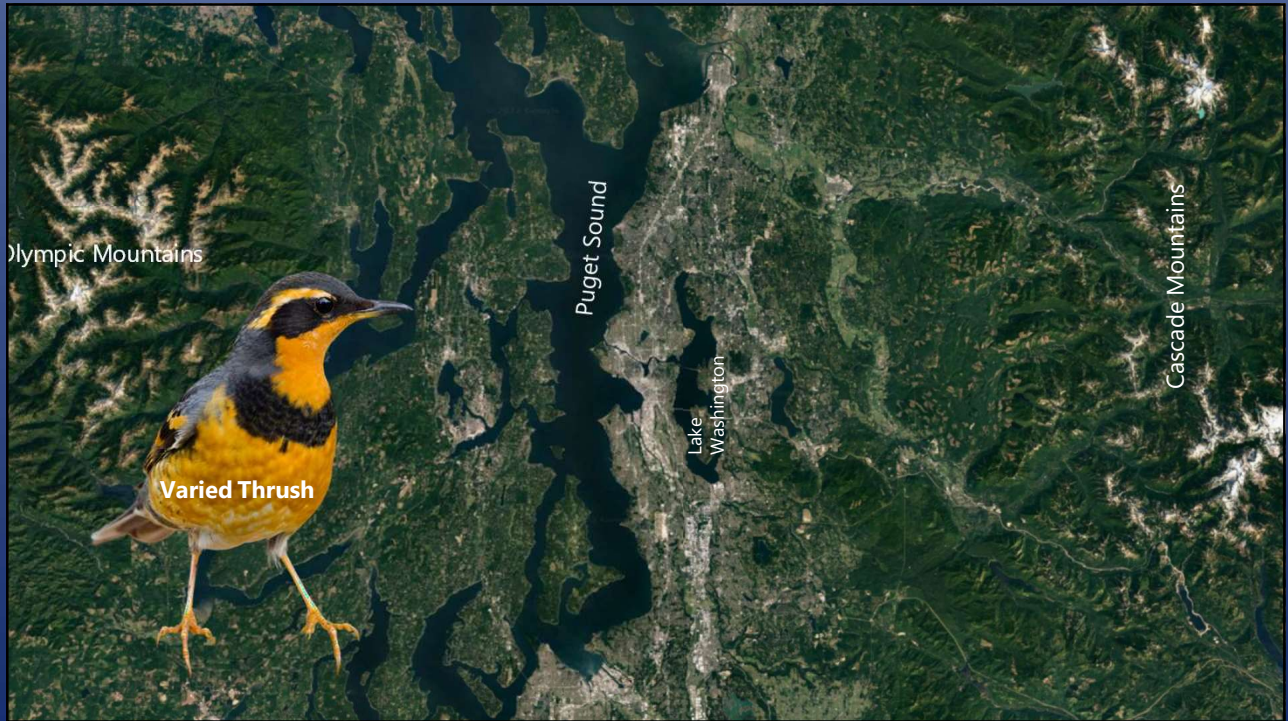
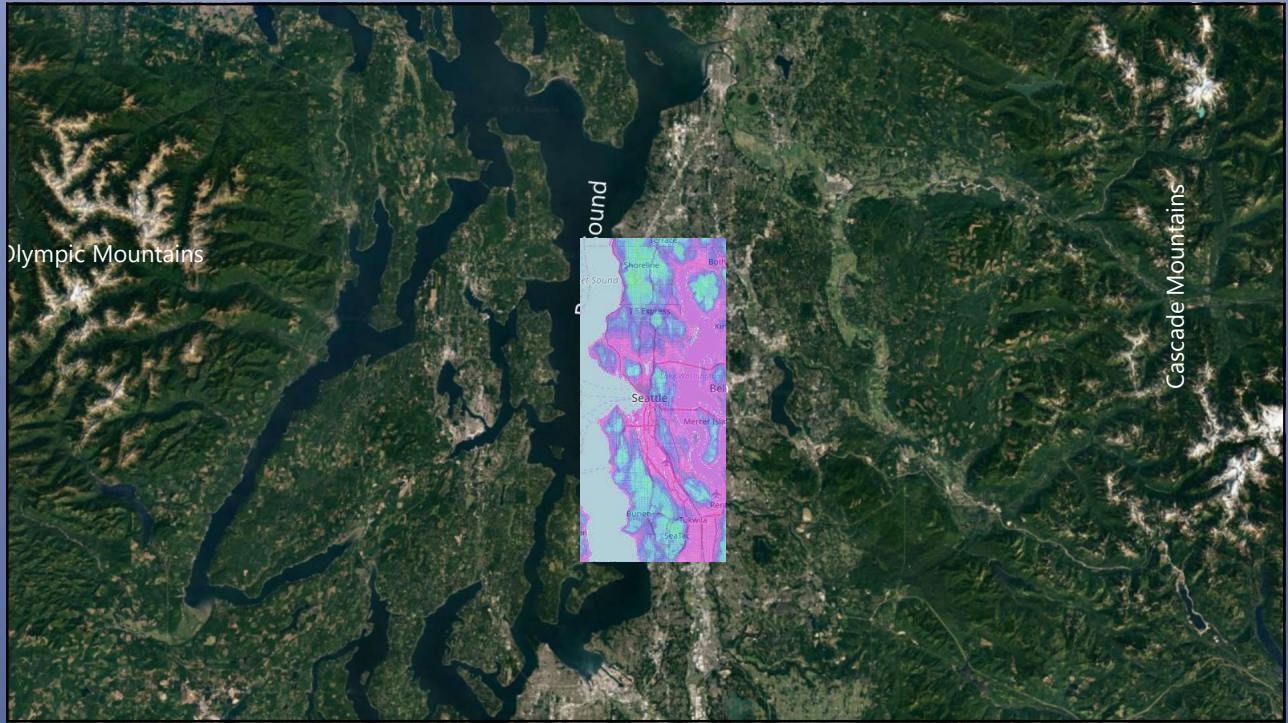


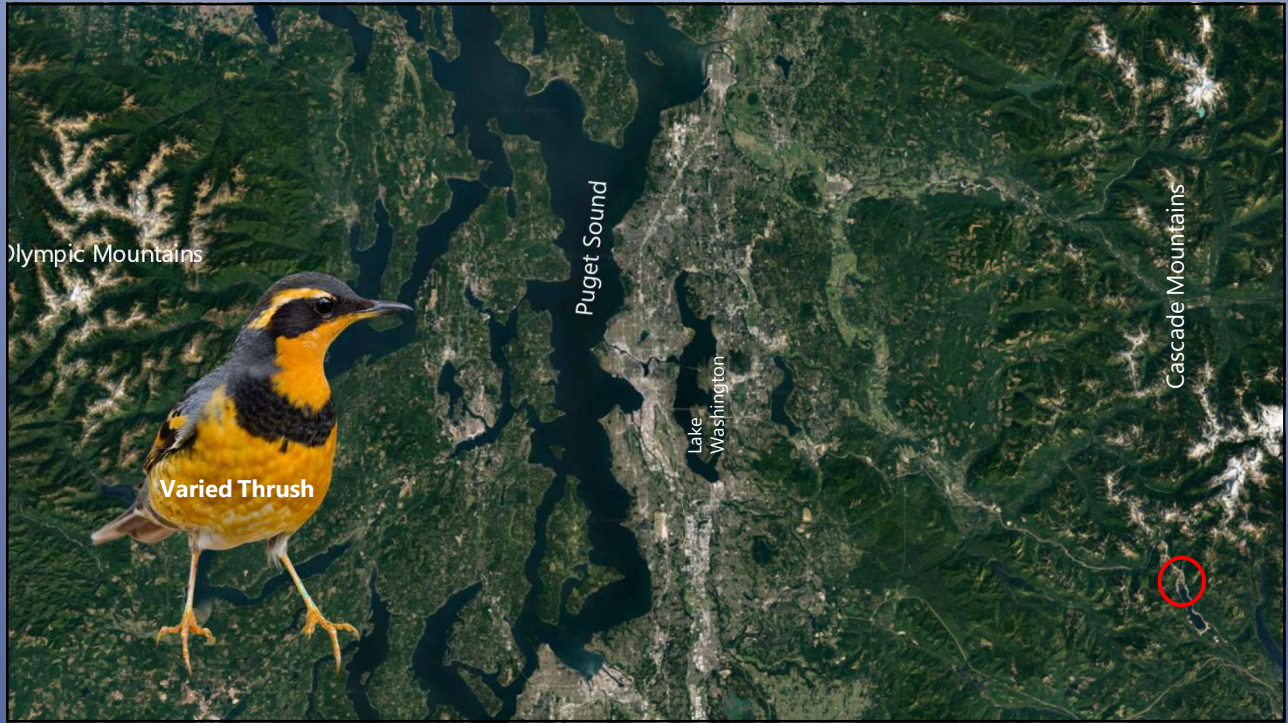
Should we consider biodiversity conservation in climate mitigation?

Joshua Morris
Urban Conservation Manager at Seattle Audubon
FEMA Mitigation Summit
March 7, 2023





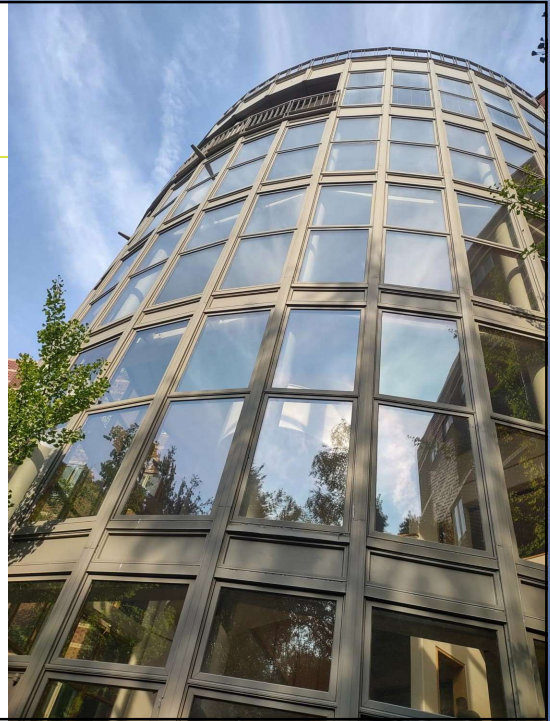








Varied Thrush vulnerable to window collisions



Chestnut-backed Chickadee



Image credit: Devonyu / Getty Images. Range map: Birds of the World.

Caterpillars appear to be important for birds



Image credit: Bird Images / Getty Images Signature



Many moths and butterflies have specialized relationships with host plants



Monarch butterfly
Milkweeds



Anise swallowtail
Carrot family

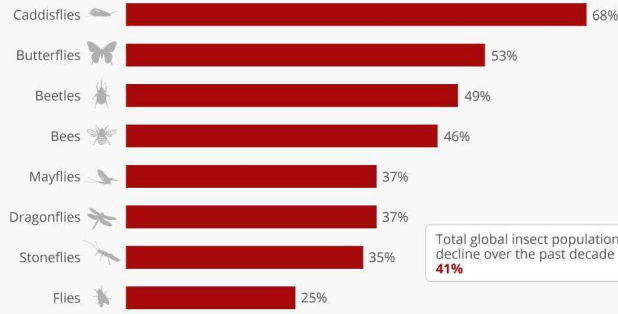


Image credits: Monarch caterpillar / CathyKeifer / Getty Images; Monarch Butterfly / Liliboas / Getty Images Signature; Anise Swallowtail caterpillar / Joshua Morris; Anise Swallowtail / yhefman / Getty Images

Insect populations are in decline globally

Massive Insect Decline Threatens Collapse Of Nature

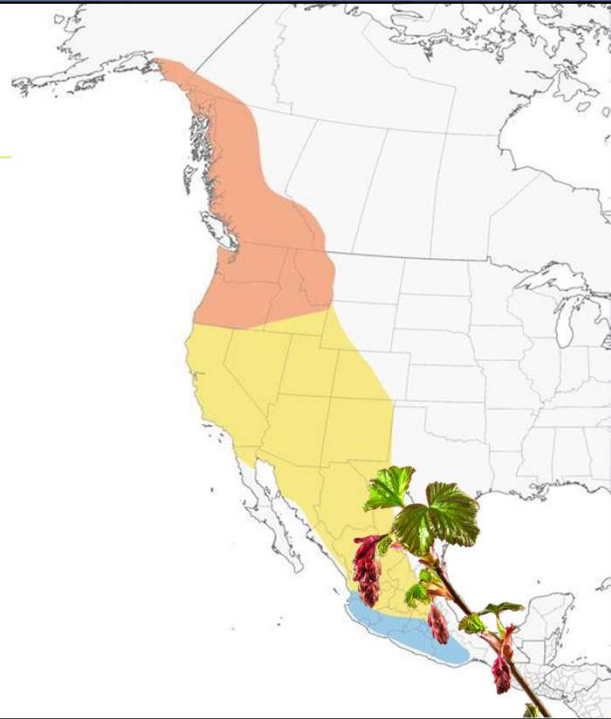
Percentage decline in selected global insect populations over the past decade



© StatistaCharts Source: Sánchez-Bayo & Wyckhuys, Biological Conservation, 2019

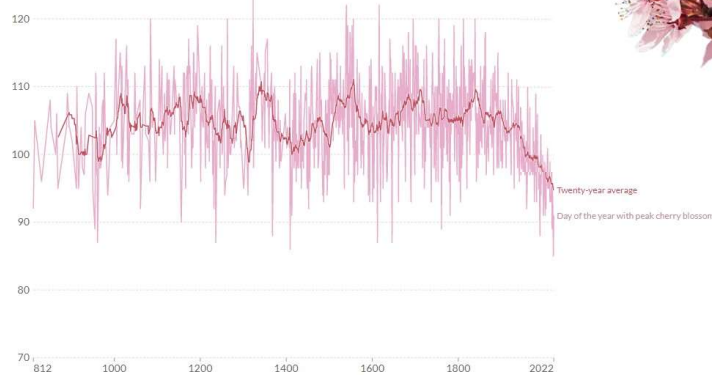


Rufous Hummingbird



Climate change affects phenology

Day of year with peak cherry tree blossom in Kyoto, Japan



Source: Multiple sources compiled by Aono (2023)
 Note: The twenty-year average is calculated when there are at least five years with data in the twenty year window.

OurWorldInData.org/biodiversity • CC BY

Birds are telling us its time to act



- Still common, but population in steep decline
- Projected to lose 69% of breeding range with further warming



- Near Threatened, population in steep decline
- Projected to lose 71% of breeding range with further warming

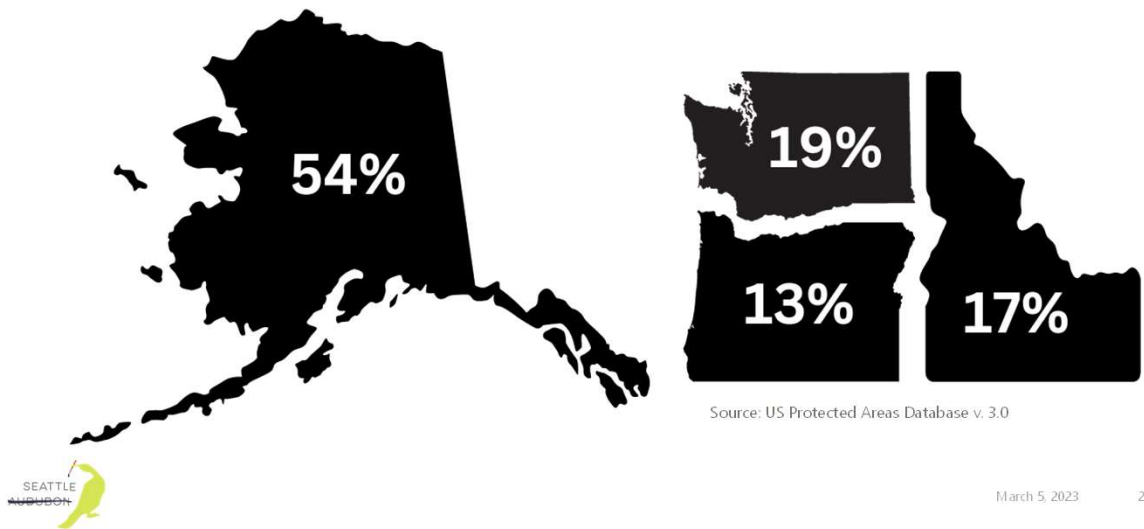


- Declining in some areas, stable in other
- Projected to gain breeding range with climate change



Population trends from Avian Conservation Assessment Database / Partners in Flight
 Climate projections from National Audubon Society

Areas conserved for biodiversity



Extent of selected land use types across US

Exurbia	333 mil. acres	Theobald 2001
Suburbia	101 mil. acres	Theobald 2001
Urban centers	69 mil. acres	Theobald 2001
Rural residential	50 mil. acres	Bigelow 2017
Power and pipeline ROWs	21 mil. acres	Conniff 2014
Roadsides	17 mil. acres	Ament et al. 2014
Railroad ROWs	3 mil. acres	Bigelow 2017
Airports	3 mil. acres	Bigelow 2017
Golf courses	2 mil. acres	Jacobs 2011
Total	599 mil. acres	

How big is 599 million acres?



What can we do about it?



Talk about biodiversity loss



Enhance habitat



Reduce hazards to wildlife





Talk about biodiversity loss

84 X

as many hits for "climate change" than "biodiversity"



Enhance habitat

Add "keystone" trees and plants that support caterpillars



Image credit: Joshua Morris



Oak 436
 Cherry 340
 Birch 249
 Poplar 249
 Maple 238



Strawberry 70
 Lupin 64
 Goldenrod 54
 Violet 27
 Willowherb 26



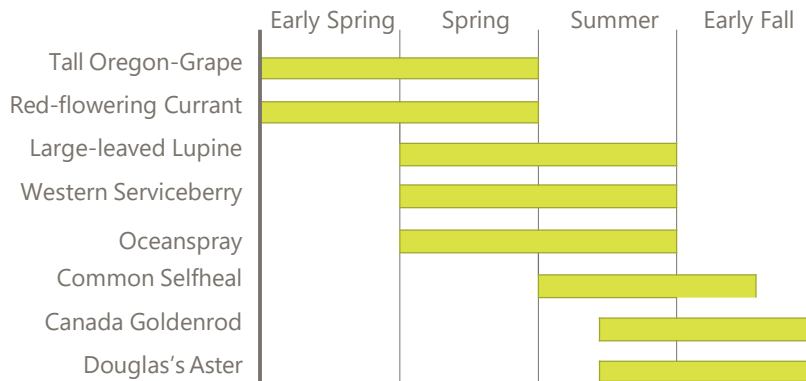
[Nfw.org/NativePlantFinder](https://www.nfw.org/NativePlantFinder)





Enhance habitat

Consider the timing of blooms and their resource availability



Enhance habitat

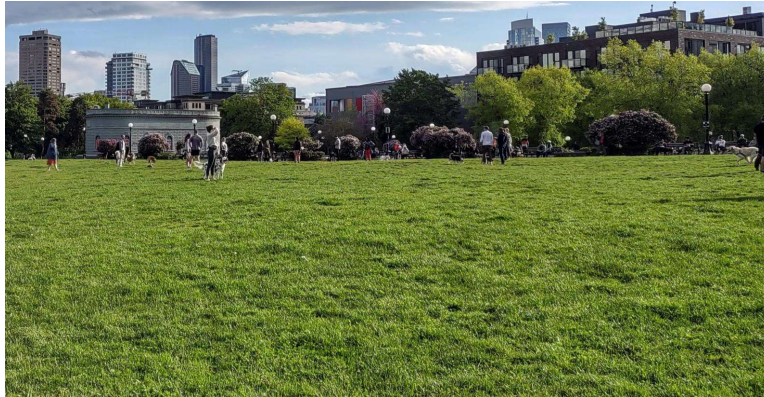
Consider the timing of blooms and their resource availability





Enhance habitat

Replace / avoid lawns and other plants that form monocultures



"Meadow" at Cal Anderson Park. Photo credit: Joshua Morris



Enhance habitat

Replace /avoid toxic plants



Heavenly Bamboo (*Nandina domestica*). Image credit: Joshua Morris





Enhance habitat

Replace /avoid toxic plants



Heavenly Bamboo (*Nandina domestica*). Image credit: Joshua Morris



Enhance habitat

Create layered habitats





Reduce risks to wildlife

Cats are the leading direct cause of human-related bird mortality.



Reduce risks to wildlife

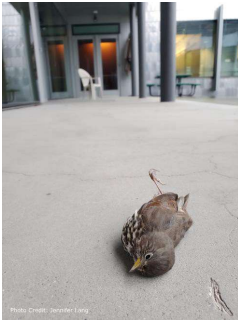
Cats are the leading direct cause of human-related bird mortality.





Reduce risks to wildlife

Bird-window collisions take a staggering toll



Fox Sparrow
Industrial District



Peregrine Falcon
Central District



Swainson's Thrush
First Hill



Reduce risks to wildlife

Prevent bird-window collisions by adding "visual noise" to window

1/8" lines
no more than 2" apart



1/4" dots
no more than 2" apart



Black-capped Chickadee by Roy Handcliff





Reduce risks to wildlife

Endless forms for collision deterrents



Angelina Villalobos with her collision deterrent design at Seattle Audubon.



Bird-safe glass at Oregon Zoo.

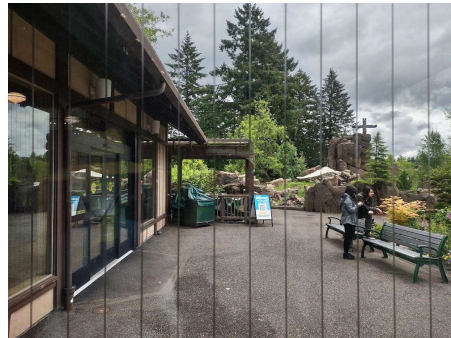


Reduce risks to wildlife

Endless forms for collision deterrents



Angelina Villalobos with her collision deterrent design at Seattle Audubon.



Bird-safe glass at Oregon Zoo.





Reduce risks to wildlife

Darkness is an increasingly scarce resource



Tribute in Lights. Photo credit: Sgt. Randall A. Clinton



Reduce risks to wildlife

Shield, dim, and turn off lights to benefit people and wildlife

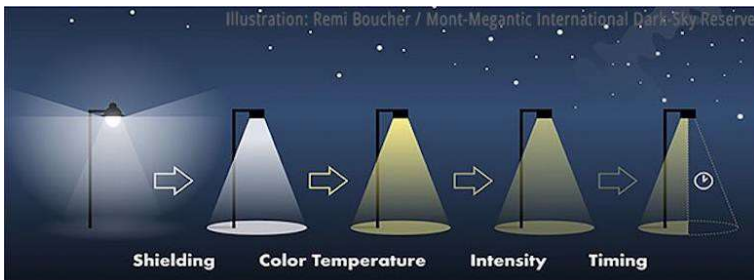


Image credit: Remi Boucher / Mont-Mégantic International Dark Sky Reserve

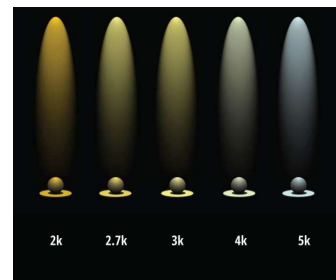
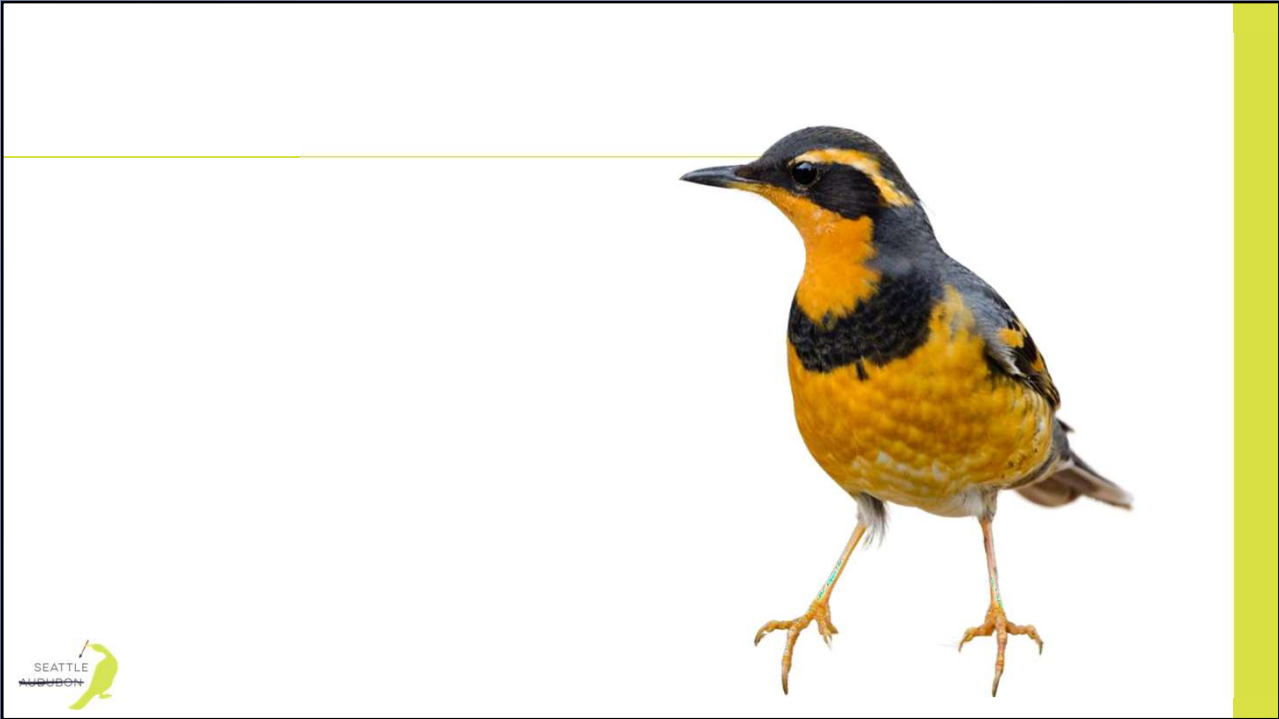


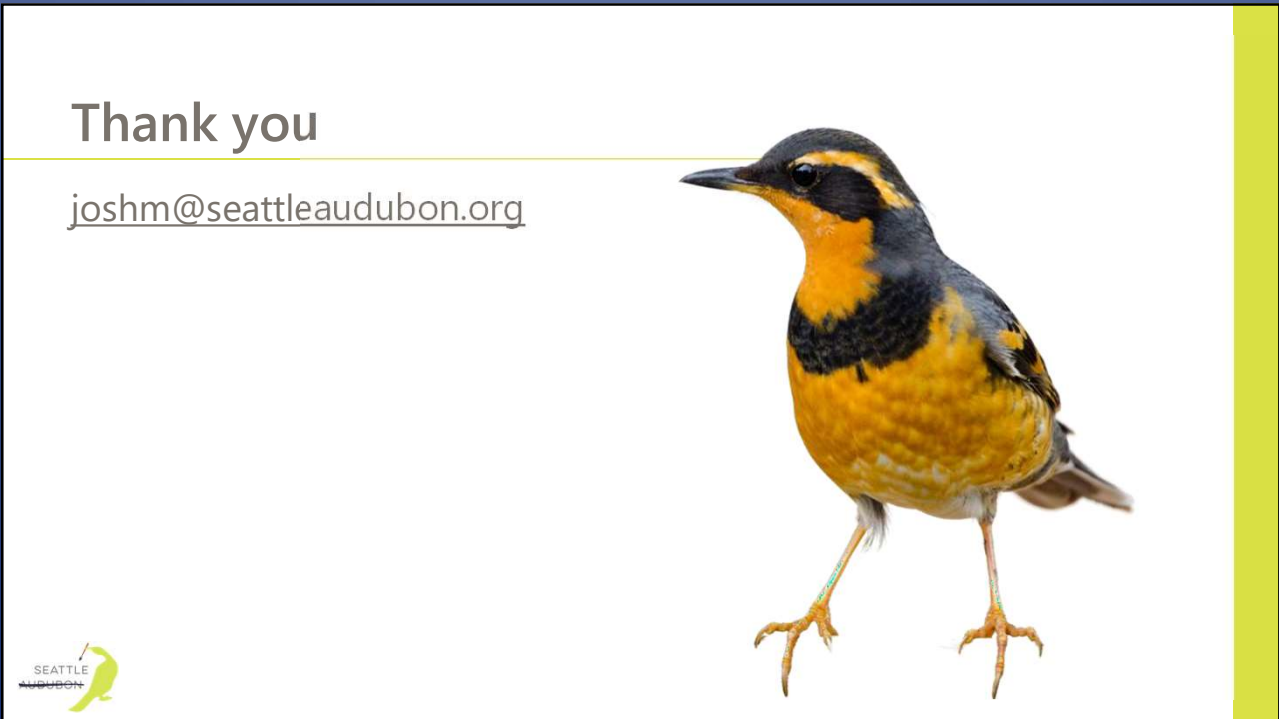
Image credit: Evluma

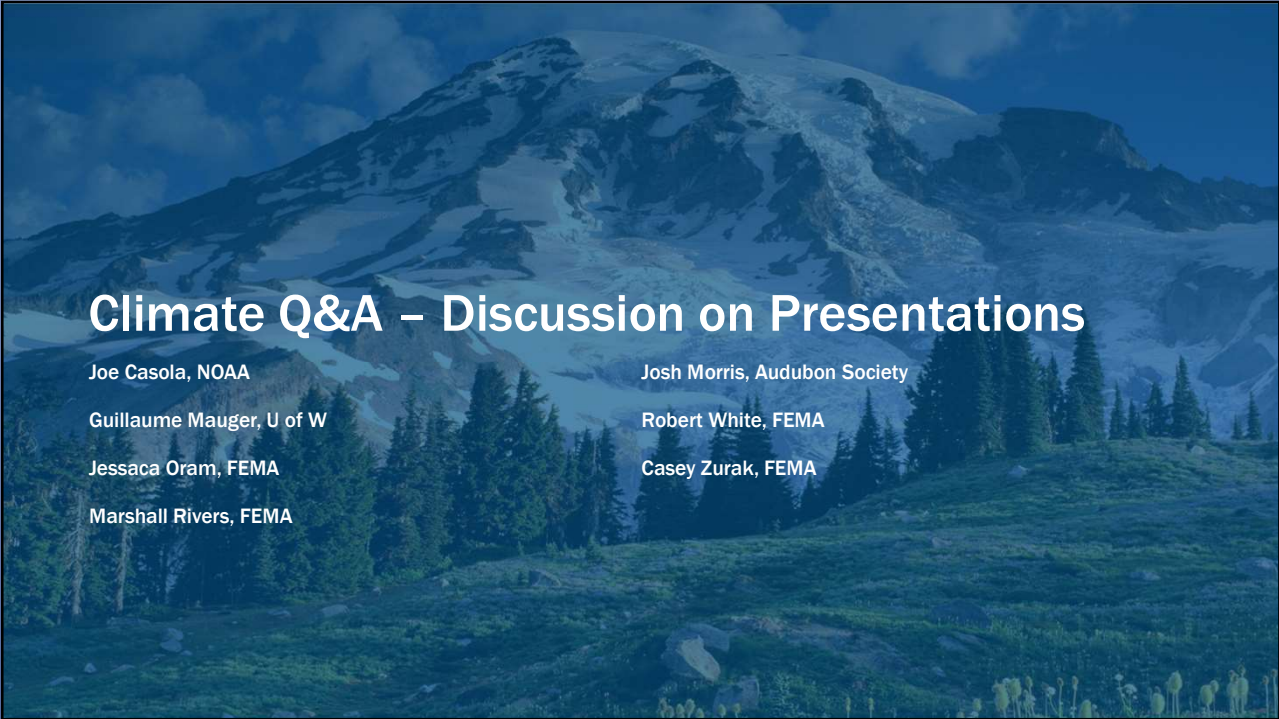




Thank you

joshm@seattleaudubon.org





Climate Q&A – Discussion on Presentations

Joe Casola, NOAA

Guillaume Mauger, U of W

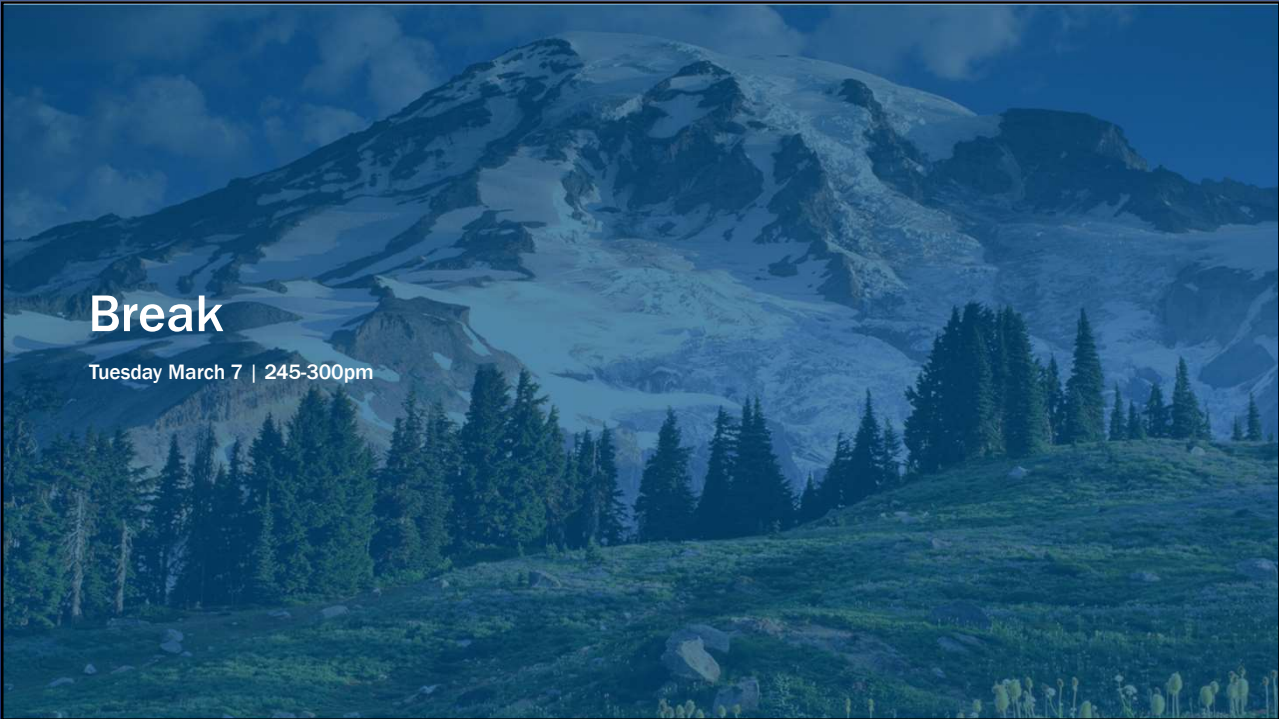
Jessaca Oram, FEMA

Marshall Rivers, FEMA

Josh Morris, Audubon Society

Robert White, FEMA

Casey Zurak, FEMA



Break

Tuesday March 7 | 245-300pm