

# Using Community Science Programing to Support Conservation Efforts

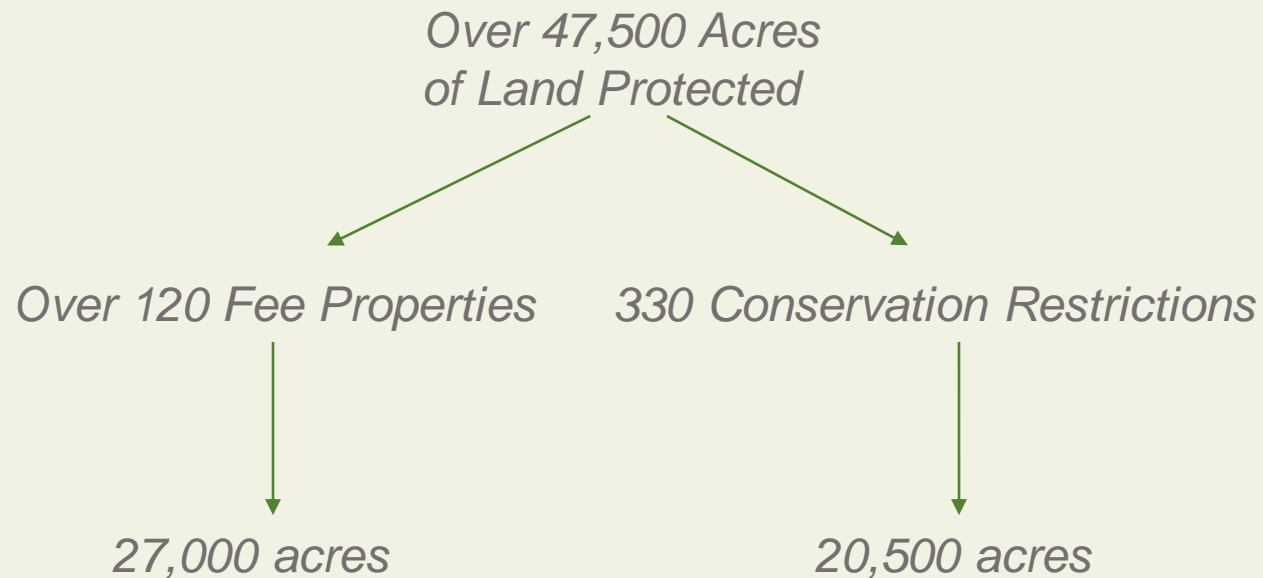
*Isabel Bronson- TerraCorps Land Stewardship Coordinator*

*Dr. Julie Richburg- Lead Inland Ecologist, The Trustees*



# The Trustees

Established in 1891 by landscape architect Charles Eliot, The Trustees is a non-profit land conservation and historic preservation organization dedicated to protecting places of ecological, historical, and cultural significance across Massachusetts.



# TerraCorps

"TerraCorps is an environmental nonprofit working at the intersection of land conservation, sustainable agriculture, and food justice to grow the next generation of environmental leaders."



# What is Community Science?

Participatory science approach

Connecting community members of all ages and backgrounds with scientists and researchers to help answer some of today's most pressing research questions.

## Community Science Participants

- Make Observations
- Collect Data
- Contribute to Data Analysis
- And More!



# Benefits Of Community Science

## *For Conservation Practitioners & Land Trusts*

- Adds Capacity
- Enables Increased Scope and Scale of Project
- Garner Support For Projects
- Integration of Local Knowledge

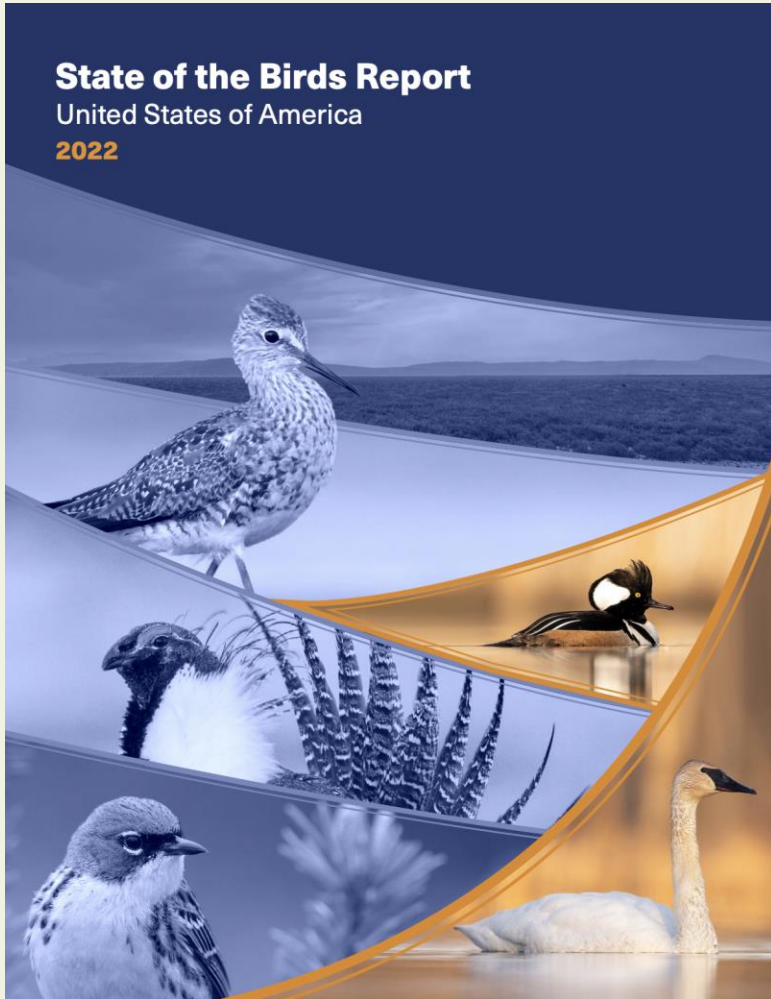
## *For Community Members*

- Science Education
- Empowerment
- Community-Building
- Human-Nature Relationship
- Can Address Community Needs

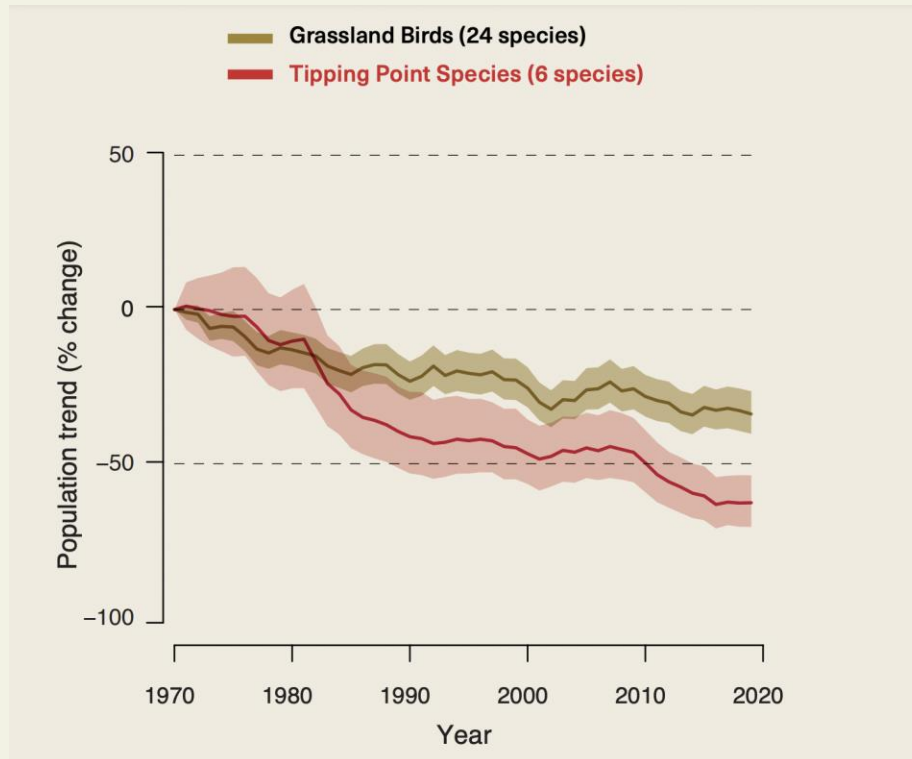
# Volunteer Grassland Bird Monitoring Program



# Conservation Need



Grassland birds have experienced the largest bird declines of any terrestrial biome!



34%  
Reduction In  
Population  
Numbers  
(1970-2019)



2/3  
Grassland  
Birds Have  
Felt The  
Effects



25% At  
Tipping  
Point

# Conservation Need

Numbers of Bobolinks on North American breeding grounds have declined roughly 60% since the 1970's.

## PIF Watch List



**SPECIES OF CONTINENTAL CONCERN**

Table 1. PIF WATCH LIST FOR CONTINENTAL UNITED STATES AND CANADA

Species	Vulnerability Factors					Loss	Urgency/ Half-Life (years)	Continental Threat	Regions of Highest Importance			Primary Breeding Habitat
	Pt	Emis	Threats	PT	PT				Breeding	Wintering	Habitat	
<b>REVERSE DECLINE: "A" Yellow Watch List - Species with extremely high vulnerability due to small population and range, high threats, and irreplaceable declines (23 species)</b>												
American Sage Grouse	> 50%				R, E, C, U, D	18	34					Stepibush
Lesser Prairie-Chicken	> 50%				R, A, E, C, D	28, 29	18, 19					Grassland
California Condor	> 50%				Ck, D, E	32, 34	32, 34					Chaparral
Red-cockaded Woodpecker	79%			38*	F	27, 25	27, 25					Eastern Forest
Lesser Yellowlegs	uncertain				F, U	27, 25, 26, 31	27, 25, 26, 31					Eastern Forest
Red-crowned Parrot	> 50%				R, T	36	36					Tropical Dry Forest
Black-capped Vireo	15-50%				R, U	26, 29	26, 29					Desert Scrub
Florida Scrub-jay	> 50%				U, A, D	31	31					Eastern Forest
Bobolink	15-50%				T, E, C	34	34					Barren Forest
Brewer's Sparrow	88%		18		R, A, U, E, C	33, 34	33					Desert Scrub
Le Conte's Thrasher	67%		27		R, A, U, E, C	33	33					Desert Scrub
Bachman's Warbler	uncertain				F	27, 25, 26	27					Eastern Forest
Golden-winged Warbler	40%				F, U	27, 29, 28	28, 29, 34, 35, 36, 37, 38					Eastern Forest
Golden-cheeked Warbler	> 50%		24*		T, E, U	30	30					Western Forest
Bachman's Sparrow	72%		34*		F	27, 31	27, 31					Eastern Forest
Saltmarsh Sparrow	94%				U	30	27, 30					Coastal Saltmarsh
Thick-knee Blackbird	> 50%		> 50		A	32	32					Wetland
Black Rony Finch	95%				C	30, 9	26					Alpine Tundra
Brewer's Noddy Finch	95%				C	30	30					Alpine Tundra
<b>REVERSE DECLINE: "B" Yellow Watch List - Species not declining but vulnerable due to small range or population and moderate threats (32 species)</b>												
Flammulated Owl	uncertain				F, C, U	34, 35, 10						Western Forest
Least Hummingbird	uncertain				C	30	30					Desert Scrub
Gray Vireo	uncertain			none	> 50	T, E, D	34, 34					Western Forest
Least Flycatcher	uncertain				F, D	32	32					Western Forest
California Gnatcatcher	uncertain				U	32	32					Chaparral
McKays' Bunting	uncertain				C	5	5					Arctic Tundra
Coffee Warbler	uncertain				F	35	35					Mountain Pine Oak
Kinglet Warbler	uncertain				T, E, F	33	33					Eastern Forest
Hermit's Sparrow	uncertain		> 50		A, U	24, 22	24, 26, 27					Grassland
Hermit's Sparrow	uncertain		> 50		CL, A, U	7, 11, 6, 10, 16	27, 27					Wetland
Song Sparrow	uncertain		> 50		CL, U	37, 30, 27	37, 27					Coastal Saltmarsh
Audubon's Oriole	uncertain				F	36	36					Tropical Dry Forest
<b>REVERSE DECLINE: "C" Yellow Watch List - Species with population declines and moderate to high threats (55 species)</b>												
Mountain Quail	> 50%		> 50		CL, F	32, 35, 5	32, 35, 5					Western Forest
Spotted Quail	67%		8		R, A, C	35, 18	35, 18					Desert Scrub
Greater Sage Grouse	67%		> 50		R, A, C, U, G, I	30, 17, 9	30, 17, 9					Stepibush
Song Sparrow	100%		> 50		F	30	30					Western Forest
Greater Prairie-Chicken	> 50%		> 50		A, E, R, L, H	33	33					Grassland
White-crowned Pigeon	15-50%				T, H	31	31					Mangrove
Band-tailed Pigeon	60%		> 50		F, T	5, 32, 34	32					Western Forest
Mangrove Cuckoo	15-50%				U, T	31	31					Mangrove
Black-billed Cuckoo	60%		37*		T, U, U	32, 13, 23, 28	32, 13, 23, 28					Eastern Forest
White-throated Sparrow	15-50%				F, U, C	34	34					Mountain Pine Oak

SEE WATCH LIST TABLE AT A GLANCE FOR DEFINITIONS (page 5)

"D" YELLOW  
WATCH LIST  
SPECIES



# Conservation Need: Drivers of Decline

The largest drivers of population decline within the breeding range are habitat loss, fragmentation, and degradation.



# Conservation Need

Large-scale habitat loss in the west/mid-west has put increasing importance on protecting the remaining grassland habitat here in New England.

- Agricultural Landscape:  
Hayfields & Pastureland
- Airports
- River Floodplains,  
Wetlands, Beaver  
Meadows
- Sandplain Grasslands
- Natural Disturbance



# Goal and Objectives

In recognition of the decline in grassland bird populations, The Trustees has been working to support grassland birds on their properties with suitable habitat. The grassland bird monitoring community science program seeks to:

1. Determine what properties support grassland bird species.
2. Determine what grassland bird species are using Trustees grasslands.
3. Determine the relative abundance of each species.
4. Evaluate the grassland breeding season timeline on individual properties.
5. Evaluate if the current management regime is supporting grassland bird nesting success and grassland habitat health.

# Volunteer Commitment/Ask

We ask that our volunteer be:

Familiar with or have a willingness to familiarize themselves with common grassland bird species.

Able to navigate via an aerial map and follow basic point count survey protocol.

Able to visit their assigned grassland between sunrise-10 am at least once per month during the nesting season (May-July).

Have access to a pair of binoculars

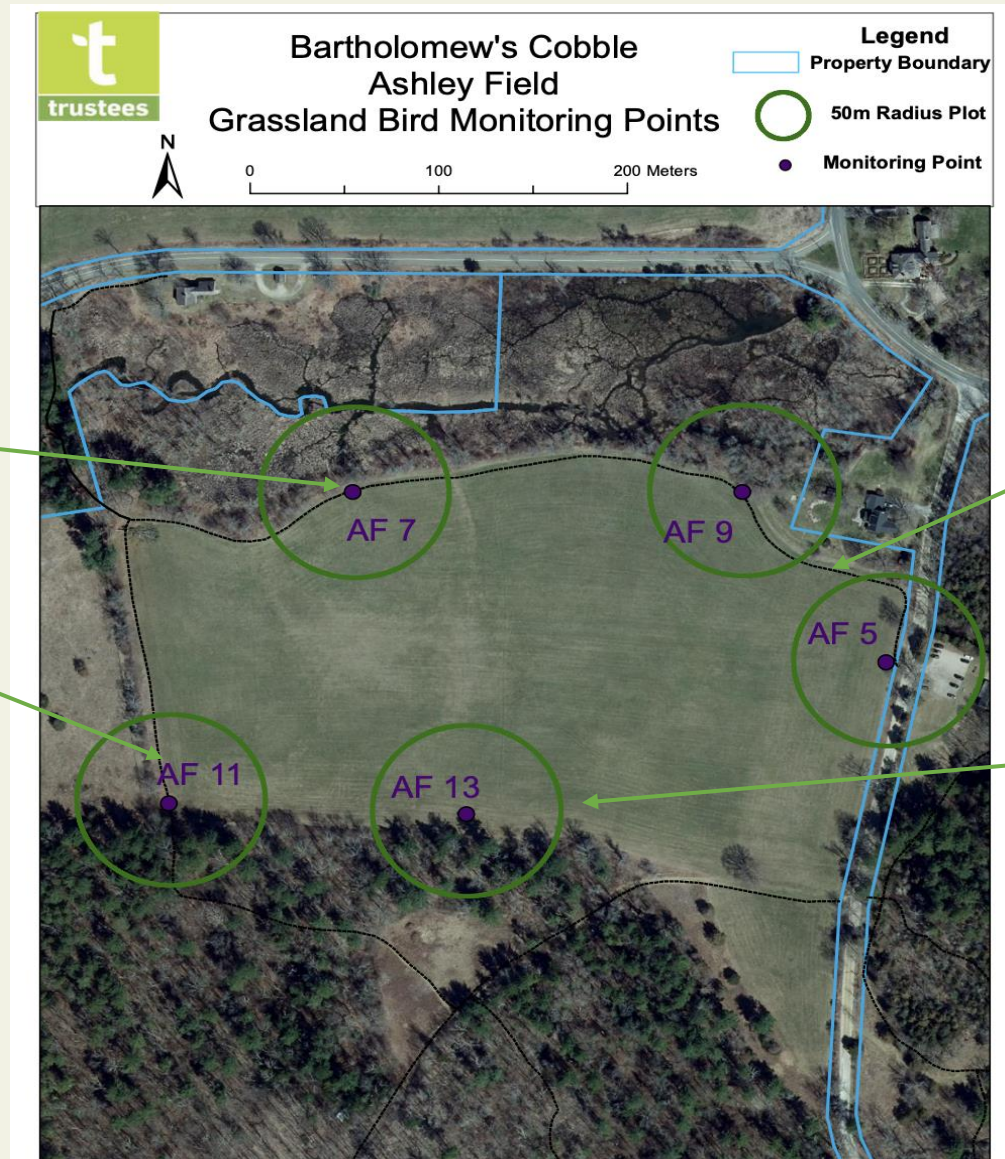
Volunteers are provided with training calls, maps & data sheets, and regular check-ins as needed.

# Monitoring Protocol

## Point Count Surveys And Navigating Via an Aerial Map

Point Count Location

Name Of Monitoring Point



# Data Collection

- Surveyor Name
- Date of Monitoring Visit
- Visit #
- Comments & Notes
- Field Mowing Status
- Start & End Time of 5- Minute Observation Period
- How Many Individuals of the Target Species Were <50m, >50m, or a Flyover
  - Noting the Breakdown of M (males), F (females), J (juveniles), S (song)
- Other Species

Bartholomew's Cobble							
Surveyor:	Isabel Bronson					<b>Field Mowing Status</b>	
Date:	5/20/23				Ashley Field	Unmown	
Visit #:	2				Hurlburt's Hill	Unmown	
Comments:	Noticed Female Carrying Nesting Material						
Survey Point	Field Name	Time (Start-End)	Target Species:	< 50 m	> 50 m	Flyover	Notes
AF5	Ashley Field	7:30-7:35	Bobolink	3m,1f	0	0	
			Savannah Sparrow		2s		
			Grasshopper Sparrow	0			→
			Eastern Meadowlark	0			→
AF9	Ashley Field		Bobolink				
			Savannah Sparrow				
			Grasshopper Sparrow				
			Eastern Meadowlark				
AF7	Ashley Field		Bobolink				
			Savannah Sparrow				
			Grasshopper Sparrow				
			Eastern Meadowlark				
AF11	Ashley Field		Bobolink				
			Savannah Sparrow				
			Grasshopper Sparrow				
			Eastern Meadowlark				
AF13	Ashley Field		Bobolink				
			Savannah Sparrow				
			Grasshopper Sparrow				
			Eastern Meadowlark				
HH1	Hurlburt's Hill		Bobolink				
			Savannah Sparrow				
			Grasshopper Sparrow				
			Eastern Meadowlark				
HH2	Hurlburt's Hill		Bobolink				
			Savannah Sparrow				
			Grasshopper Sparrow				
			Eastern Meadowlark				
HH3	Hurlburt's Hill		Bobolink				
			Savannah Sparrow				
			Grasshopper Sparrow				
			Eastern Meadowlark				
Other Species (List Other Bird Species Seen or Heard While Conducting Your Monitoring Visit):							
	Red-Winged Black Bird						
	Common Yellowthroat						
	Yellow Warbler						
	Nothern Flicker						
	Song Sparrow						

# 2023 Monitoring Data At A Glance

Expanded the program from 20 volunteers to 70 monitoring volunteers.

26 Properties



62 Fields



1,000 Acres of  
Grassland Habitat



Photo Credit:  
Bob Kitchen



Photo Credit:  
Rajan Desai



Photo Credit:  
Peter Oehlkers



Photo Credit:  
Roberto R. Calderón

25/26 Properties

20/26 Properties

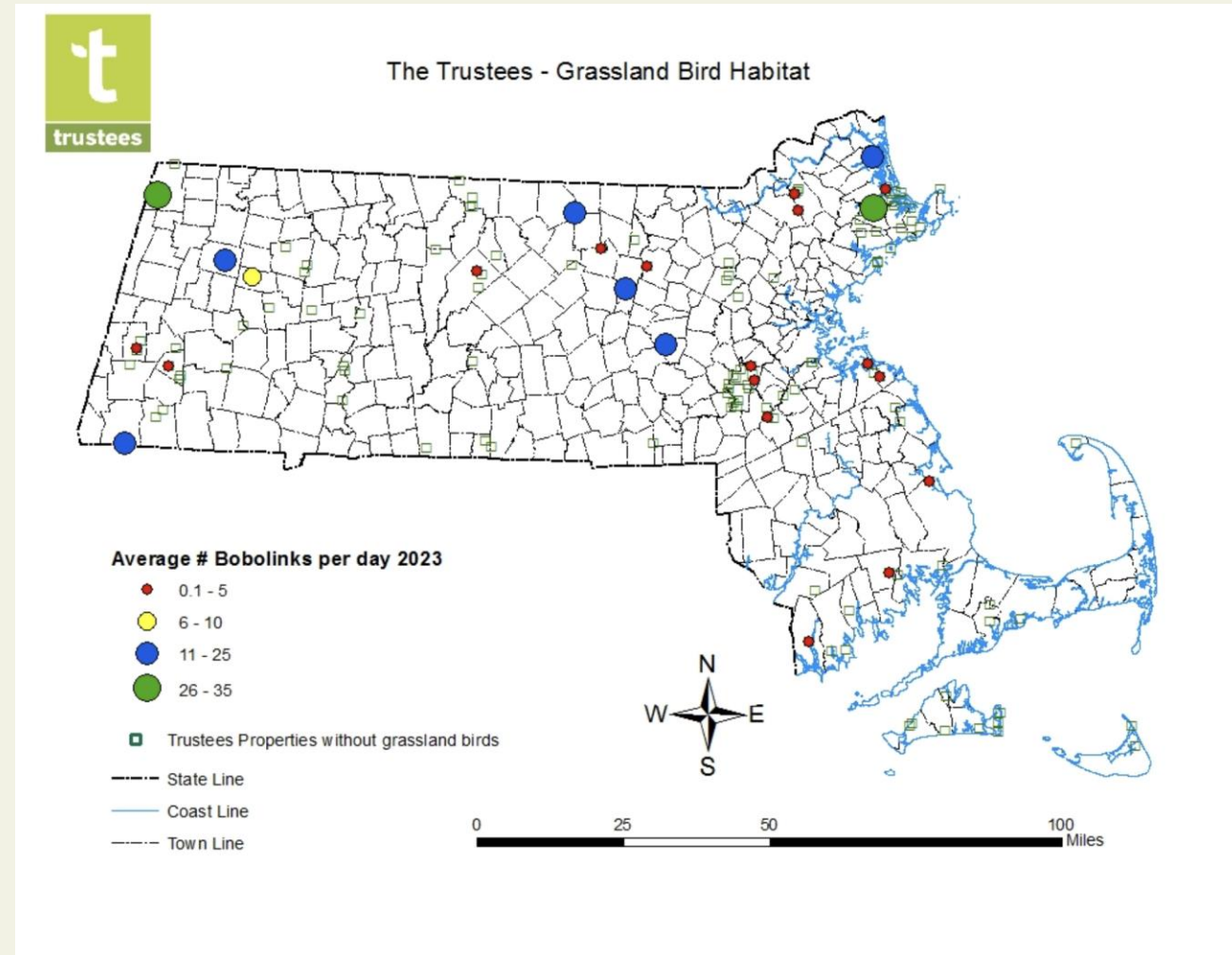
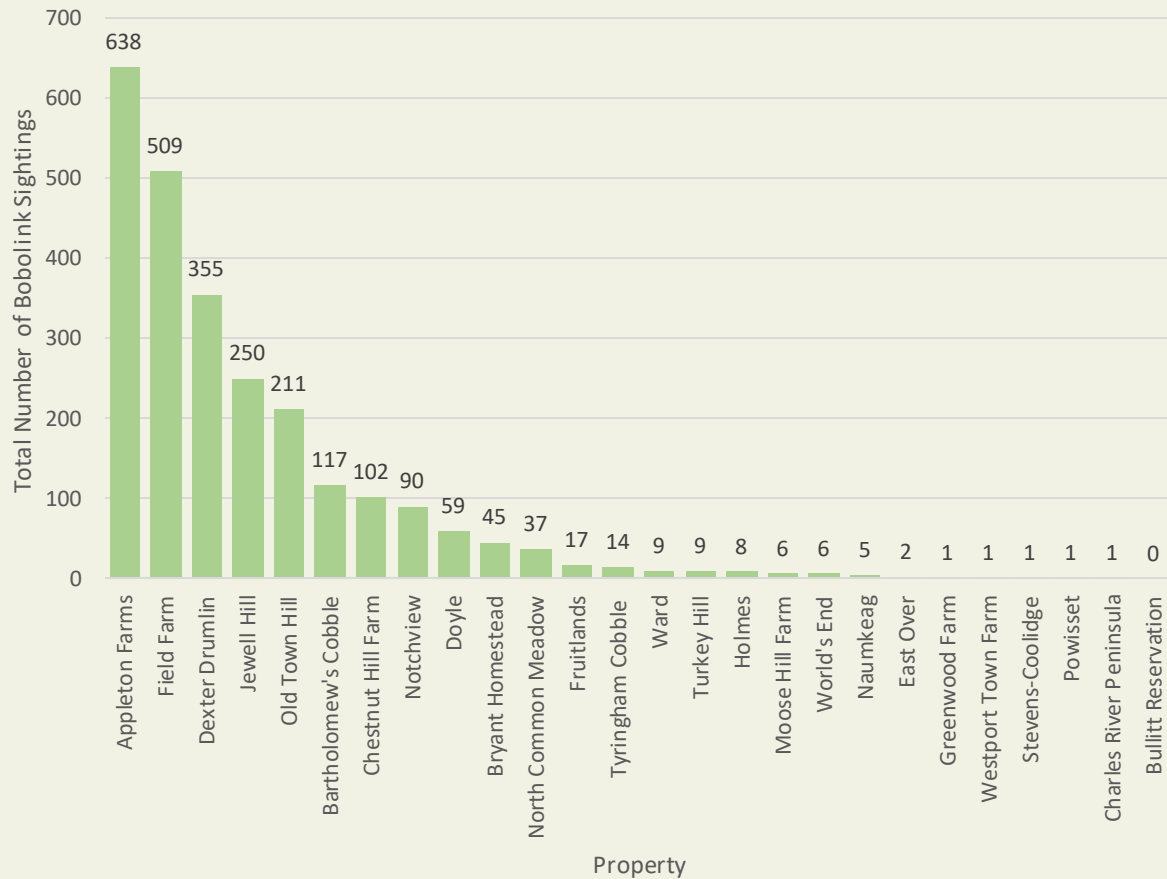
3/26 Properties

2/26 Properties

# How Are We Using This Data

*Assessing which properties support bobolinks & general bobolink abundance.*

Total Number of Bobolink Sightings By Property- 2023 Nesting Season





# How Are We Using This Data

*Which fields at each monitoring property support grassland birds?*

Field Name	Average Number of Bobolinks Seen Per Day- 2023 Nesting Season
Broad Meadow	20.6
Drainage Field	1.70
Great Pasture Section 8	1.60
Lamson Middle	0.95
Lamson South	1.15
Lower Sunset & Sunset Field	3.75
Horse & Pond Field	1.26
Williams West	2.07
Wilson's Field	0.55

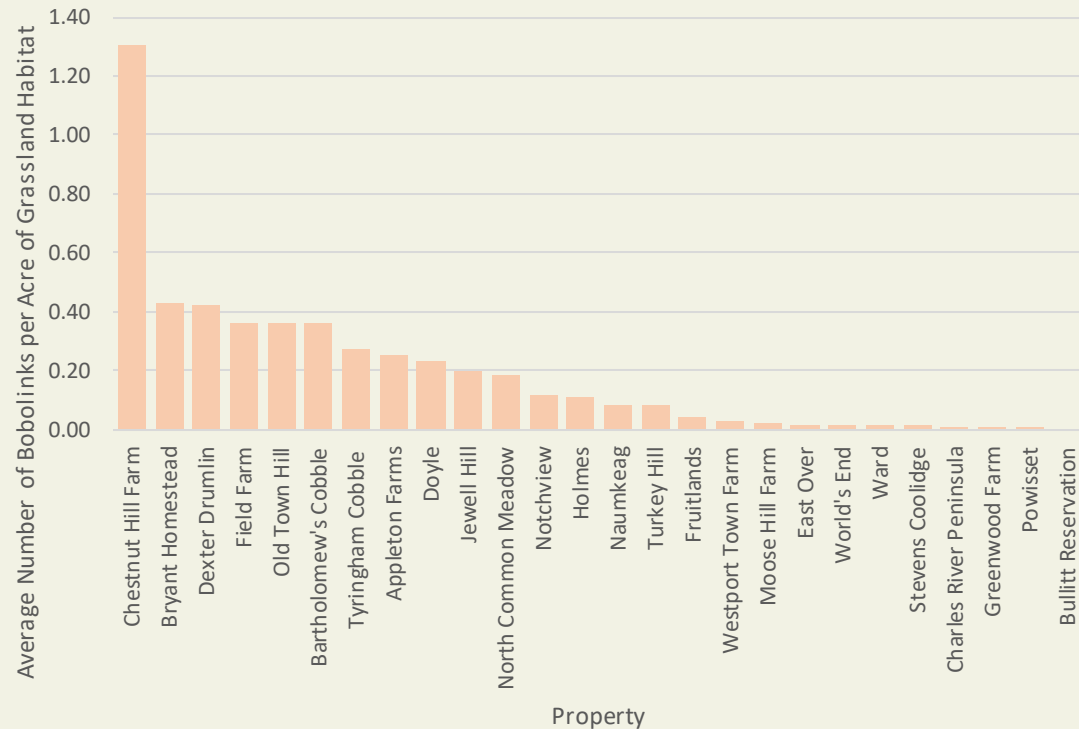
# How Are We Using This Data

*Assessing habitat quality*

Bobolinks Per Acre of Grassland Habitat

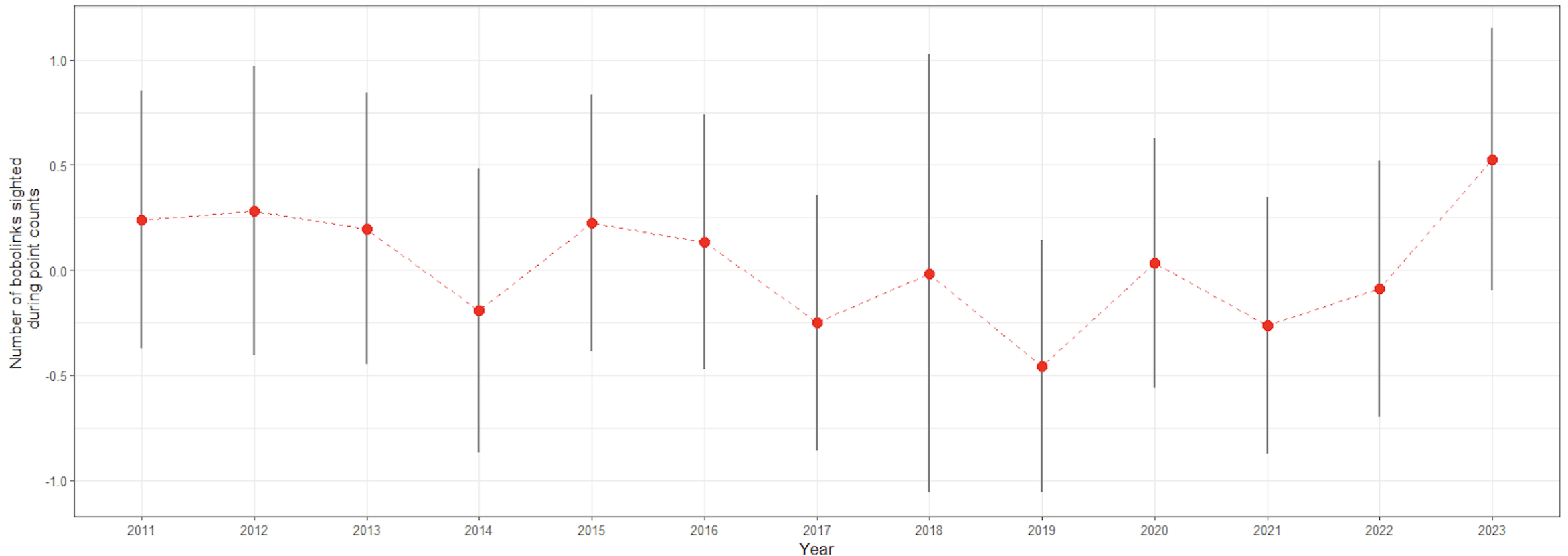
*Photo Monitoring*

Average Number of Bobolinks Per Acre of Grassland Habitat - 2023 Nesting Season



# How Are We Using This Data

*Long Term: When are bobolinks in our fields & changes in bobolink populations across study years*



# How Are We Using This Data

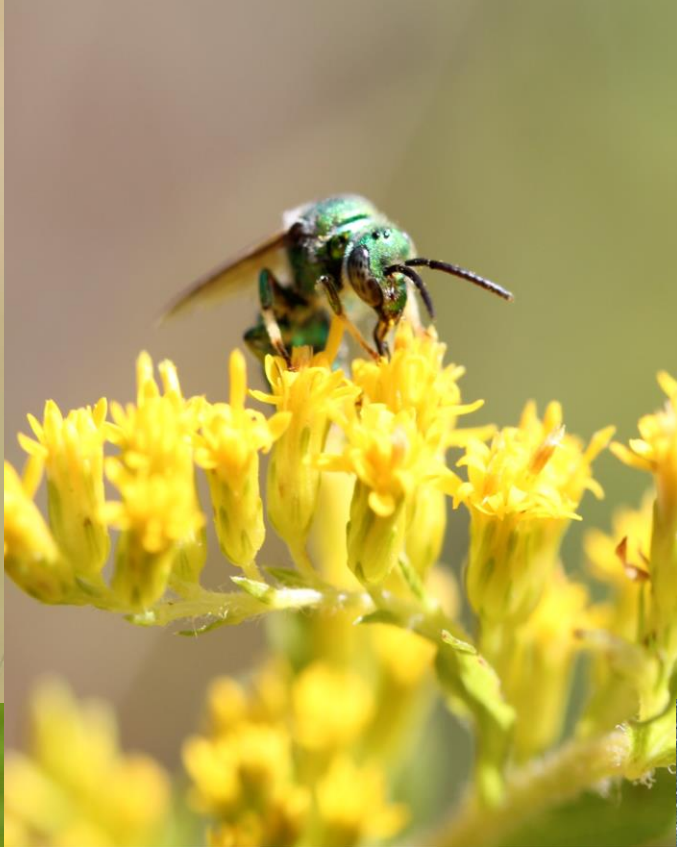
*Data Integration Into Baseline Assessments & Management Plans*



# Come Learn About Our Program!

Art In The Landscape – Jen Shin's *Perch*





# Volunteer Nest Box Monitoring



# Background

Cavity-nesting bird population declines driven by loss of suitable nesting habitat.





# Conservation Action

## Nest Box Installation and Monitoring



# NestWatch

The Cornell Lab of Ornithology

Citizen Scientist Network sign in

NestWatch

Where Birds Come to Life

HOME ABOUT YOUR DATA CONNECT LEARN EXPLORE DATA

**FEATURED CONTENT**

- All About Birdhouses**  
Construction plans, tips and more!
- Nest and Egg ID**  
Identification made easy!
- NestWatch Blog**  
Read about the latest research and other happenings.
- Download the App**  
Find it on Google Play or the App Store!
- Scientific Impact**  
Research requests, publications and more!

**HOW TO PARTICIPATE**

- 1 Take the online quiz to get certified
- 2 Find nests
- 3 Record data
- 4 Submit online or with the mobile app

Let's start monitoring nests!

See the Eastern Bluebird nest plan

Photo © Patricia Ferguson

Build a nest box or nest structure for one of these birds

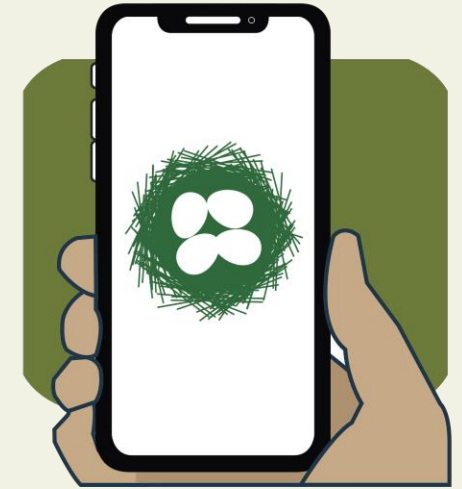


American Robin nestlings by [Emily Stashower](#).

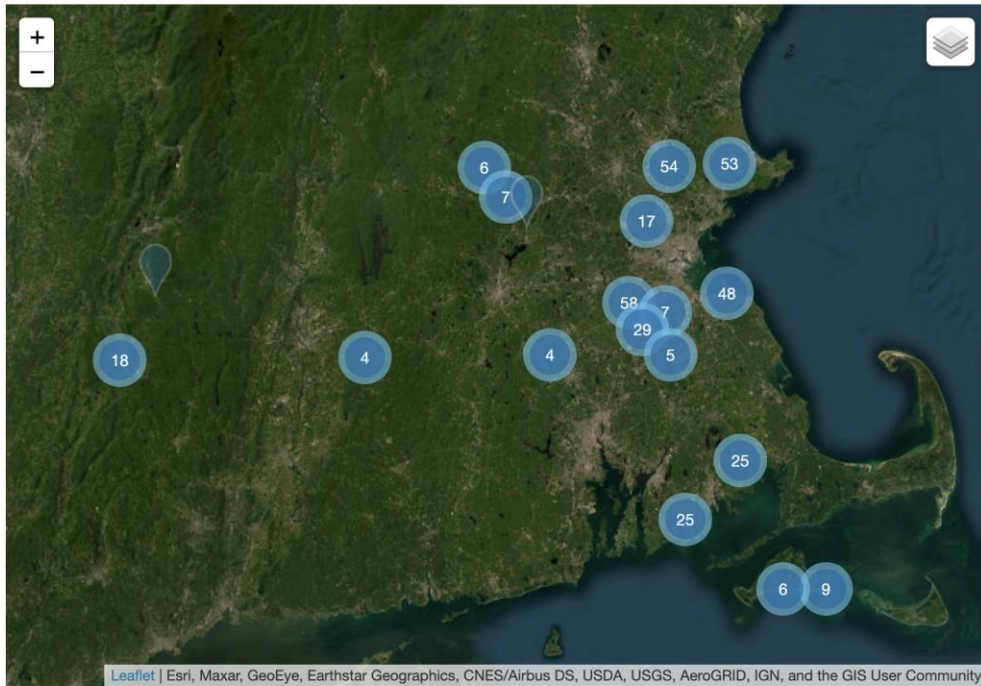
## On the Blog: Recent Findings on Cold Snaps and Heat Waves

Many songbirds are nesting earlier in spring because of warmer temperatures brought about by climate change. But the shift brings another danger that is especially deadly for nestlings: greater exposure to temperature variability in the form of cold snaps and heat waves. A new study from Cornell documents that such extremes result in more nest failures. Read about this new research [on our blog](#).

# NestWatch & Volunteers



## YOUR NEST SITE MAP



Leaflet | Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

### FILTER SITES ON MAP BY GROUPS

- Show all
- Ames Estate
- Appleton Farms
- Bartholomew's Cobble
- Bird Park
- Bradley Estate
- Charles River Peninsula
- Cormier
- Dexter Drumlin
- Doyle Community Park
- East Over
- Fork Factory Brook & Rocky Woods
- Jewell Hill
- Long Point
- Mary Cummings Park
- Moose Hill Farm
- Peaked Mountain
- Powisset Farm
- Slocum's River Reserve
- Tyringham Cobble
- Ward Reservation
- Wasque
- Weir Hill**
- Weir River Farm - Turkey Hill
- Westport Town Farm
- Worlds End

TheCornellLab  
NestWatch

## Nest Monitoring Manual



TheCornellLab of Ornithology  
NestWatch

### Nest check data sheet

Use this form to describe your nest site and to record data from each visit. Use a separate form for each nest monitored and each new nesting attempt. See back for explanations of codes and fields. When finished, please enter completed forms online at: [www.nestwatch.org](http://www.nestwatch.org).

Year \_\_\_\_\_ Species \_\_\_\_\_

1. NEST SITE LOCATION	2. DESCRIPTION (see key on back)
Nest site name _____	Nest is located (circle one) IN ON UNDER
Address: Nearest street address OR _____	Nesting substrate _____
Latitude (decimal degrees; ex 47.67932) _____	Cavity orientation (circle one) N, S, E, W, NE, SE, NW, SW
N _____	Cavity opening width _____ in. or _____ cm
Longitude (decimal degrees; ex -76.45448) _____	Predator guard <input type="checkbox"/> None or <input type="checkbox"/> Type: _____
W _____	Habitat within 1 arm length _____
	Human modified description _____
	Habitat within 1 football field length _____
	Human modified description _____
	Height above ground _____ ft. or _____ m

DATE Month / Day (1-12, 01-31)	HOST SPECIES			STATUS & ACTIVITY CODES				COWBIRD ACTIVITY			MORE INFO	
	Eggs	Live Young	Dead Young	Nest Status	Adult Status	Young Status	Mgmt. Activity	Eggs	Live Young	Dead Young	Obs. Initials	Notes (or mark X for notes below)
Ex. 05/06	1	0	0	OK	RR	ND	ND	0	0	0	BB	X
1	/											
2	/											
3	/											
4	/											
5	/											
6	/											
7	/											
8	/											
9	/											
10	/											

4. NESTING ATTEMPT SUMMARY Fill in information for HOST SPECIES TOTALS below after the nesting attempt is complete.			
IMPORTANT DATES		HOST SPECIES TOTALS	
First Egg Date	_____	Visits to nest	_____
Hatch Date	_____	Clutch Size	_____
Fledge Date	_____	Unhatched Eggs	_____
		Live Young	_____
		Fledglings	_____

NEST FATE: \_\_\_\_\_  
NOTES: \_\_\_\_\_

Please enter data online at [www.NestWatch.org](http://www.NestWatch.org)

# NestWatch Data- Breeding Summary

Breeding summary data from nest box 1PH at Ward across multiple years

## *2023- Eastern Bluebird*

- 4 Eggs
- 4 Live Young
- 4 Young Fledged
- 100% Hatch Rate
- 100% Fledge Rate

## *2022- Tree Swallow*

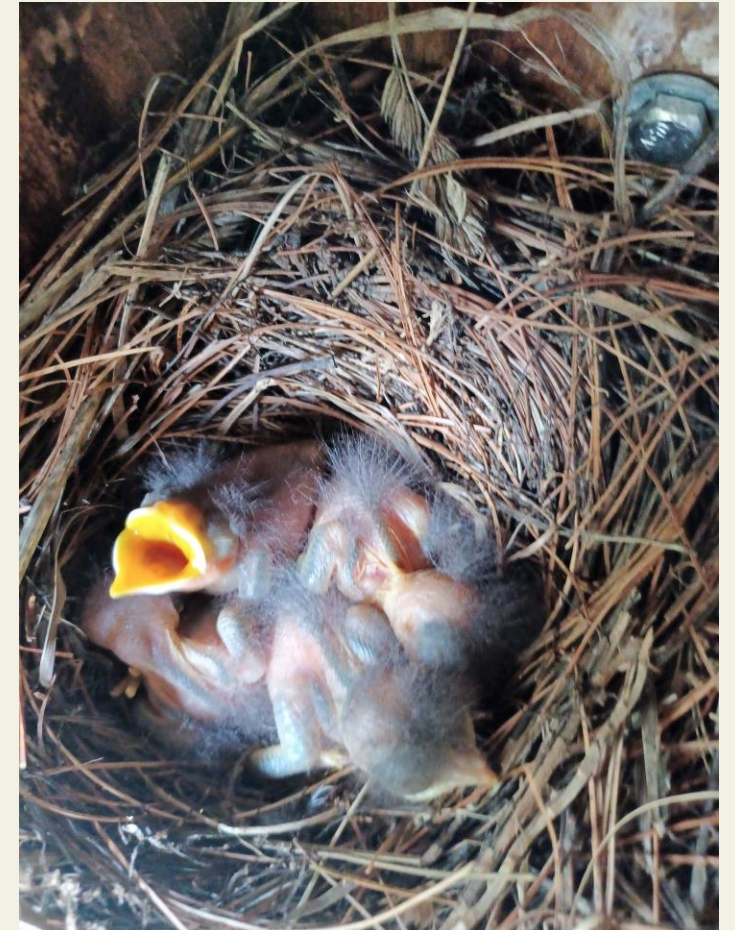
- 4 Eggs
- 4 Live Young
- 4 Young Fledged
- 100% Hatch Rate
- 100% Fledge Rate

## *2021- Tree Swallow*

- 5 Eggs
- 5 Live Young
- 0 Young Fledged
- 100% Hatch Rate
- 0 % Fledge Rate

## *2020- Eastern Bluebird*

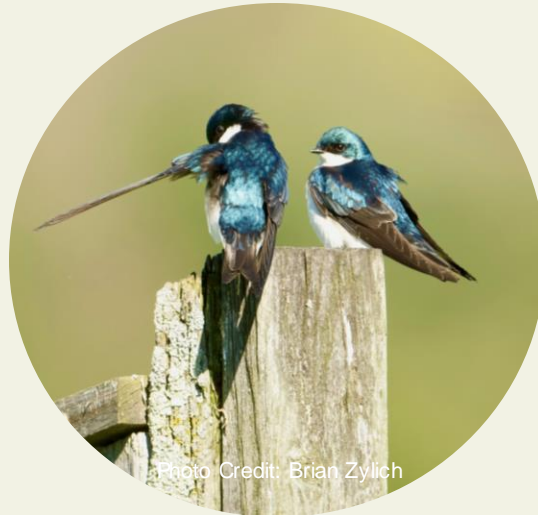
- 5 Eggs
- 5 Live Young
- 5 Young Fledged
- 100% Hatch Rate
- 100% Fledge Rate



# NestWatch Data- Species Summary



- 76 Nesting Attempts (45 had at least one young fledge)
- 276 Eggs
- 177 Nestlings
- 170 Fledglings
- Nesting success rate= 60%



- 73 Nesting Attempts (50 had at least one young fledge)
- 263 Eggs
- 223 Nestlings
- 212 Fledglings
- Nesting success rate= 68.5%

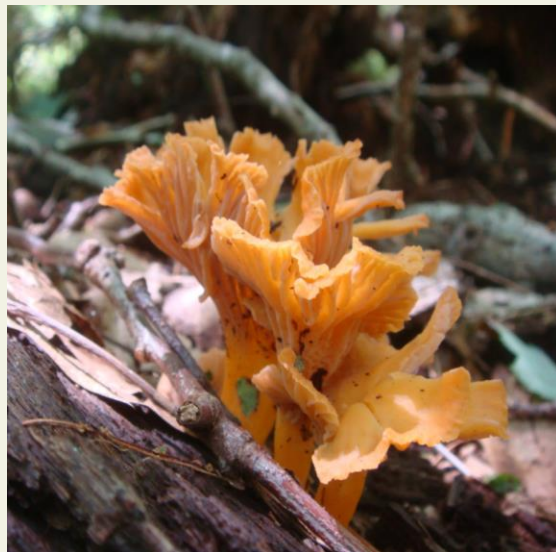


- 2 Nesting Attempts (50 had at least one young fledge)
- 2 Eggs
- No Young Fledged



- 16 Nesting Attempts (6 had at least one young fledge)
- 43 Eggs
- 12 Nestlings
- 12 Fledglings
- Nesting success rate= 37%

# Biodiversity Monitoring



# Conservation Background/Need

Biodiversity refers to the variety of all living things on Earth.

Biodiversity loss is accelerating at an unprecedented rate in comparison to other recorded extinction events.

- Habitat loss, fragmentation, and degradation
- Overexploitation of resources
- Pollution
- Introduction of non-native species
- **Climate change**



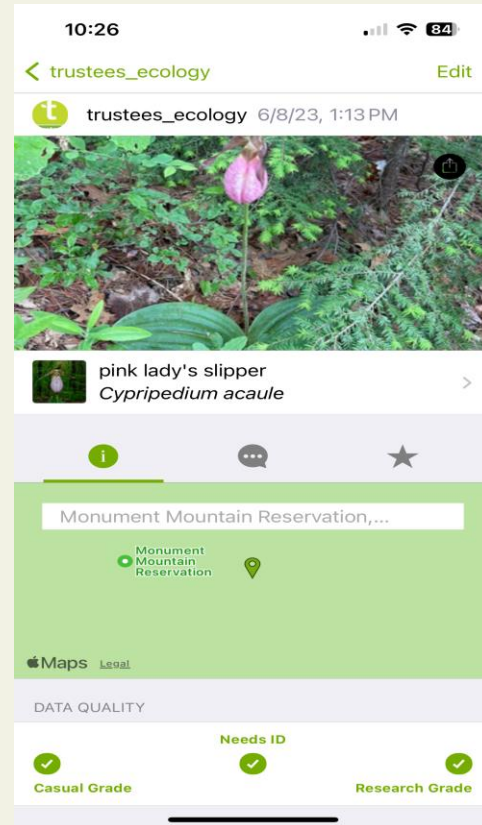
# Biodiversity Monitoring Goals

1. Track and understand the breadth of species on the property level and state-wide.
2. Map/monitor introduced species presence.
3. Monitor populations of rare and or threatened species.
4. Long-term explore how plant composition is shifting with climate change.



# iNaturalist

"An online social network of people sharing biodiversity information to help each other learn about nature."



# Project Design: Collection Projects

Each property included in the project will eventually have an individual collection project.

- Gathers observations made within a specific property boundary.

The screenshot shows the project page for 'Bartholomew's Cobble Biodiversity Monitoring'. It features a header image of a landscape with mountains and trees. Below the image is the project title and a 't' logo. To the right, there is an 'About' section with text describing the project as part of the Trustees Biodiversity Monitoring Umbrella Project, including a URL. There are also buttons for 'Members' (1), 'Read More', 'Your Membership', 'Edit Project', and 'Project Journal'.

The screenshot shows the 'Observations' page for the 'Trillium' project. It includes a search bar with 'Trillium' and a 'Location' field. Below the search bar, there are statistics: 'The World' (64 OBSERVATIONS, 3 SPECIES, 31 IDENTIFIERS, 25 OBSERVERS). A map shows the project location in Massachusetts, with a list of observations on the right. The list includes 'Large White Trillium', 'Nodding Trillium', and 'Red Trillium' with their respective research grades and dates.

The screenshot shows the 'Stats' page for the 'Trillium' project. It features three donut charts: '1,916 Observations', '578 Species', and '3,369 Identifications'. Each chart is color-coded by grade or category. The 'Observations' chart shows Research Grade (green), Needs ID (yellow), and Casual (grey). The 'Species' chart shows various taxonomic groups: Unknown, Protozoans, Fungi, Plants, Chromista, Mollusks, Insects, Arachnids, Ray-Finned F., Amphibians, Reptiles, Birds, Mammals, and Other Animals. The 'Identifications' chart shows Improving (green), Supporting (light green), Leading (yellow), and Maverick (red).

# Project Design: Umbrella Project

The data gathered within collection projects will be aggregated under a single umbrella project.

Explore Trustees Special Places

## Trustees Biodiversity Monitoring Project

About Members 9

Since its founding in 1891, the Trustees have protected over 120 special places across Massachusetts. The 27,000+ acres held within this portfolio serves as refuge for a mosaic of diverse ecological communities, from the floodplain forests and calcareous wetland communities of the Berkshires to the scrub oak

[Read More >](#) [Your Membership](#)

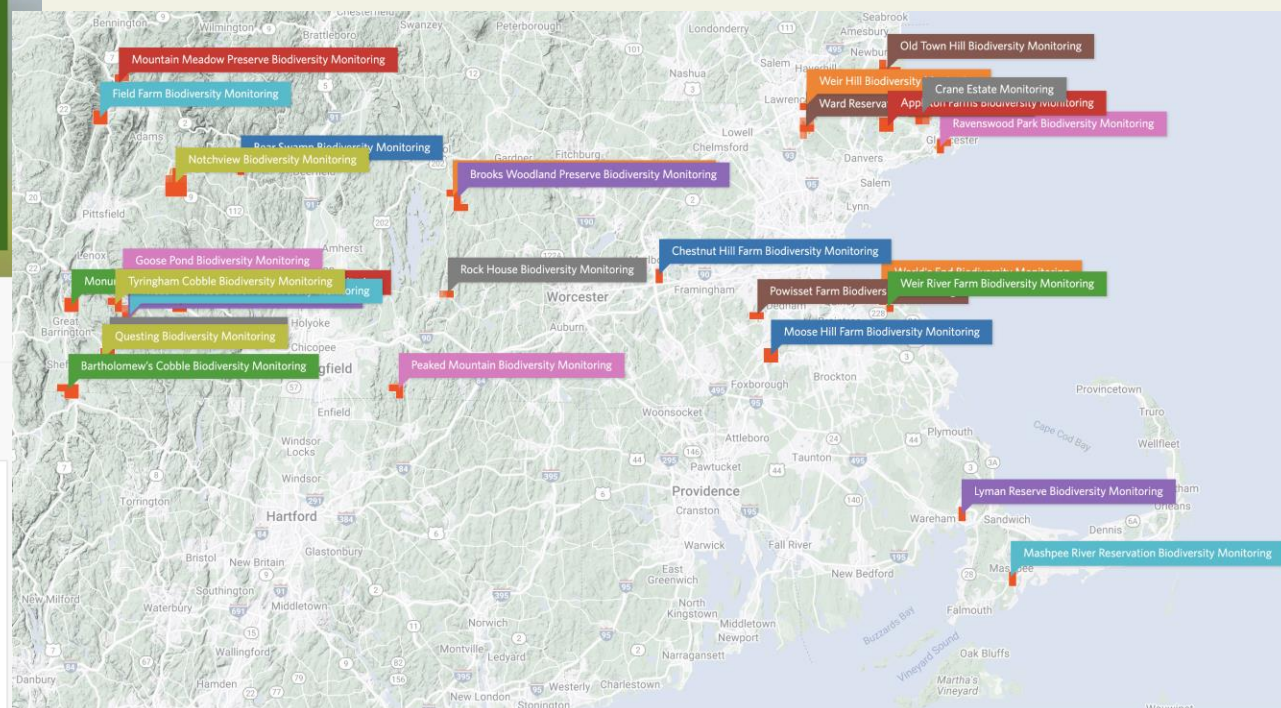
[Edit Project](#) [Project Journal](#)

Overview

16,487	2,739	2,120	1,585	<a href="#">Stats</a>
OBSERVATIONS	SPECIES	IDENTIFIERS	OBSERVERS	

Leaderboard Sort By: Observations | Species | Observers

	Moose Hill Farm Biodiversity Monitoring	2,369
	World's End Biodiversity Monitoring	2,244
	Bartholomew's Cobble Biodiversity Monitoring	1,916
	Appleton Farms Biodiversity Monitoring	1,098

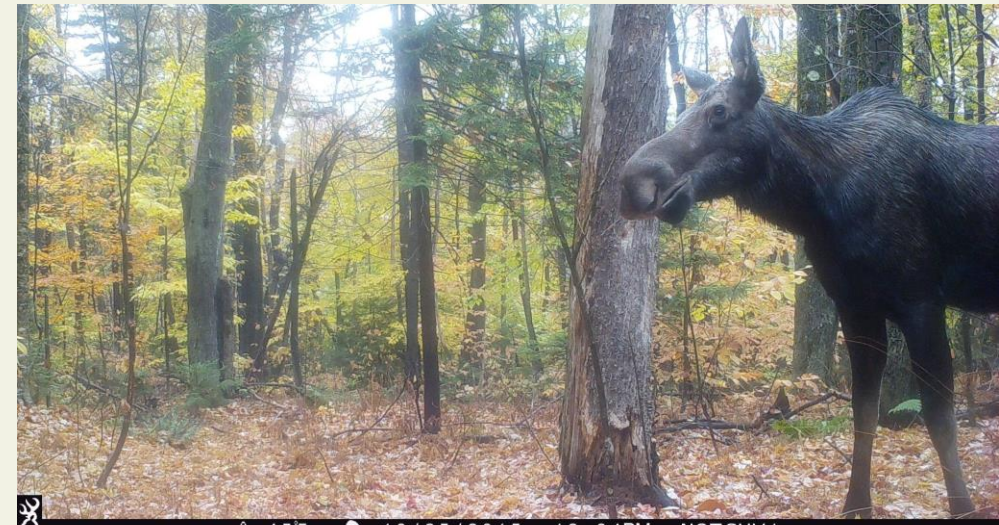


# Volunteer Biodiversity Monitoring

- Volunteers spend one to two hours per outing hiking (on trail) and exploring properties in their region.
  - Independently collect and submit biodiversity observations and environmental data on iNaturalist.
  - Review iNaturalist observations collected on other Trustees properties and confirm or suggest identifications
- Volunteers must have access to a smartphone and the ability to use and understand the iNaturalist app (training provided.)

# Additional Engagement

1. BioBlitzes
2. Walk and Talks
3. Journal Posts on iNaturalist
4. Trail Cameras



# Questions?

