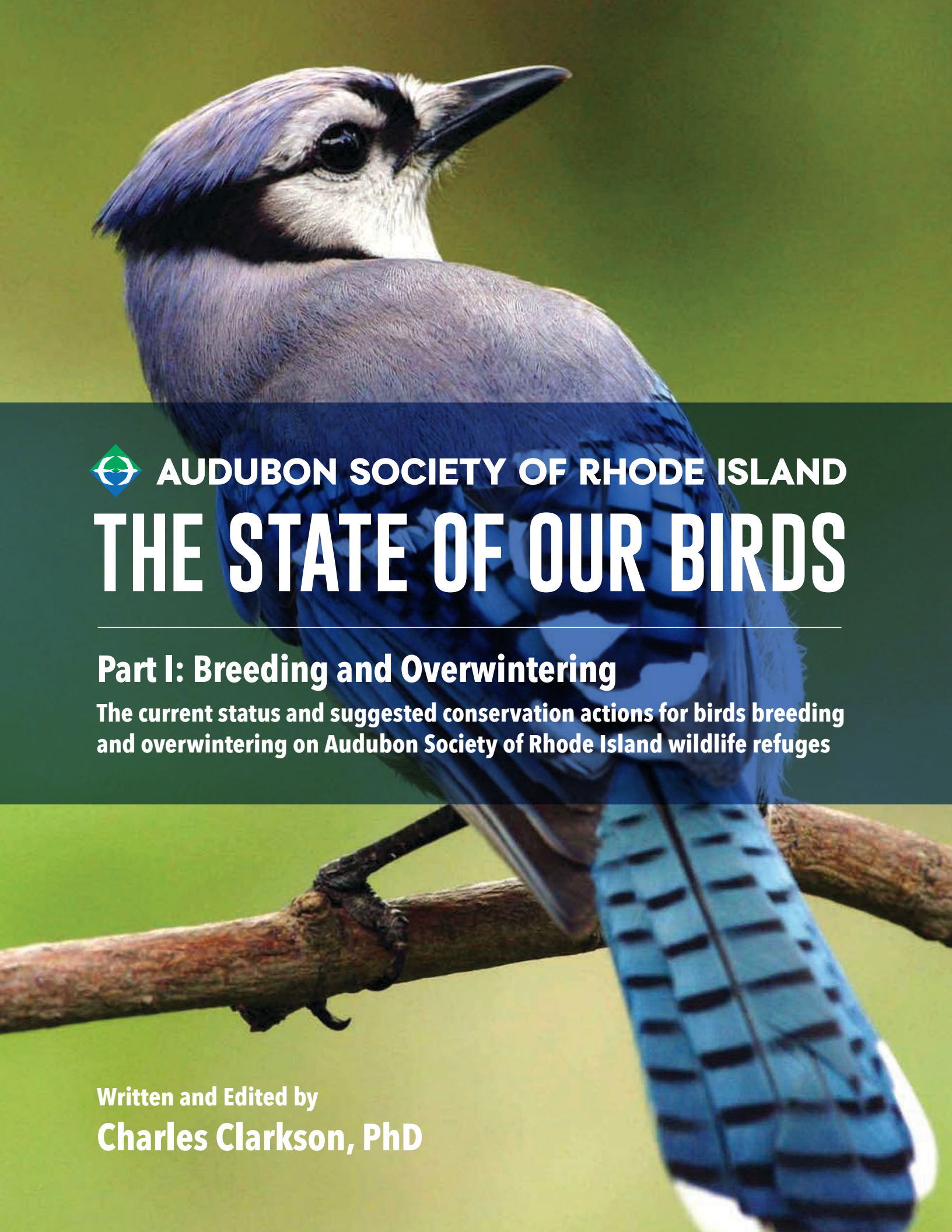


AUDUBON SOCIETY OF RHODE ISLAND

THE STATE OF OUR BIRDS

Part I: Breeding and Overwintering

The current status and suggested conservation actions for birds breeding and overwintering on Audubon Society of Rhode Island wildlife refuges

Written and Edited by

Charles Clarkson, PhD

The State of Our Birds

Let's all do more, talk more, and engage more in our communities to support bird conservation.

Barred Owl (*Strix varia*)

Nearly every group of birds, from those found in shrubby habitats and grasslands to those that reside in wetlands or eat insects on the wing, are declining.
Let's work to bring them back.

Common Yellowthroat (*Geothlypis trichas*)

Armed with the knowledge from this report, Audubon will begin a monitoring and management scheme to reverse the declining trends in our birds.
Let's support the science.

Pileated Woodpecker (*Dryocopus pileatus*)

If there are things Audubon can do to positively impact our birds, regardless of their conservation status, we will take action.
That's proactive conservation.

When we help birds survive, we help each other –
Support the Audubon Avian Research Initiative.

asri.org/AvianResearchInitiative

The State of Our Birds

Let's work together and give birds a chance.

Wood Thrush (*Hylocichla mustelina*)

Black-and-white Warbler (*Mniotilta varia*)

Prairie Warbler (*Setophaga discolor*)

Audubon uses volunteer-sourced data to develop conservation solutions.
Join our team.

Over one third of the birds breeding on Audubon Refuges are experiencing long-term population declines.
Every acre of conservation land counts.

The relative abundances within the Mid-Atlantic region for those species listed below are half of what they were just 53 years ago.

- Chimney Swift (*Chaetura pelagica*)
- Brown Thrasher (*Toxostoma rufum*)
- Prairie Warbler (*Setophaga discolor*)
- Eastern Towhee (*Pipilo erythrophthalmus*)
- Black-and-white Warbler (*Mniotilta varia*)
- Wood Thrush (*Hylocichla mustelina*)
- Field Sparrow (*Spizella pusilla*)
- Common Grackle (*Quiscalus quiscula*)

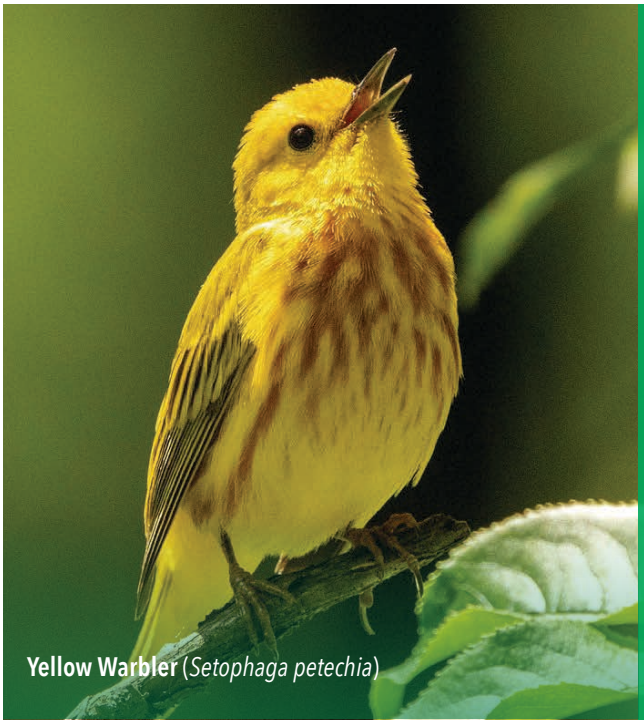
We need to act – now.

When we help birds survive, we help each other –
Support the Audubon Avian Research Initiative.

asri.org/AvianResearchInitiative

Table of Contents

Audubon Parker Woodland Wildlife Refuge, Coventry, RI



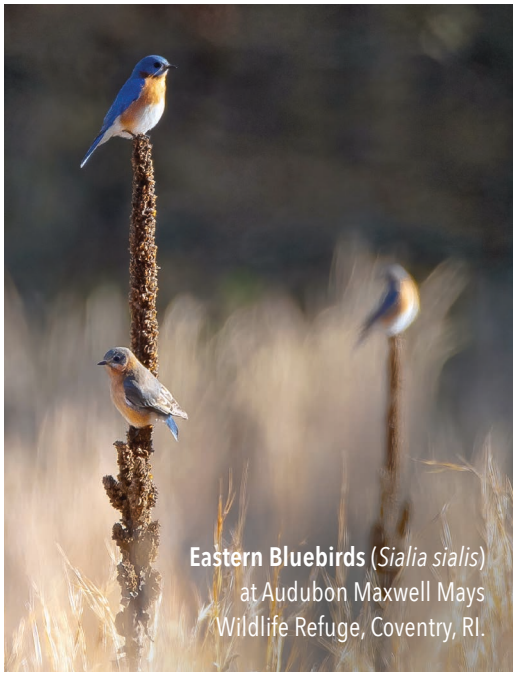
Yellow Warbler (*Setophaga petechia*)

Acknowledgements

The information contained in this report would never have been possible without the tremendous support from our volunteers. To better understand the current status of our birds and the trends their populations exhibit, a large amount of data collection is necessary. The dedication these volunteers have shown to the Avian Research Initiative has been tremendous, and the Audubon Society of Rhode Island is deeply appreciative of their commitment to bringing our birds back.

Informing Our Conservation

Across North America, birds are declining. As indicators of environmental health, the loss of roughly 3 billion birds since 1970 portends changes to our habitats, water, air and soil that deserve our attention and concern. The health of our bird populations is inextricably linked to our own.



Eastern Bluebirds (*Sialia sialis*) at Audubon Maxwell Mays Wildlife Refuge, Coventry, RI.

A fifth of all birds on Earth pollinate our wildflowers and fruiting trees. They serve as natural control agents for agricultural and household pests. Birds disperse seeds, contributing to habitat health. They scavenge dead and decaying organic matter. The ecosystem services that birds provide are countless.

Without birds, our world would be devoid of food, overrun with pests and harmful bacteria and much less biodiverse. Aside from these tangible things, birds provide one of the most vivid palettes of color and vibrancy on planet earth. Without them, we would be forced to live a drab existence. No brilliant colors, no beautiful song. Without them, we would have no natural symphony to excite our senses and no spectacular color to lift our spirits. We need birds more than they need us. And we are slowly losing them from the fabric of our existence.

Because of human population growth and all the things our species does to this planet, birds are becoming more and more scarce. Despite the numbers of binoculars, bags of bird seed, bird feeders, bird books and birding trips sold, birds continue their decline. Unless we can get a handle on the reasons behind these declines and work towards stopping them, we will lose our birds.

This report is the first of its kind to summarize which species are present on our refuges throughout the year. It shows which habitats species choose when they do occur on our refuges, and it discusses the long-term trend in these species' populations within our region. At its core, this report represents a first step towards the proactive management of birds on the properties that the Audubon Society of Rhode Island protects. With the baseline data contained in this report, well-informed management plans can be implemented and conservation success becomes easier to measure. Through this proactive conservation, we aim to keep our common birds common.

Throughout the report, 9 species are highlighted as "Responsibility Birds". These birds require additional attention to help bolster populations here in Rhode Island and throughout the region. We all have a responsibility to help our birds. After all, it is because of our actions that they are imperiled. Many of you reading this report have accepted your responsibility by donating your time and energy to help collect the data that was instrumental in the creation of this report. Moving forward, we will need more volunteers, more information and more resources to help our birds. There is much more work to be done if we hope to reverse the protracted declines that so many of our birds have experienced.

– **Charles Clarkson, PhD**
Director of Avian Research
Audubon Society of Rhode Island

Report Overview: Principal Findings

- This report summarizes the data collected across the Audubon Society of Rhode Island's 14 publicly accessible Refuges between the periods of 1 January 2022 and 1 November 2022.
- The Second Part of the Report: "The State of Our Birds 2023, Part II: Migration" is scheduled for release by 1 May 2023.
- Collectively, the 14 publicly accessible refuges contained 3,338 acres of land, or approximately 35% of the total landholdings Audubon manages.
- Sampling the bird communities across these properties allows us to determine bird-habitat associations for all species breeding and overwintering on Audubon properties as well as to create targeted management plans for species and habitats that are imperiled.
- Greater than 1/3 of all birds found breeding on Audubon Refuges are experiencing long-term population decline. Only 1/4 of all species are showing signs of long-term increases in population.
- Overwintering species are faring only slightly better, with just under 1/3 exhibiting declining population trends. Still, only 1/4 of populations are increasing over the long-term.
- A total of 9 species were selected as "Responsibility Birds". These species will receive additional monitoring to determine the steps Audubon can take to mitigate current population declines and promote local and regional population growth.

Red-winged Blackbird
(*Agelaius phoeniceus*)

Black-and-white Warbler
(*Mniotilta varia*)

Eastern Towhee
(*Pipilo erythrophthalmus*)

Report Overview: Principal Findings

- Birds across our refuges were placed into one of 12 major guilds based on shared habitat and dietary requirements.
- The Early Successional, Forest and Generalist guilds contained the greatest number of species.
- The greatest declines were seen in species associated with the Aerial Insectivore, Early Successional, Grassland and Urban foraging guilds.
- During the breeding season, Deciduous Forest, Wetland and Scrub/Shrub habitats contained the greatest number of species.
- The largest number of overwintering species were detected in Grassland/Herbaceous, Scrub/Shrub and forested habitats.
- Caratunk Wildlife Refuge was the most species diverse during the breeding season, likely due to the large number of habitats present on the property.
- Touisset Marsh Wildlife Refuge was the most species diverse during the overwintering period, likely due to the large number of waterfowl that forage along the refuge's shoreline and wetland habitats and the presence of large amounts of Grassland/Herbaceous and Scrub/Shrub habitats.

Indigo Bunting (*Passerina cyanea*)

Brown Thrasher (*Toxostoma rufum*)

Audubon Touisset Marsh Wildlife Refuge, Warren, RI

The Audubon Avian Research Initiative

A three-step management plan to mitigate local decline and contribute to regional population growth.

Step 1

Baseline Data Collection and Identification of "Responsibility Birds"

- Collection of baseline data on distribution, abundance, habitat associations and long-term population trends for all species breeding, overwintering and migrating through Audubon Society of Rhode Island properties.
- Identification of "Responsibility Birds" that are in need of additional monitoring and management recommendations.

Step 2

Detailed Monitoring of "Responsibility Birds"

- Monitoring schemes will be implemented for all "Responsibility Birds" to collect detailed data on habitat-use, productivity and phenology (timing of important biological events, such as nest-building, egg-laying, chick-fledging, molting and migration).

Step 3

Implementation of Management Plans

- Management plans informed by baseline data collection and targeted monitoring will be implemented to mitigate local declines and contribute to state and regional population growth.

Cooper's Hawk
(*Accipiter cooperii*)

BACKGROUND AND METHODOLOGY

Background and Methodology

Background

As a leading conservation organization in Rhode Island, the Audubon Society of Rhode Island adopted a new strategic plan in 2020 to further its mission of protecting the state's birds and other wildlife through conservation, education and advocacy. One of the major goals of this new plan was to provide for birds in a capacity that would promote survival in the face of climate change. Implementing bird-focused habitat conservation was identified as a metric of success for this goal. To meet this goal, Audubon hired a Director of Avian Research in September 2021 to document the bird populations utilizing the nearly 9,500 acres of land managed by the society. As the newly hired Director, I was honored to take on the task of managing our bird populations and humbled by the prospect of protecting our natural resources in the face of so much decline.

Although Audubon protects only 1.2% of the land within the state, our landholdings are critical at providing for the needs of breeding, overwintering and migrating birds. Residential, urban and commercial habitats are absent from Audubon Refuges and birds utilizing these properties are therefore insulated against many of the threats and stressors associated with these habitat types. Protected open space serves as refugia for many wildlife species and natural habitats are far more resilient to the effects of climate change than human-modified landscapes. Forests, wetlands and fields in a natural state are better equipped at absorbing the energy from a warming climate and using that energy to fuel productivity.

The first step in a successful management scheme is to document species occupancy and habitat-use throughout the year, therefore enabling the creation of full-annual cycle management plans. Focusing conservation solely on breeding species fails to identify those resources essential to birds for the majority of the year. The resource-use needs of birds overwintering and migrating through our refuges also need to be met if we are to create meaningful management plans.

Collecting a Representative Sample Across Our Properties

Beginning on 1 January 2022, a full year of baseline data collection commenced across Audubon's 14 publicly accessible Refuges (Table 1). Collectively, these refuges contain 3,338 acres (1350.8 ha) of habitat, or approximately 35% of all land managed by Audubon.

In following years, we will expand surveys to include all of Audubon's properties, but as a first step the collection of data across these select properties allow for the determination of bird-habitat associations for most species. These 14 properties contained 19 unique habitats, with deciduous, evergreen and mixed forest types dominating (Figures 1 & 2).

To survey these properties, two forms of data collection were employed: Volunteer Surveys and Point Counts.

Eastern Bluebirds (*Sialia sialis*)

Methodology

Volunteer Data Collection

During the overwintering period, volunteers performed a minimum of two surveys at each refuge, with one visit occurring during the month of January and the second occurring during the month of February. During these surveys, volunteers documented their survey route, the total number of bird species and individuals present and a metric of effort (party hours).

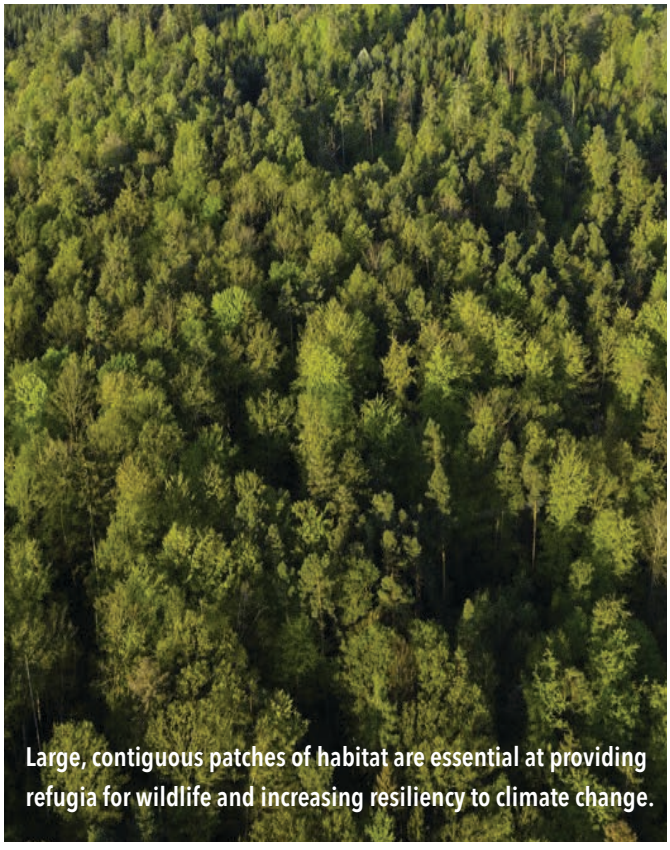
To document nocturnal and cryptic species often overlooked in large scale censuses, volunteers conducted surveys during the height of the full moon cycle (when nocturnal birds are most likely to be vocal) during the breeding season with surveys occurring between 12 and 20 April 2022. Volunteers documented environmental covariates and locations and identity of all species detected.

During the breeding season, volunteers visited refuges from 15 May to 1 August to document breeding birds. Volunteers were encouraged to spread surveys over multiple days and at certain times of the day (dawn chorus) to maximize their detection of breeding birds. Volunteers reported all species identified along with total numbers of individuals and a metric of effort (party hours).

Point Counts

Concurrent with volunteer surveys, a total of 142 point count stations were randomly stratified within the 14 publicly accessible refuges and visited during both the breeding and overwintering periods. At each point, all birds detected by sight and sound were recorded. The distance to each individual bird and the time interval within a 6-minute count period was recorded. These metrics, along with a number of recorded environmental covariates, were used to correct for imperfect detection.

Eastern Kingbird
(*Tyrannus tyrannus*)



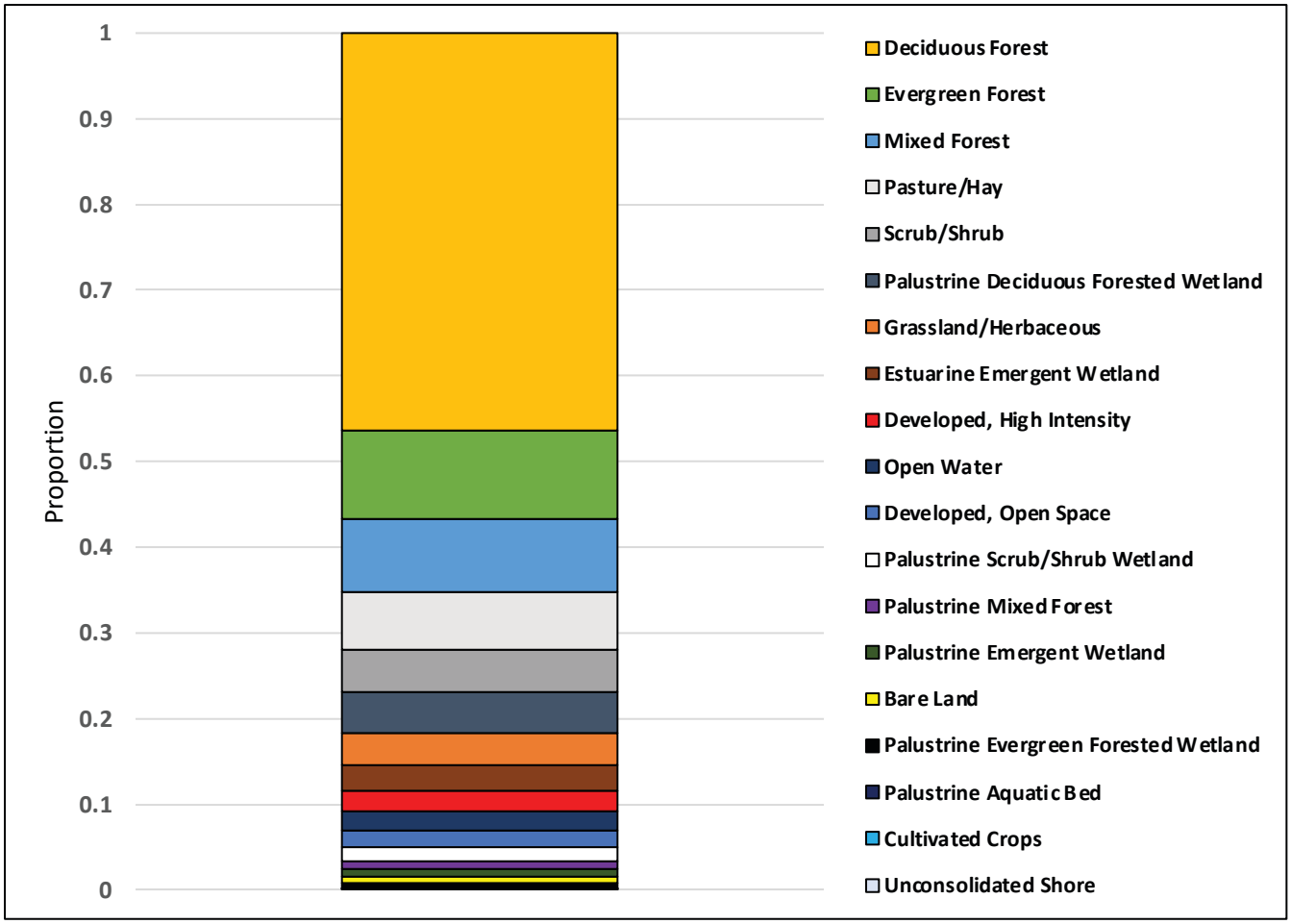
Large, contiguous patches of habitat are essential at providing refugia for wildlife and increasing resiliency to climate change.

Table 1.
The 14 publicly accessible refuges surveyed as part of the baseline data collection scheme.


Great Blue Heron (*Ardea herodias*)

Refuge	Acreage
Caratunk Wildlife Refuge	200
Claire D. McIntosh Wildlife Refuge	28
Davis Memorial Wildlife Refuge	40
Emilie Ruecker Wildlife Refuge	50
Fisherville Brook Wildlife Refuge	1,010
Fort Wildlife Refuge	235
George B. Parker Woodland Wildlife Refuge	860
Lathrop Wildlife Refuge	86
Lewis-Dickens Farm Wildlife Refuge	120
Long Pond Woods Wildlife Refuge	220
Maxwell Mays Wildlife Refuge	295
Powder Mill Ledges Wildlife Refuge	100
Touisset Marsh Wildlife Refuge	66
Waterman Pond Wildlife Refuge	28

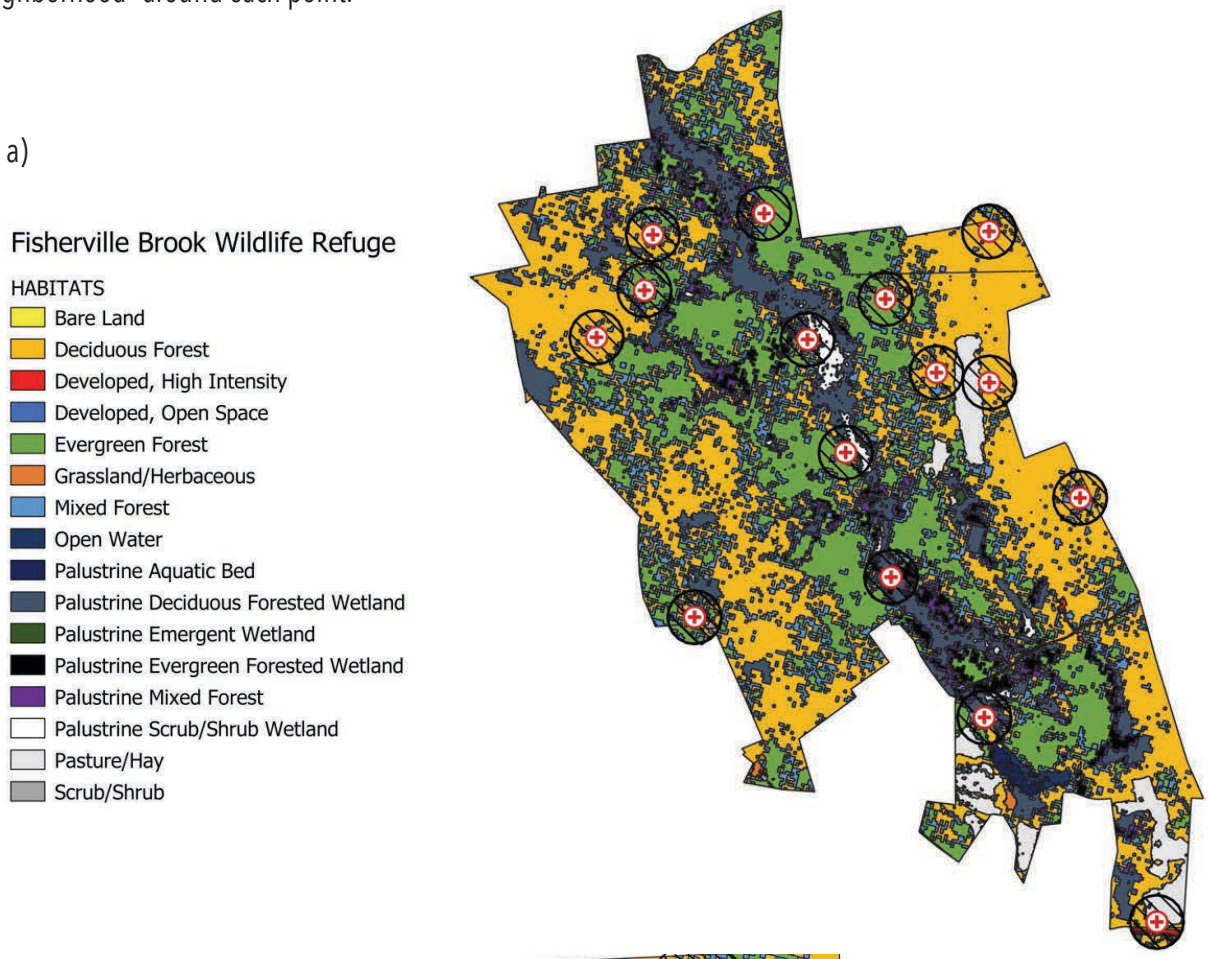
Figure 1.
The 19 primary habitat types contained on Audubon Society of Rhode Island Wildlife Refuges.



For habitat definitions, please turn to page 14.

Figure 2. Habitats present on Audubon Society of Rhode Island Wildlife Refuges. In this example a) Fisherville Brook, and b) Maxwell Mays Wildlife Refuges are pictured. Red crosses are point count locations and hashed circles represent 100m "neighborhood" around each point.

a)



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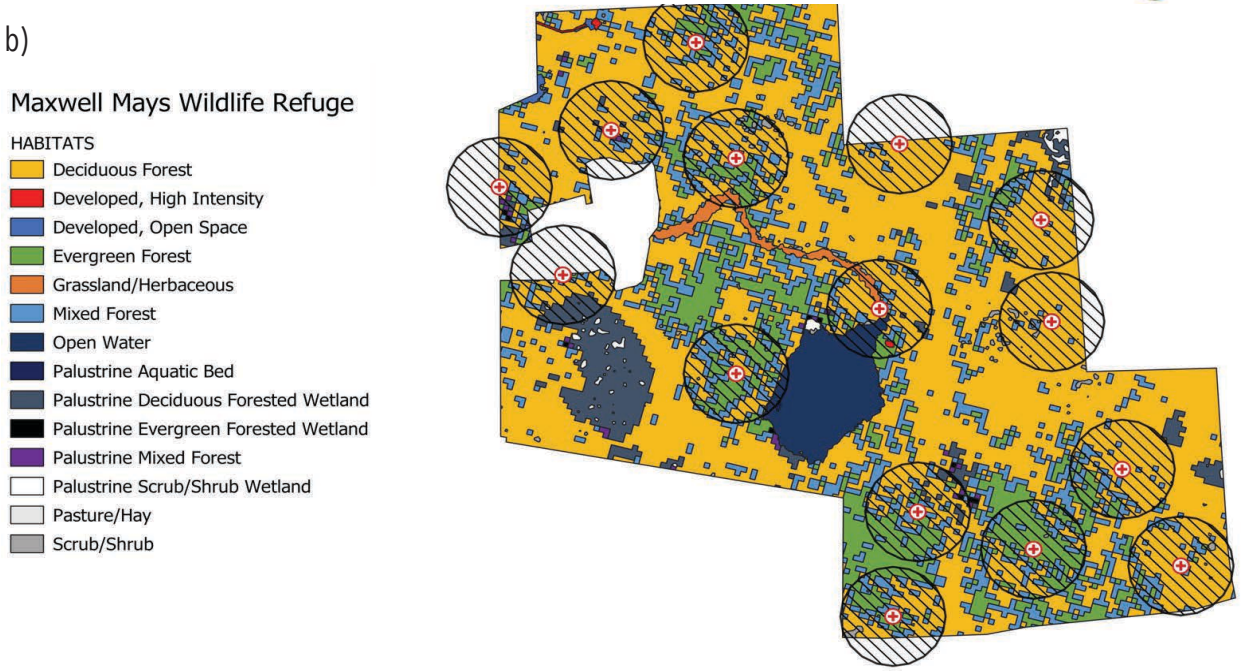


For habitat definitions, please turn to page 14.

Habitat Definitions

Adapted from NOAA's Coastal Change Analysis Program (C-CAP) 2006

Code	Habitat Type	Definition
DF	Deciduous Forest	Trees >5m tall; >20% total cover; >75% trees shed leaves seasonally
EF	Evergreen Forest	Trees >5m tall; >20% total cover; >75% trees maintain leaves year-round
MF	Mixed Forest	Trees >5m tall; >20% total cover; neither deciduous nor evergreen trees comprise >75%
PH	Pasture/Hay	Grasses, legumes planted for livestock or seed/hay production; not tilled
SS	Scrub/Shrub	Shrubs <5m tall; shrubs and early forest
PDFW	Palustrine Deciduous Forested Wetland	Tidal and non-tidal wetlands dominated by deciduous vegetation
GH	Grassland/Herbaceous	>80% grammanoid or herbaceous vegetation
EEW	Estuarine Emergent Wetland	Tidal wetlands dominated by rooted herbaceous hydrophytes
DHI	Developed High Intensity	Significant area covered by asphalt or concrete; <20% vegetation cover
OW	Open Water	Open water bodies
DOS	Developed Open Space	Mostly managed grasses or low-lying vegetation; recreational or aesthetic purposes
PSSW	Palustrine Scrub/Shrub Wetland	Tidal and non-tidal wetlands dominated by woody vegetation
PMF	Palustrine Mixed Forest	Tidal and non-tidal wetlands dominated by mixed vegetation
BL	Bare Land	Bedrock, gravel pits; <10% vegetation
PEFW	Palustrine Evergreen Forested Wetland	Tidal and non-tidal wetlands dominated by evergreen vegetation
PAB	Palustrine Aquatic Bed	Tidal and non-tidal wetlands and deepwater with salinity below 0.05%.
CC	Cultivated Crops	Intensely managed annual crops
US	Unconsolidated Shore	Silt, sand or gravel subject to inundation by water.
PEW	Palustrine Emergent Wetland	Tidal and non-tidal wetlands with vascular plants, mosses or lichens.

Data Analysis

A number of data products were created from the information submitted by volunteers and gathered during point counts.

Bird-Habitat Associations

To determine the habitats most important to each bird species breeding or overwintering on Audubon Refuges, the habitats present within a 100m diameter "neighborhood" around each point count station were determined by extracting habitat variables from a state available Geographic Information System (GIS) layer (Figure 3).

The proportion of each habitat present within the point count areas was then computed and used to determine the GINI importance (Mean Decrease in Impurity (MDI)) for each of these habitats for every species of bird detected at a minimum of 3 point count stations (Figure 4).

Habitats present at each point where a given species was detected were compared to the habitats found at all point count stations and the relative importance of each habitat at predicting the presence of the species was determined. All computations were conducted using the RandomForest package in R (v4.1.2; R Core Team 2021).

For species present during both the breeding and overwintering periods, Jaccard Similarity was computed between the most important habitats associated with each species during the two periods to determine the degree to which overlap in habitat use between these two periods occurred.

Refuge Diversity

To determine the overall diversity for each refuge, the Shannon-Diversity Index was computed by comparing the total number of species detected at each refuge. The percentage of refuges occupied by each species was also calculated to provide additional information on species distribution across the Audubon Refuge complex. The total number of species detected and an estimate of total species present was calculated using a combination of Chao, Bootstrap and Jackknife methods by comparing the total number of species present at each refuge with the species diversity estimates (±sd). Additional species accumulation curves were created to determine the likelihood that sampling across 14 refuges provided an accurate estimate of the total number of species present.

Species Trends

A major goal of the strategic plan adopted by Audubon is to create meaningful conservation plans for the birds that utilize our refuges. The baseline dataset collected represents the first snapshot of bird distribution across Audubon Refuges, and in order to effectively create management plans, an understanding of the current status and trends of species detected on our refuges at larger spatial scales was necessary. To visualize species trends, data were obtained from Breeding Bird Survey (BBS) routes throughout the Mid-Atlantic region from 1966-2019 and used to create trend graphs (Ziolkowski Jr.et al. 2022; Figures 5 & 6).

Additionally, eBird status and trend maps were used to determine regionwide trends that were inclusive of the entire breeding range for given species throughout the eastern U.S (Fink et al. 2021; Figure 7).


Northern Cardinal (*Cardinalis cardinalis*)

Figure 3.
Habitats were extracted from a 100m diameter "neighborhood" surrounding each point count station (red cross in center of circle).

Over 80% of all detections occurred less than 100m from the observer.

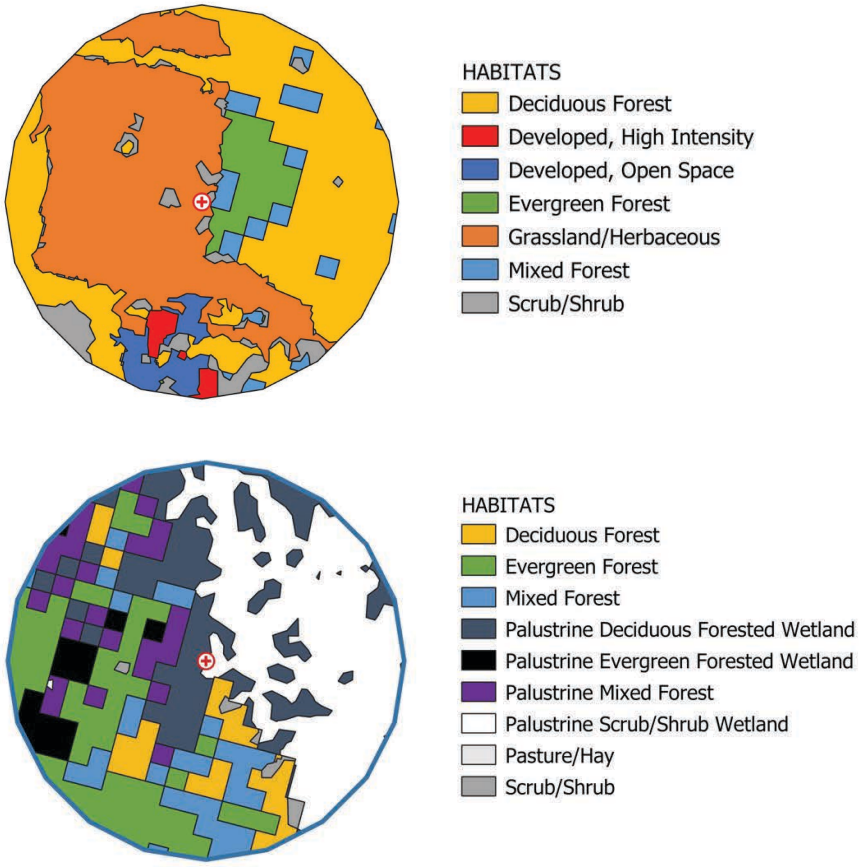
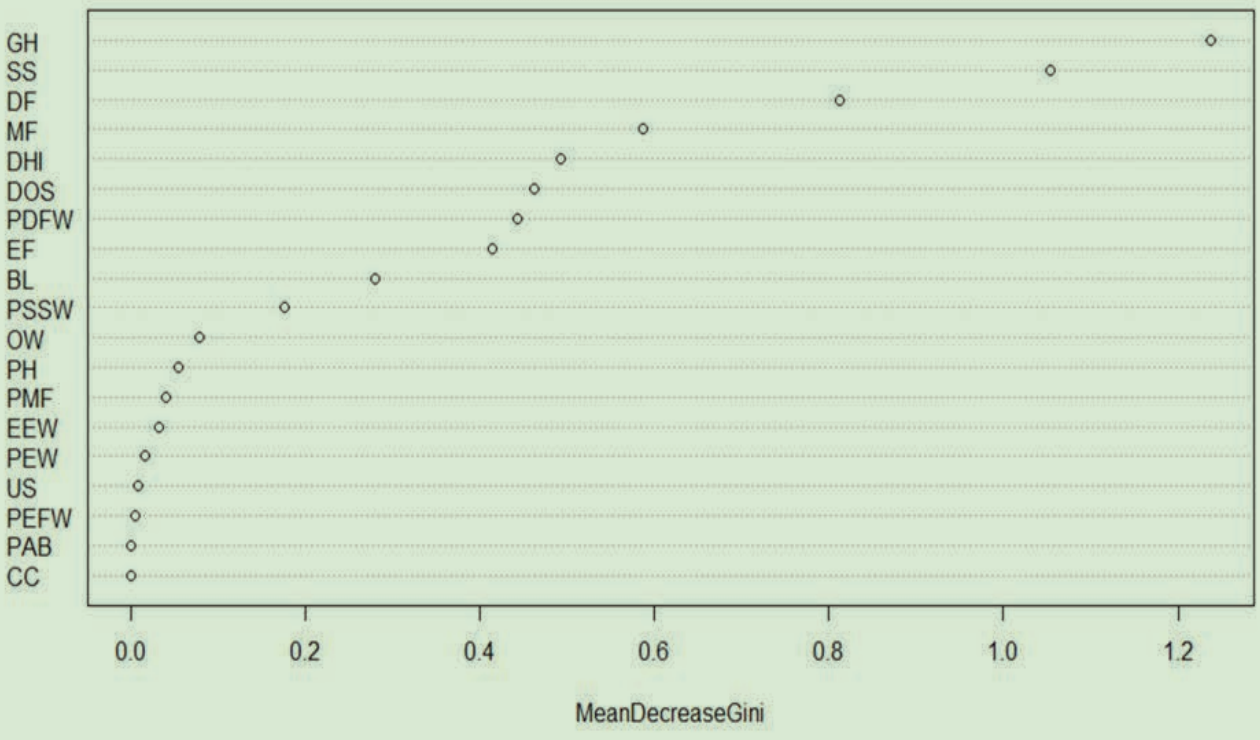


Figure 4. Habitat Importance Values were calculated for each species detected at a minimum of 3 point count stations. See "Interpreting the Graphics" for a detailed explanation of the graph.



Results

Over 80 dedicated volunteers surveyed the 14 Audubon Refuges during all three survey periods. These data were pooled with the information gathered through point counts as well as data submitted to eBird during the 2022 breeding season for analysis.

Bird-Habitat Associations

A total of 83 Variable Importance Plots (VIPs) were created for breeding species and 43 VIPs were created for overwintering species at the 14 refuges surveyed.

Refuge Diversity

During the breeding season, Caratunk Wildlife Refuge supported the highest species total and diversity index of all refuges, followed by Long Pond Woods and Fort Wildlife Refuge. During the overwintering period, Touisset Marsh, Emilie Ruecker and Caratunk Wildlife Refuges contained the largest number of species and greatest species diversity (Table 2).

Across all refuges, a total of 144 species were detected during the breeding season and 86 species were detected during the overwintering period. The estimate of the true number of species present ranged from 164 during the breeding season to 110 during the overwintering period (Table 3).

For those species that were present during both the breeding and overwintering periods, the White-breasted Nuthatch (*Sitta carolinensis*) had the greatest overlap between habitats utilized (Jaccard Index = 1), while the Northern Cardinal (*Cardinalis cardinalis*) had the least overlap (Jaccard Index = 0.01). Northern Cardinals were only detected in Scrub/Shrub habitats in both the breeding and overwintering periods, while spending more time in forested habitats during the breeding season and occupying more open habitats during the overwintering period (Table 4).

Figure 5. The Mid-Atlantic Bird Conservation Region (shaded in dark green) was used to determine long-term population trends for all species detected on Audubon refuges.

Figure 6. Example BBS trend graph created showing 50-year trend for each species detected on Audubon Refuges. See "Interpreting the Graphics" for a detailed explanation of the graph.

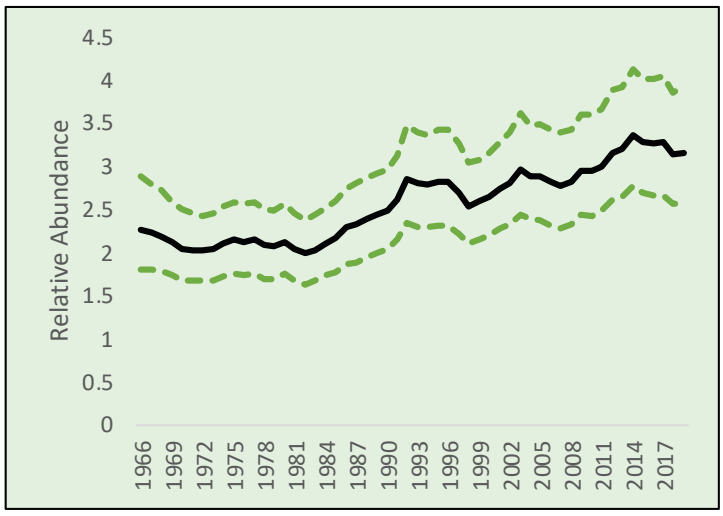


Figure 7. Status and trend maps were generated using eBird data to better visualize regional trends in distribution and population sizes. Illustrated here is the status and trend map for the Wood Thrush (*Hylocichla mustelina*) showing a general increasing trend in the western portion of the species' breeding range and a decline throughout New England. See "Interpreting the Graphics" for a detailed explanation of the image.

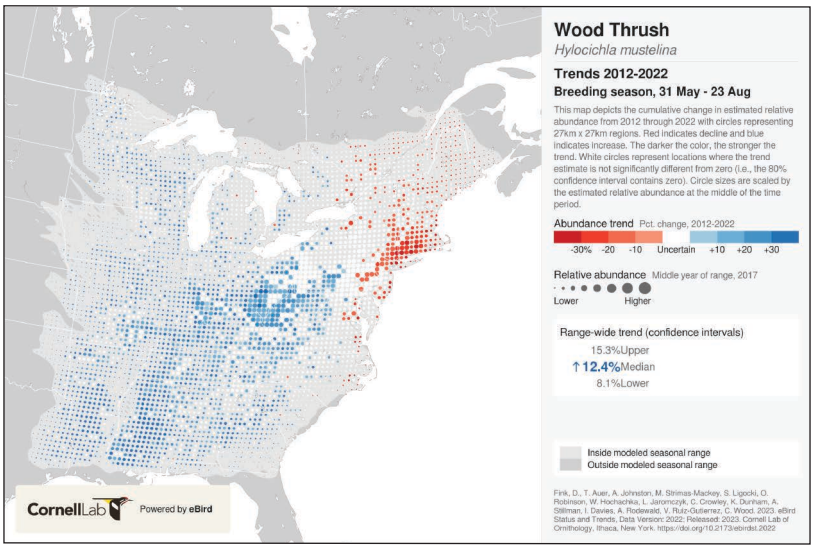


Table 2. Audubon Refuges and associated species totals and diversity indices for both the breeding and overwintering seasons.

Audubon Refuge	BREEDING SEASON		OVERWINTERING SEASON	
	Species Total	Diversity Index	Species Total	Diversity Index
Caratunk Wildlife Refuge	103	4.09	41	2.49
Long Pond Woods Wildlife Refuge	72	4.02	12	2.73
Fort Wildlife Refuge	72	3.9	27	2.78
Touisset Marsh Wildlife Refuge	84	3.89	51	2.54
Fisherville Brook Wildlife Refuge	93	3.81	34	2.68
Waterman Pond Wildlife Refuge	62	3.78	23	2.76
Emilie Ruecker Wildlife Refuge	72	3.74	47	2.95
Powder Mill Ledges Wildlife Refuge	52	3.67	29	2.72
Maxwell Mays Wildlife Refuge	65	3.53	32	2.88
George B. Parker Woodland Wildlife Refuge	73	3.44	18	2.42
Davis Memorial Wildlife Refuge	56	3.41	23	2.54
Lathrop Wildlife Refuge	60	3.19	39	2.49
Lewis-Dickens Farm Wildlife Refuge	38	2.76	16	1.95
Claire D. McIntosh Wildlife Refuge	64	2.65	40	3.3

Table 3. Total number of species detected at each refuge (combined volunteer surveys and point counts) and estimates of true total species numbers based on species diversity and measures of error.

SEASON	MEAN DIVERSITY (±SD)	TOTAL SPECIES	CHAO ESTIMATOR (±SE)	JACKKNIFE ESTIMATOR (±SE)	BOOTSTRAP ESTIMATOR (±SE)
Breeding	3.56 (0.44)	144	160.1 (9.02)	164.4 (10.2)	154.1 (6.4)
Overwintering	2.67 (0.32)	86	110.4 (13.7)	107.2 (8.9)	95.6 (5.6)

Table 4. Percentage of refuges occupied by species detected during both breeding and overwintering surveys. Most important habitat at predicting presence is indicated where appropriate. Between-season habitat similarity provides information on degree of specialization in habitat selection for a given species that is present during both seasons. Species are alphabetized by their 4-letter alpha code.

Species	BREEDING		NONBREEDING		Between Season Habitat Similarity[a]
	% Refuge Occupied	Top Habitat	% Refuge Occupied	Top Habitat	
American Black Duck	14	DD	29	PSSW	DD
Acadian Flycatcher	21	DD	NA	NA	NA
American Crow	100	GH	93	DF	0.67
American Goldfinch	100	SS	79	DF	0.43
American Kestrel	14	DD	NA	NA	NA
American Oystercatcher	7	DD	NA	NA	NA
American Tree Sparrow	NA	NA	21	DD	NA
American Redstart	79	DF	NA	NA	NA
American Robin	100	DOS	93	SS	0.43
American Woodcock	21	DD	7	DD	NA
Bald Eagle	NA	NA	7	DD	NA
Bank Swallow	14	PH	NA	NA	NA
Baltimore Oriole	93	DF	NA	NA	NA
Barn Swallow	64	PDFW	NA	NA	NA
Black Vulture	21	DD	7	DD	DD
Black-and-white Warbler	79	DF	NA	NA	NA
Black-billed Cuckoo	21	DD	NA	NA	NA
Black-capped Chickadee	100	SS	100	MF	0.43
Black-crowned Night Heron	7	DD	NA	NA	NA
Barred Owl	50	PAB	29	DD	DD
Belted Kingfisher	43	DD	21	DD	DD
Blue-gray Gnatcatcher	93	DF	NA	NA	NA
Brown-headed Cowbird	93	DHI	0	NA	DD
Brown Thrasher	29	DD	7	DD	DD
Blue-headed Vireo	43	EF	NA	NA	NA
Blue Jay	100	MF	93	DHI	0.25
Brown Creeper	36	DD	57	EF	DD
Brant	7	DD	14	EEW	DD
Black-throated Green Warbler	36	EF	NA	NA	NA
Broad-winged Hawk	57	DF	NA	NA	NA
Blue-winged Warbler	64	DD	NA	NA	NA
Canada Goose	79	SS	43	SS	0.01

Species	BREEDING		NONBREEDING		Between Season Habitat Similarity[a]
	% Refuge Occupied	Top Habitat	% Refuge Occupied	Top Habitat	
Carolina Wren	100	SS	86	SS	0.67
Canada Warbler	21	DD	NA	NA	NA
Cedar Waxwing	93	SS	21	DD	DD
Chipping Sparrow	86	MF	NA	NA	NA
Chimney Swift	71	DHI	NA	NA	NA
Common Goldeneye	NA	NA	14	DD	NA
Common Grackle	86	GH	43	DD	DD
Cooper's Hawk	43	DHI	43	DD	DD
Common Merganser	NA	NA	7	DD	DD
Common Raven	64	DD	43	DF	DD
Common Tern	14	DD	NA	NA	NA
Common Yellowthroat	100	SS	NA	NA	NA
Chestnut-sided Warbler	29	DD	NA	NA	NA
Chuck-will's-widow	7	DD	NA	NA	NA
Double-crested Cormorant	50	US	NA	NA	NA
Dark-eyed Junco	14	DD	64	DF	DD
Downy Woodpecker	100	DF	93	SS	0.67
Eastern Bluebird	50	EF	36	EF	0.43
Eastern Kingbird	64	PMF	NA	NA	NA
Eastern Phoebe	71	MF	7	DD	DD
Eastern Towhee	100	DF	29	DD	DD
Eastern Screech Owl	0	DD	7	DD	DD
Eastern Wood-Pewee	71	DF	NA	NA	NA
European Starling	79	US	43	GH	0.43
Eastern Whip-poor-will	7	DD	NA	NA	NA
Fish Crow	50	EF	14	DOS	0.25
Field Sparrow	36	GH	7	DD	DD
Fox Sparrow	NA	NA	7	DD	DD
Great Black-backed Gull	29	GH	14	PH	0.43
Golden-crowned Kinglet	NA	NA	64	DF	NA
Great Blue Heron	57	DD	21	DD	DD
Great-crested Flycatcher	100	MF	NA	NA	NA
Great Horned Owl	57	DD	0	NA	DD

Species	BREEDING		NONBREEDING		Between Season Habitat Similarity[a]
	% Refuge Occupied	Top Habitat	% Refuge Occupied	Top Habitat	
Glossy Ibis	29	GH	NA	NA	NA
Gray Catbird	100	GH	43	DD	DD
Great Egret	29	EEW	NA	NA	NA
Green Heron	14	DD	NA	NA	NA
Hairy Woodpecker	79	DF	71	DF	0.25
Herring Gull	64	BL	36	EEW	0.25
Hermit Thrush	36	EF	43	PSSW	0.43
House Finch	71	DOS	64	DHI	0.43
House Sparrow	57	DOS	43	DHI	0.43
Hooded Warbler	14	DD	NA	NA	NA
Hooded Merganser	0	NA	29	DD	DD
House Wren	93	DOS	NA	NA	NA
Indigo Bunting	57	PH	NA	NA	NA
Kentucky Warbler	7	DD	NA	NA	NA
Killdeer	29	PH	14	DD	DD
Least Bittern	7	DD	NA	NA	NA
Least Flycatcher	7	DD	NA	NA	NA
Least Tern	14	DD	NA	NA	NA
Louisiana Waterthrush	14	DD	NA	NA	NA
Mallard	57	US	57	SS	0.25
Marsh Wren	7	DD	NA	NA	NA
Mourning Dove	100	DF	71	GH	0.67
Mute Swan	7	DD	14	DD	DD
Nashville Warbler	14	DD	NA	NA	NA
Northern Cardinal	100	PDFW	79	SS	0.01
Northern Flicker	93	DOS	79	MF	0.25
Northern Harrier	7	DD	21	PH	DD
Northern Mockingbird	50	DD	21	GH	DD
Northern Parula	71	DD	NA	NA	NA
Northern Waterthrush	43	EF	NA	NA	NA
Northern Rough-winged Swallow	29	DD	NA	NA	NA
Northern Saw-whet Owl	7	DD	NA	NA	NA

Species	BREEDING		NONBREEDING		Between Season Habitat Similarity[a]
	% Refuge Occupied	Top Habitat	% Refuge Occupied	Top Habitat	
Orchard Oriole	14	DD	NA	NA	NA
Osprey	57	EEW	NA	NA	NA
Ovenbird	71	SS	NA	NA	NA
Peregrine Falcon	0	NA	7	DD	NA
Pine Warbler	64	MF	0	NA	DD
Pileated Woodpecker	36	DF	36	DF	0.43
Prairie Warbler	43	DF	NA	NA	NA
Purple Finch	7	DD	14	DD	DD
Purple Martin	21	PDFW	NA	NA	NA
Red-breasted Merganser	NA	NA	21	DD	NA
Ring-billed Gull	NA	NA	21	DD	NA
Rose-breasted Grosbeak	43	DD	NA	NA	NA
Red-breasted Nuthatch	21	PDFW	21	NA	NA
Red-bellied Woodpecker	86	SS	93	DF	0.67
Ruby-crowned Kinglet	14	DD	14	DHI	DD
Redhead	NA	NA	7	DD	NA
Red-eyed Vireo	86	DF	NA	NA	NA
Ring-necked Pheasant	7	DD	7	DD	DD
Rock Pigeon	21	DD	7	DD	DD
Red-shouldered Hawk	64	MF	50	DF	0.67
Red-tailed Hawk	79	GH	79	SS	0.67
Ruby-throated Hummingbird	79	DF	NA	NA	NA
Red-winged Blackbird	100	DF	50	DD	DD
Rusty Blackbird	NA	NA	7	DD	NA
Saltmarsh Sparrow	21	DD	NA	NA	NA
Savannah Sparrow	7	DD	7	DD	DD
Scarlet Tanager	57	DF	NA	NA	NA
Snowy Egret	21	SS	NA	NA	NA
Song Sparrow	100	SS	57	PH	0.43
Spotted Sandpiper	7	DD	NA	NA	NA
Sharp-shinned Hawk	14	DD	7	DD	DD
Swamp Sparrow	7	DD	7	DD	DD

Species	BREEDING		NONBREEDING		Between Season Habitat Similarity[a]
	% Refuge Occupied	Top Habitat	% Refuge Occupied	Top Habitat	
Tree Swallow	93	GH	NA	NA	NA
Tufted Titmouse	93	DF	93	DF	0.67
Turkey Vulture	71	DD	36	DD	DD
Veery	79	SS	NA	NA	NA
Warbling Vireo	64	PEW	NA	NA	NA
White-breasted Nuthatch	93	DF	86	EF	1.0
White-eyed Vireo	21	DD	NA	NA	NA
Worm-eating Warbler	29	DF	NA	NA	NA
Willow Flycatcher	21	EEW	NA	NA	NA
Willet	21	DD	NA	NA	NA
Wild Turkey	57	SS	7	DD	DD
Winter Wren	14	MF	14	DD	DD
Wood Duck	43	PDFW	7	DD	DD
Wood Thrush	71	DF	NA	NA	NA
White-throated Sparrow	0	NA	64	GH	NA
Yellow-billed Cuckoo	36	DF	NA	NA	NA
Yellow-bellied Flycatcher	7	DD	NA	NA	NA
Yellow-bellied Sapsucker	0	NA	50	EF	NA
Yellow Warbler	100	SS	NA	NA	NA
Yellow-rumped Warbler	64	DD	43	DOS	DD
Yellow-throated Vireo	57	PEW	NA	NA	NA

a: Computed as Jaccard Similarity Index between top 5 most important habitats at predicting species presence (using RandomForest mean decrease in impurity (MDI)). A value closer to 1 indicates more similar habitats are chosen during both periods of the year.

Habitat Codes: See page 14, DD = Data deficient (not enough detections were made to create data product, NA = Not applicable (the species was not detected and data product was not created).

THE STATE OF OUR BIRDS

Seasonal Trends: Breeding

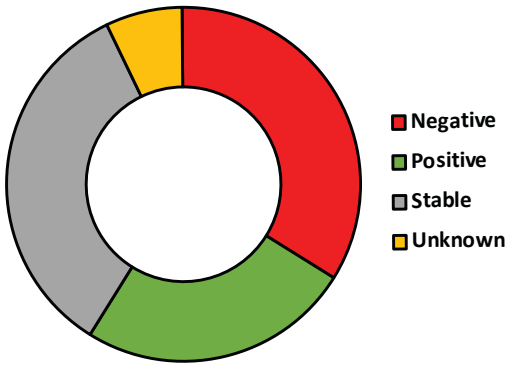
Of all species detected during the breeding season across Audubon's 14 publicly accessible Refuges, 34% are declining throughout their breeding range. An additional 34% are considered stable, with trends that exhibit declines in some years and gains in others.

The greatest declines were seen in species associated with the aerial insectivore, early successional, grassland, saltmarsh and urban foraging guilds.

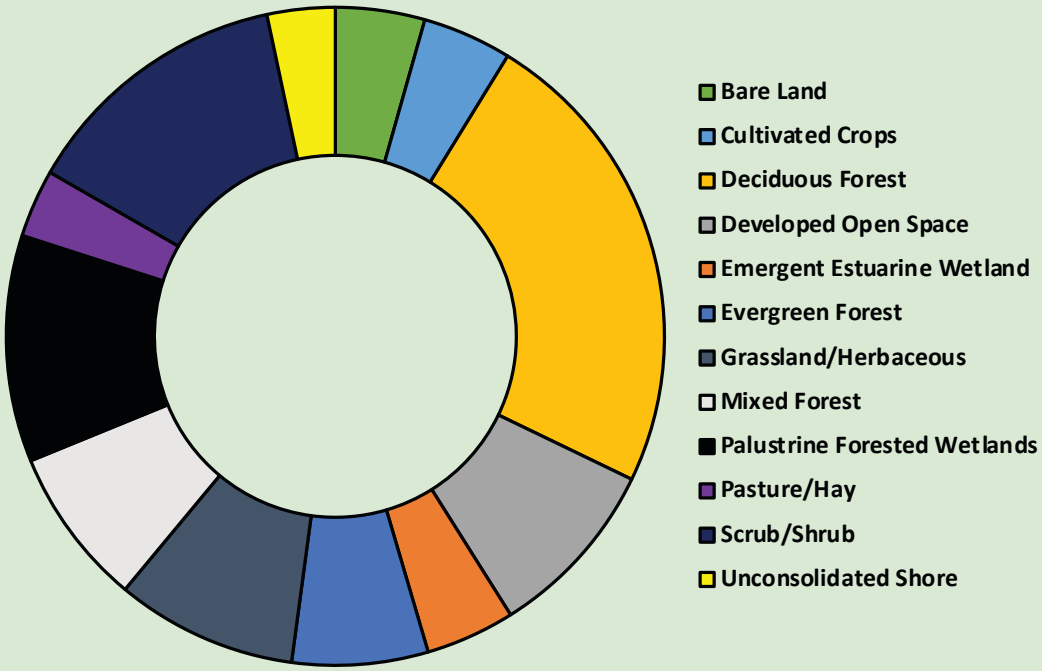
A total of 25% of all species breeding on Audubon Refuges are experiencing long-term increases in population.

The habitats that supported the largest diversity of species during the breeding season included Deciduous Forests, forested wetlands, Scrub/Shrub and Mixed Forests.

Species Population Trends (Breeding)



Most Important Habitats All Species (Breeding)



Seasonal Trends: Overwintering

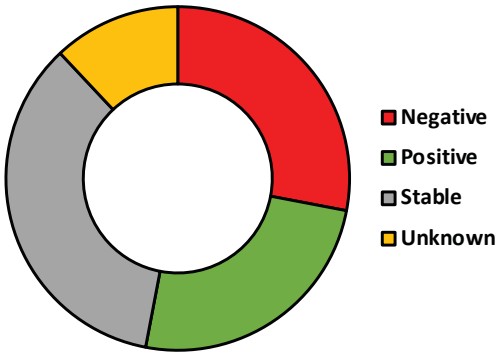
Of all species detected during the overwintering season across Audubon's 14 publicly accessible Refuges, 28% are declining throughout their breeding range. An additional 35% are considered stable, with trends that exhibit declines in some years and gains in others.

A total of 25% of all species overwintering on Audubon Refuges are experiencing long-term increases in population.

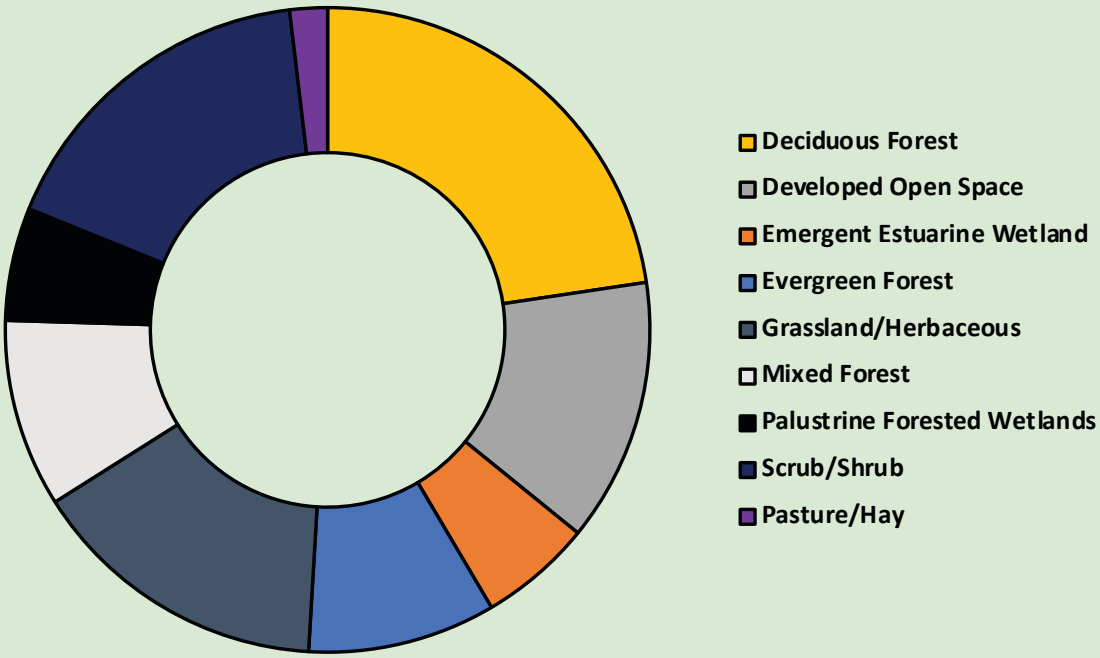
A larger percentage of species are considered data deficient (12%) for population trend analysis as many overwintering species are not adequately surveyed along Breeding Bird Survey (BBS) routes.

The habitats that supported the largest diversity of species during the overwintering season included Deciduous Forests, Grassland/Herbaceous, Scrub/Shrub and Mixed Forests.

Species Population Trends (Overwintering)



Most Important Habitats All Species (Overwintering)



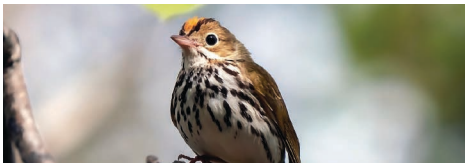
Foraging Guilds

All species detected during breeding season surveys were assigned to one of 12 guilds based on similarities in foraging habits or habitat preference. While species within a guild may not be closely related to one another, their shared use of resources allows for delineating groups for which trend analysis and conservation actions can be better visualized.

Forest, generalist, and early successional guilds contained the most species. The most imperiled guild (containing the greatest percentage of species exhibiting declining population trends) are the aerial insectivore, early successional, grassland, and urban guilds.

Aerial Insectivores

Forest



Shorebirds

Birds of Prey

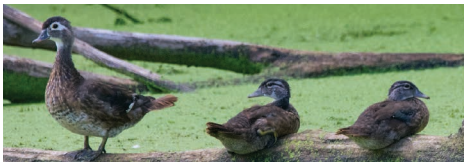
Generalist

Urban

Colonial Waterbirds

Grassland

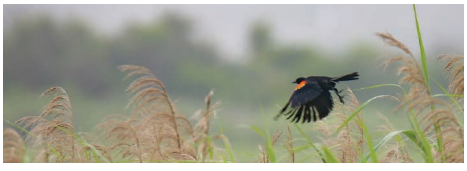
Waterfowl



Early Successional

Saltmarsh

Wetland



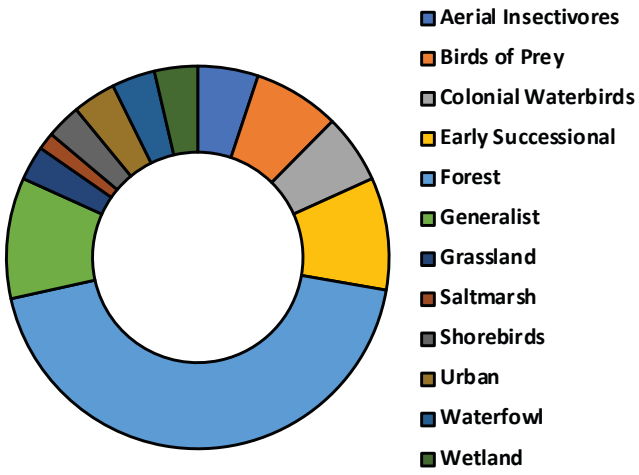
Foraging Guilds

Guild Analysis

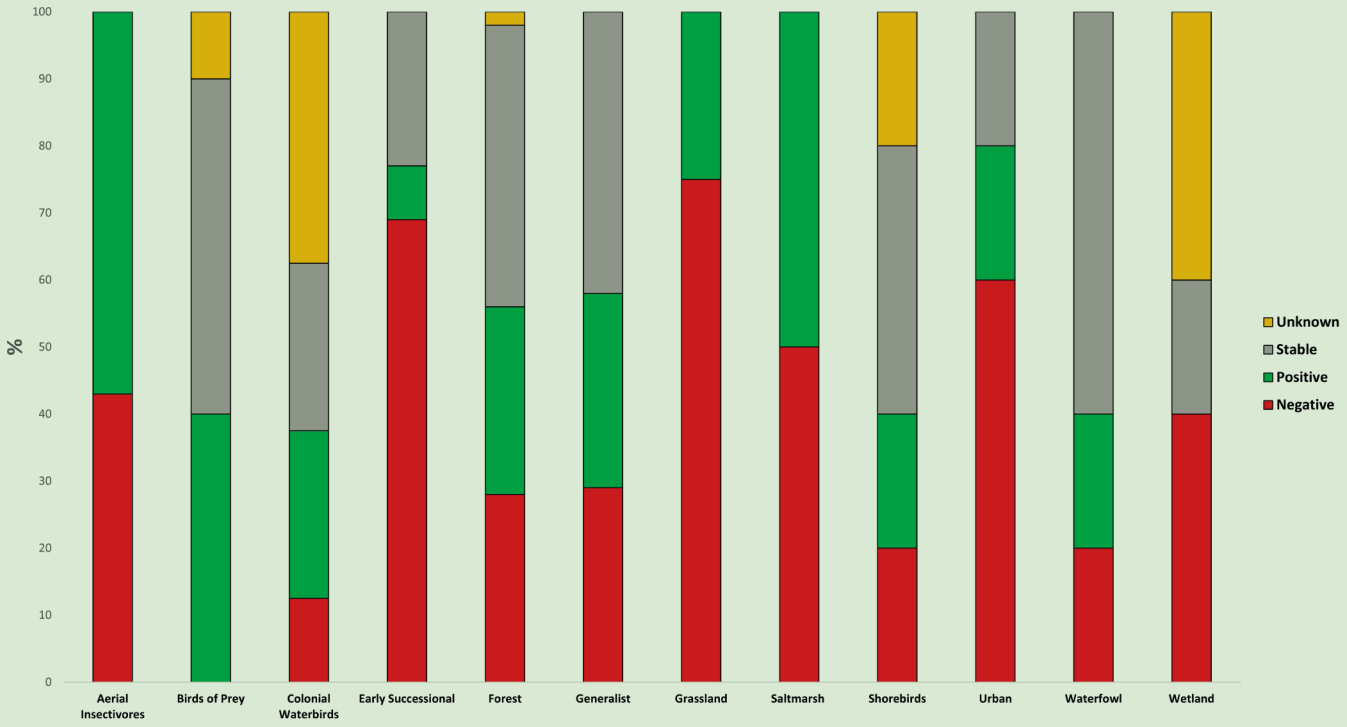
All species detected during breeding season surveys were assigned to one of 12 guilds. Forest, generalist and early successional guilds contained the most species.

The most imperiled guild (containing the greatest percentage of species exhibiting declining population trends) are the aerial insectivore, early successional, grassland and urban guilds.

Foraging Guilds (Breeding)



Guild Status



Responsibility Birds

Selection Criteria

A major goal of this report was to identify species that were candidates for designation as "Responsibility Birds". The phrase, which was borrowed from VT Audubon, is used for birds that require additional monitoring and management to reverse declines locally or contribute to reversing declines at a larger spatial-scale. Three main selection criteria were adopted to aid in the selection of those species classified as "Responsibility Birds".

1. Is the species relatively easy to monitor?

As with baseline data collection, the first step in creating a management plan for a given species is to better understand its current population status on our refuges. This requires a monitoring scheme where data can be collected on population size and distribution along with information on productivity (nesting success) and habitat use. As a large amount of data will be gathered by our dedicated volunteers, the species needs to be easy to monitor, with loud and distinct vocalizations and conspicuous habits.

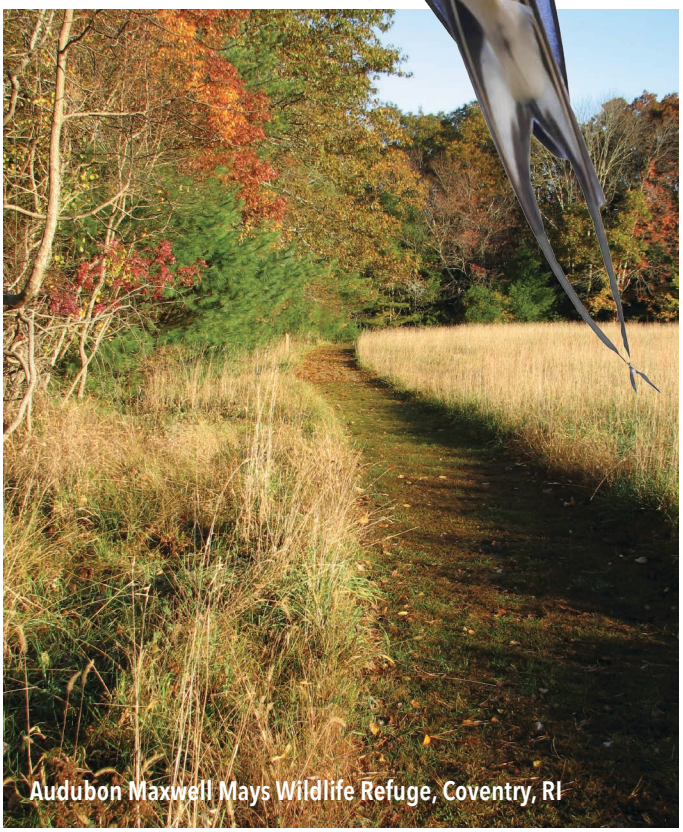
2. Are there clear, actionable steps that can be taken to promote the species?

Some species are in steep decline due to factors that no amount of management in Rhode Island can address. These include habitat loss along migratory routes or overwintering sites, window strikes or pesticide use. For these species, efforts to bolster breeding populations on Audubon Refuges may not contribute to overall population growth. For other species, steps can be taken on our refuges to increase regional populations.

3. Does the species act as an "umbrella species"?

Birds don't live in a vacuum. Instead, many species occupy similar spaces in nature, eating similar foods and nesting in similar locations. In this regard, conserving a given species may indirectly lead to the conservation of other birds with similar habits. This is the umbrella species concept: that conserving some species indirectly conserves others.

Barn Swallow (*Hirundo rustica*): 1 of 9 Responsibility Birds



Audubon Maxwell Mays Wildlife Refuge, Coventry, RI

Foraging Guild

Aerial Insectivores

Barn Swallow (*Hirundo rustica*)

Example Species:

- Barn Swallow
- Bank Swallow
- Chimney Swift

Most aerial insectivores are exhibiting long-term declines across their breeding range. In the case of some species, the decline is extreme, such as the Bank Swallow, which has declined at a rate of 3.42% per year over the past 50-years.

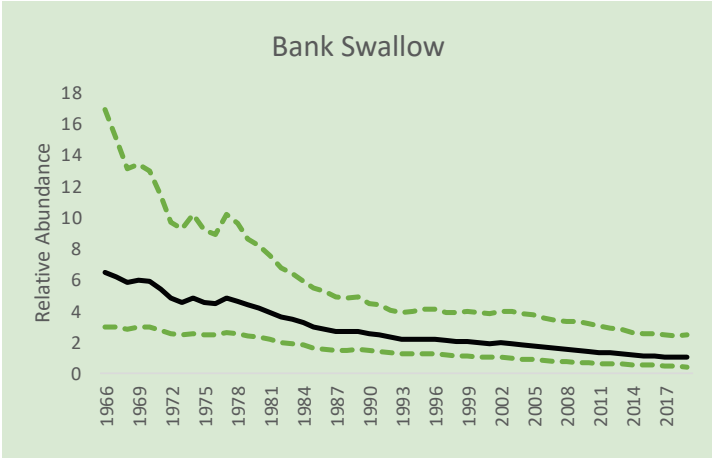
Recent research has suggested that a geographic gradient exists in the decline of many species of aerial insectivore, with the largest declines occurring in northeastern North America (Nebel et al. 2010).

The reasons for such steep decline in this guild are likely habitat loss, declines in prey abundance and climate change.

In some instances, declines have become so steep that species within this guild are considered nationally threatened or vulnerable, such as the Chimney Swift (*Chaetura pelagica*).

Barn Swallows are exhibiting declines across their breeding range, with the largest declines occurring along the Mid-Atlantic, Great Lakes and Gulf Coast regions.

Bank Swallows are in steep decline and populations have dropped by an estimated 90% across their range over the past 50-years.



Bank Swallow (*Riparia riparia*)

Bank Swallow (*Riparia riparia*)

For assistance in interpreting the graphs on pages 30 – 60, please refer to page 53.

Responsibility Bird

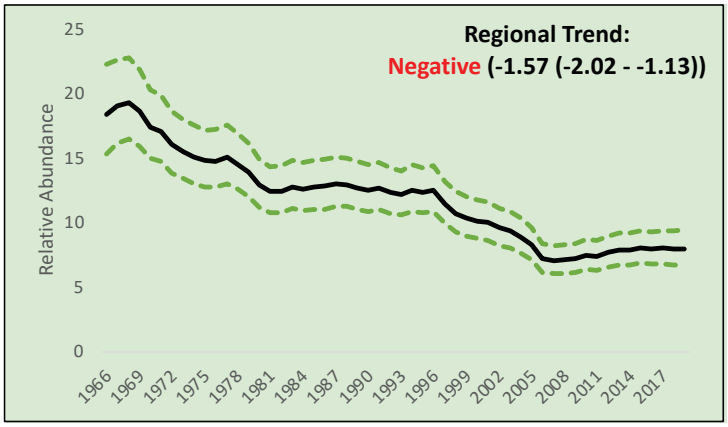
Chimney Swift *(Chaetura pelagica)*

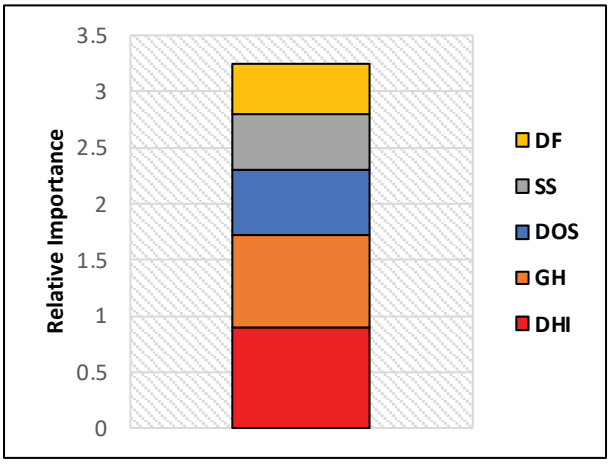
- Breeding Species:
  Not present during overwintering period
- Widespread:
  Detected at 71% of Audubon Refuges surveyed
- Most Important Habitats:
  Developed High Intensity, Grassland/Herbaceous

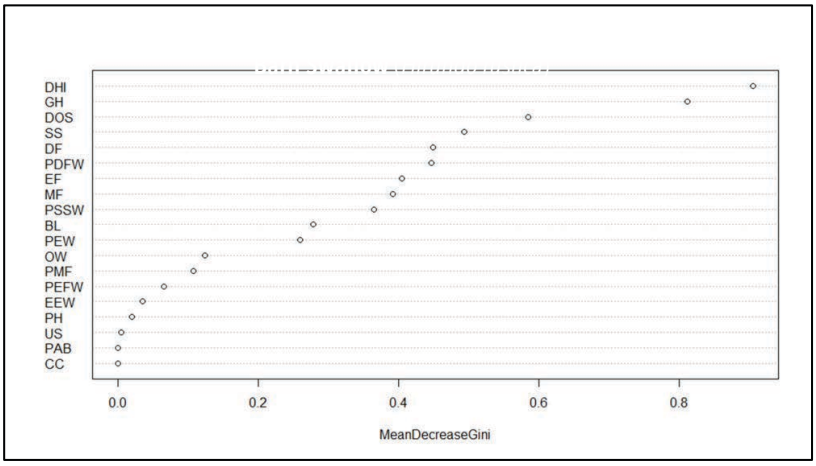
The decline in Chimney Swifts has been even more dramatic in the states of CT, MA and RI than in the Mid-Atlantic as a whole.

Chimney Swifts have been shown to respond positively to the erection of roosting and nesting towers in open fields.

Moving forward, The Audubon Society of Rhode Island will plan to erect roosting and nesting towers on some of our refuges with extensive open habitats, such as Caratunk and McIntosh Wildlife Refuges. We will hope to expand this effort should we experience success at these locations.







Responsibility Bird

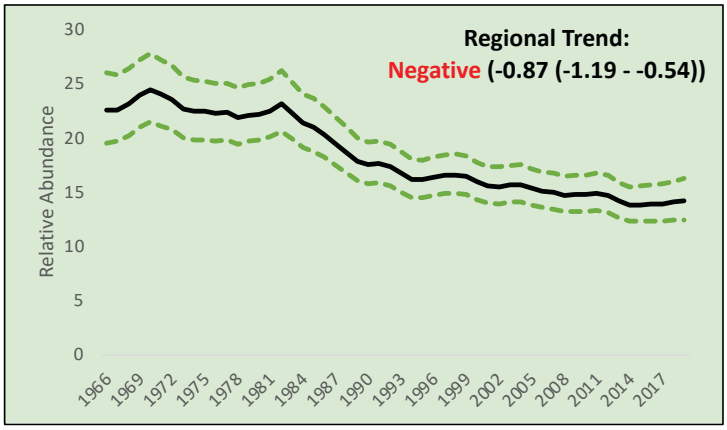
Barn Swallow *(Hirundo rustica)*

- Breeding Species:
  Not present during overwintering period
- Widespread:
  Detected at 64% of Audubon Refuges surveyed
- Most Important Habitats:
  Forested Wetlands

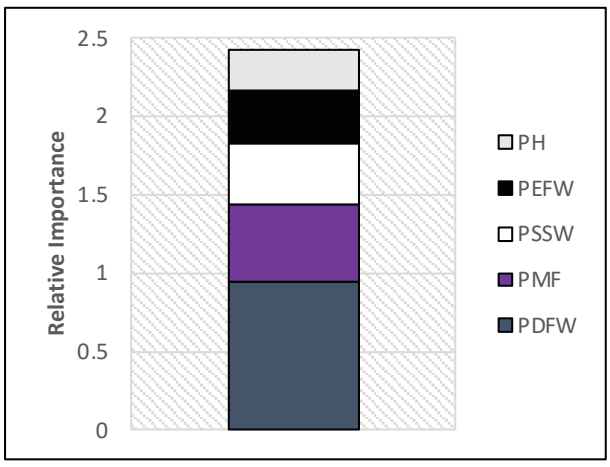
The decline in Barn Swallows has been even more dramatic in the states of CT, MA and RI than the Mid-Atlantic as a whole.

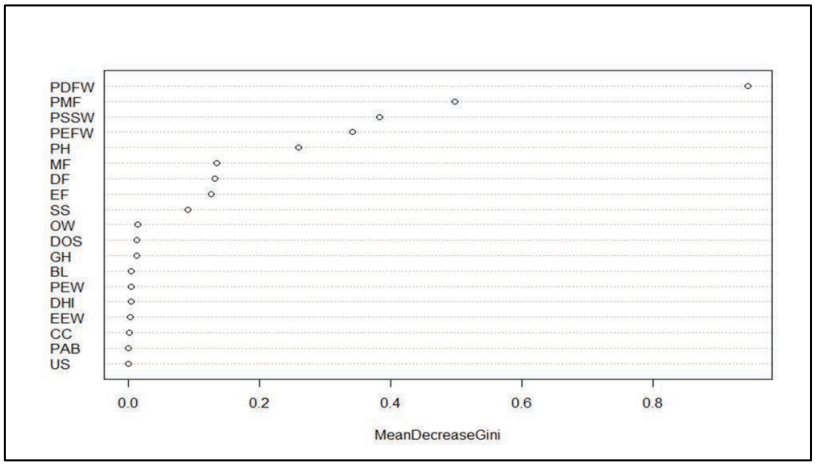
On Audubon Refuges, the species is most commonly associated with low, wet habitats such as forested and scrub/shrub wetlands. These birds are most likely foraging and not nesting.

A monitoring scheme will be designed specific to the foraging and nesting needs of this species in the hopes that we can supplement the regional population through increased foraging and nesting success on our properties.




Barn Swallow *(Hirundo rustica)*





Red-tailed Hawk (*Buteo jamaicensis*)

Foraging Guild

Birds of Prey

Example Species:

- Broad-winged Hawk
- Cooper's Hawk
- Red-shouldered Hawk

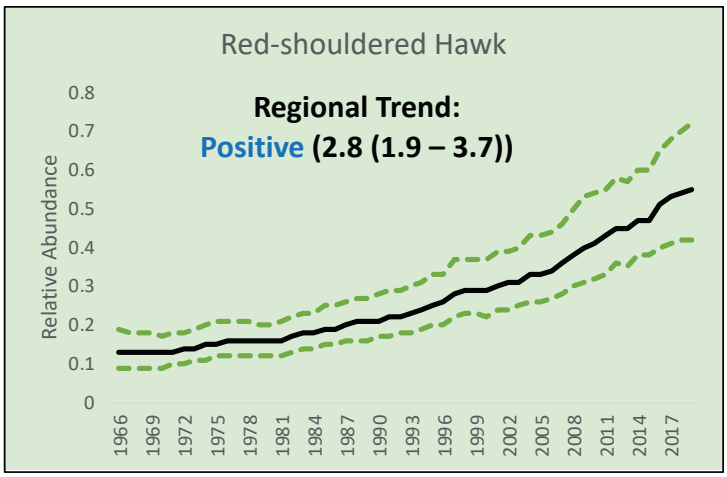
For the most part, the birds of prey breeding across Audubon Refuges are experiencing stable or growing populations. The exception to this is the Sharp-shinned Hawk (*Accipiter striatus*), which is stable across the Mid-Atlantic Region, but declining across much of its range. A single Sharp-shinned Hawk was detected during surveys and the statewide population of this imperiled species is extremely small, with only a single confirmed nest during the most recent state atlas.

While many birds of prey are increasing in abundance, a few species are in steep decline.

The reasons for declines include habitat loss, pesticide and rodenticide use. These declines are not isolated to North America. Recent research has documented a decline in global populations of birds of prey (Cruz et al. 2021).

Broad-winged Hawks (*Buteo platypterus*) are showing signs of increasing throughout much of their range, while species such as the Sharp-shinned Hawk are in decline.

Red-shouldered Hawk (*Buteo lineatus*)



Cooper's Hawk (*Accipiter cooperii*)

Broad-winged Hawk (*Buteo platypterus*)

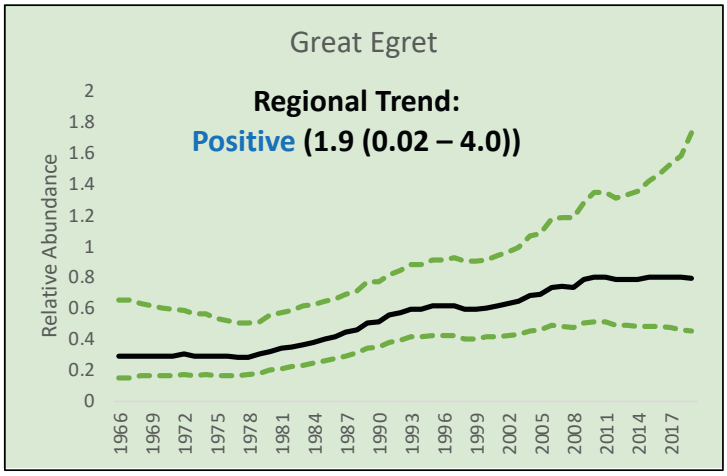
Great Egret (*Ardea alba*)

Foraging Guild
Colonial Waterbirds

Example Species:

- Great Egret
- Black-crowned Night Heron
- Snowy Egret

None of the birds in this guild actually breed on Audubon Refuges. Detected birds were foraging and therefore our level of management revolves around providing high-quality foraging habitat that can aid in overall nesting success. Most species in this guild do not have population trend data available as they are generally not detected during standard Breeding Bird Survey (BBS) routes.



Many of the species in this guild are in fact declining. While BBS trends are difficult to obtain for most species, eBird trend and status products demonstrate a clear declining trend in species such as the Glossy Ibis (*Plegadis falcinellus*) and Black-crowned Night Heron (*Nycticorax nycticorax*).

While these species are not candidates for Responsibility Birds, important foraging and nesting habitats will be identified and protected when possible.

Black-crowned Night Heron (*Nycticorax nycticorax*)

Snowy Egret (*Egretta thula*)

Foraging Guild

Early Successional

Eastern Towhee (*Pipilo erythrophthalmus*)

Example Species:

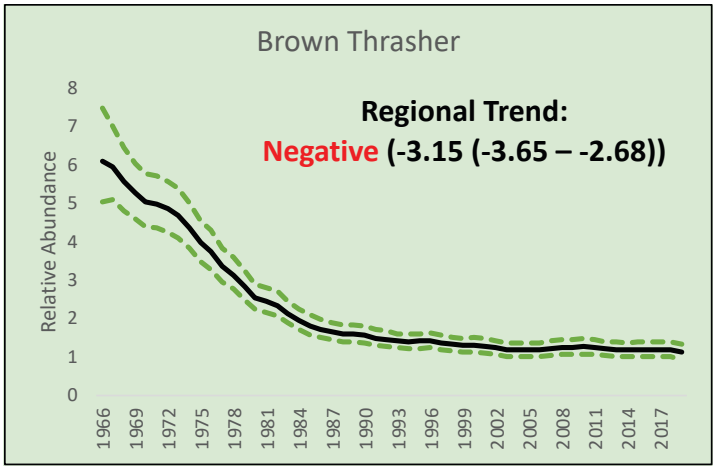
- Brown Thrasher
- Indigo Bunting
- Prairie Warbler

This is one of the most imperiled groups of birds found across Audubon Refuges, with 69% of species in decline. Some species, such as the Brown Thrasher (*Toxostoma rufum*) have declined more than 3% per year over the past 50-years. Of the 13 species contained in this guild, only one, the American Goldfinch (*Spinus tristis*) is showing signs of increase.

Early Successional birds prefer shrubby habitats, such as overgrown fields and forest edges, for nesting. As many of these habitats are no longer available in large scales across the landscape, the bulk of species in this guild are declining.

Even the Indigo Bunting (*Geothlypis trichas*), a striking bird species breeding in shrubby habitats throughout Rhode Island, is declining across most of its breeding range (right). Across the Mid-Atlantic, the species has been declining at a rate of 0.33% per year for the past 50-years.

Despite the rarity of this habitat across the state, Scrub/Shrub was one of the most important habitat types for multiple species detected during baseline data collection. Therefore, this guild contains multiple "Responsibility Birds".



American Woodcock (*Scolopax minor*)

Indigo Bunting (*Passerina cyanea*)

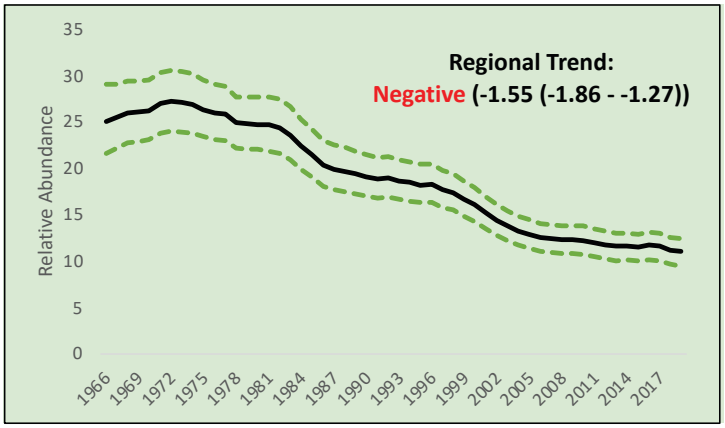
Responsibility Bird

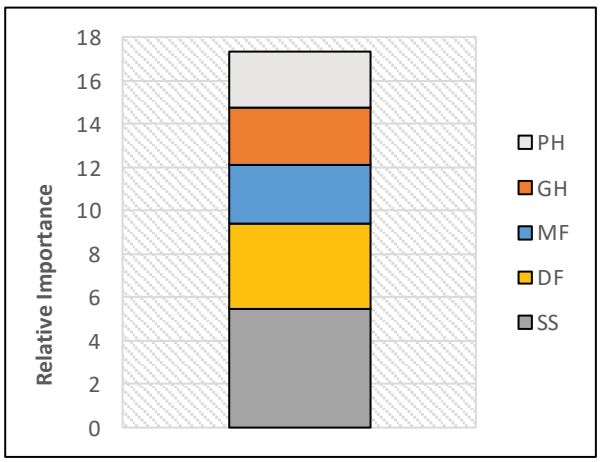
Common Yellowthroat *(Geothlypis trichas)*

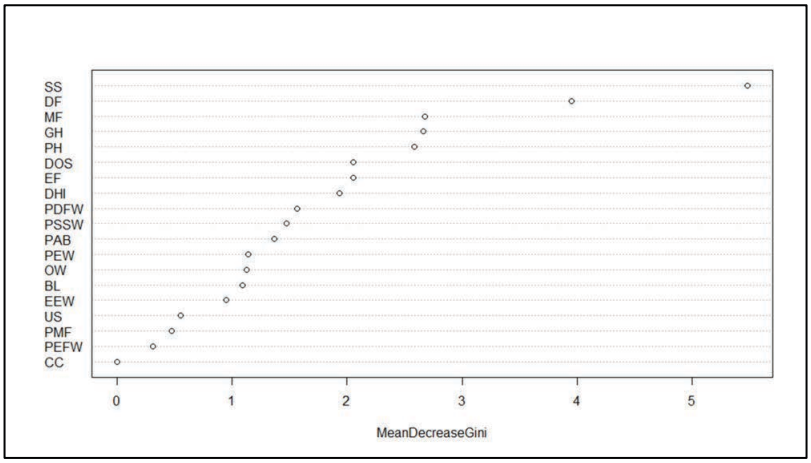
- Breeding Species:
  Not present during overwintering period
- Widespread:
  Detected at 100% of Audubon Refuges surveyed
- Most Important Habitats:
  Scrub/Shrub

While you may associate the Common Yellowthroat with low, wet habitats such as pond edges and wetlands, over 70 individuals were detected at over 40 point count stations and most birds were associated with Scrub/Shrub habitats. As a matter of fact, on Audubon properties, wetland habitat was not even in the top 5 most important habitats for predicting yellowthroat presence.

A monitoring program will be established for this species to determine annual population change and productivity on our refuges.







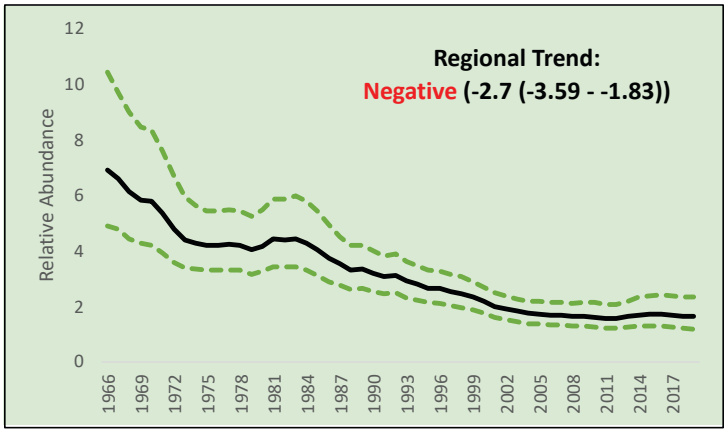
Responsibility Bird

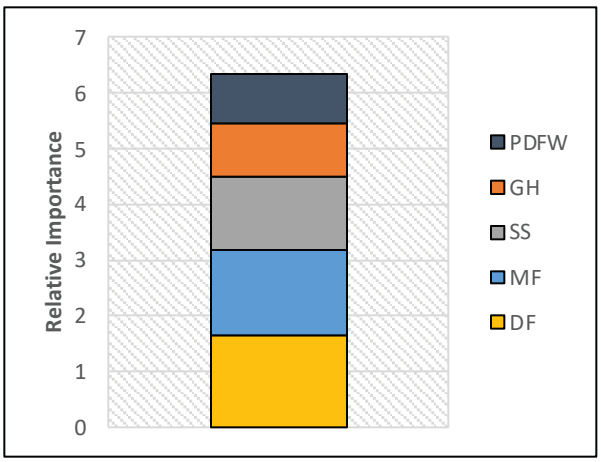
Prairie Warbler *(Setophaga discolor)*

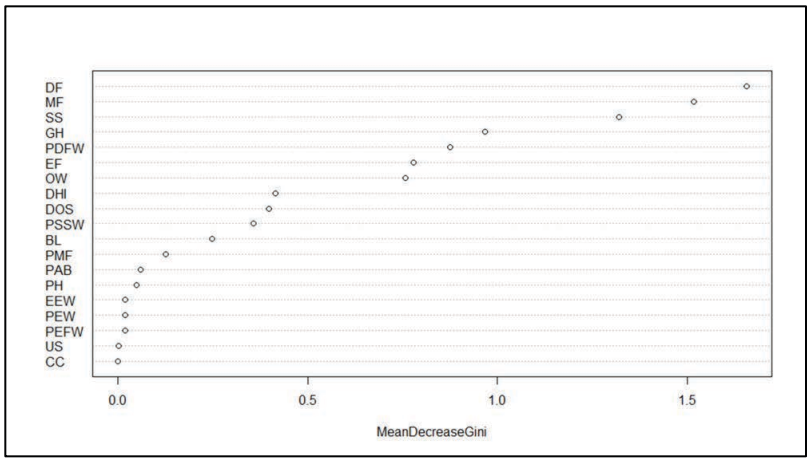
- Breeding Species:
  Not present during overwintering period
- Localized:
  Detected at 43% of Audubon Refuges surveyed
- Most Important Habitats:
  Forest edge

Prairie Warblers are found in secondary growth and young forest habitats. Throughout the entire range, the species is declining at a rate of 3% per year. In parts of their range, including most of New England, the species shows slight increases.

As mixed young forest and Scrub/Shrub habitats are present on multiple Audubon properties, the possibility of effective management for this species exists. Further, by managing for Prairie Warblers, other early successional species are likely to benefit as well, such as Common Yellowthroat, Indigo Bunting and Blue-winged Warblers (*Vermivora cyanoptera*).



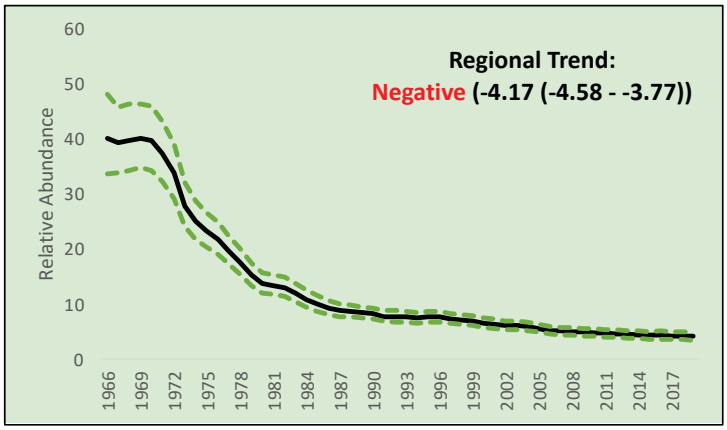




Responsibility Bird

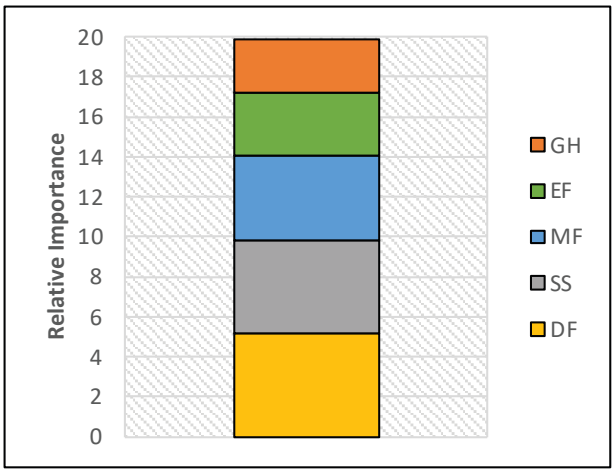
Eastern Towhee *(Pipilo erythrophthalmus)*

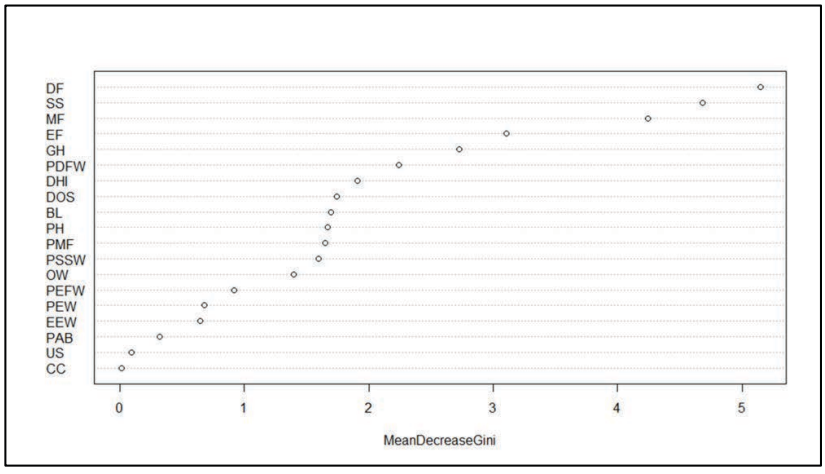
- Breeding Species:
  Not present during overwintering period, although a few individuals may overwinter in the state.
- Widespread:
  Detected at 100% of Audubon Refuges during the breeding season and 29% of refuges during the overwintering period.
- Most Important Habitats:
  Forest edge



Eastern Towhees might not come to mind when you think of species in need of conservation efforts. And, while the numbers of towhees is high enough that they are currently deemed of low conservation concern throughout their range, towhee numbers have dropped steadily over the past 50-years. In the Mid-Atlantic, this decline has been precipitous and efforts to manage for early successional birds will likely benefit this species.

Managing for species in decline before populations are severely impacted is the focus of proactive conservation.





Foraging Guild
Forest

Ovenbird (*Seiurus aurocapilla*)

Example Species:

- Wood Thrush
- American Redstart
- Brown Creeper

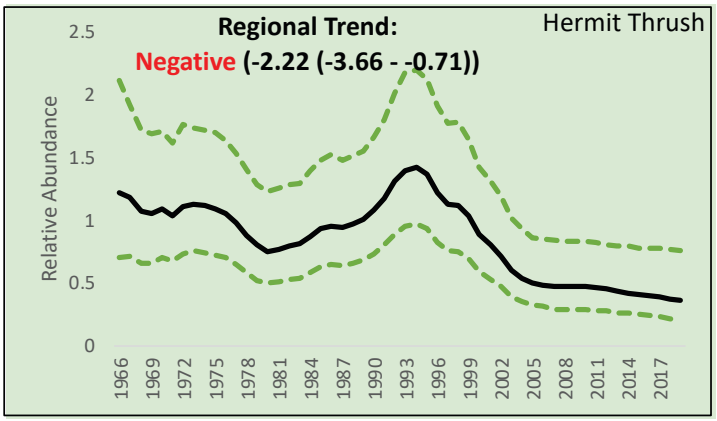
Forests are the most prolific habitats that the Audubon Society of Rhode Island protects. Greater than half of all habitats surveyed during the baseline data collection were deciduous, mixed and evergreen forests. It should come as no surprise that this guild contains the greatest number of species (60) of all. Most species in this guild exhibit stable population dynamics, but 28% are in decline.

Contiguous patches of forest are arguably the "crown jewel" of Audubon Refuges. Undisturbed and unfragmented forests provide nesting and foraging habitat for a large number of species and reduce nesting failures and mortality driven by edge effects and nest parasitism.

Extensive forest habitats in Rhode Island are responsible for providing strongholds for species in decline and have contributed to the increase in a number of "new" species to the landscape such as the Pileated Woodpecker (*Dryocopus pileatus*).

For some species, even in-tact forest habitat in Rhode Island is not enough to reverse declines elsewhere and the effects of climate change and habitat loss are leaving a indelible mark on forest bird populations. At Audubon, we will do everything in our power to ensure that forest dwelling birds on our refuges continue to experience success throughout the year.

The Hermit Thrush (*Catharus guttatus*) is one imperiled species here in Rhode Island and throughout most of its range. Understanding the major drivers of decline is essential to successful conservation of this and many forest-dwelling bird species.



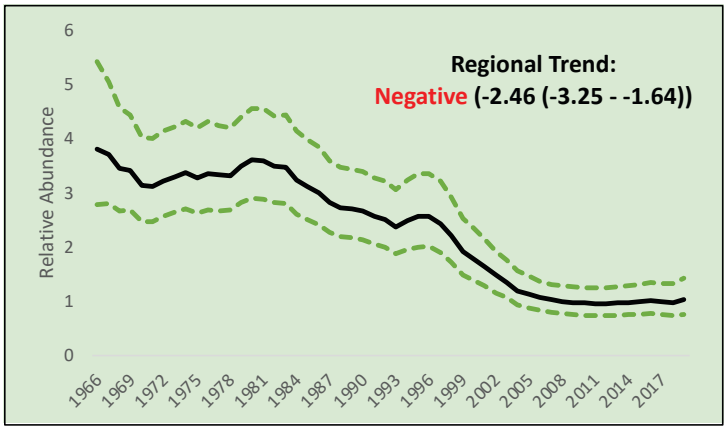
American Redstart (*Setophaga ruticilla*)

Hermit Thrush (*Catharus guttatus*)

Responsibility Bird

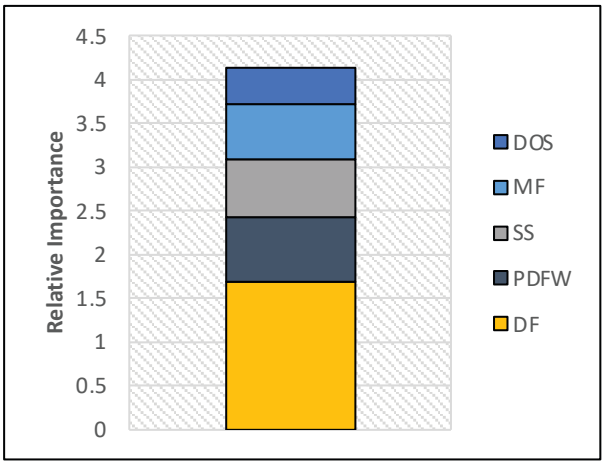
Black-and-white Warbler *(Mniotilta varia)*

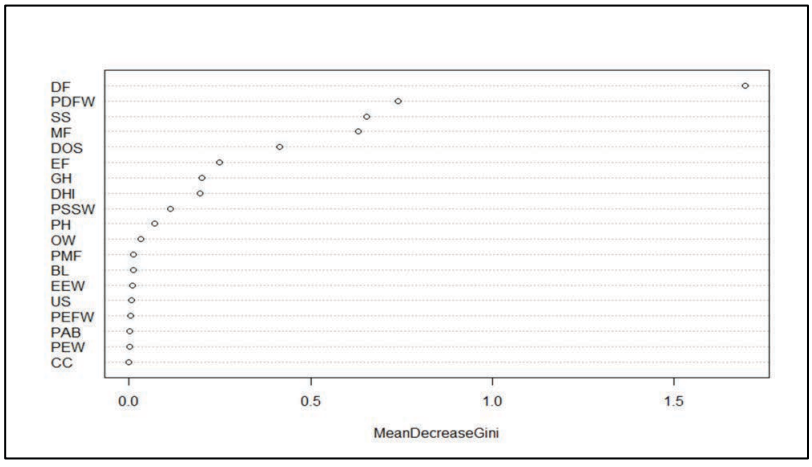
- Breeding Species:
  Not present during overwintering period
- Widespread:
  Detected at 79% of Audubon Refuges surveyed
- Most Important Habitats:
  Deciduous Forest



Black-and-white Warblers are considered a common species, although declines are obvious in many parts of the species' range. In the states of CT, MA and RI, the species has declined at a rate of 3% per year for the past 50-years.

The principal reason the Black-and-white Warbler is considered a "Responsibility Bird" is due to the sensitivity of the species to forest fragmentation. Devising a monitoring scheme for this species on Audubon properties will allow us to determine how the populations of this declining species are faring on refuges throughout the state.





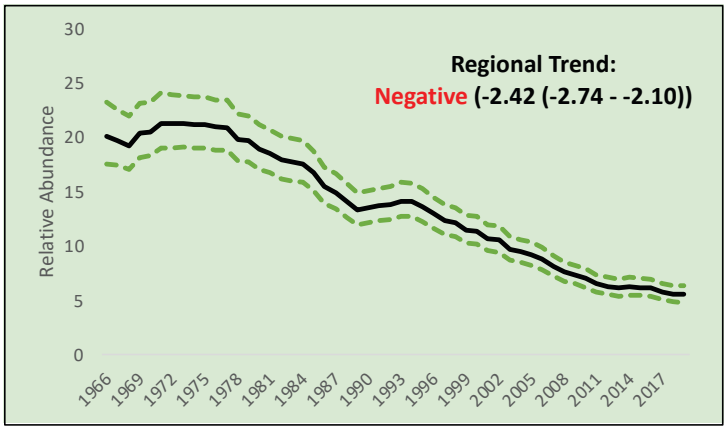
Responsibility Bird

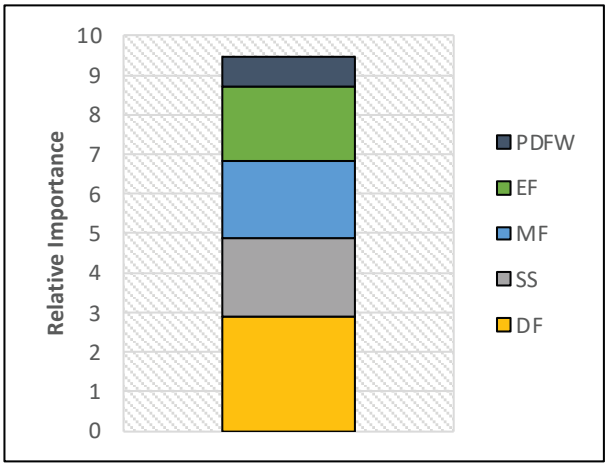
Wood Thrush *(Hylocichla mustelina)*

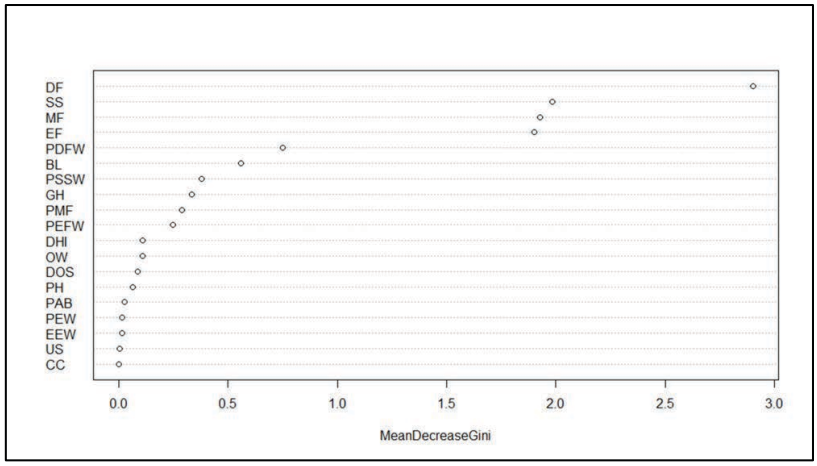
- Breeding Species:
  Not present during overwintering period
- Widespread:
  Detected at 71% of Audubon Refuges surveyed
- Most Important Habitats:
  Deciduous Forest

Wood Thrush have been a species of great conservation concern for quite some time. The species is very sensitive to forest fragmentation, both at breeding and overwintering locations. There are few areas where the species is doing well and studies have shown that nesting success declines in areas where the species is forced to breed in small forest tracts.

As the George Parker Woodland supports one of the largest breeding populations of Wood Thrush in the state, work will begin to better understand the health of our Wood Thrush population.







Responsibility Bird

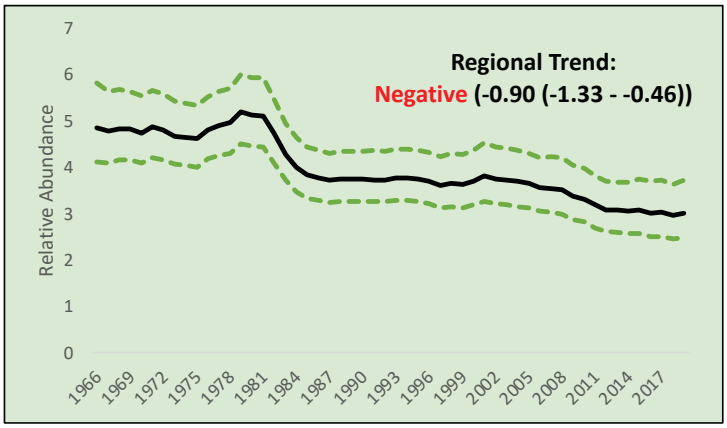
Scarlet Tanager *(Piranga olivacea)*

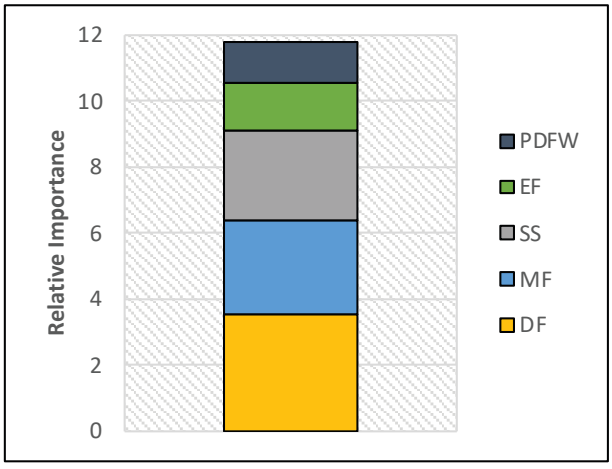
- Breeding Species:
  Not present during overwintering period
- Widespread:
  Detected at 57% of Audubon Refuges surveyed
- Most Important Habitats:
  Deciduous Forest

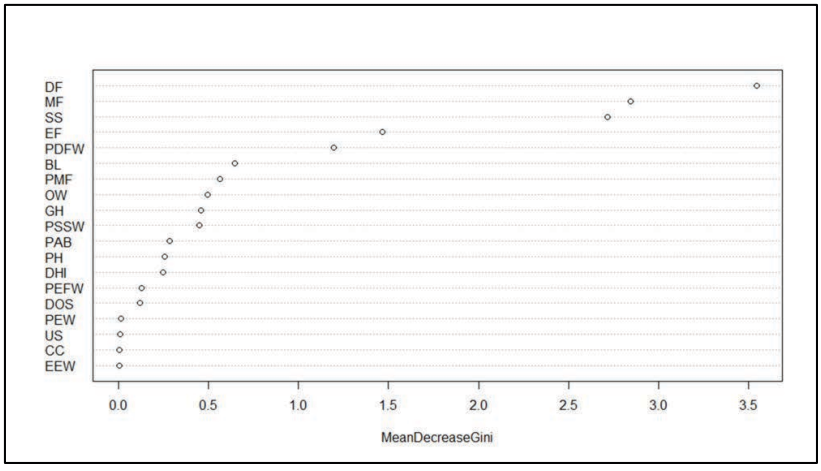
This vibrant species is declining throughout the entirety of its range, with some areas of New England experiencing a >20% decline from 2007-2021.

With Scarlet Tanagers present at over 50% of our refuges, it is incumbent upon Audubon to better understand the needs of this beautiful species when it chooses to breed on our properties.

Habitat loss has been identified as a major factor in the decline of this species.







American Robin (*Turdus migratorius*)

Foraging Guild
Generalist

Example Species:

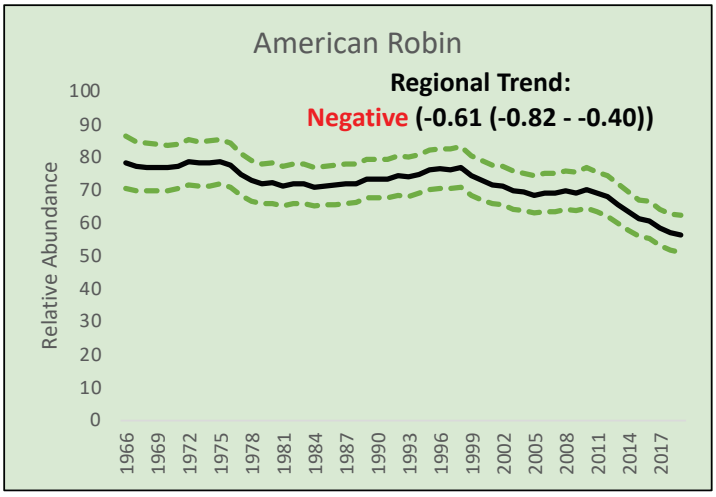
- Mourning Dove
- Blue Jay
- American Robin

Believe it or not, not even the most generalist species are insulated from the factors leading to declines among our birds. Robins, Blue Jays (*Cyanocitta cristata*), Common Grackles (*Quiscalus quiscula*) and Song Sparrows (*Melospiza melodia*) have all declined over the past 50-years along the Mid-Atlantic region. Conservation measures such as curbing feral cat populations, creating natural habitats in residential and urban areas and installing window strike decals are all likely to contribute to reversing these declines.

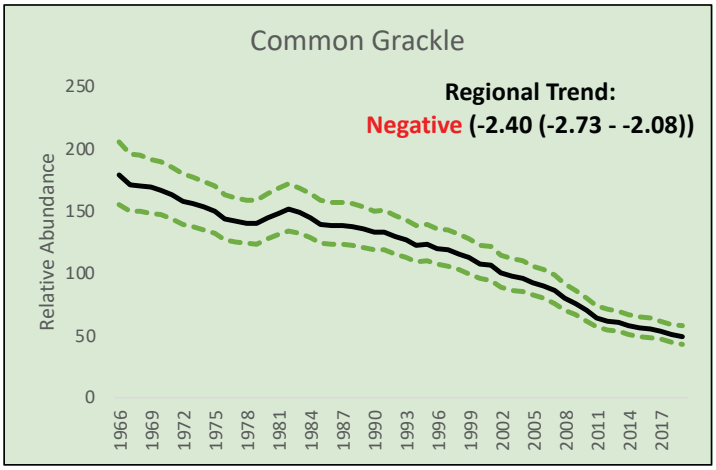
The American Robin (*Turdus migratorius*), one of the most common birds in North America, is in trouble. Curb use of pesticides and keep cats indoors to help this species.

The North American population of Common Grackles has declined by 60% in just the past 40-years. The species' large geographic range may help to reduce the impact of this decline, but conservation measures are needed to avoid continued loss.

Common Grackle (*Quiscalus quiscula*)



Mourning Dove (*Zenaida macroura*)



Foraging Guild
Grassland

American Kestrel (*Falco sparverius*)

Example Species:

- Field Sparrow
- Savannah Sparrow
- Eastern Bluebird

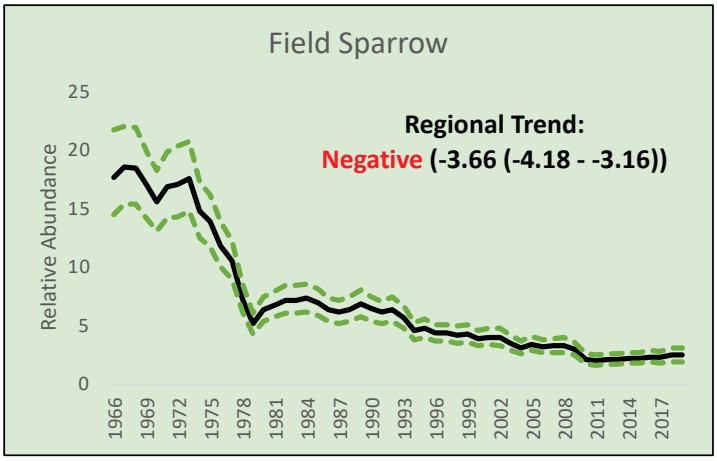
The grassland guild contains the most imperiled birds in North America. Species such as the American Kestrel (*Falco sparverius*) and Field Sparrow (*Spizella pusilla*) are in steep decline range wide. This decline is largely driven by habitat loss, with open, grassy areas once used for agriculture now maturing into early successional and forested habitats. Audubon protects only a small amount of grassland habitat in the state and therefore only a few representative species from this guild appear on our refuges and little can be done to increase populations.

A total of 6 Field Sparrows and 1 American Kestrel were detected on Audubon Refuges during baseline data collection. These quantities are small largely because of the limited grassland habitat that occurs on our properties.

Without the creation of these habitats (which would occur at the expense of other important habitat types) or the identification and conservation of additional grasslands in the state, management plans for grassland birds is not feasible at this time.

While most species of grassland birds are in decline, such as the Field Sparrow, the nest box program at Audubon has resulted in significant gains in the local Eastern Bluebird (*Sialia sialis*) population.

The Mid-Atlantic bluebird population is currently increasing at a rate of 3% per year and Audubon is proud to be contributing to that growth.



Research will commence during the 2023 breeding season to understand the habitat needs and breeding success of imperiled grassland species, such as the Field Sparrow, on Audubon properties. The research, a joint project with the University of Rhode Island, will hopefully provide us the tools to make a positive impact on other grassland-dependent species.

Saltmarsh Sparrow (*Ammodramus caudacutus*)

Foraging Guild
Saltmarsh

Example Species:

- Saltmarsh Sparrow
- Willow Flycatcher
- Clapper Rail

Rising sea levels and coastal development threaten saltmarsh habitats throughout North America. The species that utilize these habitats also find themselves in a pinch as breeding and foraging areas disappear and more frequent tidal inundation reduces nesting success. The Saltmarsh Sparrow (*Ammodramus caudacutus*) serves as the poster child for the guild, with experts predicting that the species will go extinct by the year 2050. This species is a saltmarsh specialist and is inextricably linked to the fate of the habitat type.

The Audubon Society does not protect a significant amount of saltmarsh habitat in Rhode Island. This guild is highlighted because both Saltmarsh Sparrows and Willow Flycatchers were detected during surveys, both exclusively in saltmarsh habitats. Although rails are possible in the same habitat, none were detected during surveys. Typically, these cryptic species (Saltmarsh Sparrows included) require specialized surveys in appropriate habitats to increase the likelihood of detection.

Willow Flycatchers (*Empidonax traillii*) are not saltmarsh specialists and are often found in low wet, shrubby areas around freshwater wetlands, streams and rivers. However, during point counts, all detections for this species came from saltmarsh habitats at McIntosh and Lathrop Refuges.

Any management for this species on Audubon properties would therefore focus on saltmarshes in addition to freshwater wetlands.

Saltmarsh Sparrow (*Ammodramus caudacutus*)

Clapper Rail (*Rallus crepitans*)

Foraging Guild

Shorebirds

Killdeer (*Charadrius vociferus*)

Example Species:

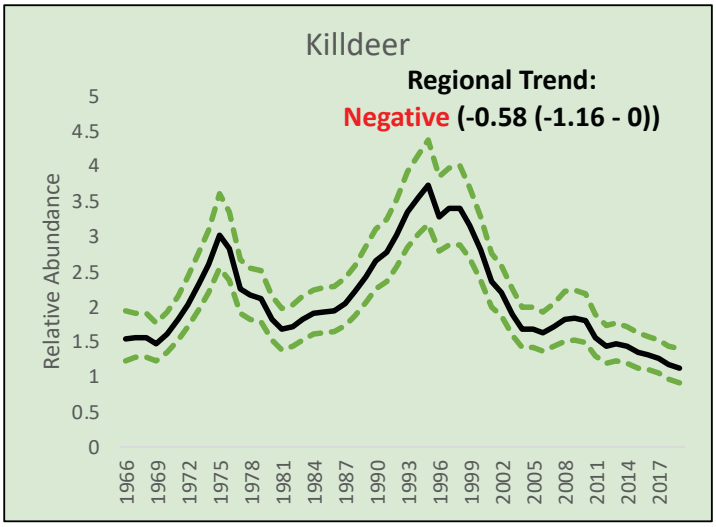
- Killdeer
- Willet
- American Oystercatcher

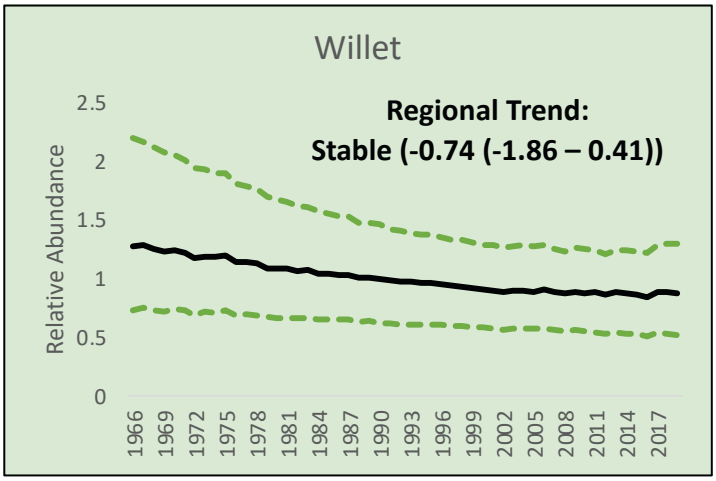
Only a handful of shorebird species were detected during baseline data collection, as shoreline and maritime habitats are not common among Audubon Refuges. In fact, the only record for American Oystercatcher (*Haematopus palliatus*) comes from an eBird sighting at Emilie Ruecker Wildlife Refuge in early July of 2022. Although this bird was not breeding on the refuge, it highlights the fact that Audubon Refuges can provide important foraging habitat for shorebirds. Preventing shoreline erosion, engaging in beach cleanups and monitoring use of our refuge shoreline by these species is a must.

Shorebirds do not breed in large numbers on Audubon properties and little management success is likely in the face of so little breeding activity. Monitoring our shorelines and doing what we can to ensure foraging habitat is available to breeding and migrating shorebirds is our best bet for contributing to species' population growth.

The Willet (*Tringa semipalmata*) is an interesting example of a species experiencing localized increases despite little gains at larger spatial scales. The species is currently increasing at a rate of 5% per year in the combined states of CT, MA and RI and increased dramatically between the first and second Rhode Island state atlases.

Despite this local increase, Willets have declined across much of their Mid-Atlantic range, although when averaged across the region, the population appears to be stable over the long-term.





Willet (*Tringa semipalmata*)

Foraging Guild

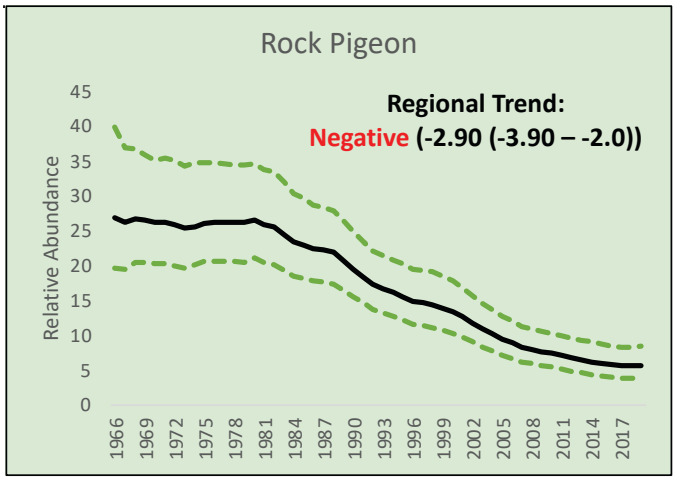
Urban

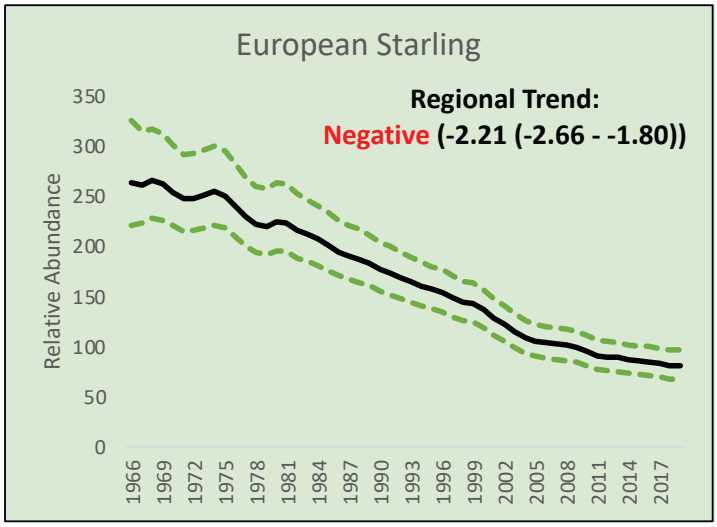
Rock Dove (*Columba livia*)

Example Species:

- European Starling
- Rock Pigeon
- House Sparrow

The Audubon Society of Rhode Island does not protect urban habitats, yet a number of birds that breed in these habitats occur on the margins of our refuges. Most point counts conducted along refuge edges abutting residential and developed areas detected House Sparrows (*Passer domesticus*) and European Starlings (*Sturnus vulgaris*). While most species are likely breeding off-refuge, individuals were found foraging within refuge boundaries. It may surprise most to know that these species, although accustomed to living in human-modified landscapes, are also in decline.





Birds are excellent indicators of overall environmental health. They are often used as an early warning system for declining ecosystem function as they are so intimately connected to habitats in which they live.

When those species most commonly associated with humans begin declining, there should be cause for concern. When compared to populations 50-years ago, there are currently half as many European Starlings occupying our cities and towns. While no management plans are being devised for this non-native species, their decline should be a warning to the conservation community, especially as the drivers of this decline are not well understood.

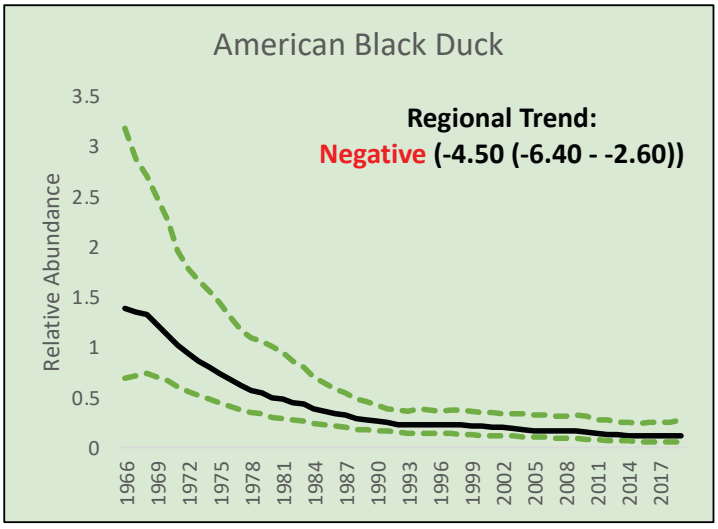
Foraging Guild
Waterfowl

Wood Duck (*Aix sponsa*)

Example Species:

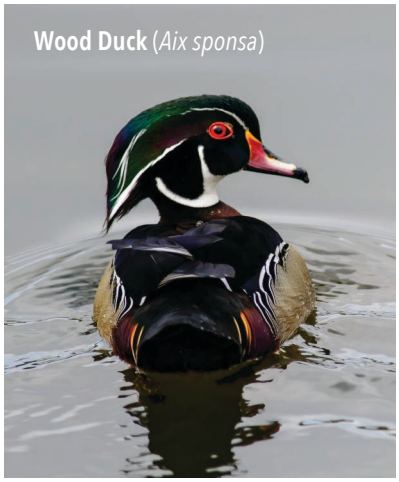
- American Black Duck
- Mallard
- Wood Duck

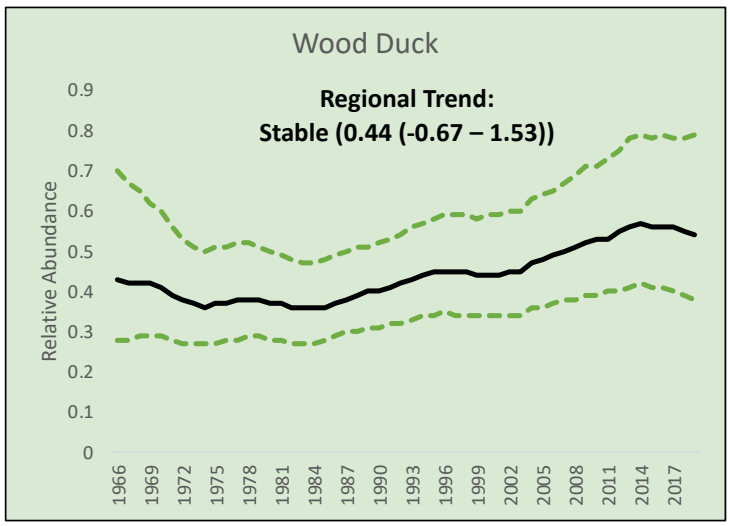
The recently released "State of the Birds" report documented a 34% increase in the duck populations of North America (NABCI 2022). This is notable, as most groups of birds continued to exhibit declining trends. Of course, when averaging across all species, individual declines are often masked by species that have experienced large increases. While wetland conservation measures across North America have increased nesting and foraging habitat for many duck species, it is important to highlight species still in decline and in need of targeted management.

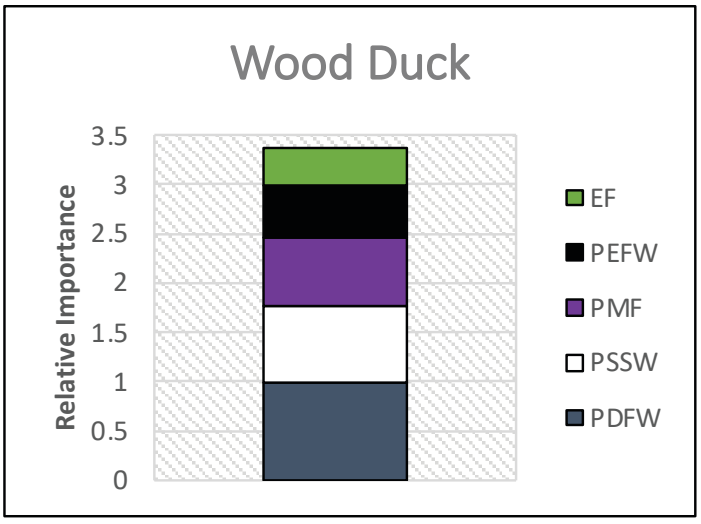


Wood Ducks (*Aix sponsa*) and American Black Ducks (*Anas rubripes*) were both detected in breeding and overwintering surveys on Audubon Refuges. Black ducks are in steep decline throughout the Mid-Atlantic, while Wood Ducks have exhibited a stable population trend for the past 50-years.

Wood Ducks prefer wetland habitats, with forested wetlands and scrub/shrub wetlands the most important habitats predicting their presence.







Foraging Guild
Wetland

Example Species:

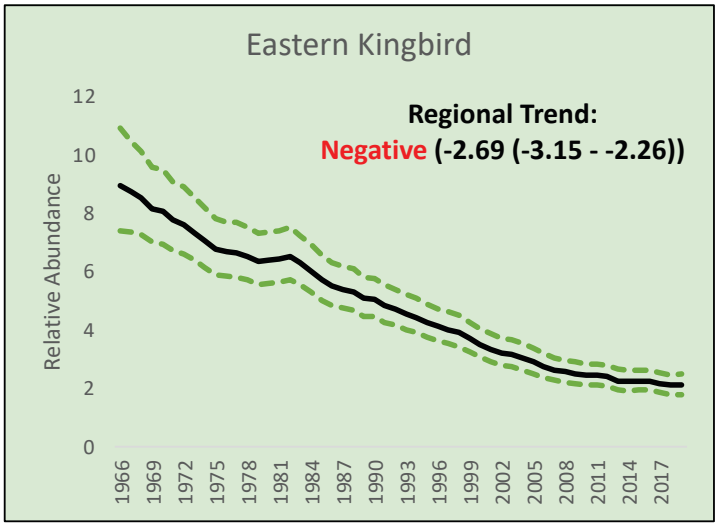
- Marsh Wren
- Red-winged Blackbird
- Swamp Sparrow

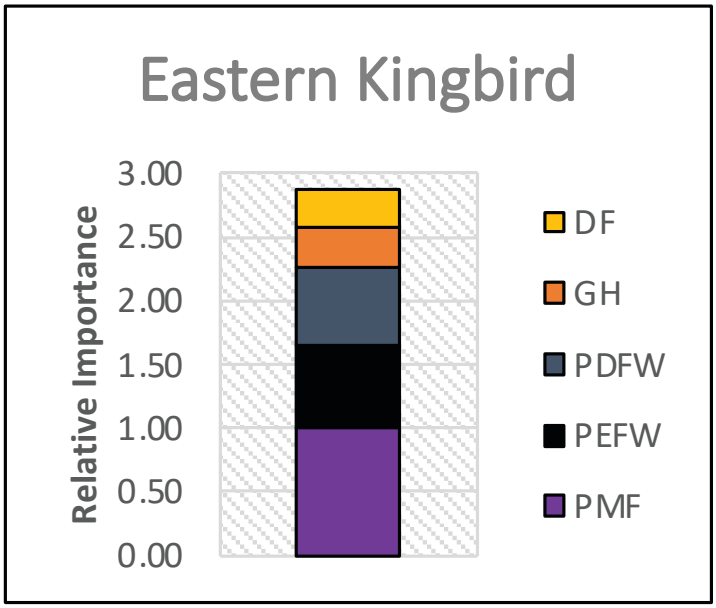
Not a single species in this guild has exhibited a long-term increase in population. Instead, 40% of species have declined, 20% are considered stable and the remaining 40% are data deficient, meaning BBS trends are not available. For those species in decline, protection of wetland habitats is essential if we hope to reverse the trends we have seen over the past 50-years. Protection of these habitats is also likely to positively impact species in the waterfowl guild as well, as wetlands serve as breeding and foraging areas for many of those species.

The Eastern Kingbird (*Tyrannus tyrannus*) was detected at 64% of surveyed Audubon Refuges. The most important habitats at predicting the species' presence include wetlands in deciduous and evergreen forests. In New England, declines in kingbirds have been as high as 35% from 2007-2021.

Other wetland species, such as Marsh Wrens (*Cistothorus palustris*) have also declined dramatically as native wetland vegetation, such as cattails, have been replaced by invasive species like the Common Reed.

Audubon protects a large amount of forested wetland habitat. It is essential that these areas are monitored to control invasive species and continue providing high-quality habitat for these species in decline.

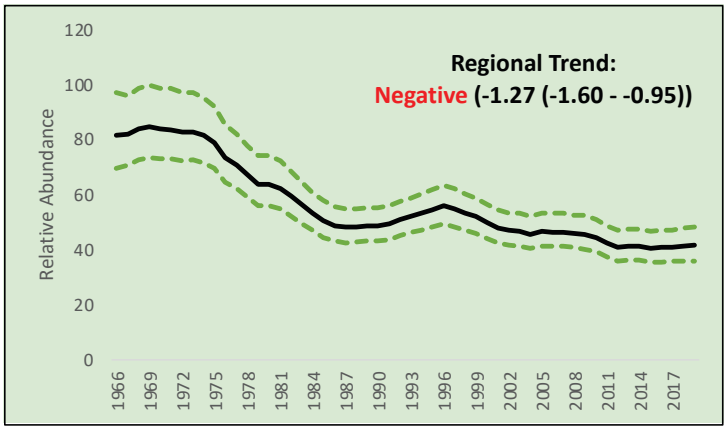




Responsibility Bird

Red-winged Blackbird *(Agelaius phoeniceus)*

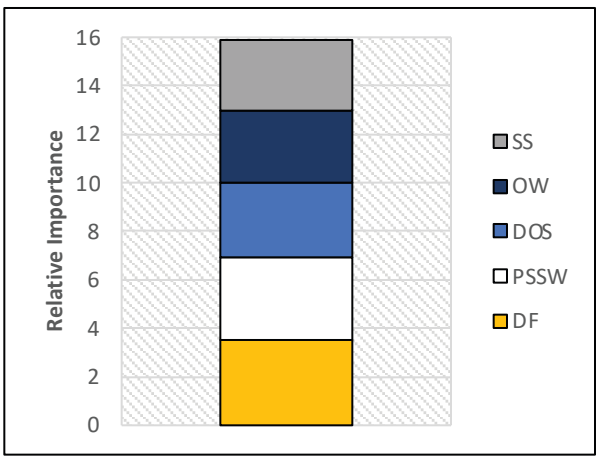
- Present year-round
- Widespread: Detected at 100% of Audubon Refuges during the breeding season and 50% of refuges during the overwintering period.
- Most Important Habitat: Deciduous Forest edge and Scrub/Shrub Wetlands

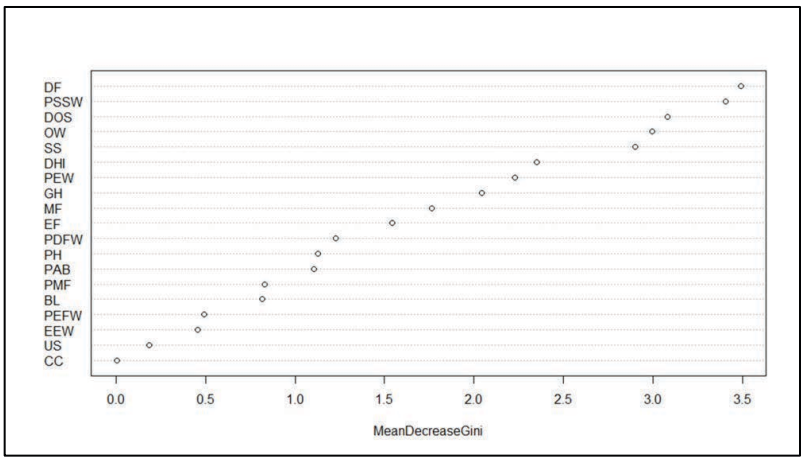


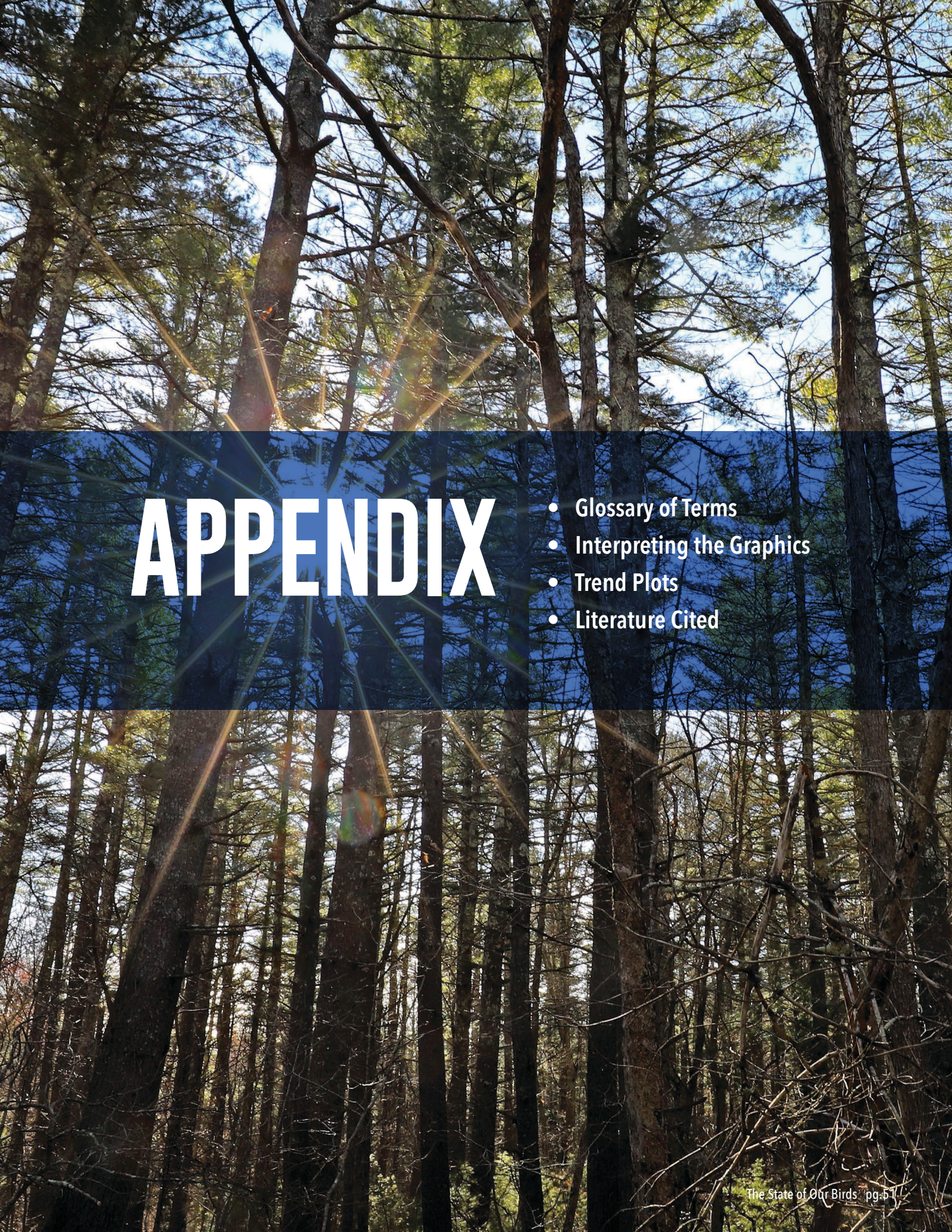
The Red-winged Blackbird is an obvious choice for designation as a "Responsibility Bird". The species has declined throughout most of its eastern North American range over the past 50-years, it is found breeding on multiple Audubon Refuges and its conspicuous habits make it an ideal candidate for monitoring.

Moving forward, censuses of the Red-winged Blackbird populations on our refuges will allow us to determine how our birds are faring relative to the larger regionwide population.


Red-winged Blackbird (*Agelaius phoeniceus*)







APPENDIX

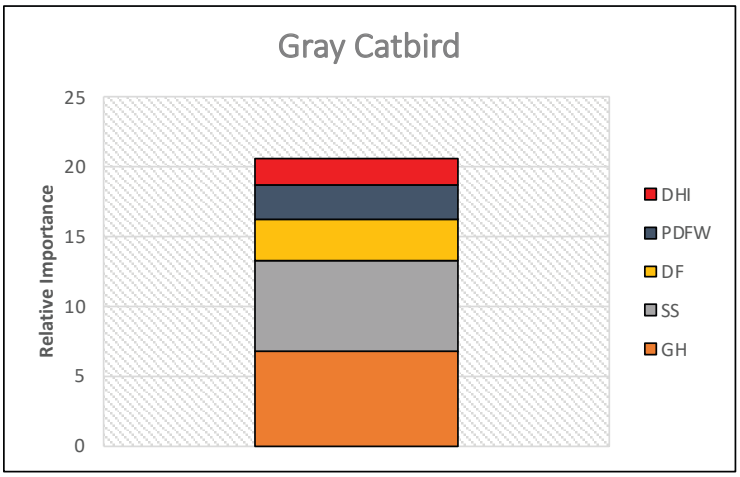
- Glossary of Terms
- Interpreting the Graphics
- Trend Plots
- Literature Cited

Glossary of Terms

TERM	DEFINITION
Overwintering	A bird found on refuges during the winter months of January and February
Breeding	A bird found on refuges during the months of May – August with the intention to breed
Responsibility Bird	A species identified as needing targeted management to reverse local or regional decline
Guild	An assemblage of birds that share a similar habitat or diet
Bird-Habitat Association	The primary habitats a bird species selects for breeding, overwintering or during periods of migration
Shannon Diversity	The diversity of species within a community (refuge), taking into account the proportion of the entire community made up by each species present. A higher value indicates a higher diversity in a particular community (refuge)
Covariates	An independent variable that changes in conjunction with the measured outcome variable
Chao, Jackknife and Bootstrap Estimator	Estimators of species richness within a community based on a limited sample of abundance data
GINI Importance or (Mean Decrease in Impurity (MDI))	A measure of the average gain in model purity. Calculated as importance of each model feature, summed over the total number of splits in a RandomForest Model in which feature is present
Jaccard Similarity	A test of the similarity between two sets of data. Similarity is determined by comparing elements that are shared versus those that are distinct
Variable Importance Plot	This plot depicts the GINI importance values for habitat variables, illustrating how important each habitat type is at classifying data
Accumulation Curve	Depicts expected number of species relative to sampling effort
Plot	Graphical representation of data
Geographic Information System (GIS)	Computer program that is used to display and analyze geographically-referenced data

Interpreting the Graphics

Habitat Importance Plots



The Habitat Importance Plots show the results of a machine-learning process that determined the most important habitats at predicting the presence of a particular species. The top 5 most important habitats are shown (for definitions of these habitats, refer to page 14).

Each habitat has a relative importance, the largest habitat block is the most important habitat.

In this example, Grassland/Herbaceous (GH) habitat is the most important at predicting the presence of Gray Catbirds, followed by Scrub/Shrub (SS).

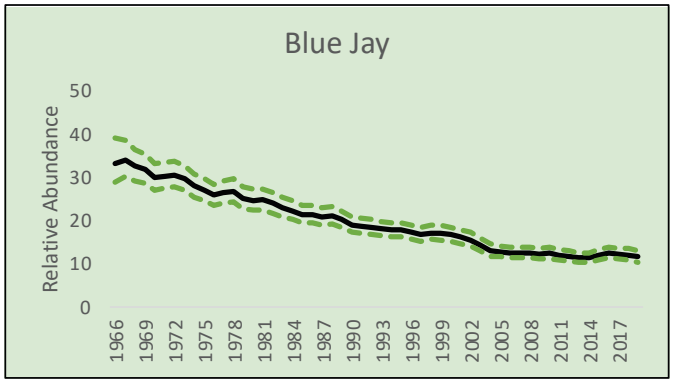
BBS Trend Graphs

Breeding Bird Survey (BBS) trend plots were created for most species using data collected within the New England/ Mid-Atlantic Bird Conservation Region. Trend data were analyzed from 1966 – 2019.

The overall trend during the analysis period is presented at the top, along with measures of error. A statistically significant trend is indicated by color (**Negative**, **Positive** or **Stable**).

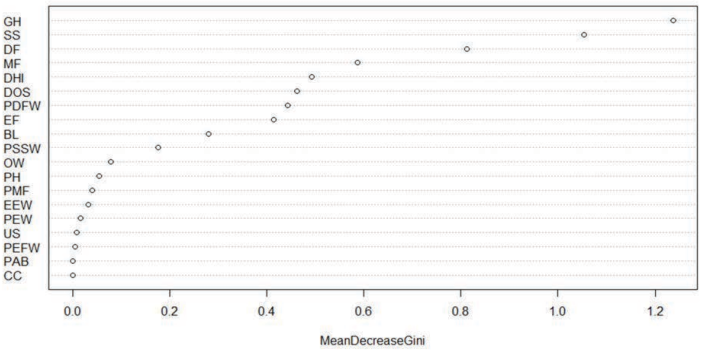
An index of relative abundance is presented on the y-axis (number of birds per route)

Regional Trend:
Negative (-1.97 (-2.32 – -1.64))



Interpreting the Graphics

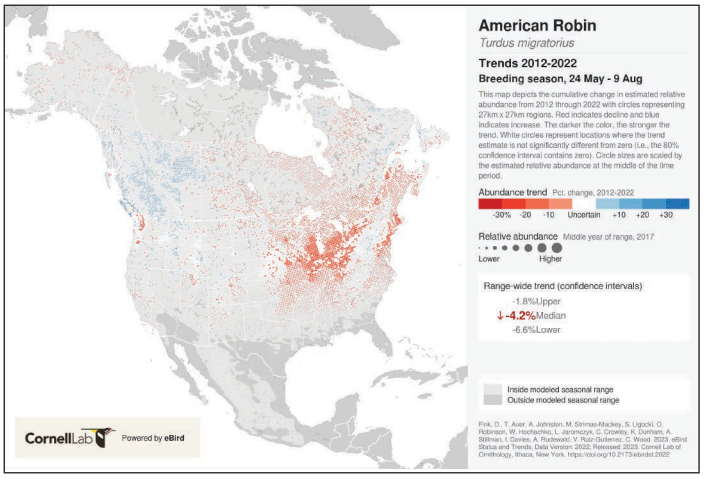
Variable Importance Plots



Variable Importance plots show the decrease in importance from the most important to the least important habitat type.

The mean decrease in habitat importance is denoted on the x-axis. The abbreviations for all habitats are located on the y-axis. For definitions of these habitats, refer to page 14.

The distance between importance values provides an idea of the degree certain habitats are important relative to others. In this example, Grassland/Herbaceous (GH) habitats are the most important habitat for Field Sparrows, with Scrub/Shrub (SS) identified as the second most important. The distance between these habitats highlights the importance of Grassland/Herbaceous habitats relative to all other habitats.



eBird Status and Trends

eBird status and trend data display change in relative abundance between the years of 2011–2021.

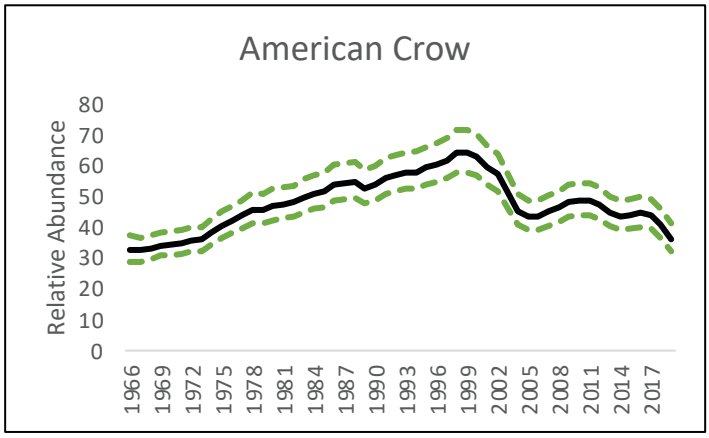
The color of each circle indicates trend (red = decline, blue = increase, white = stable). Darker colors indicate stronger trends.

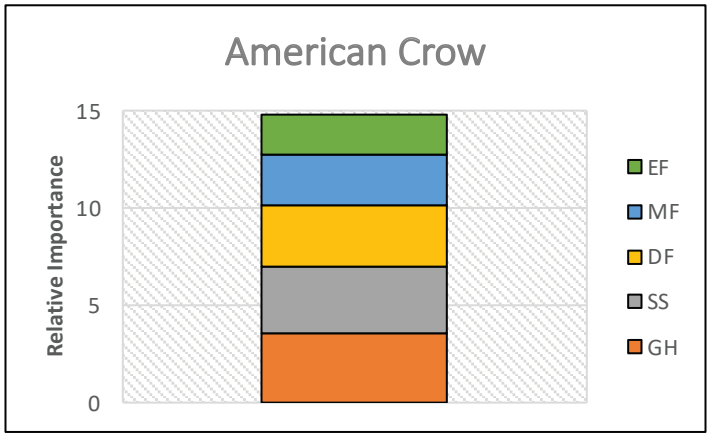
*Trend data were obtained from Fink et al. 2020.

For eBird status and trend maps, please turn to page 96.

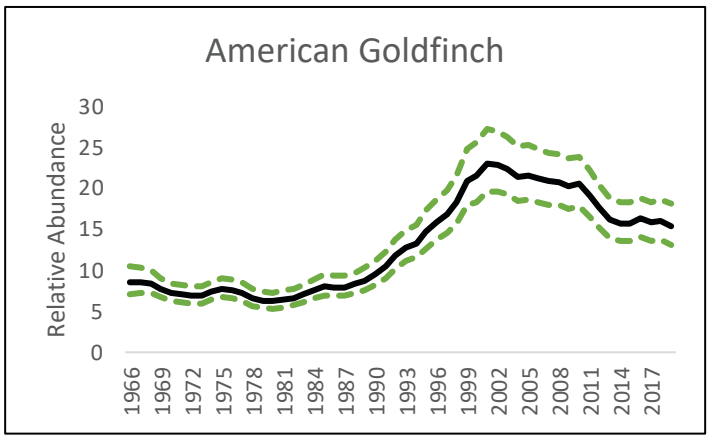
Trend Plots

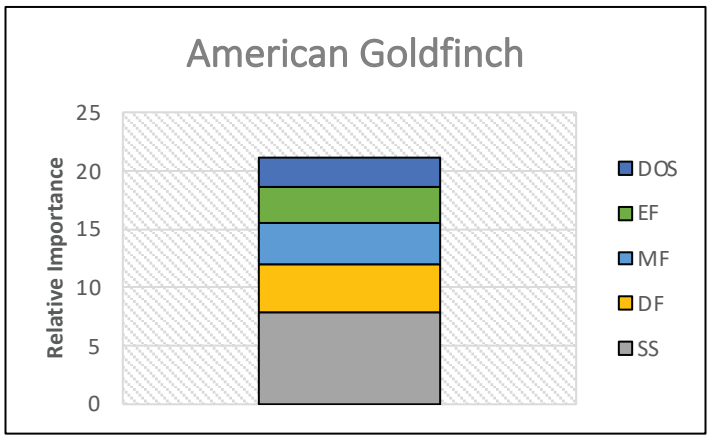
Regional Trend:
Stable (0.19 (-0.09 - 0.46))



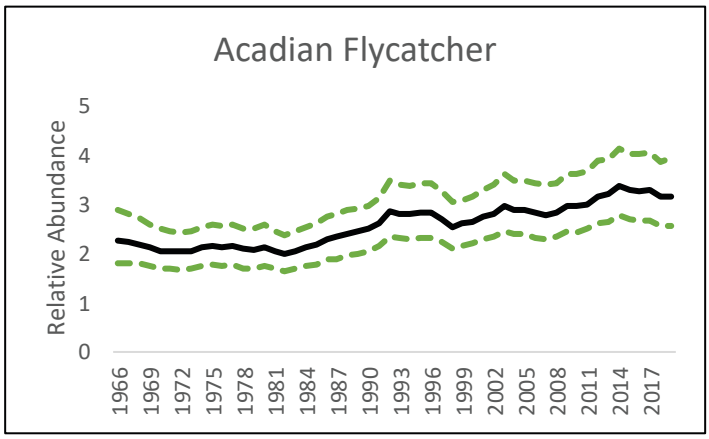


Regional Trend:
Positive (1.12 (0.66 – 1.57))



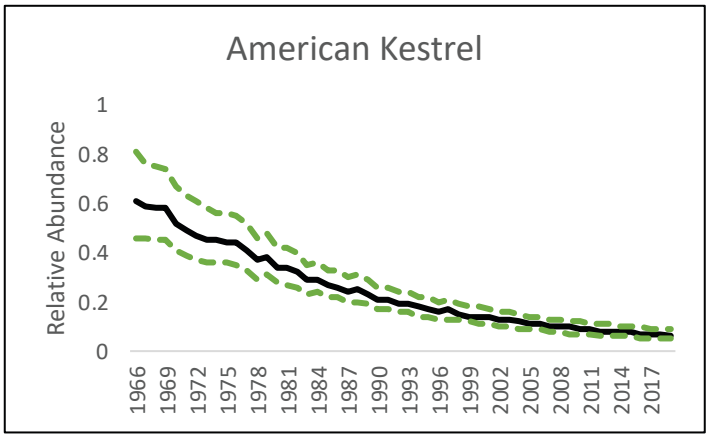


Regional Trend:
Positive (0.64 (0.12 – 1.12))



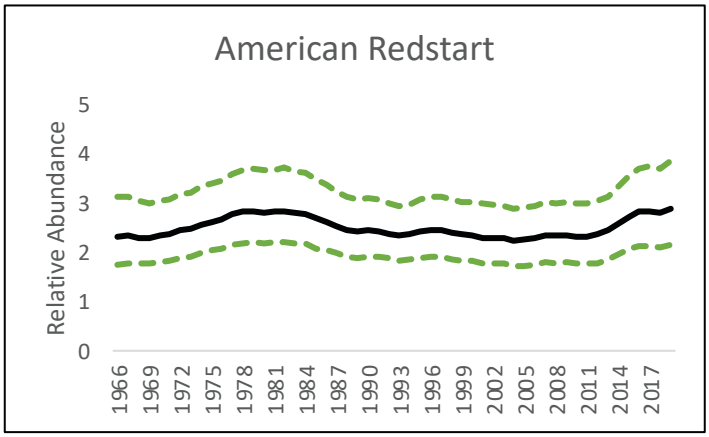
Data Deficient

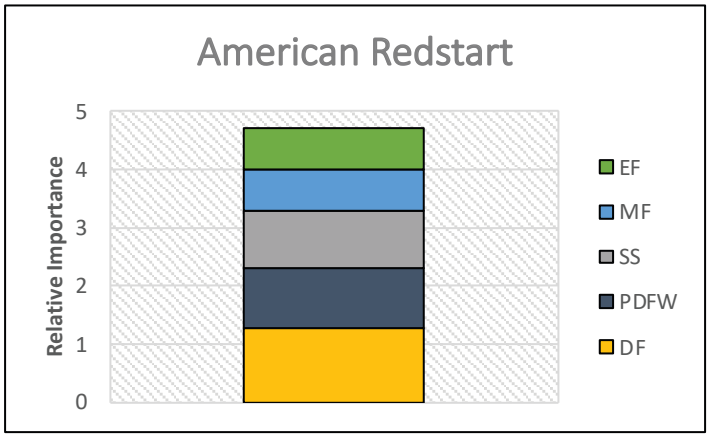
Regional Trend:
Negative (-4.15 (-4.98 - -3.0))



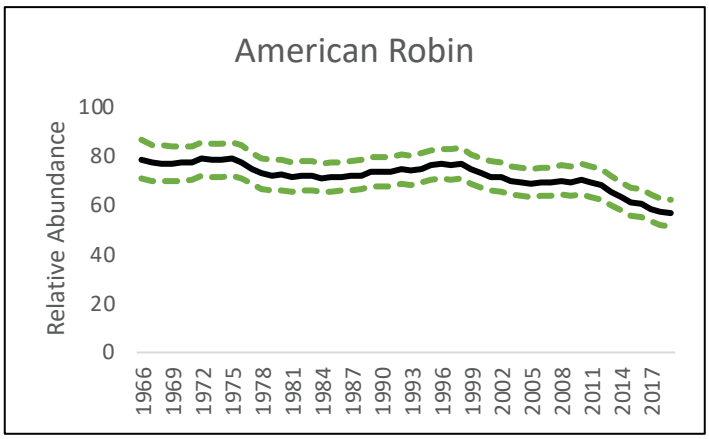
Data Deficient

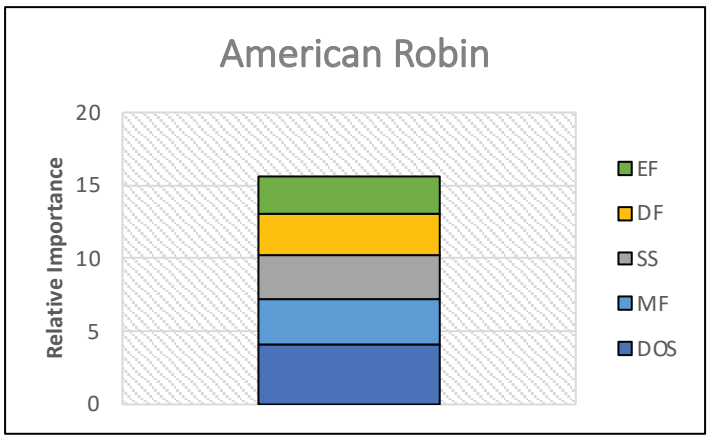
Regional Trend:
Positive (0.40 (-0.30 – 1.10))



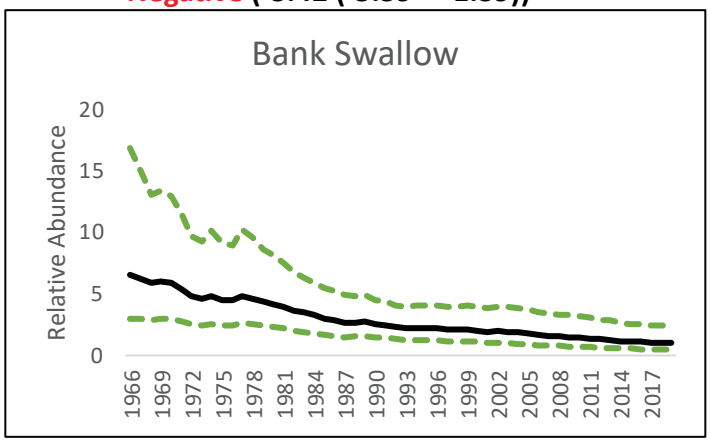


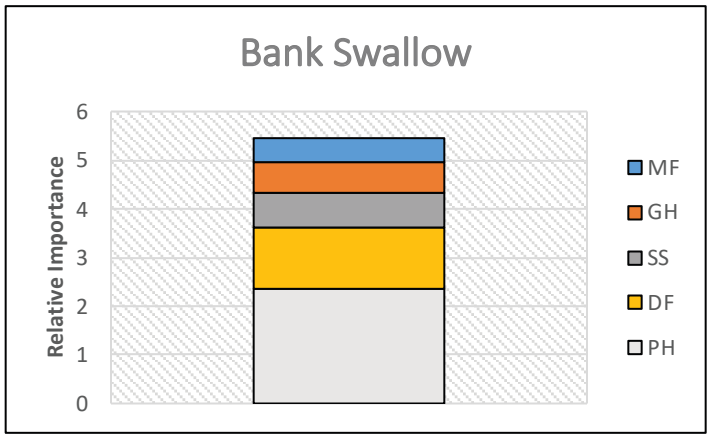
Regional Trend:
Negative (-0.61 (-0.82 – -0.40))



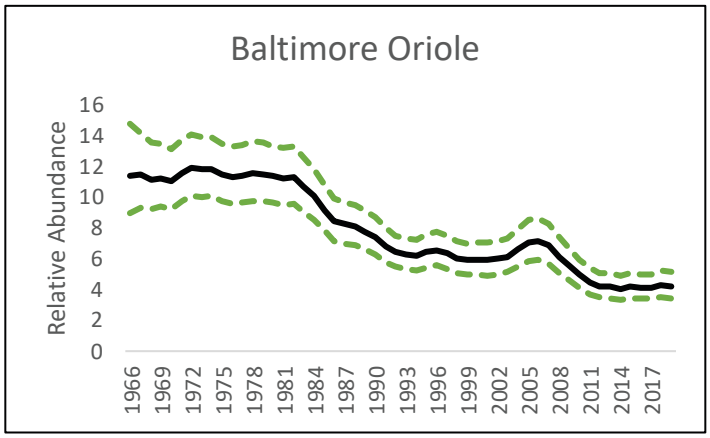


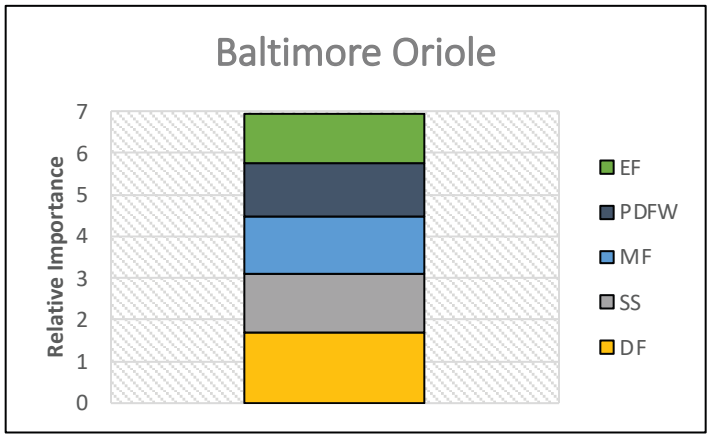
Regional Trend:
Negative (-3.42 (-5.59 – -1.39))



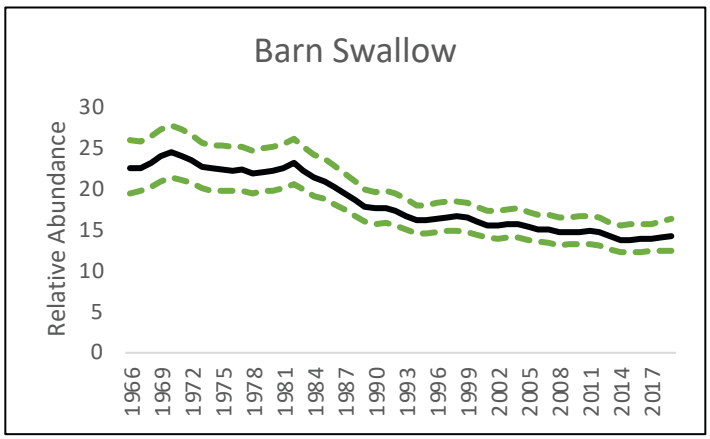


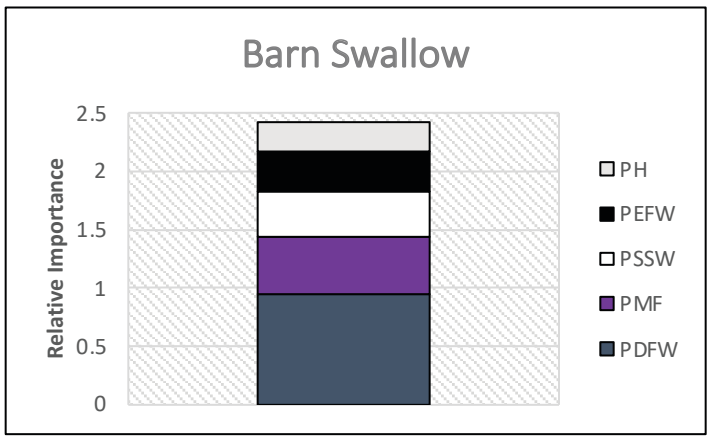
Regional Trend:
Negative (-1.87 (-2.45 – -1.33))



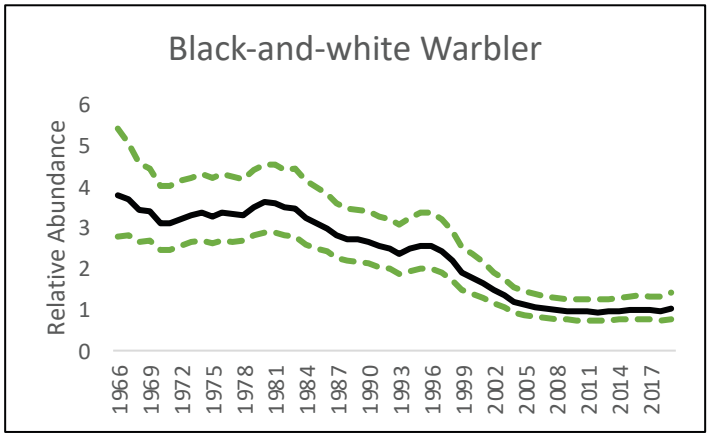


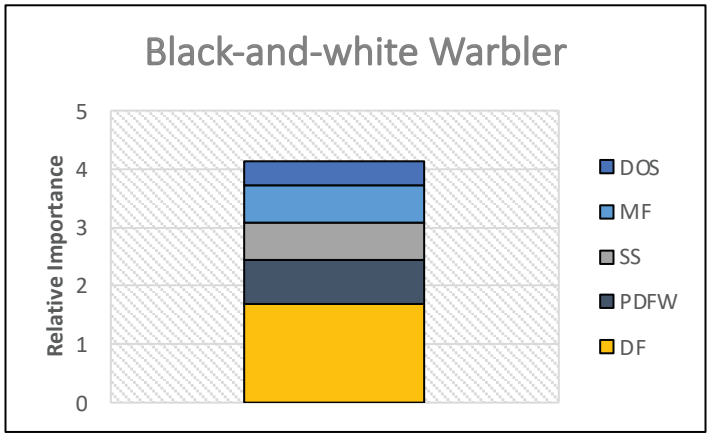
Regional Trend:
Negative (-0.87 (-1.19 - -0.40))



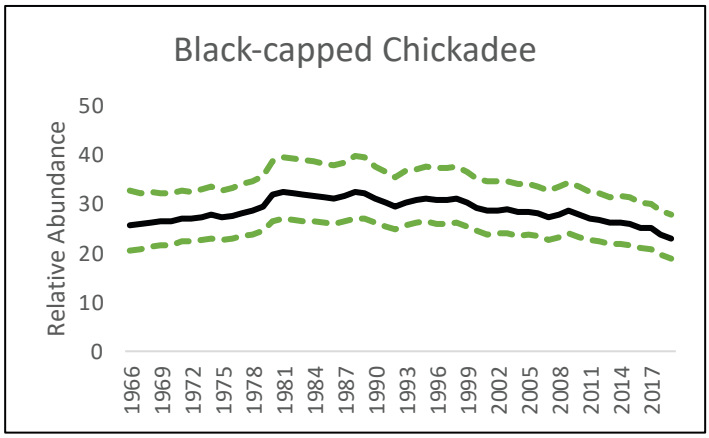


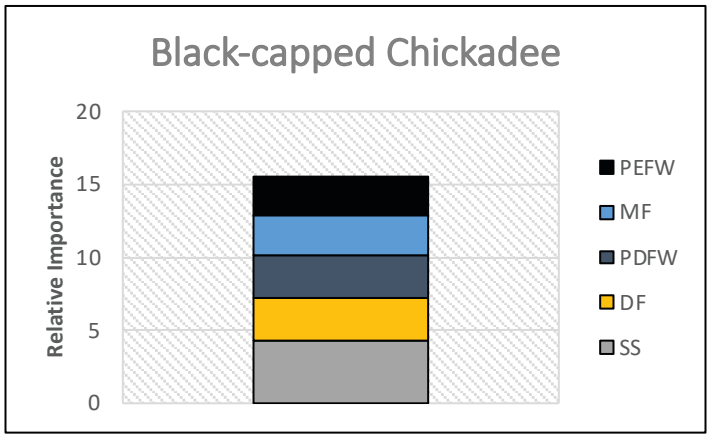
Regional Trend:
Negative (-2.46 (-3.25 – -1.64))



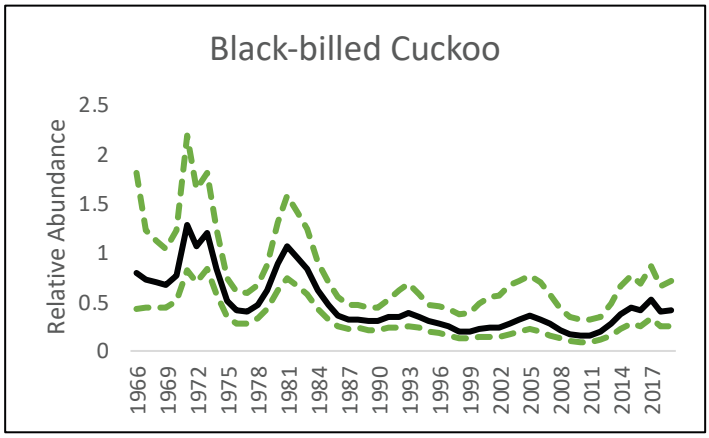


Regional Trend:
Stable (-0.22 (-0.71 – 0.26))



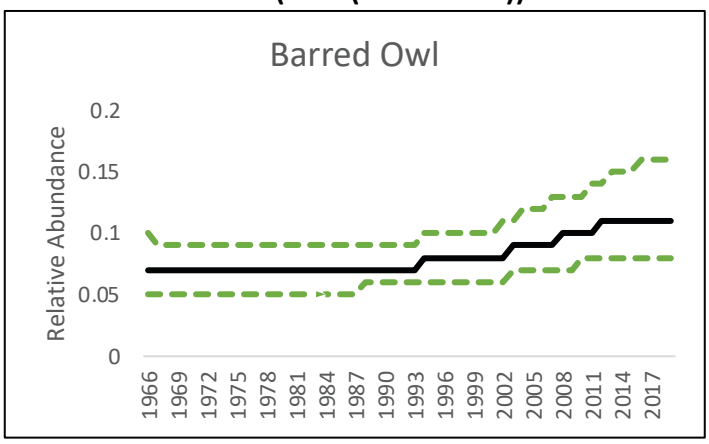


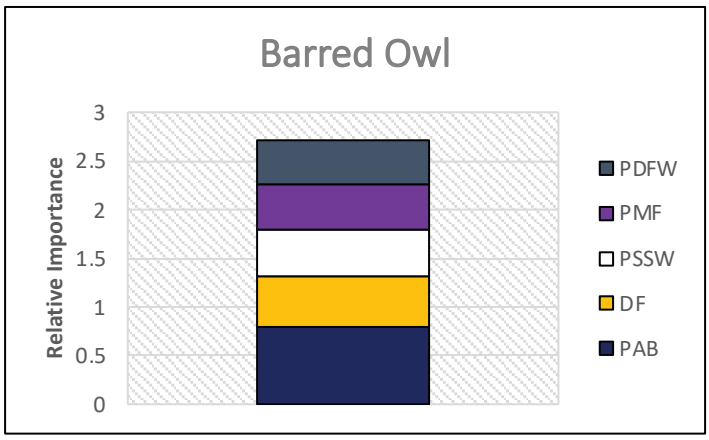
Regional Trend:
Stable (-1.22 (-3.01 - 0.32))



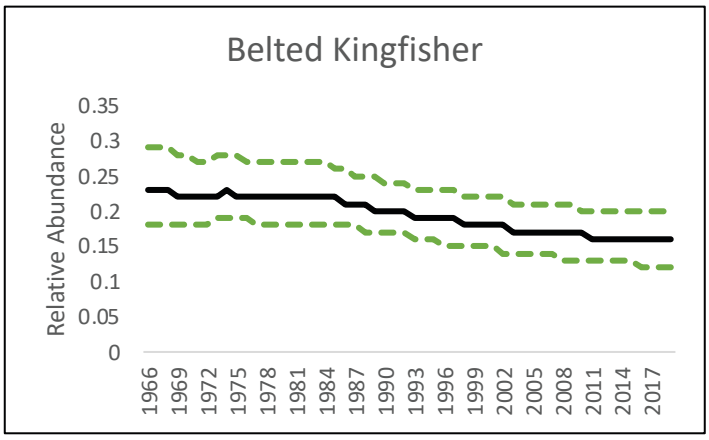
Data Deficient

Regional Trend:
Positive (1.00 (0.08 – 1.95))



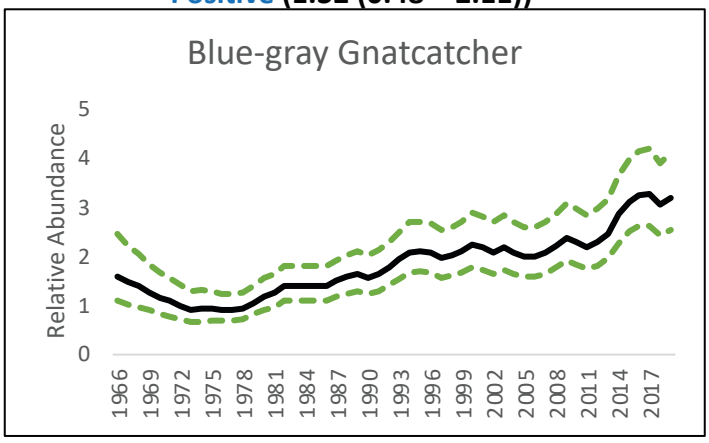


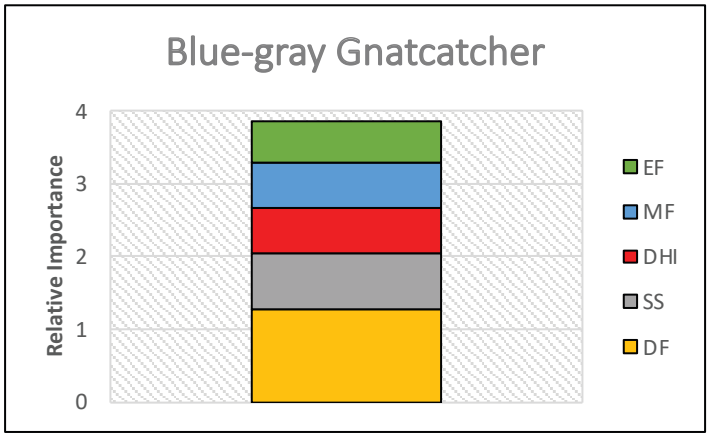
Regional Trend:
Negative (-0.73 (-1.36 – -0.08))



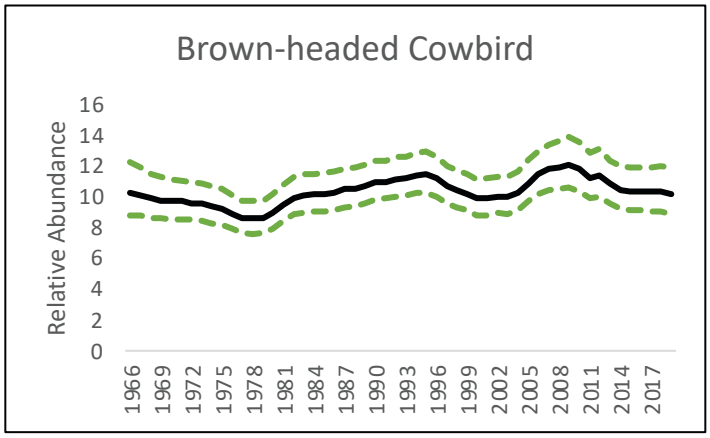
Data Deficient

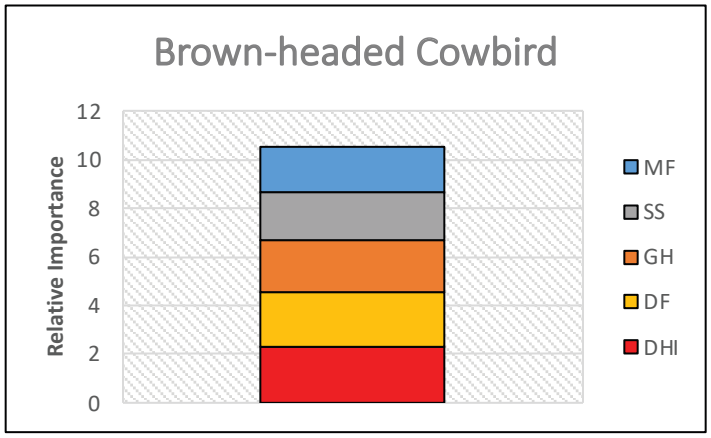
Regional Trend:
Positive (1.32 (0.48 – 2.11))



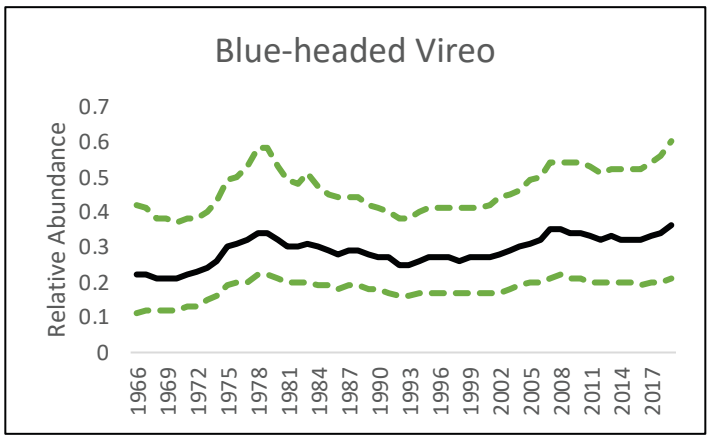


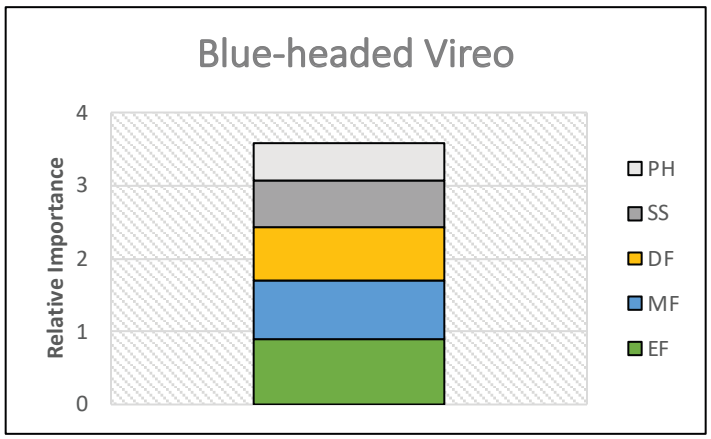
Regional Trend:
Stable (-0.01 (-0.41 – 0.37))



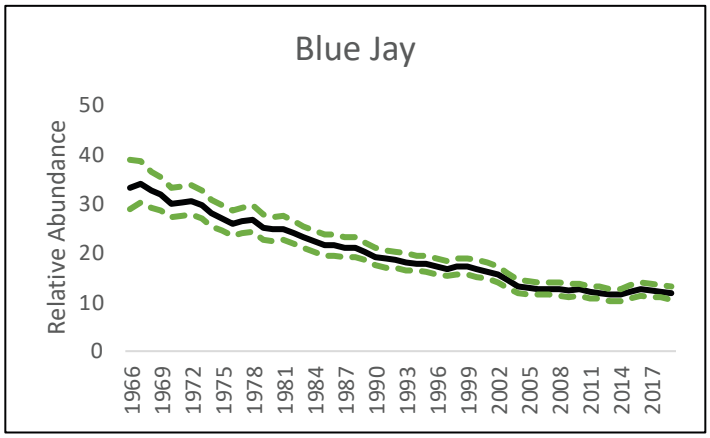


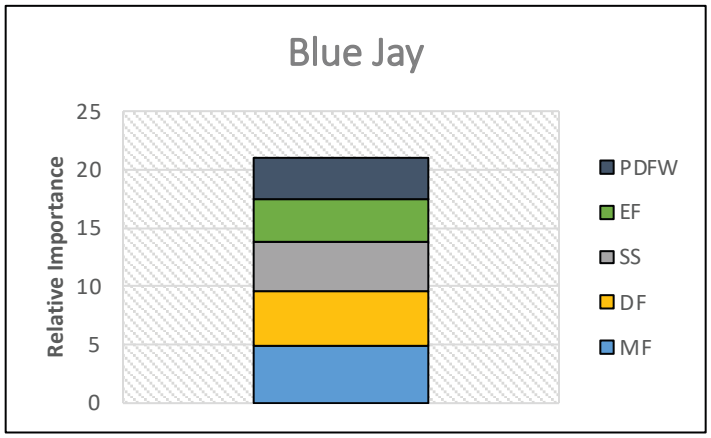
Regional Trend:
Stable (0.90 (-0.56 – 2.44))



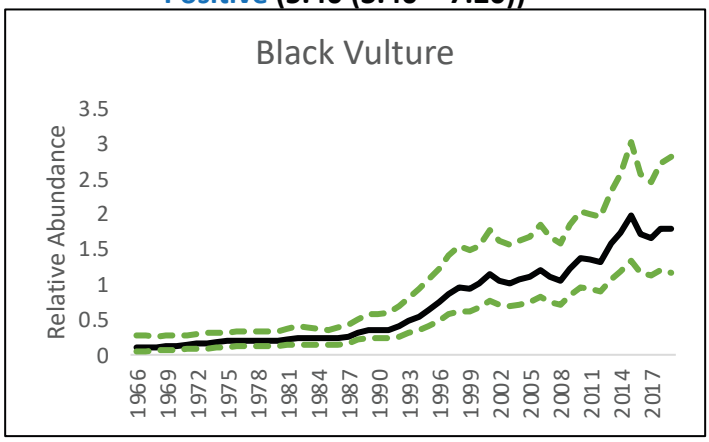


Regional Trend:
Negative (-1.97 (-2.32 – -1.64))



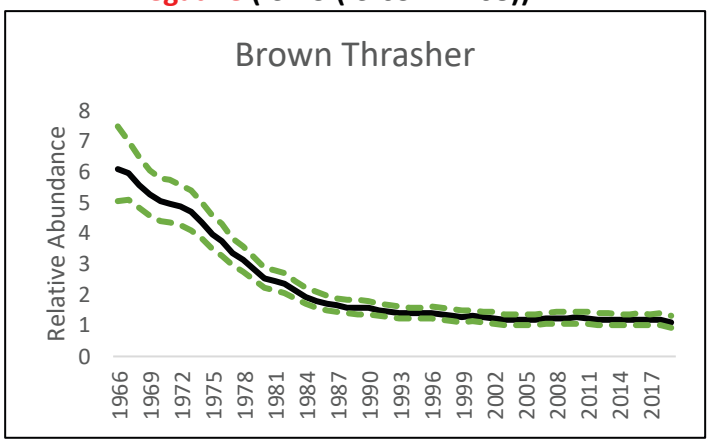


Regional Trend:
Positive (5.40 (3.40 – 7.20))



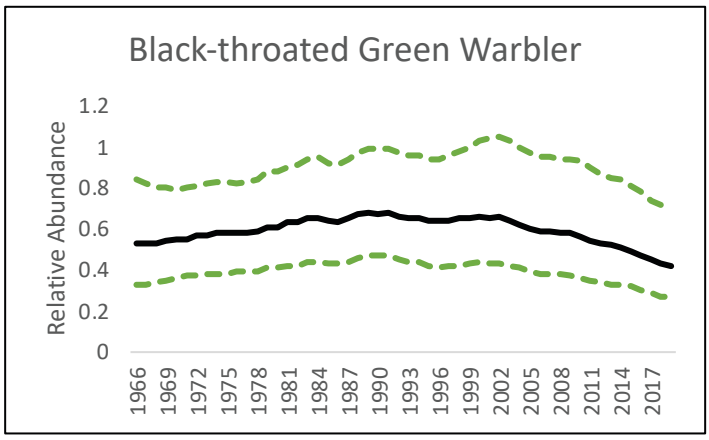
Data Deficient

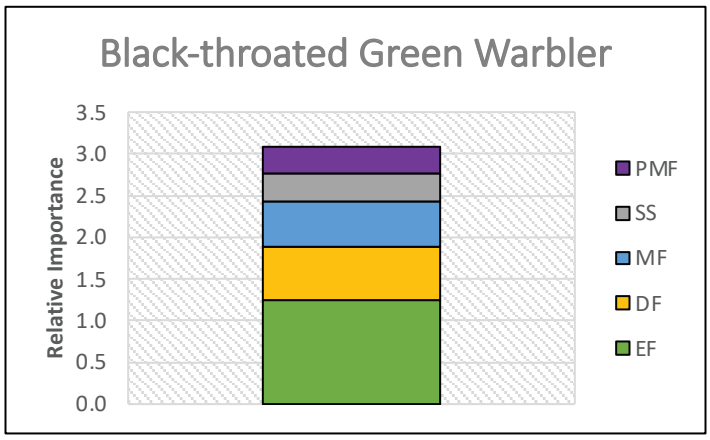
Regional Trend:
Negative (-3.15 (-3.65 – -2.68))



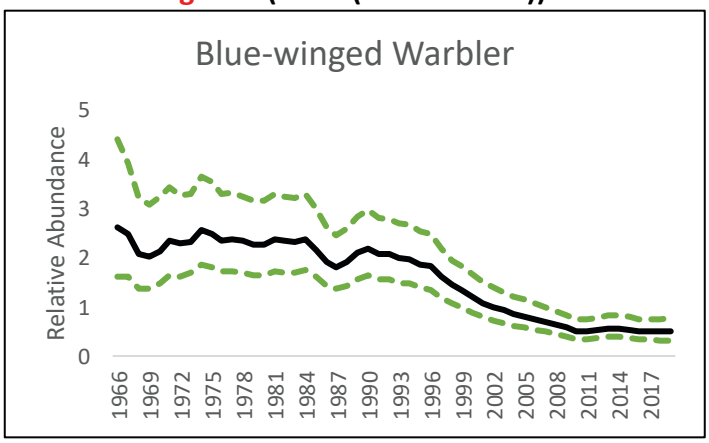
Data Deficient

Regional Trend:
Stable (-0.39 (-1.48 – 0.72))



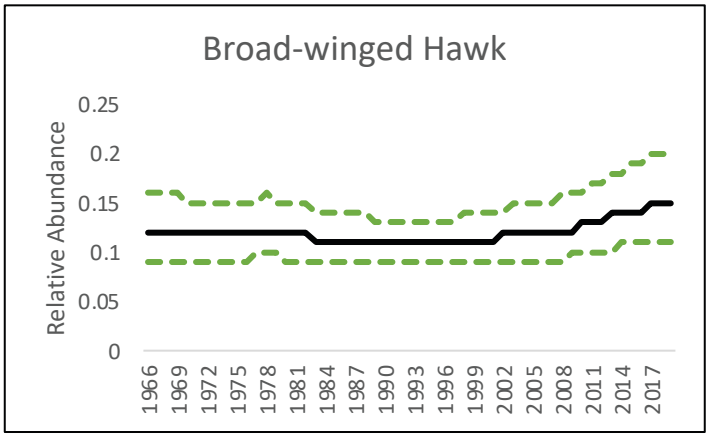


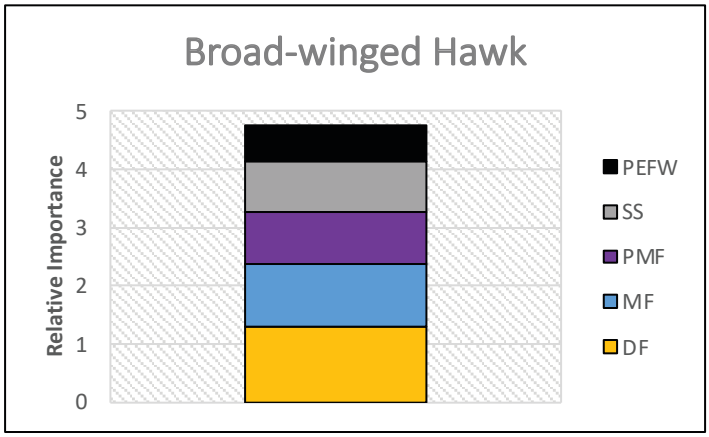
Regional Trend:
Negative (-3.09 (-4.32 – -1.96))



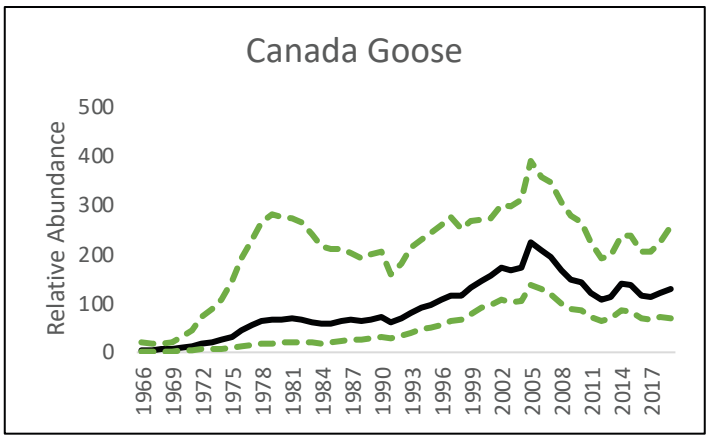
Data Deficient

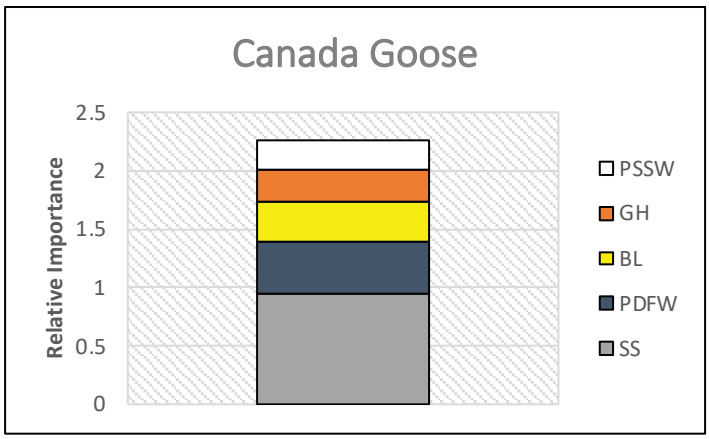
Regional Trend:
Stable (0.40 (-0.40 – 1.20))



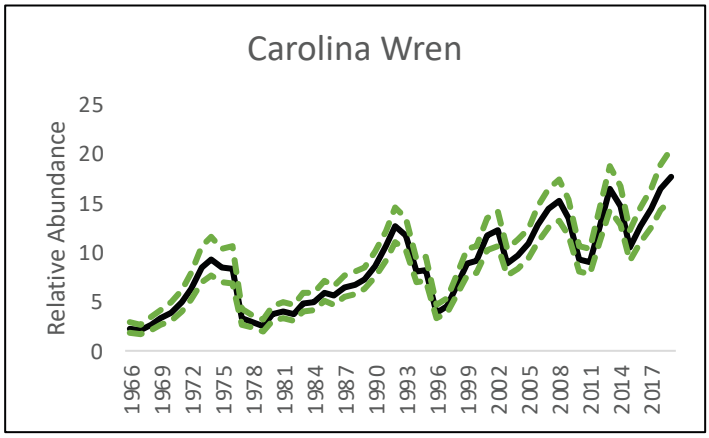


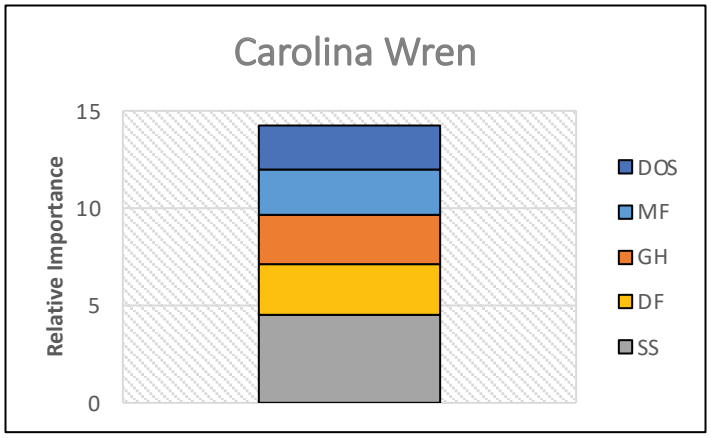
Regional Trend:
Positive (6.39 (3.27 – 9.22))



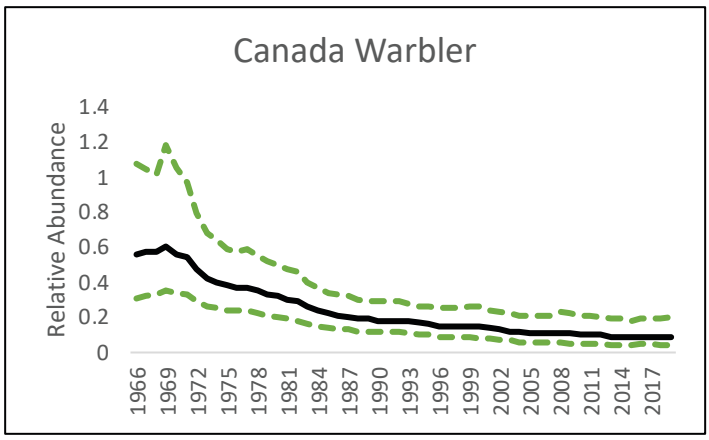


Regional Trend:
Positive (3.96 (3.45 – 4.48))



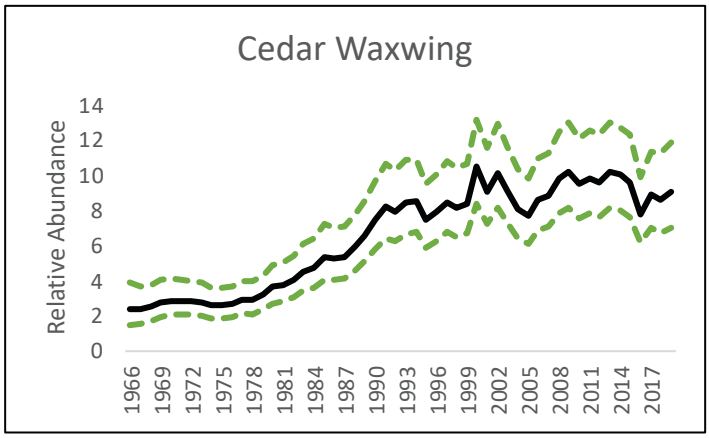


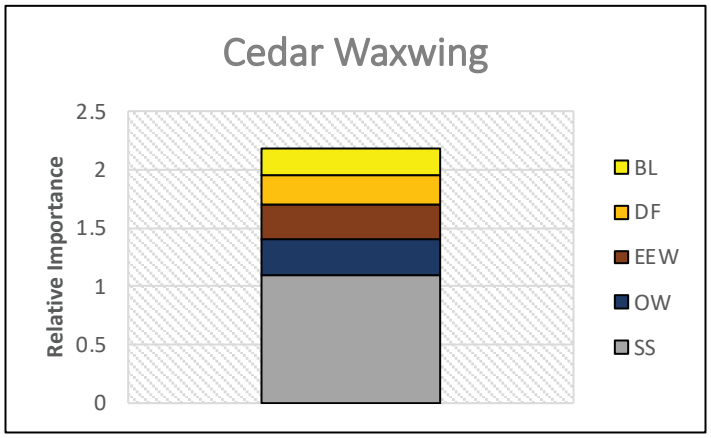
Regional Trend:
Negative (-3.30 (-5.10 – -1.60))



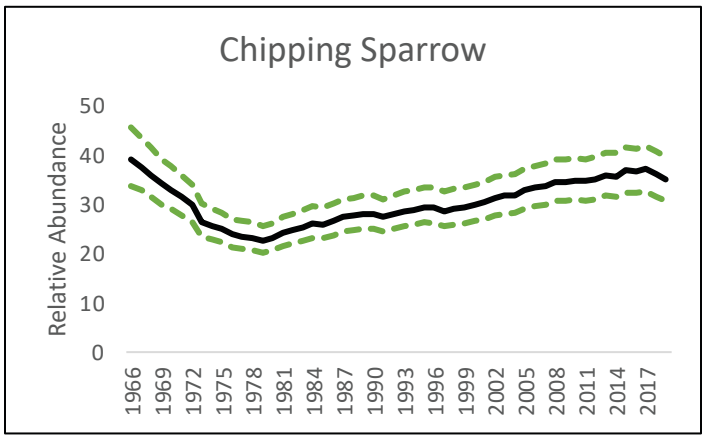
Data Deficient

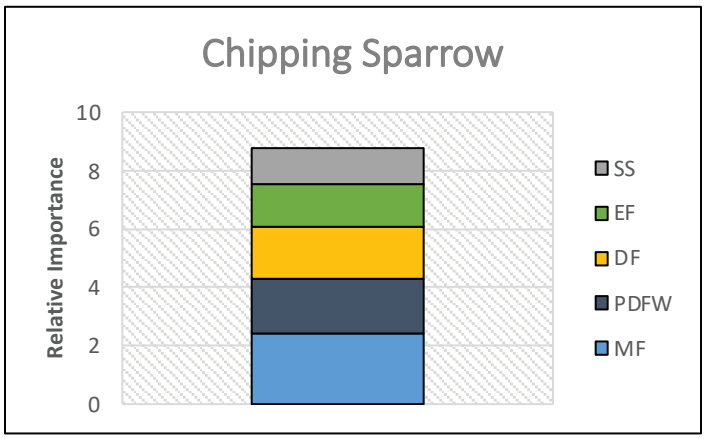
Regional Trend:
Positive (2.55 (1.53 – 3.61))



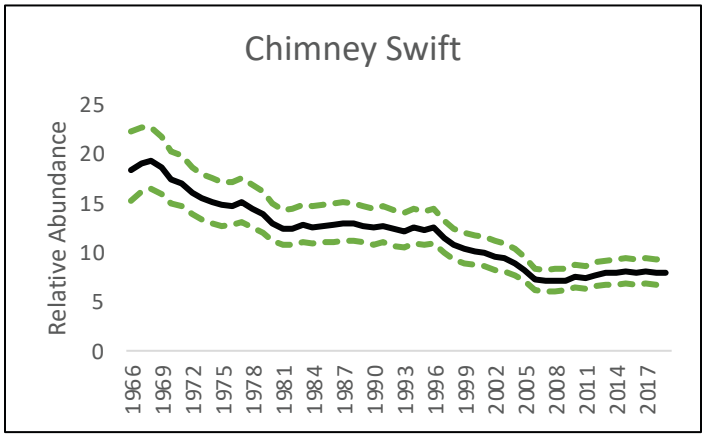


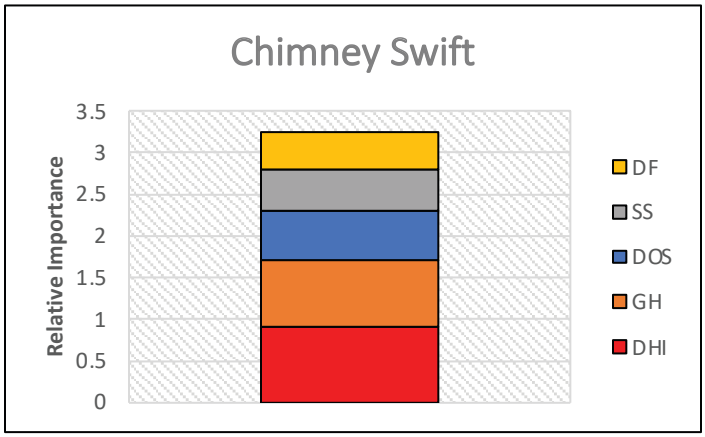
Regional Trend:
Positive (3.96 (3.45 – 4.48))



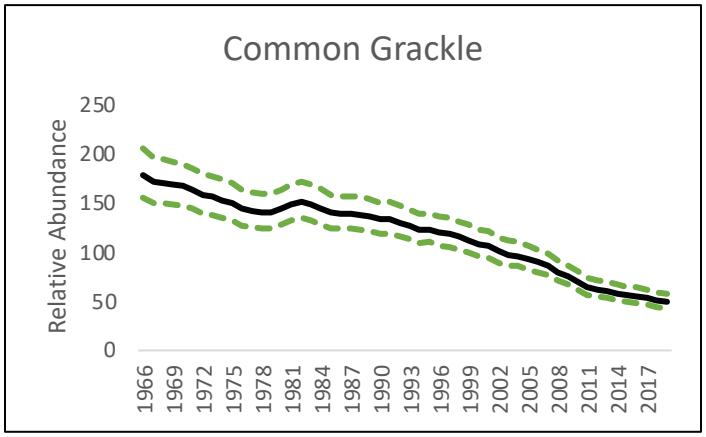


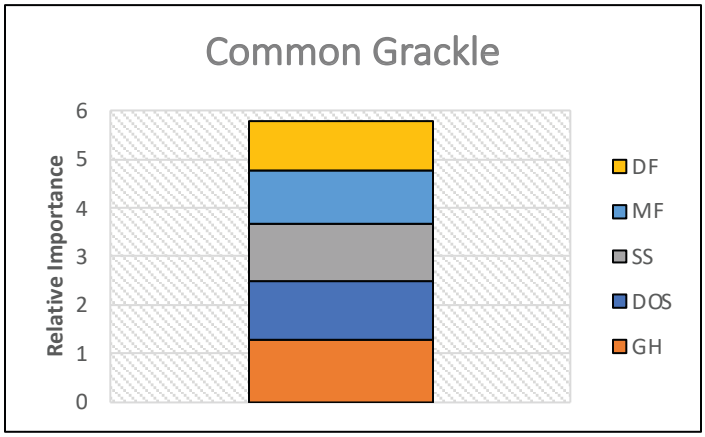
Regional Trend:
Negative (-1.57 (-2.02 – -1.13))



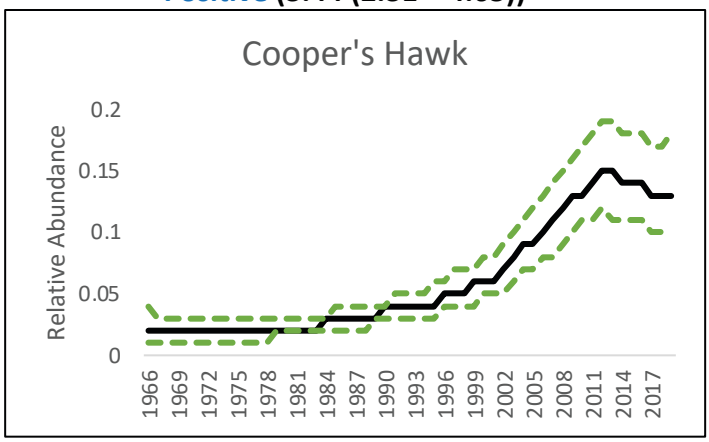


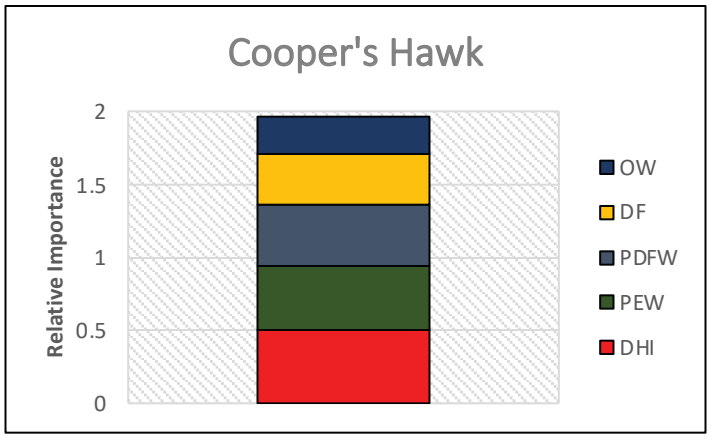
Regional Trend:
Negative (-2.40 (-2.73 – -2.08))



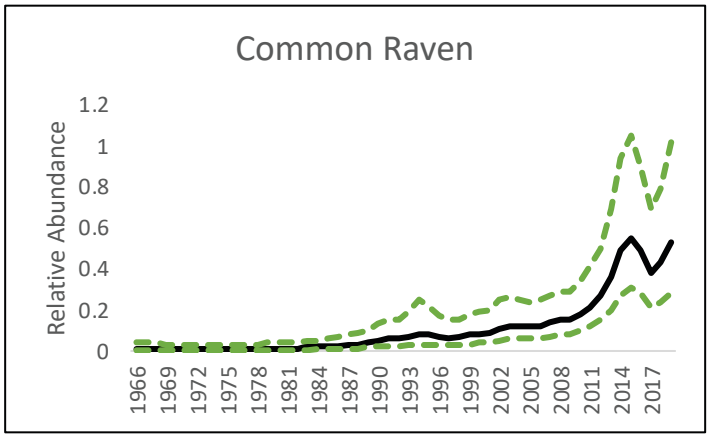


Regional Trend:
Positive (3.44 (2.31 – 4.65))



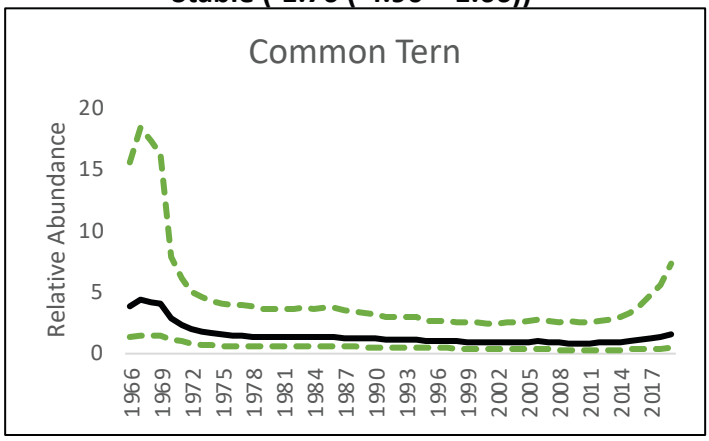


Regional Trend:
Positive (8.24 (4.68 – 12.34))



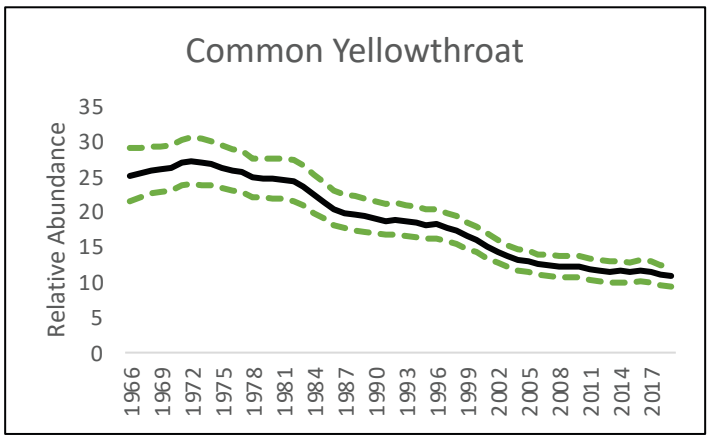
Data Deficient

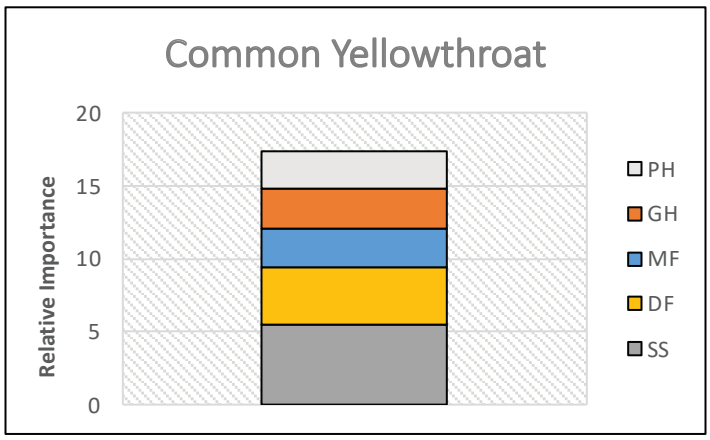
Regional Trend:
Stable (-1.76 (-4.90 – 1.66))



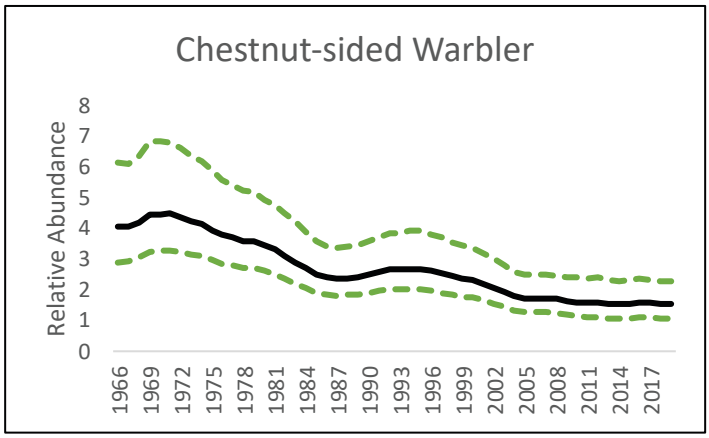
Data Deficient

Regional Trend:
Negative (-1.55 (-1.86 – -1.27))



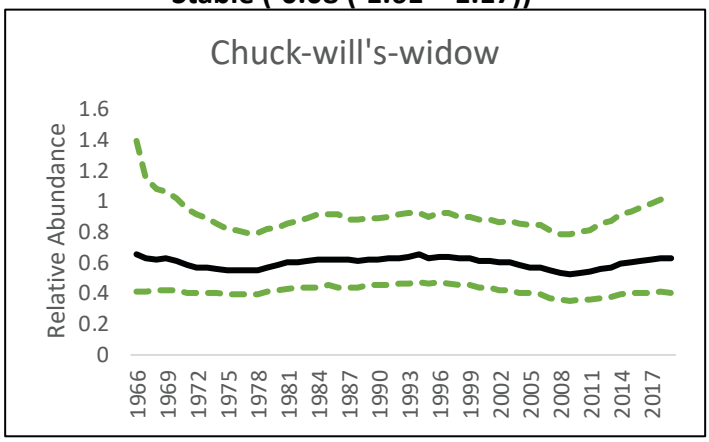


Regional Trend:
Negative (-1.85 (-2.59 – -1.15))



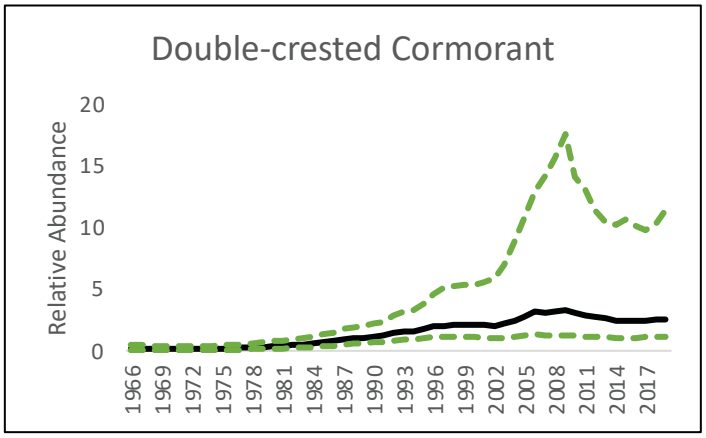
Data Deficient

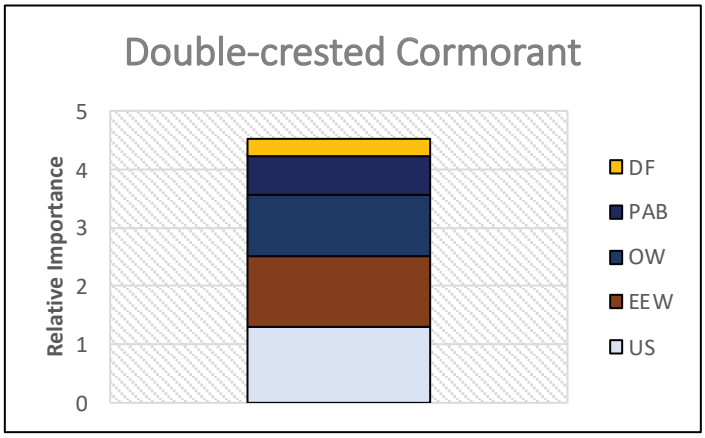
Regional Trend:
Stable (-0.08 (-1.61 – 1.17))



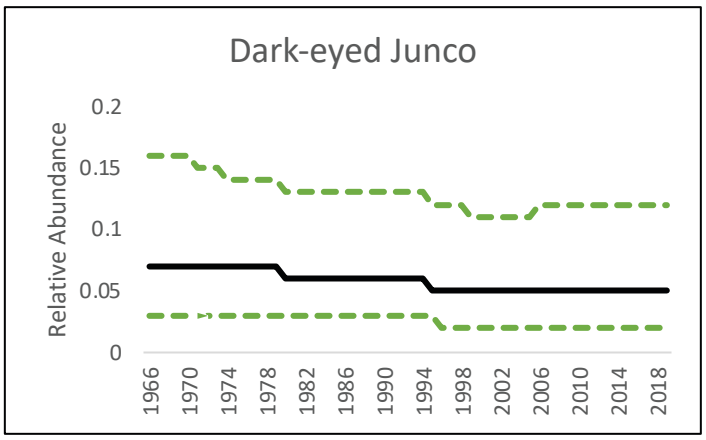
Data Deficient

Regional Trend:
Positive (5.35 (2.52 – 8.84))



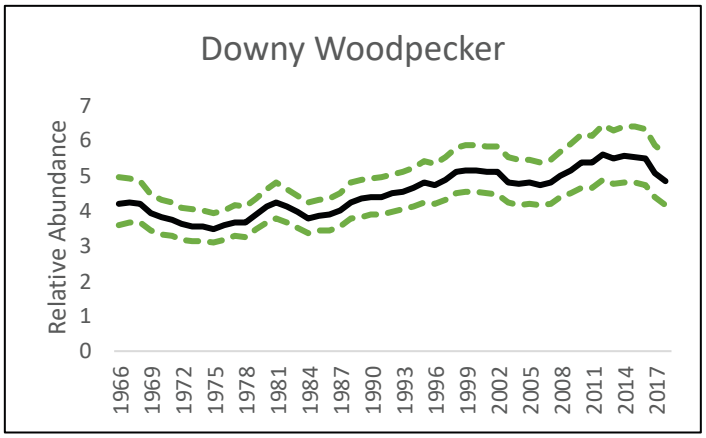


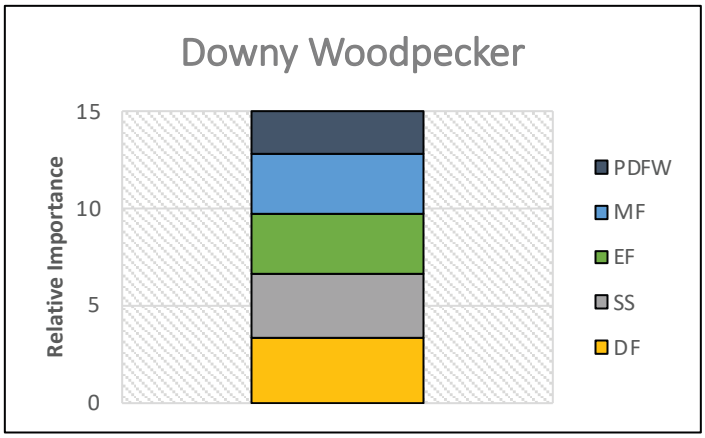
Regional Trend:
Stable (-0.62 (-2.48 – 1.14))



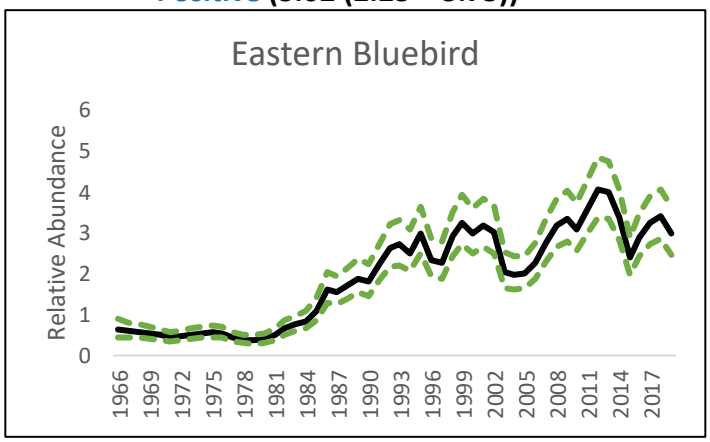
Data Deficient

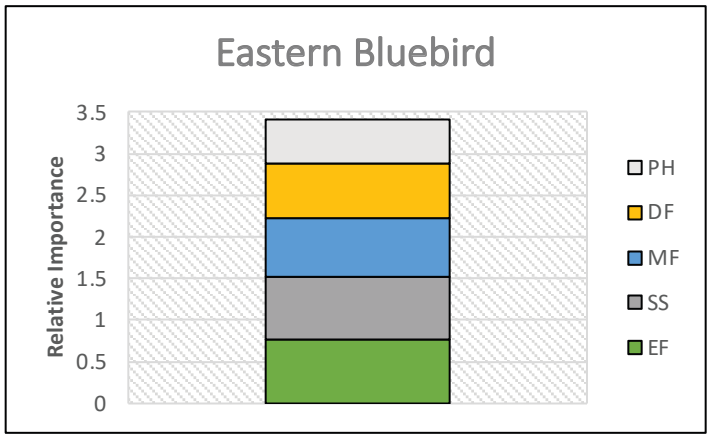
Regional Trend:
Stable (0.20 (-0.20 – 0.60))



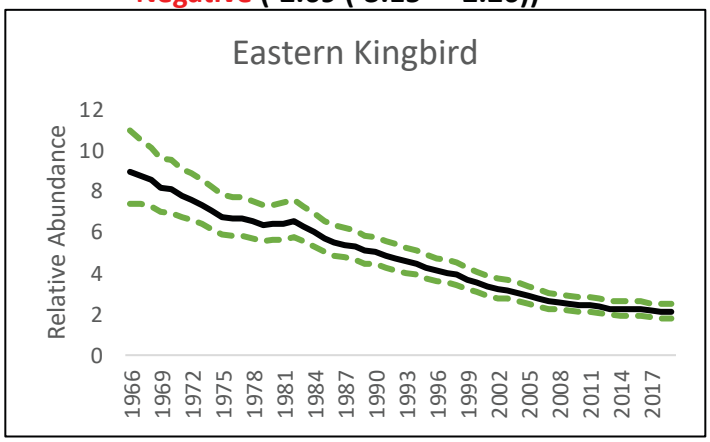


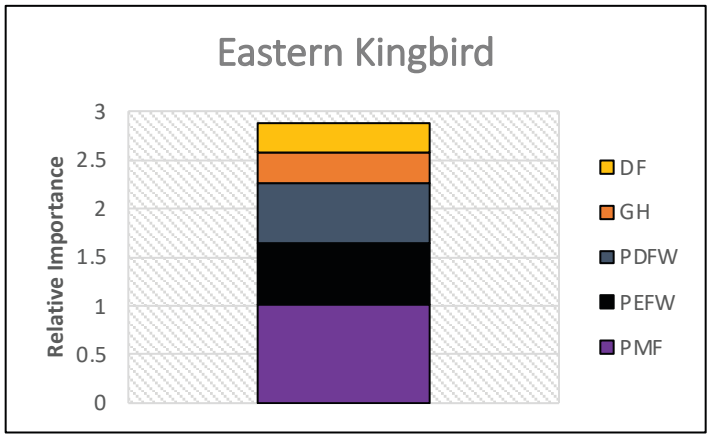
Regional Trend:
Positive (3.02 (2.23 – 3.75))



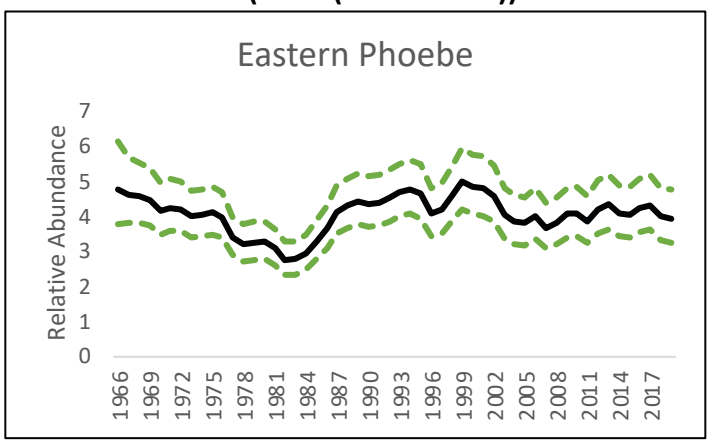


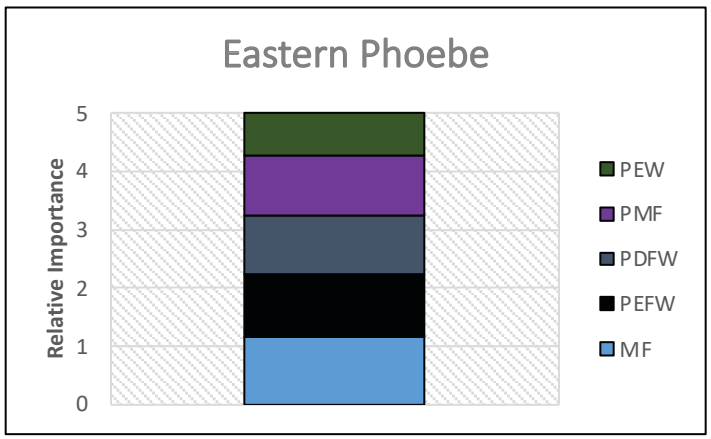
Regional Trend:
Negative (-2.69 (-3.15 – -2.26))



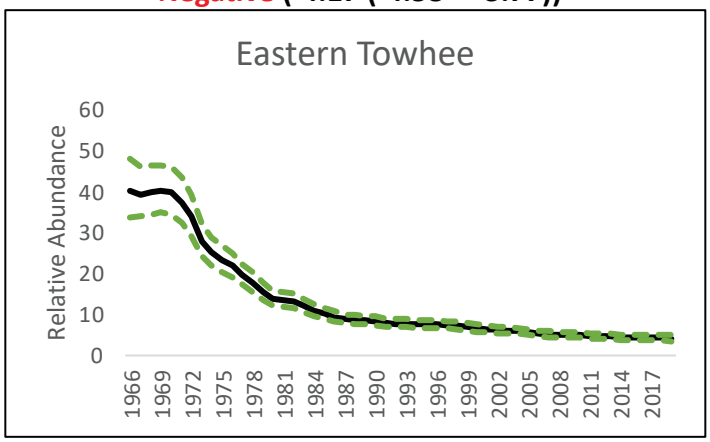


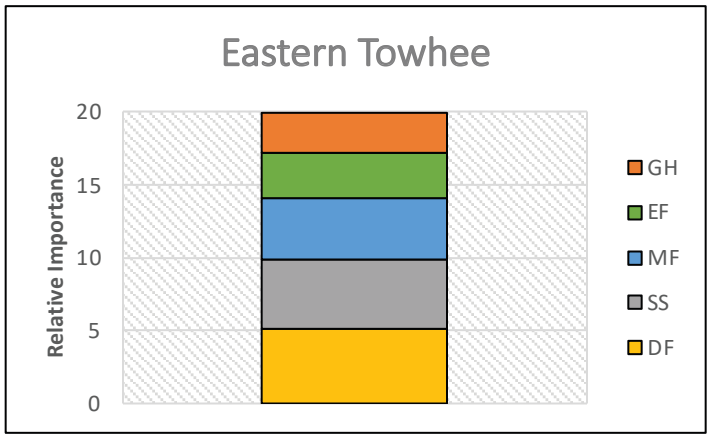
Regional Trend:
Stable (-0.36 (-0.89 – 0.16))



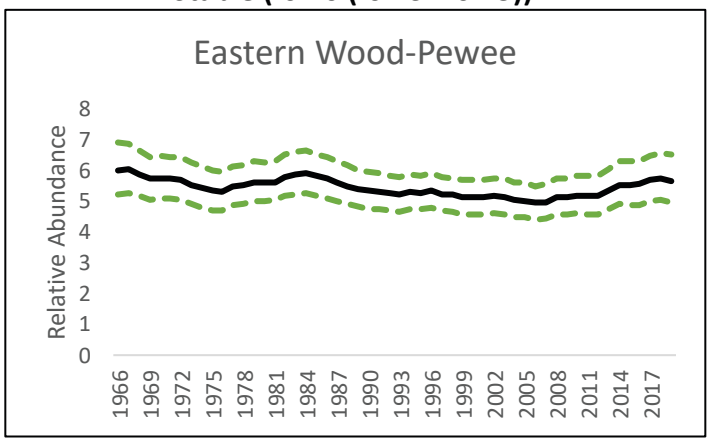


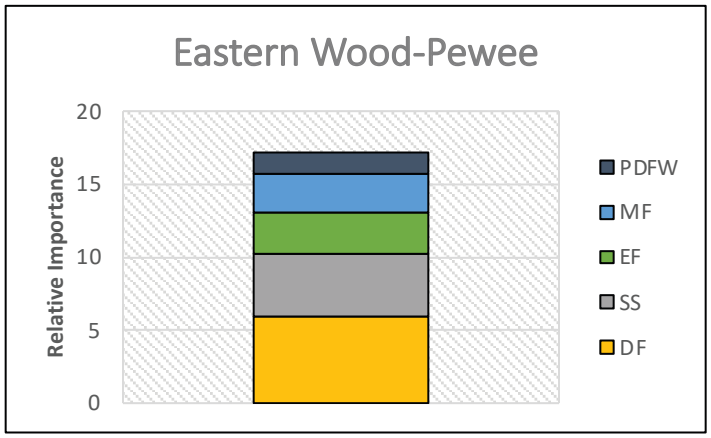
Regional Trend:
Negative (-4.17 (-4.58 – -3.77))



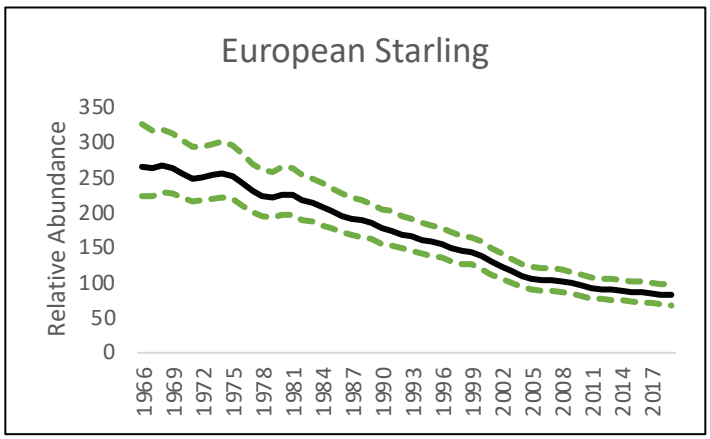


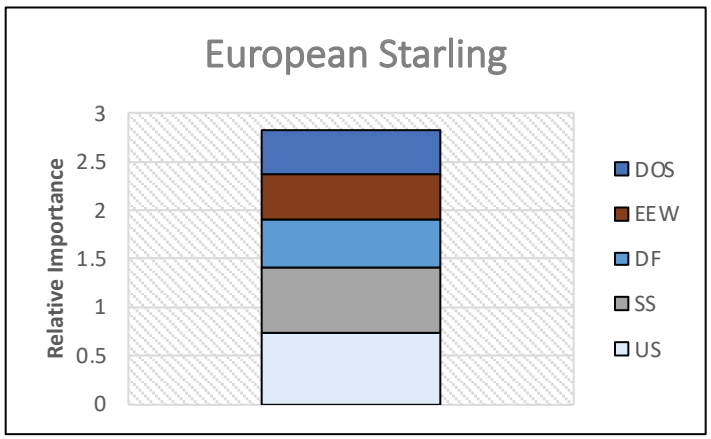
Regional Trend:
Stable (-0.10 (-0.43 – 0.25))



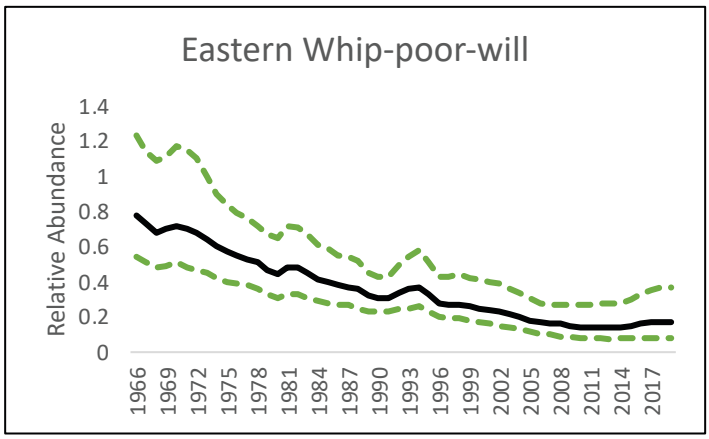


Regional Trend:
Negative (-2.21 (-2.66 – -1.80))



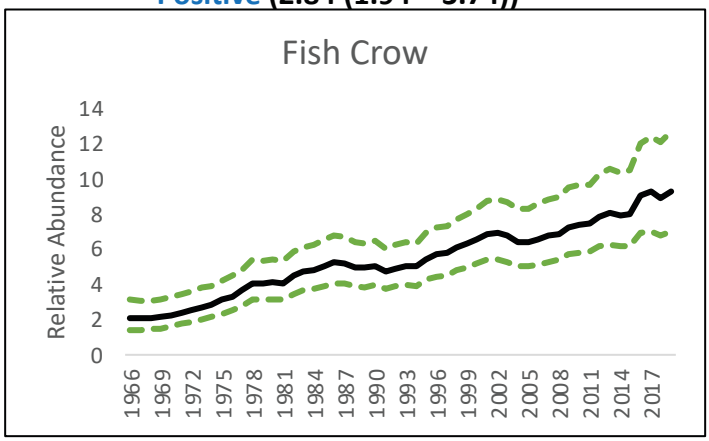


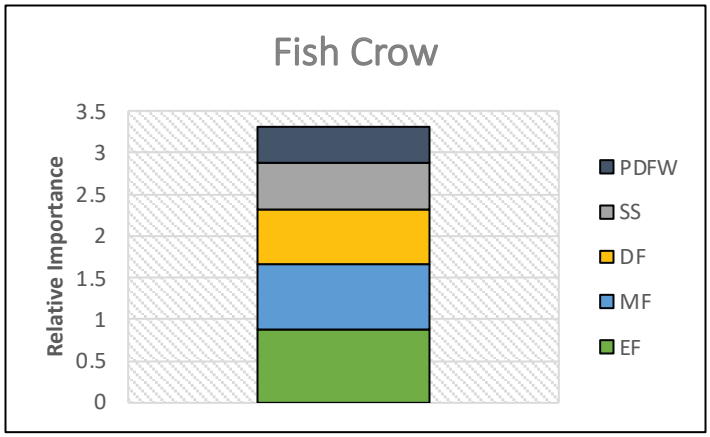
Regional Trend:
Negative (-2.89 (-4.39 – -1.26))



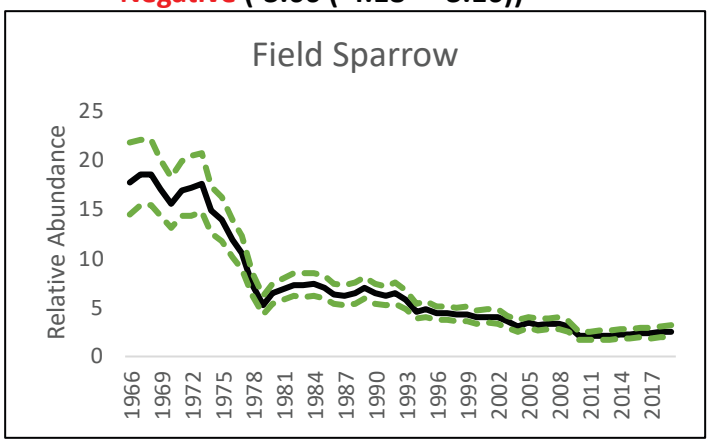
Data Deficient

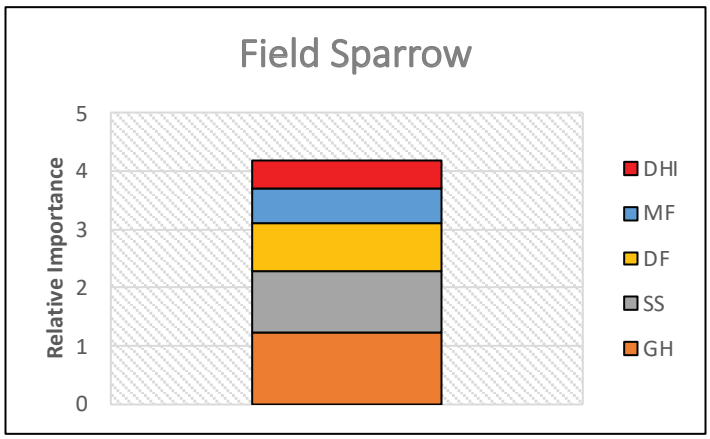
Regional Trend:
Positive (2.84 (1.94 – 3.74))



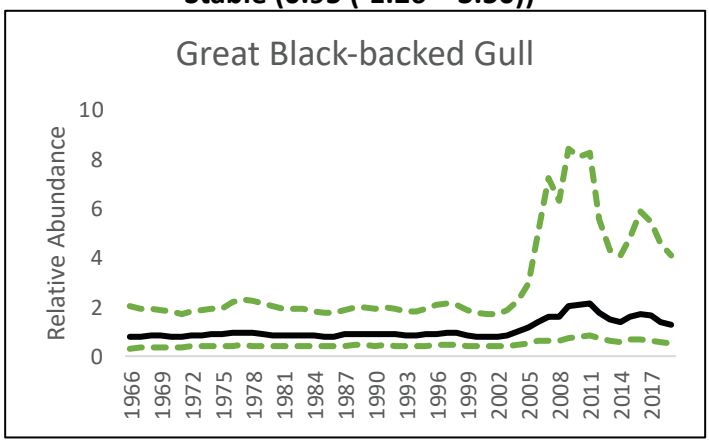


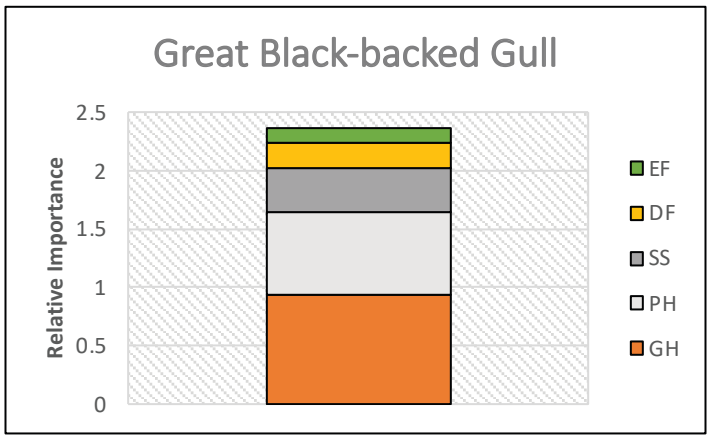
Regional Trend:
Negative (-3.66 (-4.18 – -3.16))



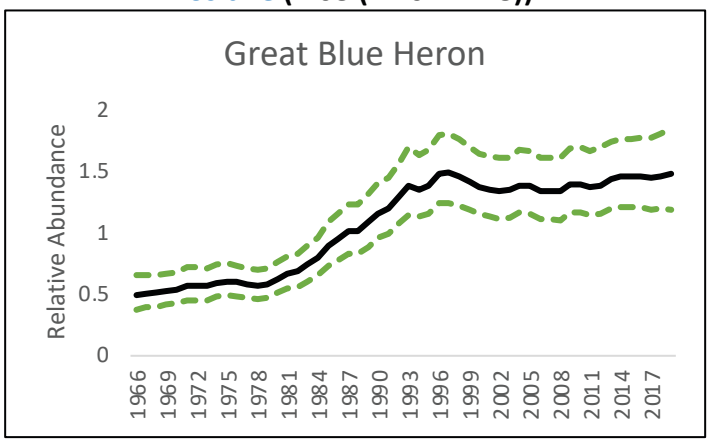


Regional Trend:
Stable (0.95 (-1.26 – 3.50))



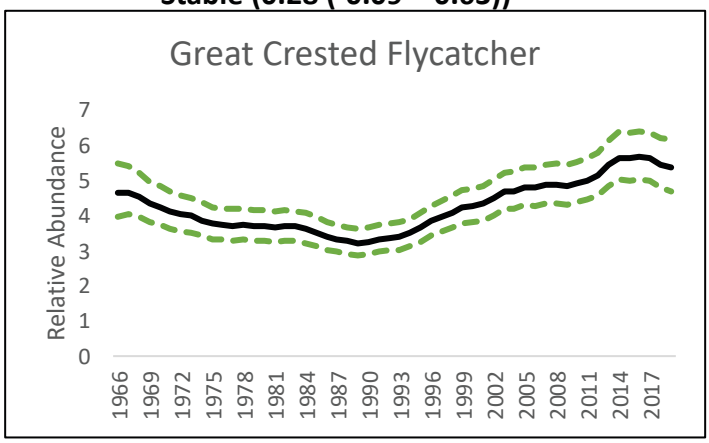


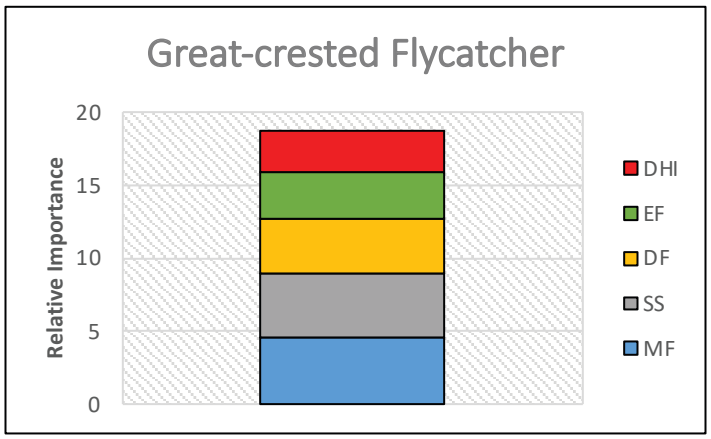
Regional Trend:
Positive (2.08 (1.40 – 2.78))



Data Deficient

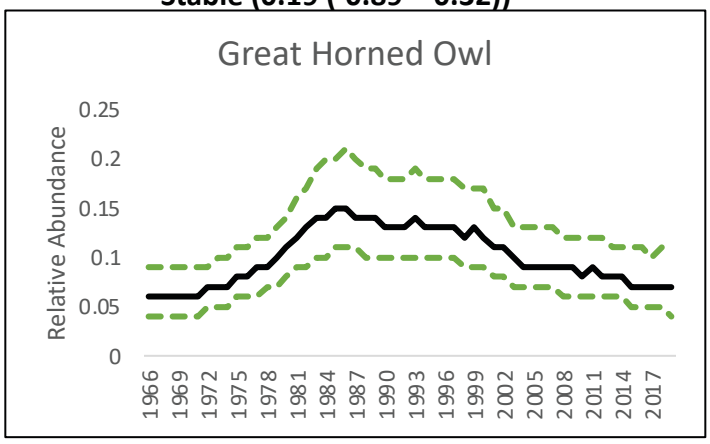
Regional Trend:
Stable (0.28 (-0.09 – 0.63))





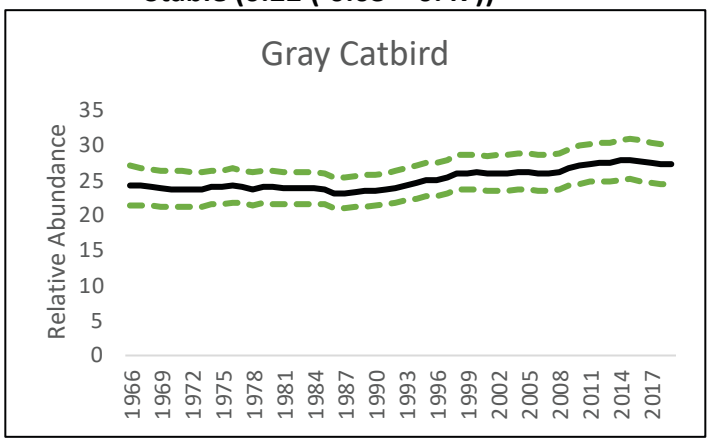
No BBS Data

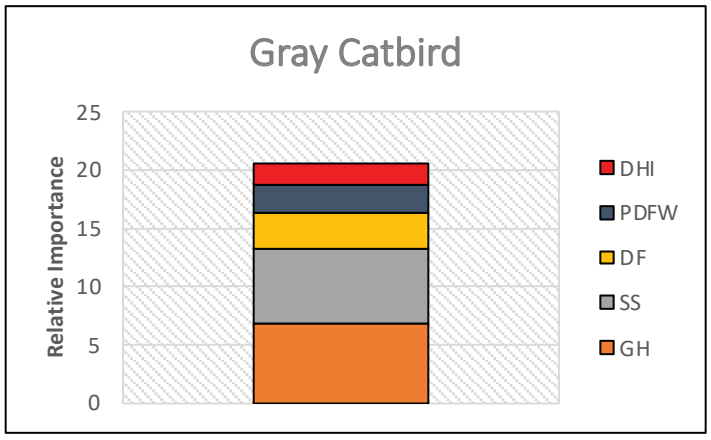
Regional Trend:
Stable (0.19 (-0.89 – 0.32))



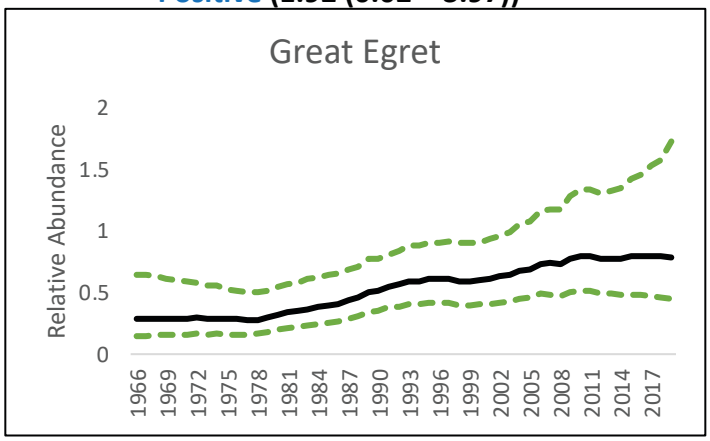
Data Deficient

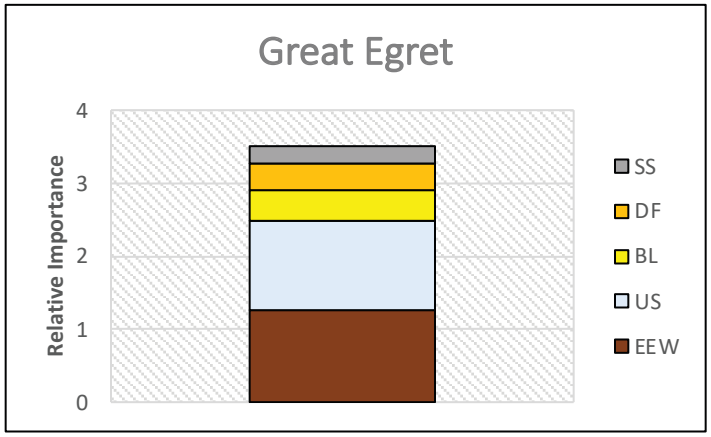
Regional Trend:
Stable (0.22 (-0.03 – 0.47))



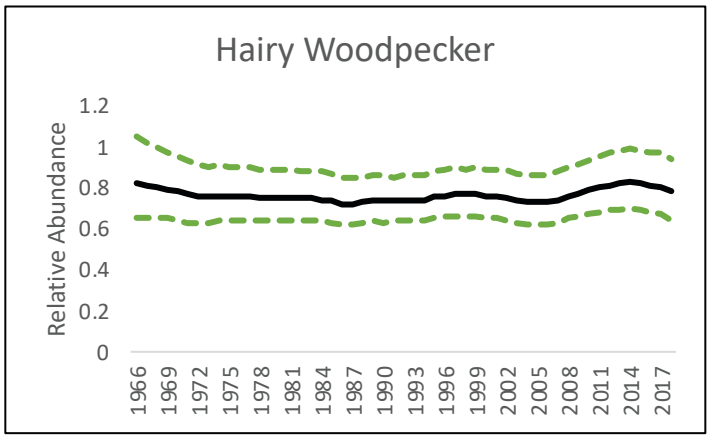


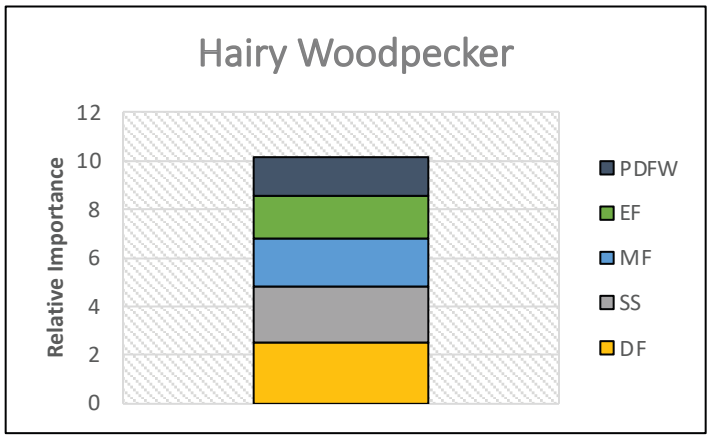
Regional Trend:
Positive (1.92 (0.02 – 3.97))



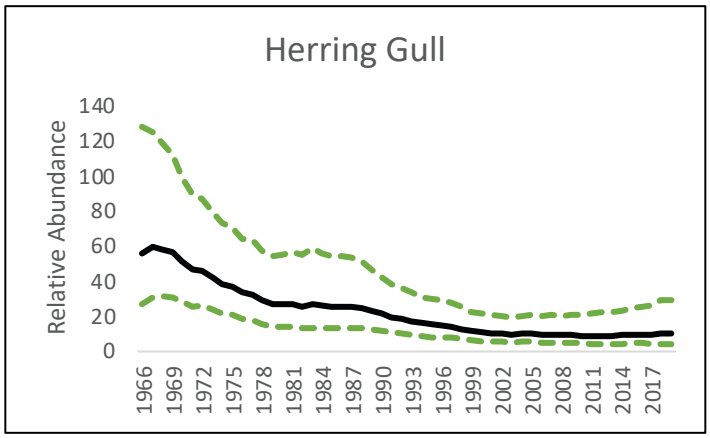


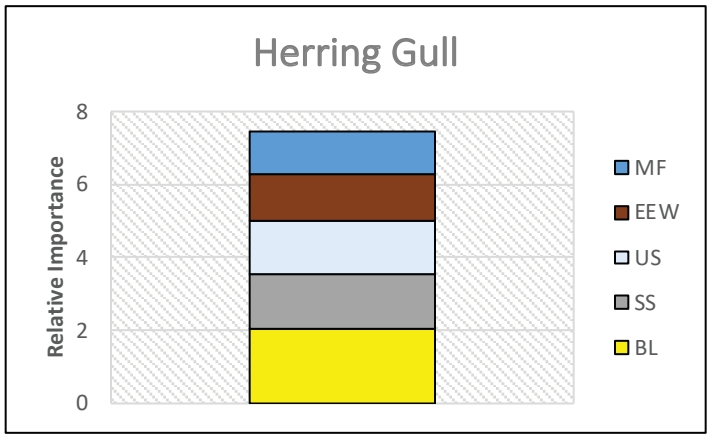
Regional Trend:
Stable (-0.10 (-0.70 – 0.40))



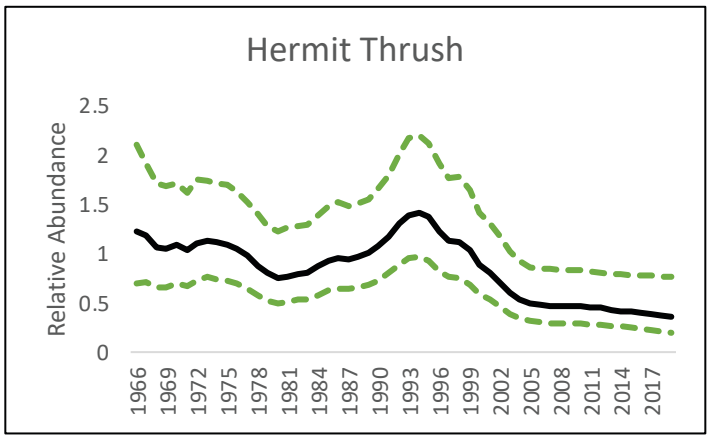


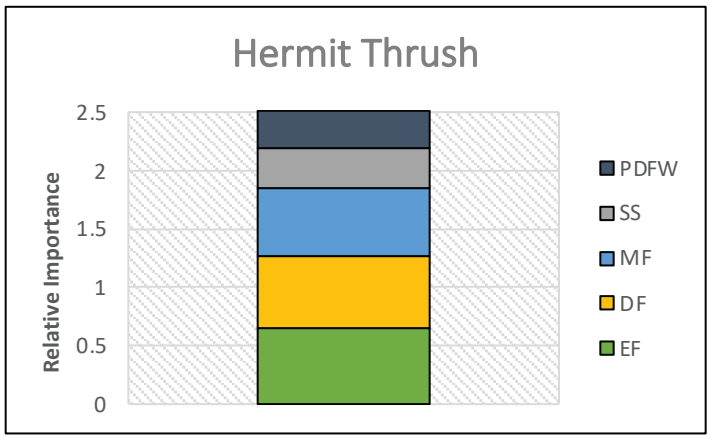
Regional Trend:
Negative (-3.16 (-5.17 – -1.01))



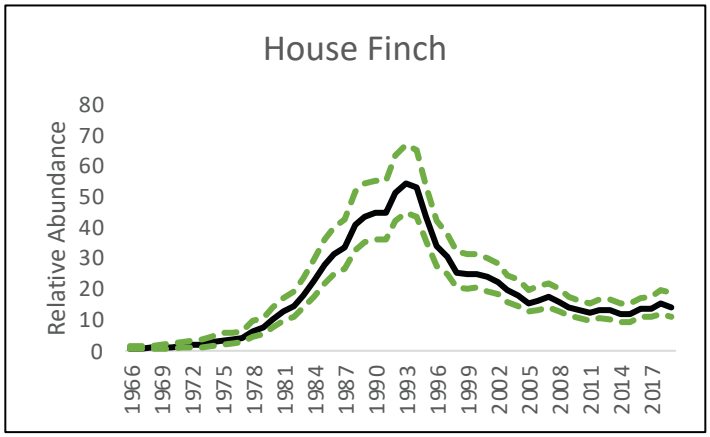


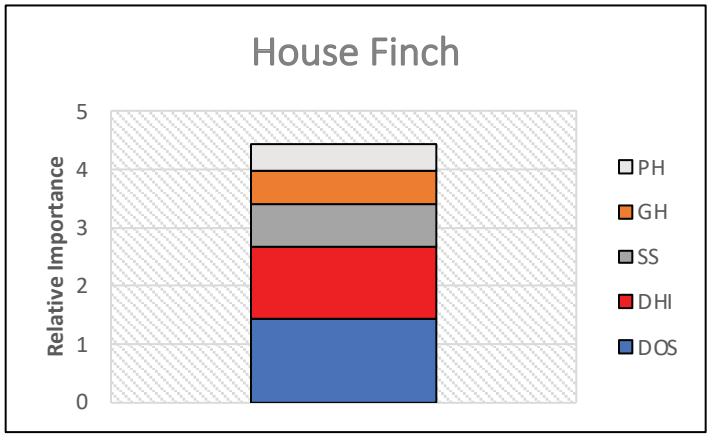
Regional Trend:
Negative (-2.22 (-3.66 – -0.71))



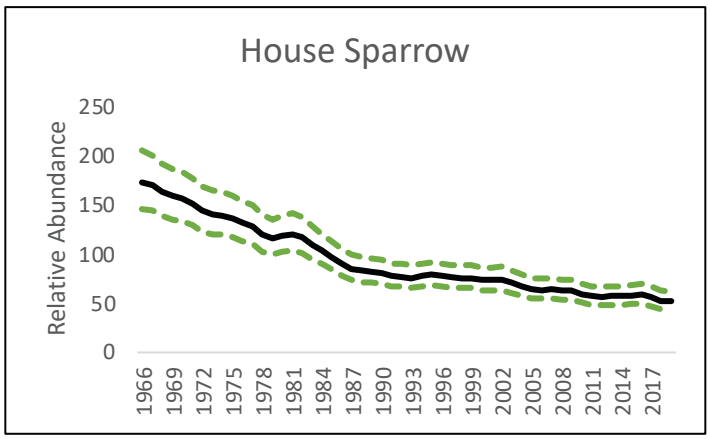


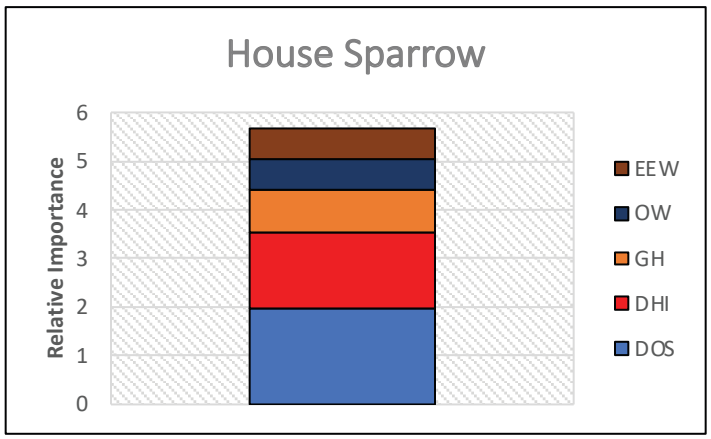
Regional Trend:
Positive (5.60 (4.19 – 7.01))



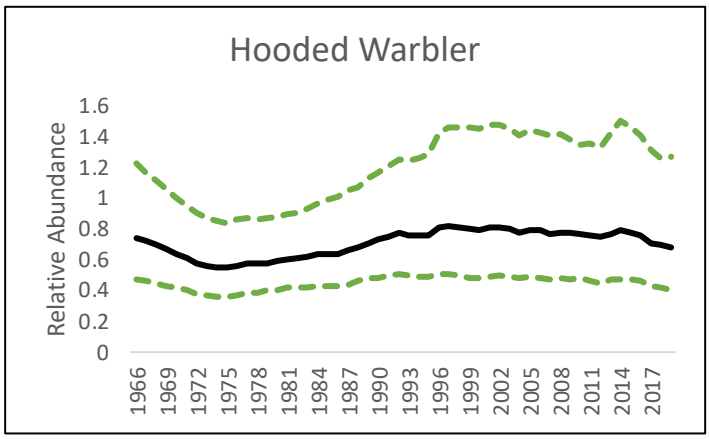


Regional Trend:
Negative (-2.26 (-2.65 – -1.85))



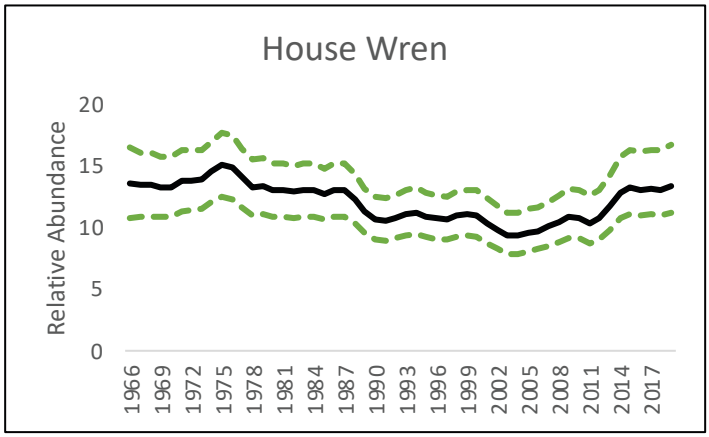


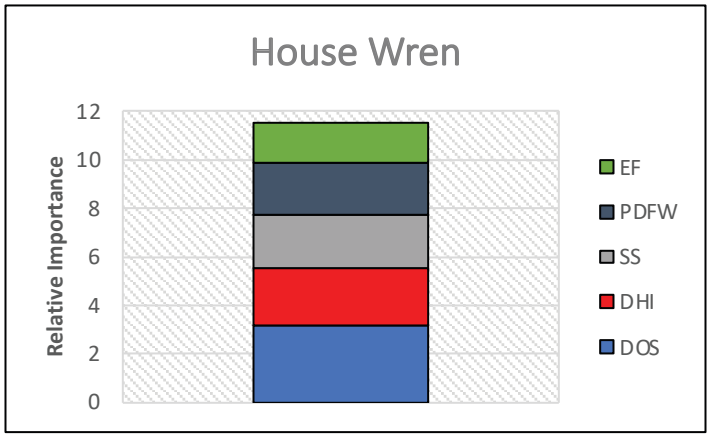
Regional Trend:
Stable (-0.18 (-1.21 – 1.07))



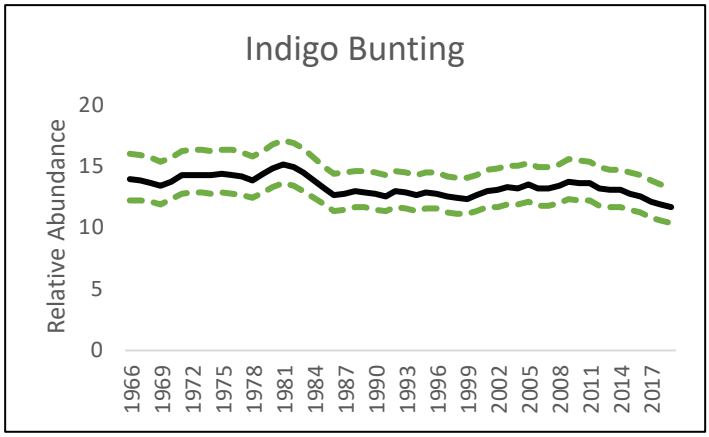
Data Deficient

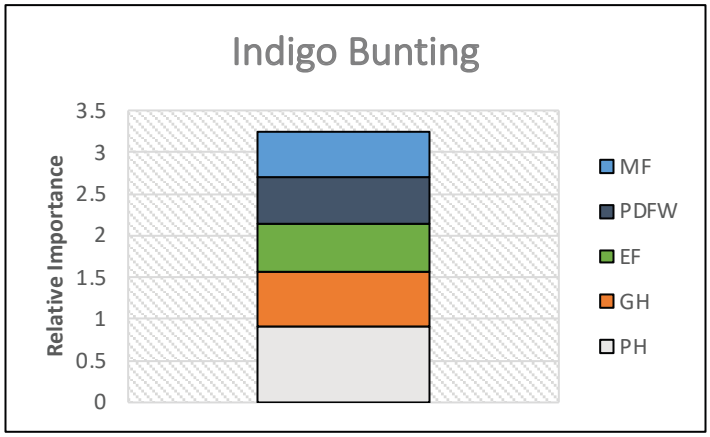
Regional Trend:
Stable (-0.01 (-0.46 – 0.49))



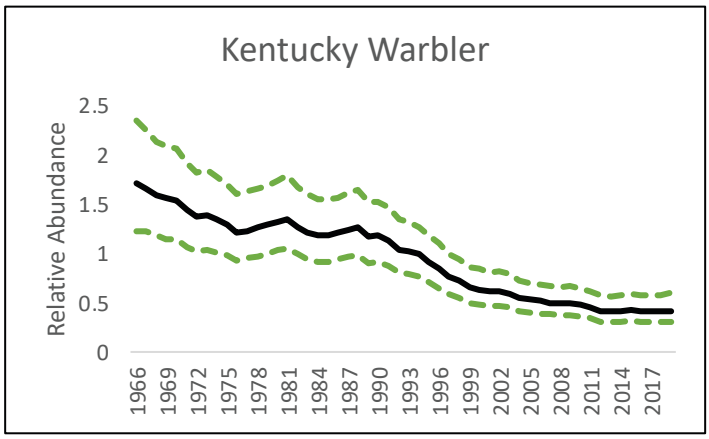


Regional Trend:
Negative (-0.33 (-0.59 – -0.07))



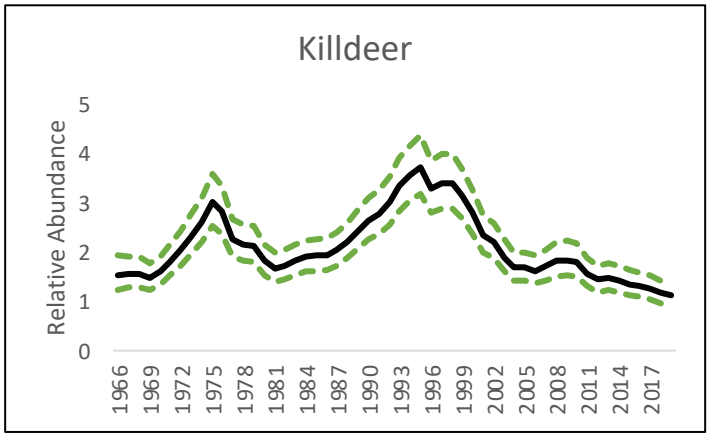


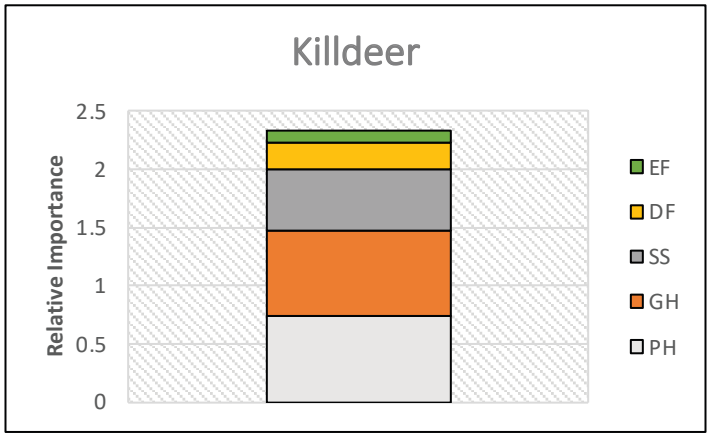
Regional Trend:
Negative (-2.60 (-3.41 – -1.77))



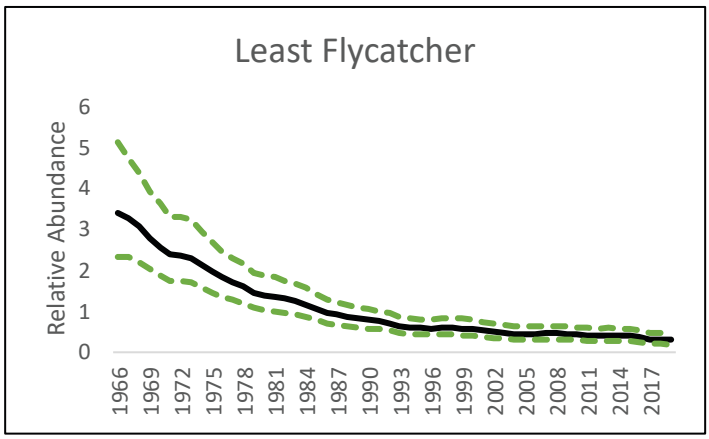
Data Deficient

Regional Trend:
Negative (-0.58 (-1.16 – 0.0))



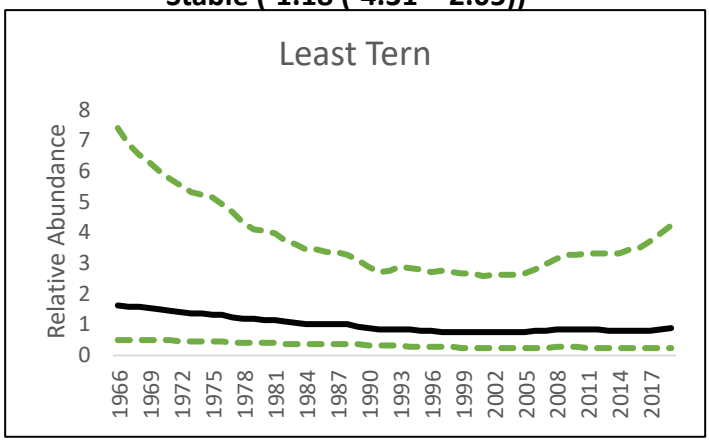


Regional Trend:
Negative (-4.54 (-5.57 – -3.58))



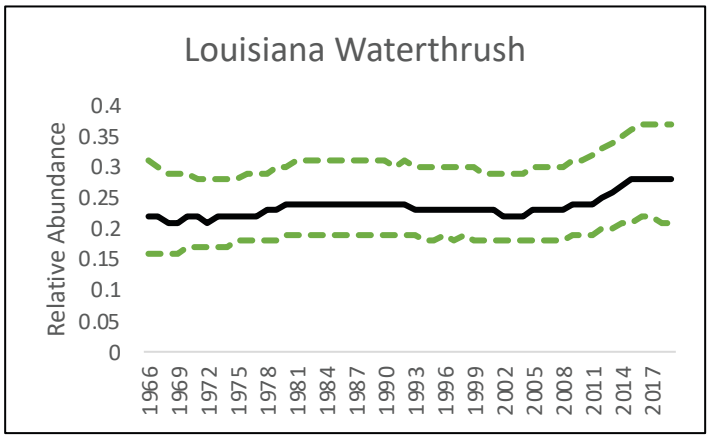
Data Deficient

Regional Trend:
Stable (-1.18 (-4.31 – 2.05))



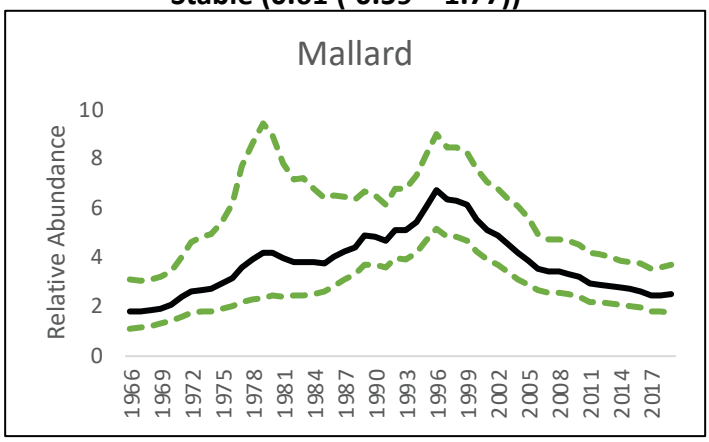
Data Deficient

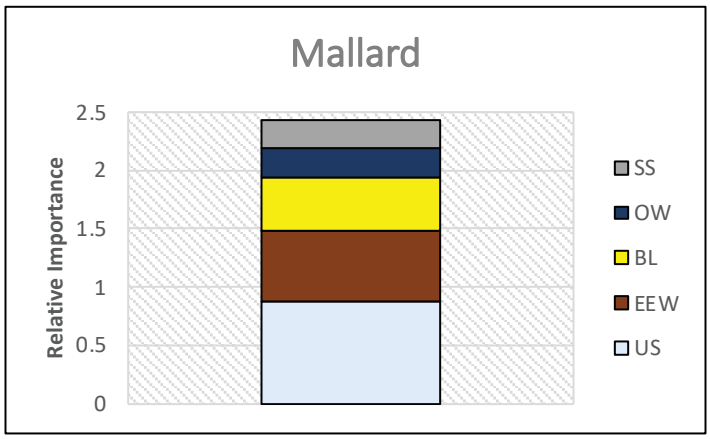
Regional Trend:
Stable (0.48 (-0.31 – 1.17))



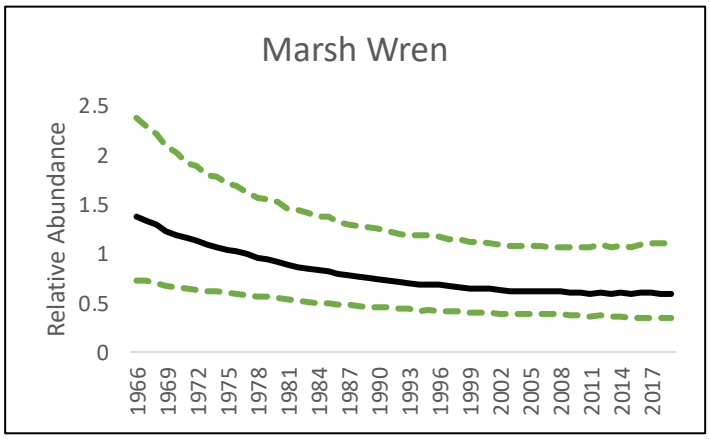
Data Deficient

Regional Trend:
Stable (0.61 (-0.59 – 1.77))



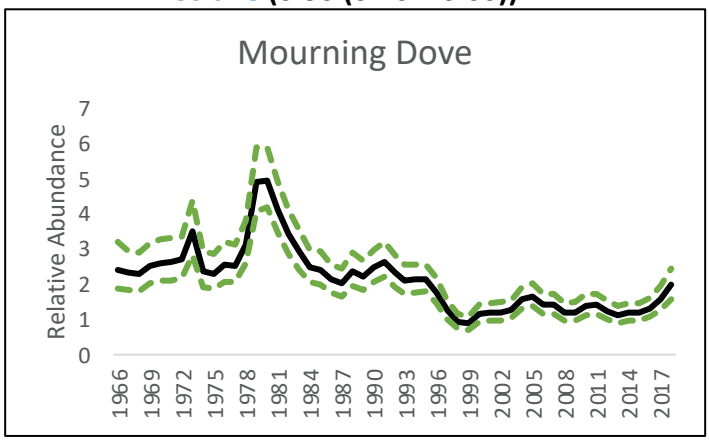


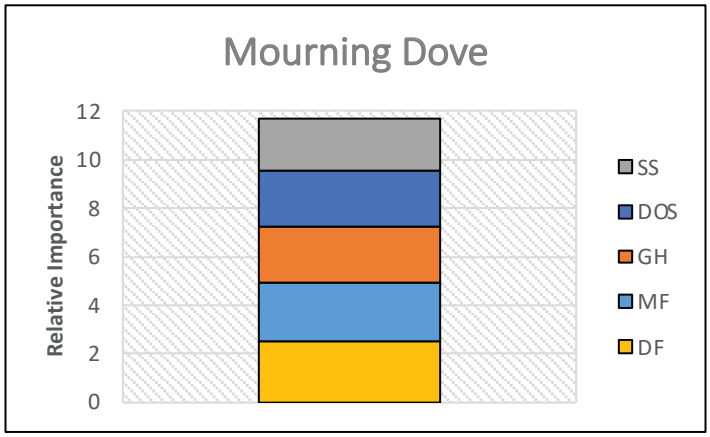
Regional Trend:
Negative (-1.51 (-2.88 – -0.09))



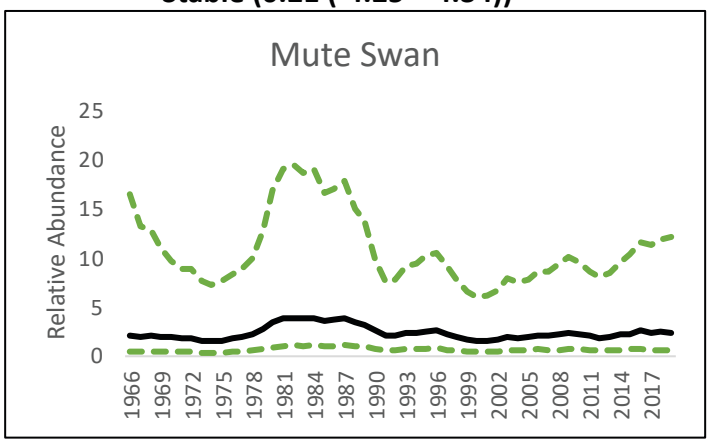
Data Deficient

Regional Trend:
Positive (0.30 (0.10 – 0.60))



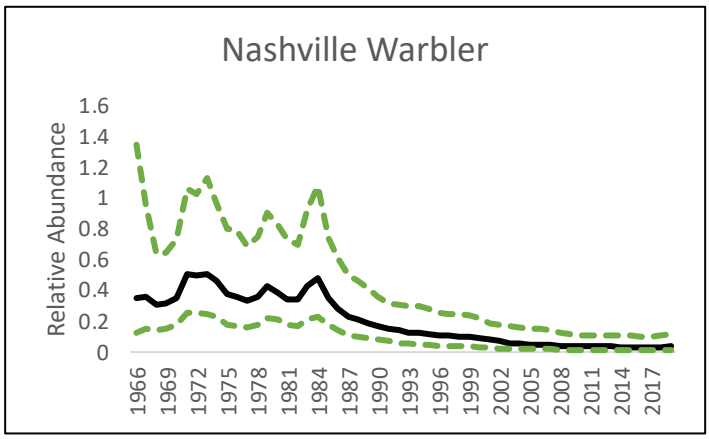


Regional Trend:
Stable (0.21 (-4.25 – 4.34))



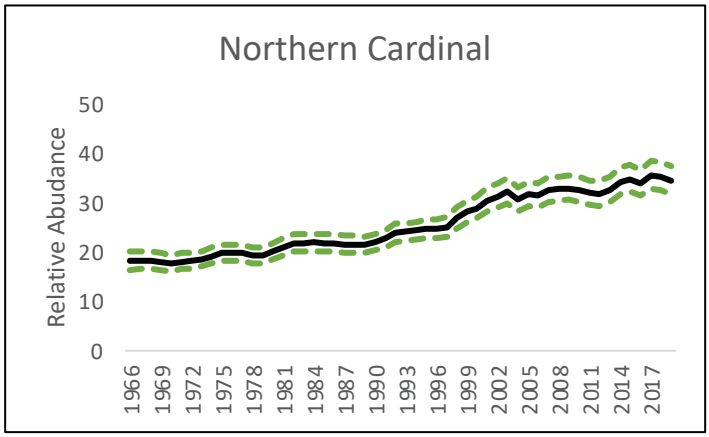
Data Deficient

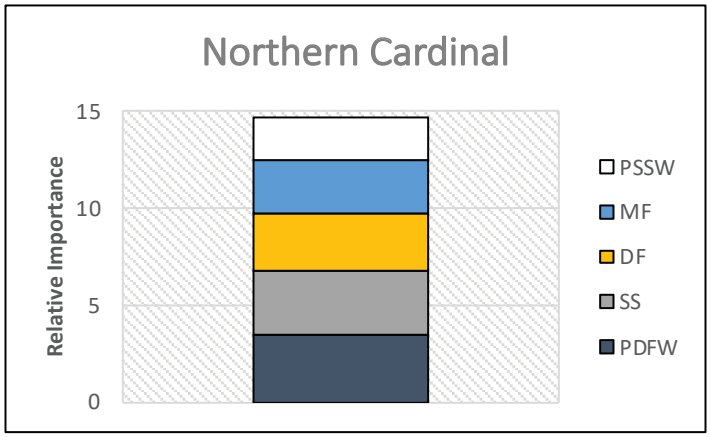
Regional Trend:
Negative (-4.29 (-7.60 – -1.55))



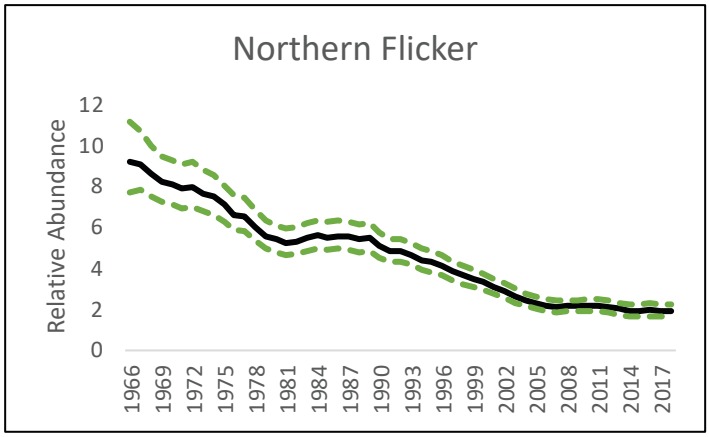
Data Deficient

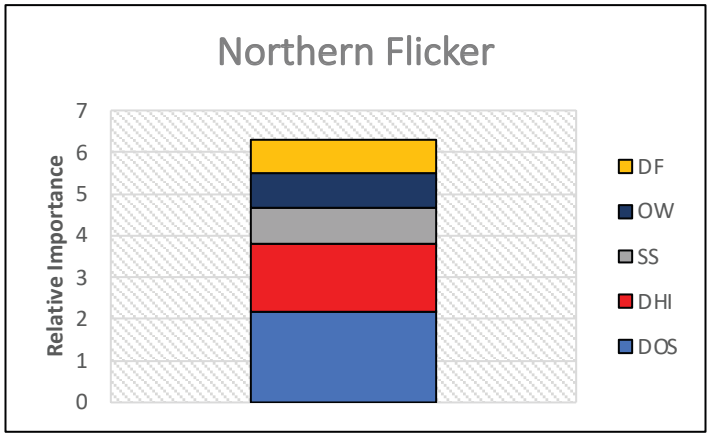
Regional Trend:
Positive (1.22 (1.0 – 1.45))



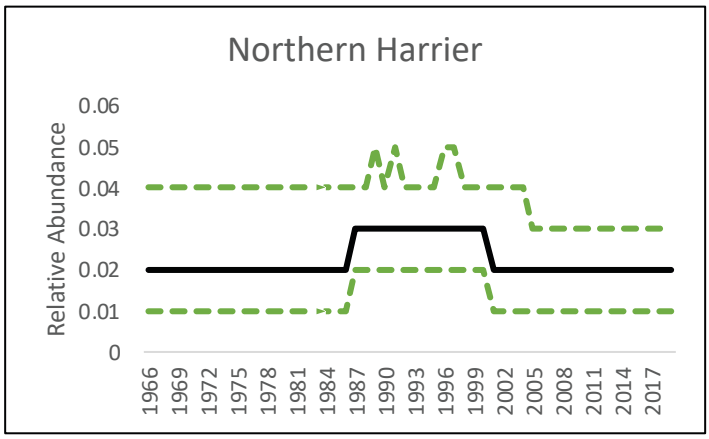


Regional Trend:
Negative (-2.90 (-3.40 – -2.50))



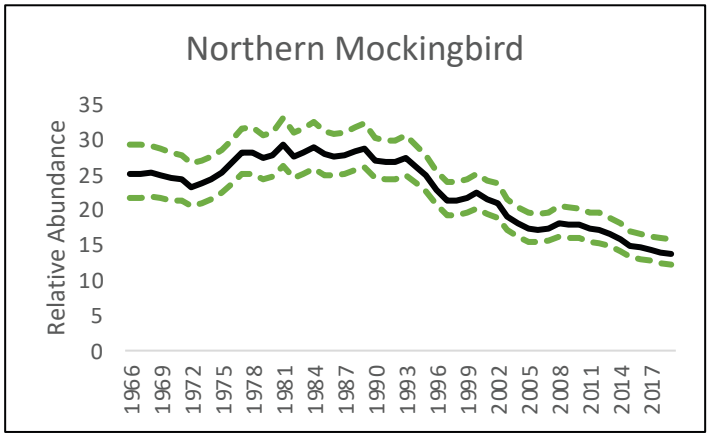


Regional Trend:
Stable (-0.48 (-2.36 – 1.14))



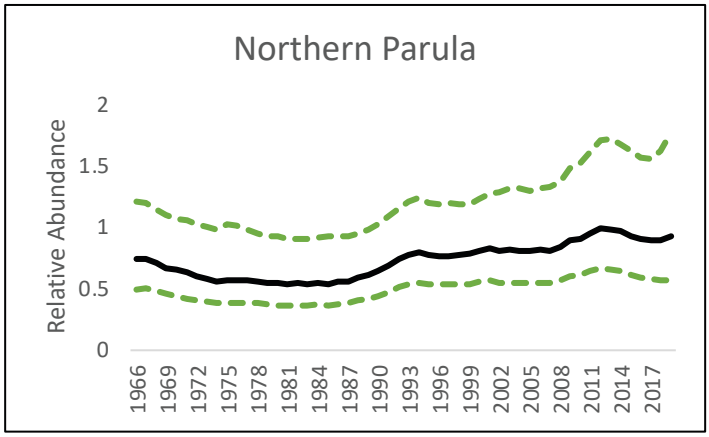
Data Deficient

Regional Trend:
Negative (-1.12 (-1.4 – -0.82))



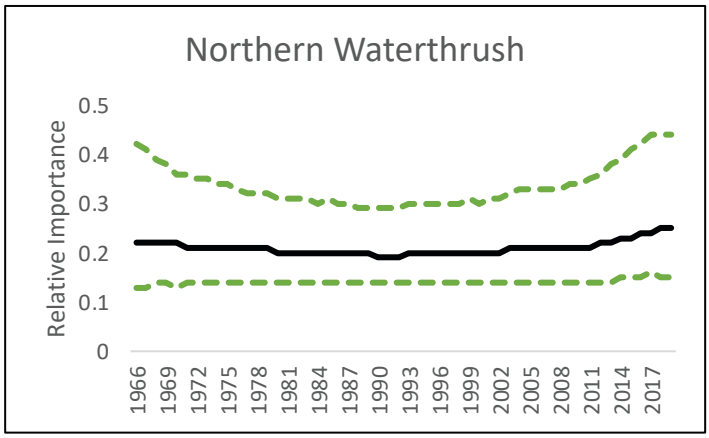
Data Deficient

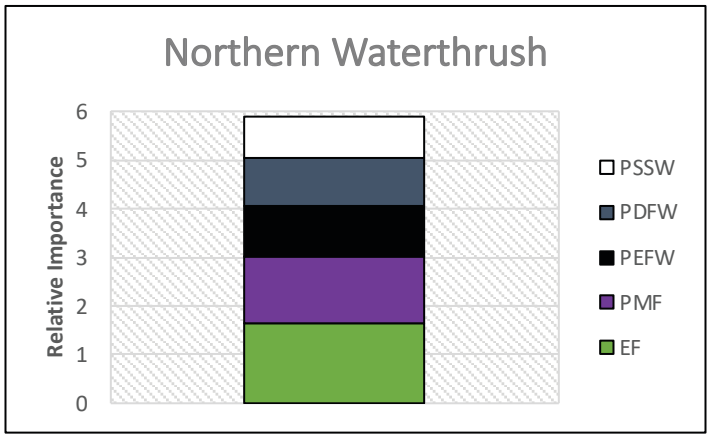
Regional Trend:
Stable (0.43 (-0.59 – 1.63))



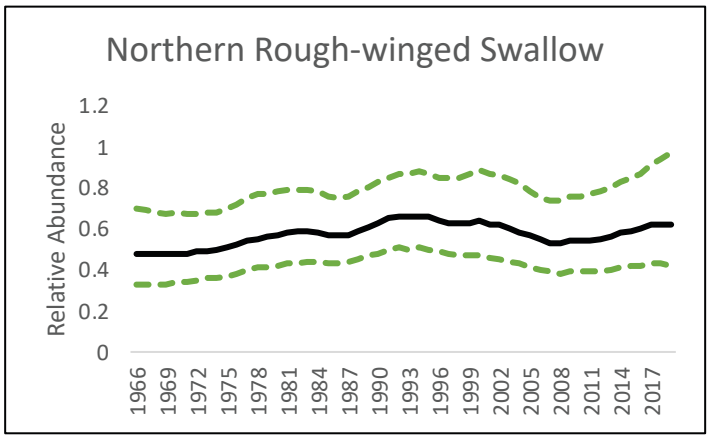
Data Deficient

Regional Trend:
Stable (0.13 (-1.08 – 1.64))



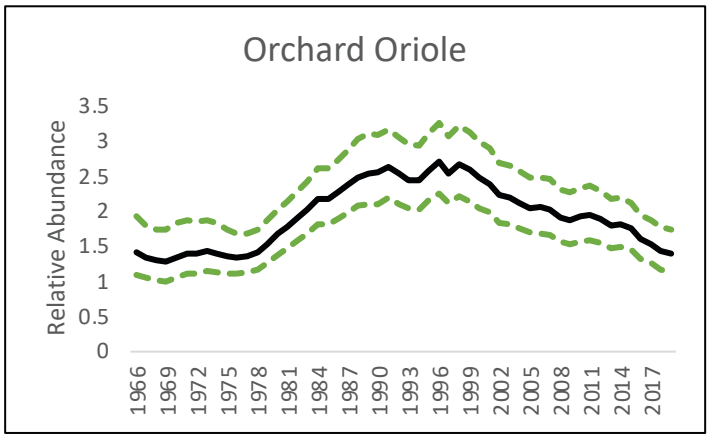


Regional Trend:
Stable (0.50 (-0.44 – 1.52))



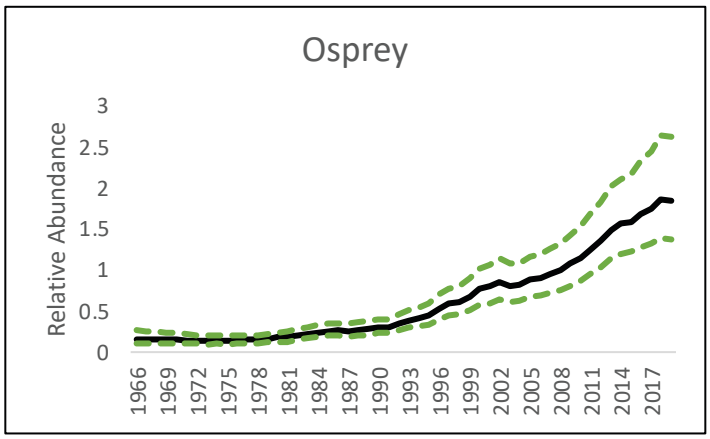
Data Deficient

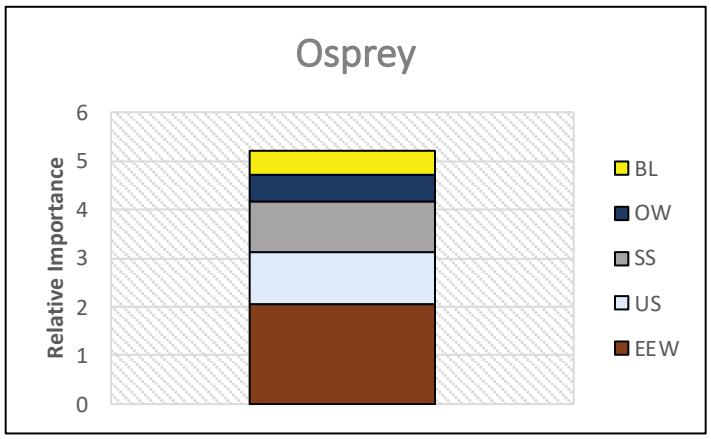
Regional Trend:
Stable (-0.02 (-0.70 – 0.56))



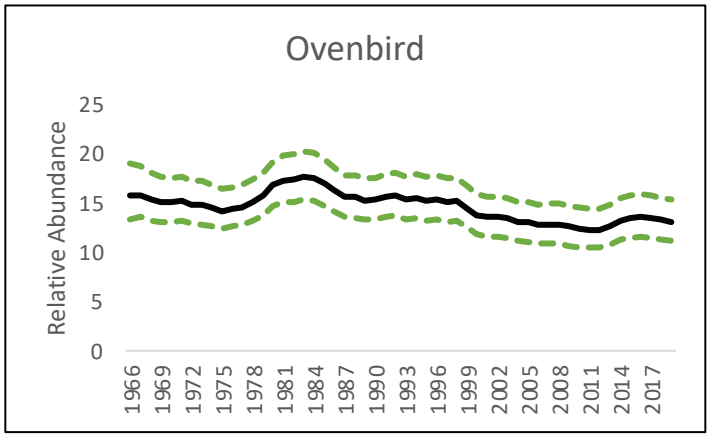
Data Deficient

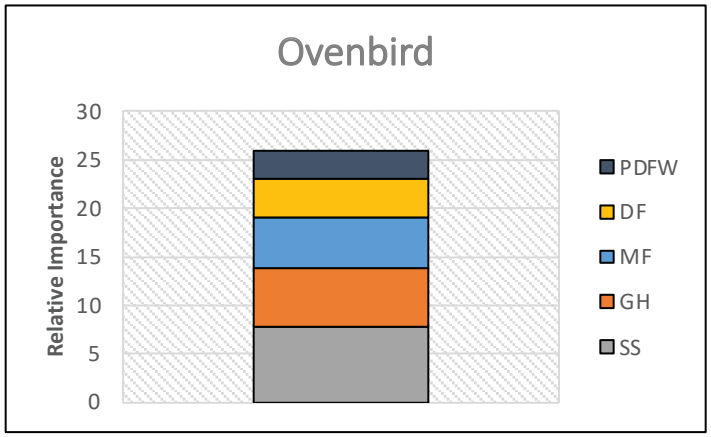
Regional Trend:
Positive (4.71 (3.56 – 5.82))



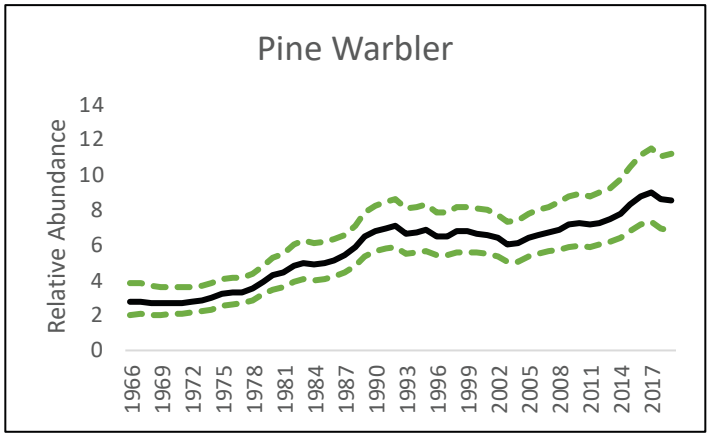


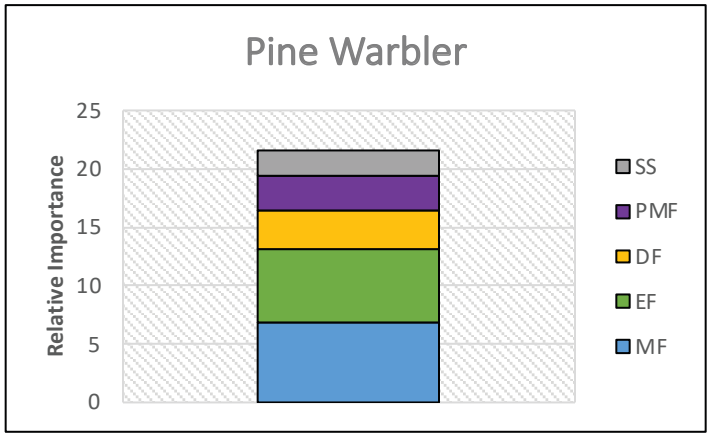
Regional Trend:
Negative (-0.35 (-0.72 – 0.0))



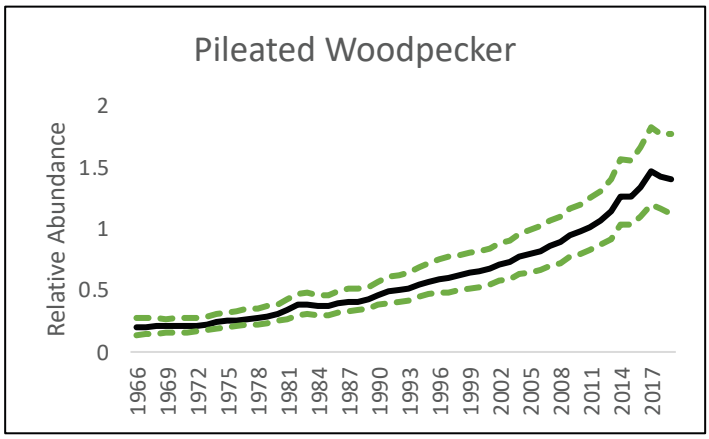


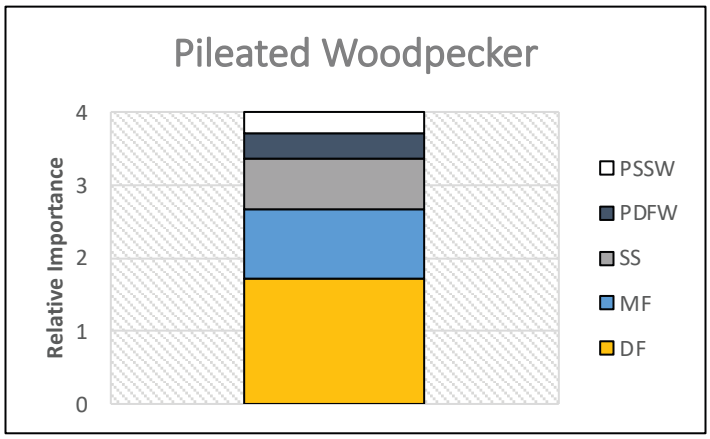
Regional Trend:
Positive (2.19 (1.48 – 2.91))



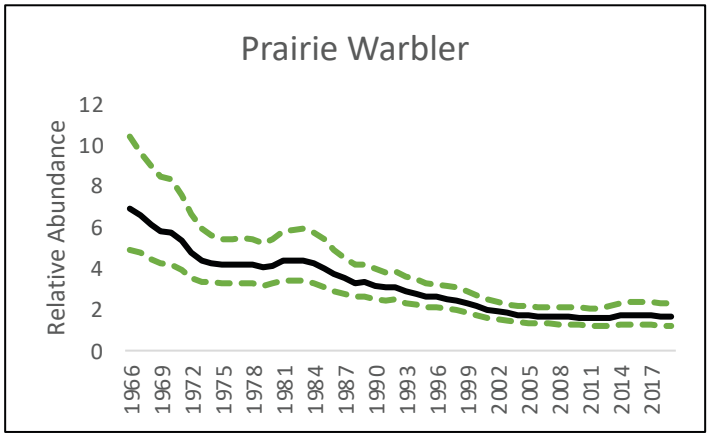


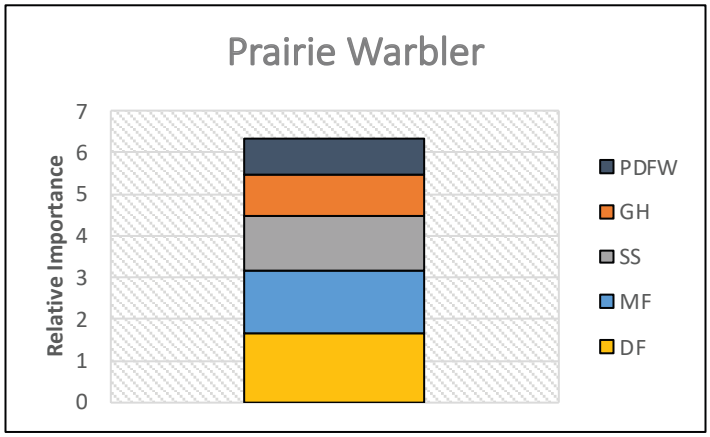
Regional Trend:
Positive (3.78 (2.99 – 4.56))



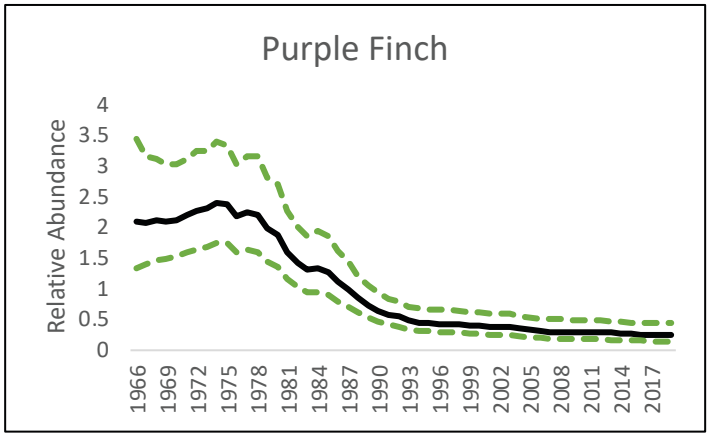


Regional Trend:
Negative (-2.70 (-3.59 – -1.83))



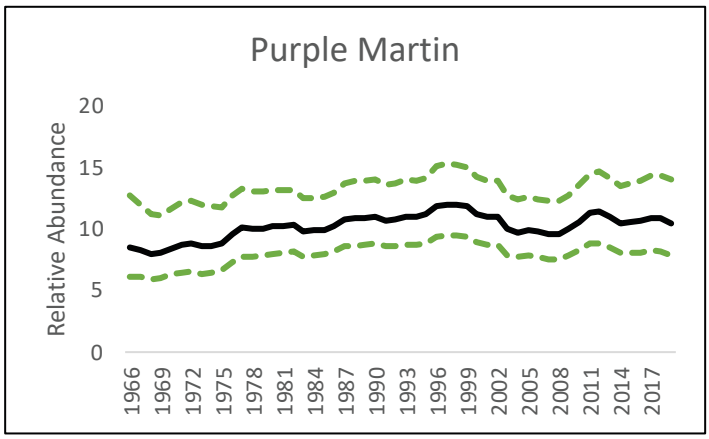


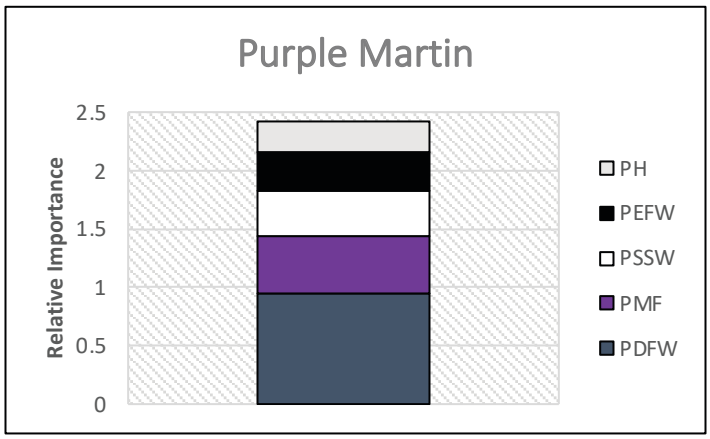
Regional Trend:
Negative (-4.02 (-5.36 – -2.71))



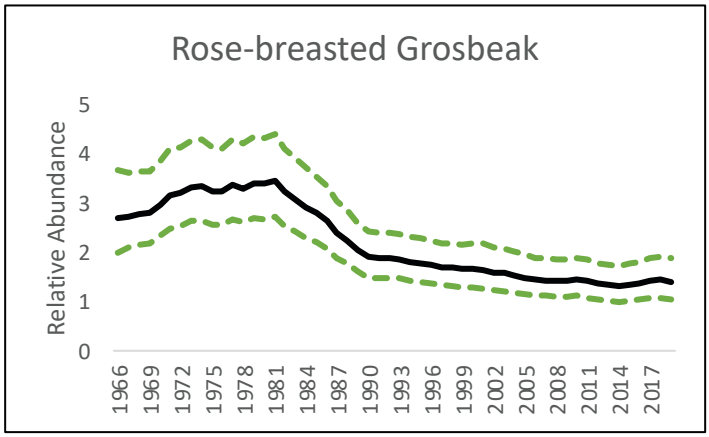
Data Deficient

Regional Trend:
Stable (0.37 (-0.44 – 1.16))



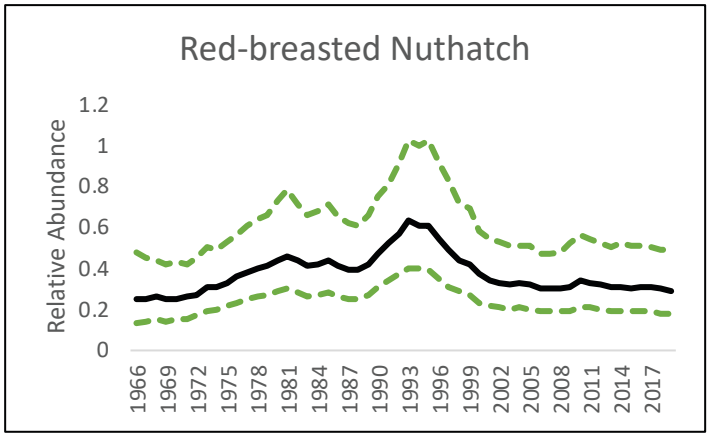


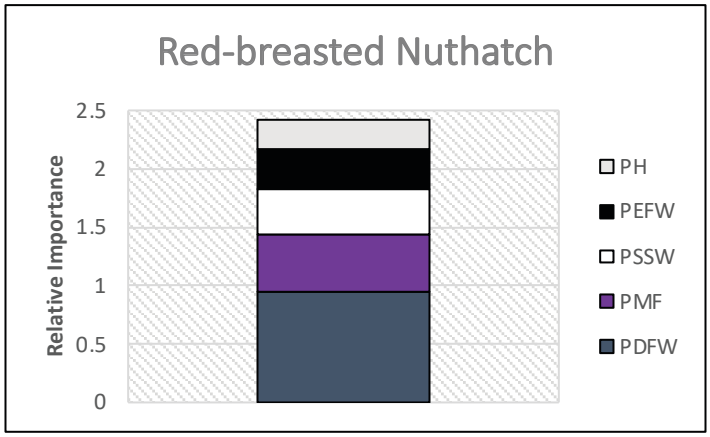
Regional Trend:
Negative (-1.25 (-1.95 – -0.52))



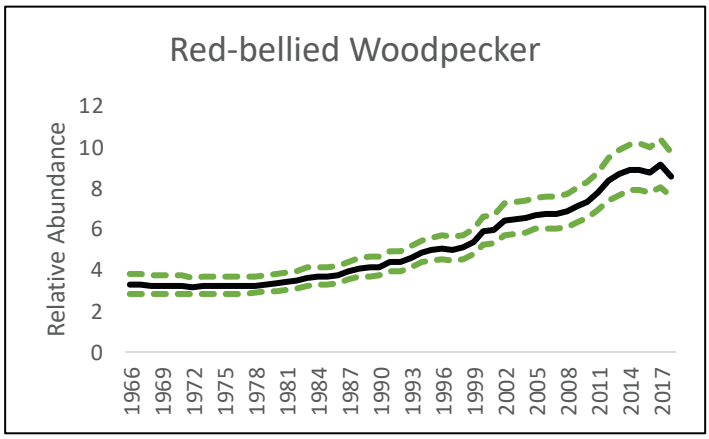
Data Deficient

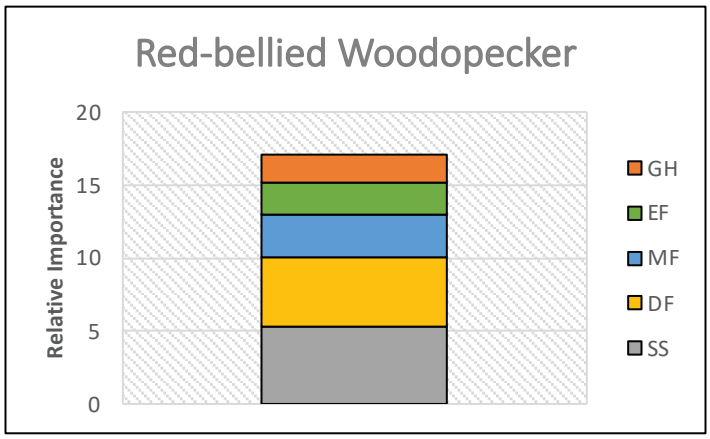
Regional Trend:
Stable (0.31 (-1.17 – 1.83))



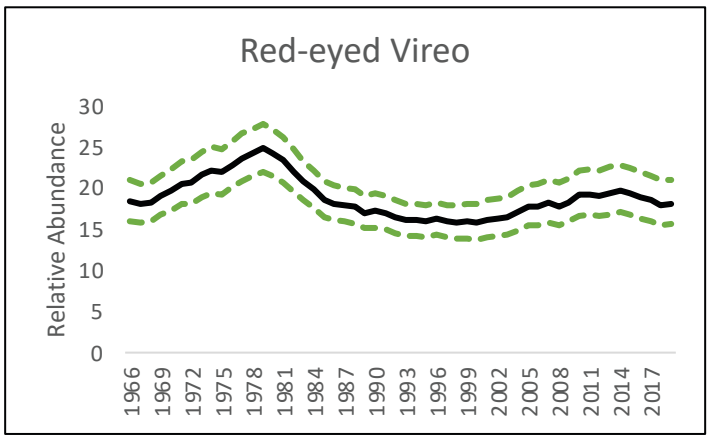


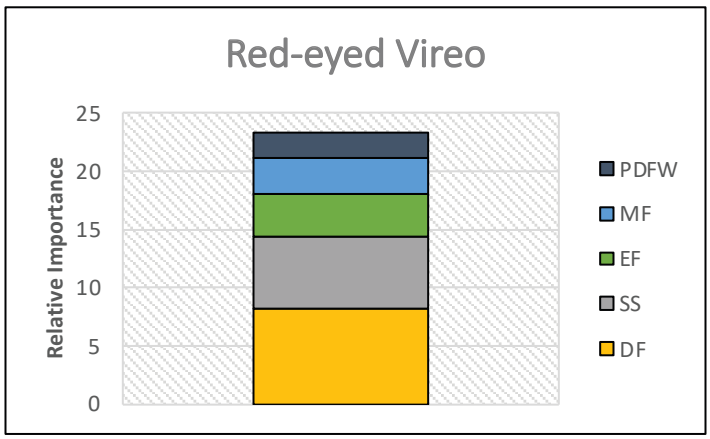
Regional Trend:
Positive (1.90 (1.50 – 2.20))



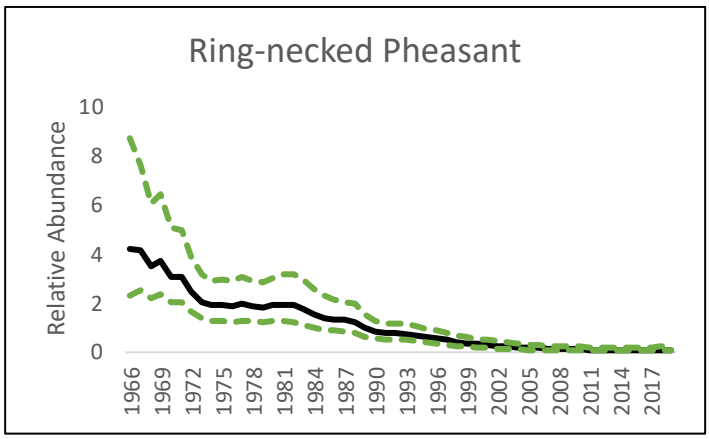


Regional Trend:
Stable (-0.04 (-0.32 – 0.25))



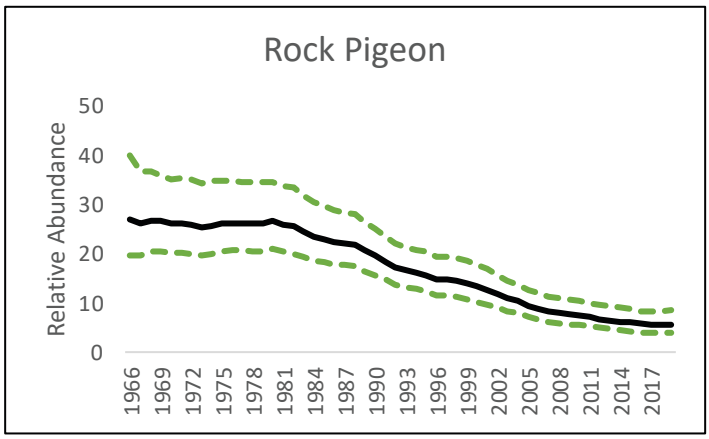


Regional Trend:
Negative (-6.88 (-8.65 – -5.14))



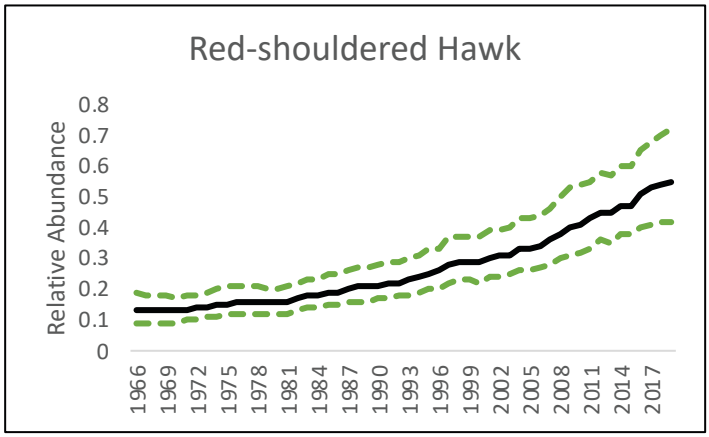
Data Deficient

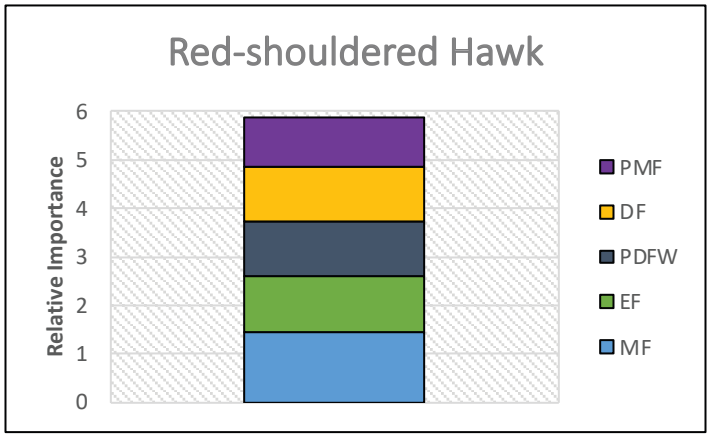
Regional Trend:
Negative (-2.90 (-3.90 – -2.0))



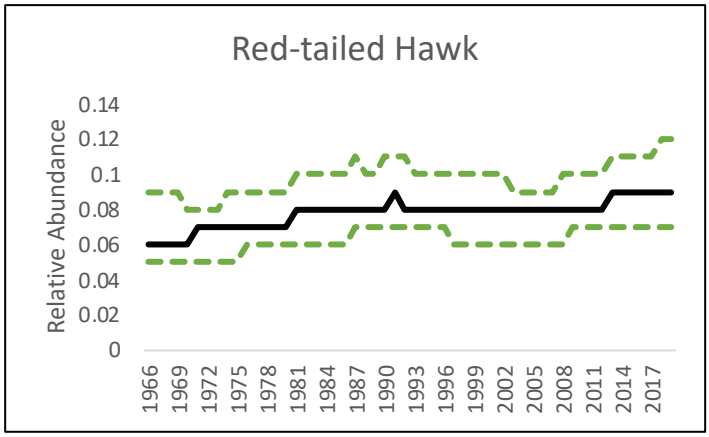
Data Deficient

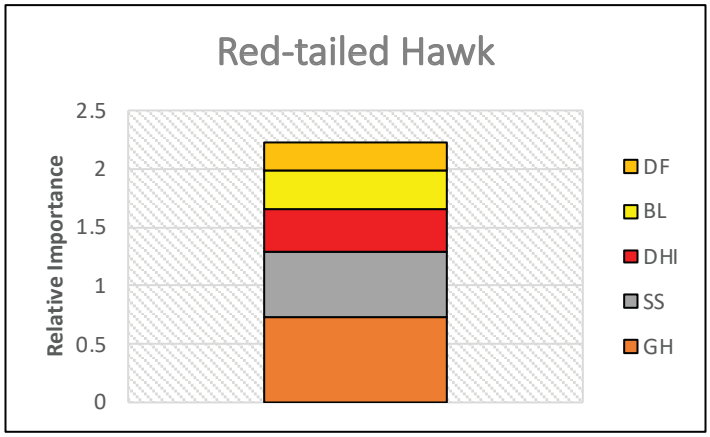
Regional Trend:
Positive (2.80 (1.90 – 3.70))



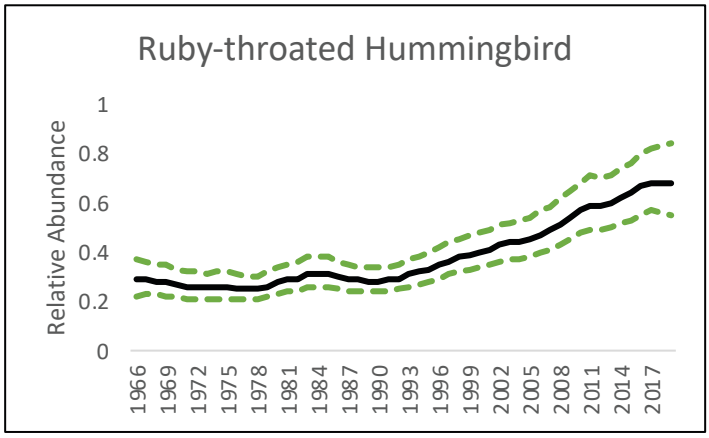


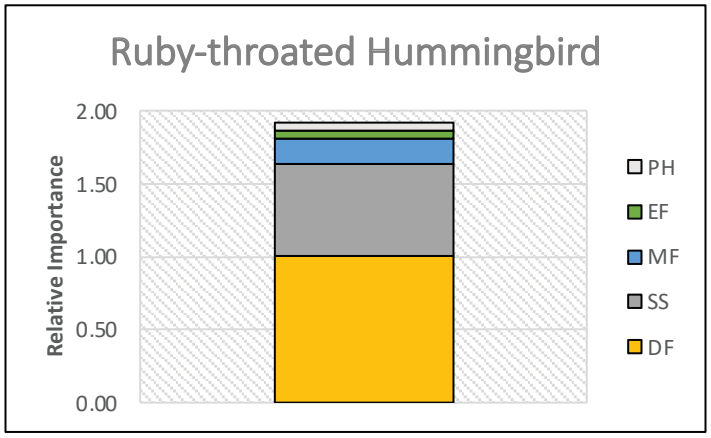
Regional Trend:
Stable (0.70 (-0.10 – 1.50))



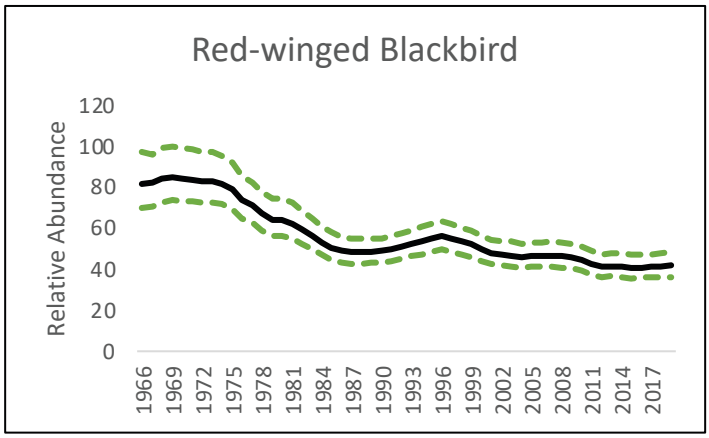


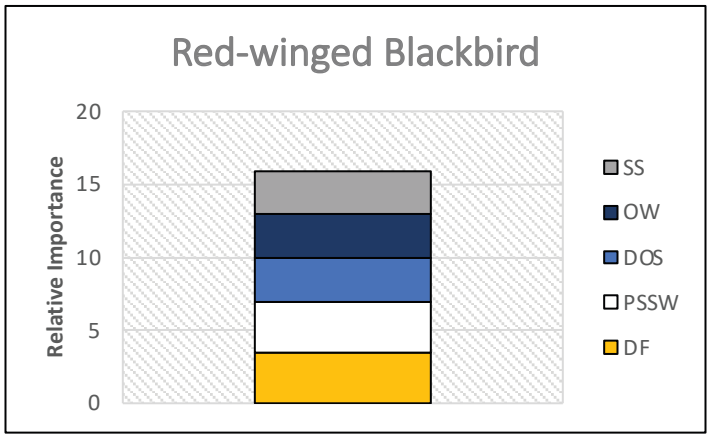
Regional Trend:
Positive (1.64 (1.02 – 2.27))



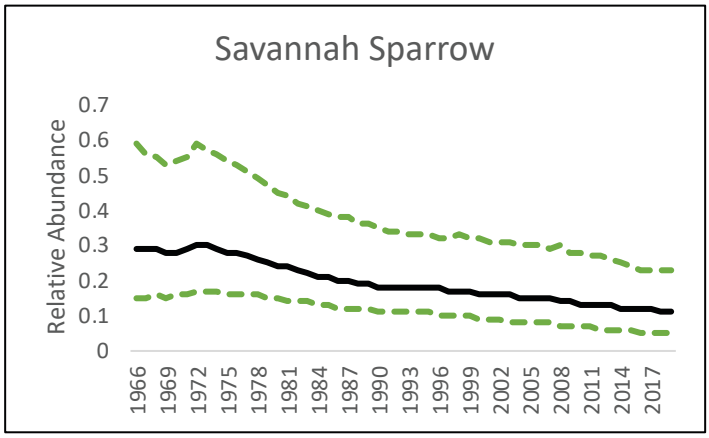


Regional Trend:
Negative (-1.27 (-1.60 – -0.95))



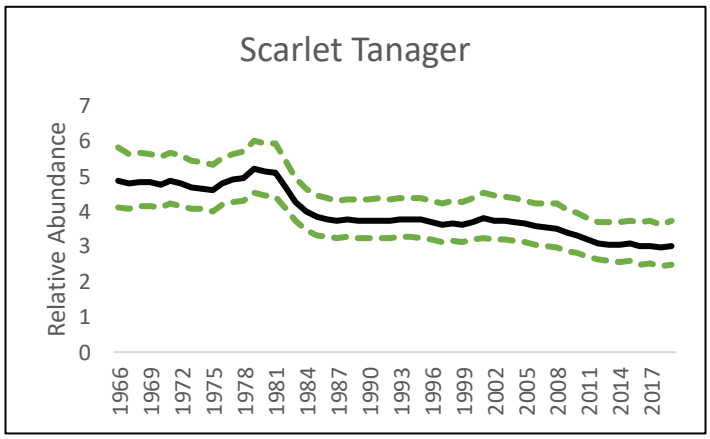


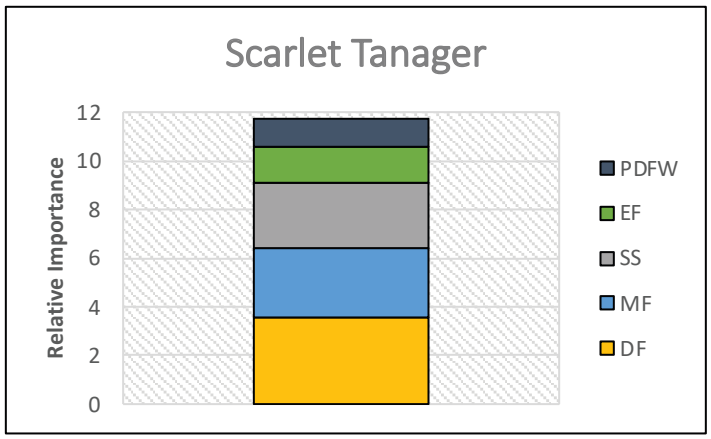
Regional Trend:
Negative (-1.71 (-3.58 – -0.16))



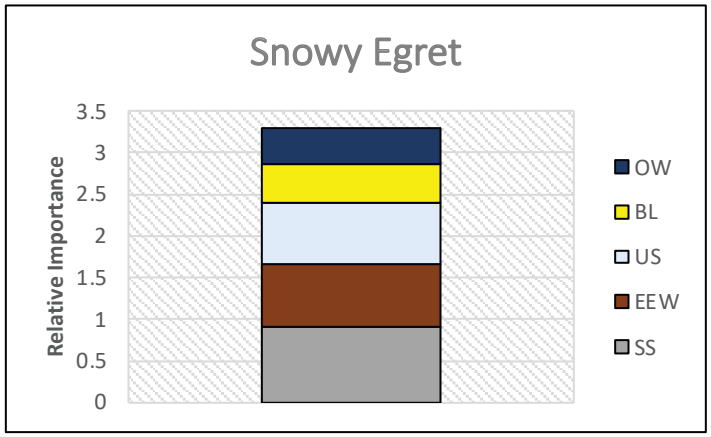
Data Deficient

Regional Trend:
Negative (-0.90 (-1.33 – -0.46))

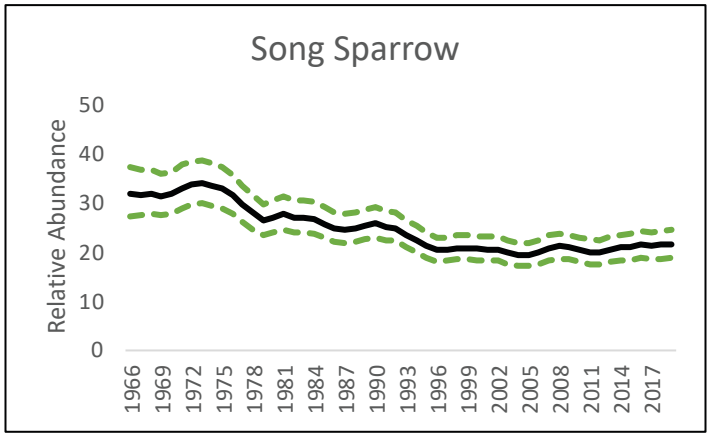


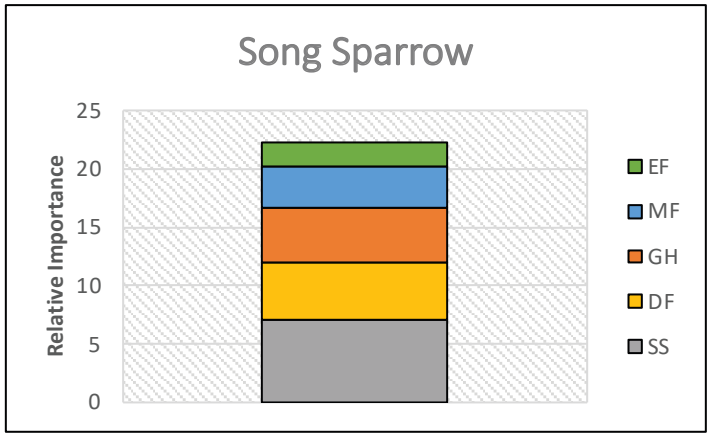


No BBS Data

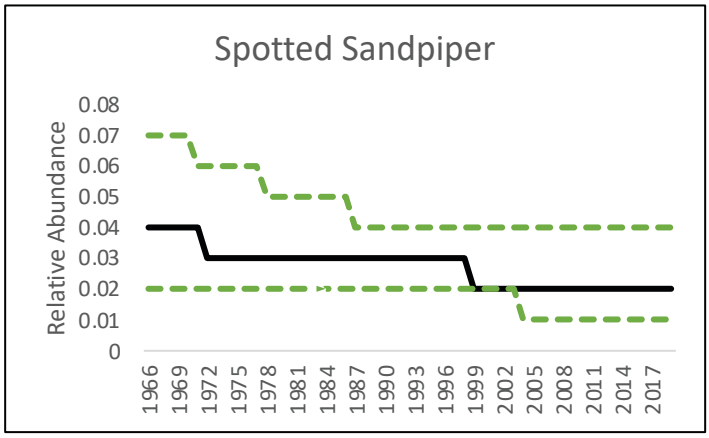


Regional Trend:
Negative (-0.73 (-1.03 – -0.42))



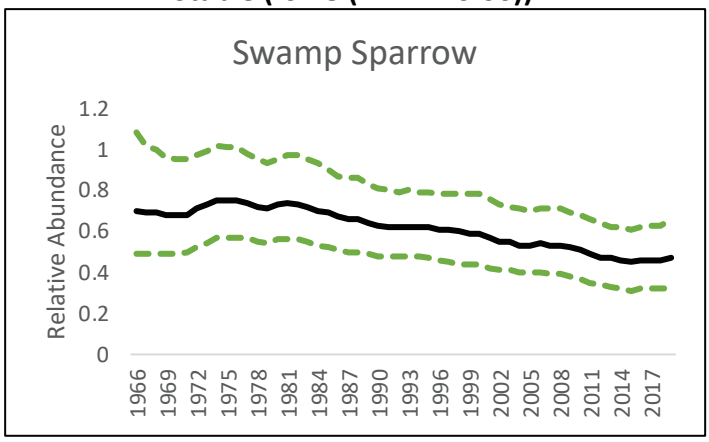


Regional Trend:
Stable (-1.06 (-2.68 – 0.64))



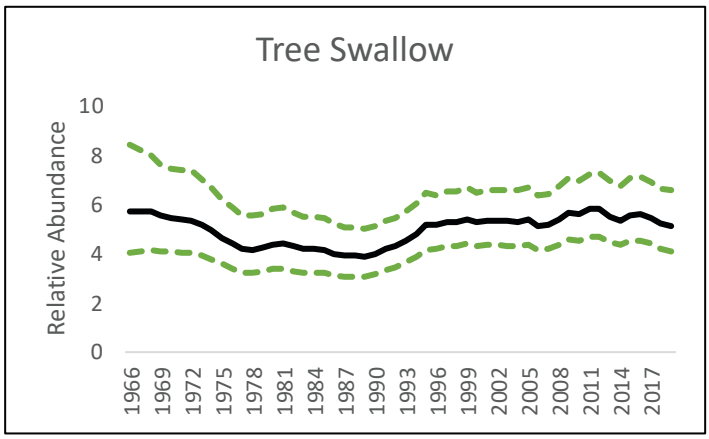
Data Deficient

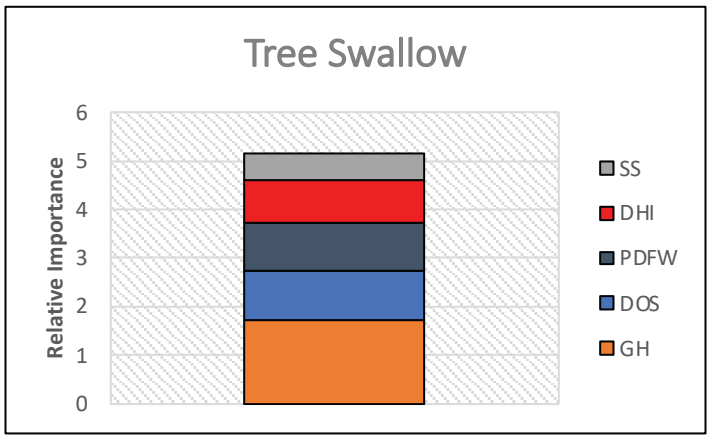
Regional Trend:
Stable (-0.78 (-1.71 – 0.06))



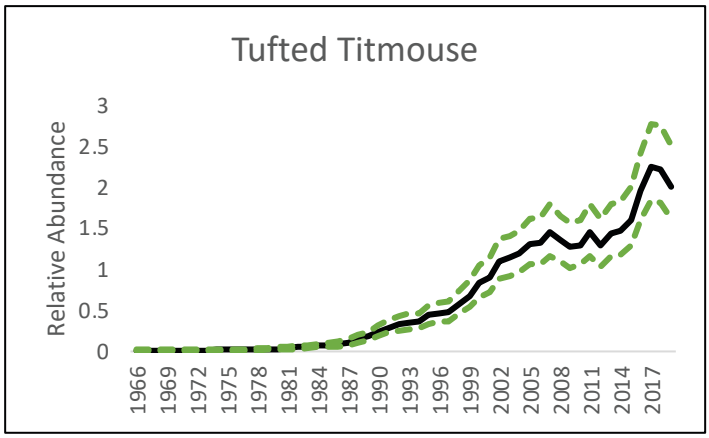
Data Deficient

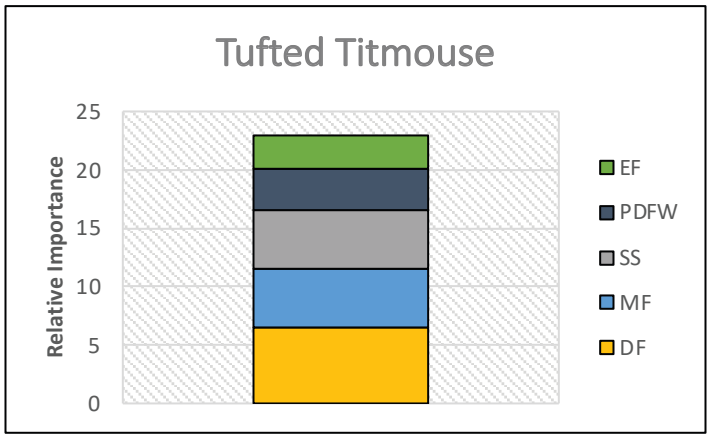
Regional Trend:
Stable (-0.19 (-1.03 – 0.53))



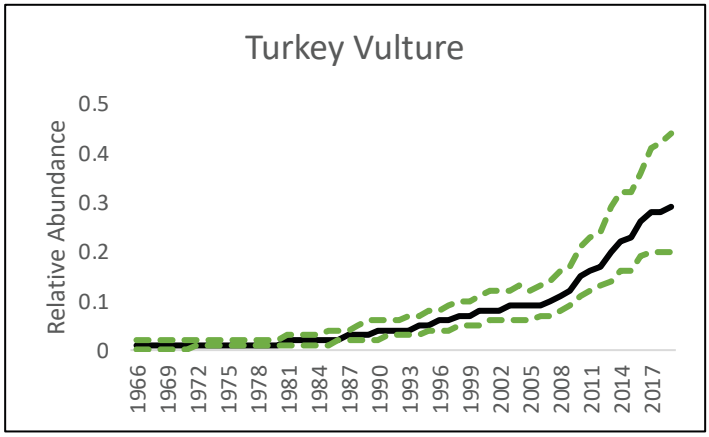


Regional Trend:
Positive (10.0 (8.30 – 11.90))



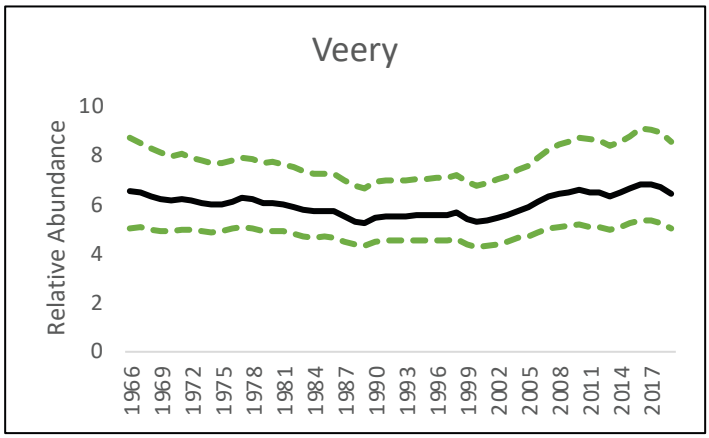


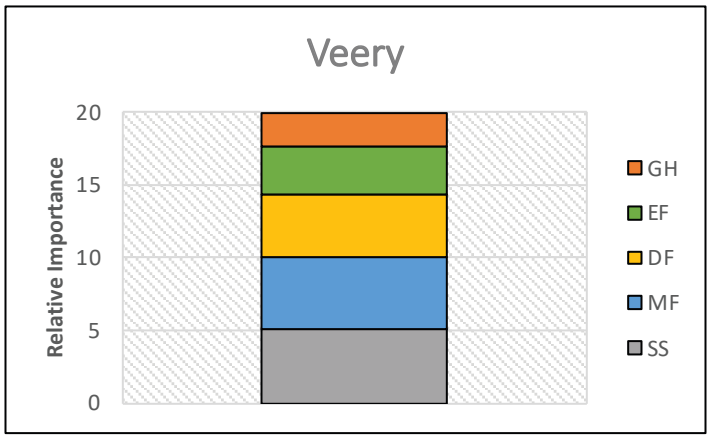
Regional Trend:
Positive (6.60 (4.6 – 8.50))



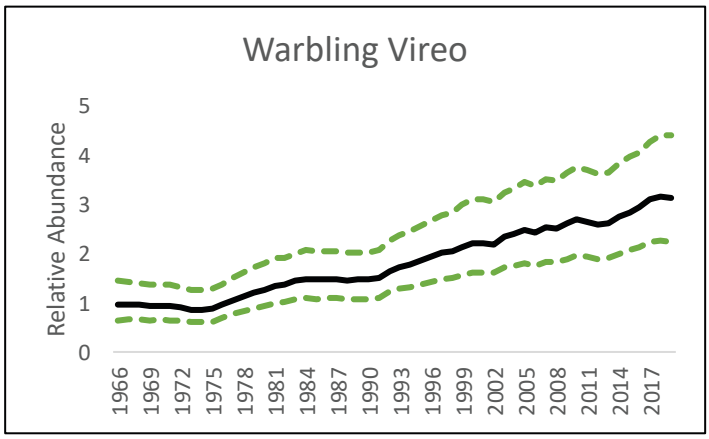
Data Deficient

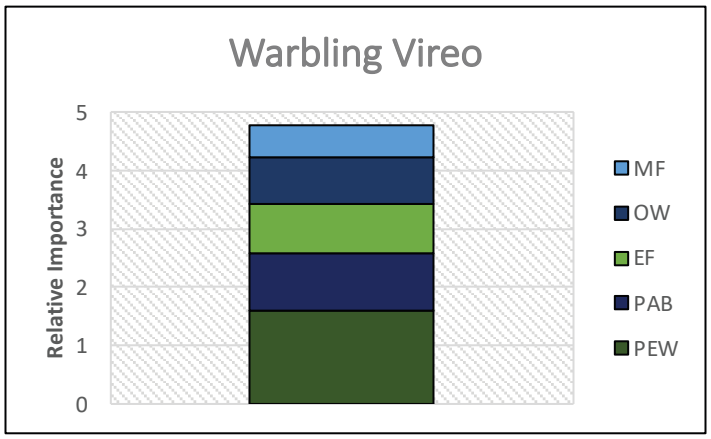
Regional Trend:
Stable (-0.02 (-0.57 – 0.51))



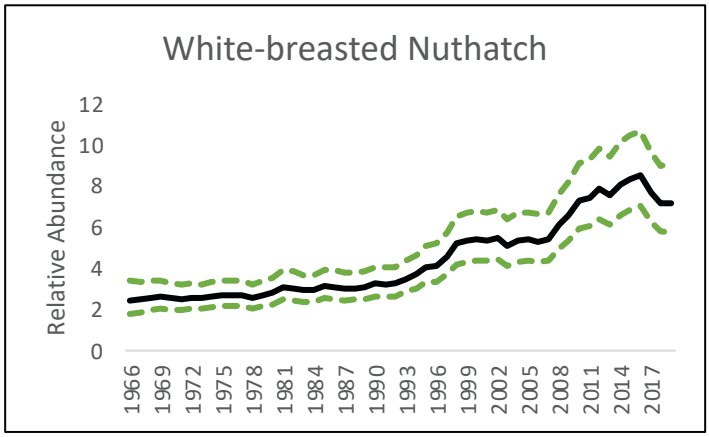


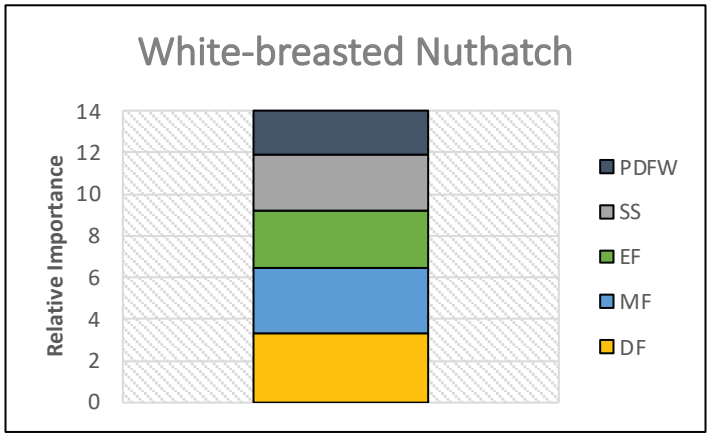
Regional Trend:
Positive (2.26 (1.45 – 3.07))



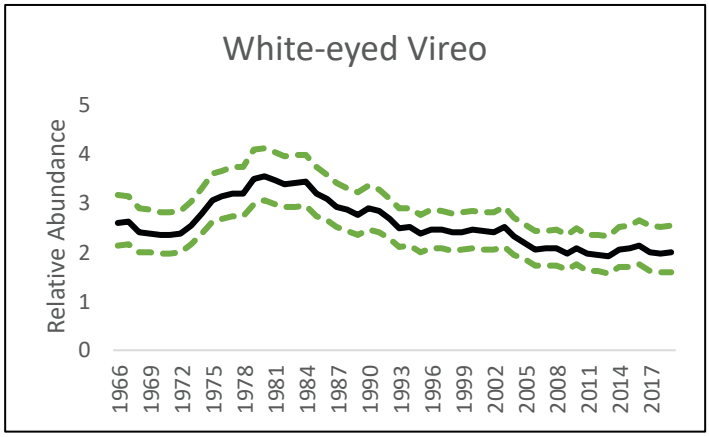


Regional Trend:
Positive (2.06 (1.33 – 2.78))



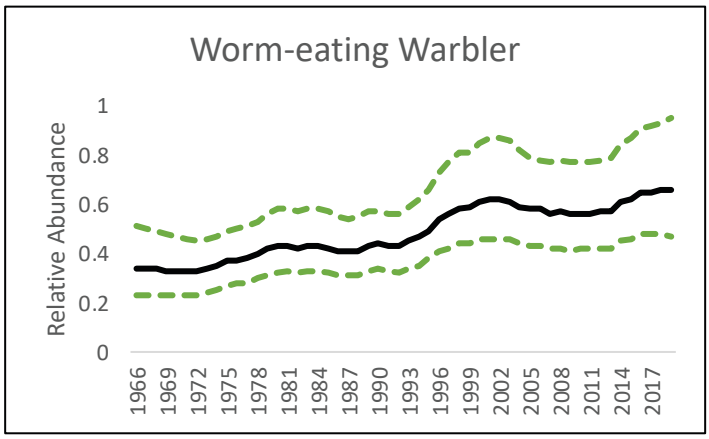


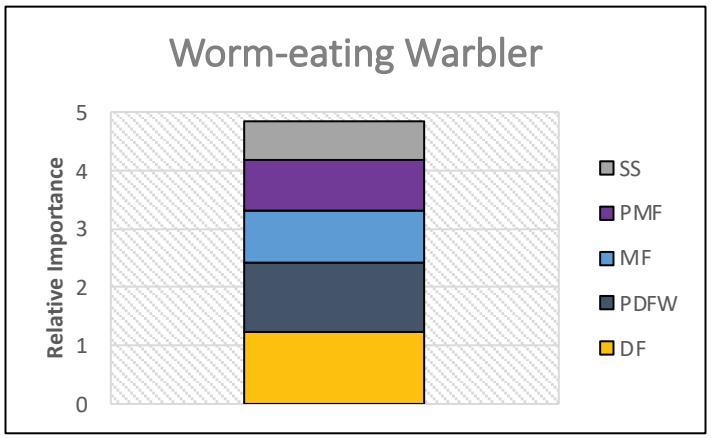
Regional Trend:
Stable (-0.50 (-1.01 – 0.06))



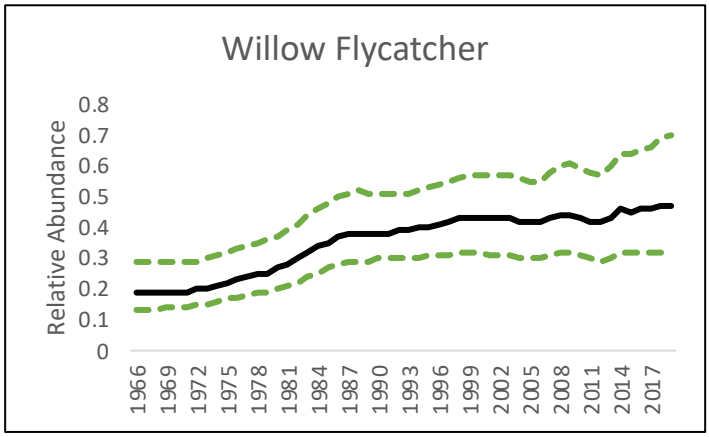
Data Deficient

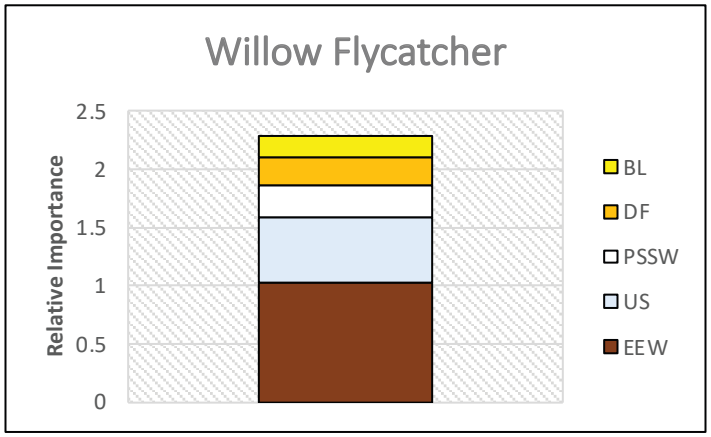
Regional Trend:
Positive (1.23 (0.31 – 2.28))



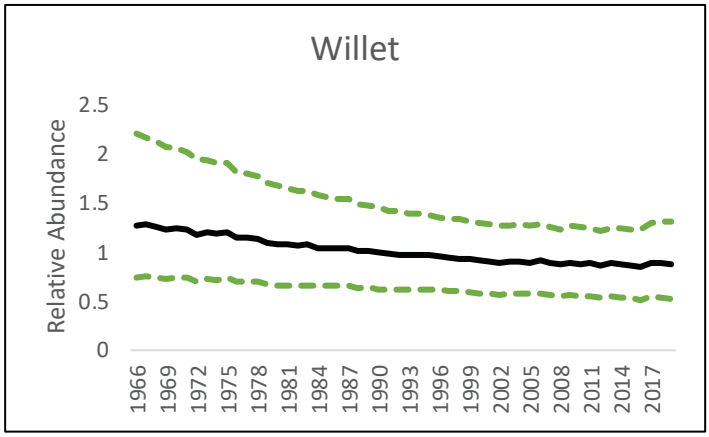


Regional Trend:
Positive (1.70 (0.80 – 2.70))



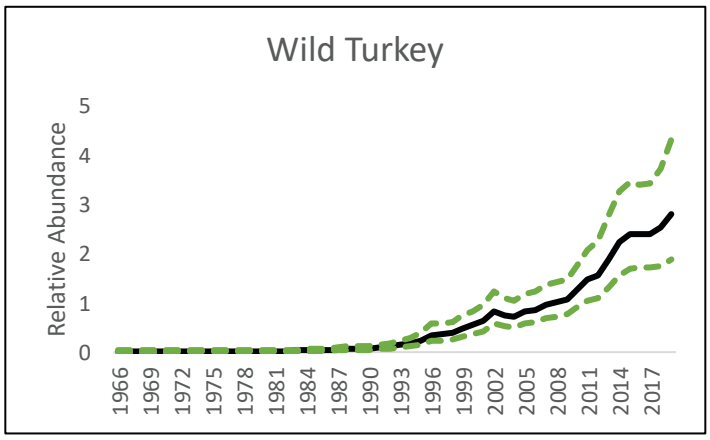


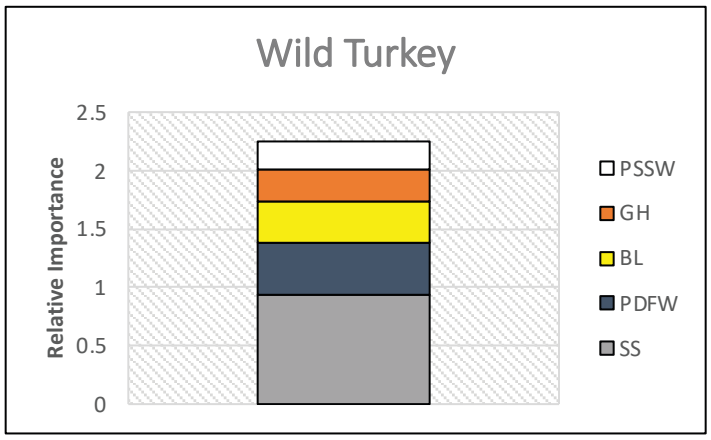
Regional Trend:
Stable (-0.74 (-1.86 – 0.41))



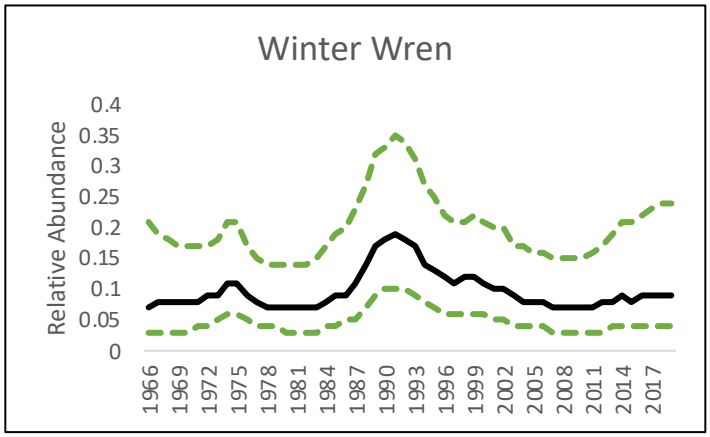
Data Deficient

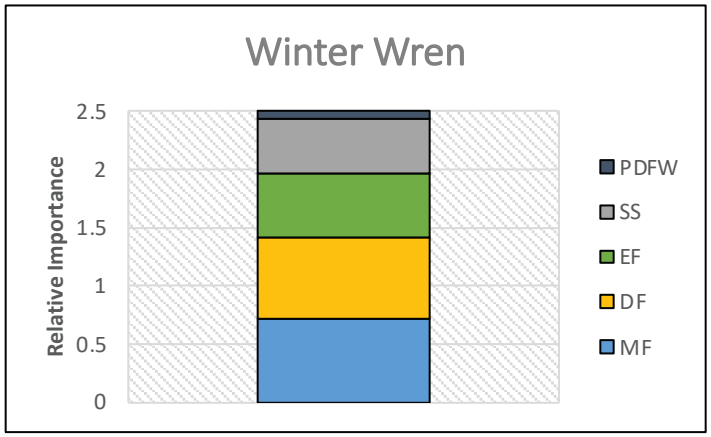
Regional Trend:
Positive (10.81 (8.17 – 13.25))



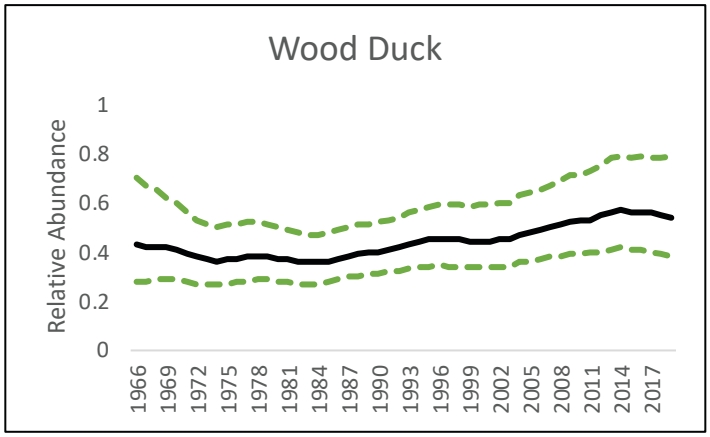


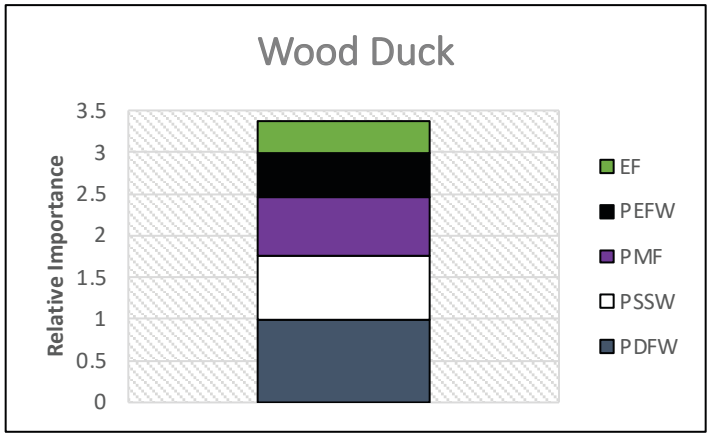
Regional Trend:
Stable (0.42 (-2.11 – 2.94))



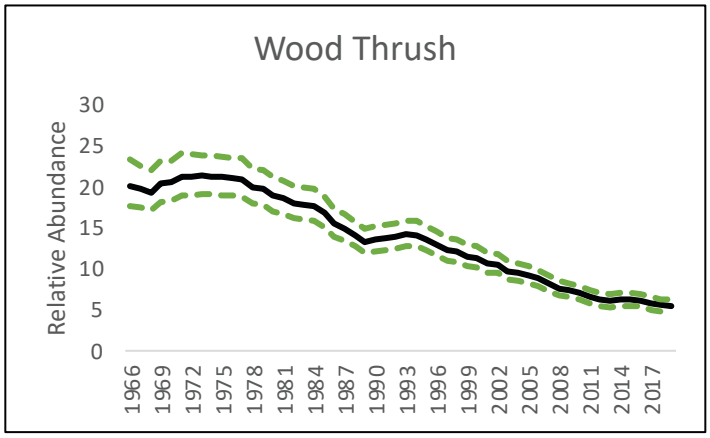


Regional Trend:
Stable (0.44 (-0.67 – 1.53))

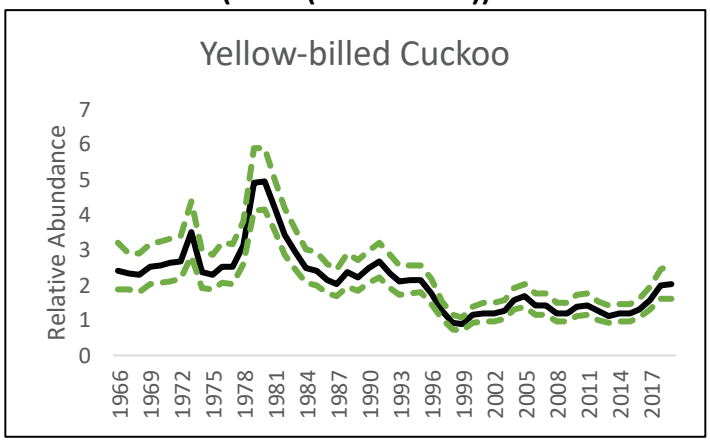


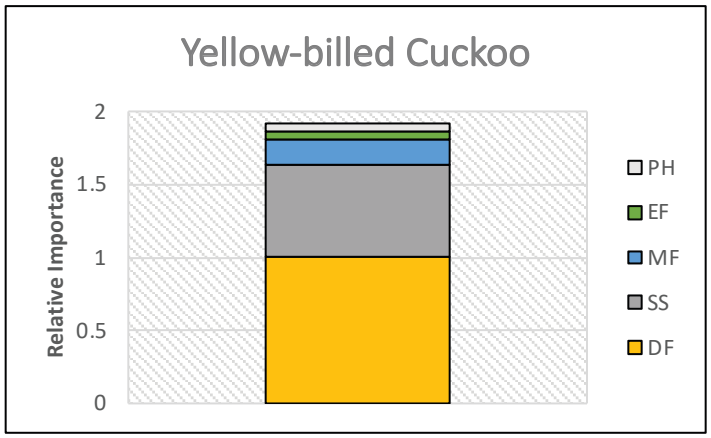


Regional Trend:
Negative (-2.42 (-2.74 – -2.10))

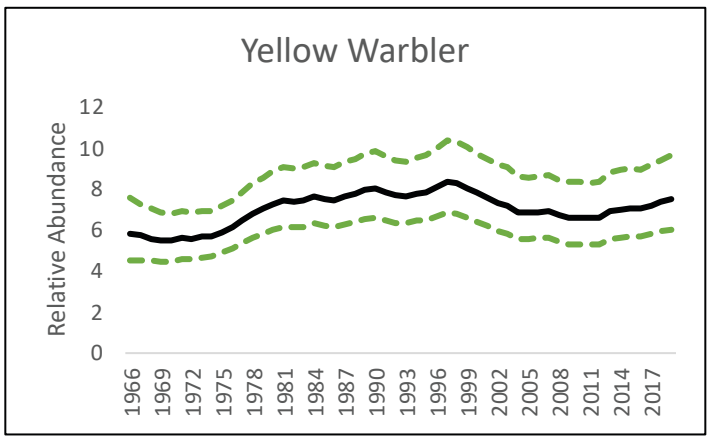


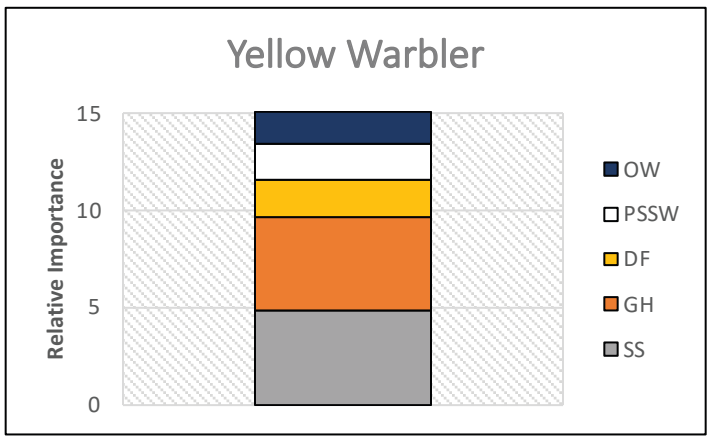
Regional Trend:
Stable (-0.31 (-0.98 – 0.33))



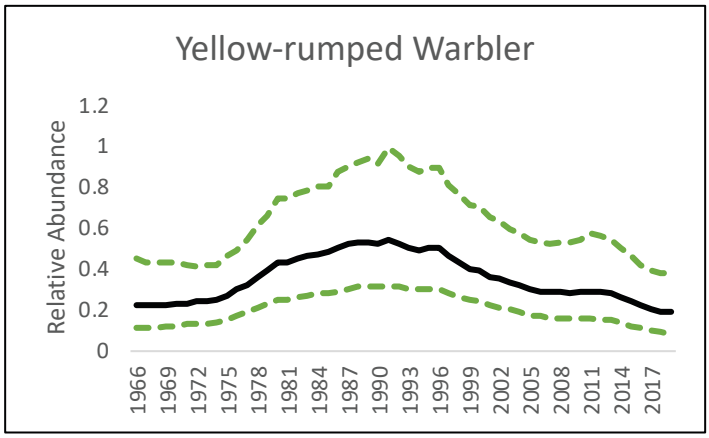


Regional Trend:
Stable (0.48 (-0.06 – 1.02))



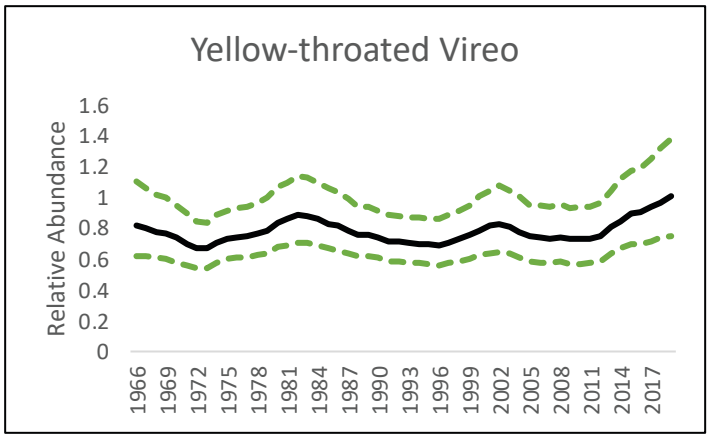


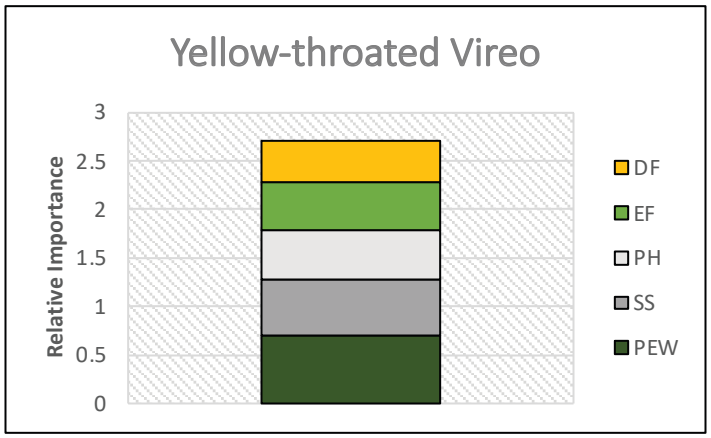
Regional Trend:
Stable (-0.31 (-2.11 – 1.42))



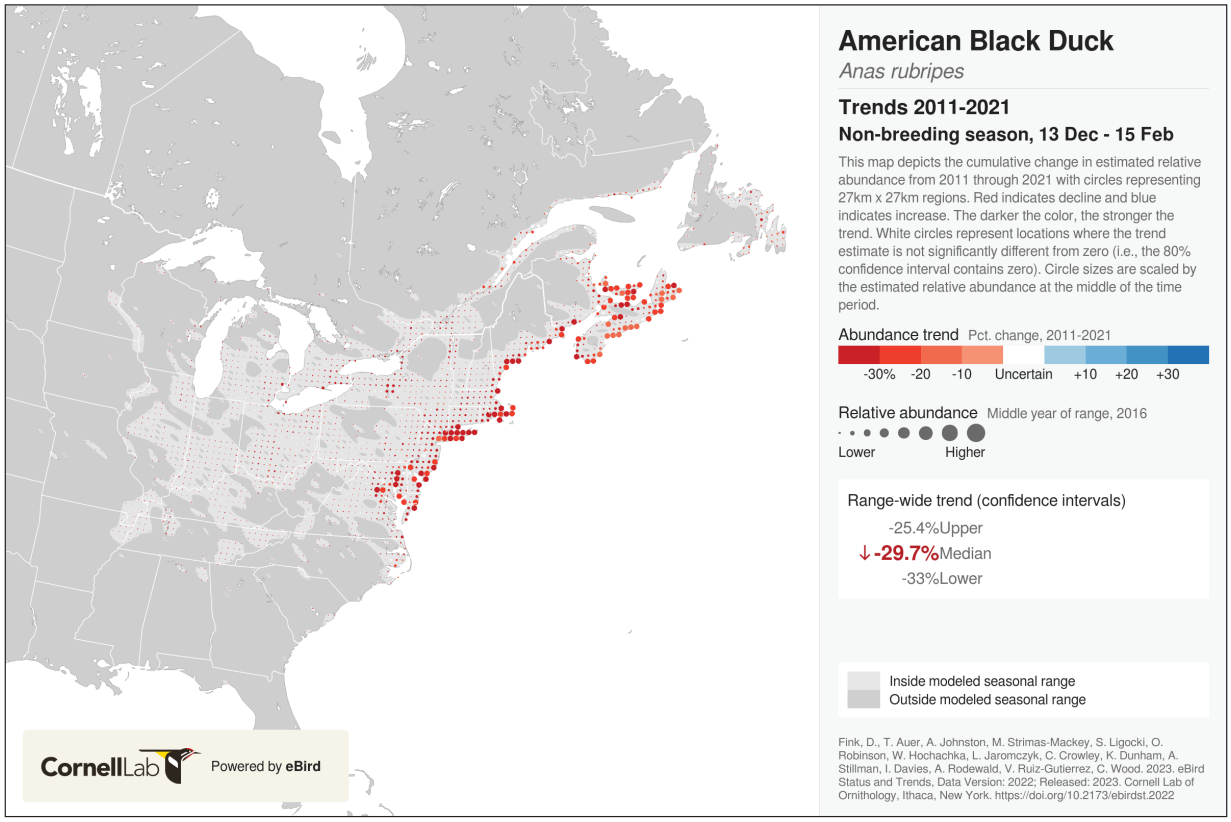
Data Deficient

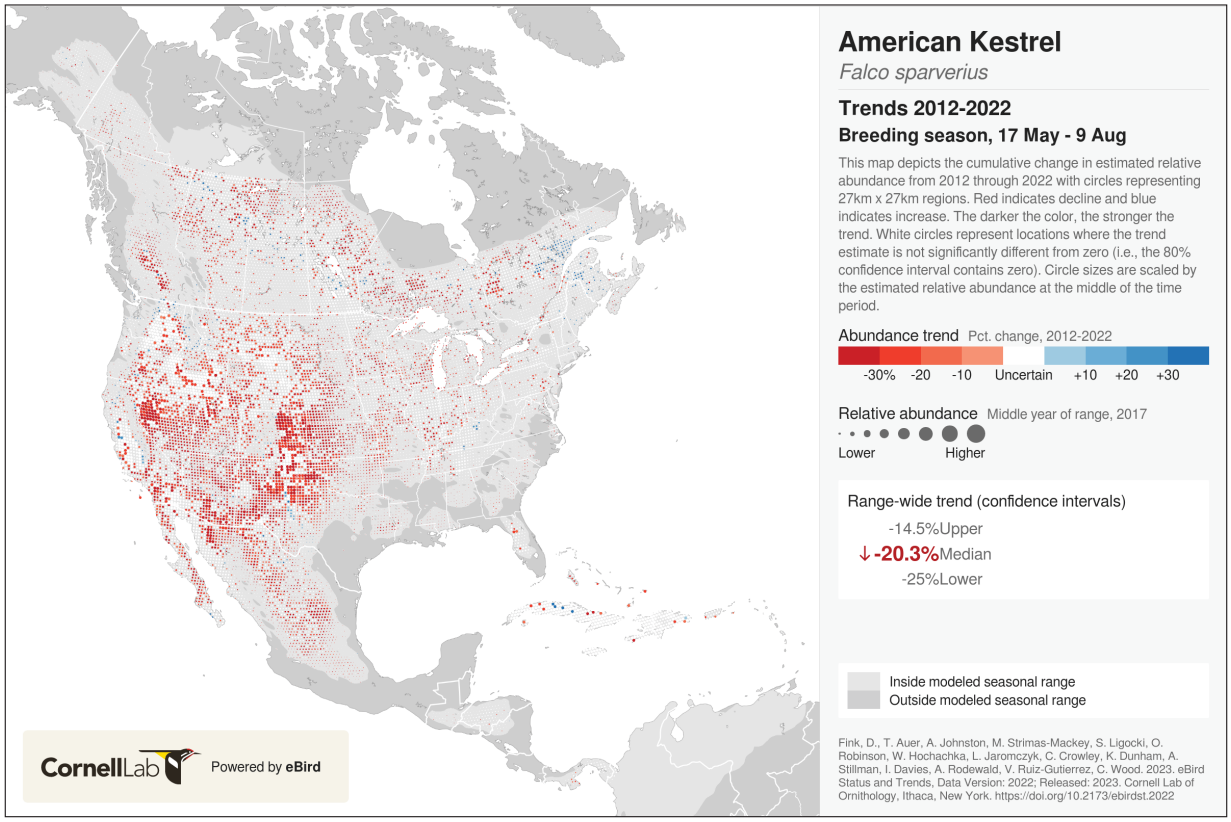
Regional Trend:
Stable (0.39 (-0.34 – 1.18))

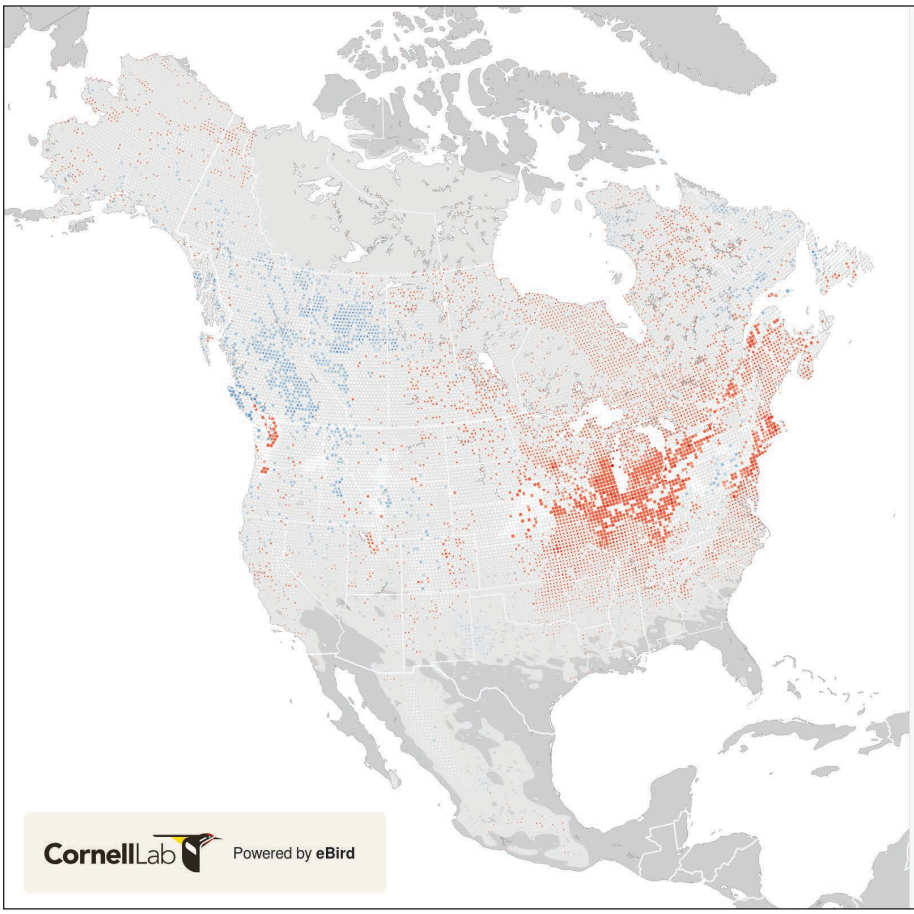




eBird Status and Trend Maps







American Robin

Turdus migratorius

Trends 2012-2022

Breeding season, 24 May - 9 Aug

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-1.8% Upper

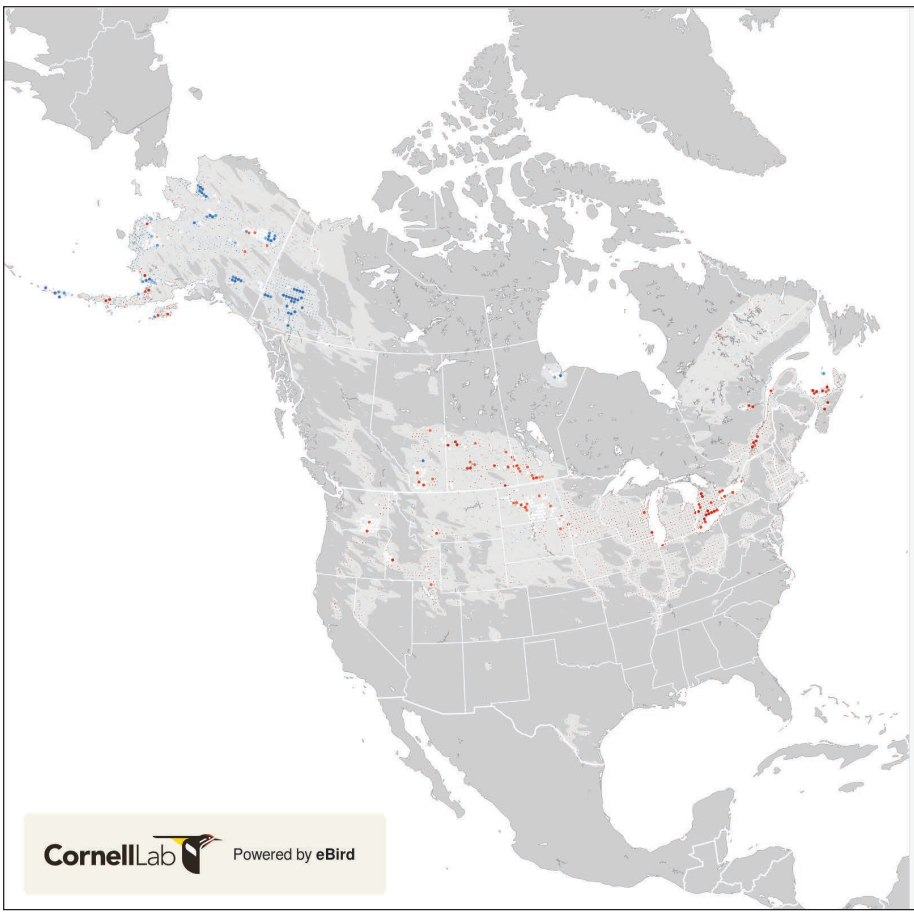
↓ **-4.2%** Median

-6.6% Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Bank Swallow *Riparia riparia*

Trends 2012-2022

Breeding season, 7 Jun - 21 Jun

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

1.1% Upper

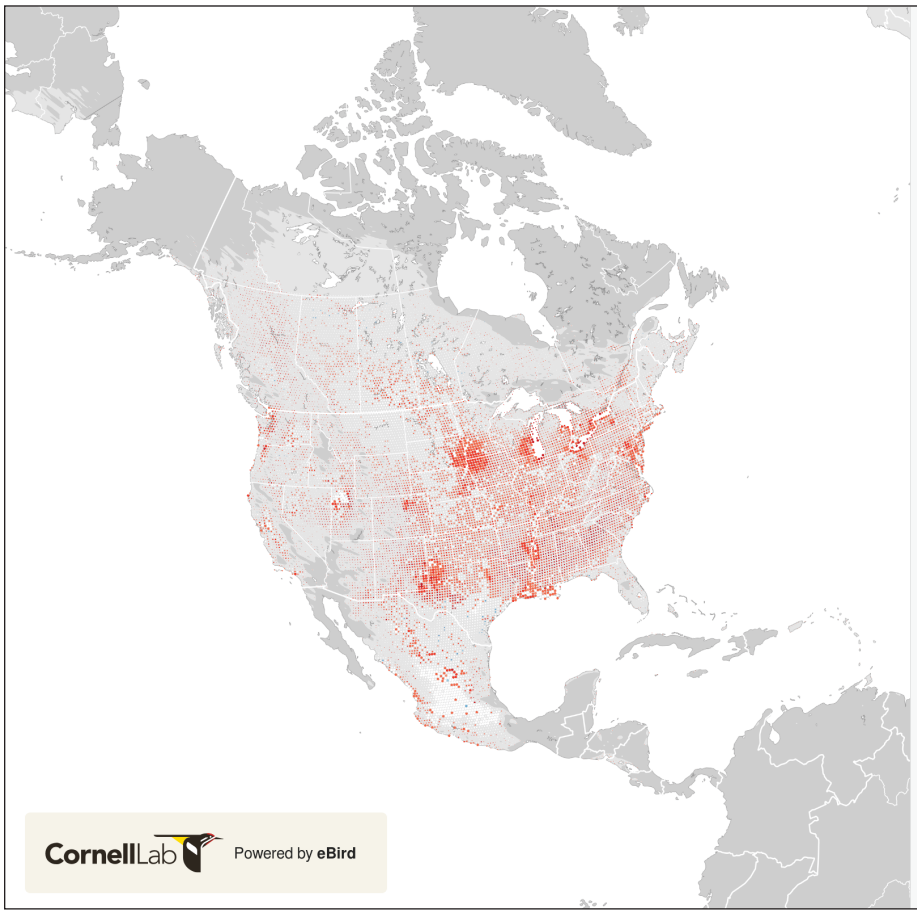
↓ **-2.8%** Median

-8.5% Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Barn Swallow *Hirundo rustica*

Trends 2012-2022

Breeding season, 31 May - 12 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-12.7%Upper

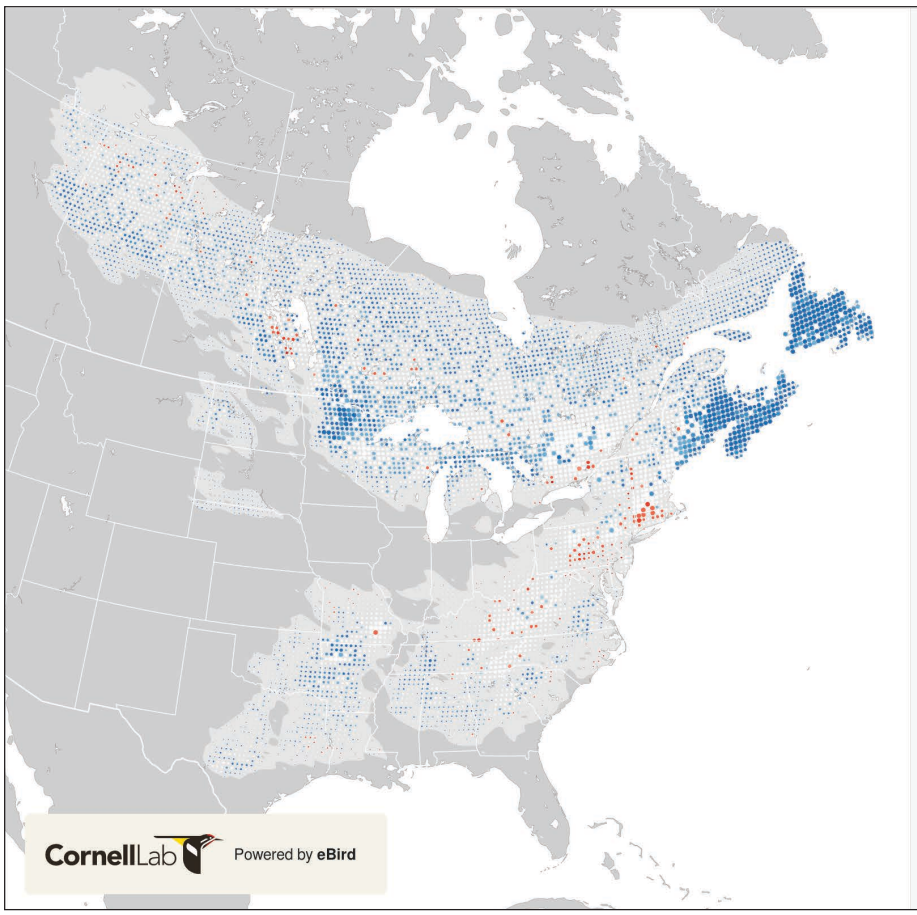
↓**-15.6%**Median

-18.2%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Black-and-white Warbler

Mniotilta varia

Trends 2012-2022

Breeding season, 7 Jun - 5 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

20.6%Upper

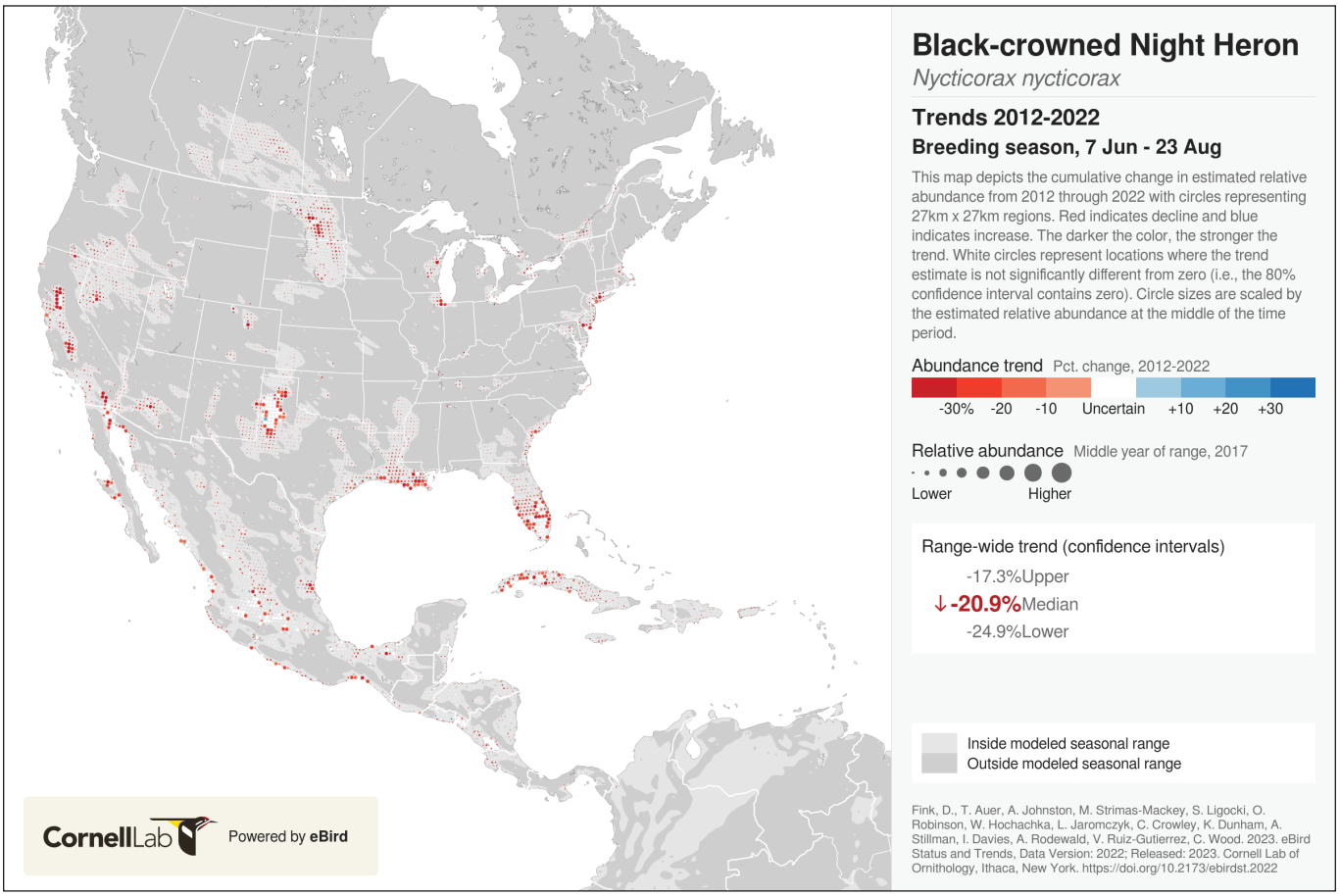
↑**18.3%**Median

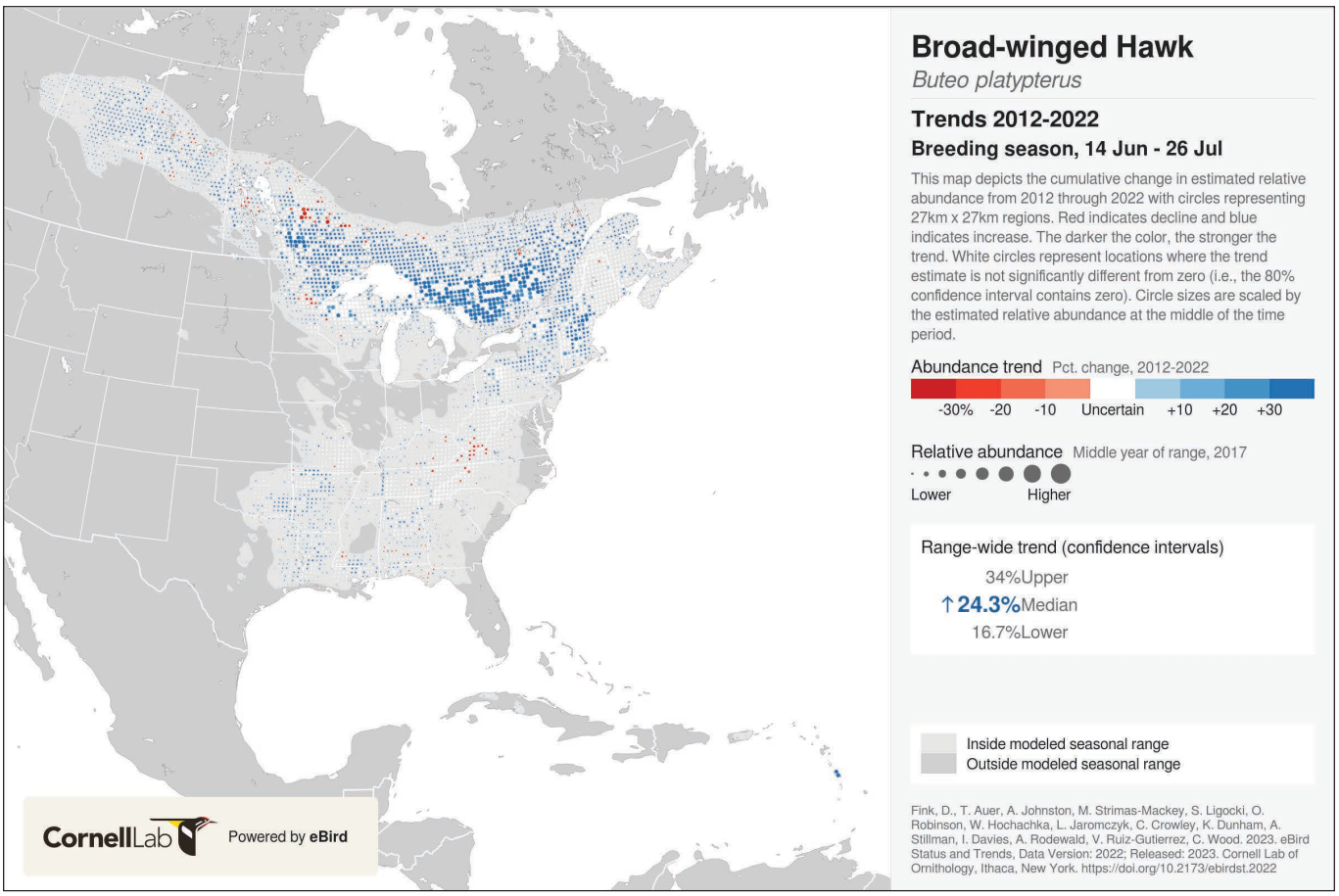
15.2%Lower

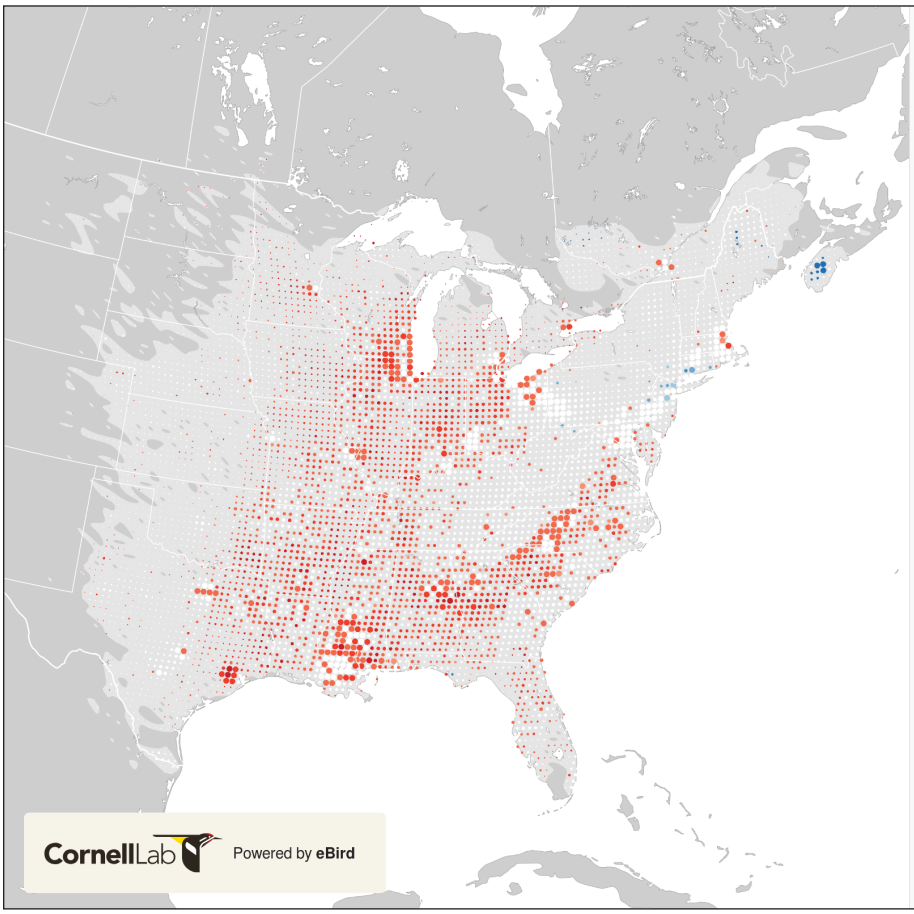
Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022


Black-crowned Night Heron
Nycticorax nycticorax
Trends 2012-2022
Breeding season, 7 Jun - 23 Aug
This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.
Abundance trend Pct. change, 2012-2022
-30% -20 -10 Uncertain +10 +20 +30
Relative abundance Middle year of range, 2017
Lower Higher
Range-wide trend (confidence intervals)
-17.3%Upper
↓ -20.9%Median
-24.9%Lower
Inside modeled seasonal range
Outside modeled seasonal range
CornellLab Powered by eBird
Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022


Broad-winged Hawk
Buteo platypterus
Trends 2012-2022
Breeding season, 14 Jun - 26 Jul
This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.
Abundance trend Pct. change, 2012-2022
-30% -20 -10 Uncertain +10 +20 +30
Relative abundance Middle year of range, 2017
Lower Higher
Range-wide trend (confidence intervals)
34%Upper
↑ 24.3%Median
16.7%Lower
Inside modeled seasonal range
Outside modeled seasonal range
CornellLab Powered by eBird
Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Chimney Swift *Chaetura pelagica*

Trends 2012-2022

Breeding season, 31 May - 12 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-12%Upper

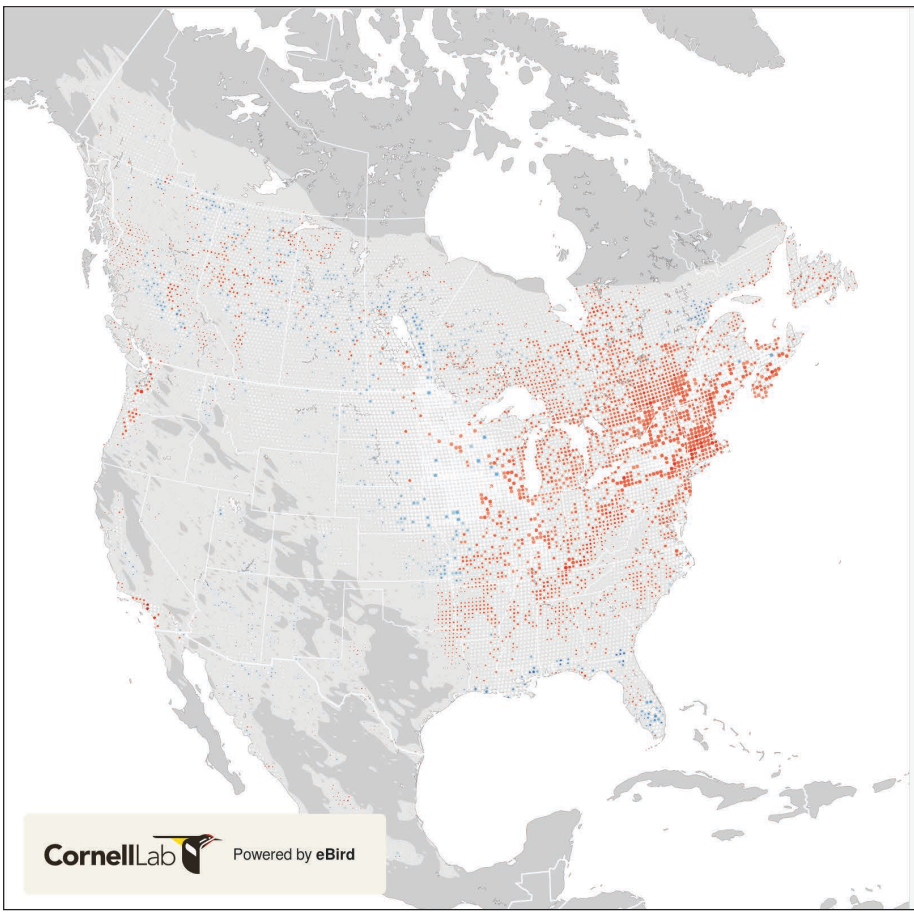
↓**-13.7%**Median

-15.9%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Common Yellowthroat

Geothlypis trichas

Trends 2012-2022

Breeding season, 31 May - 19 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-2.4%Upper

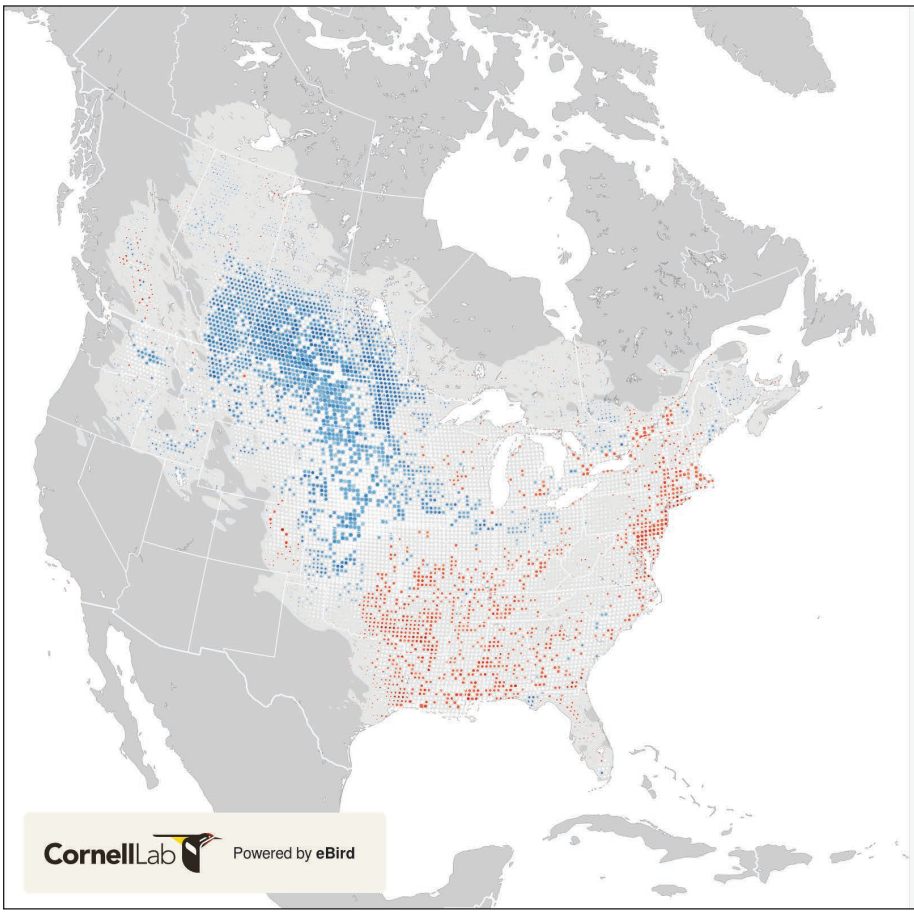
↓**-4.2%**Median

-6.8%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Eastern Kingbird

Tyrannus tyrannus

Trends 2012-2022

Breeding season, 7 Jun - 26 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

8%Upper

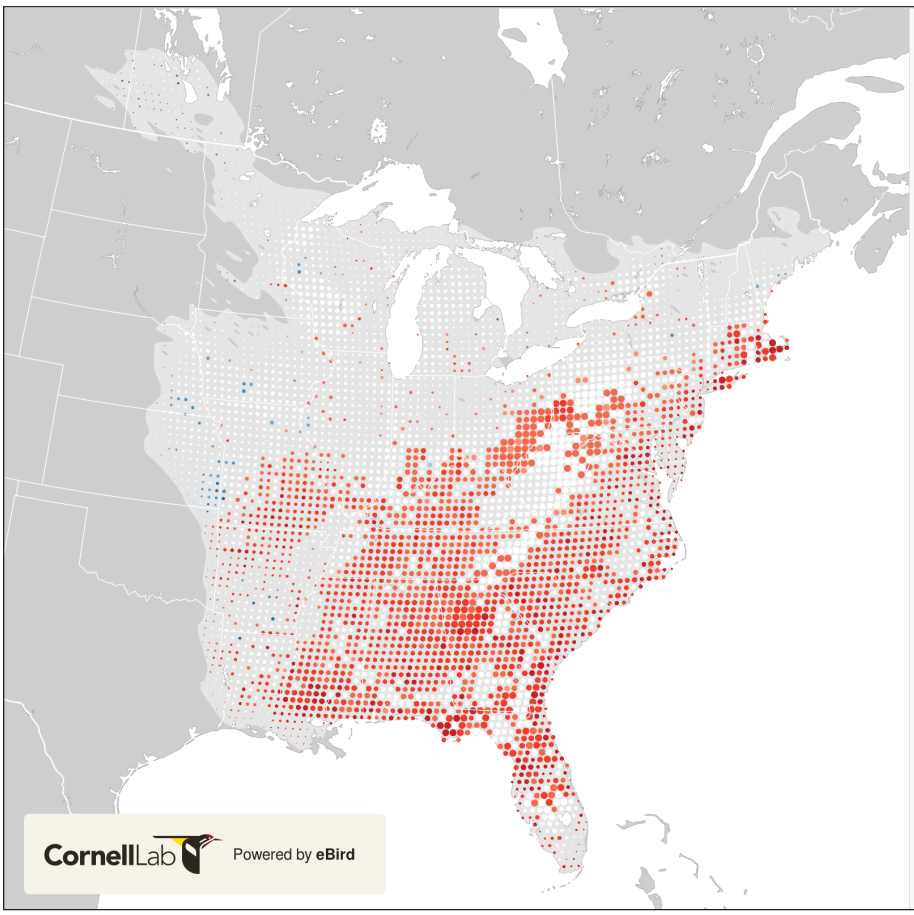
↑ 4.9%Median

2.6%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Eastern Towhee

Pipilo erythrophthalmus

Trends 2012-2022

Breeding season, 7 Jun - 13 Sep

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-12.5%Upper

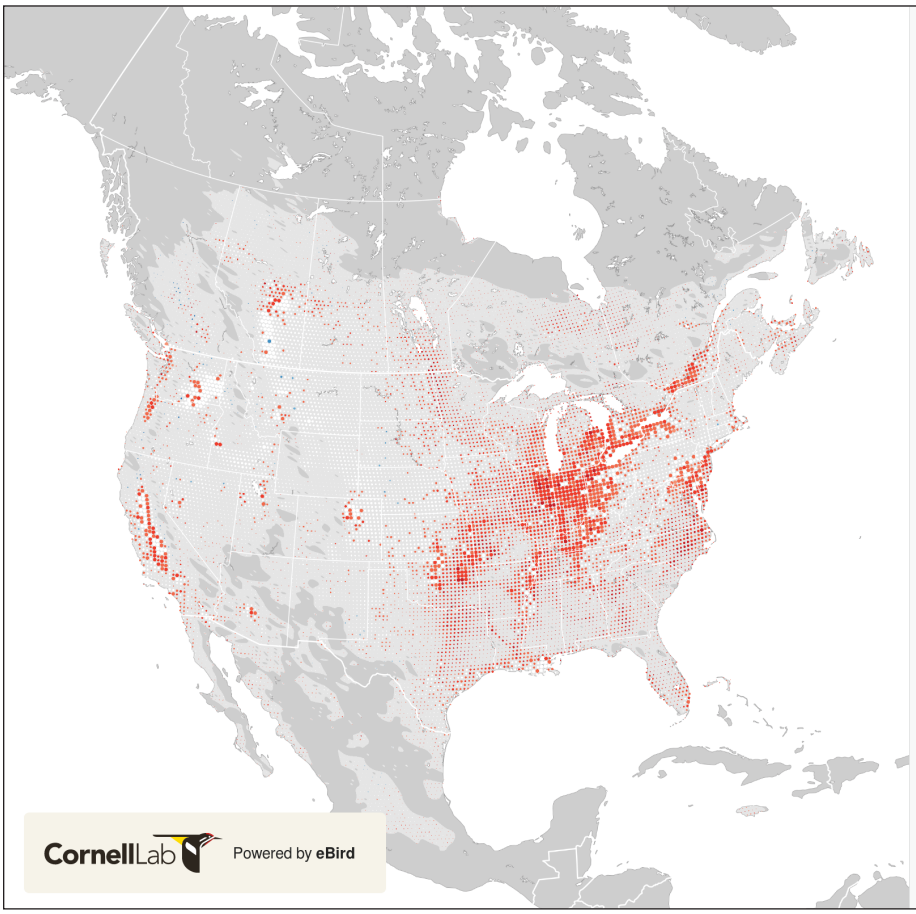
↓ -15.1%Median

-17.7%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



European Starling

Sturnus vulgaris

Trends 2012-2022

Breeding season, 19 Apr - 30 Aug

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-12.8%Upper

↓ **-14.9%**Median

-17.5%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022

Glossy Ibis *Plegadis falcinellus*

Trends 2012-2022

Breeding season, 3 May - 19 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

31.4%Upper

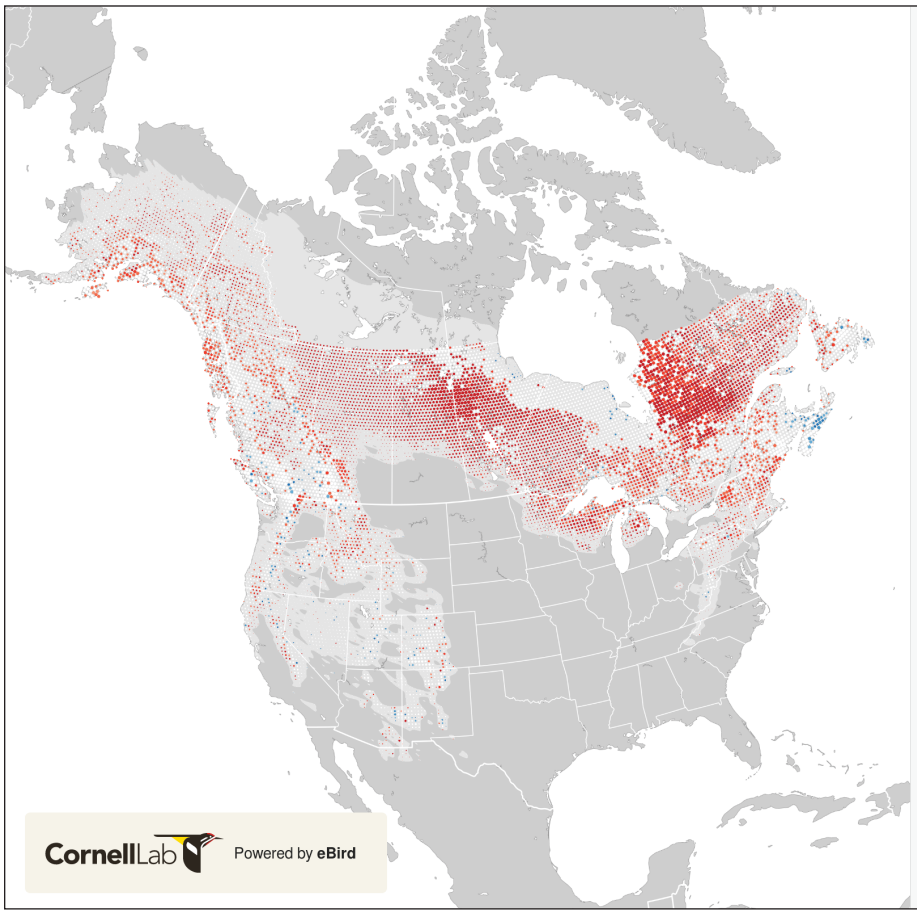
↑ **21.1%**Median

14.3%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Hermit Thrush *Catharus guttatus*

Trends 2012-2022

Breeding season, 7 Jun - 16 Aug

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-18.9%Upper

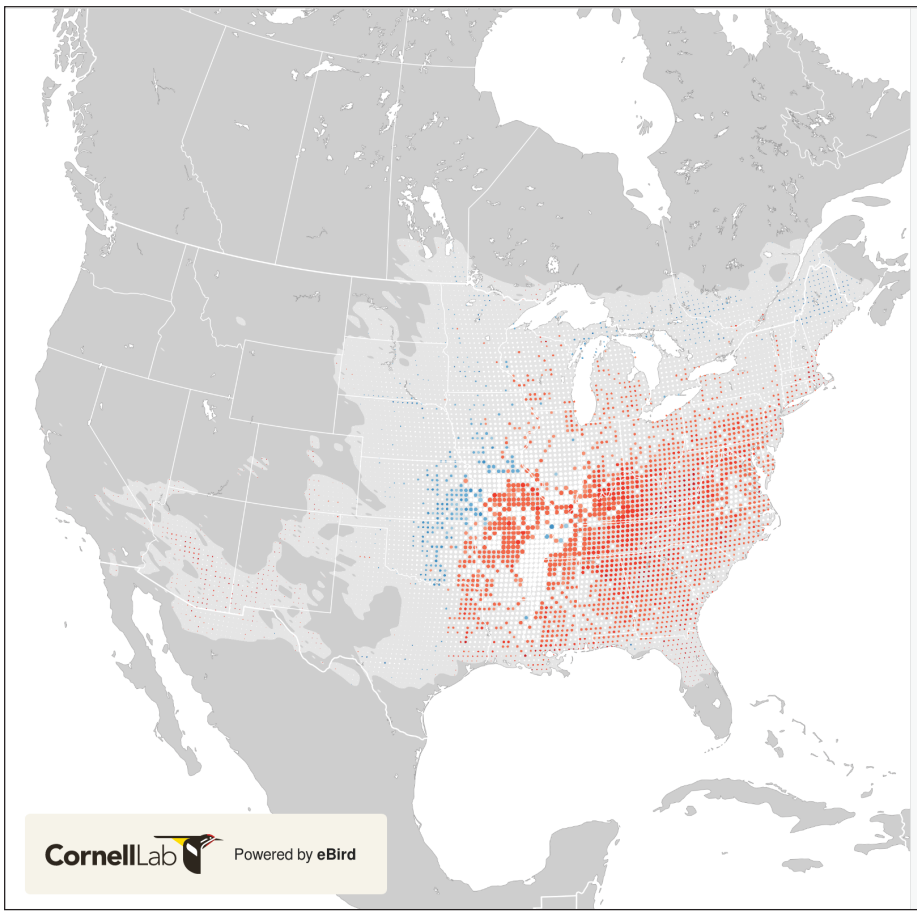
↓ **-23.6%**Median

-26%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Indigo Bunting *Passerina cyanea*

Trends 2012-2022

Breeding season, 7 Jun - 2 Aug

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-6.7%Upper

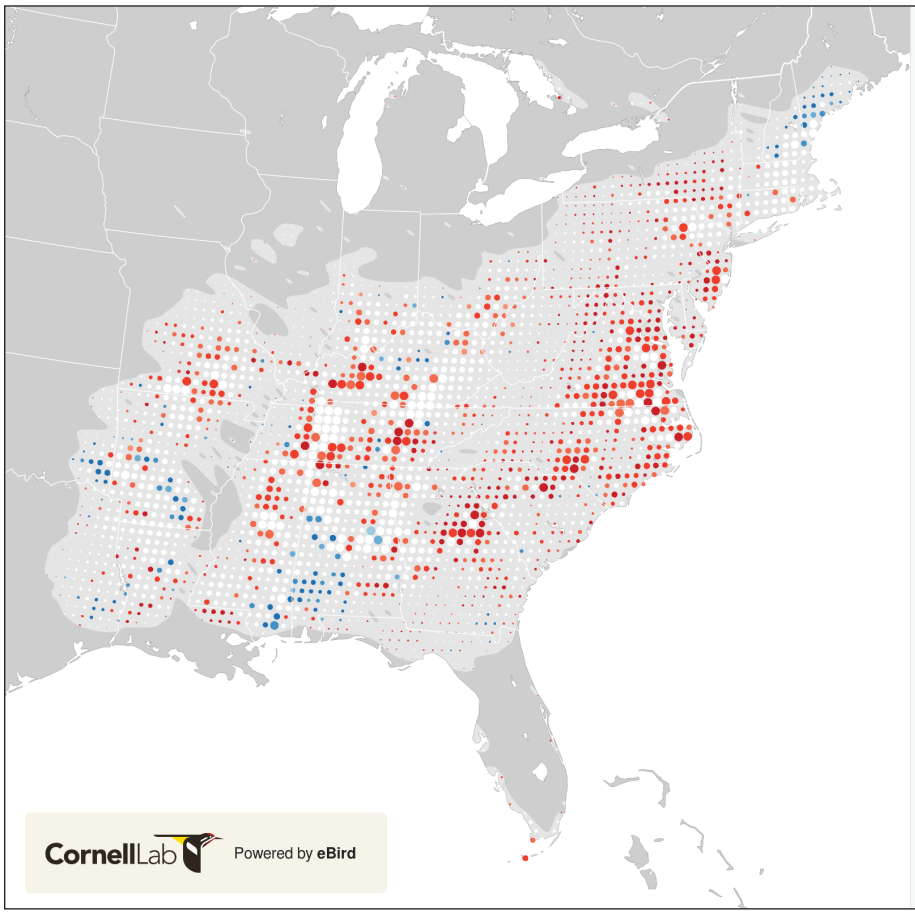
↓ **-8.6%**Median

-10.6%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Prairie Warbler

Setophaga discolor

Trends 2012-2022

Breeding season, 24 May - 5 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-7.2%Upper

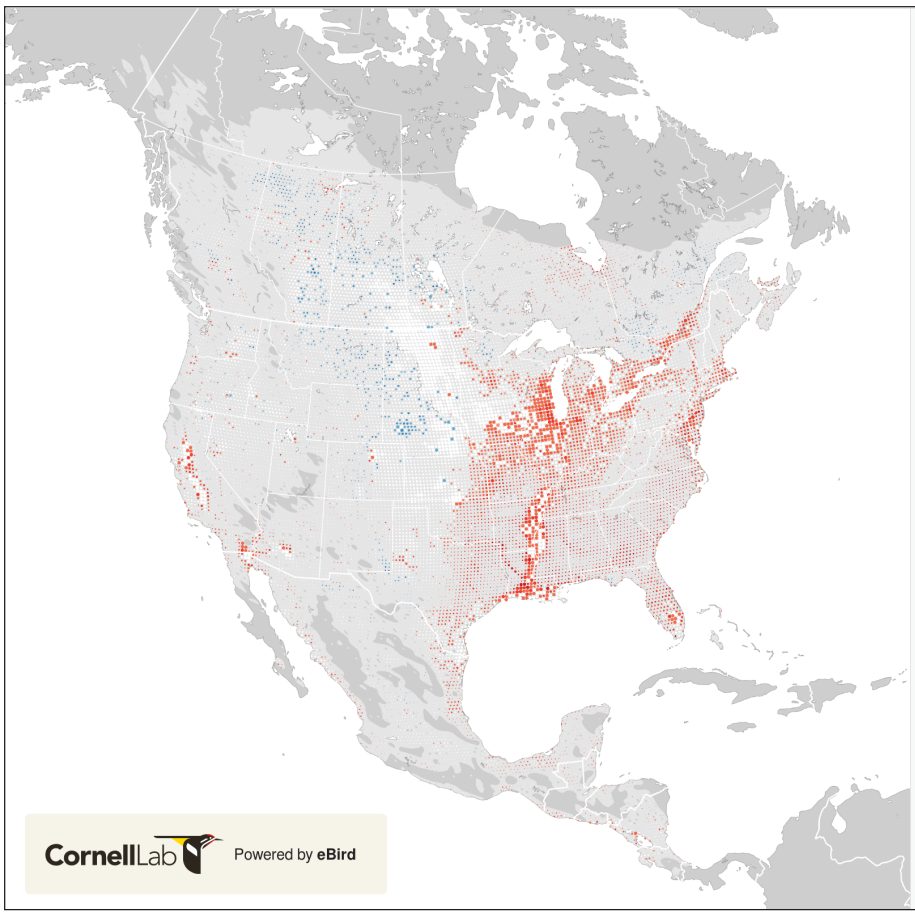
↓-12.4%Median

-15.6%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Red-winged Blackbird

Agelaius phoeniceus

Trends 2012-2022

Breeding season, 3 May - 2 Aug

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-3%Upper

↓-6.2%Median

-9%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022

Rock Pigeon *Columba livia*

Trends 2012-2022

Year-round

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-13.5%Upper

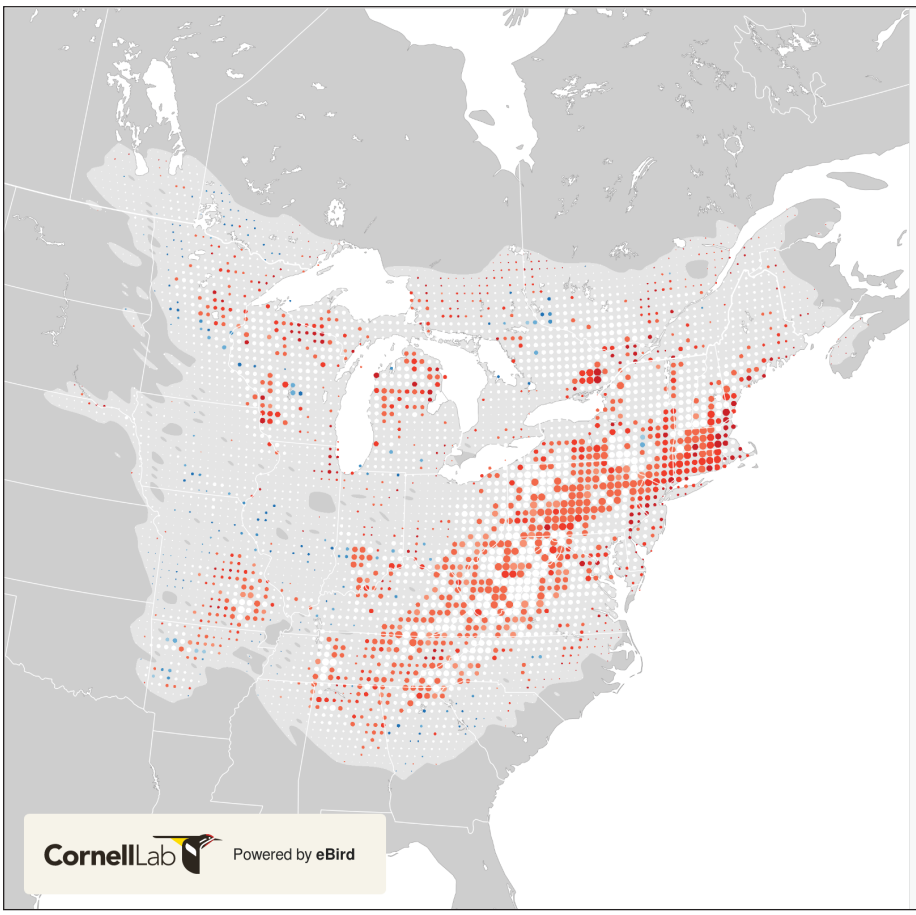
↓**-19.9%**Median

-24.1%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Scarlet Tanager *Piranga olivacea*

Trends 2012-2022

Breeding season, 7 Jun - 16 Aug

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-7.2%Upper

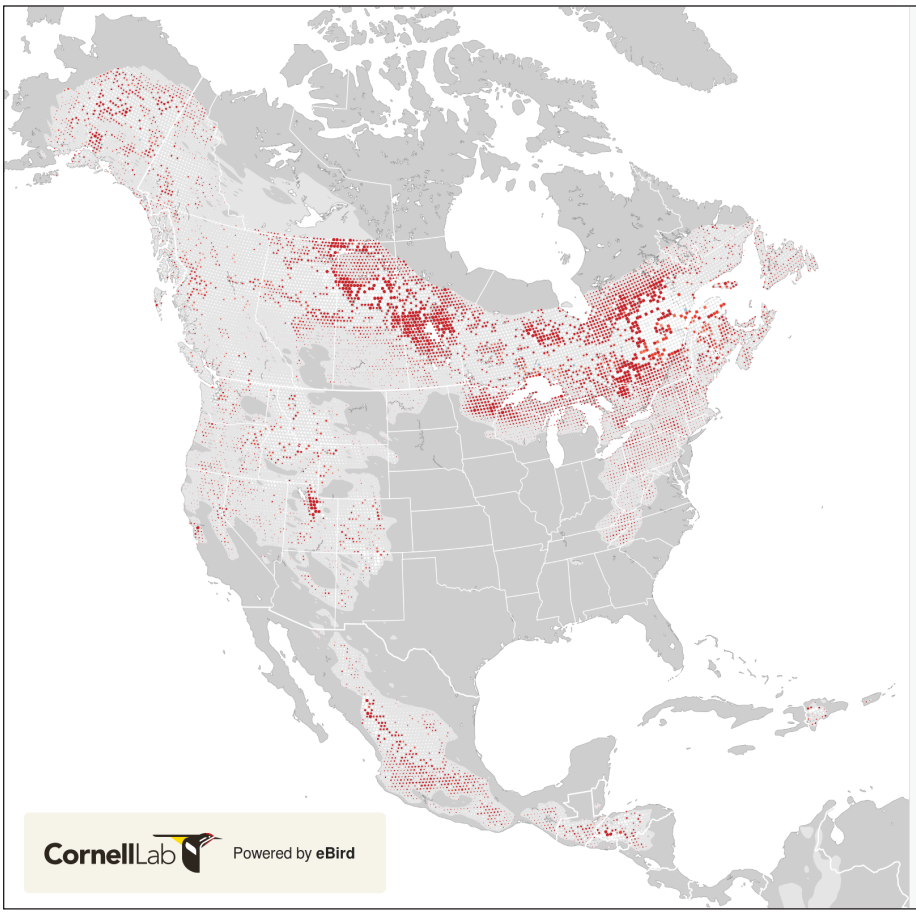
↓**-10.9%**Median

-14.6%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Sharp-shinned Hawk

Accipiter striatus

Trends 2012-2022

Breeding season, 31 May - 19 Jul

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

-29.3%Upper

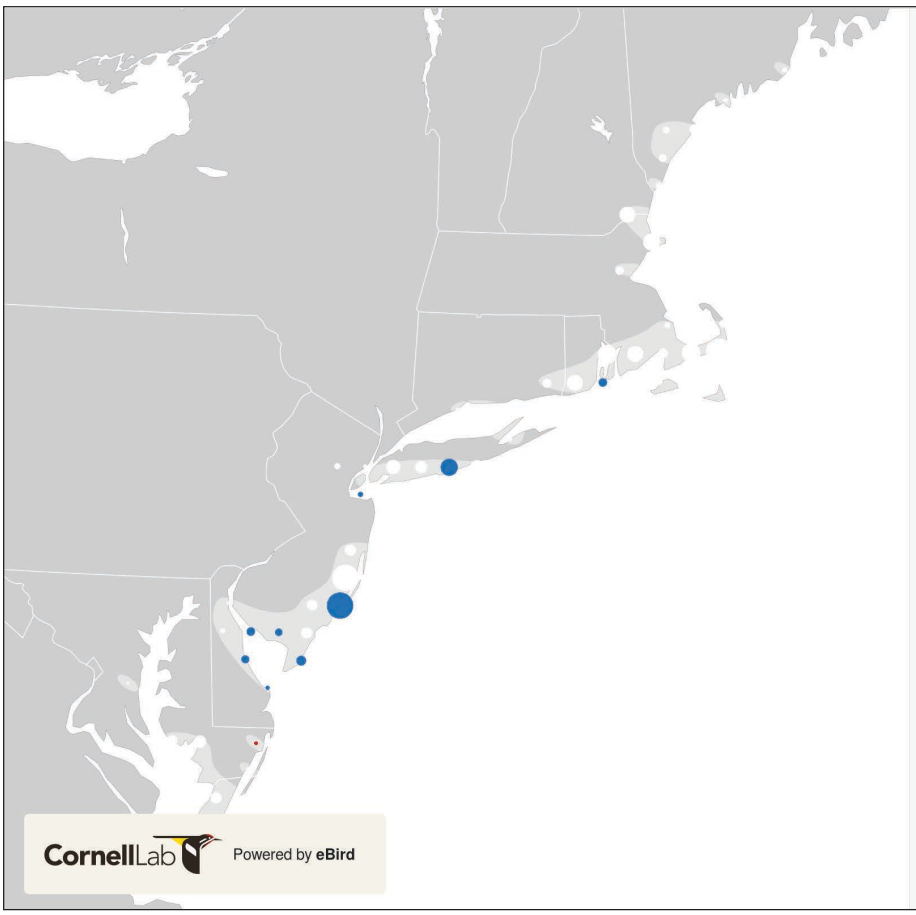
↓ **-41.2%**Median

-46.4%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022



Saltmarsh Sparrow

Ammospiza caudacuta

Trends 2012-2022

Breeding season, 24 May - 6 Sep

This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.

Abundance trend Pct. change, 2012-2022

-30% -20 -10 Uncertain +10 +20 +30

Relative abundance Middle year of range, 2017

Lower Higher

Range-wide trend (confidence intervals)

29.8%Upper

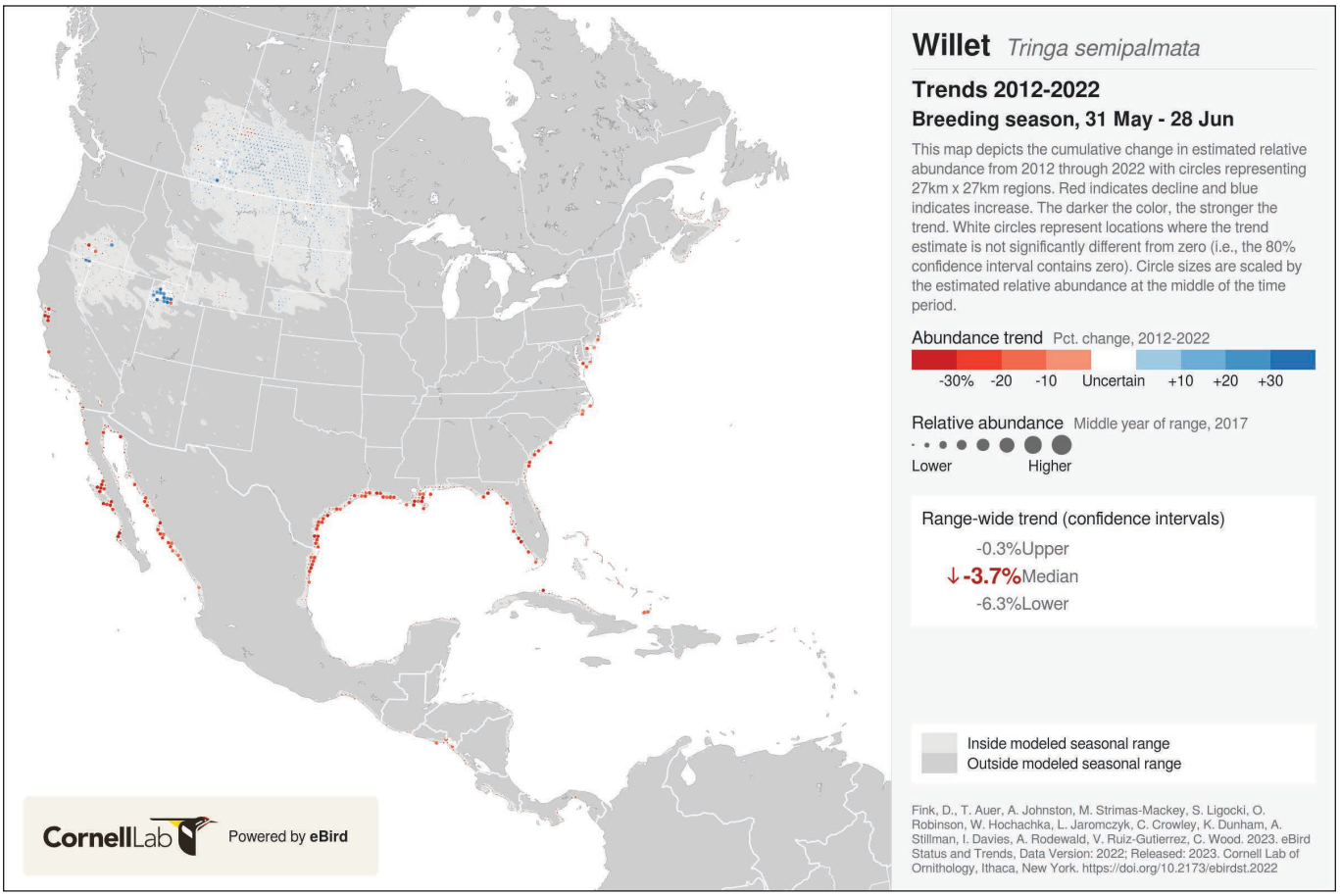
↑ **14.7%**Median

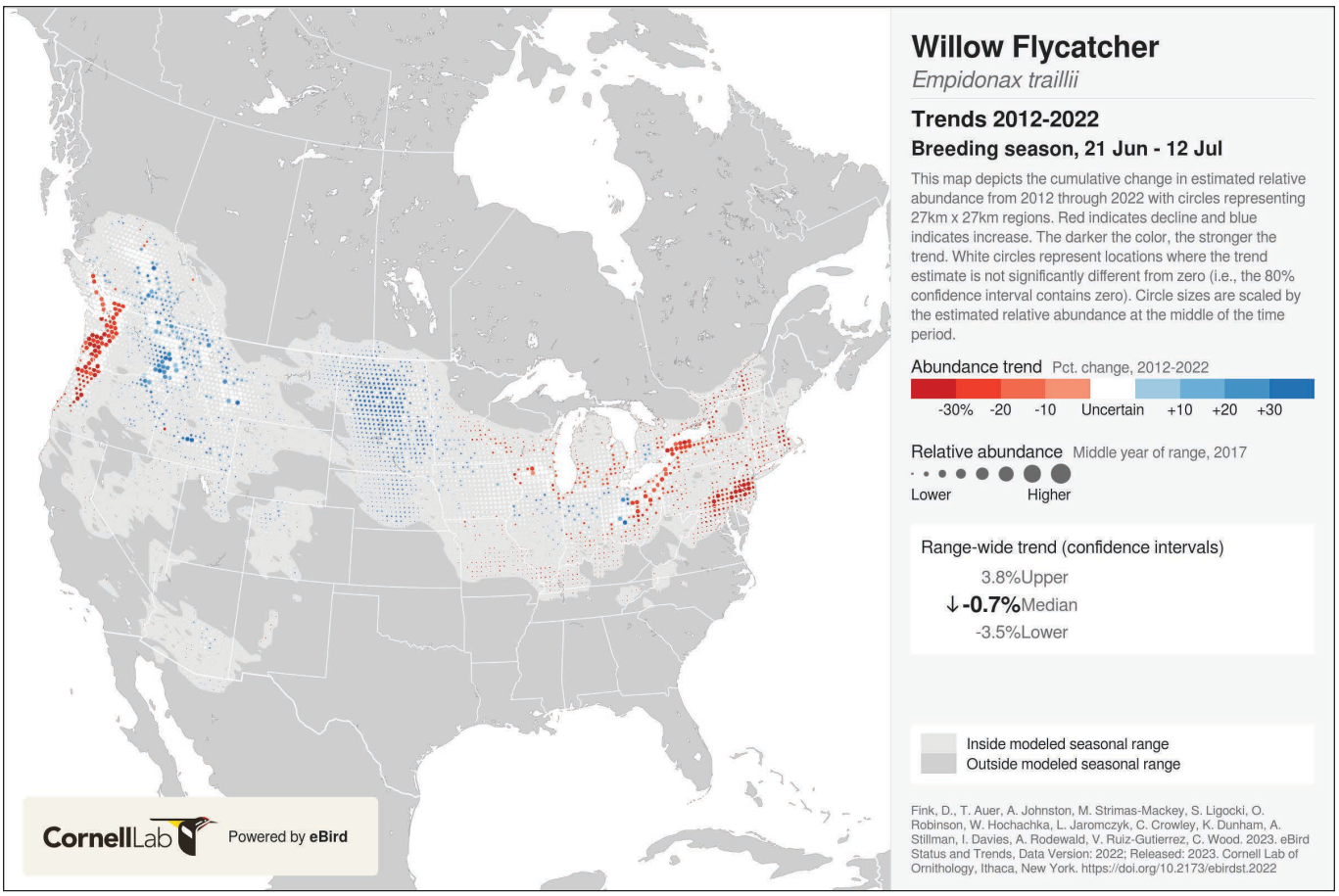
-0.3%Lower

Inside modeled seasonal range

Outside modeled seasonal range

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022


Willet Tringa semipalmata
Trends 2012-2022
Breeding season, 31 May - 28 Jun
This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.
Abundance trend Pct. change, 2012-2022
-30% -20 -10 Uncertain +10 +20 +30
Relative abundance Middle year of range, 2017
Lower Higher
Range-wide trend (confidence intervals)
-0.3%Upper
↓-3.7%Median
-6.3%Lower
Inside modeled seasonal range
Outside modeled seasonal range
CornellLab Powered by eBird
Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022


Willow Flycatcher
Empidonax traillii
Trends 2012-2022
Breeding season, 21 Jun - 12 Jul
This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.
Abundance trend Pct. change, 2012-2022
-30% -20 -10 Uncertain +10 +20 +30
Relative abundance Middle year of range, 2017
Lower Higher
Range-wide trend (confidence intervals)
3.8%Upper
↓-0.7%Median
-3.5%Lower
Inside modeled seasonal range
Outside modeled seasonal range
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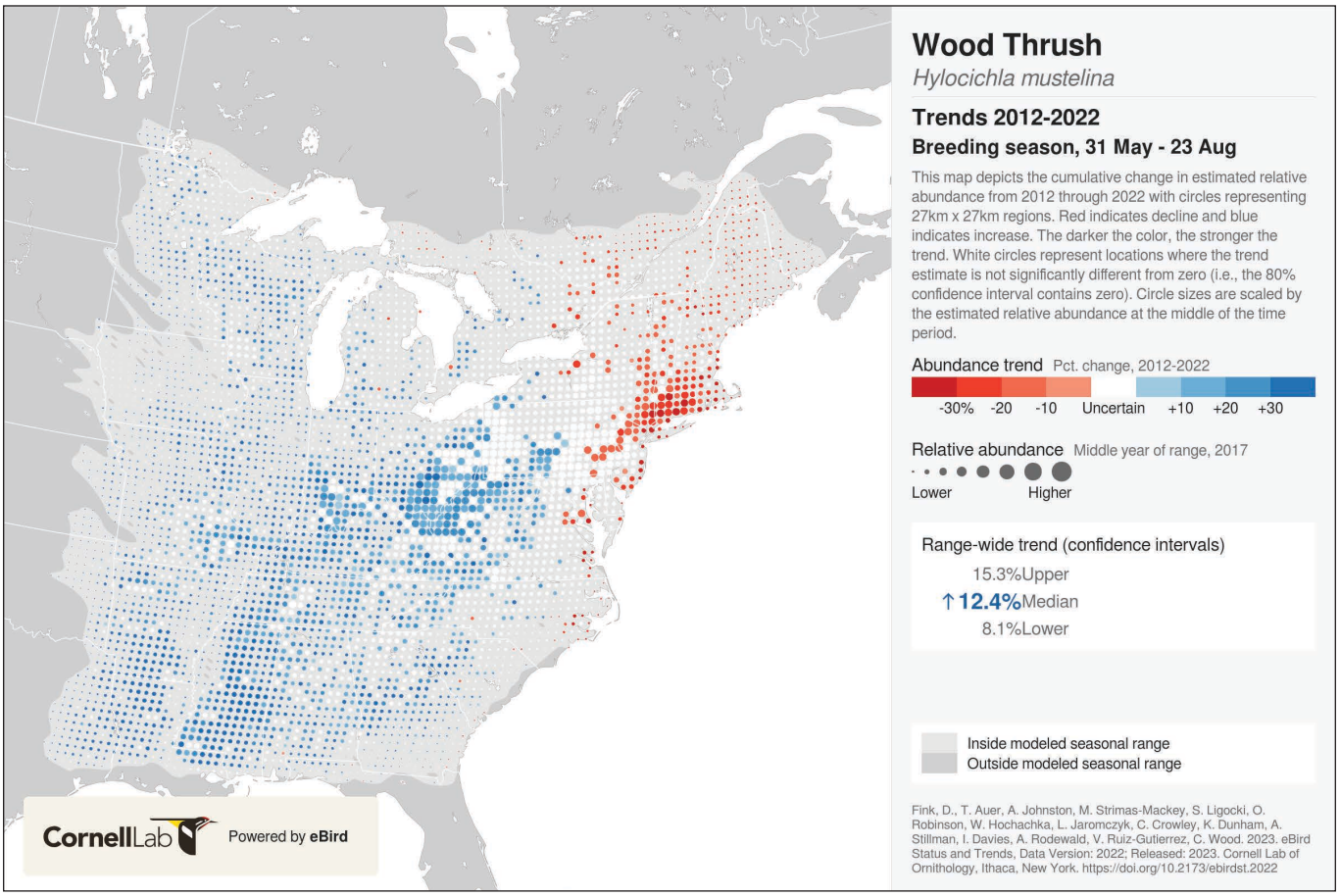
Wood Thrush
Hylocichla mustelina
Trends 2012-2022
Breeding season, 31 May - 23 Aug
This map depicts the cumulative change in estimated relative abundance from 2012 through 2022 with circles representing 27km x 27km regions. Red indicates decline and blue indicates increase. The darker the color, the stronger the trend. White circles represent locations where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero). Circle sizes are scaled by the estimated relative abundance at the middle of the time period.
Abundance trend Pct. change, 2012-2022
-30% -20 -10 Uncertain +10 +20 +30
Relative abundance Middle year of range, 2017
Lower Higher
Range-wide trend (confidence intervals)
15.3% Upper
↑12.4% Median
8.1% Lower
Inside modeled seasonal range
Outside modeled seasonal range
Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022
CornellLab
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Ruby-throated Hummingbird (*Archilochus colubris*)

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eBird Trend and Status Maps were provided by: Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, O. Robinson, S. Ligocki, W. Hochachka, L. Jaromczyk, C. Wood, I. Davies, M. Iliff, L. Seitz. 2021. eBird Status and Trends, Data Version: 2020; Released: 2021. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2020. https://ebird.org/science/status-and-trends.

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Habitat Data were derived from: Office for Coastal Management, 2023: NOAA's Coastal Change Analysis Program (C-CAP) 2006 Regional Land Cover Data - Coastal United States, https://www.fisheries.noaa.gov/inport/item/48333.

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BBS Trend Plots were created using data from: Ziolkowski Jr., D.J., Lutmerding, M., Aponte, V.I., and Hudson, M-A.R., 2022, North American Breeding Bird Survey Dataset 1966 - 2021: U.S. Geological Survey data release, https://doi.org/10.5066/P97WAZE5.

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For questions regarding this report, please contact Dr. Charles Clarkson, Director of Avian Research at cclarkson@asri.org.

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THE STATE OF OUR BIRDS

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AUDUBON SOCIETY OF RHODE ISLAND
12 Sanderson Road, Smithfield, RI 02917
audubon@asri.org / www.asri.org

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