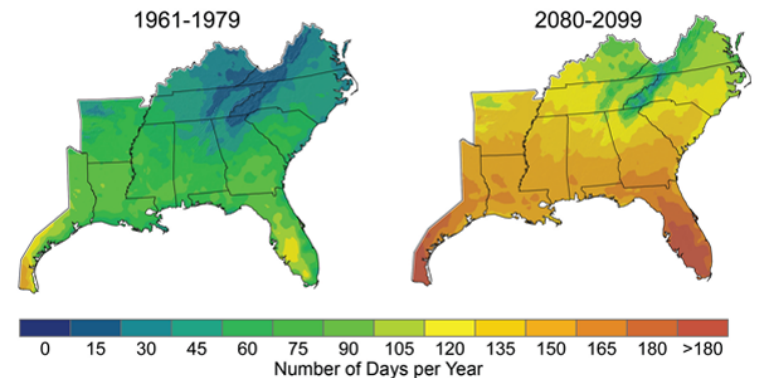
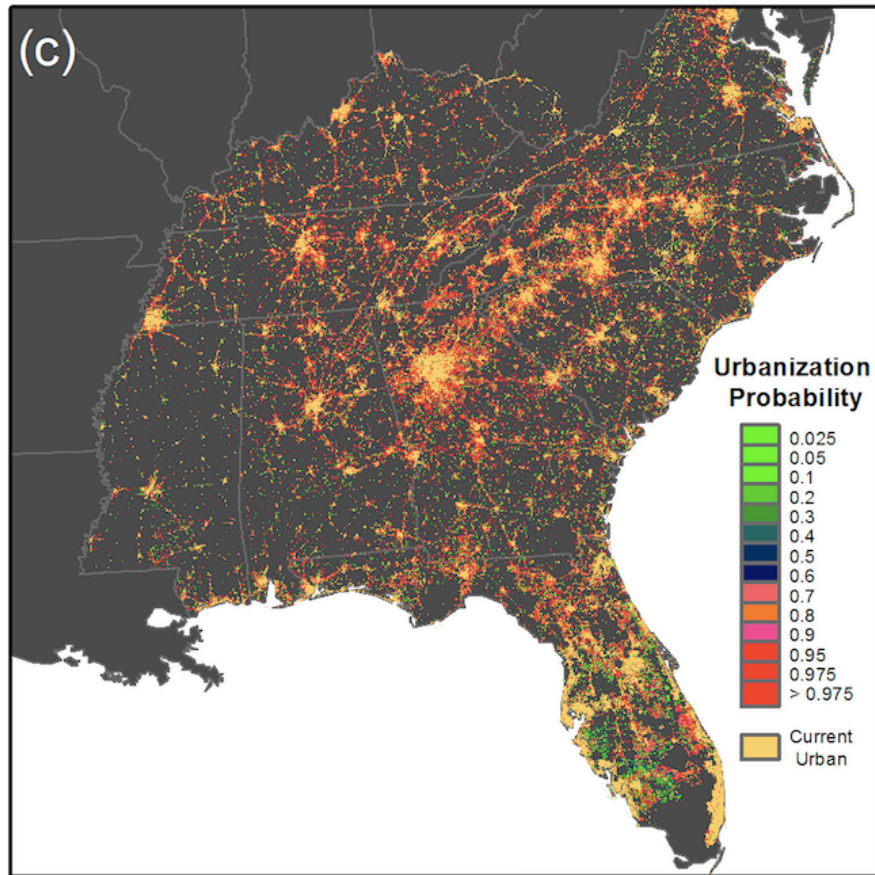
cooperate in its implementation,

and **collaborate** in its refinement.



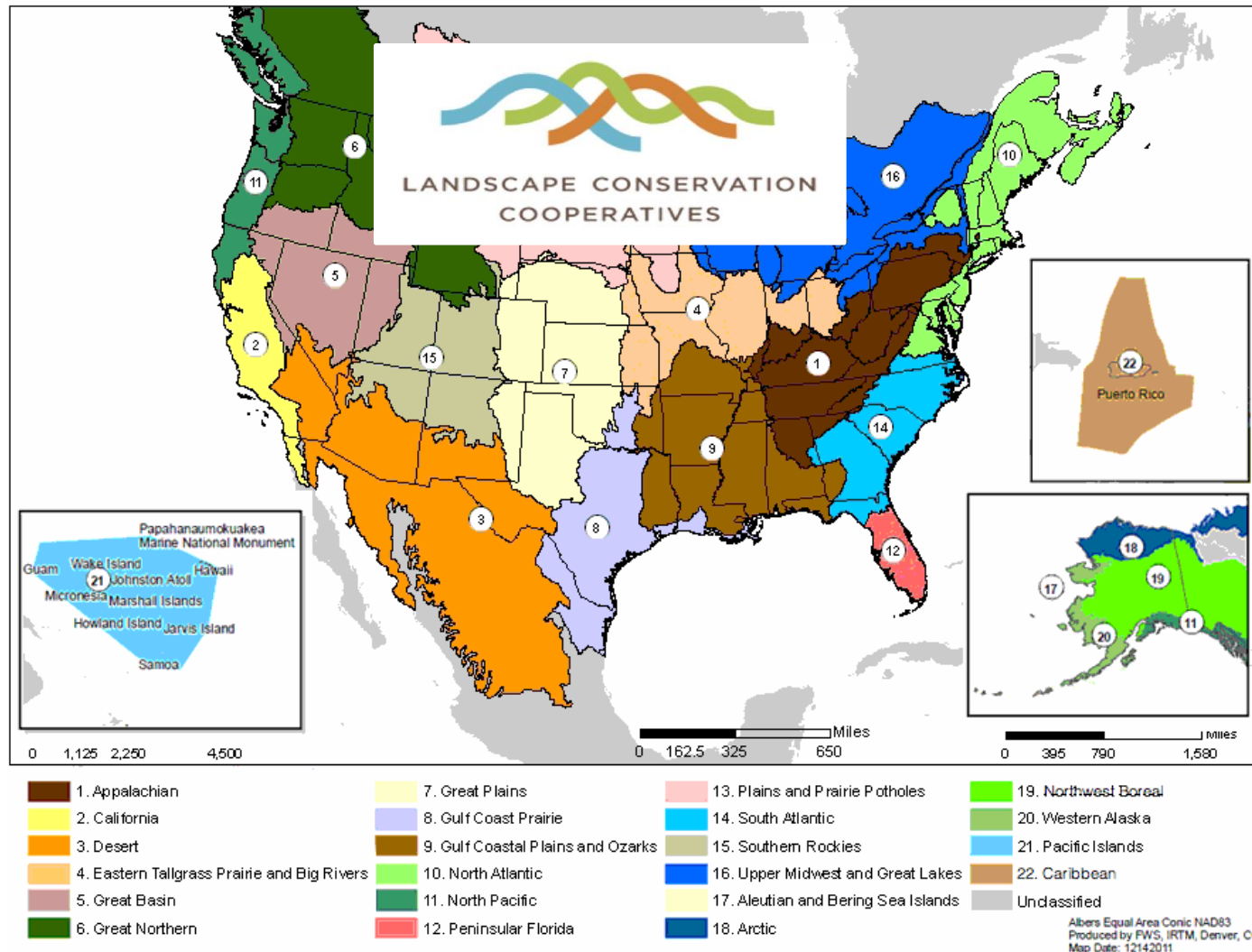
Intro to the South Atlantic LCC

Why Cooperate?



Intro to the South Atlantic LCC

Part of a larger network



Intro to the South Atlantic LCC

The Steering Committee



**US Army Corps
of Engineers®**

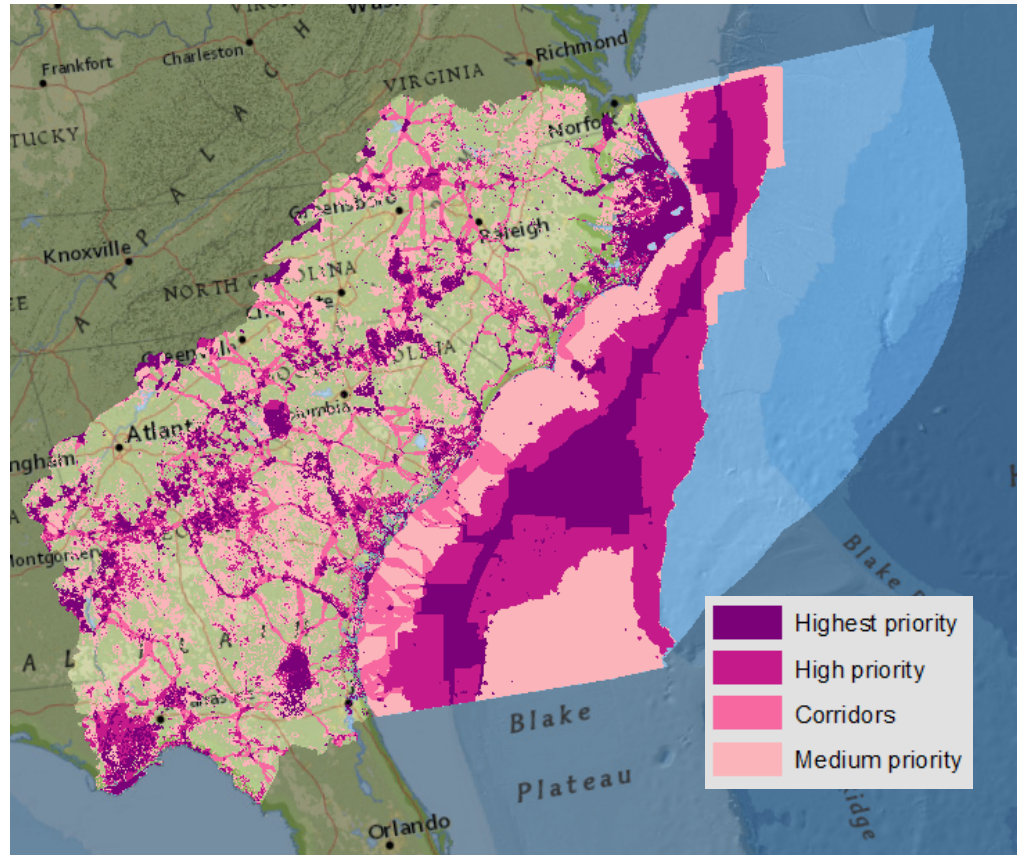
SOUTH ATLANTIC DIVISION



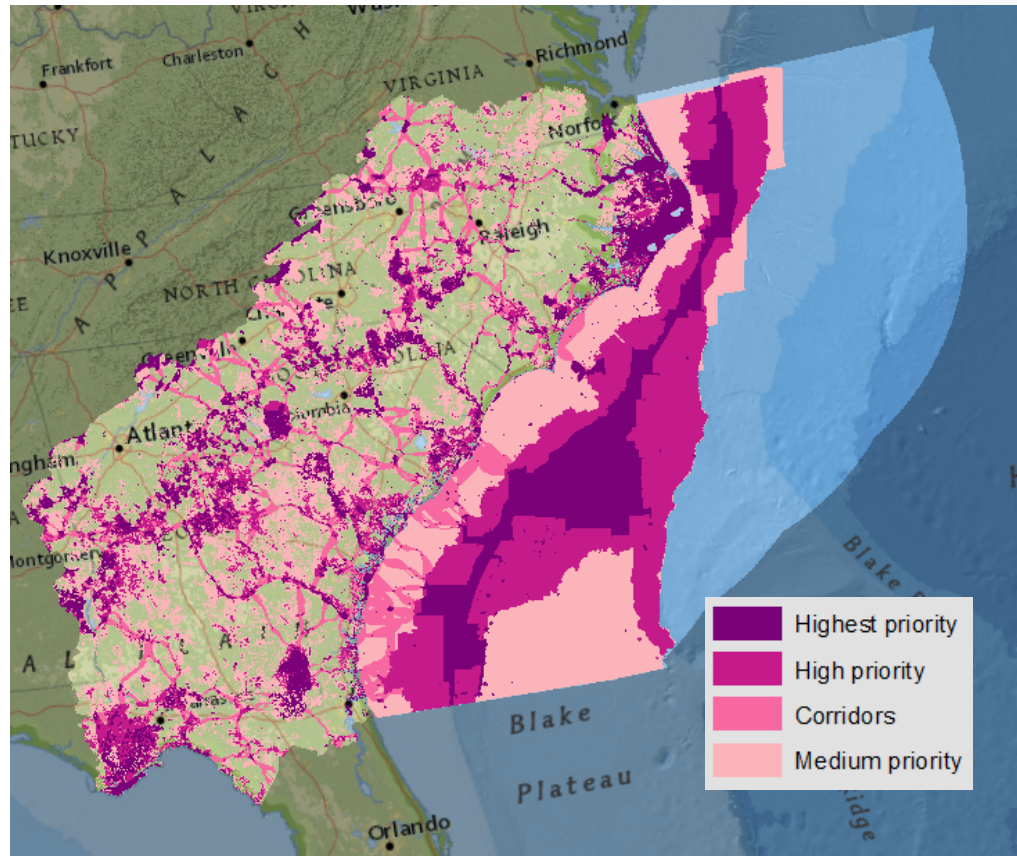
Intro to the South Atlantic LCC

Mission

Create a shared
blueprint for
landscape
conservation actions
that sustain natural
and cultural
resources



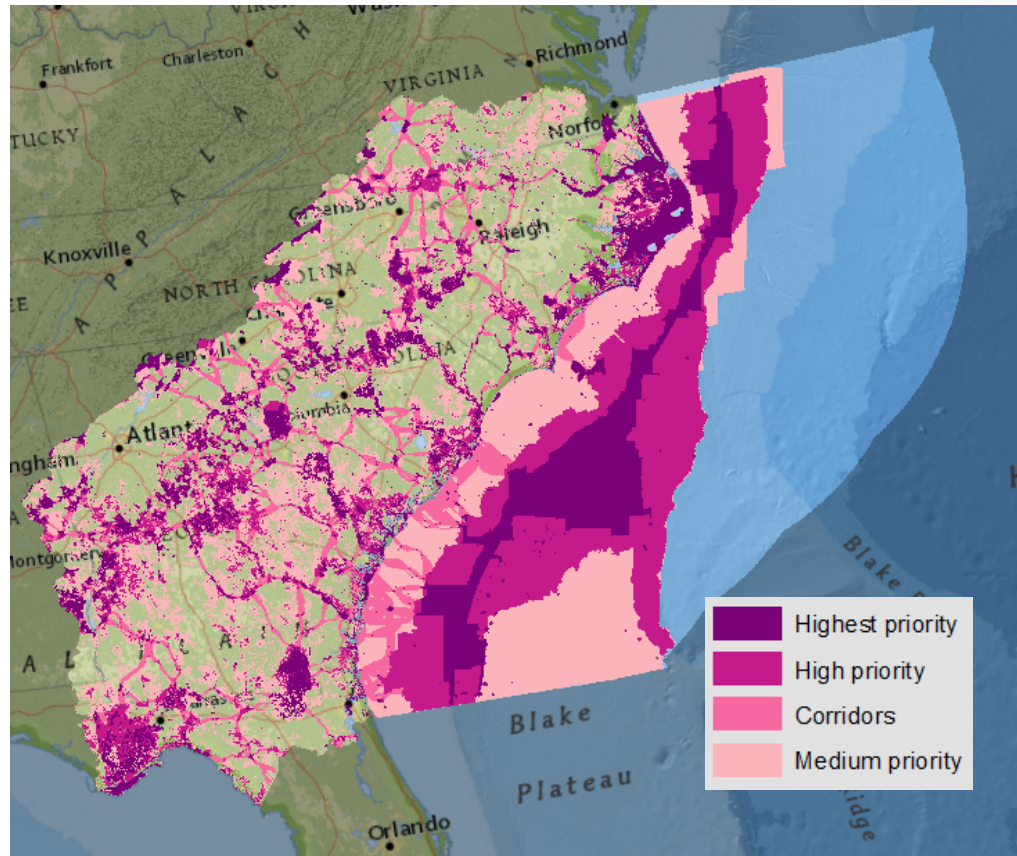
The Conservation Blueprint



The Conservation Blueprint

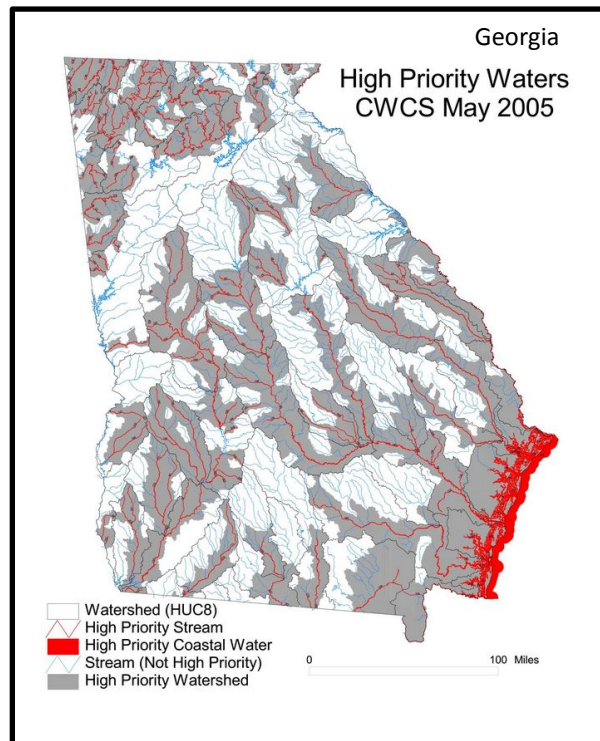
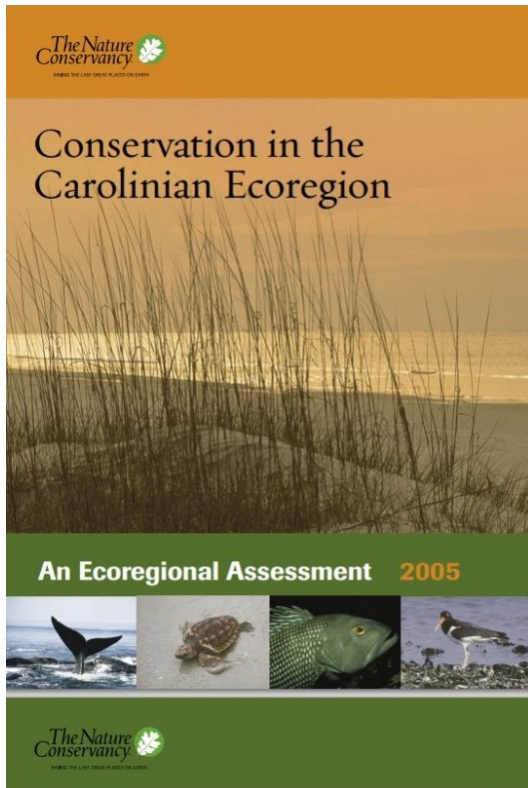
What is the Blueprint?

A spatially-explicit,
living plan that
describes the places
and actions needed to
meet the
Cooperative's shared
conservation
objectives in the face
of future change



The Conservation Blueprint

The idea is not new



The Conservation Blueprint

So, what's different from past efforts?

- Planning for the Cooperative, not any one organization
- An adaptation strategy (incorporating climate change, urban growth, and other future changes)
- Bigger scope and scale

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The Conservation Blueprint

How can the Blueprint be used?

The Conservation Blueprint

How can the Blueprint be used?

- Finding the best places to partner
- Bringing in new conservation dollars
- Guiding infrastructure development
- Creating incentives as an alternative to regulation
- Bringing in landscape perspectives to local adaptation (how do I fit in?)
- Preparing for major disasters

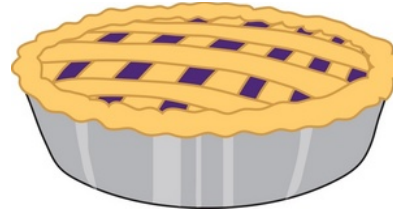


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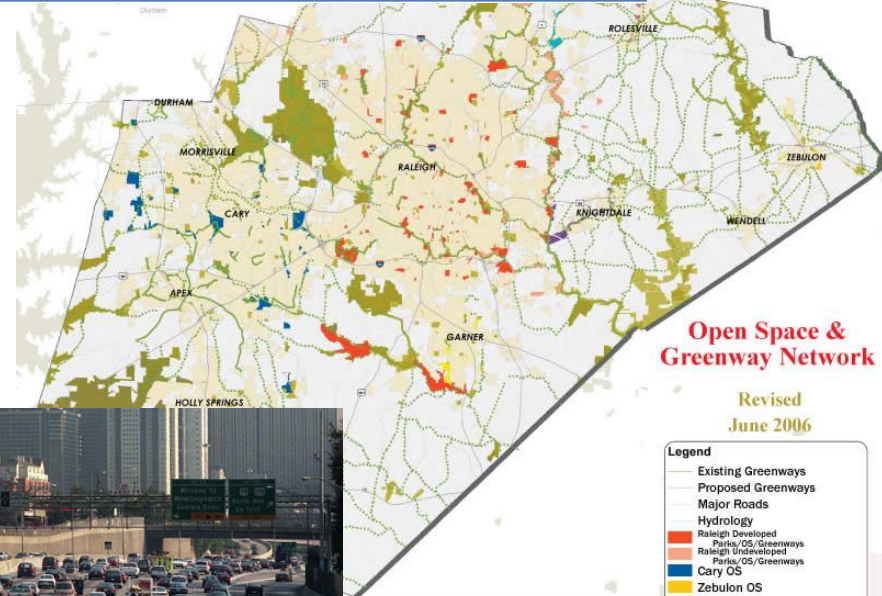
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Wake County
Open Space
Plan



- Legend
- Existing Greenways
 - Proposed Greenways
 - Major Roads
 - Hydrology
 - Raleigh Developed
 - Raleigh Undeveloped
 - Parks/OS/Greenways
 - Cary OS
 - Zebulon OS
 - Wake Forest OS
 - Rolesville OS
 - Garner OS
 - Fuquay-Varina OS
 - Knightdale OS
 - TJCOG OS
 - Wake County OS
 - Urban Areas



The Conservation Blueprint

How can the Blueprint be used?

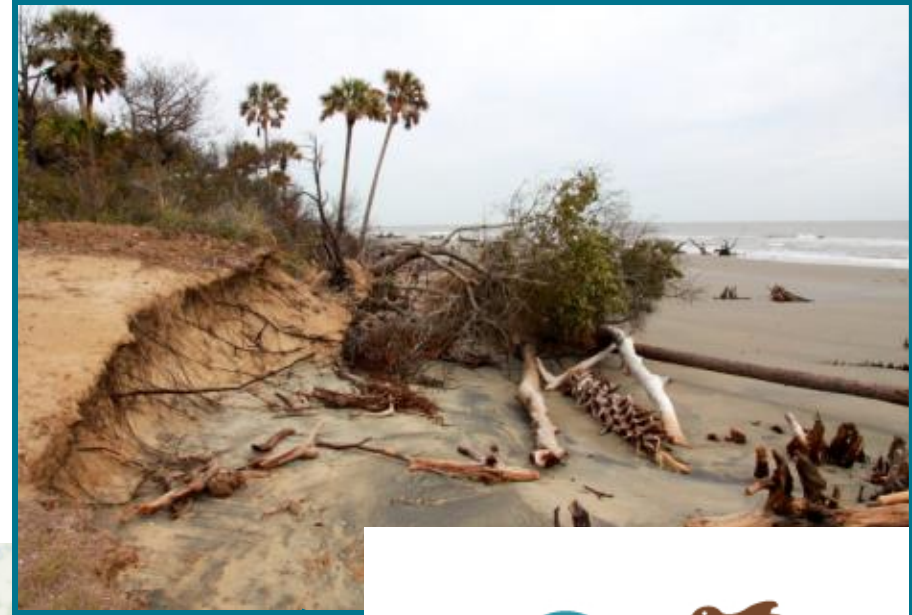
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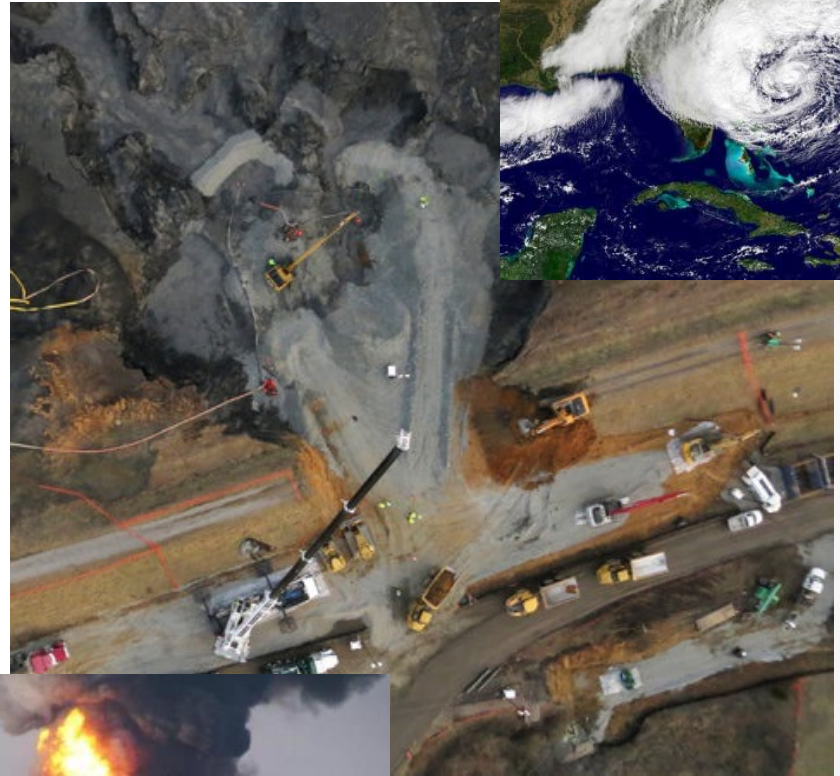


NATIONAL *fish, wildlife & plants*
CLIMATE ADAPTATION STRATEGY

The Conservation Blueprint

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The Conservation Blueprint

Blueprint 1.0

- Expert driven
- HUC 12



South Atlantic LCC Geographic Area



The lean startup method



The Conservation Blueprint

Blueprint 1.0

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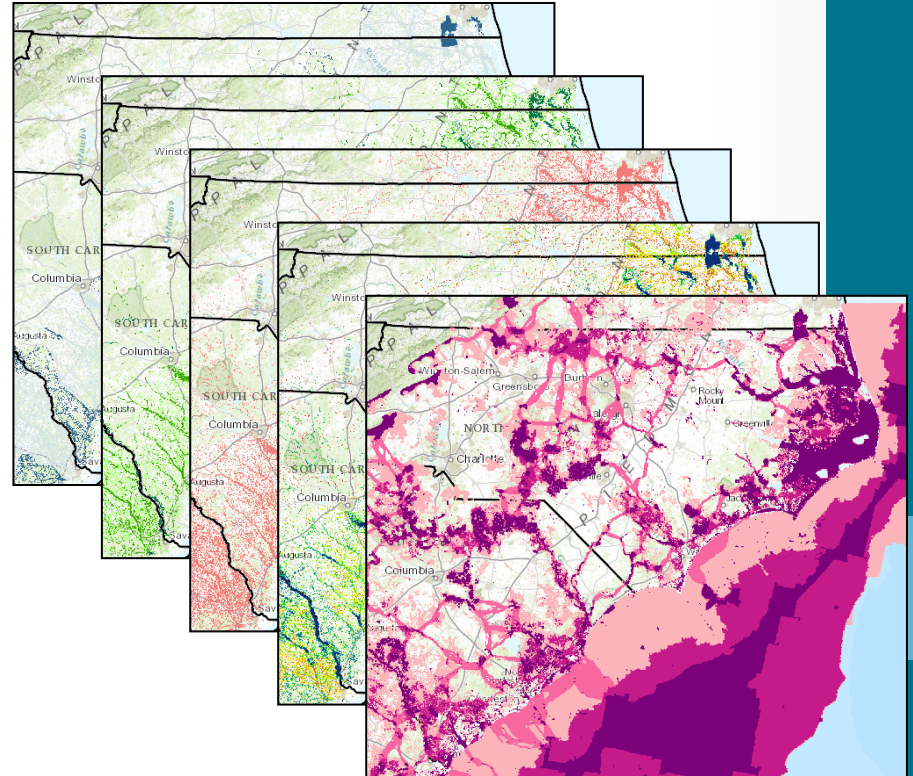


South Atlantic LCC Geographic Area



Blueprint 2.0

- Data driven
- 200 meter pixels



Indicators

Why are indicators needed?

- Design and evaluate the success of the **Blueprint**
- Simplify modeling and monitoring of complex ecosystems
- Represent other components of the system that are either too expensive or time consuming to model and measure.

How were indicators selected?

- Input from 235 experts in marine, freshwater, and terrestrial resources in the South Atlantic region and 9 experts representing all 5 adjacent LCCs.

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Indicators

Selection Criteria

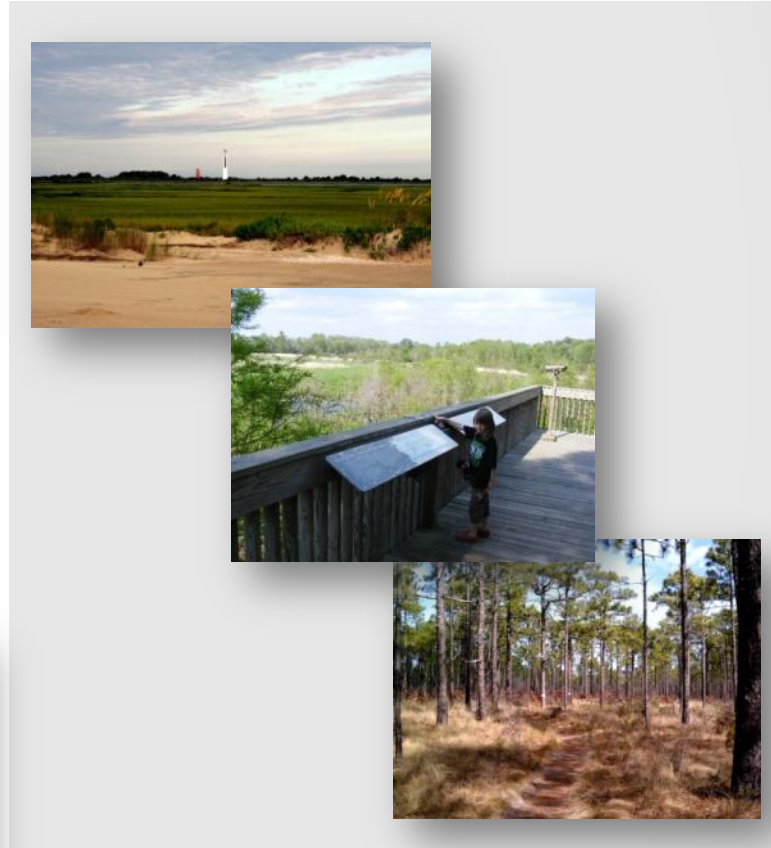
- **Ecological** (How well it represents a variety of other organisms/ ecological attributes and responds to landscape change),
- **Practical** (Can it be monitored and modeled based on current programs and resources)
- **Social** (How well do they resonate with a variety of audiences).

Indicators

- Ecosystem Integrity



- Intact Cultural Landscapes



Indicators

Ecosystems

Upland hardwood

Pine & prairie

Forested wetland

Freshwater marsh

Estuarine

Maritime forest

Beach & dune

Marine

- **Marine turtles & mammals:** index of highly productive areas for sea turtles, dolphins, and whales.
- **Potential hardbottom condition:** index of potential condition of deepwater corals and other hardbottom habitats.
- **Primary productivity:** index of ocean ecosystem productivity based on chlorophyll measurements.

Indicators

Ecosystems

Upland hardwood

Pine & prairie

Forested wetland

Freshwater marsh

Estuarine

Maritime forest

Beach & dune

Marine

Cross-ecosystem Indicators

Freshwater aquatic

Waterscapes

Landscapes

- **Structural connectivity:** important hubs and corridors for ecological connectivity.
- **Low road density:** index of areas with few roads.
- **Resilient biodiversity hotspots:** index of mostly natural high-diversity areas potentially resilient to climate change.
- **Low-urban historic landscapes:** index of National Historic Register Sites surrounded by limited urban development.

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Indicators

SALT MARSH?

Ecosystems

Upland hardwood

Pine & prairie

Forested wetland

Freshwater marsh

Estuarine

Maritime forest

Beach & dune

Marine

Cross-ecosystem Indicators

Freshwater aquatic

Waterscapes

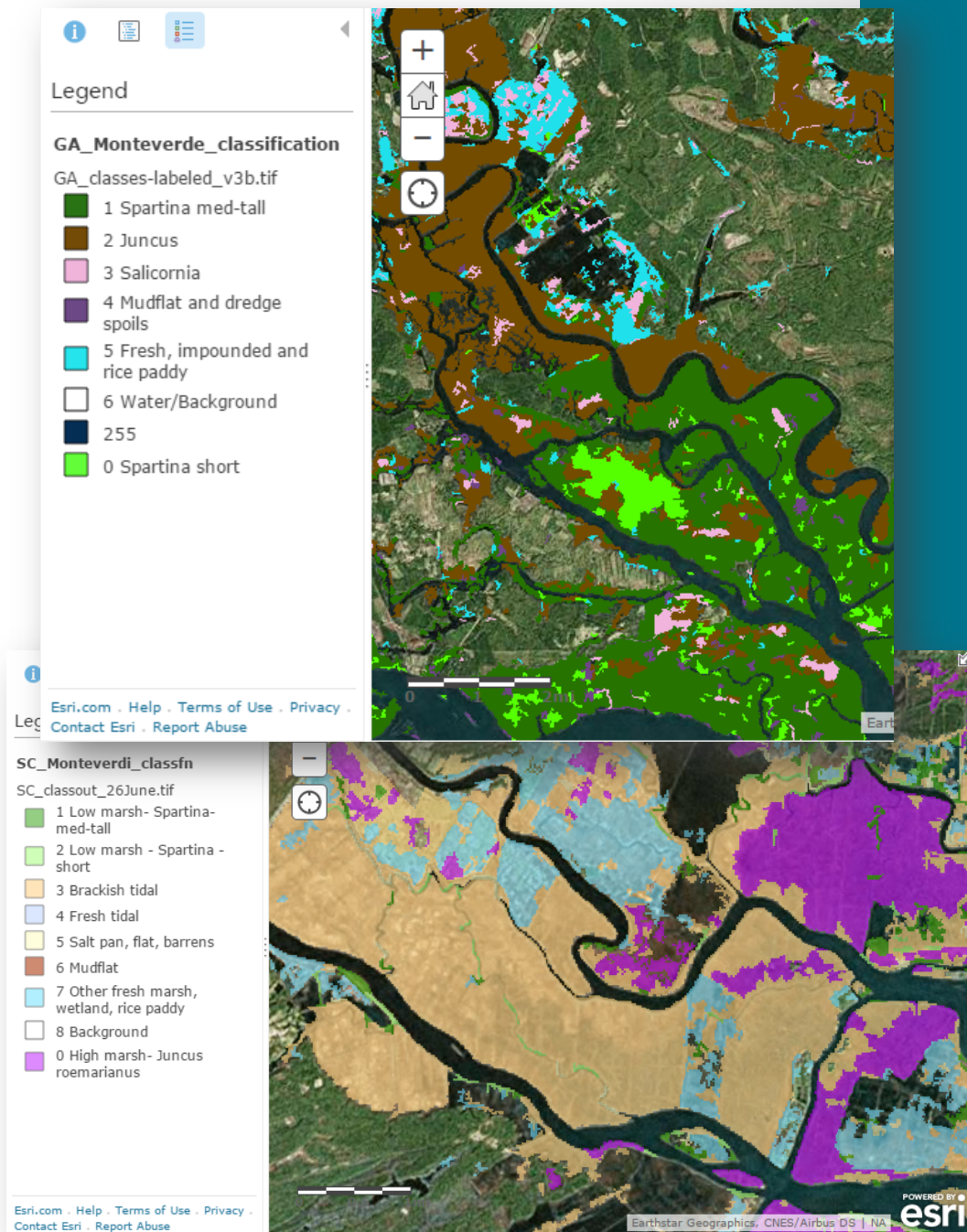
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Salt Marsh

- Funded project mapping high and low marsh
- Target completion date 8/2016
- Detailed mapping in 3 pilot areas in NC, SC and GA
- Synthesis across entire South Atlantic



Indicators

Ecosystems

Upland hardwood

Pine & prairie

Forested wetland

Freshwater marsh

Estuarine

- **Wetland patch size:** index based on the size of wetland patches.
- **Water-vegetation edge:** index of length of edge between open water and vegetation.
- **Coastal condition:** index of water quality, sediment quality, and benthic condition.

Cross-ecosystem

Freshwater aquatic

Waterscapes

Landscapes

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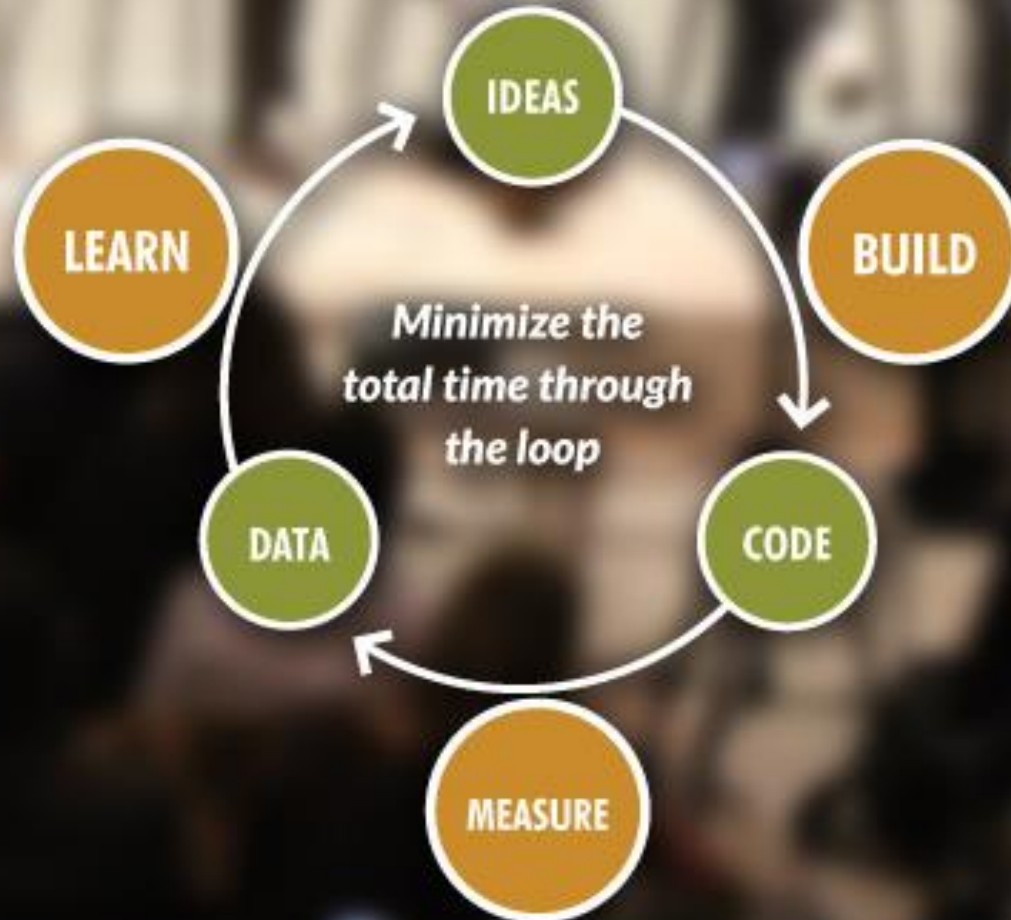
Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird

The lean startup method



Salt Marsh

Estuarine Indicators

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- Index of coastal condition
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1 month review period results

- Passed
- measures the overall abiotic condition of the system
- synthesized by the Environmental Protection Agency (EPA) every 5 years.
- Integrates measures of water quality, sediment quality, and benthic habitat quality.

Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird

1 month review period results

- Passed review but moved to freshwater aquatic category
- easy to monitor and model
- widely used and understood by diverse partners.
- strongly linked to water quality, estuary condition, eutrophication, and freshwater inflow.

Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird

1 month review period results

- Designing Sustainable Landscapes models
 - American Black Duck
 - Nelson's Sharp-tailed Sparrow
 - Redhead
 - Seaside Sparrow
 - Saltmarsh Sharp-tailed Sparrow
 - Wood Stork

Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird

1 month review period results

- Did a good job identifying bird associated habitats
- Expert reviewers wanted to see areas prioritized by habitat configuration
- Created 2 new indicators that try to capture habitat configuration

Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird
- Wetland patch size
- Water/vegetation edge

1 month review period results

- Larger, better connected wetlands are positively associated with fish, shrimp and marsh birds.
- In particular, seaside sparrow, saltmarsh sharp-tailed sparrow, and marsh wren have been associated with marsh area effects.
- In addition, wave attenuation is increased with wetland area. Over time, a decrease in patch size will correspond to marsh degradation and wetland loss.

Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird
- Wetland patch size
- Water/vegetation edge

1 month review period results

- The density and abundance of shrimp, crab, fish, and other nekton are strongly correlated with the open water-vegetation edges (Minello et al. 2003). For marsh birds, clapper rail (Rush et al. 2009) and king rail (Pickens and King 2013)--as well as least bittern, American bittern, sora, and Virginia rail (Rehm and Baldassarre 2007)--use open water-vegetation edge habitats. Wood storks also use tidal creeks (Gaines et al. 1998), which are depicted by the edge characteristic.

Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird
- Wetland patch size
- Water/vegetation edge

1 month review period results

- The density and abundance of shrimp, crab, fish, and other nekton are strongly correlated with the open water-vegetation edges
- For marsh birds, clapper rail, king rail, least bittern, American bittern, sora, and Virginia rail-- use open water-vegetation edge habitats.
- Wood storks also use tidal creeks, which are depicted by the edge characteristic.

Salt Marsh

Estuarine Indicators

Original Indicators

- Index of coastal condition
- Percent impervious cover
- Index of estuarine bird

Current Indicators

- Coastal condition
- Percent impervious cover
- Wetland patch size
- Water/vegetation edge

Indicators

Ecosystems

Upland hardwood

Pine & prairie

Forested wetland

Freshwater marsh

- **Freshwater marsh extent:** overall acres of freshwater marsh.
- **Freshwater marsh birds:** index of habitat suitability for five freshwater marsh bird species.

Cross-ecosystem

Freshwater and marine

Waterscapes

Landscapes

- **Structural connectivity:** important hubs and corridors for ecological connectivity.
- **Low road density:** index of areas with few roads.
- **Resilient biodiversity hotspots:** index of mostly natural high-diversity areas potentially resilient to climate change.
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other hardbottom habitats.

- **Primary productivity:** index of ocean ecosystem productivity based on chlorophyll measurements.

Salt Marsh

Freshwater Marsh Indicators

Original Indicators

- Freshwater marsh extent
- Freshwater marsh birds
 - Least bittern
 - Northern pintail
 - Northern shoveler
 - King rail

1 month review period results

- 0 = Less potential for freshwater marsh bird presence (< 5 ha) (low)
- 1 = Potential presence of least bittern, Northern pintail, Northern shoveler, and others (≥ 5 and ≤ 20 ha)
- 2 = Potential presence of king rail (> 20 ha) (high)

Indicators

Ecosystems

Upland hardwood

Pine & prairie

Forested wetland

Freshwater marsh

Estuarine

Maritime forest

Beach & dune

Marine

Cross-ecosystem Indicators

Freshwater aquatic

- **Riparian buffers:** index of natural habitat near rivers, streams, and large waterbodies.
- **Impervious surface:** index of impervious surface within each watershed.

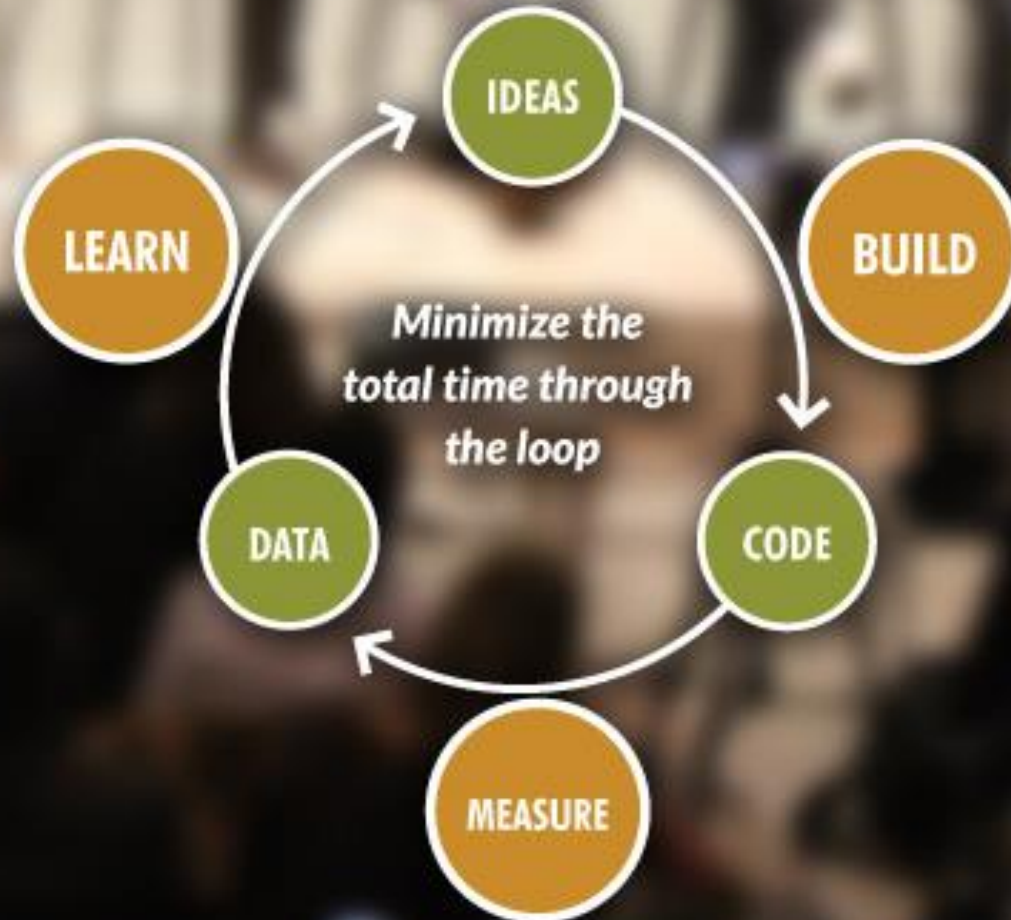
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National Historic Register Sites surrounded by limited urban development.

The lean startup method



The lean startup method

