

# State of the South Atlantic 2013

Version 0.2 - 9/4/2013

## *Overview*

The lands and waters of the South Atlantic are changing rapidly. Climate change, urban growth, and increasing human demands on resources are reshaping the landscape. While these forces cut across political and jurisdictional boundaries, the conservation community does not have a consistent cross-boundary, cross-organization plan for how to respond. The South Atlantic Conservation Blueprint will be that plan.

This assessment of the State of the South Atlantic is the second step in a three step process to develop the Conservation Blueprint. It assesses the past, current, and future condition of natural and cultural resource indicators selected by the South Atlantic Landscape Conservation Cooperative. It will be regularly updated as new information becomes available.

[Read more about the Conservation Blueprint](#)

## Appropriate use

This document is an early draft version of the 2013 assessment

- Use this document to review the draft results and formatting. Your LCC staff would love to hear your thoughts and suggestions for improvements
- Do not use any of these results to make conservation decisions at this time

## Ecosystem types

### Landscapes

Connections across all terrestrial ecosystems

### Beaches and dunes

All beach and dune types

### Forested wetlands

All forested wetlands on organic soils (e.g., pocosins, carolina bays) and mineral soils (e.g., bottomland hardwood forests, floodplain forests)

### Maritime forest

All maritime forests types

### Pine woodlands, savannas, and prairies

Longleaf, loblolly, and slash dominated systems and the small number of prairies present in the South Atlantic

### **Tidal and nontidal freshwater marshes**

All types of tidal and nontidal freshwater marshes

### **Upland hardwood forests**

All upland forest types ranging from dry upland forests to wetter hydric hammocks

### **Waterscapes**

Connections across all aquatic ecosystems

### **Freshwater aquatic**

All lakes, rivers, and streams

### **Estuarine**

All areas upstream to head of tide and seaward to the mouth of the estuary

### **Marine**

All areas from either the mouth of the estuary or the splash zone affected by breaking waves to the 200 mile EEZ in the central ocean

## ***Executive summary***

To be completed in a later draft...

## *State of the South Atlantic*

### Landscapes

#### Summary

Draft analysis of the overall Landscapes Index is not yet complete

#### Data sources

[SALCC terrestrial connectivity project](#), [TNC Southeast Terrestrial Resilience Project](#), [National register of historic places](#), [NLCD 2001 & 2006](#), 2050 Landcover estimate (NLCD 2006, SLAMM sea level rise, SLEUTH urban growth)

#### Uncertainties and data limitations

Draft analysis of the overall Landscapes Index is not yet complete

#### More information

### Natural resource indicators

#### Functional connectivity

##### Summary

Draft analysis of functional connectivity is only partly complete. A draft of current connectivity is complete and predictions of future connectivity are in progress. Functional connectivity is intended to represent connectivity from the perspective of multiple species with different home range sizes and connectivity requirements. Species in the index include: Black Bear, Eastern Cougar, Red Wolf, Timber “Canebrake” Rattlesnake, Eastern “Diamondback” Rattlesnake, and Box Turtle.

##### Data sources

[SALCC terrestrial connectivity project](#)

##### Uncertainties and data limitations

Results have not been adjusted for areas outside the range of some species or some species specific dispersal limitations

##### More information

[GIS details](#)

[Draft spatial data](#)

#### Structural connectivity

##### Summary

Draft analysis of this indicator is not yet complete. Structural connectivity is intended to represent

how natural habitats are connected in general without using species specific thresholds.

Data sources

[TNC Southeast Terrestrial Resilience Project](#)

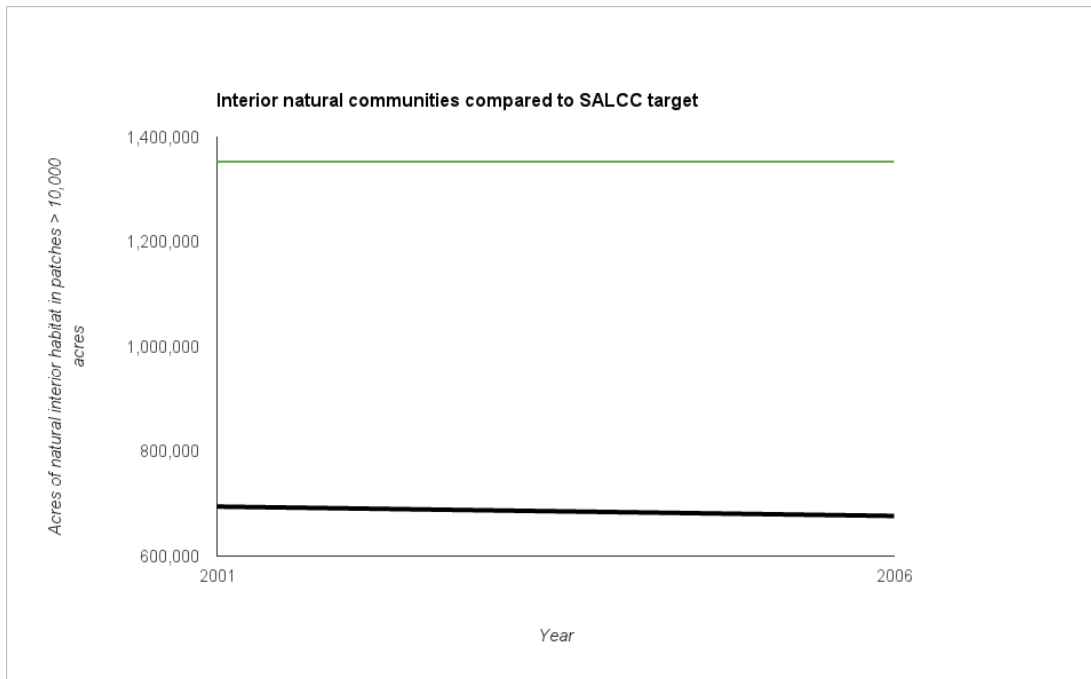
Uncertainties and data limitations

Draft analysis of this indicator is not yet complete.

More information

[GIS details](#)

### Interior natural communities



Summary

The Interior natural communities indicator depicts the change in large connected patches of natural areas since 2001. It is intended to represent large areas without extensive human alteration. The interior natural community indicator has declined since 2001. The indicator does not appear to be on track to reach the SALCC target in the future.

Data sources

[NLCD 2001 & 2006](#)

Uncertainties and data limitations

Variations in how NLCD 2001 and 2006 are mapped (particularly with respect to roads). This indicator is particularly sensitive to roads as connected interior patches must be at least 200m from a non natural edge (e.g., roads). Predictions for 2050 are not depicted due to difficulties in predicting future roads and rural development

[More information](#)

[GIS details](#)

[Draft spatial data](#)

## **Biodiversity hotspots**

[Summary](#)

Draft analysis of this indicator is not yet complete. It is intended to represent landscape condition for rare and range restricted organisms.

[Data sources](#)

[Soils and landform data from TNC Southeast Terrestrial Resilience Project](#)

[Uncertainties and data limitations](#)

Draft analysis of this indicator is not yet complete.

[More information](#)

[GIS details](#)

## **Cultural resource indicators**

### **National Historic Register**

[Summary](#)

Draft analysis of this indicator is not yet complete. It is intended to represent the maintenance of the cultural context near historic sites. Specifically, the indicator measures decline in natural habitat (i.e., loss of cultural context) within 250m of historic sites. Sites with large enough declines in cultural context are subject to removal from the National Historic Register.

[Data sources](#)

[National register of historic places, NLCD 2001 & 2006, 2050 Landcover estimate \(NLCD 2006, SLAMM sea level rise, SLEUTH urban growth\)](#)

[Uncertainties and data limitations](#)

Draft analysis of this indicator is not yet complete

[More information](#)

## **Beaches and dunes**

[Summary](#)

Draft analysis of the overall Beaches and Dunes Index is not yet complete

## Data sources

[Sea turtle nesting data](#), [Designing Sustainable Landscapes bird models](#), [NOAA Environmental Sensitivity Index](#)

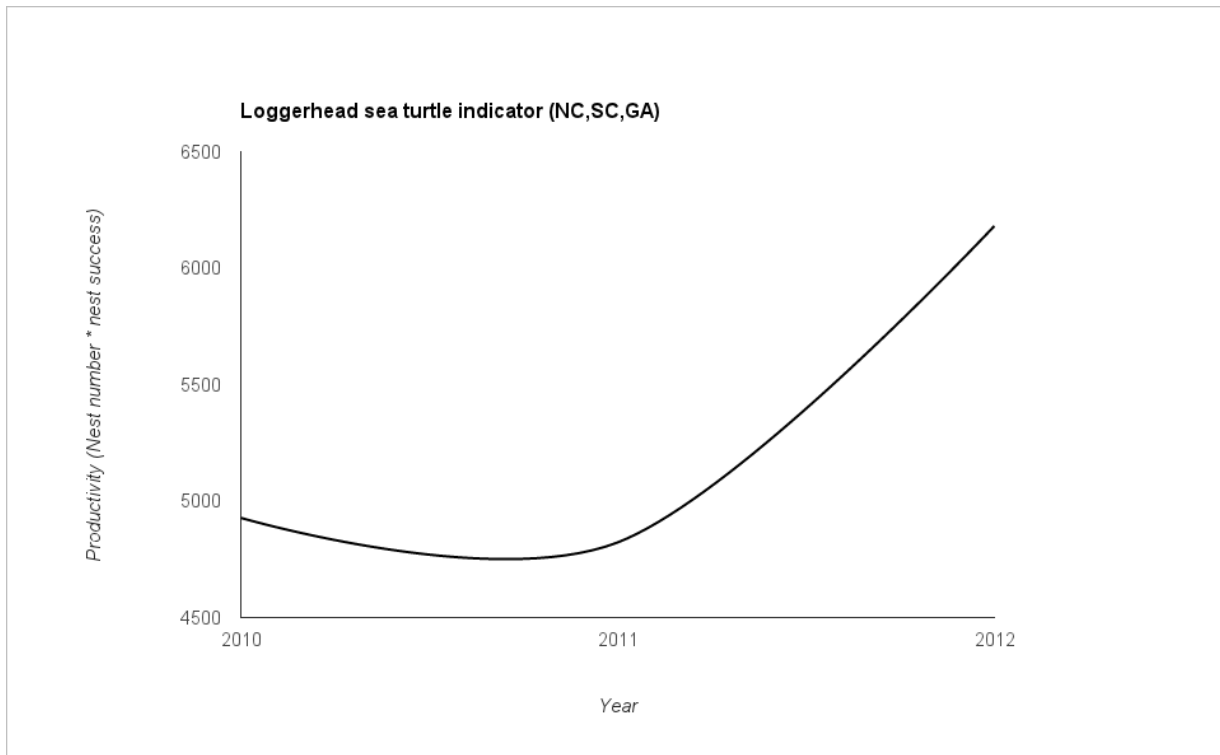
## Uncertainties and data limitations

Draft analysis of the overall Beaches and Dunes Index is not yet complete

## More information

## Natural resource indicators

### Loggerhead sea turtles



### Summary

The Loggerhead Sea Turtle indicator depicts change in productivity since 2010. It is an indicator of human disturbance and nest predation pressure for beach nesting species. Loggerhead Sea Turtles appear to be recovering and on track to reach the SALCC target in the future.

### Data sources

[Sea turtle nesting data from NC, SC, and GA](#)

### Uncertainties and data limitations

Underestimates productivity as it does not account for nests that were not detected and does not

include data from Florida.

[More information](#)

## **Beach birds**

### Summary

Draft analysis of the beach birds indicator is not yet complete. Birds in the indicator include Piping Plover, American Oystercatcher, Wilson's Plover, Red Knot, Least Tern. Beach birds are intended to represent a wide range of ecosystem features.

### Data sources

[Designing Sustainable Landscapes bird models](#)

### Uncertainties and data limitations

Draft analysis of the beach birds indicator is not yet complete.

### More information

[GIS details](#)

[Draft Spatial Data](#)

## **Altered beach**

### Summary

Draft analysis of this indicator is not yet complete. Altered beach is intended to represent overall habitat alteration and includes jetties, groins, and other shoreline hardening.

### Data sources

[NOAA Environmental Sensitivity Index](#)

### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete.

### More information

## **Forested wetlands**

### **Summary**

Draft analysis of the overall Forested Wetland Index is not yet complete

### **Data sources**

[Protected Areas Database \(Ver 2\)](#), [National Conservation Easement Database \(05/15/2013\)](#), [NLCD 1992, 2001 & 2006](#), [2050 Landcover Estimate](#), [Designing Sustainable Landscapes bird models](#), [TNC Southeast Terrestrial Resilience Project](#)

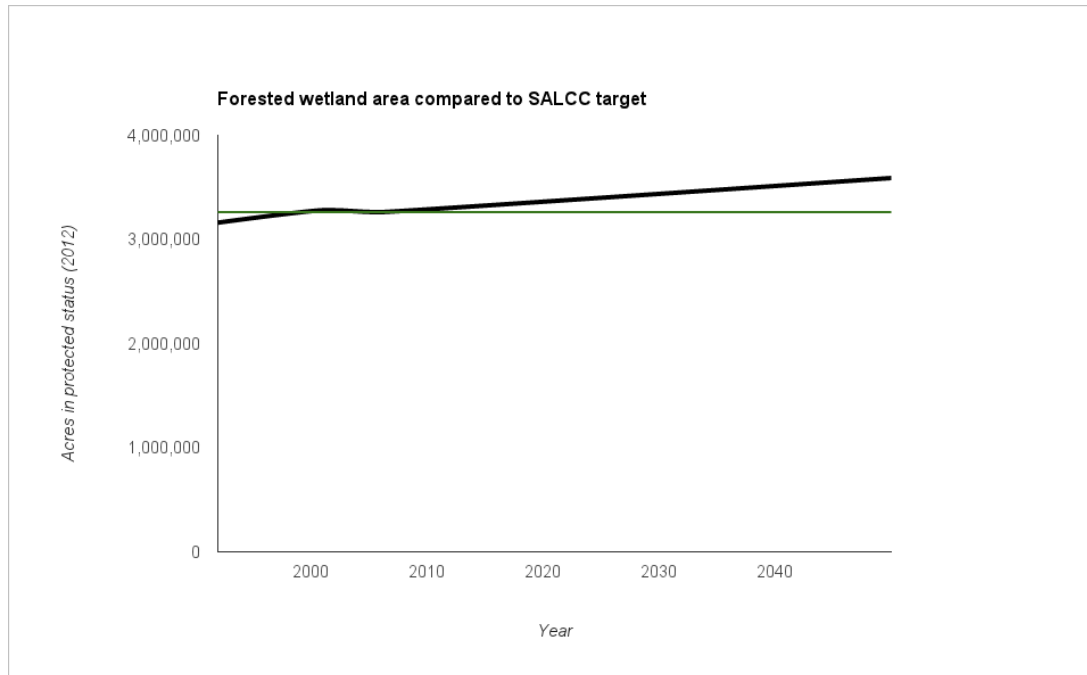
## Uncertainties and data limitations

Draft analysis of the overall Forested Wetland Index is not yet complete

More information

## Natural resource indicators

### Forested wetland area



### Summary

The Forested wetlands area indicator depicts the predicted change in acres of forested wetlands on lands in protected status from 1992 to 2050. It is intended to represent overall forested wetland extent and test whether forested wetlands being inundated by sea level rise are being replaced or restored somewhere else. Forested wetland area is predicted to increase due to increases in wetlands inland caused by sea level rise and low probability of urban development in wetlands (see uncertainties and data limitations). Forested wetland area appears to be on track to meet the SALCC target of maintaining the current acreage of protected forested wetlands in the future.

### Data sources

[Protected Areas Database \(Ver 2\)](#), [National Conservation Easement Database \(05/15/2013\)](#), [NLCD 1992, 2001 & 2006](#), [2050 Landcover Estimate](#),

### Uncertainties and data limitations

Does not include past or future changes in protected areas. This likely results in an



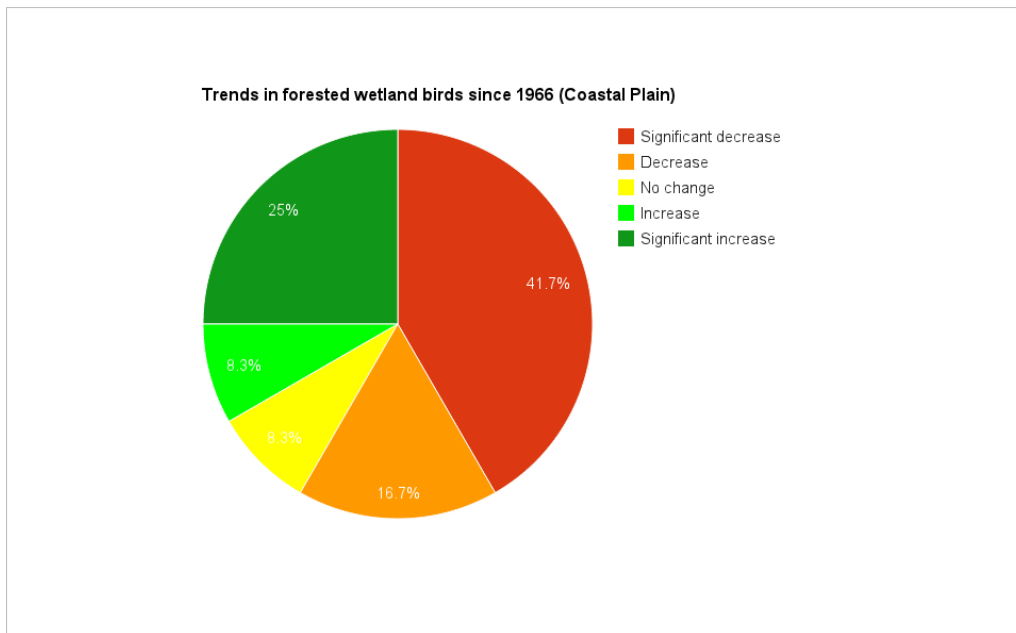
underestimate of future increases in protected forested wetlands. Does not include predictions of rural conversion of forested wetlands. This likely results in an underestimate of overall conversion rate on non protected lands. Structural uncertainty in sea level rise models and incomplete protected areas data coverage also introduce additional uncertainties

[More information](#)

[GIS details](#)

[Draft spatial data](#)

## Forested wetlands birds



### Summary

Draft analysis of this indicator is only partly completed. Estimates of future habitat change and historic population trends for the Piedmont are in development. The figure above shows the change in forested wetland birds in the Coastal Plain since 1966. Birds in the indicator include Prothonotary Warbler, Swainson's Warbler, Yellow-throated Warbler, Wood Duck, Swallow tailed Kite, Cerulean Warbler, Black-throated Green Warbler, Brown-headed Nuthatch, Northern Parula, Chuck-will's-widow, Red-headed Woodpecker, and Red-cockaded Woodpecker. The Forested Wetland birds are intended to represent a wide range of ecosystem features.

### Data sources

[Breeding Bird Survey](#), [Designing Sustainable Landscapes bird models](#)

### Uncertainties and data limitations

Draft analysis of this indicator is only partly completed

[More information](#)

## Natural habitat near isolated wetlands

### Summary

Draft analysis of this indicator is not yet complete. Natural habitat near isolated wetlands is intended to represent overall habitat condition of isolated wetlands

### Data sources

[TNC Southeast Terrestrial Resilience Project](#)

### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete

### More information

## Maritime forests

### Summary

Draft analysis of the overall Maritime Forest Index is not yet complete

### Data sources

[Southeast GAP Landcover](#), [Protected Areas Database \(Ver 2\)](#), [National Conservation Easement Database \(05/15/2013\)](#)

### Uncertainties and data limitations

Draft analysis of the overall Maritime Forest Index is not yet complete

### More information

## Natural resource indicators

### Painted bunting

#### Summary

Draft analysis of the Painted Bunting Indicator is not yet complete. It is intended to represent habitat structure and configuration.

#### Data sources

[Designing Sustainable Landscapes bird models](#)

#### Uncertainties and data limitations

Draft analysis of the Painted Bunting Indicator is not yet complete.

More information

## Protected status

### Summary

Draft analysis of the Protected status is not yet complete. It is intended to represent the overall status of the ecosystem.

### Data sources

[Southeast GAP Landcover](#), [Protected Areas Database \(Ver 2\)](#), [National Conservation Easement Database \(05/15/2013\)](#)

### Uncertainties and data limitations

Draft analysis of the Protected status is not yet complete.

More information

## Pine woodlands, savannas, and prairies

### Summary

Draft analysis of the overall Pine Woodlands, Savannas, and Prairies Index is not yet complete

### Data sources

[Forest Inventory and Analysis \(FIA\) standard report](#), [Designing Sustainable Landscapes bird models](#), [Landfire](#), [Breeding Bird Survey](#)

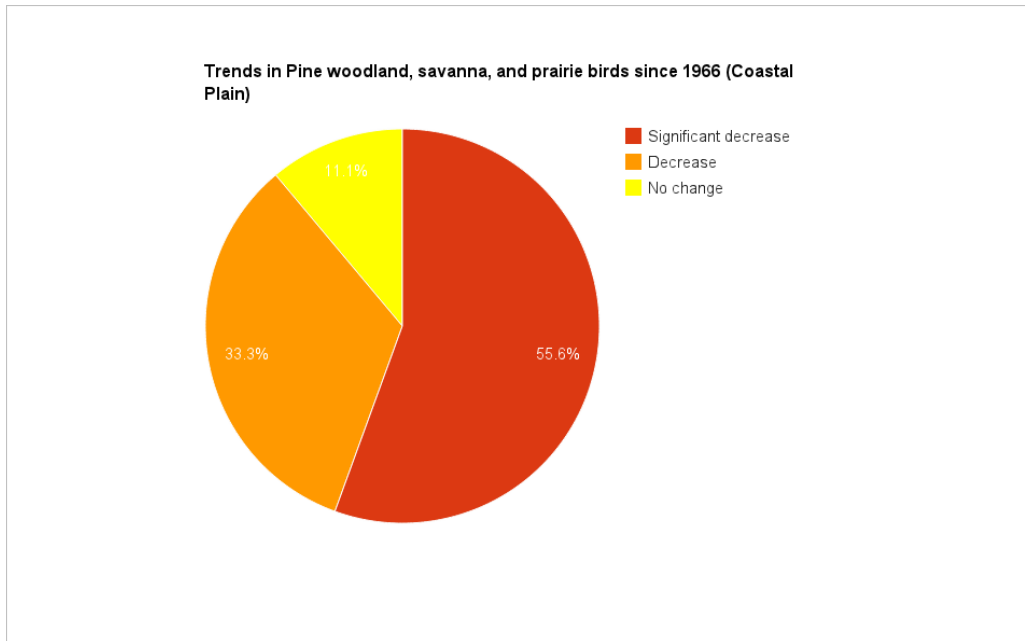
### Uncertainties and data limitations

Draft analysis of the overall Pine Woodlands, Savannas, and Prairies Index is not yet complete

More information

## Natural resource indicators

Pine woodland, savanna, and prairie birds



#### Summary

Draft analysis of this indicator is only partly completed. Estimates of future habitat change and historic population trends for the Piedmont are in development. The figure above shows the change in pine woodland, savanna, and prairie birds in the Coastal Plain since 1966. Birds in the indicator include Brown-headed Nuthatch, Bachman's Sparrow, Red-cockaded Woodpecker, Northern Bobwhite, American Kestrel, Red-headed Woodpecker, Prairie Warbler, Henslow's Sparrow, and Loggerhead Shrike. The pine woodland, savanna and prairie birds are intended to represent a wide range of ecosystem features.

#### Data sources

[Breeding Bird Survey](#), [Designing Sustainable Landscapes bird models](#)

#### Uncertainties and data limitations

Draft analysis of this indicator is only partly completed

#### More information

### Regularly burned open canopy habitat

#### Summary

Draft analysis of the Regularly Burned Open Habitat Indicator is not yet complete. It is intended to represent the overall structure and condition of the ecosystem.

#### Data sources

[Landfire](#)

#### Uncertainties and data limitations

Draft analysis of the Regularly Burned Open Habitat Indicator is not yet complete

[More information](#)

## Flatwoods salamanders

### Summary

Draft analysis of this indicator is not yet complete. Flatwoods salamander occurrence is intended to represent the condition and arrangement of embedded isolated wetlands. This indicator will eventually evolve into a more diverse index of herpetofauna.

[Data sources](#)

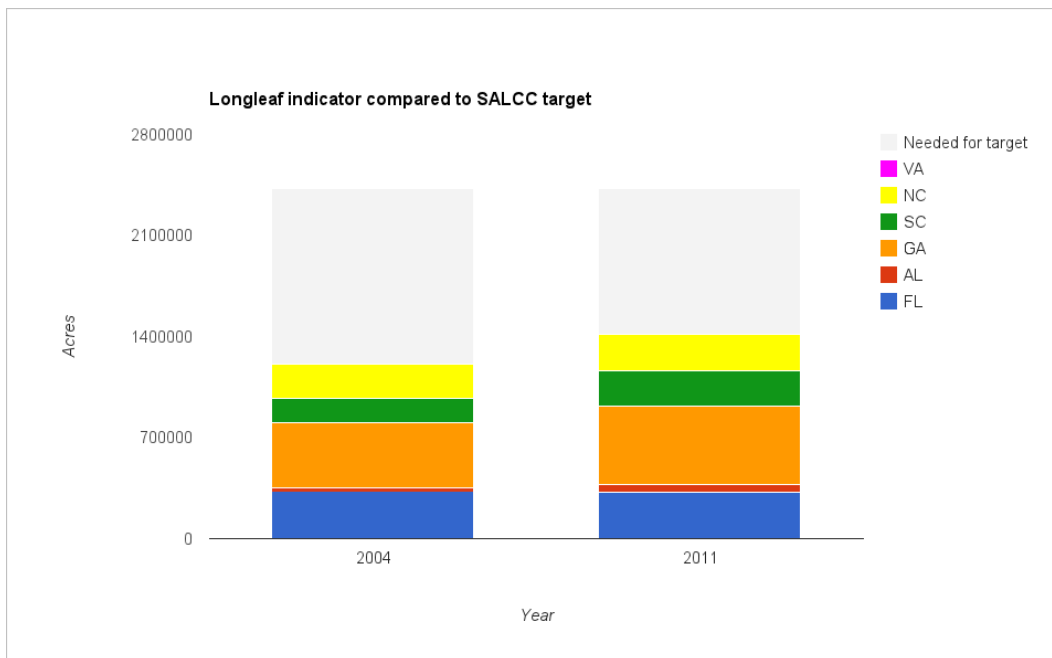
[Uncertainties and data limitations](#)

Draft analysis of this indicator is not yet complete

[More information](#)

## Cultural resource indicators

### Longleaf pine



### Summary

The Longleaf Pine indicator depicts estimated change in acreage of longleaf since 2004. It is a

biotic indicator of the historic cultural landscape. After dramatic historical decline, longleaf is increasing throughout the South Atlantic and is on track to meet the SALCC target in the future.

Data sources

[FIA standard report for all counties in the SALCC](#)

Uncertainties and data limitations

More information

## Tidal and nontidal freshwater marshes

### Summary

Draft analysis of the overall Tidal and Nontidal Freshwater Marshes Index is not yet complete

### Data sources

[National Wetland Condition Assessment](#), [Designing Sustainable Landscapes bird models](#), [NLCD 2001 & 2006](#), 2050 Landcover estimate (NLCD 2006, SLAMM sea level rise, SLEUTH urban growth)

### Uncertainties and data limitations

Draft analysis of the overall Tidal and Nontidal Freshwater Marshes Index is not yet complete

### More information

## Natural resource indicators

### Tidal and nontidal freshwater marsh birds

#### Summary

Draft analysis of this indicator is not yet complete. Birds in the indicator include King Rail, American Black Duck, Northern Pintail, Least Bittern, Whimbrel, and Wood Stork. The tidal and nontidal freshwater marsh birds are intended to represent a wide range of ecosystem features.

#### Data sources

[Designing Sustainable Landscapes bird models](#)

#### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete.

#### More information

## Tidal freshwater marsh area

### Summary

Draft analysis of this indicator is not yet complete. Tidal freshwater marsh area is intended to represent whether tidal freshwater marsh being inundated by sea level rise are being replaced or restored somewhere else

### Data sources

[NLCD 2001 & 2006](#), 2050 Landcover estimate (NLCD 2006, SLAMM sea level rise, SLEUTH urban growth)

### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete.

### More information

## Invasive species

### Summary

Draft analysis of this indicator is not yet complete. Invasive species are intended to represent overall habitat structure and quality.

### Data sources

[National Wetland Condition Assessment](#)

### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete

### More information

## Upland hardwood forests

### Summary

Draft analysis of the overall Upland Hardwood Forest Index is not yet complete

### Data sources

[Forest Inventory and Analysis program \(FIA\)](#), [Soils and landform data from TNC Southeast Terrestrial Resilience Project](#), [Breeding Bird Survey](#), [Designing Sustainable Landscapes bird models](#)

### Uncertainties and data limitations

Draft analysis of the overall Upland Hardwood Forest Index is not yet complete

## More information

### Natural resource indicators

#### Biodiversity hotspots in natural condition

##### Summary

Draft analysis of this indicator is not yet complete. It is intended to represent landscape condition for rare and range restricted organisms.

##### Data sources

[Soils and landform data from TNC Southeast Terrestrial Resilience Project](#)

##### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete.

##### More information

[GIS details](#)

#### Big trees

##### Summary

Draft analysis of this indicator is not yet complete. Big trees are intended to represent a mature habitat condition.

##### Data sources

[Forest Inventory and Analysis program \(FIA\)](#)

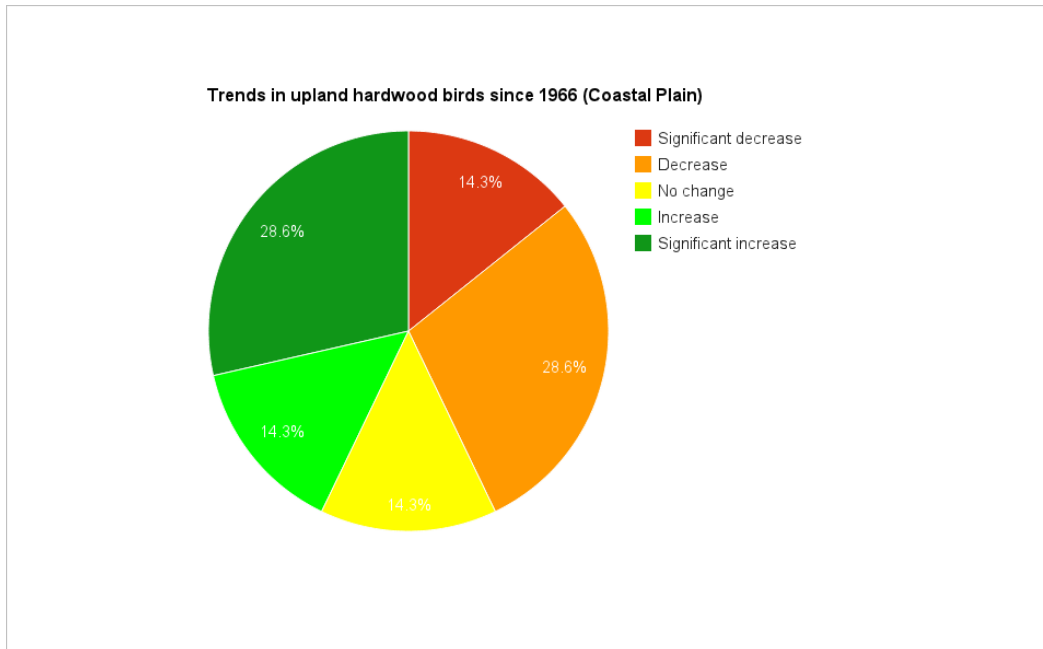
##### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete

##### More information

#### Upland hardwood birds





### Summary

Draft analysis of this indicator is only partly completed. Estimates of future habitat change and historic population trends for the Piedmont are in development. The figure above shows the change in upland hardwood birds in the Coastal Plain since 1966. Birds in the indicator include Acadian Flycatcher, Louisiana Waterthrush, Kentucky Warbler, Swainson's Warbler, Cerulean Warbler, Hooded Warbler, and Wood thrush. The upland hardwood birds are intended to represent a wide range of ecosystem features.

### Data sources

[Breeding Bird Survey](#), [Designing Sustainable Landscapes bird models](#)

### Uncertainties and data limitations

Draft analysis of this indicator is only partly completed

### More information

## Waterscapes

### Summary

Draft analysis of the overall Waterscapes Index is not yet complete

### Data sources

### Uncertainties and data limitations

Draft analysis of the overall Waterscapes Index is not yet complete

## More information

### Natural resource indicators

#### Fish passage

##### Summary

Draft analysis of this indicator is not yet complete. The Fish passage indicator is intended to represent aquatic connectivity and ranges from no passage for any species to complete removal of barrier. Includes level of passage for American Eel, River Herring, American Shad, Atlantic Menhaden, Striped Bass, and Sturgeon

##### Data sources

##### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete.

##### More information

#### Dams mimicking natural flow

##### Summary

Draft analysis of this indicator is not yet complete. Dams mimicking natural flow are intended to represent departures from the natural flow regime where flow is already being altered. A dam “mimicking natural flow” will be defined as a dam with at least one measure in it’s operation plan that is intended to imitate natural flow patterns.

##### Data sources

##### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete

##### More information

### Cultural resource indicators

#### Clean water

##### Summary

Draft analysis of this indicator is not yet complete.

### Data sources

SALCC Freshwater aquatic and Estuarine Natural Resource Indicators

### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete

### More information

## Freshwater aquatic

### Summary

Draft analysis of the overall Freshwater Aquatic Index is not yet complete

### Data sources

### Uncertainties and data limitations

Draft analysis of the overall Freshwater Aquatic Index is not yet complete

### More information

## Natural resource indicators

### Natural habitat near rivers and streams

#### Summary

Draft analysis of this indicator is not yet complete. It is intended to represent alteration to water quality and freshwater instream flow.

#### Data sources

[NLCD 2001 & 2006](#), [NHD Plus](#), 2050 Landcover estimate (NLCD 2006, SLAMM sea level rise, SLEUTH urban growth)

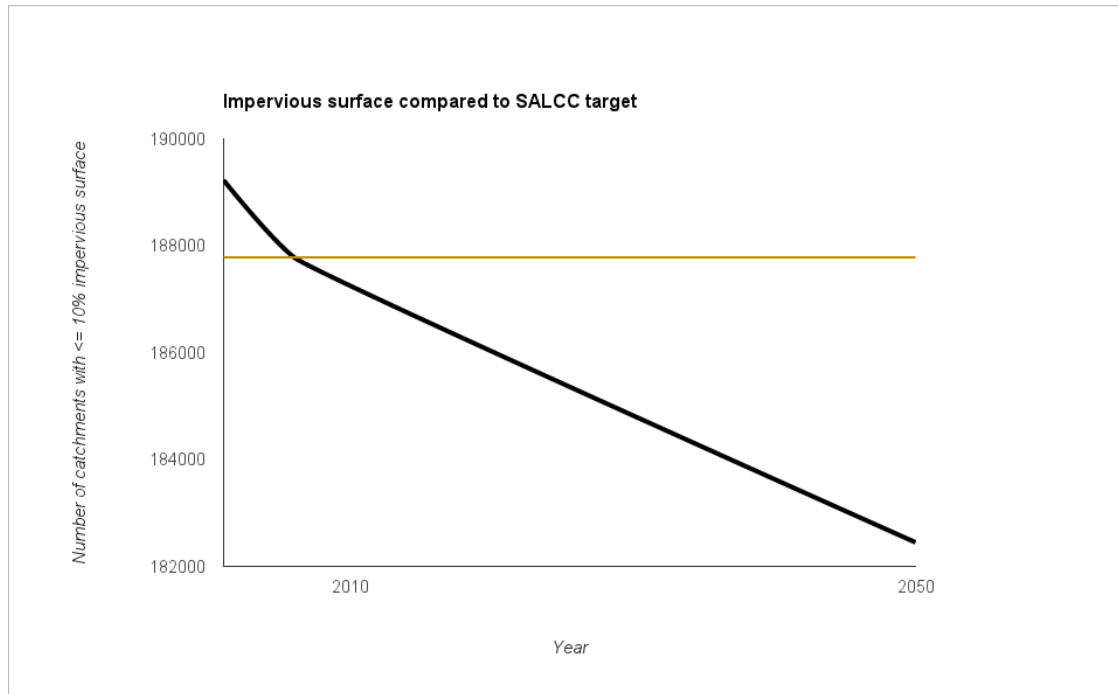
#### Uncertainties and data limitations

Draft analysis of this indicator is not yet complete.

#### More information

#### [GIS details](#)

### Impervious surface



### Summary

The impervious surface indicator predicts the change in the number of catchments with 10% or less impervious surface from 2001 to 2050. It is intended to represent alterations to water quality and freshwater instream flow. Impervious surface is increasing over time and does not appear to be on track to reach the SALCC target in the future.

### Data sources

[NLCD 2001 & 2006](#), [NHD Plus](#), [ICLUS](#)

### Uncertainties and data limitations

Current estimates do not show accumulated impervious but impervious only within each catchment

### More information

[GIS details](#)

[Draft spatial data](#)

## Index of Biotic Integrity

### Summary

Draft analysis of this indicator is not yet complete. The Index of Biotic Integrity (IBI) is intended to represent other components of water quality not covered by the two other freshwater aquatic indicators: impervious surface and natural habitat near streams

### Data sources

[National rivers and streams assessment](#), [National lakes assessment](#)

Uncertainties and data limitations

Draft analysis of this indicator is not yet complete

More information

## Estuarine

### Summary

Draft analysis of the overall Estuarine Index is not yet complete

### Data sources

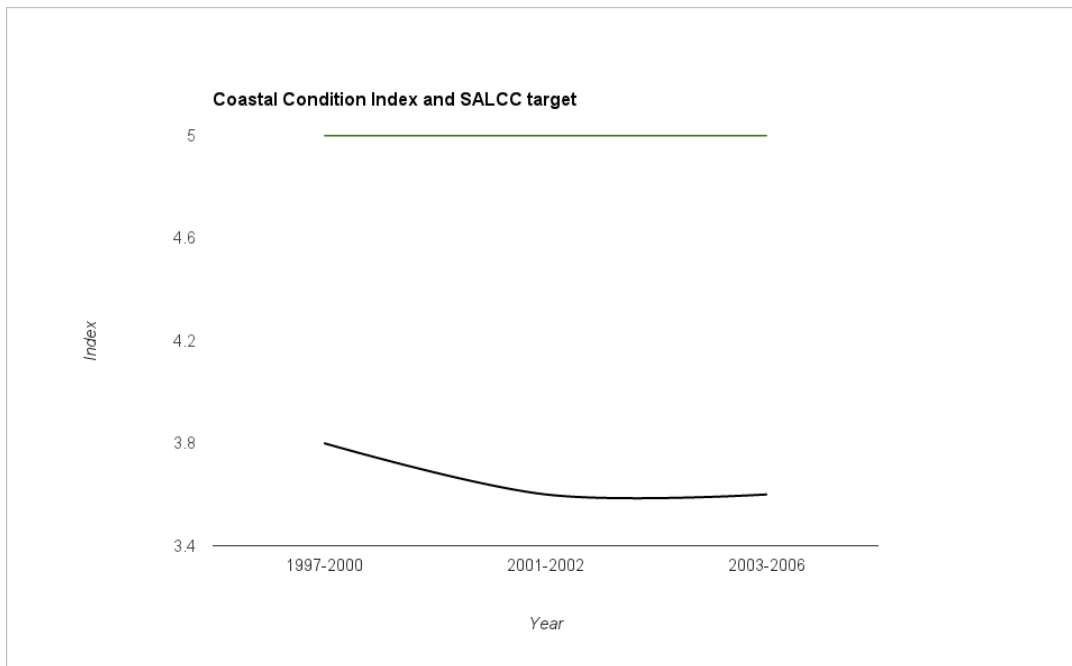
### Uncertainties and data limitations

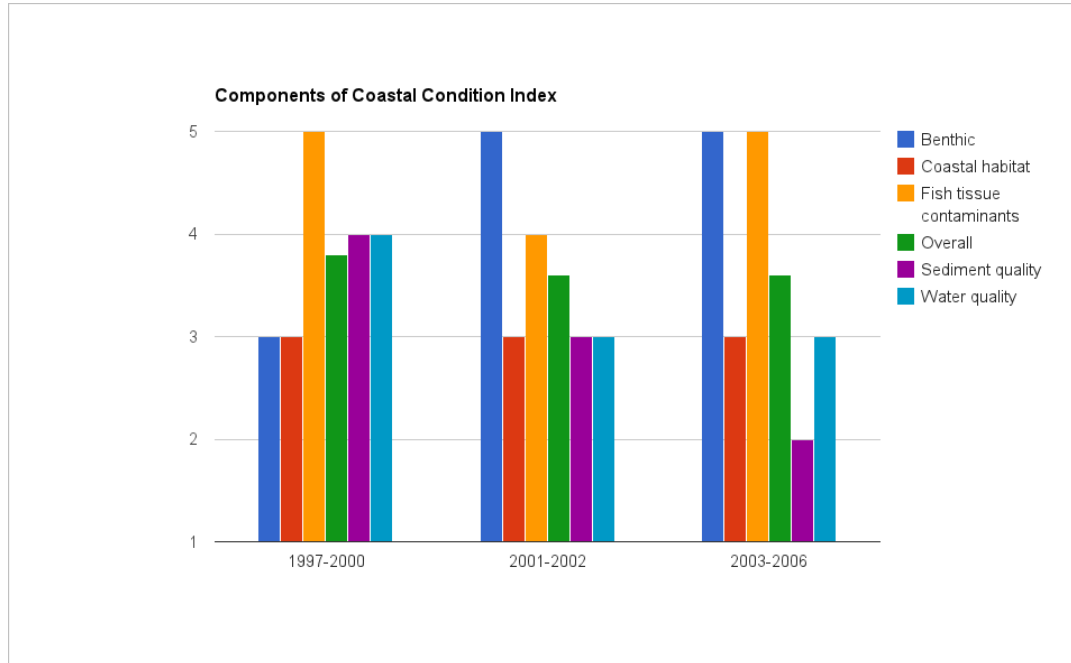
Draft analysis of the overall Estuarine Index is not yet complete

More information

## Natural resource indicators

### Coastal Condition





### Summary

The Coastal Condition indicator depicts the change in the Coastal Condition Index since 1997. It is intended to represent the overall abiotic condition of the estuarine ecosystem. The Coastal Condition indicator is in Good-Fair condition (Good: 5, Fair: 3) and declining. Benthic condition has been improving while both water quality and sediment quality have been declining. Sediment quality is now in Fair-Poor condition. The Coastal Condition indicator does not appear to be on track to reach the SALCC target in the future.

### Data sources

[National Coastal Condition reports 2005, 2008, 2012](#)

### Uncertainties and data limitations

Result summary includes the full Southeast Coast of Florida part of which is outside the SALCC boundaries, No data included from the Gulf of Mexico.

### More information

## Estuarine birds

### Summary

Draft analysis of the Estuarine Birds Indicator is not yet complete. Birds in the indicator include Seaside Sparrow, Nelson's Sharp-tailed Sparrow, Saltmarsh Sharp-tailed Sparrow, American Black Duck, Wood Stork, Redhead, and Canvasback. Estuarine birds are intended to represent a wide range of ecosystem features.

Data sources

[Designing Sustainable Landscapes bird models](#)

Uncertainties and data limitations

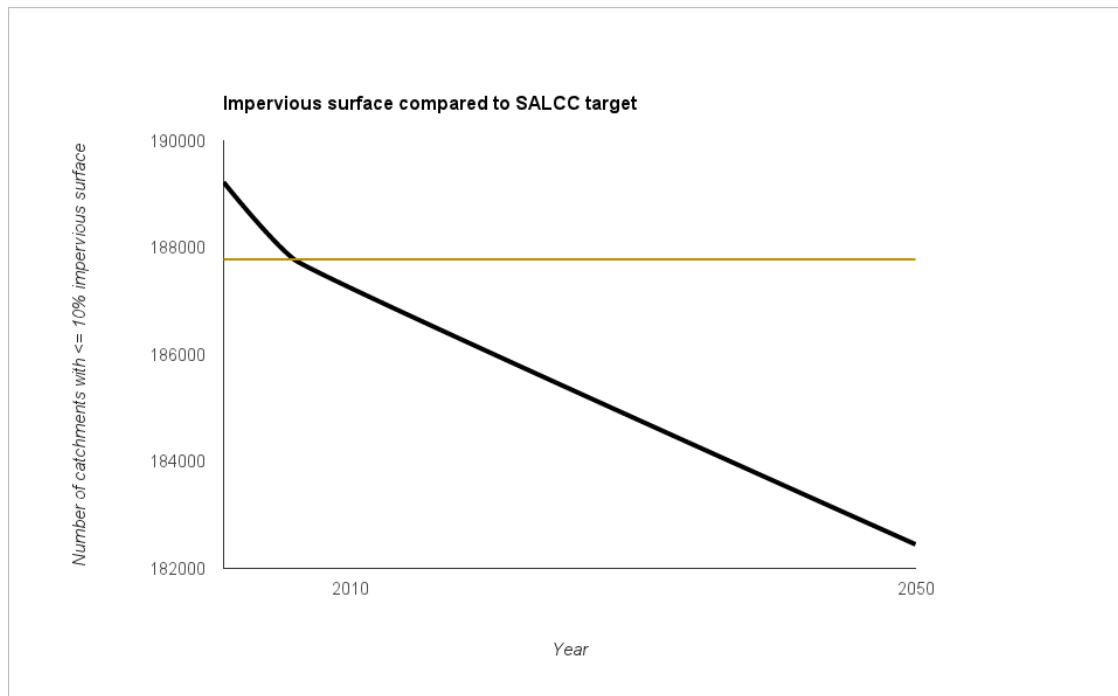
Draft analysis of the Estuarine Birds Indicator is not yet complete.

More information

[GIS Summary](#)

[Draft Spatial Data](#)

## Impervious surface



Summary

The impervious surface indicator predicts the change in the number of catchments with >10% impervious surface from 2001 to 2050. It is intended to represent alterations to water quality and freshwater instream flow. Impervious surface is increasing over time and does not appear to be on track to reach the SALCC target in the future.

Data sources

[NLCD 2001 & 2006](#), [NHD Plus](#), [ICLUS](#)

Uncertainties and data limitations

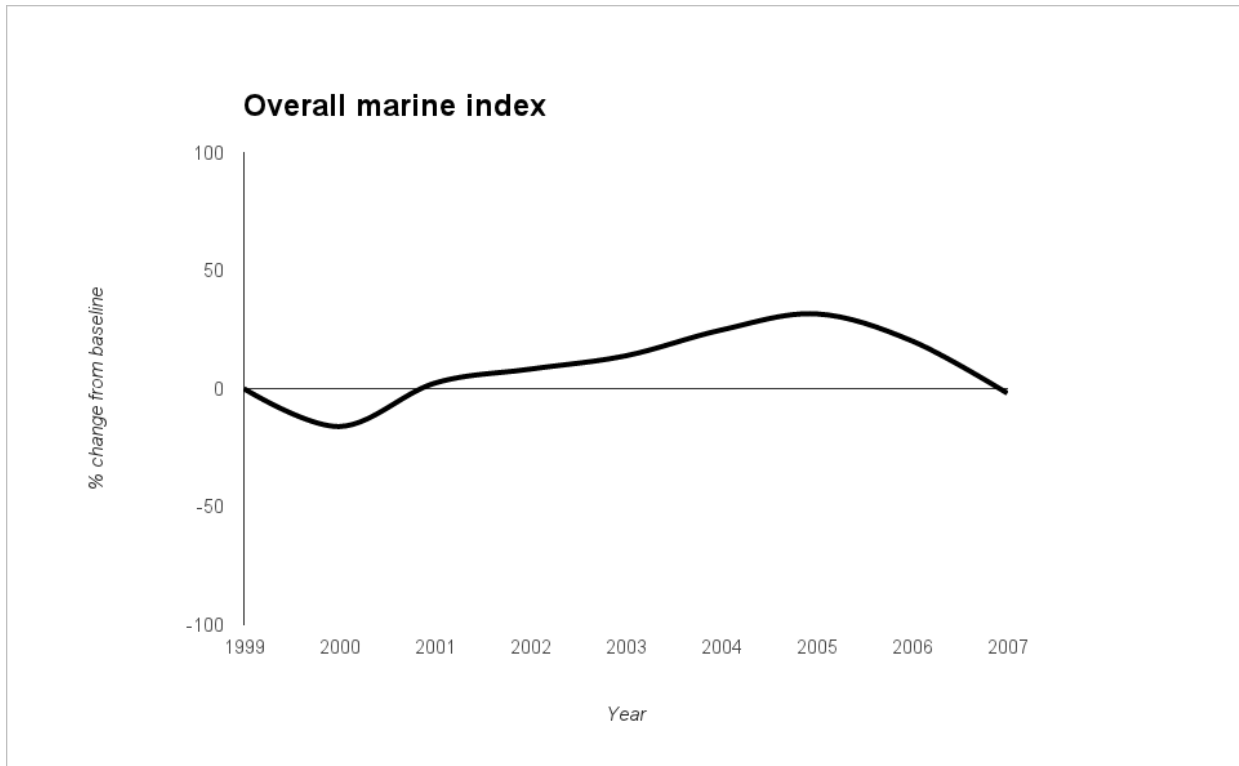
Current estimates do not show accumulated impervious but impervious only within each catchment

More information

[GIS details](#)

[Draft spatial data](#)

## Marine



### Summary

The overall marine index depicts the average change in the three South Atlantic LCC marine indicators from a common baseline year (1999). It is intended to represent the overall integrity of the marine ecosystem. The marine index appears to be in fair condition with some indicators not reaching the SALCC target in some years (Nearshore forage fish, Red drum) and some that despite recent increases, have not yet met the SALCC target (Gag grouper)

### Data sources

[SEDAR 10 - Atlantic Gag Stock Assessment](#), [SEDAR 18 - Atlantic Red Drum Assessment](#), [South Atlantic SEAMAP](#)

### Uncertainties and data limitations

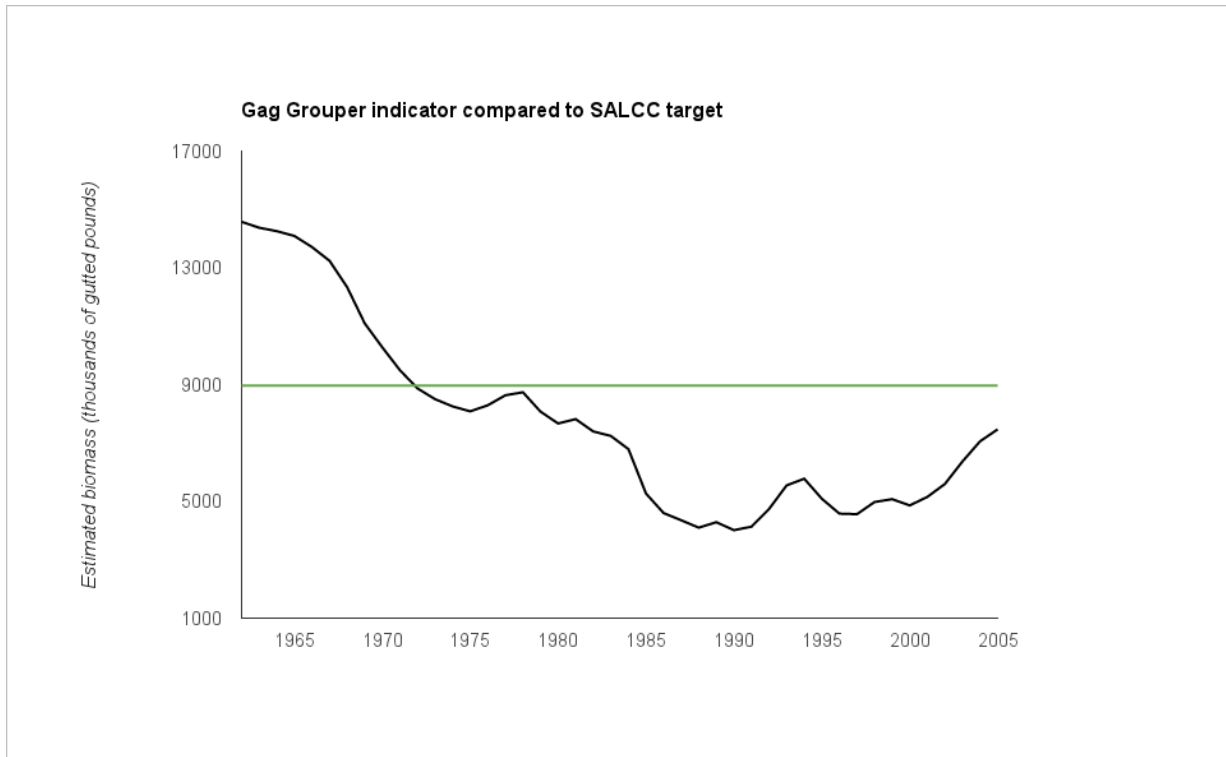
Some indicators in the index are based on fishery dependent data (Gag grouper and Red Drum), One indicator in the index does not include data from North of the South Atlantic Bight (Northern NC and Southern SC), No data are included for the Gulf of Mexico

### More information



## Natural resource indicators

### Gag grouper



#### Summary

The Gag Grouper indicator depicts estimated change in biomass since 1962. It is an indicator of hard bottom habitat condition in state and federal waters. After historic declines, Gag Grouper appear to be recovering and on track to reach the SALCC target in the future.

#### Data sources

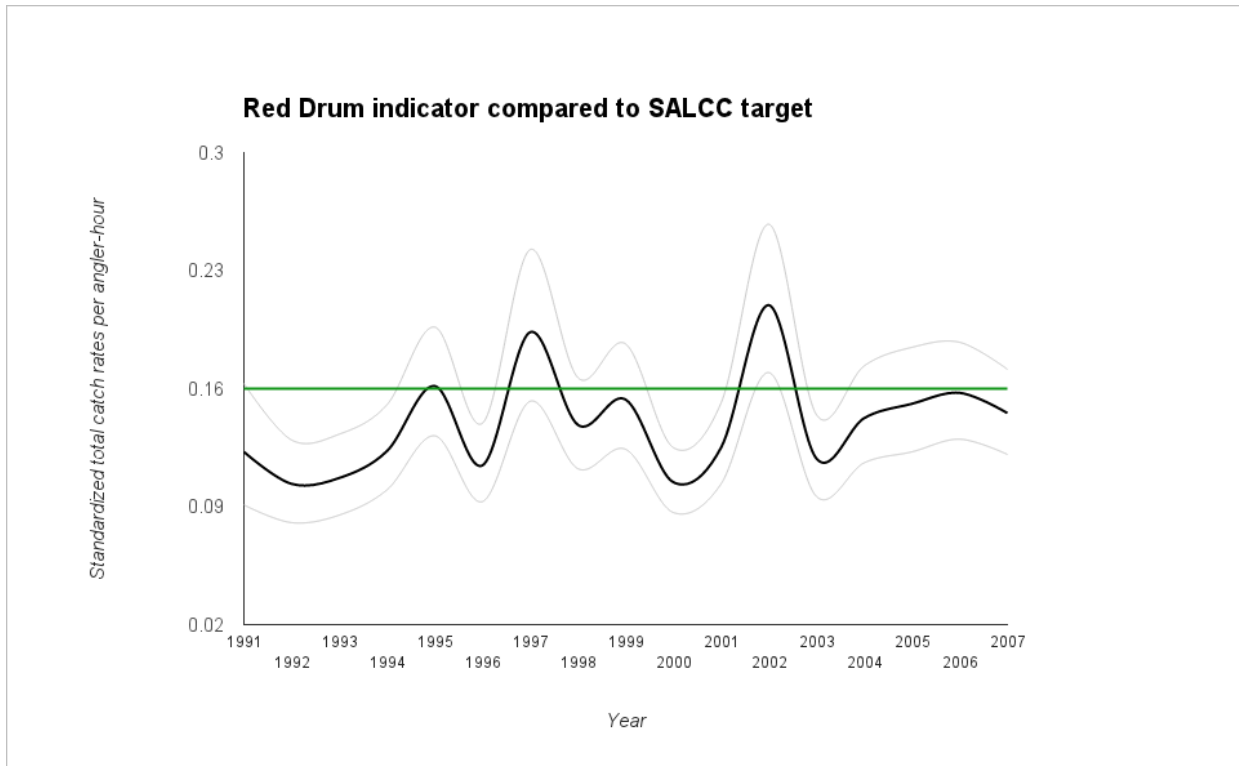
[SEDAR 10 - Atlantic Gag Stock Assessment](#)

#### Uncertainties and data limitations

Indicator is based on fishery dependent data and may be biased due to changes in fishing pressures and practices, No data are included for the Gulf of Mexico

#### More information

### Red drum



### Summary

The Red Drum indicator depicts estimated change in catch per unit effort since 1991. It is an indicator of nearshore ocean bottom habitat condition. Red drum appear to be relatively stable and slightly below the SALCC target in most years.

### Data sources

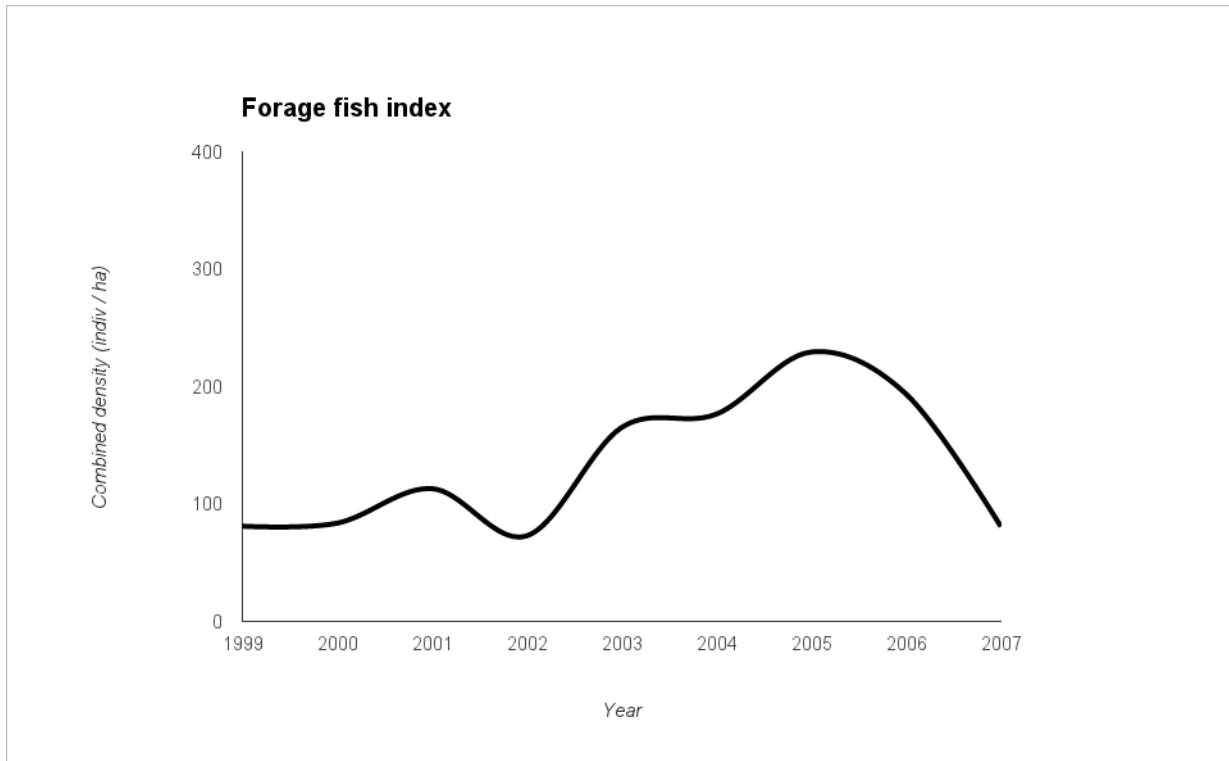
[SEDAR 18 - Atlantic Red Drum Assessment](#)

### Uncertainties and data limitations

Indicator is based on fishery dependent data and may be biased due to changes in fishing pressures and practices, No data are included for the Gulf of Mexico

### More information

## Nearshore forage fish



### Summary

The Forage Fish indicator depicts change in the combined density of Atlantic Croaker, Spot Croaker, and Southern Kingcroaker since 1999. It is an indicator of the prey base for larger fish, seabirds, and marine mammals. The Nearshore Forage fish indicator appears to be relatively stable and most fish in the index stay at or above the SALCC target in a given year.

### Data sources

[South Atlantic SEAMAP](#)

### Uncertainties and data limitations

Does not include data from North of the South Atlantic Bight (Northern NC and Southern SC), No data are included for the Gulf of Mexico, Indicator does not include data on Whiting and Brief Squid as originally intended due to lack of data.

### More information