Recent Trends in Southeastern Ecosystems (2021)

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

October 13, 2021

Contents

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 the third annual 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. Longleaf pine area, forested wetland birds, working lands conservation, coastal condition, and marine fisheries indicators improved fast enough to stay on track to meet the SECAS goal. Longleaf pine, forested wetland conservation, working lands, and marine fisheries have been major areas of shared conservation focus in the Southeast, and those efforts are clearly having a big impact.

Only 5 of the 17 indicators had declining trends. Of these, pine and prairie birds continue to be the most off track for meeting the SECAS goal. Declines in habitat, especially within the West Gulf Coastal Plain, Piedmont, Southeast Coastal Plain, Central Hardwoods, and Peninsular Florida, are likely driving this pattern. There is still hope that focused conservation can have an impact as Bachman's sparrow, subject to significant conservation attention, increased in abundance through much of the longleaf pine range. This further reinforces the importance of accelerating open pine, pine/oak savanna, and other grassland restoration throughout the Southeast for grassland birds, pollinators, and other key species.

For the first time in the 3-year history of this report, prescribed fire in longleaf switched to a declining trend. Despite the COVID-19 pandemic, prescribed fire did increase between 2019 and 2020—a major achievement. That said, the overall declining trend over the last 6 years suggests that more work will be needed to maintain the restoration momentum in this important ecosystem.

To learn more about the role of SECAS in meeting the goal, see the SECAS Statement of Purpose.

Overview of recent trends in ecosystem indicators

Table 1. Overview of recent trends in ecosystem indicators. Indicators shown in green are on track to meet the goal (≥1% increase every 4 years); indicators shown in yellow (<1% increase) and red (declines) are not.

Ecosystem	Type	Indicator	% change/year	Page
Terrestrial				
	Health	Areas without invasive plants	0.33% decline	5
		Beach birds	0.003% increase	7
		Forested wetland area	0.15% increase	8
		Forested wetland birds	2.1% increase	10
		Gopher tortoise (Eastern population)	Increasing but % change unknown	13
		Longleaf pine area	4.5% increase	15
		Pine and prairie birds	2.9% decline	16
		Prescribed fire in longleaf pine	2% decline	20
		Salt marsh area	0.03% decline	21
		Upland forest area	0.14% increase	22
		Upland forest birds	0.23% increase	24
	Function	Working lands conservation	11% increase	28
	Connectivity	Undeveloped land in corridors	0.03% decline	31
Freshwater				
	Function	Water quality	0.003% increase	33
	Connectivity	Aquatic connectivity	0.004% increase	35
Marine & Estuarine				
	Health	Coastal condition	1.1% increase	37
	Function	Fisheries	0.56% increase	39

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 to meet 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 assesses 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

Changes since the last report

For 2021, we made three major improvements: 1) new indicators for working lands conservation, salt marsh area, and undeveloped land in corridors, 2) updated data for bird indicators, prescribed fire in longleaf pine, and coastal condition, and 3) reformatting to better match the health, function, and connectivity categories within the SECAS goal.

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 health, function, and connectivity

For the purposes of this report, we use these definitions for health, function and connectivity:

- **Health:** The condition of species and the ecosystems they depend on
- **Function:** The benefits provided to people by species and ecosystems
- **Connectivity**: The ability of species and ecosystems to move over time

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, 2015 is the most recent year with available data from the National Coastal Condition 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 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 13 different assessments to evaluate indicator trends. Assessments ranged from remotely sensed data like the National Land Cover Database 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, Gopher Tortoise Candidate Conservation Agreement reports, USDA Soil and Water Resources Conservation Act Reports, Southeast Conservation Blueprint, International Shorebird Survey , EPA 303(d) state reports, Southeast Aquatic Resources Partnership Aquatic Barrier Database, NOAA C-CAP Regional Landcover, 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

Terrestrial

All inland and coastal terrestrial ecosystems

Health

The condition of species and the ecosystems they depend on

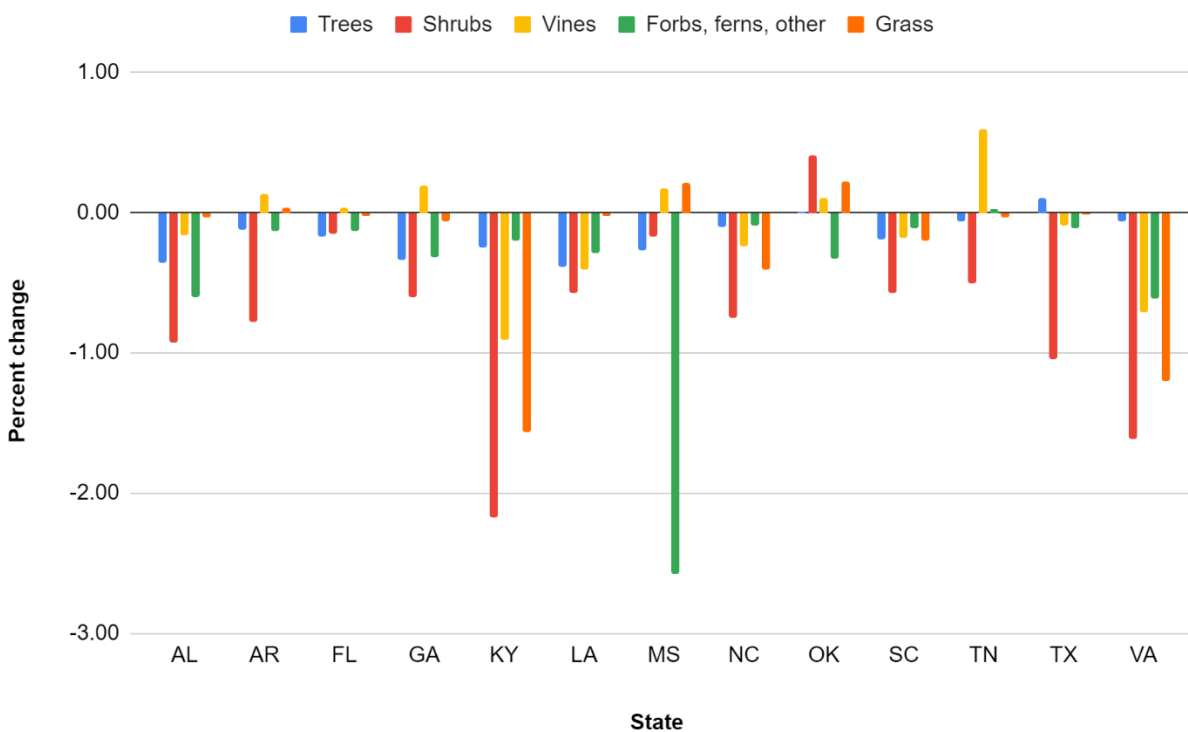## Areas without invasive plants

Figure 1. Percent change in areas without invasive plants by plant type, based on the most recent available state data.

Yearly trend

Most states showed declining trends for areas without different types of invasive plants. The most recent data available varied for each state, with some as old as 2016 and others as recent as 2019. Averaging trends across plant type and states results in a 0.33% decline per year.

On track to meet SECAS goal

No. The decline of about 1.3% every 4 years is not on track to meet the SECAS goal of a 1% increase every 4 years.

< -2%   -1%   0%   1%   > 2%

Data source

Forest Inventory Analysis (FIA) data extracted using the Southern Nonnative Invasive Plant Extraction Tool (SNIPET)

Confidence in trend

Medium. While data for some states was a few years old, the statistically randomized design of the FIA program, its long history of tracking trends, and the sample size across all states suggest these data provide a reasonable estimate of the trend.

Interpretation

This is an indicator of local conditions across terrestrial ecosystems. This indicator suggests that work to reduce the spread of specific invasive species is having an impact. Without the ongoing work to reduce invasives, landscape and climate change in the Southeast would likely lead to far worse trends. However, this indicator also shows that additional attention to invasive plants will be required to get on track to meet the SECAS goal.

Notable trends for this indicator include: 1) improvements in areas without invasive vines in Tennessee mostly due to reductions in Japanese honeysuckle, 2) improvements in areas without invasive shrubs in Oklahoma mostly due to reductions in shrubby and Thunberg's lespedeza, 3) declines in areas without invasive forbs in Mississippi due to large increases in liriope, and 4) declines in areas without invasive grasses in Kentucky, Virginia, and the Carolinas mostly due to increases in Japanese stiltgrass.
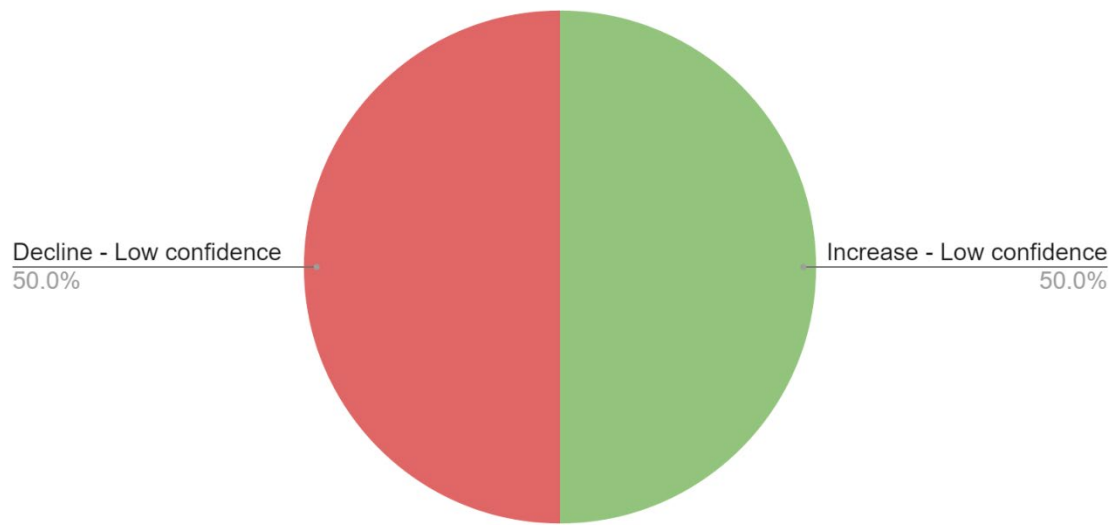
Beach birds

Figure 2. 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. The increase of about 0.012% every 4 years is not enough to reach the SECAS goal of a 1% increase 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 ISS.

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' ranges.
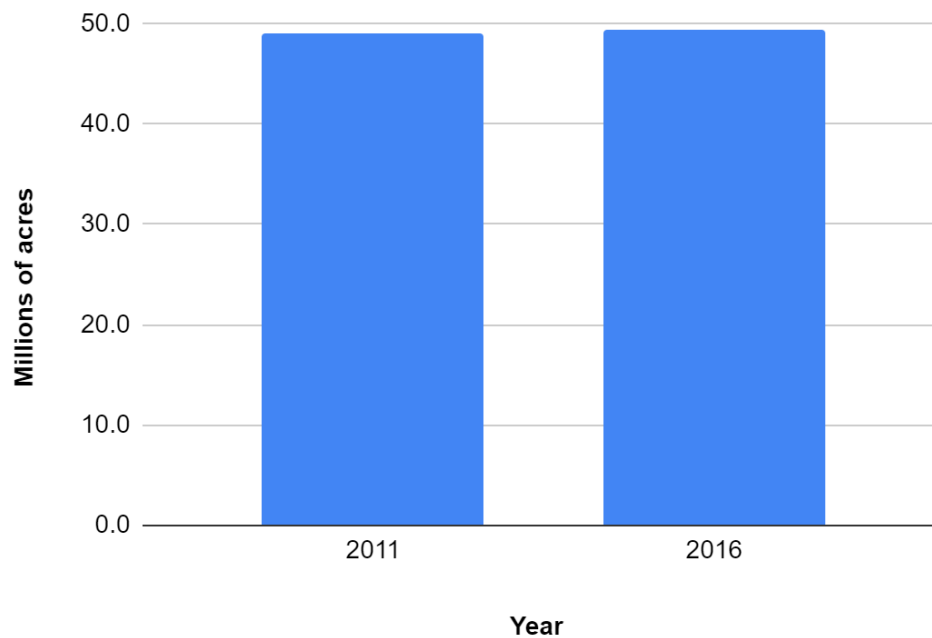
Forested wetland area

Figure 3. Millions of acres of forested wetland in 2011 and 2016.

*Table 2. State-specific percent change in forested wetland area from 2011-2016.*

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

Yearly trend

Overall area of forested wetlands 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. The increase of about 0.6% every 4 years is not enough to reach the SECAS goal of a 1% increase every 4 years.
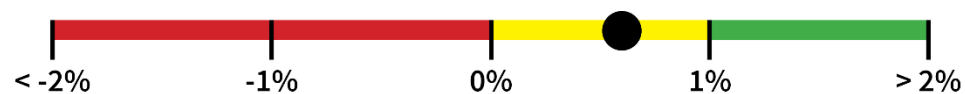
Data source

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.
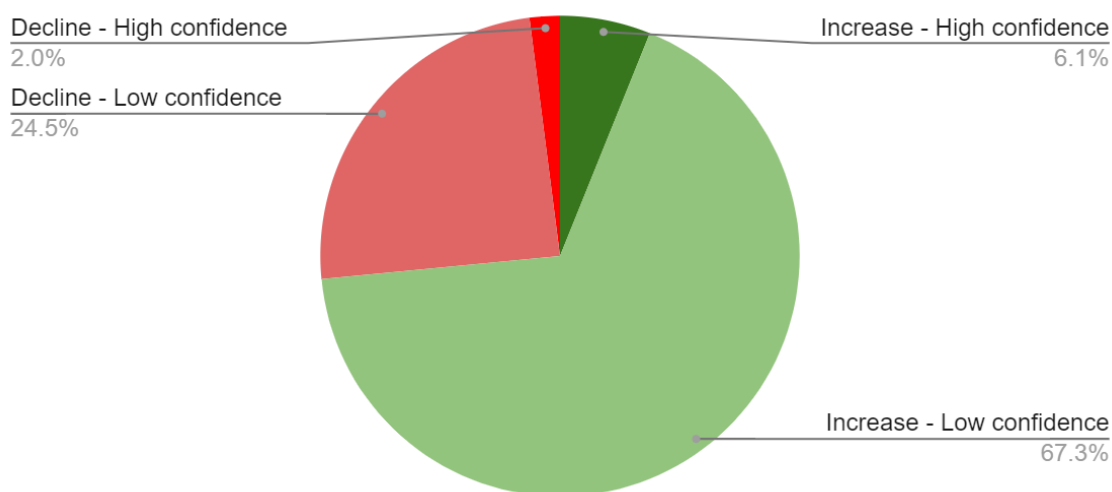
Forested wetland birds

Figure 4. Percent of forested wetland bird species that are increasing or declining by state from 2014-2019.

Table 3. Species trend data from 2014-2019 for each state used in Figure 4 above. Brighter colors indicate higher confidence.

|	Prothonotary warbler	Swallow-tailed kite	Yellow-throated warbler	Swainson's warbler
Alabama	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence
Arkansas	Increase - Low confidence		Decline - Low confidence	Decline - Low confidence
Florida	Increase - Low confidence	Increase - High confidence	Increase - Low confidence	Increase - Low confidence
Georgia	Increase - Low confidence	Increase - High confidence	Decline - Low confidence	Increase - Low confidence
Kentucky	Increase - Low confidence		Increase - Low confidence	Increase - Low confidence
Louisiana	Increase - Low confidence	Increase - Low confidence	Decline - Low confidence	Increase - High confidence
Mississippi	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence	Decline - Low confidence
Missouri	Increase - Low confidence		Decline - Low confidence	
North Carolina	Decline - Low confidence		Increase - Low confidence	Increase - Low confidence
Oklahoma	Decline - Low confidence		Increase - Low confidence	
South Carolina	Increase - Low confidence	Increase - Low confidence	Decline - High confidence	Increase - Low confidence
Tennessee	Increase - Low confidence		Increase - Low confidence	Increase - Low confidence
Texas	Decline - Low confidence		Increase - Low confidence	Increase - Low confidence
Virginia	Decline - Low confidence		Increase - Low confidence	Increase - Low confidence
West Virginia	Decline - Low confidence		Increase - Low confidence	Increase - Low confidence
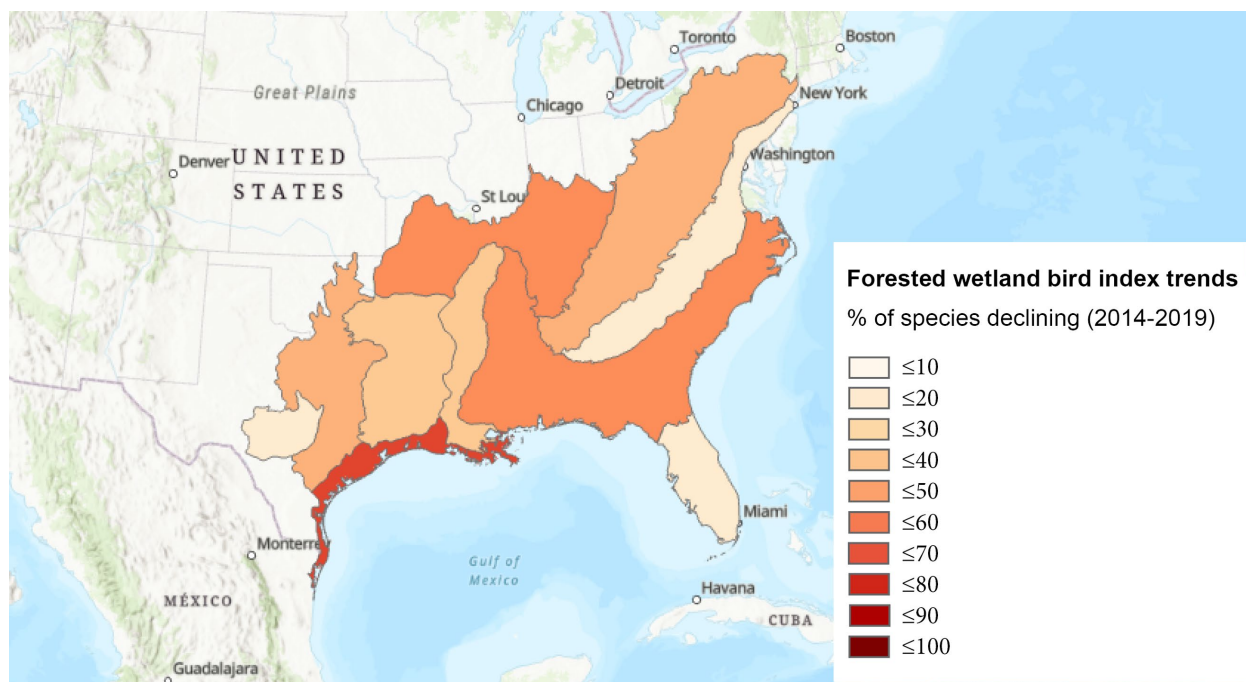
Figure 5. Percent of forested wetland bird species declining from 2014-2019 by Bird Conservation Region (BCR).

Yearly trend

Most states showed increasing trends for forested wetland bird species from 2014-2019. Species selected are Regional Species of Greatest Conservation Need 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 2.1% increase per year.

On track to meet SECAS goal

Yes. The increase of about 8.4% every 4 years is greater than the SECAS goal of a 1% increase every 4 years.

Data source

[Breeding Bird Survey (BBS)](#)

Medium. Despite issues with roadside sampling and detectability for some species, the BBS 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.

Gulf Coastal Prairie is the only Bird Conservation Region where more species are declining than increasing. There are two species that are declining in this region: Prothonotary warbler and Yellow-throated warbler. Prothonotary warbler populations in this region had been increasing from the 1960s into the late 1990s and have been steadily declining ever since. Yellow-throated warbler population trends are highly uncertain in this region with wide confidence intervals and a relatively small sample size.
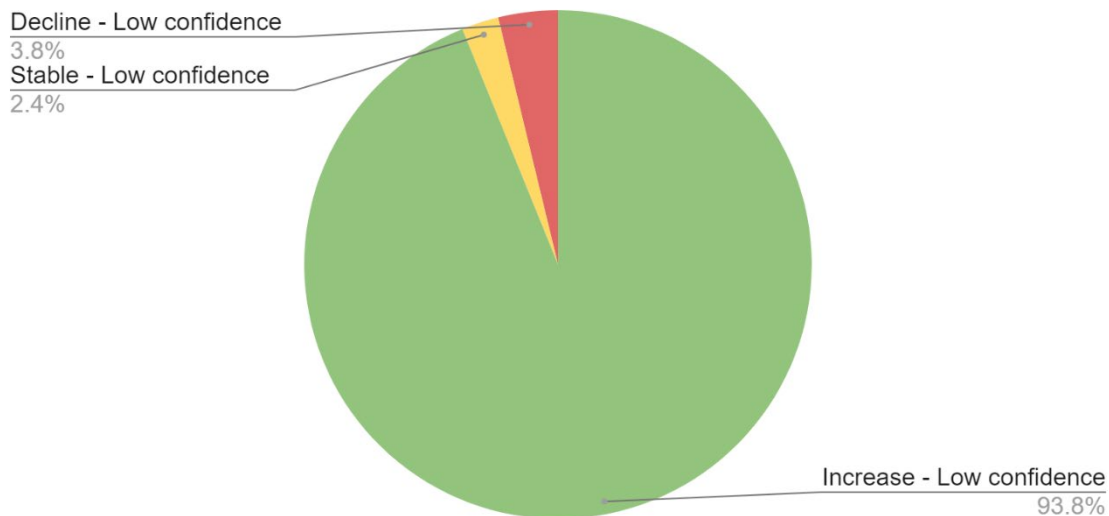
Gopher tortoise (Eastern population)

Figure 6. Percent of gopher tortoise sites with increasing, declining, or stable trends during resurveys in 2017.

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.
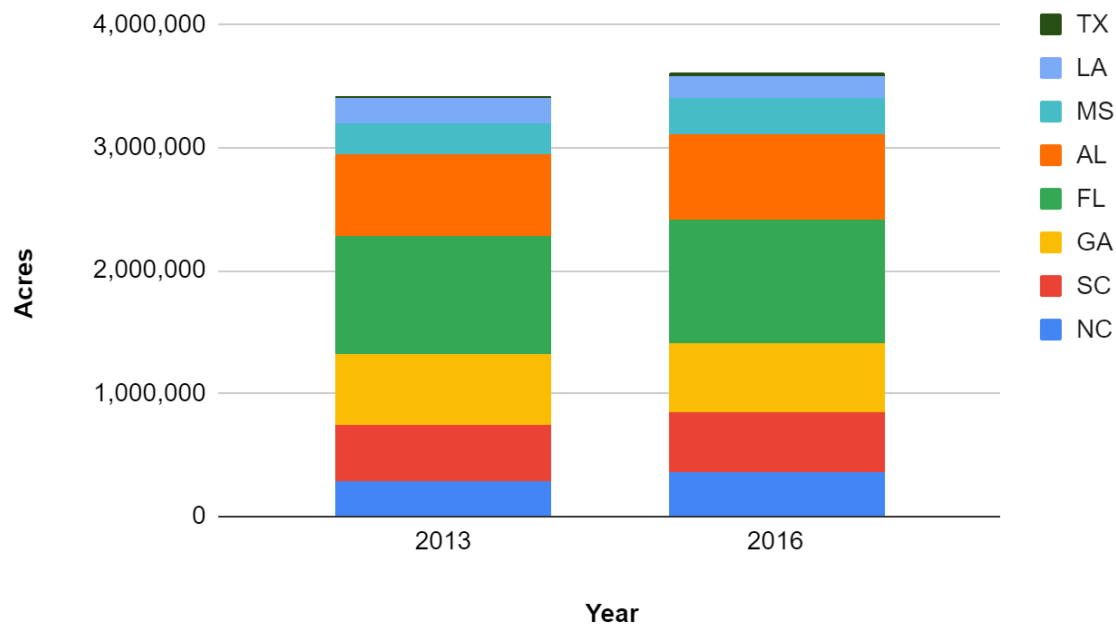
Longleaf pine area

Figure 7. 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. The increase of about 18% every 4 years is greater than the SECAS goal of 1% increase every 4 years.
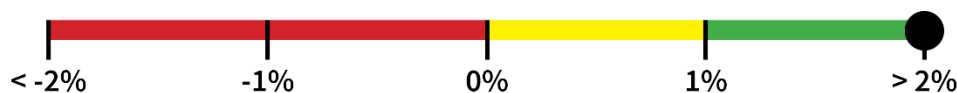
Data source

[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 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.
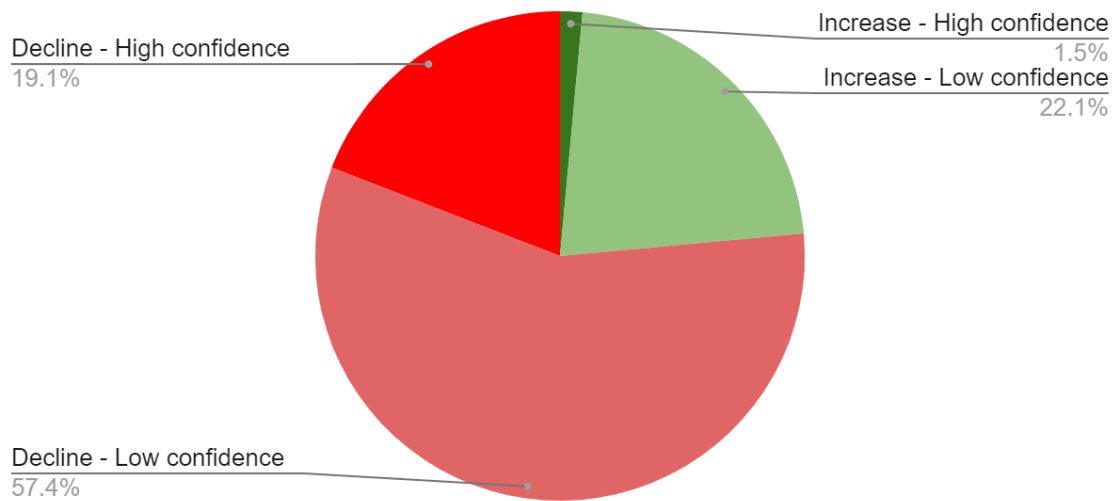
Pine and prairie birds

Figure 8. Percent of pine and prairie bird species that are increasing or declining by state from 2014-2019.

Table 4. Species trend data from 2014-2019 for each state used in Figure 8 above. Brighter colors indicate higher confidence.

|	Northern bobwhite	Grasshopper sparrow	Prairie warbler	Loggerhead shrike	Bachman's sparrow
Alabama	Increase - Low confidence	Increase - Low confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
Arkansas	Decline - Low confidence	Increase - Low confidence	Decline - High confidence	Decline - Low confidence	Decline - Low confidence
Florida	Decline - Low confidence		Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
Georgia	Increase - Low confidence	Increase - Low confidence	Decline - High confidence	Decline - Low confidence	Increase - Low confidence
Kentucky	Decline - High confidence	Decline - High confidence	Increase - Low confidence	Increase - Low confidence	Decline - Low confidence
Louisiana	Decline - High confidence		Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
Mississippi	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
Missouri	Decline - Low confidence	Decline - High confidence	Increase - Low confidence	Decline - Low confidence	
Oklahoma	Decline - High confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	
North Carolina	Decline - High confidence	Decline - Low confidence	Decline - High confidence	Decline - Low confidence	Increase - Low confidence
South Carolina	Decline - Low confidence	Decline - Low confidence	Decline - High confidence	Increase - Low confidence	Increase - Low confidence
Tennessee	Decline - High confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	
Texas	Decline - High confidence	Increase - High confidence	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
Virginia	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	Decline - Low confidence	
West Virginia	Decline - Low confidence	Decline - High confidence	Increase - Low confidence	Decline - Low confidence	
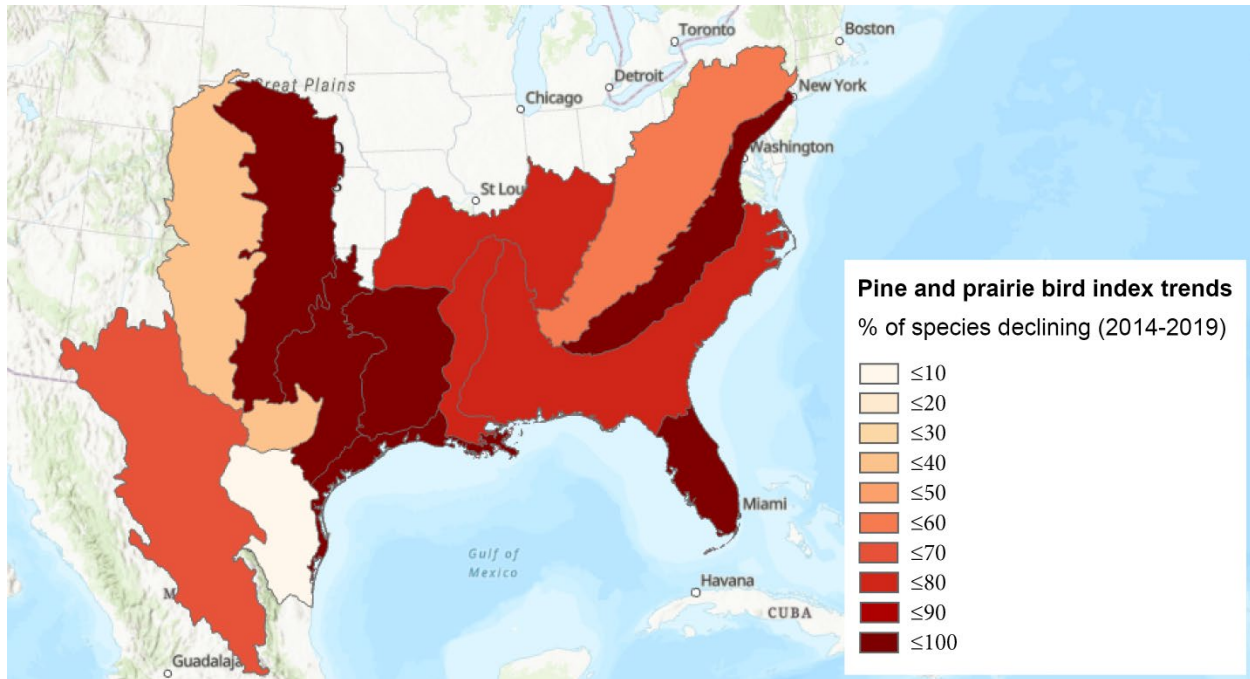
Figure 9. Percent of pine and prairie bird species declining from 2014-2019 by Bird Conservation Region (BCR).

Yearly trend

Most states showed declining trends for pine and prairie bird species from 2014-2019. Species selected are Regional Species of Greatest Conservation Need 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 decline of 2.9% per year.

On track to meet SECAS goal

No. The decline of about 11.6% every 4 years is not on track to meet the SECAS goal of a 1% increase every 4 years.
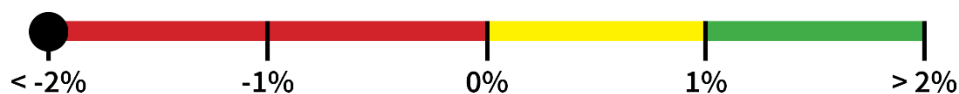
Data source

Breeding Bird Survey (BBS)

Confidence in trend

Medium. Despite issues with roadside sampling and detectability for some species, the BBS 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 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. Looking at trends within Bird Conservation Regions (BCRs) provides additional context for the state-level results (see Figure 9). Recent trends for most BCRs had high percentages of declines. There are, however, some differences in drivers of major trends in Western vs. Eastern BCRs in the Southeast.

For the Western BCRs, trends in arid regions can vary significantly based on yearly weather patterns. Trends from the last few decades in pine and prairie bird species suggest that the recent declines are part of larger cycles of increases and declines.

Declines in the Eastern BCRs seem to be driven more by long-term patterns in habitat loss. While there are ongoing efforts in these regions to bring back open pine, pine/oak savanna, and other grasslands, it doesn't appear that they have yet been able to restore enough habitat to fully reverse declines across the entire area. That said, there are indications in the data that some species trends are starting to improve. In Alabama, Georgia, South Carolina, North Carolina, and Kentucky, at least 2 of the 5 index species had increasing trends. Bachman's sparrow populations had non-significant increases across the Southeast Coastal Plain. This recent increase is likely due to the substantial restoration efforts through America's Longleaf and specific targeted management for this species.
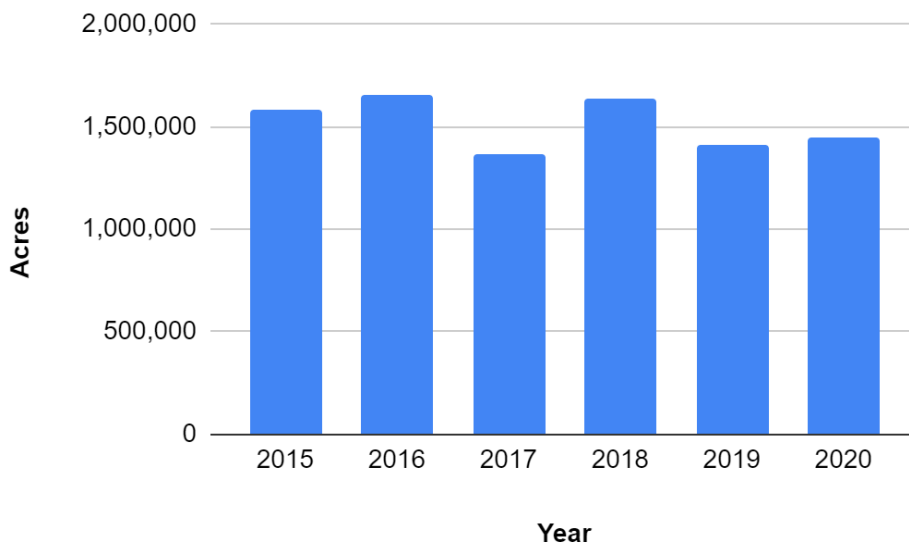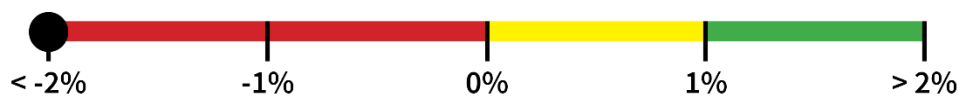
Prescribed fire in longleaf pine

Figure 10. Acres of prescribed fire in longleaf pine from 2015-2020.

Yearly trend

Prescribed fire in longleaf pine decreased by about 2% per year from 2014-2019.

On track to meet SECAS goal

No. The decline of about 8% every 4 years is not on track to reach the SECAS goal of a 1% increase 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 is also important outside of the longleaf range, but sufficient trend data wasn't yet available in those areas. For the first time in the 3-year history of this report, prescribed fire in longleaf switched to a declining trend. Despite the COVID-19 pandemic, prescribed fire did increase between 2019 and 2020—a major achievement. That said, the overall declining trend over the last 6 years suggests that more work will be needed to maintain the restoration momentum in this important ecosystem.
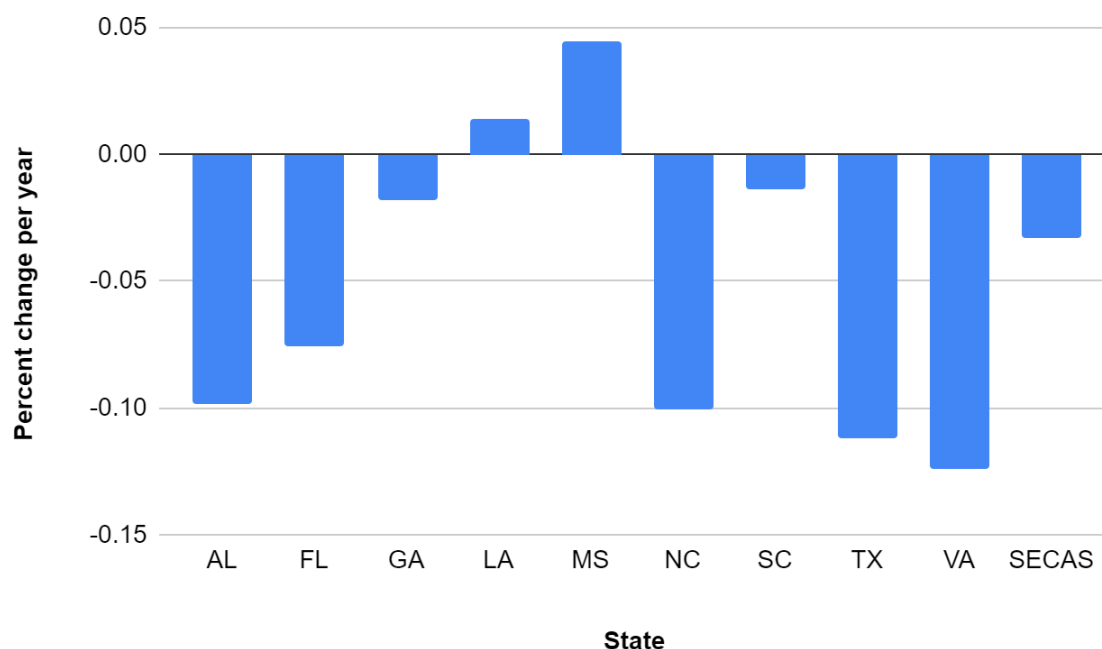
Salt marsh area

Figure 11. Percent change per year in area of estuarine emergent wetland between 2010 and 2016.

Yearly trend

Salt marsh area declined across most states. Total salt marsh area in the SECAS region declined by 0.03% per year from 2010-2016.

On track to meet SECAS goal

No. The decline of about 0.12% every 4 years is not enough to reach the SECAS goal of a 1% increase every 4 years.

Confidence in trend

Medium. The remotely sensed data used in this indicator provides full coverage of the region, but yearly weather variations can influence how well it classifies estuarine emergent wetlands.

Interpretation

This is a coarse indicator of the overall extent of potential habitat in salt marshes. Sea-level rise is having major impacts on salt marshes and this indicator tracks how well salt marshes are keeping up with pressure from rising seas.

Salt marsh area declined across most states. Two exceptions were in Mississippi and Louisiana. These increases are likely from the substantial amount of marsh restoration in these areas after the 2010 Deepwater Horizon oil spill in the Gulf of Mexico. Longer-term declines suggest that without continued focus on marsh restoration these increases may be temporary. From 2006-2016 (not depicted), these two states and all other Southeastern states had declines in salt marsh area.
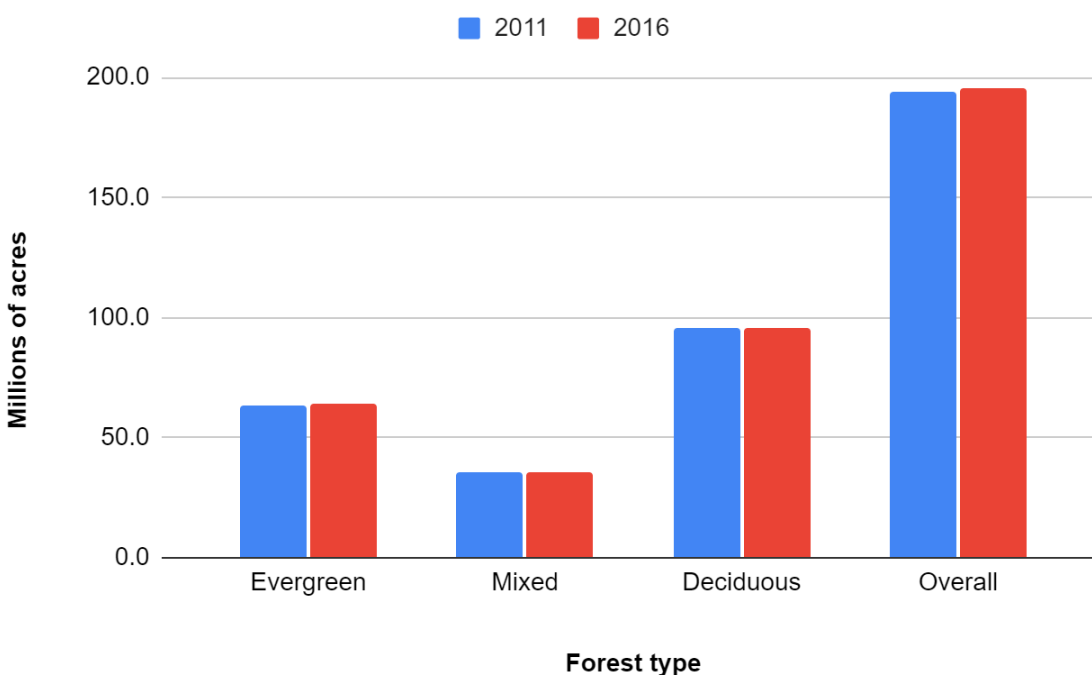
Upland forest area

Figure 12. Millions of acres of various forest types in 2011 and 2016.

*Table 5. State-specific percent change in forest area from 2011-2016.*

	Evergreen	Mixed	Deciduous	Overall
Alabama	3.36	1.95	0.52	2.01
Arkansas	1.12	0.62	0.18	0.49
Florida	0.67	-1.42	2.26	1.07
Georgia	-1.75	0.62	-0.45	-0.48
Kentucky	1.75	1.74	0.56	0.79
Louisiana	5.69	-0.71	0.82	2.59
Mississippi	2.54	0.83	-1.26	0.98
Missouri	-0.73	1.28	0.27	0.33
North Carolina	2.61	1.4	-0.49	0.74
Oklahoma	0.81	3.29	1.67	1.62
South Carolina	-1.43	1.99	-0.01	-0.58
Tennessee	3.45	2.11	1.26	1.5
Texas	2.18	1.12	-0.43	1.3
Virginia	-2.21	1.05	-1.3	-0.6
West Virginia	1.55	0.84	-0.47	-0.27

Yearly trend

Overall area of upland forest 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. The increase of about 0.56% every 4 years is not enough to reach the SECAS goal of a 1% increase every 4 years.

< -2%   -1%   0%   1%   > 2%
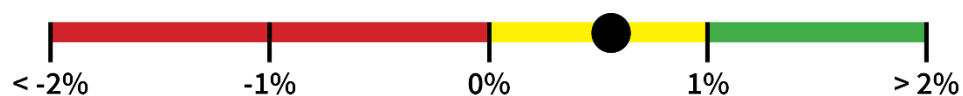
Data source

[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.
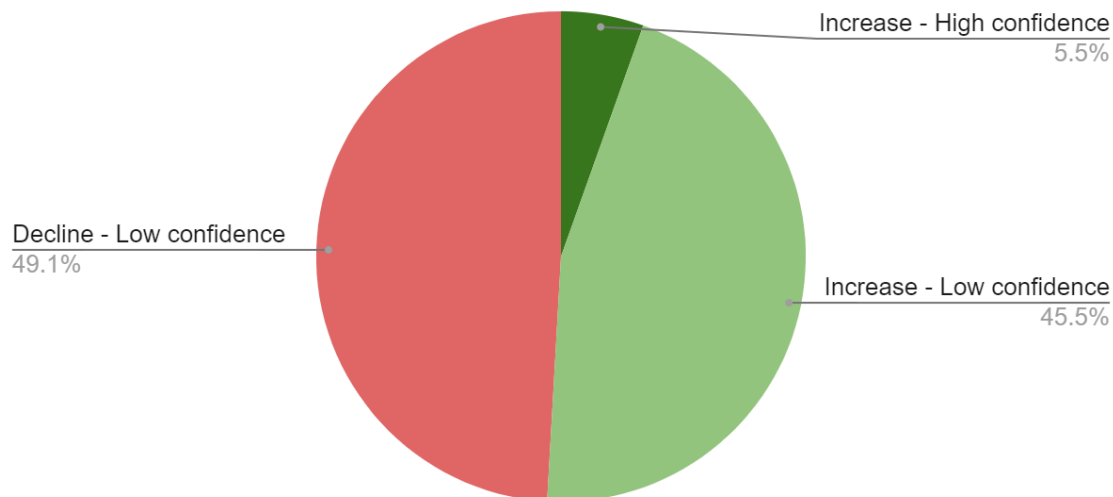
Upland forest birds

Figure 13. Percent of upland forest bird species that are increasing or declining by state from 2014-2019.

Table 6. Species trend data from 2014-2019 for each state used in Figure 13 above. Brighter colors indicate higher confidence.

|	Cerulean warbler	Wood thrush	Louisiana waterthrush	Worm-eating warbler
Alabama		Decline - Low confidence	Decline - Low confidence	Decline - Low confidence
Arkansas	Decline - Low confidence	Increase - Low confidence	Decline - Low confidence	Decline - Low confidence
Florida		Decline - Low confidence	Decline - Low confidence	
Georgia		Increase - Low confidence	Decline - Low confidence	Increase - Low confidence
Kentucky	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence
Louisiana		Increase - High confidence	Decline - Low confidence	Increase - Low confidence
Mississippi	Decline - Low confidence	Increase - High confidence	Decline - Low confidence	Decline - Low confidence
Missouri	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence
North Carolina	Decline - Low confidence	Decline - Low confidence	Increase - Low confidence	Decline - Low confidence
Oklahoma		Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
South Carolina		Increase - Low confidence	Decline - Low confidence	Decline - Low confidence
Tennessee	Increase - Low confidence	Increase - Low confidence	Decline - Low confidence	Decline - Low confidence
Texas		Increase - High confidence	Decline - Low confidence	Decline - Low confidence
Virginia	Decline - Low confidence	Decline - Low confidence	Increase - Low confidence	Increase - Low confidence
West Virginia	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence	Increase - Low confidence
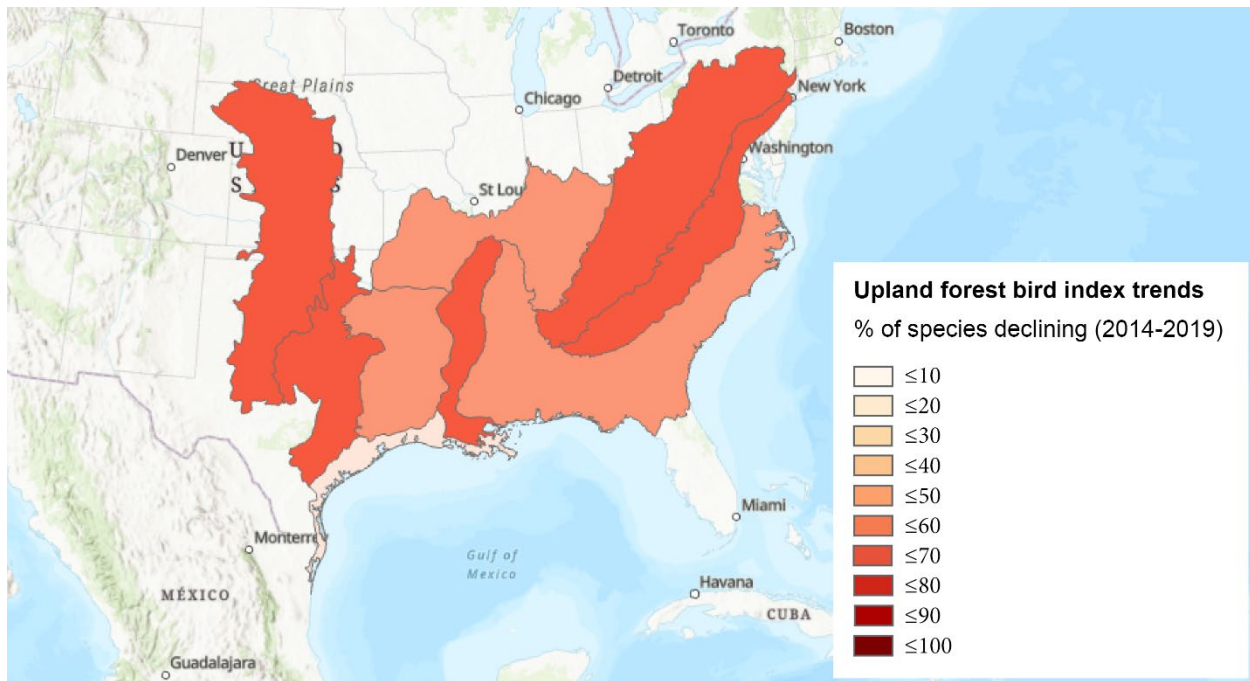
Figure 14. Percent of upland forest bird species declining from 2014-2019 by Bird Conservation Region (BCR).

Yearly trend

A slight majority of states showed increasing trends for upland forest bird species from 2014-2019. Species trends were mixed across states. Species selected are Regional Species of Greatest Conservation Need 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 0.23% increase per year.

On track to meet SECAS goal

No. The increase of about 0.92% every 4 years is not quite enough to achieve the SECAS goal of a 1% increase every 4 years.
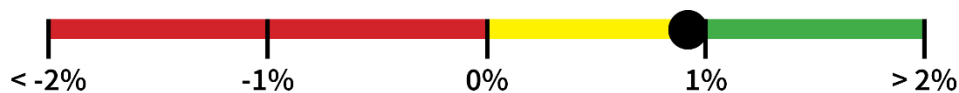
Data source

[Breeding Bird Survey (BBS)](#)

Confidence in trend

Medium. Despite issues with roadside sampling and detectability for some species, the BBS is a standardized and randomized sample regularly used to estimate bird population trends. The mixed patterns across species and the low number of statistically significant ("high confidence") trends 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.

However, these species are all neotropical migrants, and threats to survival during migration (e.g., communication towers) and on their wintering grounds (e.g., habitat loss) are likely also impacting population trends.

Function

The benefits provided to people by species and ecosystems
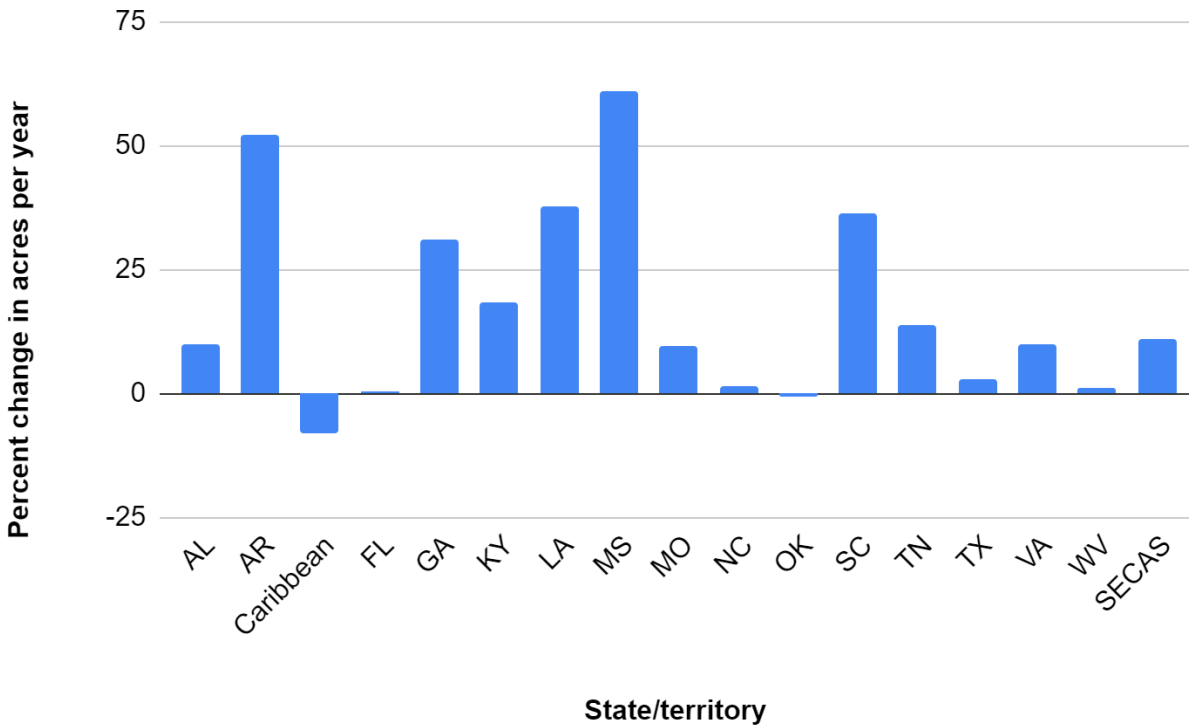
Working lands conservation

Figure 15. Percent change in acres per year under all U.S. Department of Agriculture (USDA) conservation practices from 2015-2020. Caribbean includes both Puerto Rico and the U.S. Virgin Islands.

Table 7. Working lands conservation metrics for 2020 for each state used in Figure 15 above. Caribbean includes both Puerto Rico and the U.S. Virgin Islands.

State	% of state composed of private land	Acres of conservation practices (2020)	# of conservation practices/acre of private land (2020)
Alabama	95.24	2,384,324	0.07
Arkansas	88.56	6,211,121	0.21
Caribbean	95.10	37,226	0.01
Florida	75.57	1,437,251	0.04
Georgia	93.43	3,564,081	0.10
Kentucky	94.85	1,013,557	0.04
Louisiana	91.02	3,431,829	0.11
Missouri	93.49	11,963,013	0.29
Mississippi	91.26	3,164,320	0.11
North Carolina	90.58	624,856	0.02
Oklahoma	96.61	2,936,612	0.07
South Carolina	93.26	1,135,824	0.06
Tennessee	91.13	1,663,166	0.07
Texas	96.74	23,095,458	0.14
Virginia	89.40	868,485	0.04
West Virginia	88.86	389,941	0.03

Yearly trend

Most states and territories showed increasing trends for acres under conservation practices. Acres under conservation practices across the entire SECAS area increased by 11% per year.

On track to meet SECAS goal

Yes. The increase of about 44% every 4 years is on track to meet the SECAS goal of a 1% increase every 4 years.

< -2%   -1%   0%   1%   > 2%
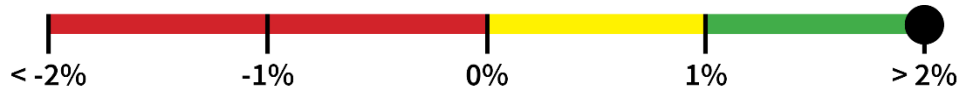
Data source

USDA data reported as part of the Soil and Water Resources Conservation Act

Confidence in trend

Medium. A substantial amount of working lands conservation in the Southeast occurs through U.S. USDA programs and the reported acres is likely a reasonable estimate of application of these programs.

Interpretation

This is an indicator of conservation on working lands. It suggests both across the Southeast and in most states, conservation on working lands has been increasing by a large amount over the last 5 years. Working lands is a large focus of conservation in the Southeast and it appears that extra effort working with landowners is resulting in increased adoption of conservation practices.

While acres can vary widely from year to year, relative trends across states are broadly similar when looking at trends going back to 2010 (not depicted).

Acreage of conservation practices by USDA programs does have a few limitations as an indicator. It does not include working lands programs administered by states or other organizations and doesn't include voluntary actions on working lands not funded by a specific conservation program. Acreage trends don't always predict trends in conservation impact as some more expensive practices that cover smaller areas can sometimes have a bigger overall impact that inexpensive practices covering large areas.

Connectivity

The ability of species and ecosystems to move over time
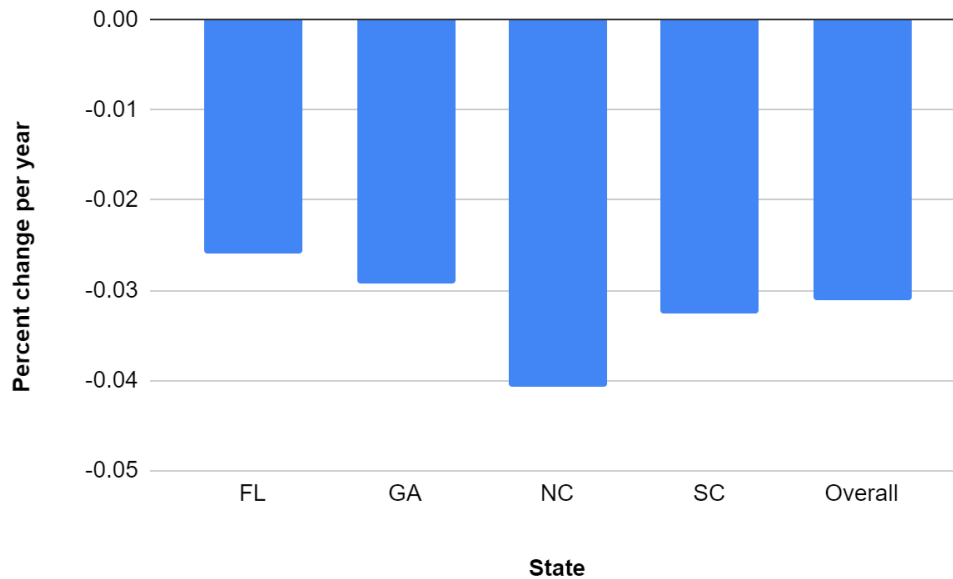
Undeveloped lands in corridors

Figure 16. Percent change per year in undeveloped land within Southeast Conservation Blueprint corridors from 2013-2019. Overall depicts FL, GA, NC, and SC combined.

Yearly trend

All four states showed declining trends for undeveloped land in corridors. Undeveloped area within corridors declined by 0.03% per year.

On track to meet SECAS goal

No. The decline of about 0.12% every 4 years is not enough to reach the SECAS goal of a 1% increase every 4 years.

Data source

National Land Cover Database (NLCD) and Southeast Conservation Blueprint

Confidence in trend

Medium. While the remotely sensed data used in this indicator provides full coverage of the corridors within the 4 states, and developed areas have high classification accuracy, full corridor coverage in the Southeast Conservation Blueprint for the other states in the Southeast is not yet available.

Interpretation

This is an indicator of terrestrial connectivity. Within the 4 states where corridor data is fully available, it suggests development is continuing to occur in important movement corridors. Like many areas of the Southeast, these 4 states are experiencing rapid population growth, and other states with similar growth may have similar trends in undeveloped land within important movement areas. The 2022 version of the Southeast Conservation Blueprint will likely have corridor coverage for most Southeast states in time for next year's update of this report.

Freshwater

Rivers and streams draining into the Atlantic Ocean and Gulf of Mexico

Function

The benefits provided to people by species and ecosystems
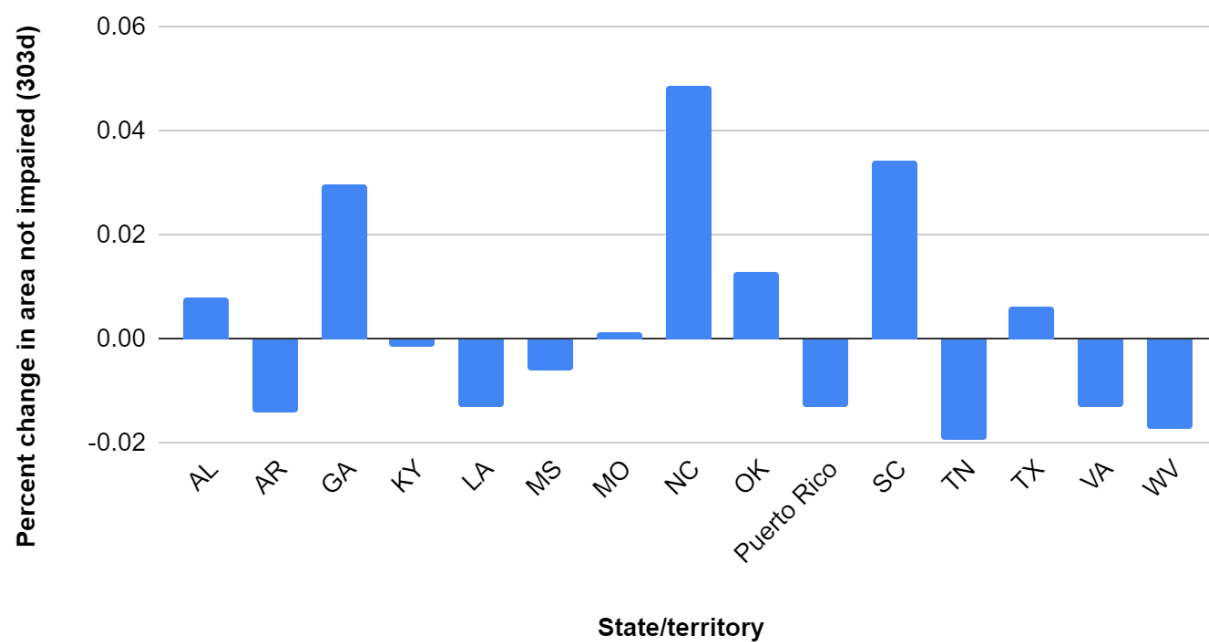
Water quality

Figure 17. Percent change in area not impaired from the three most recent 303(d) assessments available per state/territory.

Yearly trend

When averaged across state trends, overall water quality increased by approximately 0.003% per year. For all states and territories except North Carolina, the most recent data available was 2014, 2016, or 2018. For North Carolina, the most recent data was 2010. Florida did not report its data in a format that allowed for trend estimates.

On track to meet SECAS goal

No. The increase of about 0.012% every 4 years is not enough to reach the SECAS goal of a 1% increase every 4 years.

< -2%   -1%   0%   1%   > 2%

Data source

[Environmental Protection Agency 303(d) Clean Water Act reports](#)

Confidence in trend

Low. Estimating water quality trends can be particularly challenging. While there are extensive survey efforts and approaches for standardization across state-specific 303(d) reports, yearly weather variation over multiple years and different state standards can complicate estimates of water quality trends.

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 mixed trends across different states and a lack of strong consistent improvement or decline across the Southeast.

Connectivity

The ability of species and ecosystems to move over time

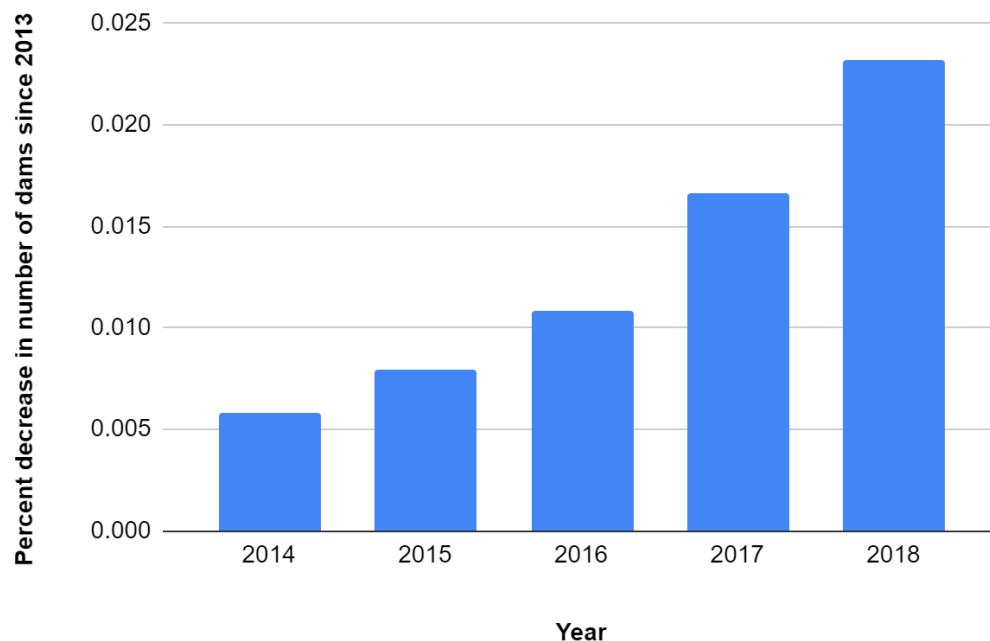### Aquatic connectivity

Figure 18. Percent decrease in number of dams since 2013, from 2014-2018.

Yearly trend

Aquatic connectivity, based on overall number of dams, increased by 0.004% per year from 2013-2018.

On track to meet SECAS goal

No. The increase of about 0.016% every 4 years is not enough to reach the SECAS goal of a 1% increase every 4 years.

Data source

[Southeast Aquatic Resources Partnership Aquatic Barrier Database](link) (data available on request; contact 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 the number of dam removals and the total number of dams in the region.

Interpretation

This is an indicator of species' ability to access habitat within the 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.

Estuarine & marine

From estuaries to the open ocean at the edge of U.S. waters

Health

The condition of species and the ecosystems they depend on
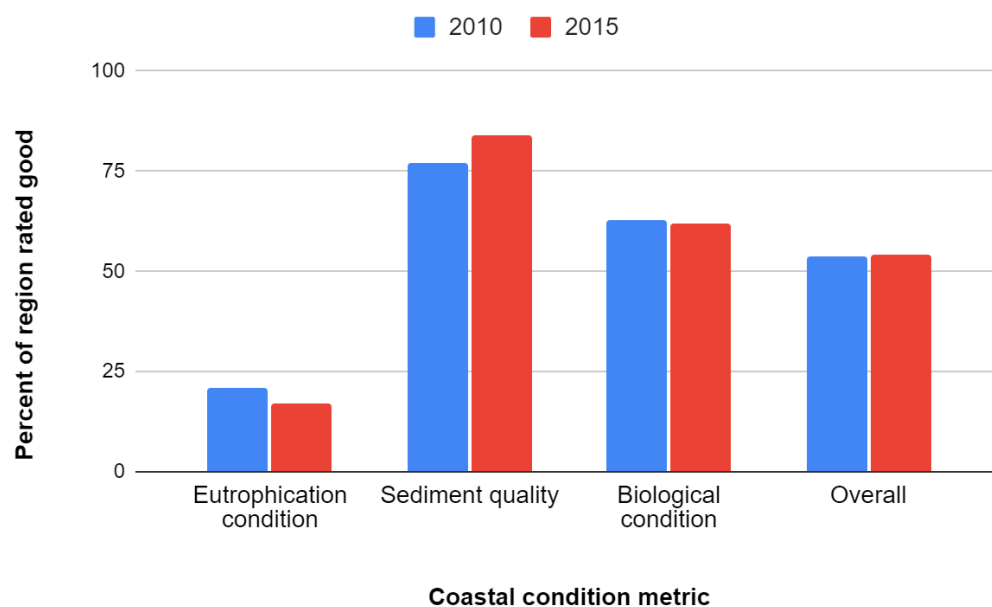
Coastal condition

Figure 19. Percent of the Southeast rated "good" for various coastal condition metrics in 2010 and 2015.

Table 8. Change in percent "good" from 2010 – 2015 for each of the subregions used in Figure 19 above (South Atlantic, Gulf of Mexico).

	Eutrophication condition	Sediment quality	Biological condition	Overall
South Atlantic	-4	7	-1	.67
Gulf of Mexico	2	27	3	10.67

Yearly trend

When averaged across subregions, overall coastal condition increased by 1.1% per year from 2010 to 2015. Condition improved in the South Atlantic and Gulf of Mexico.

On track to meet SECAS goal

Yes. The increase of about 4.4% every 4 years is on track to meet the SECAS goal of a 1% increase every 4 years.

< -2%   -1%   0%   1%   > 2%

Data source

National Coastal Condition Assessment

Confidence in trend

Medium. While this is a well-designed, randomized survey, it is only a snapshot in time every few years.

Interpretation

This is an indicator of the overall condition of the water and sediment in the estuaries and nearshore marine areas of the Southeast. From 2005/2006 (not depicted in graph) to 2015, condition has been declining in the South Atlantic and improving in the Gulf of Mexico. This new 2015 data suggest continued improvements in the Gulf and a small recent improvement in the South Atlantic that doesn't offset previous declines.

Function

The benefits provided to people by species and ecosystems
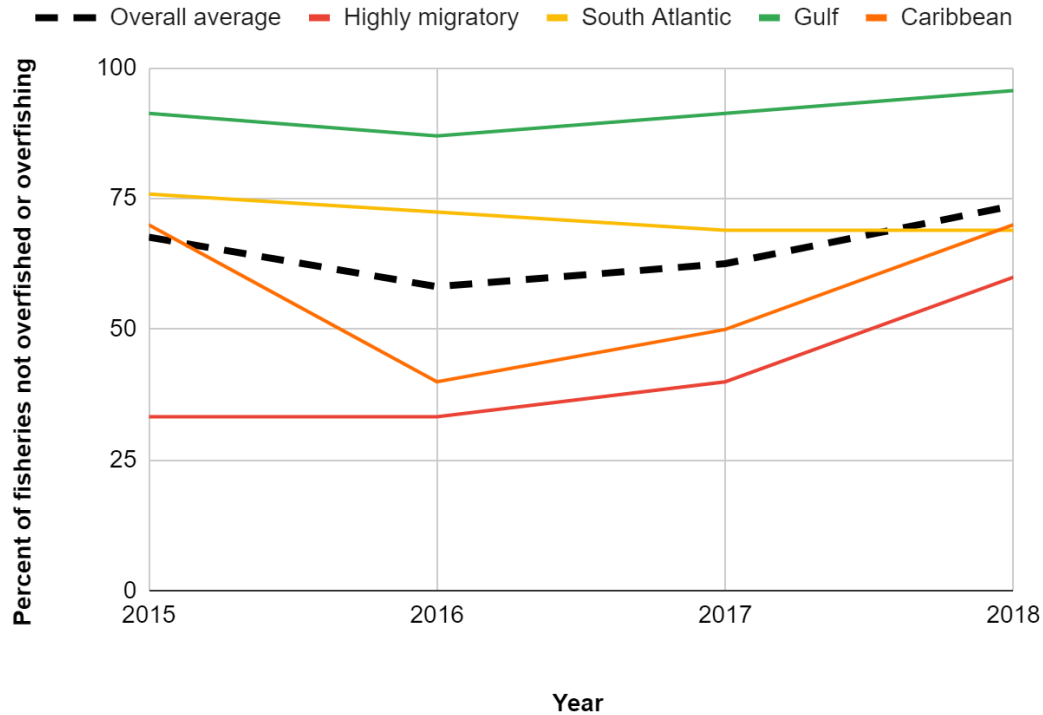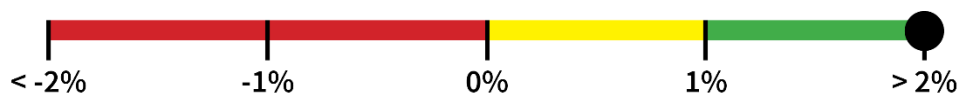
Fisheries

Figure 20. 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. The increase of about 2.2% every 4 years is greater than the SECAS goal of a 1% increase every 4 years.

Data source

National Oceanic and Atmospheric Administration reports to Congress on the status of U.S. fisheries

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.

Image credits

- Ecosystem icons (terrestrial, freshwater, estuarine and marine) from the University of Maryland Center for Environmental Science [Integration and Application Network](#)
- Health, function, and connectivity icons from [the Noun Project](#)
  - **Health:** Health by Alzam from the Noun Project
  - **Function:** People by Kiran Shastry from the Noun Project
  - **Connectivity:** Chain by Robert Bjurshagen from the Noun Project