



SURVIVAL BY DEGREES:
389 Bird Species
on the Brink

JANUARY 15, 2020

SONORAN AUDUBON SOCIETY

Photo: Yellow Warbler. Brian Collier/Audubon Photography Awards.

Audubon's Birds and Climate Change Report

314 Species on the Brink

Shrinking and shifting ranges could imperil nearly half of U.S. birds within this century.



Baird's Sparrow

By 2080, this grassland bird is expected to lose 100 percent of its current breeding range.

[See the climate forecast map »](#)



Tony Bynum

Take Action

Climate change threatens the birds we see every day. I pledge to help build a brighter future for the 314 birds at risk.

Your Email Address

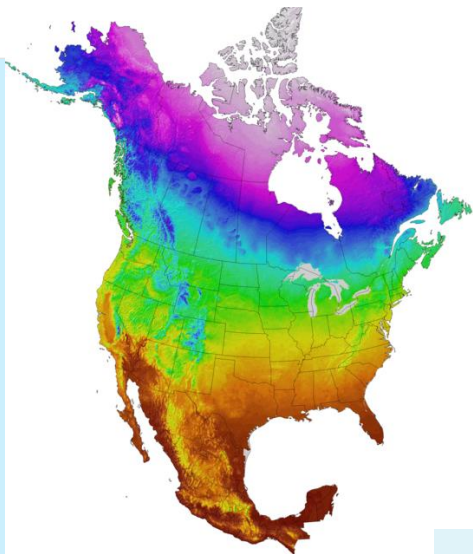
Pledge

The science: a new way of assessing vulnerability

Massive data = better predictions, finer detail

New analysis of nine threats (Heat waves, fire, early spring, etc.)

Pivoting from the past (3B birds lost) to the future—even more alarming



climate

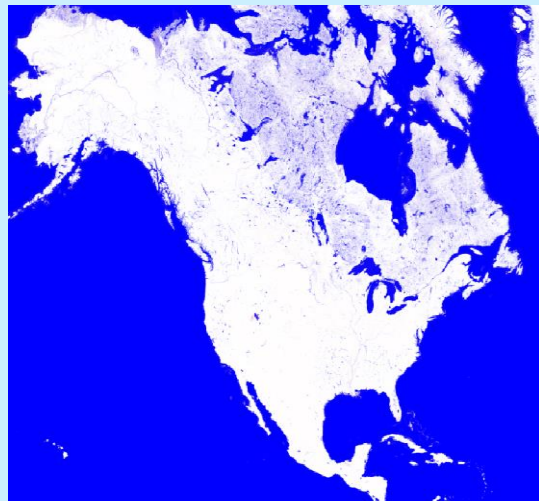


vegetation

human
land-use



group-
specific
variables



Datasets

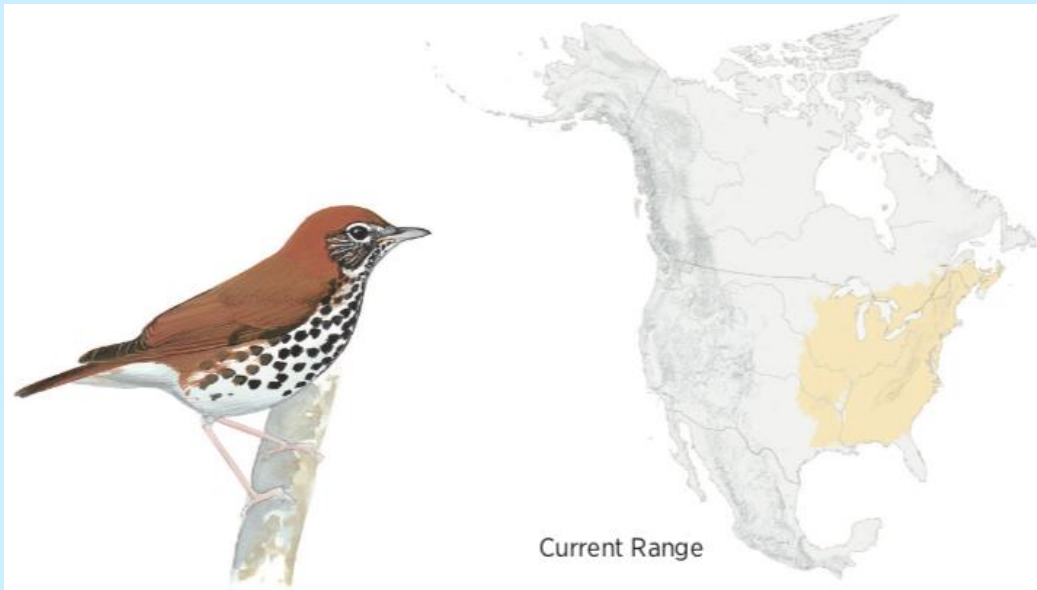
140+ million observations

70+ data sources

Bird Datasets for Climate 2.0 Models (sample of 10,000 records)

- Global Biodiversity Information Facility
- USGS Bird Banding Lab
- North American Breeding Bird Survey
- Biodiversity Information Serving Our Nation
- NatureCounts / Bird Studies Canada
- Bird Conservancy of the Rockies
- Alaska Center for Conservation Science
- US Fish and Wildlife Service
- US National Park Service

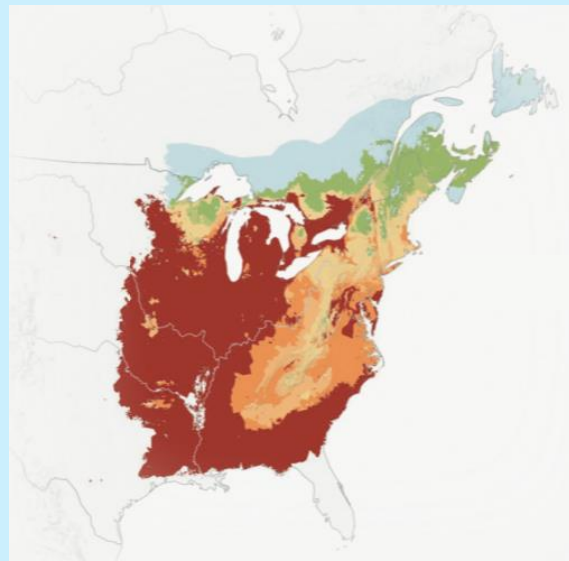
Modeling ranges



projection



Future Range

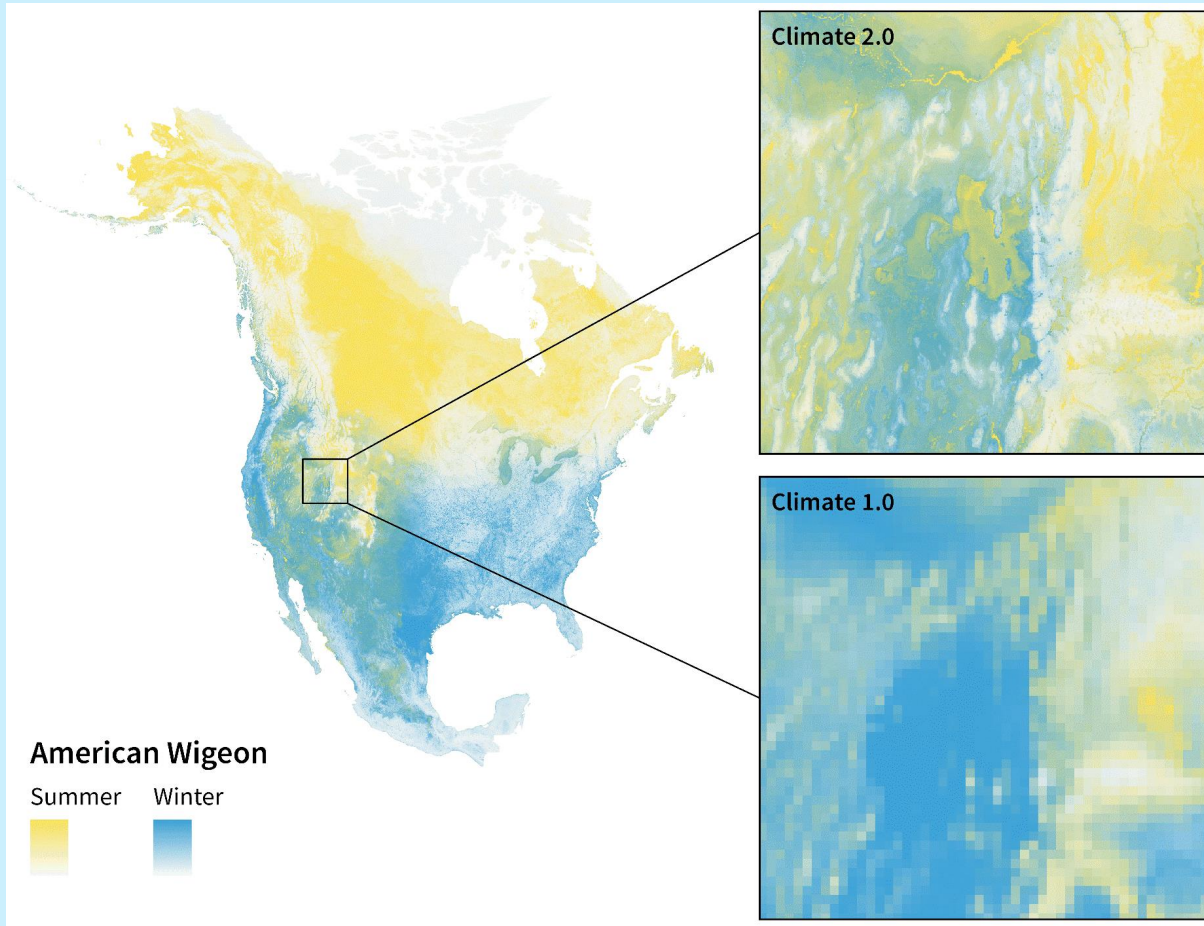


Wood Thrush

- Range Gain
- Improving
- Slightly Improving
- Stable
- Slightly Worsening
- Worsening
- Range Loss

Conditions
Within Stable
Range

Finer Resolution



TAKEAWAY ①

Climate Change is the Greatest Threat to North American Birds

Audubon's *Survival by Degrees* shows that **two-thirds of North American bird species** are at risk from climate change.



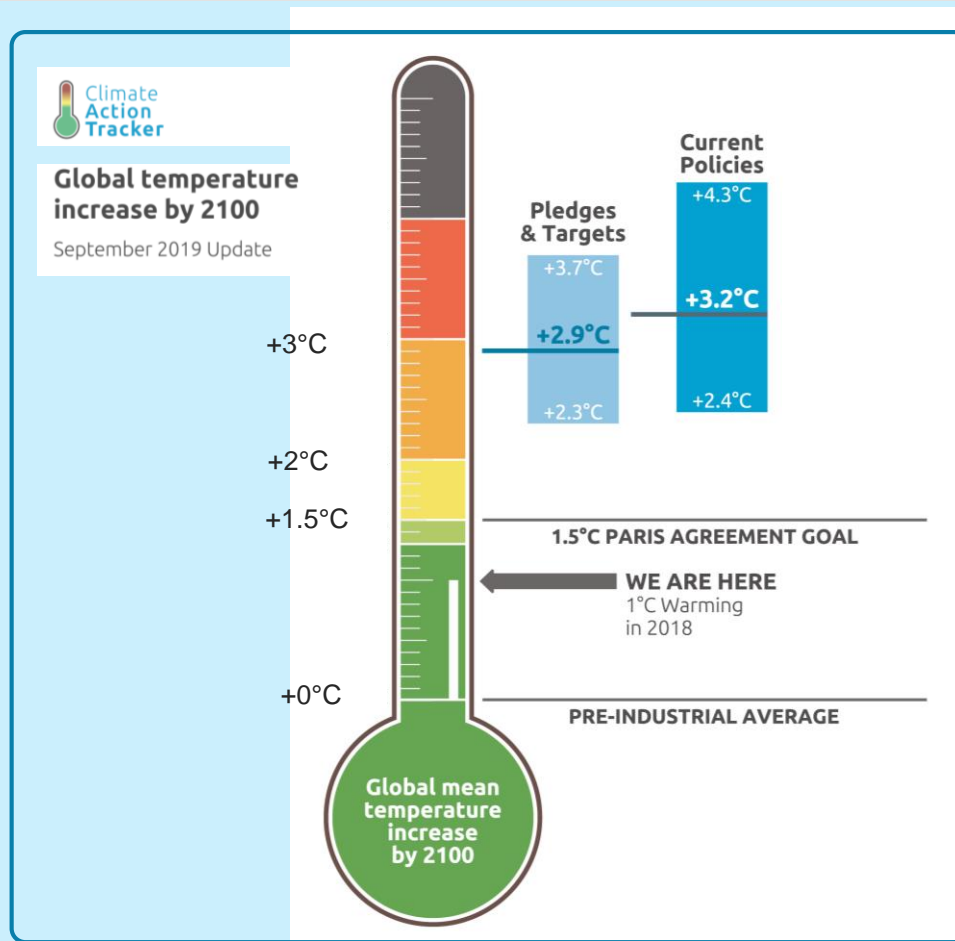
Photo: American Avocet. Melissa GROO

Survival by Degrees: warming scenarios for future projections

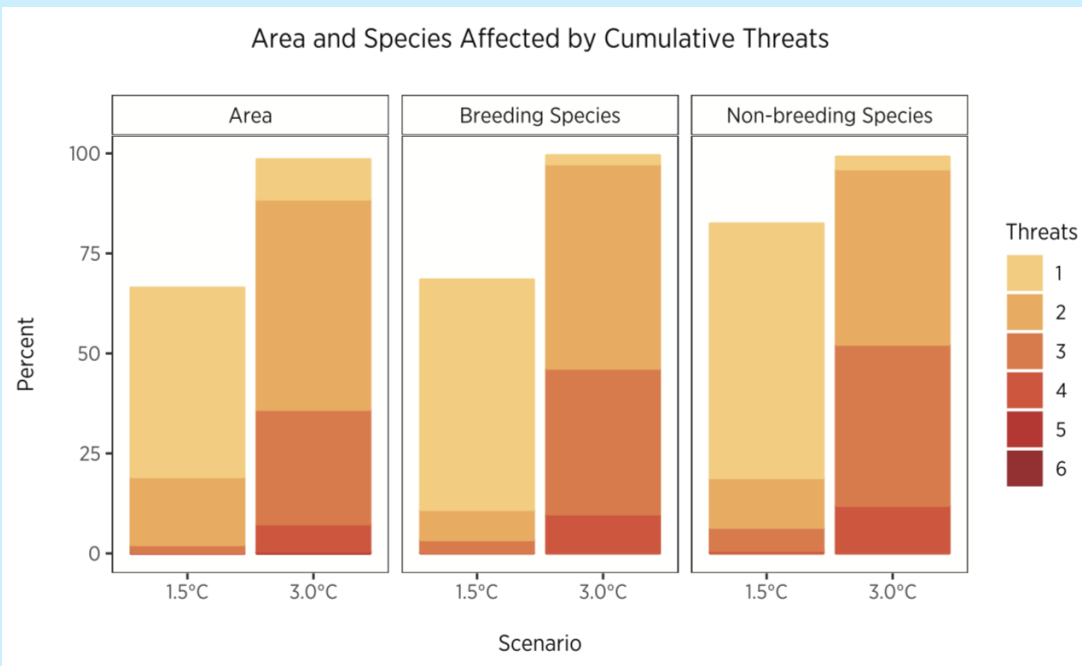
1.5°C (2.7°F)

2°C (3.6°F)

3°C (5.4°F)

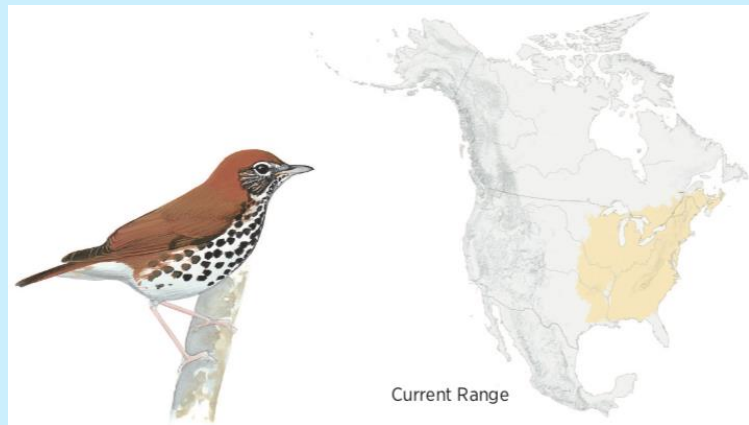


97% of species could be affected by multiple climate-related threats under a 3°C warming scenario, 95% face 2 or more

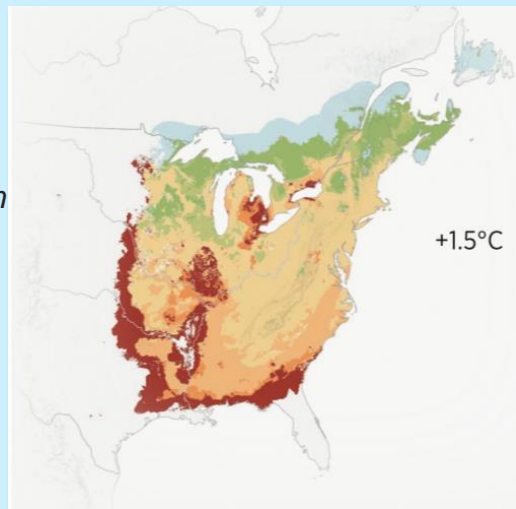


Under a 1.5 °C warming scenario, only 20% of species would face multiple climate-related threats

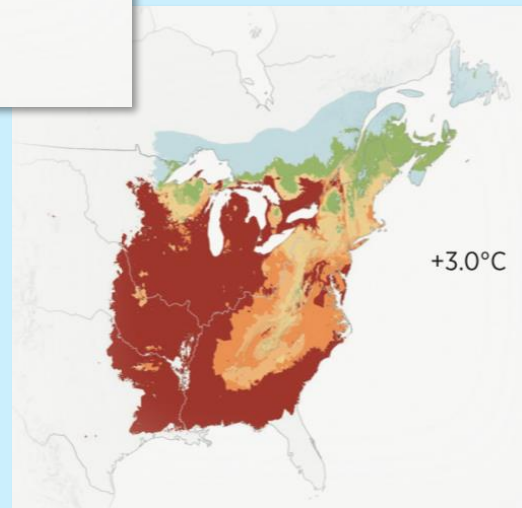
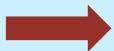
Survival by Degrees



projection



Wood Thrush



TAKEAWAY ②

For the first time we looked at nine existential climate threats facing birds (e.g. fire, sea level rise, heavy rain).

305 bird species will face 3 or more climate threats at 3.0°C

34 bird species will face 3 or more climate threats at 1.5°C



Photo: American Robin. Joseph Rossi

Climate-related Threats Assessment

- Sea Level Rise
- Great Lakes Level Changes
- **Urbanization**
- Cropland Expansion
- **Extreme Spring Heat**
- **Spring Droughts**
- **Fire Weather**
- Heavy Rain
- **False Springs**

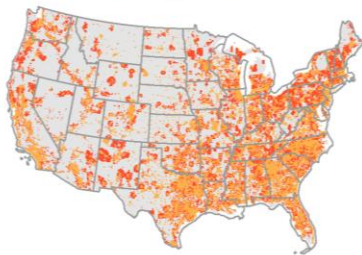


Threats mapped across the conterminous United States

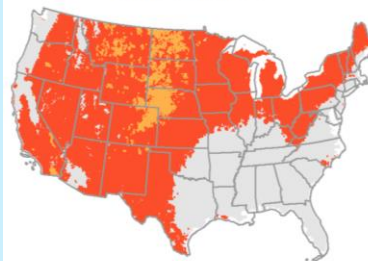
Sea Level Rise and Lake Level Change



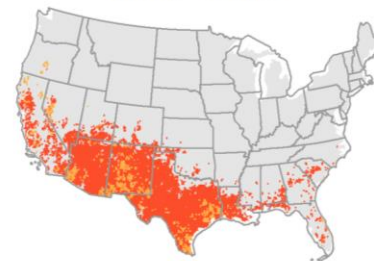
Urbanization



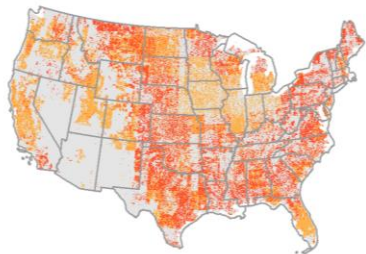
Fire Weather



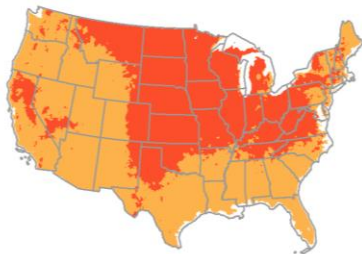
Spring Droughts



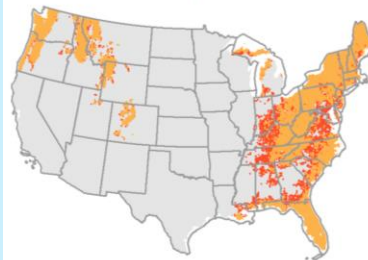
Cropland Expansion



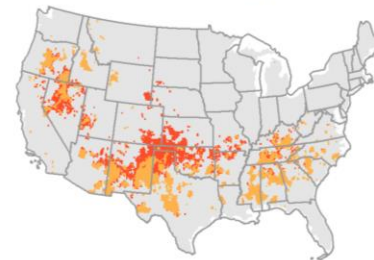
Extreme Spring Heat



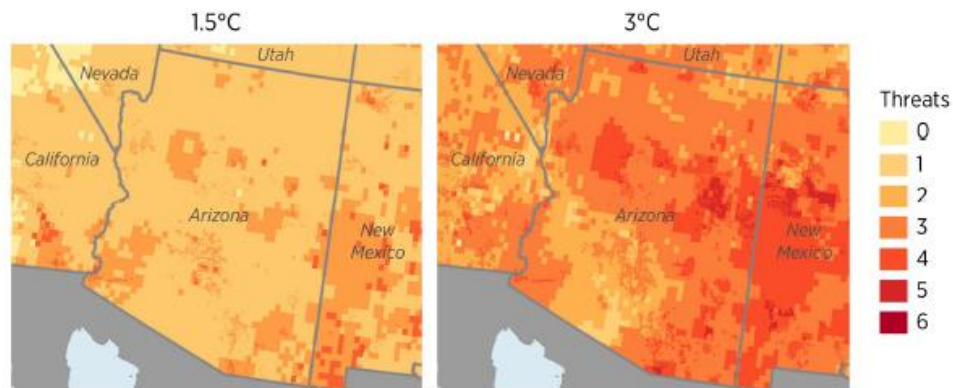
Heavy Rain








False Springs



Climate-Related Threats (Cont.)



Threat	Scenario	Area Affected (acres)	Summer (Vulnerable) Species Affected	Winter (Vulnerable) Species Affected
 Urbanization	3°C	5,094,435	28 (6)	42 (4)
 Extreme Spring Heat	1.5°C	72,803,064	253 (62)	260 (23)
	3°C	72,997,041	239 (89)	280 (53)
 Fire Weather	3°C	56,810,922	223 (88)	238 (52)
 Spring Droughts	1.5°C	5,008,324		3 (0)
	3°C	66,477,670	239 (89)	279 (52)
 False Springs	1.5°C	7,473,444	1 (0)	1 (1)
	3°C	10,389,036	14 (13)	8 (6)

TAKEAWAY ③

Every bird species will experience some kind of impact from climate change.

One quarter of state birds could lose the majority of their range in either the winter or summer season at 3.0°C.



Northern Flicker

Threat



Urbanization



Extreme Spring Heat



Fire Weather



Spring Droughts



False Springs

Habitat classifications:

F-B = Boreal Forests

F-E = Eastern Forests

F-W = Western Forests

F-S = Subtropical Forests

A = Arctic

D = Aridlands

G = Grasslands

M = Marshlands

C = Coastal

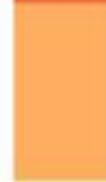
W = Waterbirds

Gen = Generalists

Trend classifications:



Potential
extirpation



Worsening



Stable



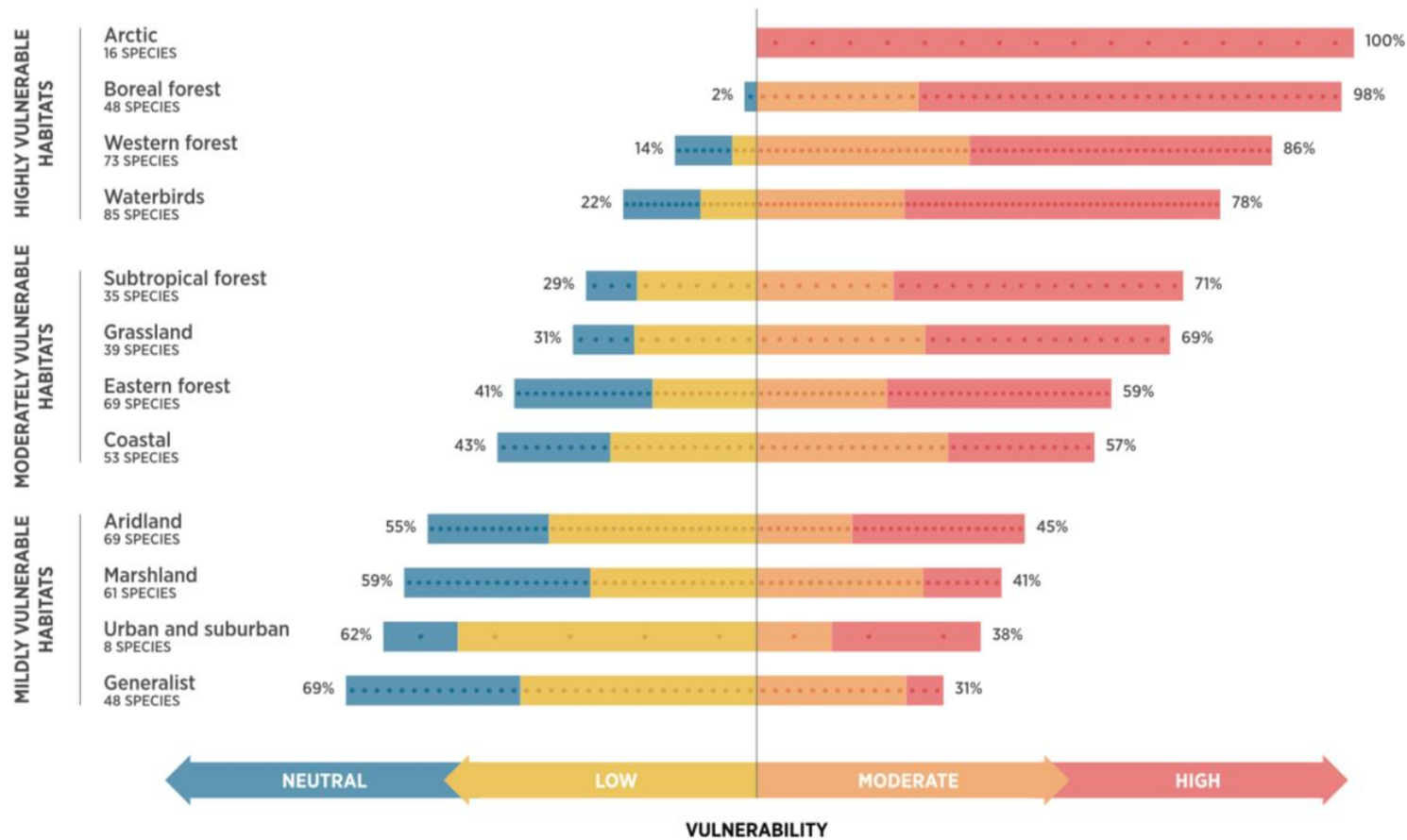
Improving



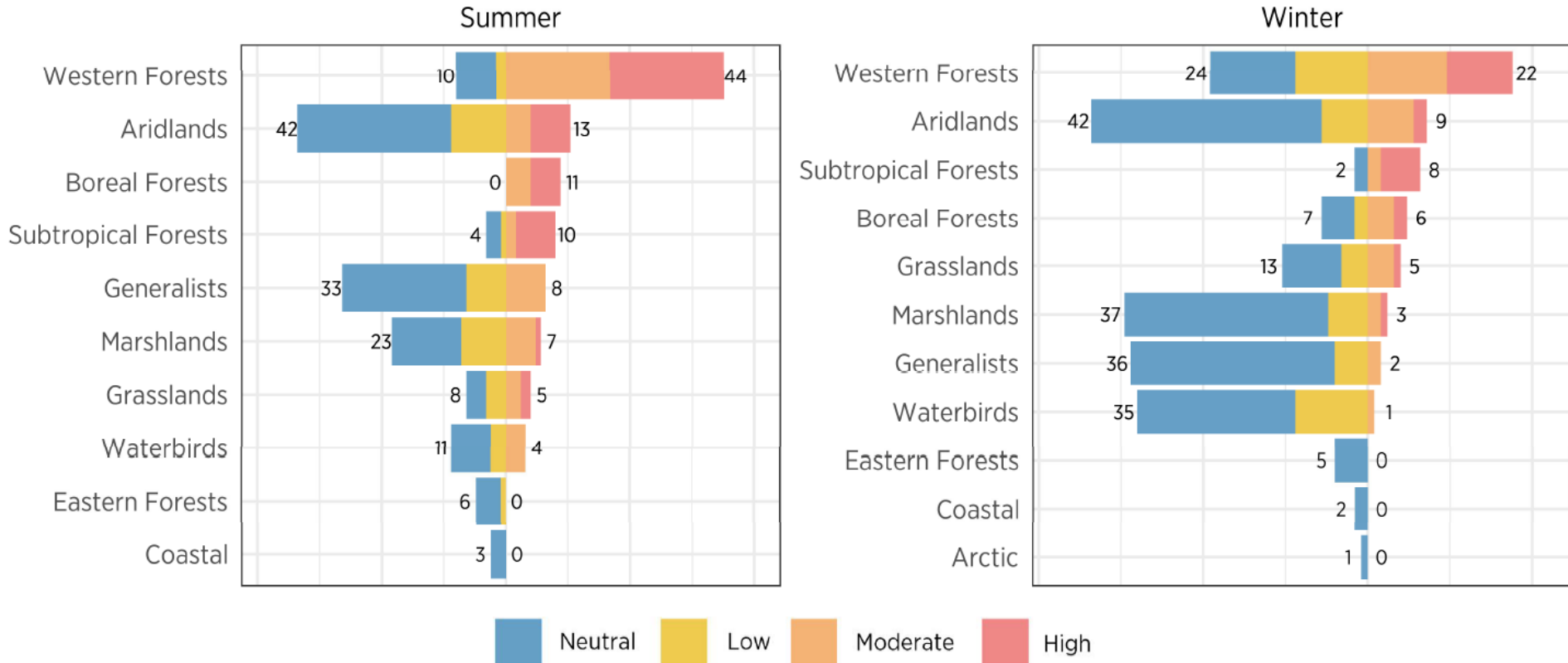
Potential
colonization

Continental Vulnerability Assessment








































Species Vulnerability Grouped by Habitat







































Arizona Habitats Vulnerable to Climate Change




















Western Forests – Northern Arizona

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends	State Threats			
Band-tailed Pigeon	F-W	Summer	Moderate	2%				
	F-W	Winter	High	2%				
Northern Pygmy-Owl	F-W	Summer	High	7% 1%				
	F-W	Winter	High	12% 2%				
Spotted Owl	F-W	Summer	High	6%				
	F-W	Winter	High	3% <1%				
Broad-tailed Hummingbird	F-W	Summer	High	8% 1%				
Williamson's Sapsucker	F-W	Summer	High	7% <1%				
	F-W	Winter	High	16% 3%				
Acorn Woodpecker	F-W	Summer	High	16% 3%				
	F-W	Winter	Moderate	15% 5%				
Western Wood-Pewee	F-W	Summer	High	44% 9%				





















Western Forests – Northern Arizona

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends		State Threats			
Cordilleran Flycatcher	F-W	Summer	High	<div><div>5%</div><div>1%</div></div>					
Dusky Flycatcher	F-W	Summer	High	<div><div>3%</div><div><1%</div></div>					
	F-W	Winter	Neutral	<div><div>1%</div><div>6%</div></div>					
Mountain Chickadee	F-W	Summer	High	<div><div>14%</div><div>3%</div></div>					
	F-W	Winter	High	<div><div>19%</div><div>2%</div></div>					
Hutton's Vireo	F-W	Summer	Moderate	<div><div>11%</div><div>3%</div></div>					
	F-W	Winter	Moderate	<div><div>15%</div><div>4%</div></div>					
Steller's Jay	F-W	Summer	Moderate	<div><div>9%</div><div>2%</div></div>					
	F-W	Winter	Moderate	<div><div>14%</div><div>3%</div></div>					
Clark's Nutcracker	F-W	Summer	High	<div><div>5%</div><div><1%</div></div>					
	F-W	Winter	High	<div><div>4%</div><div></div></div>					


















Western Forests – Northern Arizona

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends		State Threats			
American Dipper	F-W	Summer	Moderate	12%	8%				
	F-W	Winter	High	6%	1%				
Townsend's Solitaire	F-W	Summer	High	3%	<1%				
	F-W	Winter	High	27%	10%				
Hermit Thrush	F-W	Summer	High	1%	<1%				
	F-W	Winter	Low	25%	15%				
































Mixed Conifer - Spruce-Fir Forests – Northern Arizona

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends		State Threats			
Dusky Grouse	F-W	Summer	High	1%	<1%				
Northern Goshawk	F-B	Summer	High	12%	<1%				
	F-B	Winter	Low	28%	1%				
American Three-toed Woodpecker	F-B	Summer	High	2%	<1%				
	F-B	Winter	High	1%					
Olive-sided Flycatcher	F-B	Summer	High	3%	<1%				
Evening Grosbeak	F-B	Summer	High	3%					
	F-B	Winter	Moderate	18%	1%				
Red Crossbill	F-B	Summer	High	10%	1%				
	F-B	Winter	Moderate	23%	4%				































Western Forests – Pinyon and Juniper

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends		State Threats		
Pinyon Jay	F-W	Summer	Moderate	15%	14%			
	F-W	Winter	Low	14%	16%			
Woodhouse's Scrub-Jay	F-W	Summer	Moderate	15%	27%			
	F-W	Winter	Moderate	19%	37%			
Gray Vireo	D	Summer	Moderate	12%	6%			
	D	Winter	Neutral	2%	11%			


















Subtropical Forest –SE Arizona “Sky Islands” and Central Highlands

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends	State Threats			
Montezuma Quail	F-S	Summer	High	<div><div></div>3%</div>				
	F-S	Winter	High	<div><div></div>10%<div></div>8%</div>				
Mexican Jay	F-S	Summer	High	<div><div></div>16%<div></div>5%</div>				
	F-S	Winter	Moderate	<div><div></div>8%<div></div>6%</div>				
Bridled Titmouse	F-S	Summer	High	<div><div></div>10%<div></div>3%</div>				
	F-S	Winter	High	<div><div></div>11%<div></div>8%</div>				
Olive Warbler	F-S	Summer	High	<div><div></div>6%<div></div>1%</div>				
	F-S	Winter	High	<div><div></div>3%<div></div>2%</div>				
Red-faced Warbler	F-S	Summer	High	<div><div></div>9%<div></div>2%</div>				
Painted Redstart	F-S	Summer	High	<div><div></div>6%<div></div>3%</div>				
	F-S	Winter	Moderate	<div><div></div><1%<div></div><1%</div>				






































Arid Lands

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends	State Threats
LeConte's Thrasher	D	Summer	High	21% 4%	  
	D	Winter	Moderate	24% 12%	  
Canyon Towhee	D	Summer	Low	14% 27%	  
	D	Winter	High	14% 12%	  
Abert's Towhee	D	Summer	Moderate	26% 22%	  
	D	Winter	Moderate	25% 21%	  
Rufous-crowned Sparrow	D	Summer	Low	25% 18%	  
	D	Winter	High	11% 12%	  
Green-tailed Towhee	D	Summer	High	7% <1%	  
	D	Winter	Neutral	24% 21%	  






































Arid Lands

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends	State Threats
Scaled Quail	D	Summer	Moderate	<div> <div>10%</div> <div>16%</div> </div>	  
	D	Winter	Moderate	<div> <div>9%</div> <div>14%</div> </div>	  
Gilded Flicker	D	Summer	High	<div> <div>22%</div> <div>1%</div> </div>	  
	D	Winter	Neutral	<div> <div>22%</div> <div>8%</div> </div>	 
Cassin's Kingbird	D	Summer	High	<div> <div>28%</div> <div>6%</div> </div>	  
	D	Winter	Neutral	<div> <div>1%</div> <div>2%</div> </div>	  

Grasslands

Burrowing Owl	G	Summer	Neutral	15%	60%			
	G	Winter	Neutral	21%	18%			
Botteri's Sparrow	G	Summer	High	9%	10%			
	G	Winter	Low	7%	10%			
Cassin's Sparrow	G	Summer	Low	13%	5%			
	G	Winter	Moderate	20%	9%			
Grasshopper Sparrow	G	Summer	Low	3%				
	G	Winter	Neutral	15%	23%			
Western Meadowlark	G	Summer	Low	18%	12%			
	G	Winter	Neutral	56%	11%			
Eastern Meadowlark	G	Summer	Moderate	5%	4%			 
	G	Winter	Neutral	5%	9%			

Water and Marsh Birds

Species	Habitat Group	Season	Range-wide Vulnerability	State Trends	State Threats
Black-bellied Whistling-Duck	M	Summer	Neutral	6% 24%	   
	M	Winter	Neutral	<1% 2%	  
Cinnamon Teal	M	Summer	Moderate	25% 12%	  
	M	Winter	Neutral	70% 20%	  
Ring-necked Duck	W	Summer	Moderate	17% 30%	  
	W	Winter	Neutral	65% 15%	  
Clark's Grebe	M	Summer	Low	2% 1%	  
	M	Winter	High	10% 4%	  
Virginia Rail	M	Summer	Moderate	27% 3%	  
	M	Winter	Low	14% 19%	  
Ridgway's Rail	M	Summer	Neutral	4% 15%	  
	M	Winter	Neutral	6% 2%	  

TAKEAWAY ④

The good news is that our science also shows that if we take action now **we can help improve the chances for 76% of species at risk.**

And everyone can start with a first-of-its-kind zip code-based tool that will show the impact of climate change in communities and on local birds.





Birds and Climate Visualizer

Take it personally: Climate change is a serious threat to birds and your community. Enter your location to see which impacts from climate change are predicted for your area, and how birds near you will be affected.

or

Send me email updates about Audubon's work and how I can protect birds. [Privacy Policy](#)

<https://www.audubon.org/climate/survivalbydegrees/county?zipCode=85007>


































Audubon Climate Watch

A new community science collaboration

CLIMATE WATCH BIRDS



Species	Habitat Group	Season	Range-wide Vulnerability	State Trends	State Threats
Red-breasted Nuthatch	F-B	Summer	Moderate	5% <1%	
	F-B	Winter	Neutral	38% 28%	  
White-breasted Nuthatch	F-E	Summer	Low	30% 8%	  
	F-E	Winter	Neutral	20% 18%	  
Pygmy Nuthatch	F-W	Summer	High	14% 1%	  
	F-W	Winter	Moderate	16% 3%	  
Eastern Bluebird	F-E	Winter	Neutral	<1%	  
Western Bluebird	F-W	Summer	Moderate	27% 11%	  
	F-W	Winter	High	37% 13%	  
Mountain Bluebird	F-W	Summer	High	6%	  
	F-W	Winter	Low	25%	  

TAKEAWAY ⑤

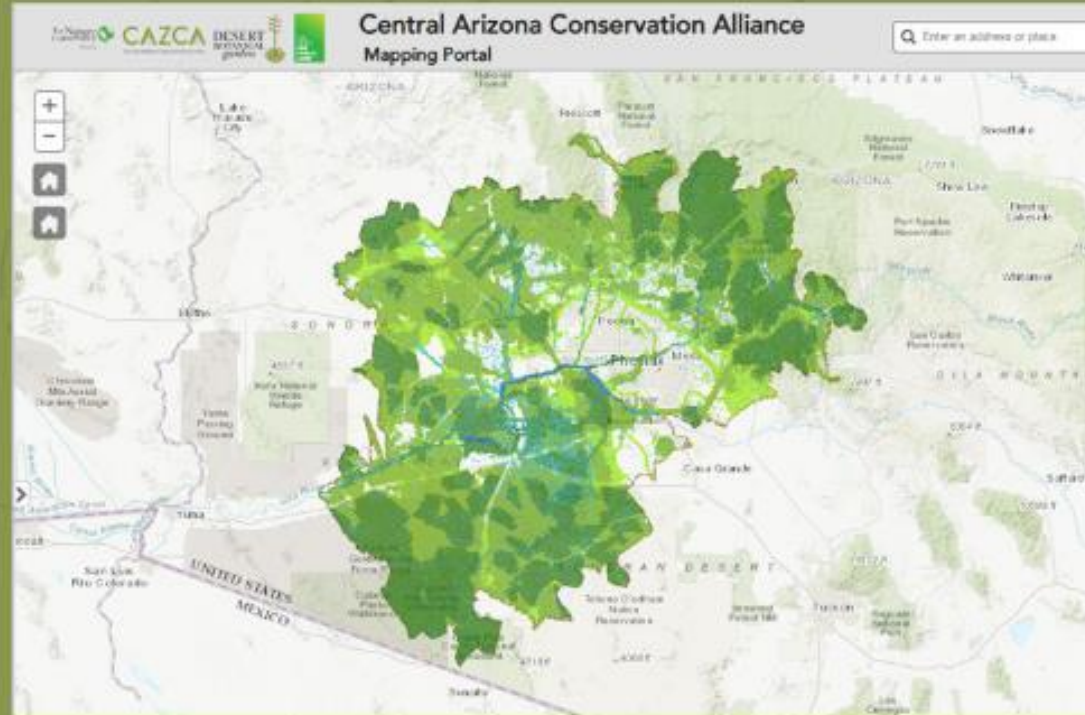
We already know what we need to do to help protect the birds we love.


- Protect the places birds need now and in the future.



POLICY GOAL: Climate Adaptation

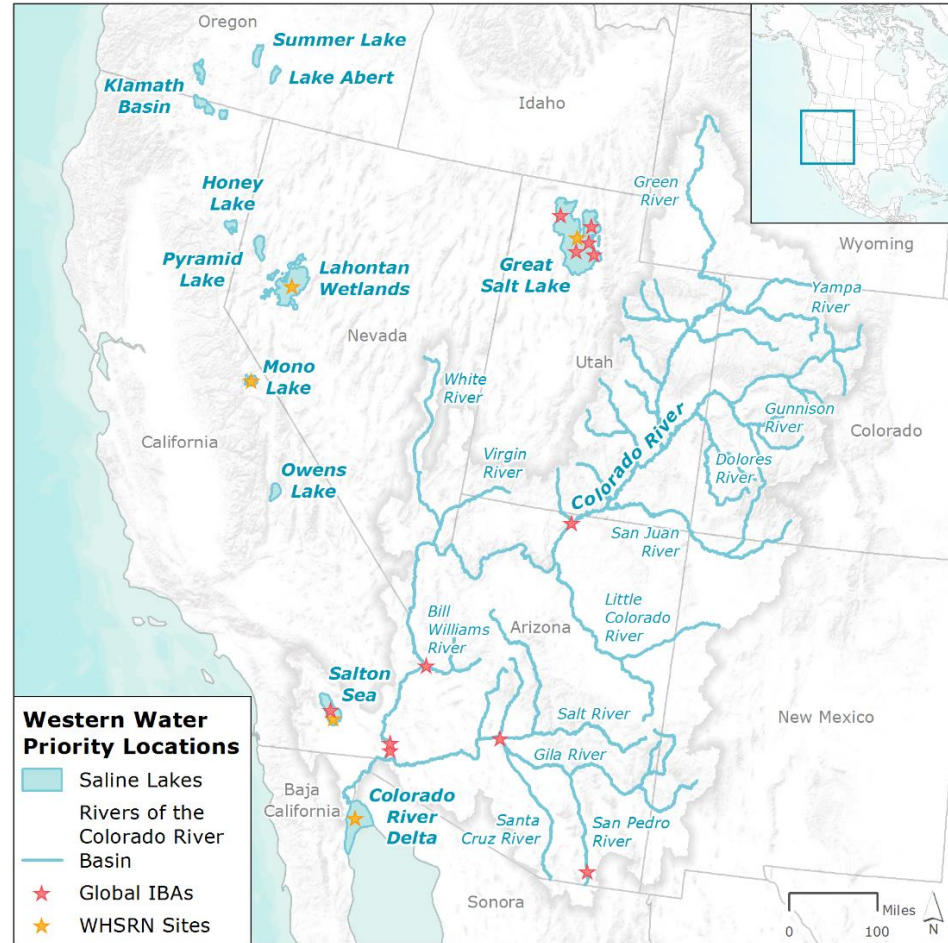
Protect and expand the places birds need





Audubon

WESTERN RIVERS ACTION NETWORK



POLICY GOAL: Natural Solutions

Expand, preserve, restore, and protect landscapes that can naturally store carbon and provide places that birds need.





Working Lands

- Develop market-based conservation solutions that encourage bird-friendly practices
- Create bird specific land-management practices
- Collaborate with landowners
- Increase government incentives for bird conservation and engage on a policy level
- Build local and international partnerships



Montezuma Quail, Scaled Quail, Botteri's Sparrow, Cassin's Sparrow, Grasshopper Sparrow, Lilian's Eastern Meadowlark, Azure Eastern Bluebird

- Conservation Ranching





Photo: Royal Terns. Melissa James.

**By taking action –
personally and politically –
we can**

- hold our planet's increasing thermostat to **2.7° Fahrenheit** (1.5 degrees Celsius).
- By doing so, we'll protect 76% of bird species in North America.

That's a big deal.

POLICY GOAL: Economy Wide Solutions

Support comprehensive federal legislation and policies

POLICY GOAL: Clean Energy

Transition to 100% clean energy



POLICY GOAL: Innovation

- Carbon-Free Electricity
- Energy Storage
- Carbon Capture and Utilization

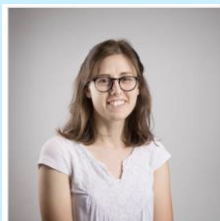


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