

# Recent Trends in Southeastern Ecosystems

---

Measuring progress toward the Southeast  
Conservation Adaptation Strategy (SECAS) goal

October 22, 2019

**Preferred Citation:** Southeast Conservation Adaptation Strategy. 2019. Recent Trends in Southeastern Ecosystems: Measuring Progress toward the SECAS Goal. Available online: <http://secassoutheast.org/pdf/SECAS-goal-report-2019.pdf>

# Contents

Executive summary .....	1
Overview of recent trends in ecosystem indicators.....	2
Introduction .....	3
Background .....	3
Purpose of this report .....	3
Methods.....	3
Selecting indicators .....	3
Defining “recent” trends .....	3
Estimating trends.....	4
Evaluating confidence in trend.....	4
Assessments used in the report.....	4
Assessments considered but not used in this report.....	4
Ecosystem indicator trends .....	5
Pine and prairie .....	5
Prescribed fire in longleaf pine.....	5
Longleaf pine area.....	6
Pine and prairie birds.....	7
Gopher tortoise (Eastern population) .....	10
Upland forest.....	12
Upland forest area.....	12
Upland forest birds.....	14
Forested wetland .....	17
Forested wetland area .....	17
Forested wetland birds .....	19
Rivers and streams .....	22
Water quality .....	22
Aquatic connectivity .....	24
Beaches and Dunes .....	26
Beach birds.....	26
Estuarine and Marine .....	28
Coastal condition .....	28
Fisheries.....	30

# Executive summary

Through SECAS, diverse partners are working together to design and achieve a connected network of lands and waters that supports thriving fish and wildlife populations and improved quality of life for people across the Southeastern United States and the Caribbean. The long-term goal for SECAS is a 10% or greater improvement in the health, function, and connectivity of Southeastern ecosystems by 2060. To stay on track for achieving that goal, a 1% improvement will be needed every 4 years.

This report is an initial assessment of progress toward the SECAS goal using information from existing monitoring programs. It uses the most recent 3-6 years of available data. The report is intended to facilitate discussion around conservation actions needed to meet the goal.

Most indicators improved overall during the period covered in this report. Given the rapid changes happening in the Southeast, this is an encouraging sign for achieving the SECAS goal. Prescribed fire in longleaf pine, longleaf pine area, forested wetland birds, and marine fisheries indicators improved fast enough to stay on track to meet the SECAS goal. Longleaf pine, forested wetlands, and marine fisheries have been major areas of shared conservation focus in the Southeast, and those efforts are clearly having a big impact.

Pine and prairie birds and freshwater water quality indicators had large declines and are far off track for meeting the SECAS goal. There are many possible factors contributing to pine and prairie bird declines, including the time it takes for newly restored longleaf to provide quality habitat, and major declines in other grassland habitats used by these species. The confidence rating for the freshwater water quality indicator trend is low, so it should be interpreted with caution. This water quality indicator does, however, suggest major differences in water quality trends in different parts of the Southeast.

# Overview of recent trends in ecosystem indicators

Table 1. Overview of recent trends in ecosystem indicators.

	Recent trend	On track for goal	Trend confidence	Page
<b>Pine and prairie</b>				
Prescribed fire in longleaf pine	8.30% increase/year	Yes	Medium	5
Longleaf pine extent	4.50% increase/year	Yes	Medium	6
Pine and prairie birds	3.70% decline/year	No	Medium	7
<b>Upland forests</b>				
Upland forest area	0.14% increase/year	No	High	12
Upland forest birds	0.01% decline/year	No	Medium	14
<b>Forested wetlands</b>				
Forested wetland area	0.15% increase/year	No	Medium	17
Forested wetland birds	1.50% increase/year	Yes	Medium	19
<b>Freshwater aquatic</b>				
Water quality	0.17% decline/year	No	Low	22
Aquatic connectivity	< 0.01% increase/year	No	Low	24
<b>Beaches and dunes</b>				
Beach birds	< 0.01% increase/year	No	Low	26
<b>Estuaries and marine</b>				
Coastal condition	0.19% increase/year	No	Low	28
Fisheries	0.56% increase/year	Yes	Medium	29

# Introduction

## Background

Through SECAS, diverse partners are working together to design and achieve a connected network of lands and waters that supports thriving fish and wildlife populations and improved quality of life for people across the Southeastern United States and the Caribbean. In the fall of 2018, SECAS leadership approved a long-term goal and supporting short-term metrics to evaluate progress toward that connected network.

The long-term goal is a 10% or greater improvement in the health, function, and connectivity of Southeastern ecosystems by 2060. One of the short-term metrics, selected to stay on track with meeting the long-term goal, is a 1% improvement in the health, function, and connectivity of Southeastern ecosystems every 4 years. This report on recent trends seeks to measure progress toward that metric.

## Purpose of this report

This report is an initial assessment of progress toward the SECAS goal using information from existing monitoring programs. It is intended to facilitate discussion around conservation actions needed to meet the goal.

## Methods

### Selecting indicators

We selected indicators that are monitored by consistent multi-state efforts and are already used by other organizations to evaluate ecosystem conditions.

### Defining “recent” trends

We used the most recent 3-6 years of available data for each indicator to calculate the recent trend. In many cases, the time periods for various indicators do not overlap. The available data from all of the monitoring made it difficult to select a single time period as the definition of recent. For example, 2009 is the most recent year with available data for water quality from the National Rivers and Streams assessment, while data on prescribed fire in longleaf pine was only available starting in 2013.

## Estimating trends

For indicators where charts only show two points in time (e.g., longleaf pine area), we simply calculated the change between those points. For indicators showing data from more than two years (e.g., prescribed fire in longleaf pine), we estimated the trend based on the slope of a linear regression through all points. For water quality, coastal condition, and bird indicators, where trends were only available for discrete subregions or states, we averaged trends equally instead of weighting by area.

## Evaluating confidence in trend

The confidence estimate for each trend is a qualitative judgement based on the design of the monitoring, overall sample size, and major sources of variability in the indicator.

## Assessments used in the report

We used 10 different assessments to evaluate indicator trends. Assessments ranged from remotely sensed data like the National Land Cover Database (NLCD) to long-term volunteer-driven monitoring programs like the Breeding Bird Survey. Additional assessments used included America's Longleaf Range-wide Accomplishment Reports, Forest Inventory and Analysis (FIA), Gopher Tortoise Candidate Conservation Agreement reports, International Shorebird Survey (ISS), National Rivers and Streams Assessments, Southeast Aquatic Resources Partnership Aquatic Barrier Database, National Coastal Condition Assessments, and NOAA Reports to Congress on the Status of Fisheries.

## Assessments considered but not used in this report

There are many subregional assessments of ecosystem conditions (e.g., Chesapeake Bay, Everglades), but their coverage of only part of the Southeast made them difficult to formally integrate into this particular report. One national assessment, [Surfrider Foundation's State of the Beach](#), had potential, but was not used because it focused on policies related to beach conditions rather than the actual condition of the beaches.

# Ecosystem indicator trends

## Pine and prairie

This ecosystem includes open pine and grasslands.

### Prescribed fire in longleaf pine

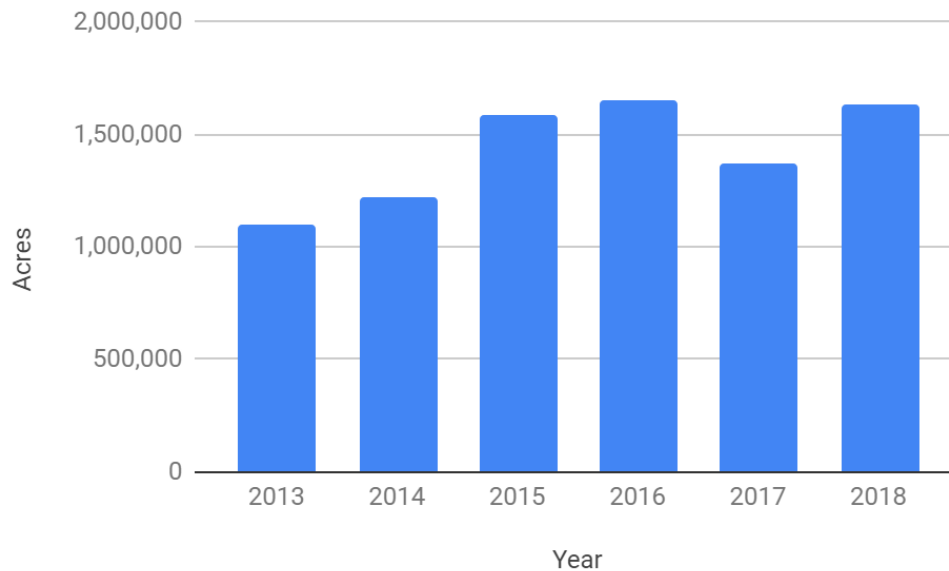


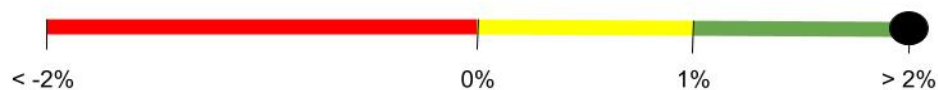
Figure 1. Acres of prescribed fire in longleaf pine from 2013-2018.

### Yearly trend

Prescribed fire in longleaf pine increased by about 8.3% per year from 2013-2018.

### On track to meet SECAS goal

Yes. Increase is greater than 1% every 4 years.



### Data source

[America's Longleaf Range-wide Accomplishment Reports](#)

### Confidence in trend

Medium. While the range-wide tracking system for prescribed fire in longleaf is not perfect, its strong coverage of significant geographic areas means it likely documents a large percentage of prescribed fire in longleaf over this period.

### Interpretation

This is an indicator of habitat management in one part of the pine and prairie ecosystem. Prescribed fire in longleaf has increased considerably despite major weather-related variations in what can be burned each year. Changes in prescribed fire in other grassland systems are not as well understood.

### Longleaf pine area

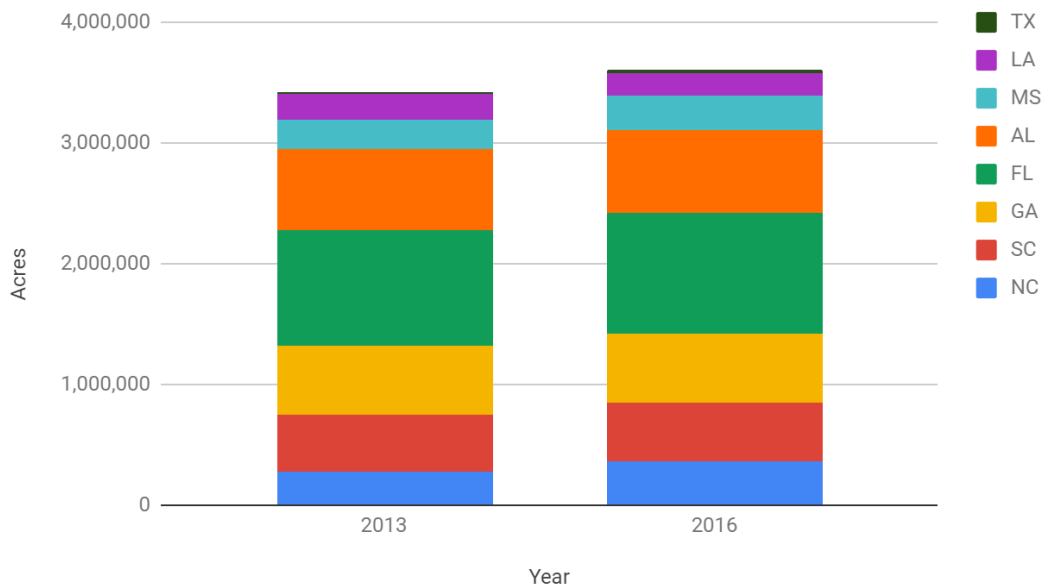


Figure 2. Acres of longleaf pine in 2013 and 2016.

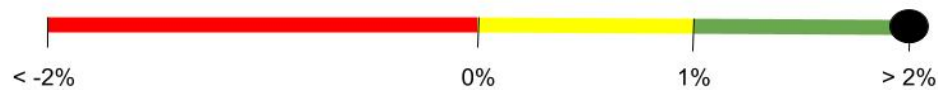
### Yearly trend

Longleaf pine acres increased by about 4.5% per year from 2013-2016. Acreage increased during this period in most states, except for Louisiana and Georgia, which had small overall declines. The latest data from Georgia in 2017 shows an overall increase from 2013-2017. More recent data was not available for Louisiana. Virginia also has longleaf pine, but it was not present in the samples used for this analysis.



On track to meet SECAS goal

Yes. Increase is greater than 1% every 4 years.



Data source

[Forest Inventory and Analysis \(FIA\) data from EVALIDator](#) (last revised April 10, 2019)

Confidence in trend

Medium. While the longleaf sample size is small in some states, the statistically randomized design of Forest Inventory and Analysis (FIA), its long history of tracking trends, and the larger sample across all states with longleaf suggest these data provide a reasonable estimate of the trend across the full longleaf range.

Interpretation

This is an indicator of restoration for one part of the pine and prairie ecosystem. Longleaf pine acreage continues to increase. Reported longleaf establishment numbers from 2017 and 2018 also show this positive trend.

Pine and prairie birds

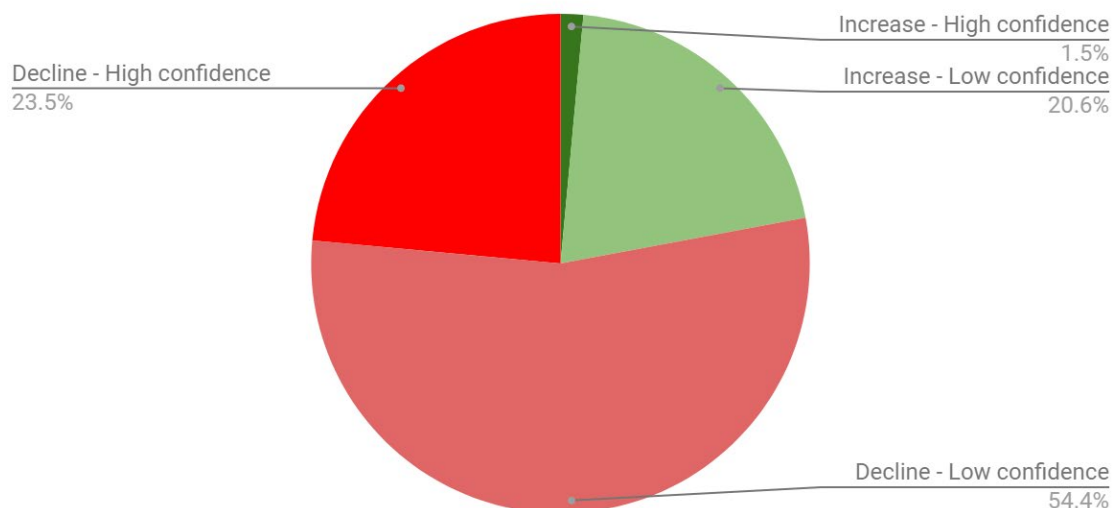


Figure 3. Pine and prairie bird trends and confidence.

Table 2. Species trend data from 2010-2015 for each state used in Figure 3 above. Brighter colors indicate higher confidence.

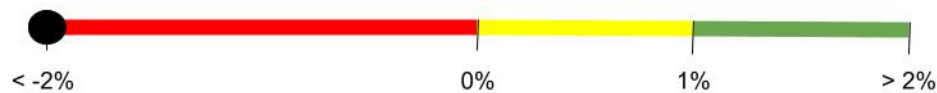
	Northern bobwhite	Grasshopper sparrow	Prairie warbler	Loggerhead shrike	Bachman's sparrow
West Virginia	Decline - Low confidence	Decline - High confidence	Decline - Low confidence	Decline - Low confidence	
Kentucky	Decline - Low confidence	Decline - High confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
Virginia	Decline - High confidence	Decline - Low confidence	Increase - Low confidence	Decline - Low confidence	
Missouri	Increase - Low confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	
Oklahoma	Increase - Low confidence	Increase - Low confidence	Decline - Low confidence	Decline - Low confidence	
North Carolina	Decline - High confidence	Decline - Low confidence	Increase - Low confidence	Decline - High confidence	Decline - Low confidence
Tennessee	Decline - High confidence	Decline - Low confidence	Decline - Low confidence	Decline - High confidence	
Texas	Increase - High confidence	Increase - Low confidence	Decline - Low confidence	Increase - Low confidence	Decline - Low confidence
Alabama	Decline - High confidence	Decline - Low confidence	Increase - Low confidence	Decline - Low confidence	Decline - Low confidence
Mississippi	Decline - High confidence	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence	Decline - Low confidence
Georgia	Decline - High confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
South Carolina	Decline - High confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	Increase - Low confidence
Arkansas	Decline - High confidence	Decline - Low confidence	increase - Low confidence	Decline - Low confidence	Decline - Low confidence
Louisiana	Decline - High confidence		Increase - Low confidence	Decline - Low confidence	Decline - Low confidence
Florida	Decline - High confidence		Decline - High confidence	Decline - Low confidence	Decline - High confidence

## Yearly trend

Most states showed declining trends for pine and prairie bird species from 2010-2015. Species selected are Regional Species of Greatest Conservation Need (RSGCNs) for states in the Southeast, primarily occur in this ecosystem, and have sufficient data for trend analysis in the Breeding Bird Survey. High confidence trends were statistically significant while low confidence trends were not. Averaging species trends across species and states results in an overall 3.6% decline per year.

## On track to meet SECAS goal

No. Indicator is not on track for an increase of 1% every 4 years.



## Data source

[Breeding Bird Survey](#)

## Confidence in trend

Medium. Despite issues with roadside sampling and detectability for some species, the Breeding Bird Survey is a standardized and randomized sample regularly used to estimate bird population trends. While the declines are only statistically significant (“high confidence”) for some of the states and species, the overall number of declining trend predictions is very suggestive of overall declines in these species.

## Interpretation

This is an indicator of both local and landscape conditions across the pine and prairie ecosystem. There are many possible reasons for the decline in pine and prairie birds, despite large increases in prescribed fire and overall acreage of longleaf.

These species use other grassland habitats outside of longleaf. Declines in these other grassland habitats, and in grassland birds generally, are well-documented and seem to be offsetting gains from longleaf restoration. Recent increases in one longleaf-dependent species not covered in this report, red-cockaded woodpecker, provide further support for the problems stemming from other grassland habitats. See also the interpretation of the upland forest area indicator and discussion of increases in forest area coming from areas classified as hay/pasture.

The breeding bird trend analysis stops at 2015, only a few years into the major push for longleaf restoration. Much of that early restoration is still fairly young and may not yet provide good habitat for these species.

State-specific trends, especially in arid regions, can also be driven by yearly weather patterns. For example, low summer rainfall sometimes combined with high spring rainfall during multiple years from 2010-2015 could explain bobwhite quail increases in TX, OK, and MO.

### Gopher tortoise (Eastern population)

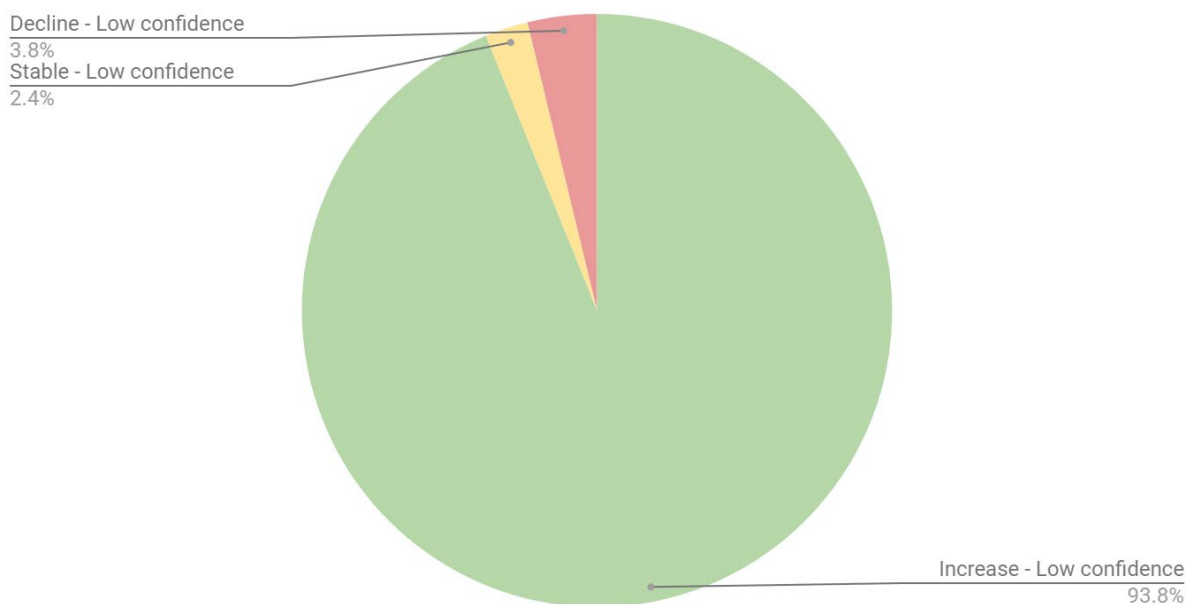


Figure 4. Gopher tortoise trends and confidence.

#### Yearly trend

Most of the sites that were resurveyed in 2017 showed an increase in gopher tortoises within the Eastern population segment (Florida, Georgia, South Carolina, and Eastern Alabama). The Eastern population is a candidate for listing under the Endangered Species Act. The chart above shows reported population trends and is weighted by acres surveyed. Due to inconsistencies in methods and reporting, it was not possible to estimate a numerical trend.

On track to meet SECAS goal

Unknown

Data source

[10th Annual Gopher Tortoise Candidate Conservation Agreement report](#)

Confidence in trend

Low. Due to inconsistencies in methods and reporting, it was not possible to estimate a numerical trend. The organizations in the Candidate Conservation Agreement report collectively own and/or

manage more than 1.3 million acres of gopher tortoise habitat. Only approximately 35,000 acres of that habitat was resurveyed in 2017. The areas resurveyed were also not a random sample of potential habitat.

#### Interpretation

This is an indicator of both local and landscape conditions in part of the pine and prairie ecosystem. Despite the low confidence in the trend, it does appear that gopher tortoise populations are increasing overall. Significant effort has gone into restoration and habitat protection for this species and, where trend data are available, it appears the species is responding positively to these actions.

## Upland forest

This ecosystem includes wooded communities ranging from dry upland forests to moist forests next to floodplains.

### Upland forest area

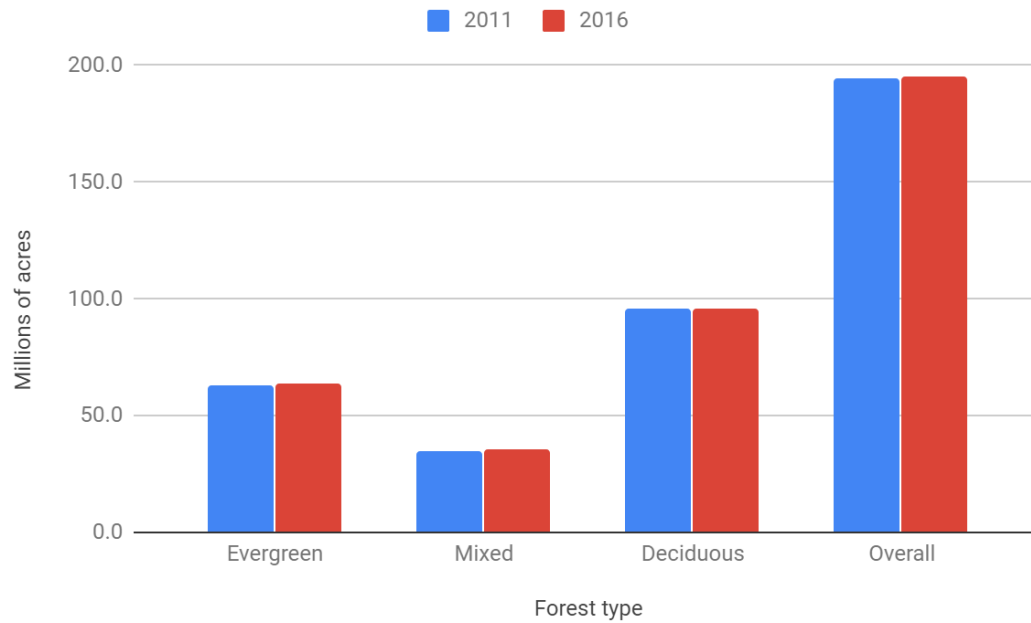


Figure 5. Millions of acres of various forest types in 2011 and 2016.

Table 3. Table showing state-specific percent change from 2011-2016.

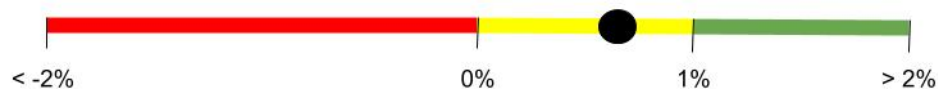
	Evergreen	Mixed	Deciduous	Overall
West Virginia	1.55	0.84	-0.47	-0.27
Kentucky	1.75	1.74	0.56	0.79
Virginia	-2.21	1.05	-1.30	-0.60
Missouri	-0.73	1.28	0.27	0.33
Oklahoma	0.81	3.29	1.67	1.62
North Carolina	2.61	1.40	-0.49	0.74
Tennessee	3.45	2.11	1.26	1.50
Texas	2.18	1.12	-0.43	1.30
Alabama	3.36	1.95	0.52	2.01
Mississippi	2.54	0.83	-1.26	0.98
Georgia	-1.75	0.62	-0.45	-0.48
South Carolina	-1.43	1.99	-0.01	-0.58
Arkansas	1.12	0.62	0.18	0.49
Louisiana	5.69	-0.71	0.82	2.59
Florida	0.67	-1.42	2.26	1.07

### Yearly trend

Overall upland forest area increased by approximately 0.14% per year from 2011-2016. While that translates to a gain of approximately 280,000 acres per year, it is still a relatively small percent change given the large forest area across the Southeast. Evergreen, mixed, and deciduous forest area all increased during this time period. Forest area overall also increased for most states.

### On track to meet SECAS goal

No. Increase is not enough to reach 1% every 4 years.



### Data source

[National Land Cover Database \(NLCD\)](#)

### Confidence in trend

High. The remotely sensed data used in this indicator provides full coverage of the region and forests typically have high classification accuracy.

### Interpretation

This is a coarse indicator of the overall extent of potential habitat in the upland forest ecosystem. Conversion back to forest, particularly from areas classified as hay/pasture, is outpacing conversion of forests to urban and row crops. This estimate of forest area change may even be an underestimate of forest area increase as the new NLCD classifies many small linear forest fragments surrounded by development as developed open space. While more forest can be good for many upland species, additional forest often comes at the expense of grassland and early successional habitat. For more information on these possible impacts, see the pine and prairie bird indicator.

### Upland forest birds

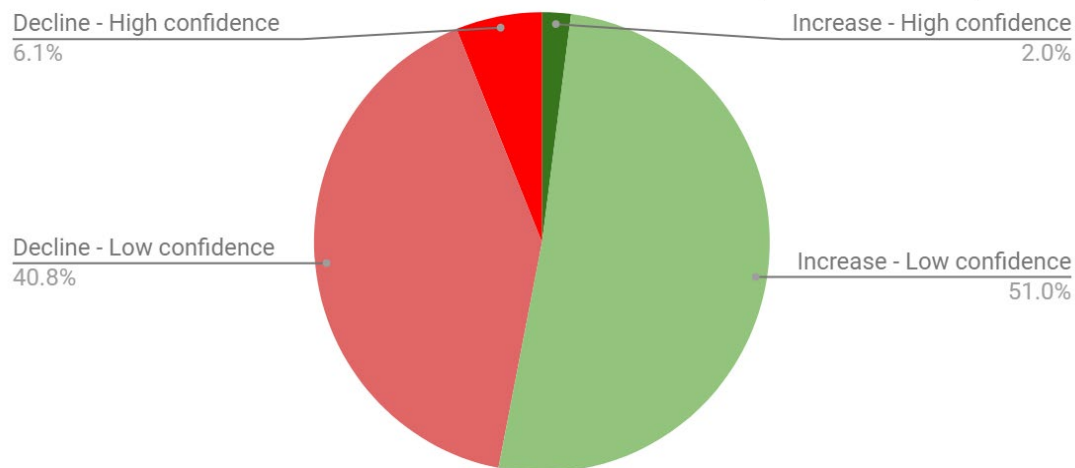


Figure 6. Upland forest bird trends and confidence.



Table 4. Species trend data for each state used in Figure 6 above. Brighter colors indicate higher confidence.

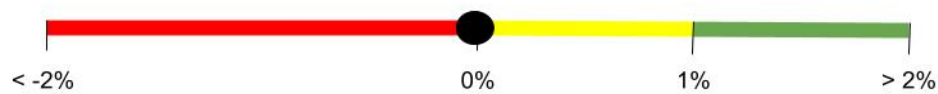
	<b>Cerulean warbler</b>	<b>Wood thrush</b>	<b>Louisiana waterthrush</b>	<b>Worm-eating warbler</b>
<b>West Virginia</b>	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
<b>Kentucky</b>	Increase - Low confidence	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
<b>Virginia</b>	Decline - Low confidence	Decline - High confidence	Increase - Low confidence	Increase - Low confidence
<b>Missouri</b>	Decline - Low confidence	Increase - Low confidence	Increase - High confidence	Decline - Low confidence
<b>Oklahoma</b>		Decline - High confidence	Increase - Low confidence	
<b>North Carolina</b>	Increase - Low confidence	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
<b>Tennessee</b>	Decline - Low confidence	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
<b>Texas</b>		Decline - High confidence	Increase - Low confidence	Decline - Low confidence
<b>Alabama</b>		Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
<b>Mississippi</b>	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence
<b>Georgia</b>		Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
<b>South Carolina</b>		Decline - Low confidence	Decline - Low confidence	
<b>Arkansas</b>	Increase - Low confidence	Decline - Low confidence	Increase - Low confidence	Decline - Low confidence
<b>Louisiana</b>		Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
<b>Florida</b>		Decline - Low confidence	Decline - Low confidence	

### Yearly trend

A slight majority of states showed increasing trends for upland forest bird species from 2010-2015. Some species mostly increased across states (Louisiana waterthrush, worm-eating warbler), some were relatively stable (cerulean warbler), while others mostly declined (wood thrush). Species selected are Regional Species of Greatest Conservation Need (RSGCNs) for states in the Southeast, primarily occur in this ecosystem, and have sufficient data for trend analysis in the Breeding Bird Survey. High confidence trends were statistically significant while low confidence trends were not. Averaging species trends across species and states results in an overall 0.01% decline per year.

### On track to meet SECAS goal

No. Indicator is not on track for an increase of 1% every 4 years.



### Data source

[Breeding Bird Survey](#)

### Confidence in trend

Medium. Despite issues with roadside sampling and detectability for some species, the Breeding Bird Survey is a standardized and randomized sample regularly used to estimate bird population trends. The mixed patterns across species and the low number of trends being statistically significant (“high confidence”) suggests that overall upland forest birds may be stable, slightly increasing, or slightly decreasing, with major variations in trends within species.

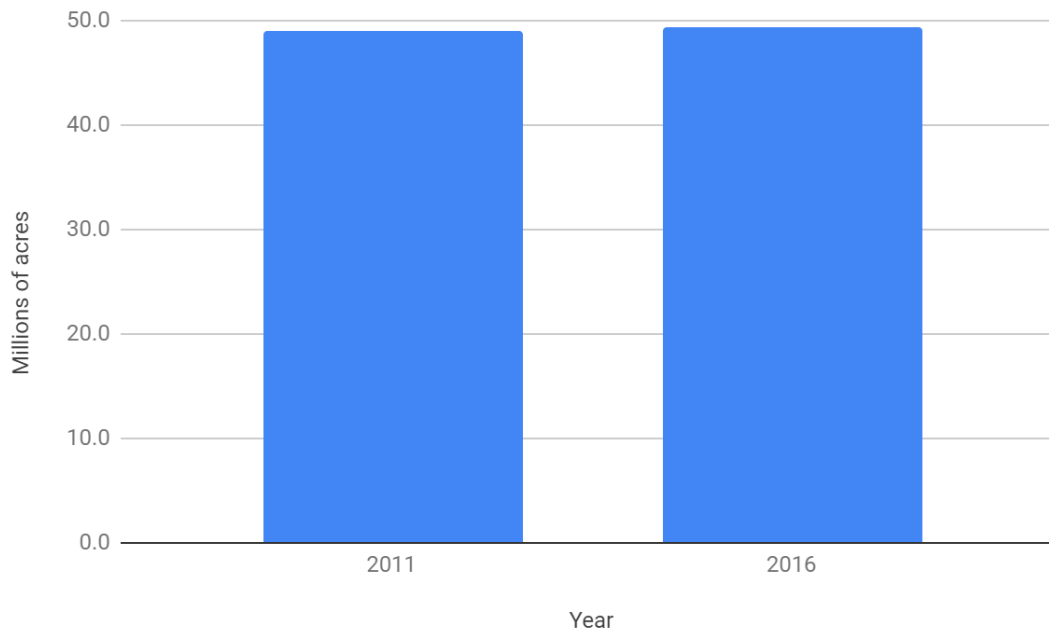
### Interpretation

This is an indicator of both local and landscape conditions across the upland forest ecosystem. The mixed trends across species highlight competing changes in this ecosystem: increasing forest area and increasing forest fragmentation. Each species likely responds differently depending on where those changes are occurring. The two species with the most divergent trends—wood thrush (mostly declining) and Louisiana waterthrush (mostly increasing)—may provide good examples of those differences. Louisiana waterthrush likely benefits from the focus in the Southeast on intact forests near water, while wood thrush, which also uses habitat far from water, is impacted by increased fragmentation farther from water. Worm-eating warblers are likely benefiting from maturing forests throughout the Southeast. These species are all neotropical migrants, however, and conditions on their wintering grounds may also be impacting population trends.

## Forested wetland

This ecosystem includes frequently flooded forests on both organic and mineral soils.

### Forested wetland area



*Figure 7. Millions of acres of forested wetland in 2011 and 2016.*

Table 5. State-specific percent change in forested wetland area from 2011-2016.

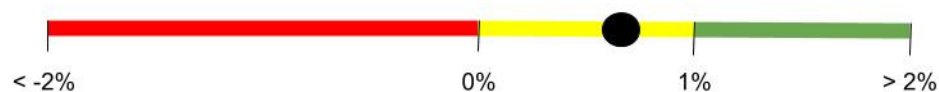
	2011 acres	2016 acres	% change/year
<b>West Virginia</b>	19,314	20,512	1.24
<b>Kentucky</b>	288,882	290,485	0.11
<b>Virginia</b>	1,171,155	1,187,160	0.27
<b>Missouri</b>	774,396	774,222	<0.01
<b>Oklahoma</b>	312,459	308,604	-0.25
<b>North Carolina</b>	4,388,645	4,394,197	0.03
<b>Tennessee</b>	810,654	813,549	0.07
<b>Texas</b>	4,456,595	4,530,058	0.33
<b>Alabama</b>	3,468,382	3,530,626	0.36
<b>Mississippi</b>	4,724,999	4,753,287	0.12
<b>Georgia</b>	5,899,054	5,955,290	0.19
<b>South Carolina</b>	3,979,274	3,958,338	-0.11
<b>Arkansas</b>	3,407,234	3,406,490	<0.01
<b>Louisiana</b>	6,325,396	6,347,868	0.07
<b>Florida</b>	8,913,578	9,040,669	0.29

### Yearly trend

Forested wetland area increased by approximately 0.15% per year from 2011-2016. That translates to a gain of approximately 74,000 acres per year. Forested wetland area overall also increased for most states.

### On track to meet SECAS goal

No. Increase is not enough to reach 1% every 4 years.



### Data source

[National Land Cover Database \(NLCD\)](#)

### Confidence in trend

High. The remotely sensed data used in this indicator provides full coverage of the region and forested wetlands typically have high classification accuracy.

### Interpretation

This is a coarse indicator of the overall extent of potential habitat in the forested wetland ecosystem. Extensive conservation investments in forested wetlands, policies restricting wetland development, and growing interest from urban communities in water supply protection and reducing flood risks may be causing the increases in forested wetland area. However, forested wetland area is also very sensitive to timber management decisions and yearly weather fluctuations that facilitate or hinder harvest. It is likely that many complicated interacting factors will drive changes in this indicator in the future.

### Forested wetland birds

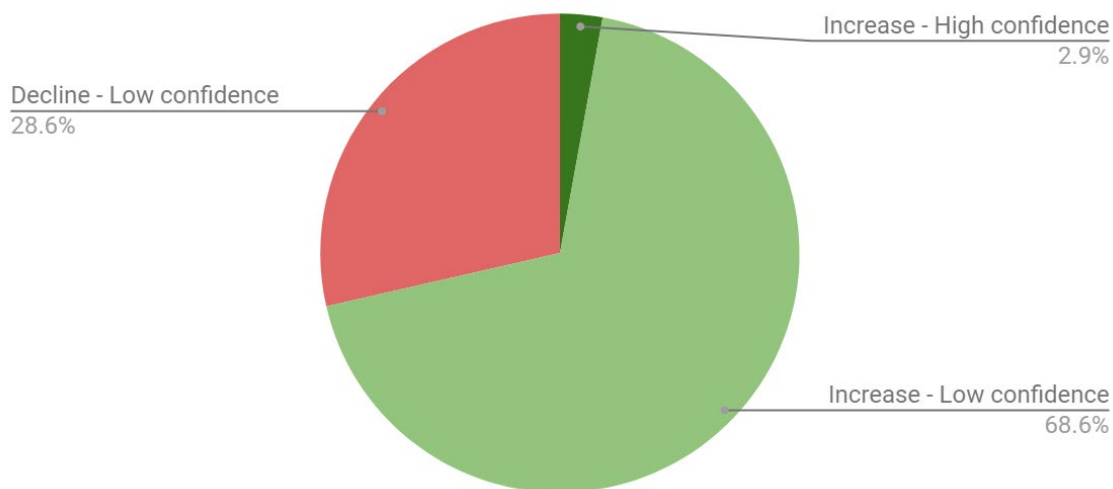


Figure 8. Forested wetland birds trends and confidence.

Table 6. Species trend data for each state used in Figure 8 above. Brighter colors indicate higher confidence.

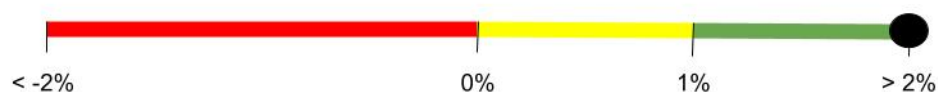
	Prothonotary warbler	Swallow-tailed kite	Yellow-throated warbler
West Virginia	Decline - Low confidence		Increase - Low confidence
Kentucky	Increase - Low confidence		Increase - Low confidence
Virginia	Increase - Low confidence		Increase - Low confidence
Missouri	Increase - Low confidence		Increase - Low confidence
Oklahoma	Increase - Low confidence		Decline - Low confidence
North Carolina	Increase - Low confidence		Increase - High confidence
Tennessee	Increase - Low confidence		Increase - Low confidence
Texas	Increase - Low confidence		Increase - Low confidence
Alabama	Decline - Low confidence	Decline - Low confidence	Increase - Low confidence
Mississippi	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
Georgia	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
South Carolina	Increase - Low confidence	Decline - Low confidence	Increase - Low confidence
Arkansas	Increase - Low confidence		Increase - Low confidence
Louisiana	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
Florida	Decline - Low confidence	Increase - Low confidence	Decline - Low confidence

### Yearly trend

Most states showed increasing trends for forested wetland bird species from 2010-2015. Species selected are Regional Species of Greatest Conservation Need (RSGCNs) for states in the Southeast, primarily occur in this ecosystem, and have sufficient data for trend analysis in the Breeding Bird Survey. High confidence trends were statistically significant while low confidence trends were not. Averaging species trends across species and states results in an overall 2% increase per year.

### On track to meet SECAS goal

Yes. Increase is greater than 1% every 4 years.



Data source

[Breeding Bird Survey](#)

Confidence in trend

Medium. Despite issues with roadside sampling and detectability for some species, the Breeding Bird Survey is a standardized and randomized sample regularly used to estimate bird population trends. The mixed patterns across states and the low number of trends being statistically significant (“high confidence”) suggests that overall forested wetland birds may be stable, slightly increasing, or slightly decreasing with major variation across states.

Interpretation

This is an indicator of both local and landscape conditions across the forested wetland ecosystem. While there is variation across species and states, forested wetland birds appear to be on track to meet the SECAS goal. This may be due to the extensive conservation investments in forested wetlands, policies restricting wetland development, and growing interest from urban communities in water supply protection and reducing flood risks.

## Rivers and streams

This ecosystem includes rivers and streams draining into the Atlantic Ocean and Gulf of Mexico.

### Water quality

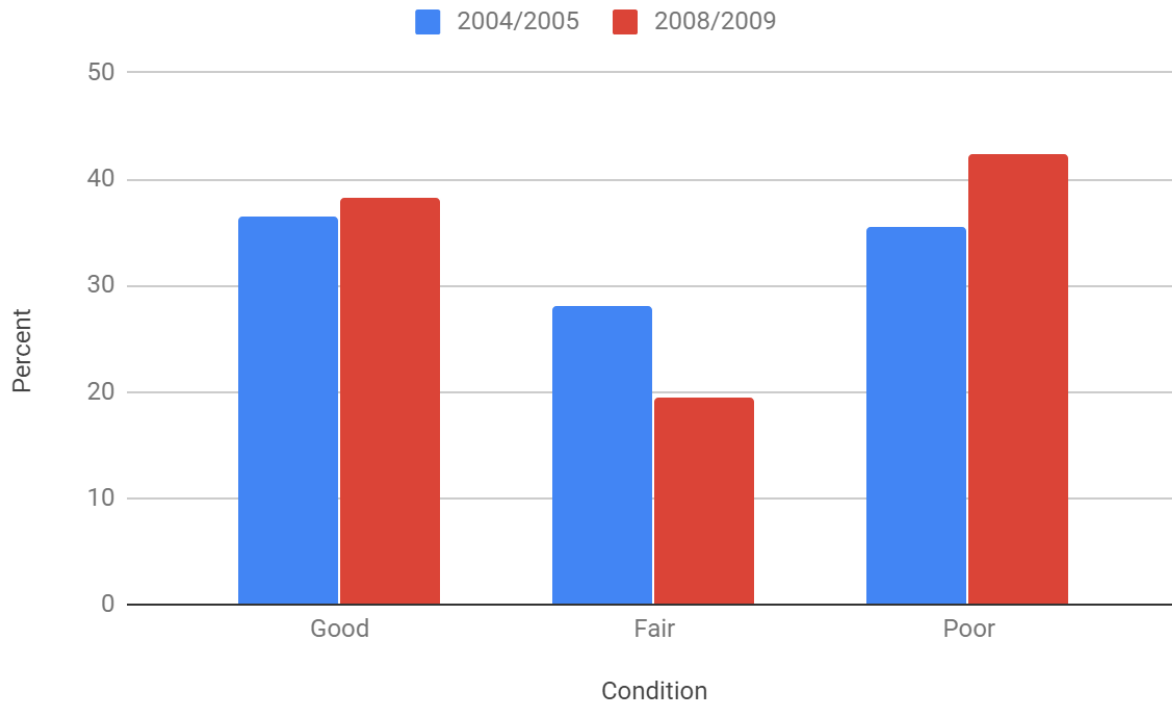


Figure 9. Percent of the Southeast in good, fair, and poor condition in 2004/2005 and 2008/2009.

Table 7. Trends for each of the subregions used in Figure 10 above (Coastal Plains, Southern Appalachians, Southern Plains).

	Good	Fair	Poor
Coastal Plains	-2.44	-1.38	3.81
Southern Appalachians	-0.19	-1.56	1.75
Southern Plains	3.88	-3.56	-0.31



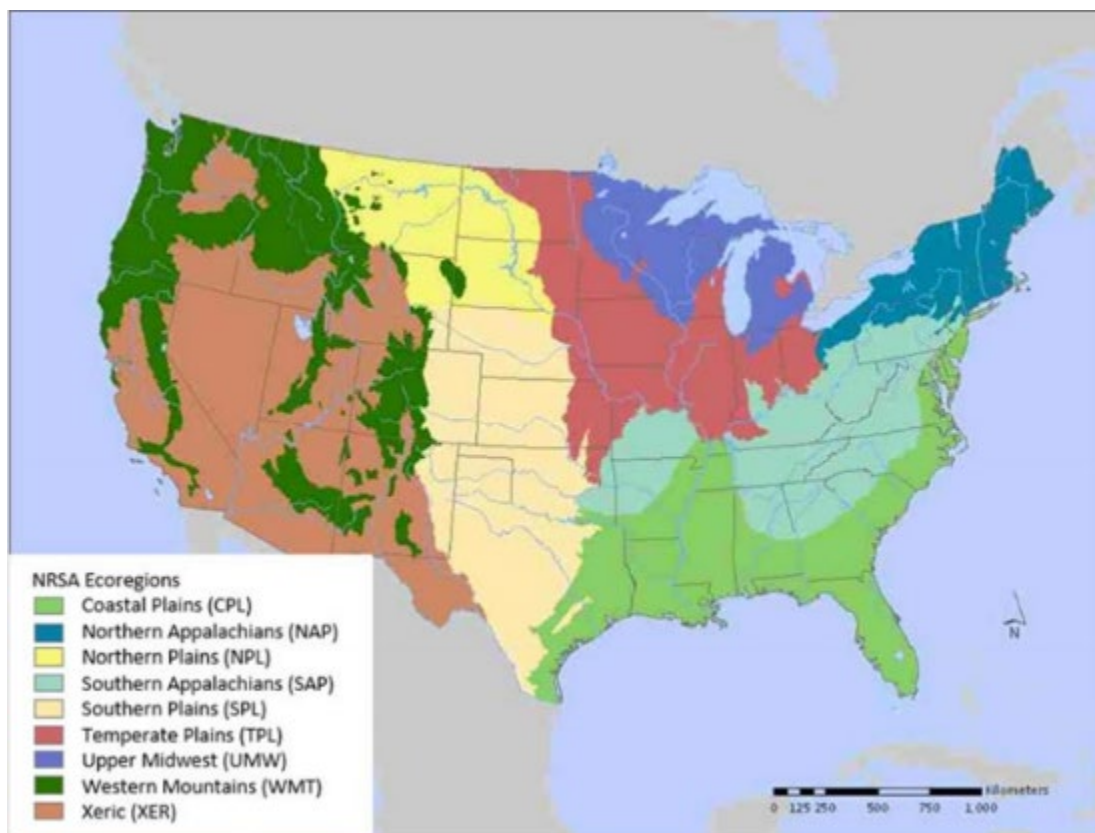


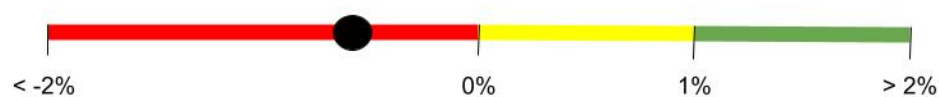
Figure 10. Map of subregions used in Table 7.

### Yearly trend

When averaged across subregions, overall water quality declined by approximately 0.17% per year from 2004/2005 to 2008/2009. Both the overall area classified as good and area classified as poor increased. The overall increase in area classified as good came primarily from large improvements in the Southern Plains while the largest increases in areas classified as poor came from the Coastal Plains.

### On track to meet SECAS goal

No. Indicator is not on track for an increase of 1% every 4 years.



### Data source

[National Rivers and Streams Assessment](#)

### Confidence in trend

Low. While the data come from a well-designed, randomized study, its biggest weakness is that there are only two points in time represented. Water quality can be especially sensitive to this issue as yearly weather patterns have an important impact on water quality. Furthermore, the most recent data are from 2008/2009.

### Interpretation

This is an indicator of overall water quality across the freshwater aquatic ecosystem. Given the low confidence in the trends, it's important to not read too much into these initial numbers. That said, these numbers suggest there could be major differences in water quality trends among regions.

### Aquatic connectivity

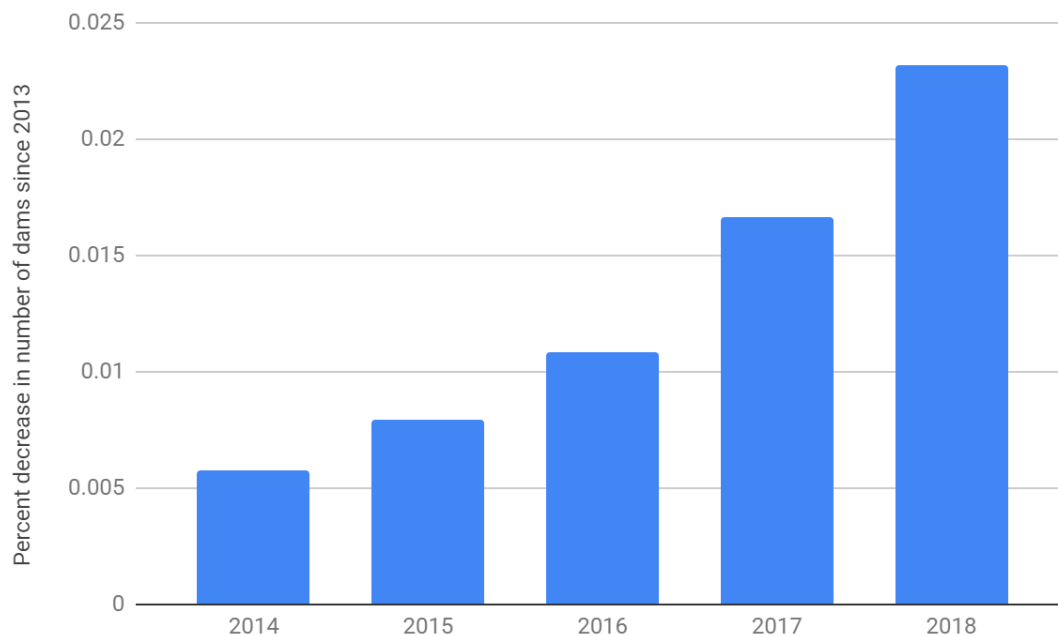


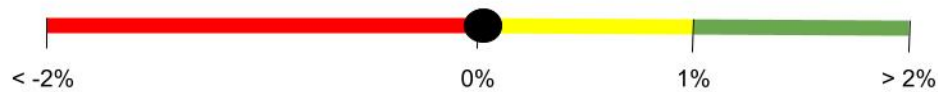
Figure 11. Percent decrease in number of dams since 2013, from 2014-2018.

### Yearly trend

The overall number of dams decreased by 0.004% per year from 2013-2018.

On track to meet SECAS goal

No. Increase is not enough to reach 1% every 4 years.



Data source

[Southeast Aquatic Resources Partnership \(SARP\) Aquatic Barrier Database](#) (data available on request; contact [kat@southeastaquatics.net](mailto:kat@southeastaquatics.net))

Confidence in trend

Low. While a small increase in overall connectivity is likely, estimating the magnitude of that change is difficult. Tracking dam removals and the year they are removed is still a challenge. Estimating the overall number of dams in the region can also be a challenge. The current data are probably underestimating both number of dam removals and total number of dams in the region.

Interpretation

This is an indicator of species ability to access habitat within rivers and streams of the region. While the increases are relatively small, this is another example of an ecosystem condition that is improving over time. Maintaining improvements in aquatic connectivity may be a challenge in the near future as coastal communities explore creating new dams and reservoirs in response to increased flooding from intense storms and sea-level rise.

## Beaches and dunes

This ecosystem extends from the nearshore ocean across sand, gravel, or shell intertidal beaches, and into more stable and vegetated dunes.

### Beach birds

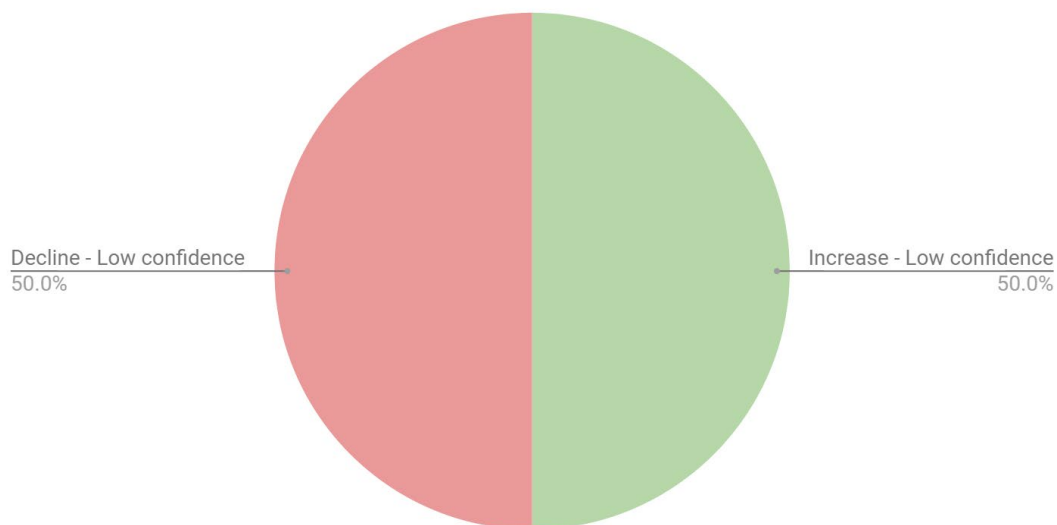


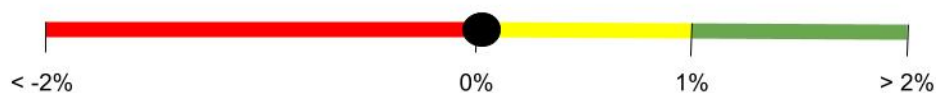
Figure 12. Beach bird trends and confidence.

### Yearly trend

When averaged across species, beach birds increased by 0.003% per year from 2011-2016. Piping plover and whimbrel increased by 0.02% and 0.03% per year, respectively. Red knot and willet declined by 0.02% and 0.01%, respectively.

### On track to meet SECAS goal

No. Increase is not enough to reach 1% every 4 years.



### Data source

[International Shorebird Survey \(ISS\)](#)

Special thanks to Adam Smith (Canadian Wildlife Service, Environment and Climate Change Canada) and Paul Smith (Environment and Climate Change Canada) for providing data and estimates for this report. Special thanks to Manomet for overall coordination of the International Shorebird Survey.

### Confidence in trend

Low. All trend estimates have high statistical uncertainty. This is mostly due to low sample sizes along the South Atlantic and Gulf coasts.

### Interpretation

This is an indicator of beach habitat quality. The mixed trends highlight the challenges and opportunities within this ecosystem. Habitat modification, climate change, and human disturbance continue to pose problems, but conservation action throughout the Atlantic and Gulf coasts also seems to be making an impact. As these birds are migratory, conservation actions and threats impacting their populations occur both within the Southeast and in other parts of the species range.

## Estuarine and marine

This ecosystem extends upstream into tidal flats and salt marshes, and seaward into the open ocean covering the extent of U.S. waters.

### Coastal condition

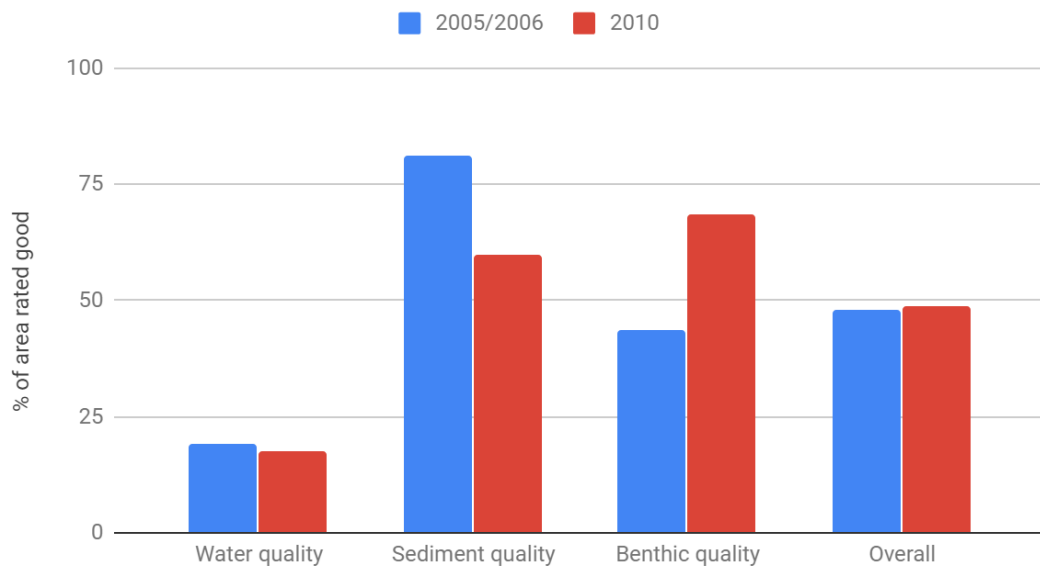


Figure 13. Percent of the Southeast rated “good” for various coastal condition metrics in 2005/2006 and 2010.

Table 8. Trends for each of the subregions used in Figure 13 above (South Atlantic, Gulf of Mexico).

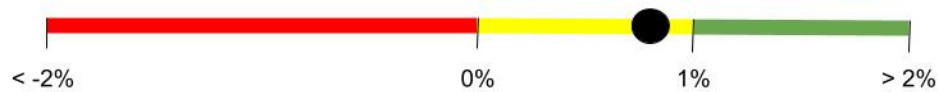
	Water quality	Sediment quality	Benthic quality	Overall
South Atlantic	7.80	-27.30	13.90	-1.87
Gulf of Mexico	-9.90	-14.50	35.40	3.67

### Yearly trend

When averaged across subregions, overall coastal condition increased by 0.19% per year from 2005/2006 to 2010. Condition declined in the South Atlantic and increased in the Gulf of Mexico.

On track to meet SECAS goal

No. Increase is not enough to reach 1% every 4 years.



Data source

[National Coastal Condition Assessment](#)

Confidence in trend

Low. While this is a well-designed, randomized survey, benthic quality can undergo large yearly variations based on weather that do not necessarily indicate trends in coastal condition.

Interpretation

This is an indicator of the overall condition of the water and sediment in the estuaries and nearshore marine areas of the Southeast. Since 2001/2002 (not depicted in graph), condition has been stable or declining in the South Atlantic and improving in the Gulf of Mexico. Data in this assessment predate the Gulf Horizon oil spill and subsequent restoration efforts. Those events will likely impact future trends in Gulf condition.

## Fisheries

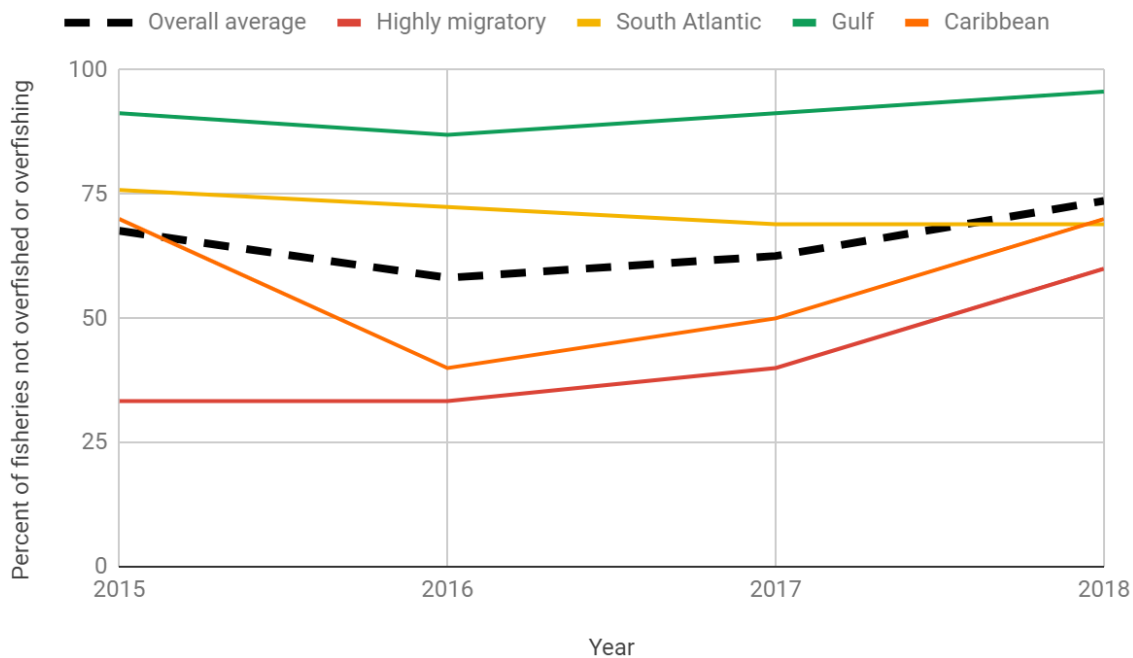


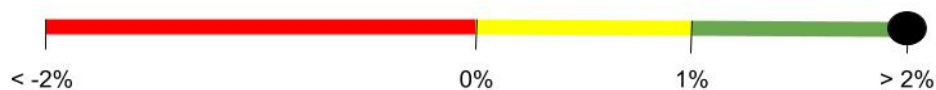
Figure 14. Percent of fisheries not overfished or overfishing from 2015-2018.

### Yearly trend

Overall fisheries condition has improved by approximately 0.56% per year from 2015-2018. The condition of highly migratory, Gulf, and Caribbean fisheries improved while South Atlantic fisheries condition declined.

### On track to meet SECAS goal

Yes. Increase is greater than 1% per year.



### Data source

[NOAA reports to Congress on the status of U.S. fisheries](#)

### Confidence in trend

Medium. Stock status assessments can be challenging, but extensive work and data go into assessing these statuses every year.



## Interpretation

This is an indicator of management for the most important estuarine and marine fisheries of the Southeast. Fishing is only one of the many stressors faced by the fisheries of the Southeast. Overall improvements in fishery management make important contributions to the SECAS goal, but broader ecosystem-based approaches will be important for sustaining fisheries at desired levels into the future.