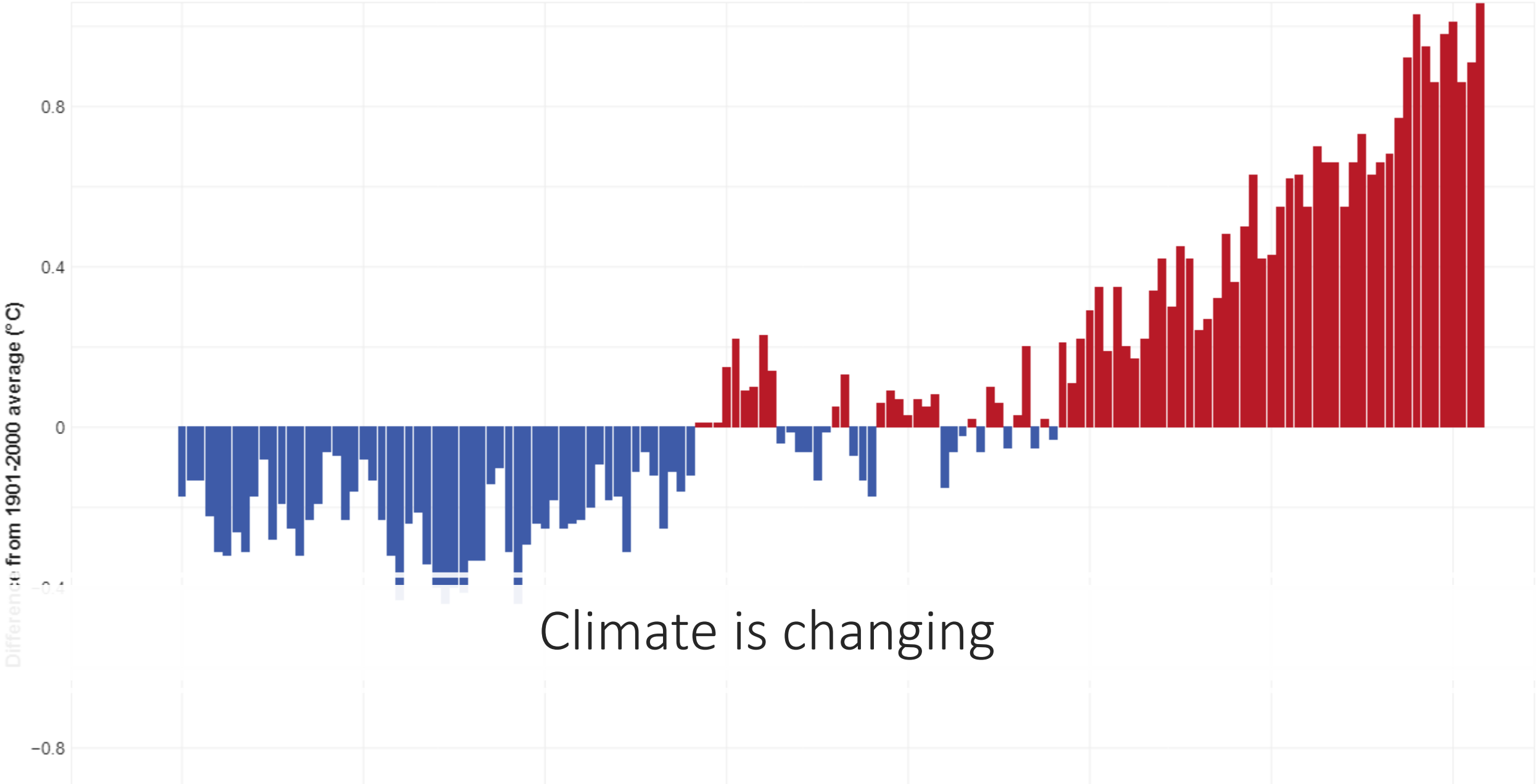
Climate Change and Species Extinction

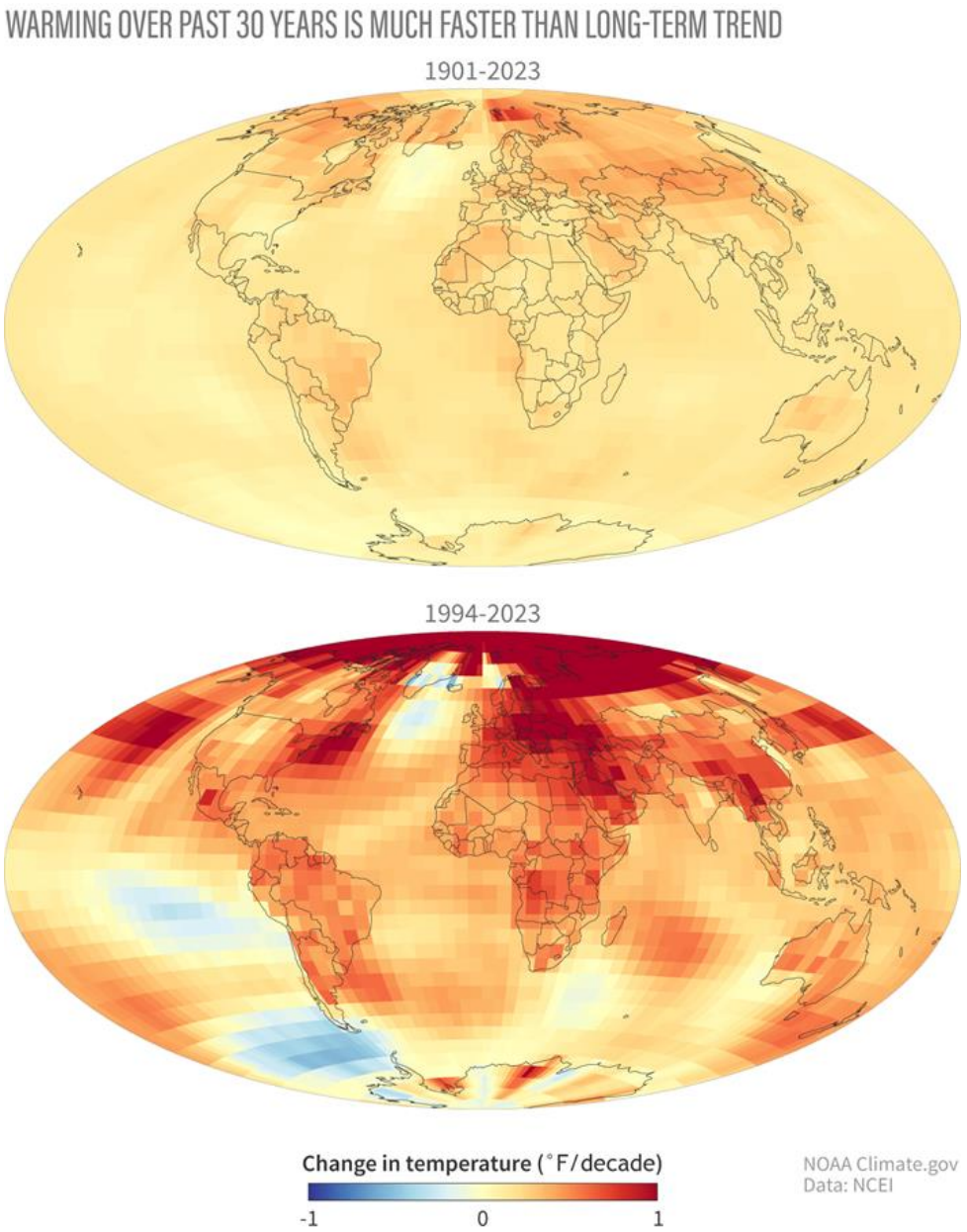
Australia's Great Barrier Reef has experienced four mass bleaching events in the last seven years, like this one in 2017. Scientists warn repeated bleaching makes it tough for corals to recover.
Brett Monroe Garner/Getty Images

GLOBAL AVERAGE SURFACE TEMPERATURE

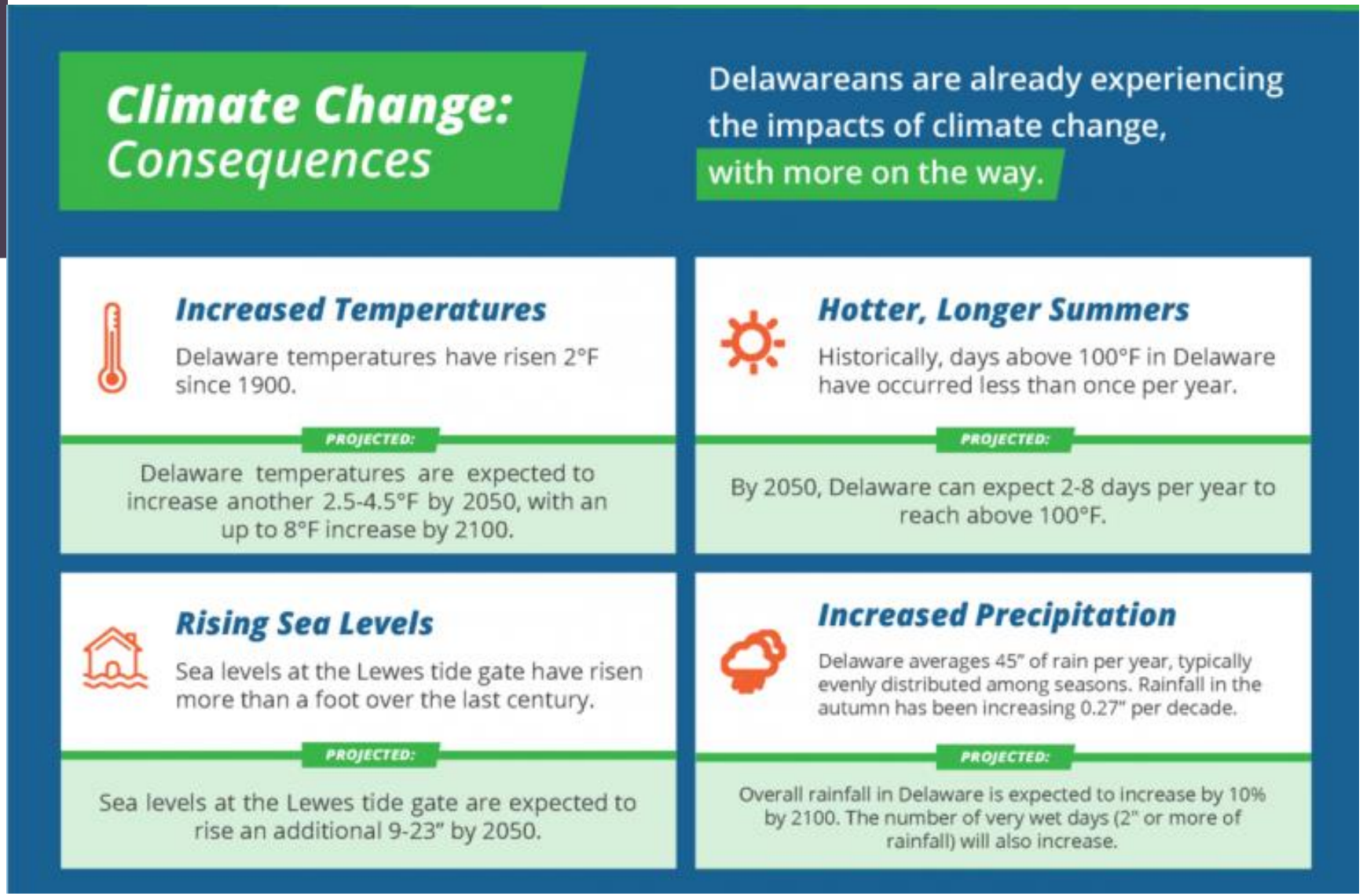


Climate is changing

Rate of Change



Signs of Climate Change



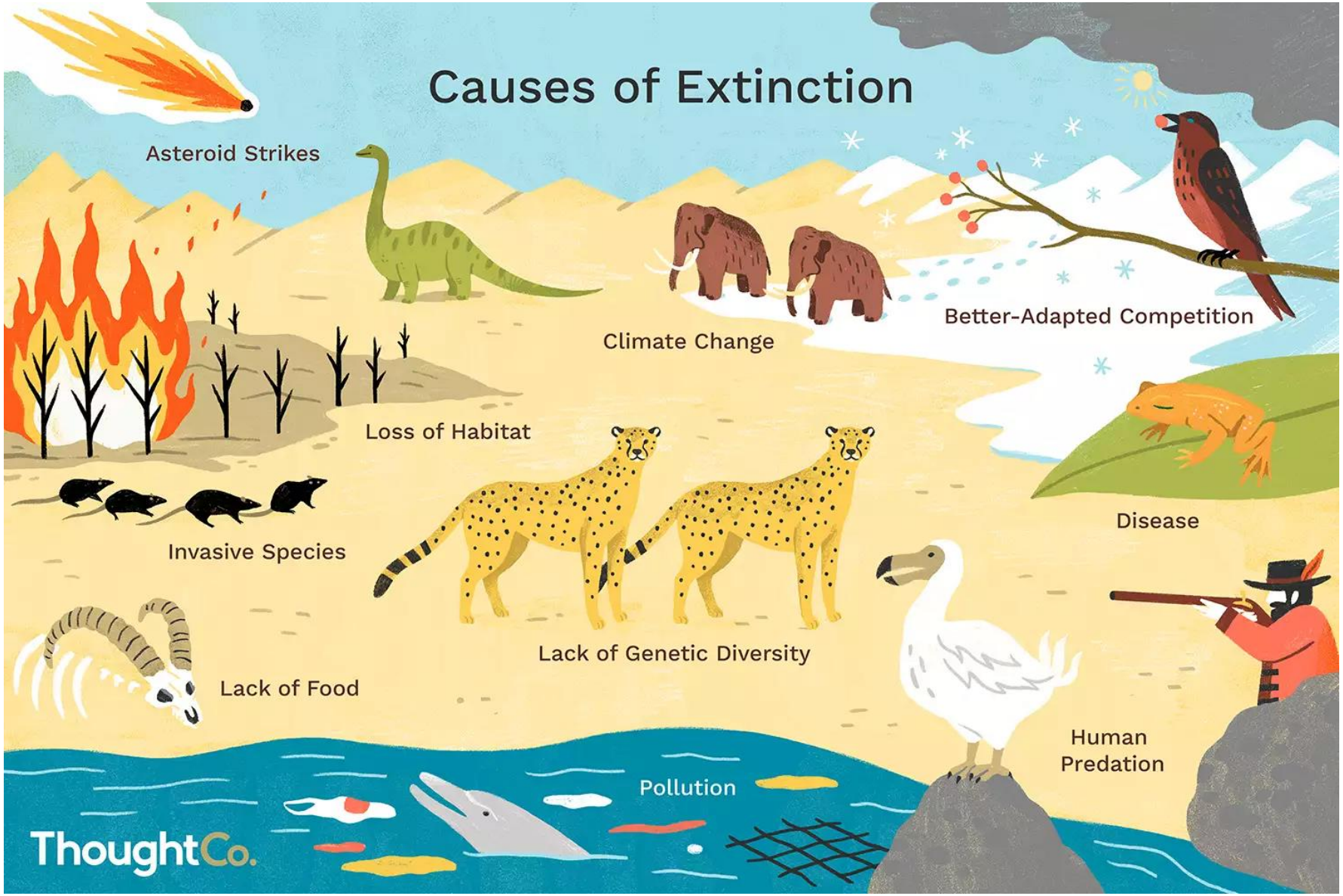
How Do Species Respond to Climate Change?

Adapt?

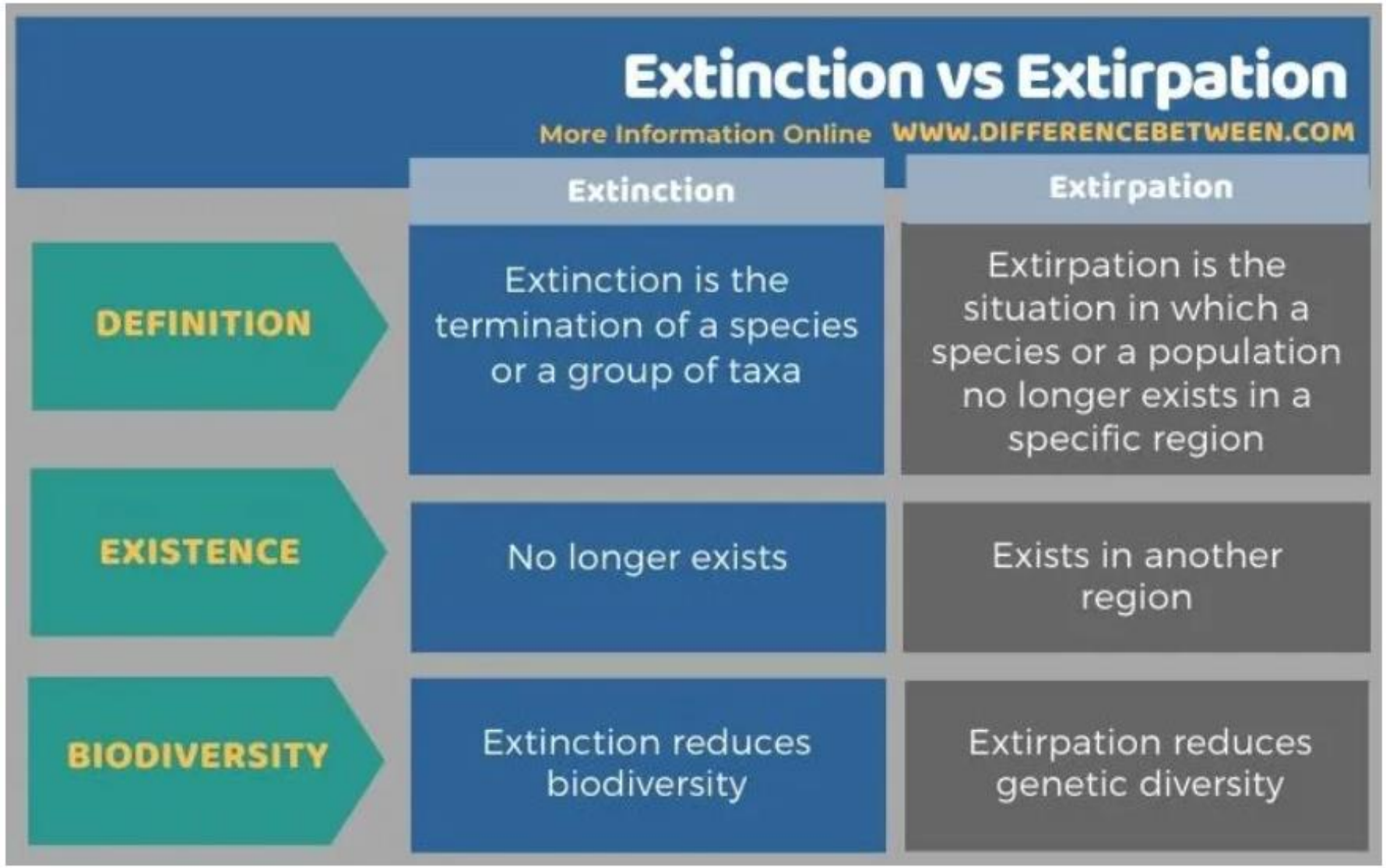
Die?

Move?

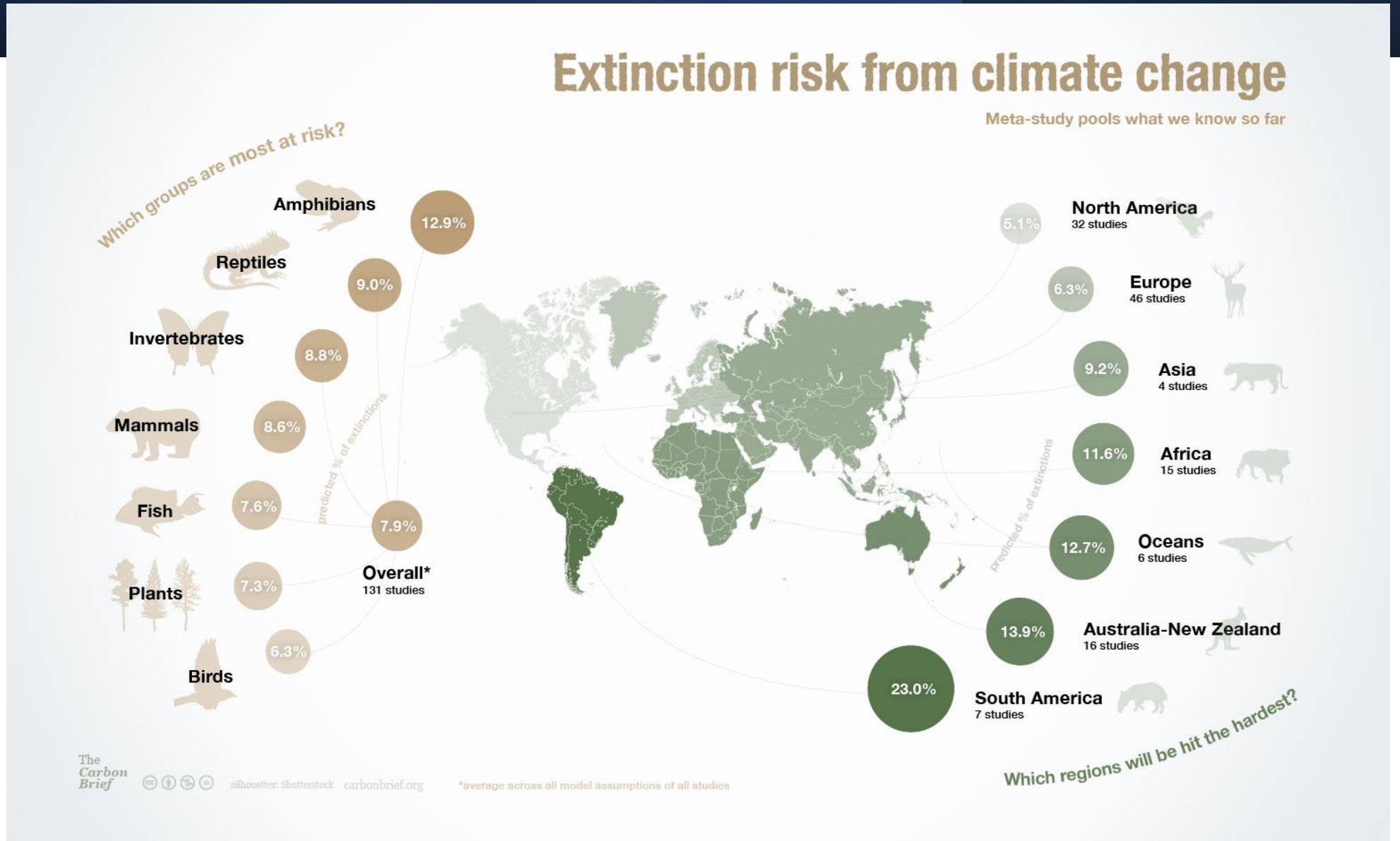
Species Extinction



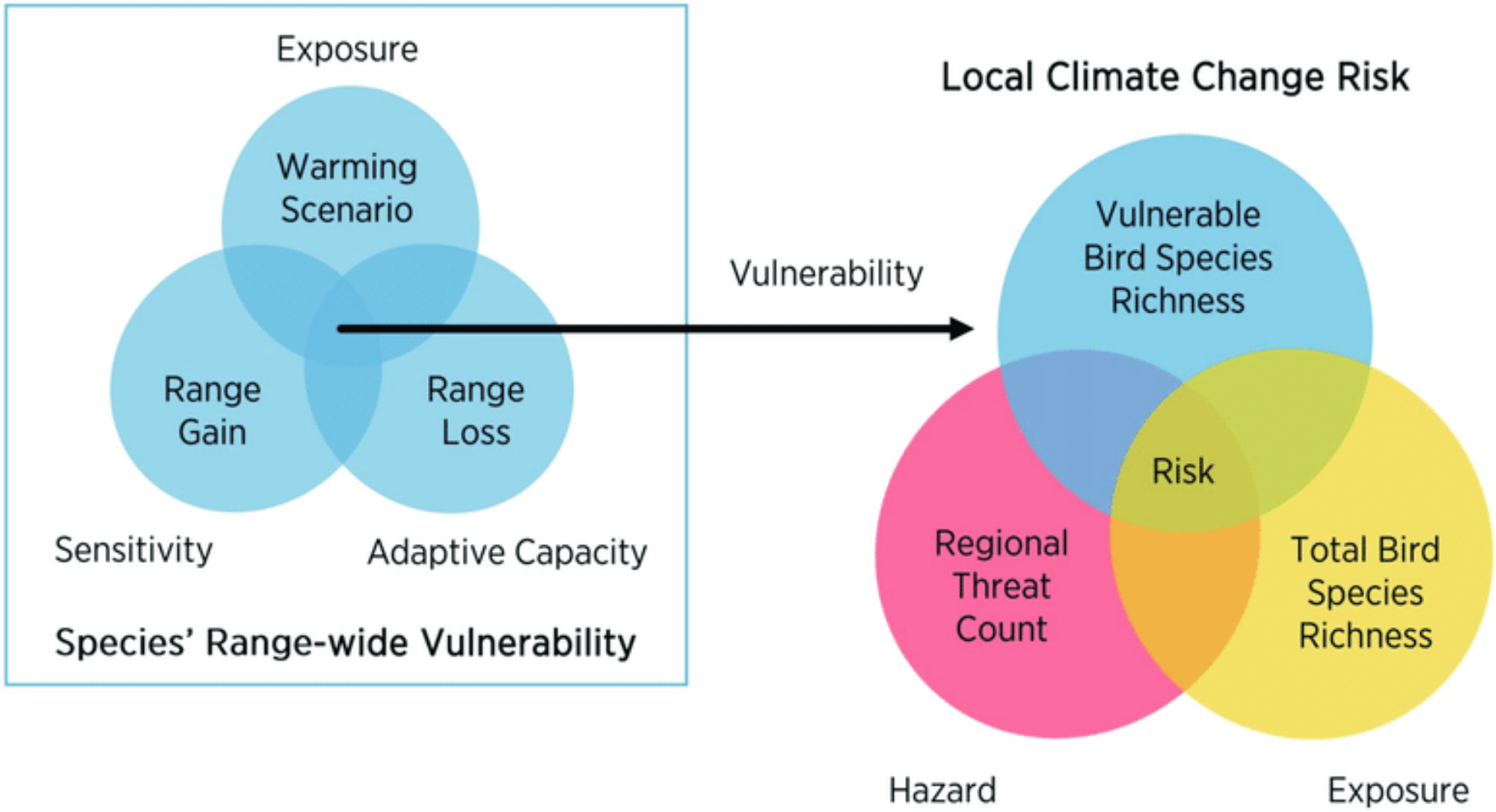
Extinction vs. Extirpation



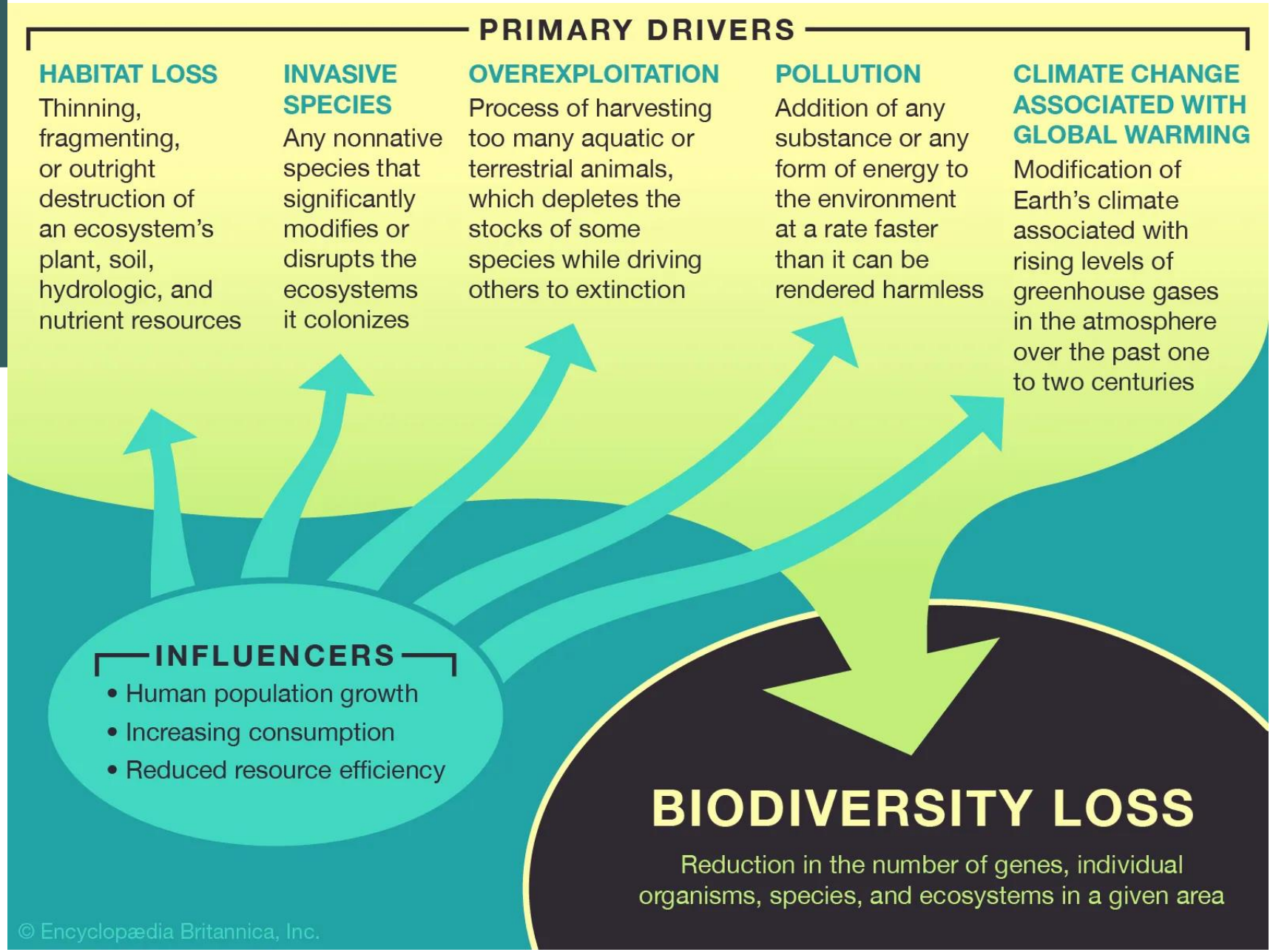
What is at Risk?



Vulnerability

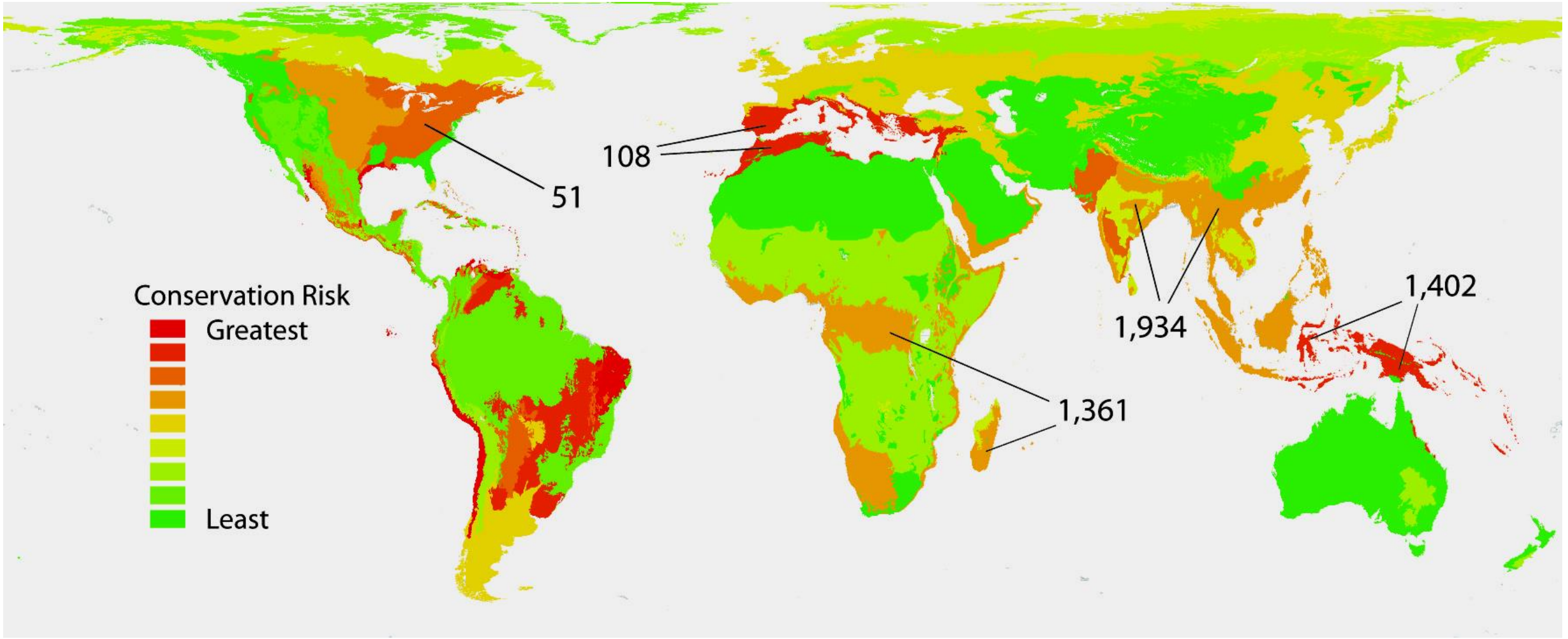


Loss of Biodiversity

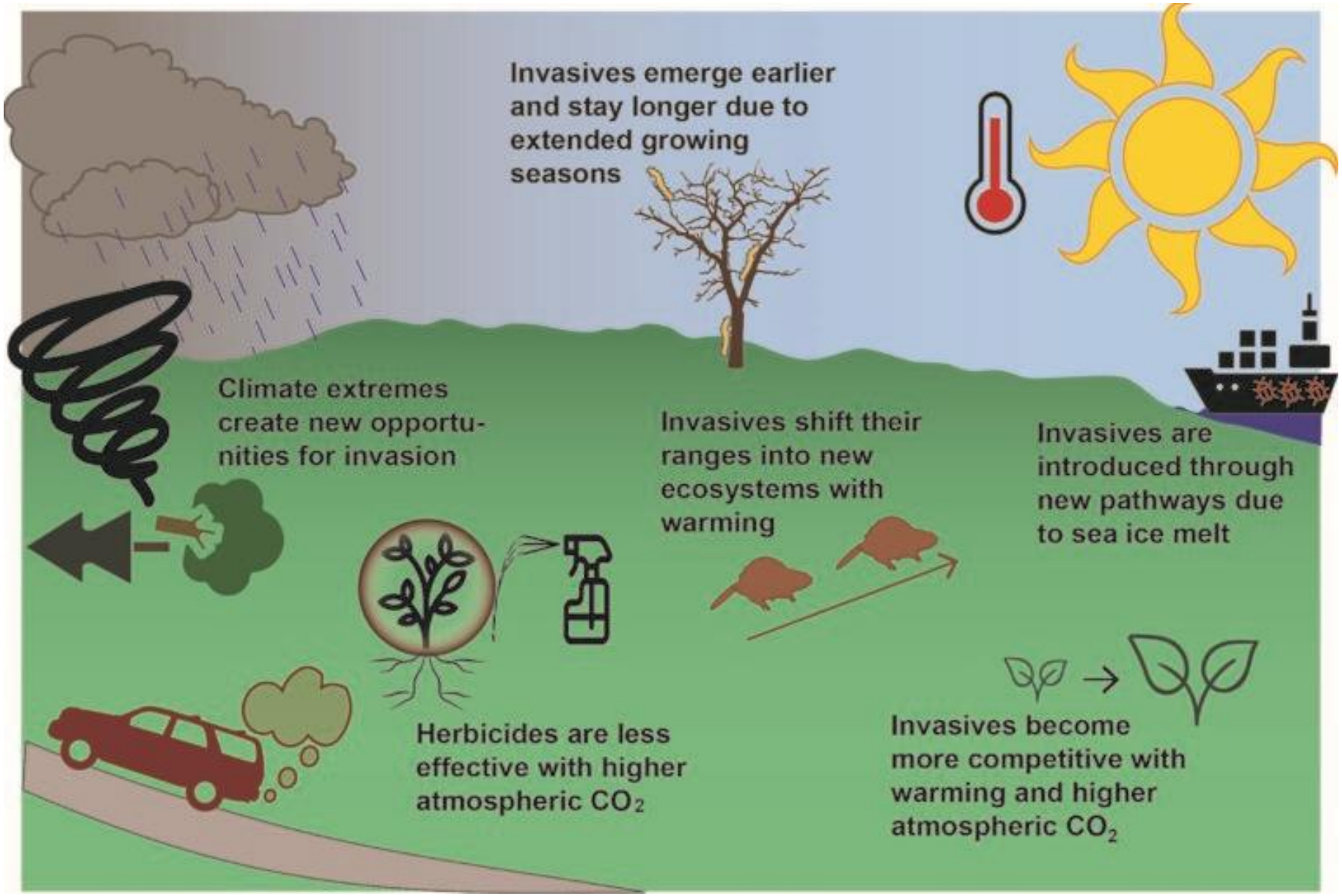


https://cdn.britannica.com/08/204708-050-D85E7D32/Biodiversity-loss-primary-drivers-climate-change-influencers-human-population-growth-consumption.jpg

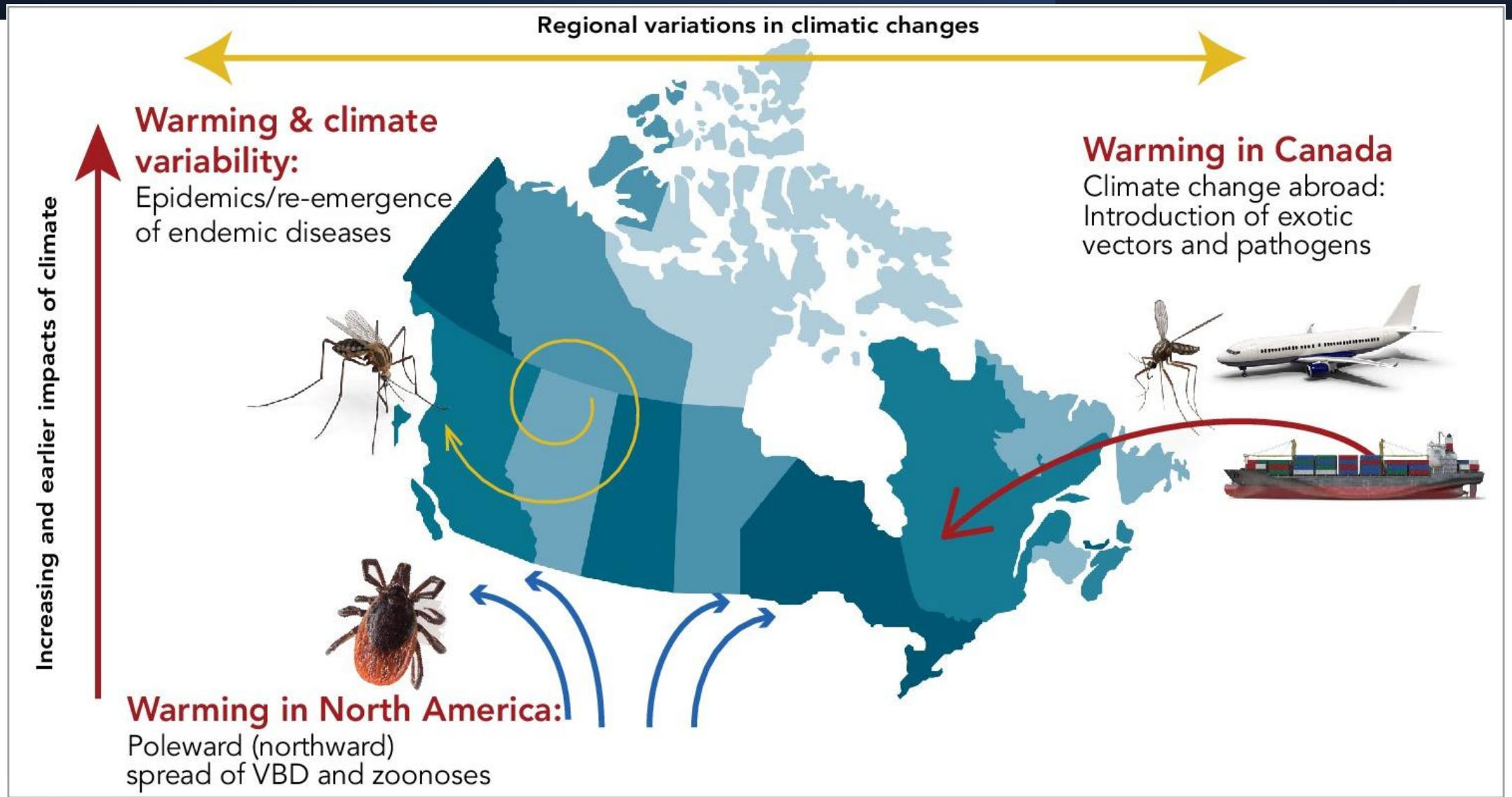
Habitat Loss



Invasive Species



Parasites and Pathogens



THREATS TO CORAL REEFS CLIMATE CHANGE

Increased greenhouse gases from human activities result in climate change and ocean acidification.

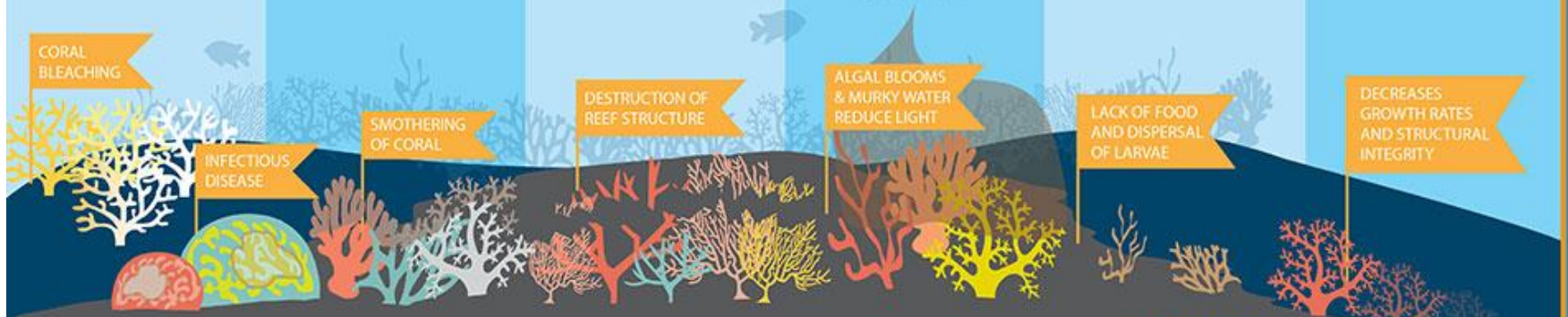
CLIMATE CHANGE = OCEAN CHANGE

CO_2

The world's ocean is a massive sink that absorbs carbon dioxide (CO_2). Although this has slowed global warming, it is also changing ocean chemistry.

CLIMATE CHANGE dramatically affects CORAL REEF ECOSYSTEMS

Warming Ocean	Sea Level Rise	Changes in Storm Patterns	Changes in Precipitation	Altered Ocean Currents	Ocean Acidification • a result of increased CO_2 •
thermal stress	sedimentation	stronger, more frequent storms	increased runoff of freshwater, sediment & land-based pollutants	change in connectivity & temperature regimes	pH reduction in pH levels



Impacts are immediate and long term, direct and indirect - A weakened coral is vulnerable.

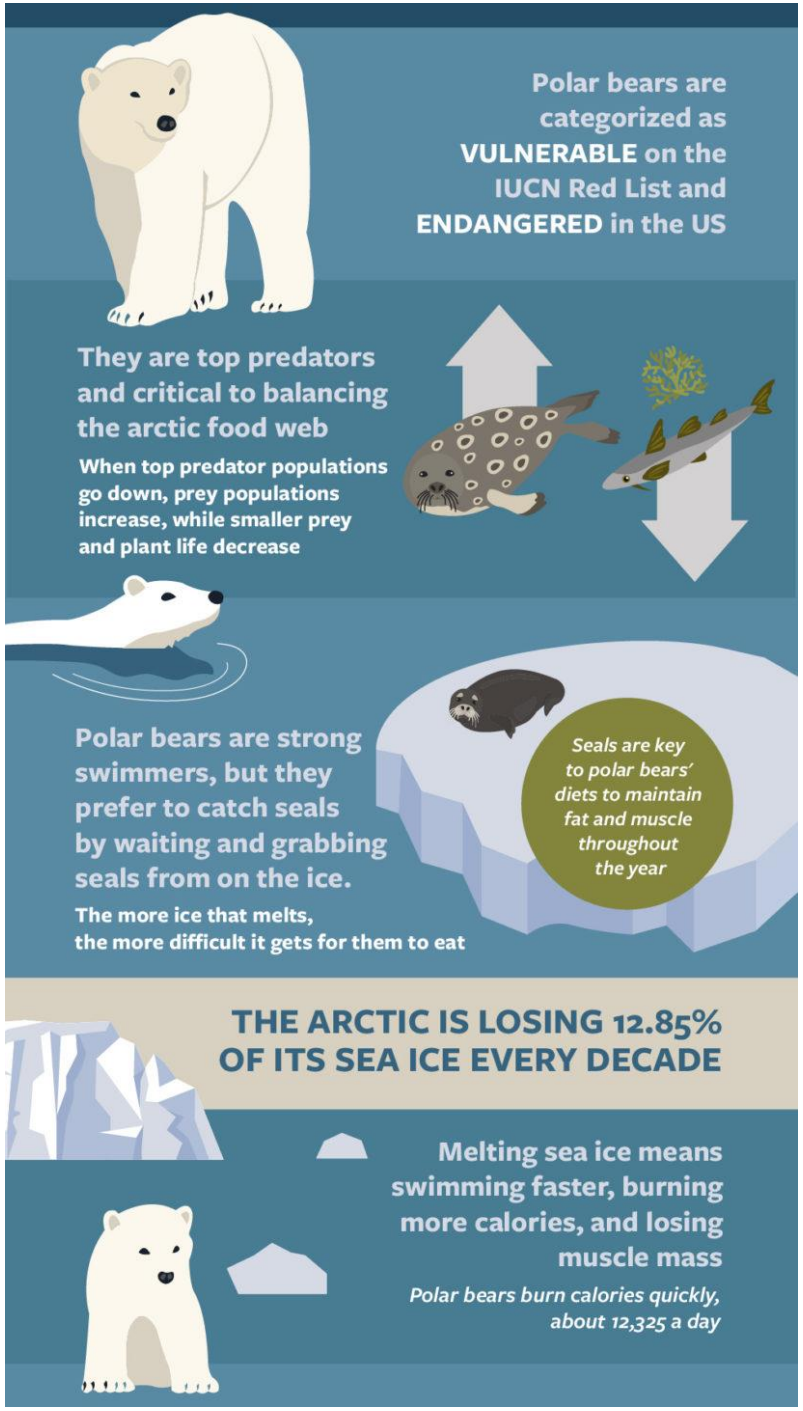
HOW YOU CAN HELP

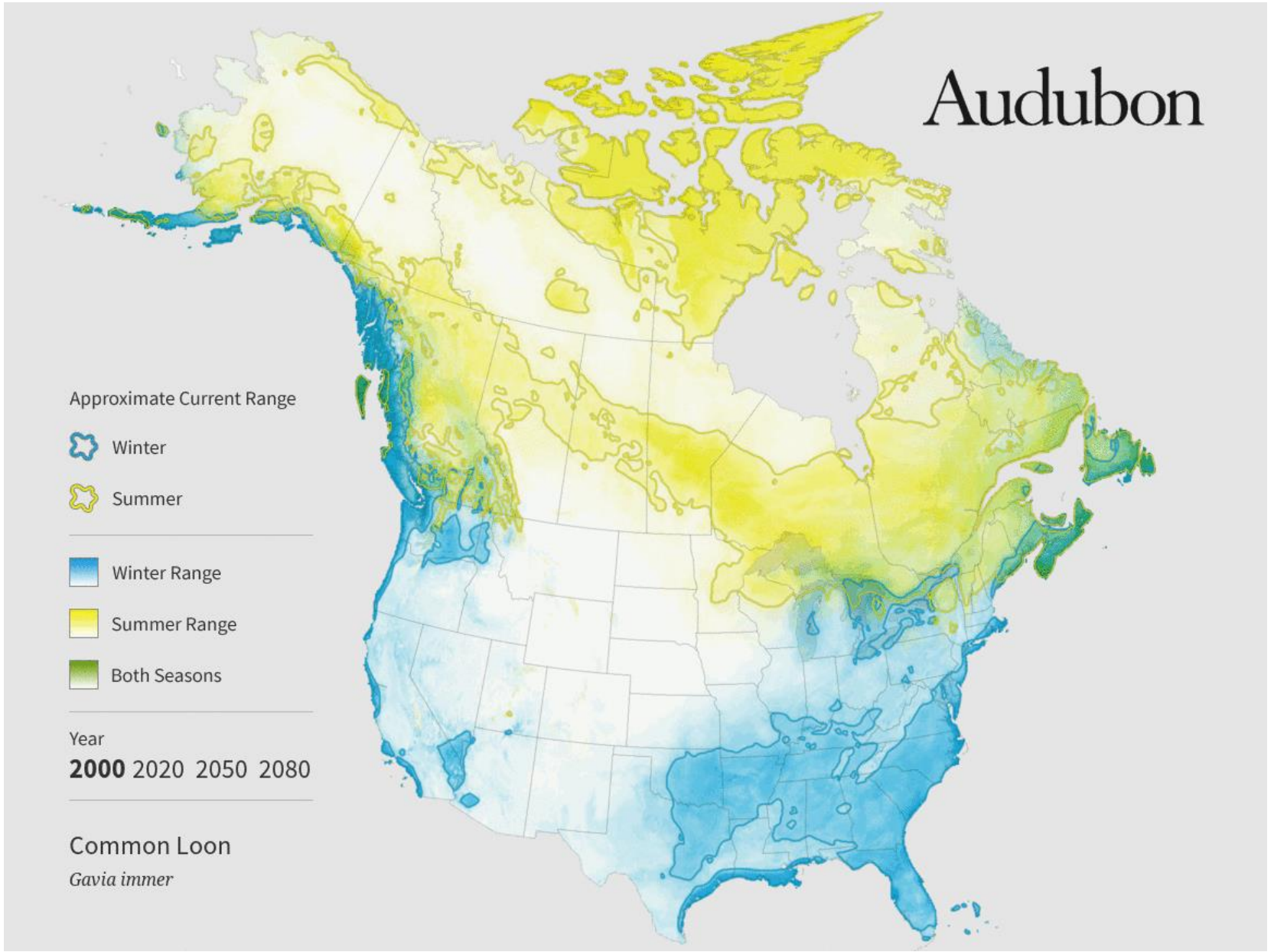
Shrink your carbon footprint to reduce greenhouse gases.

- Drive less.
- Reduce, reuse or recycle.
- Purchase energy-efficient appliances and lightbulbs.
- Print less. Download more. Use less water.

Do your part to help improve overall coral reef condition.

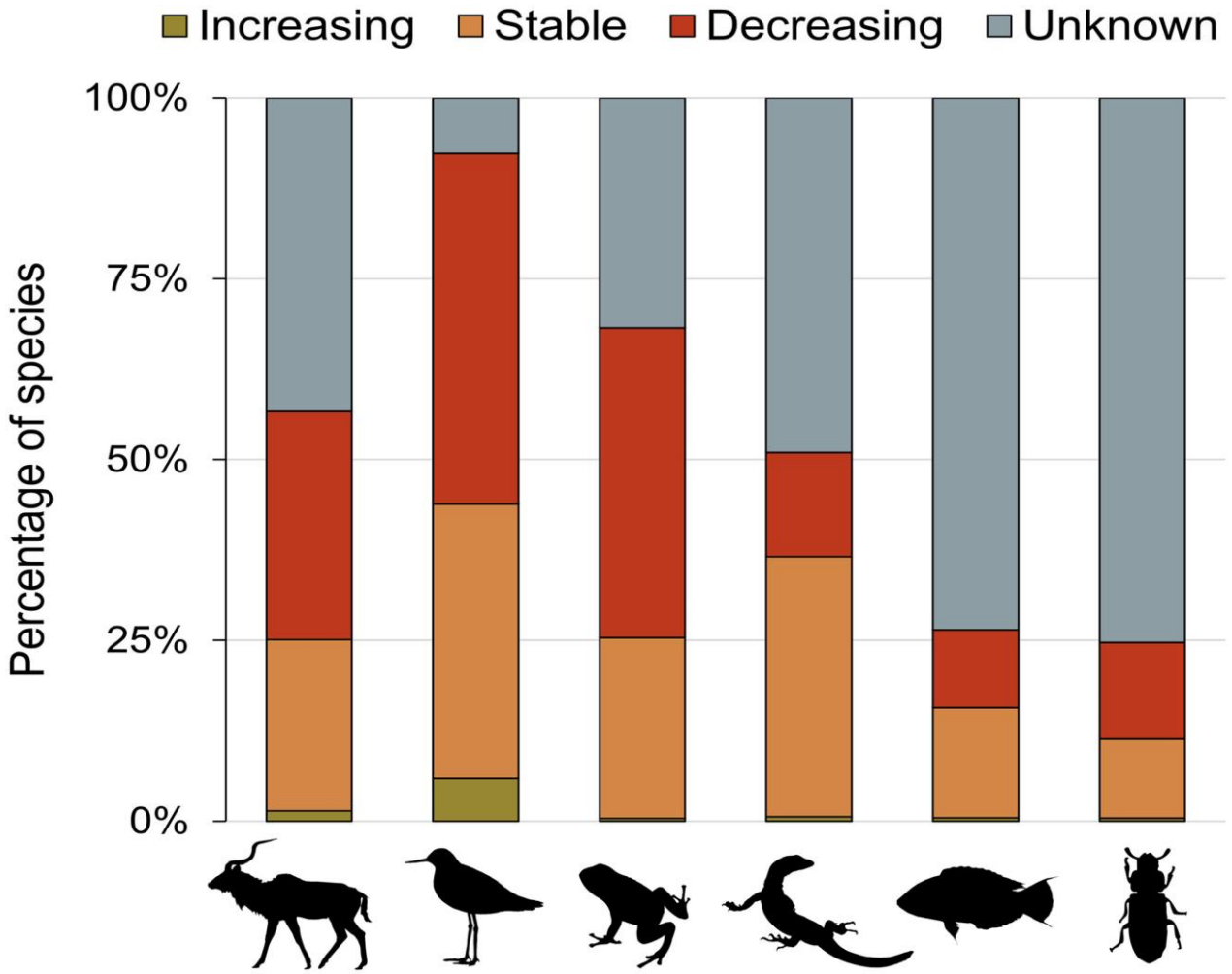
- Reduce the use of lawn and garden chemicals.
- DO NOT dump household chemicals in storm drains.
- Choose sustainable seafood. www.FishWatch.gov
- Learn about good reef etiquette and practice it when in the water.
- Volunteer for beach and waterway clean ups.


Polar bears are categorized as VULNERABLE on the IUCN Red List and ENDANGERED in the US
They are top predators and critical to balancing the arctic food web
When top predator populations go down, prey populations increase, while smaller prey and plant life decrease
Polar bears are strong swimmers, but they prefer to catch seals by waiting and grabbing seals from on the ice.
The more ice that melts, the more difficult it gets for them to eat
Seals are key to polar bears' diets to maintain fat and muscle throughout the year
THE ARCTIC IS LOSING 12.85% OF ITS SEA ICE EVERY DECADE
Melting sea ice means swimming faster, burning more calories, and losing muscle mass
Polar bears burn calories quickly, about 12,325 a day


Audubon
Approximate Current Range
Winter
Summer
Winter Range
Summer Range
Both Seasons
Year
2000 2020 2050 2080
Common Loon
Gavia immer

BLACK RAIL – Species on the Edge

What Does the Future Look Like?



More losers than winners: investigating Anthropocene defaunation through the diversity of population trends

Biological Reviews, Volume: 98, Issue: 5, Pages: 1732-1748, First published: 15 May 2023, DOI: (10.1111/brv.12974)

How Can We Adapt?

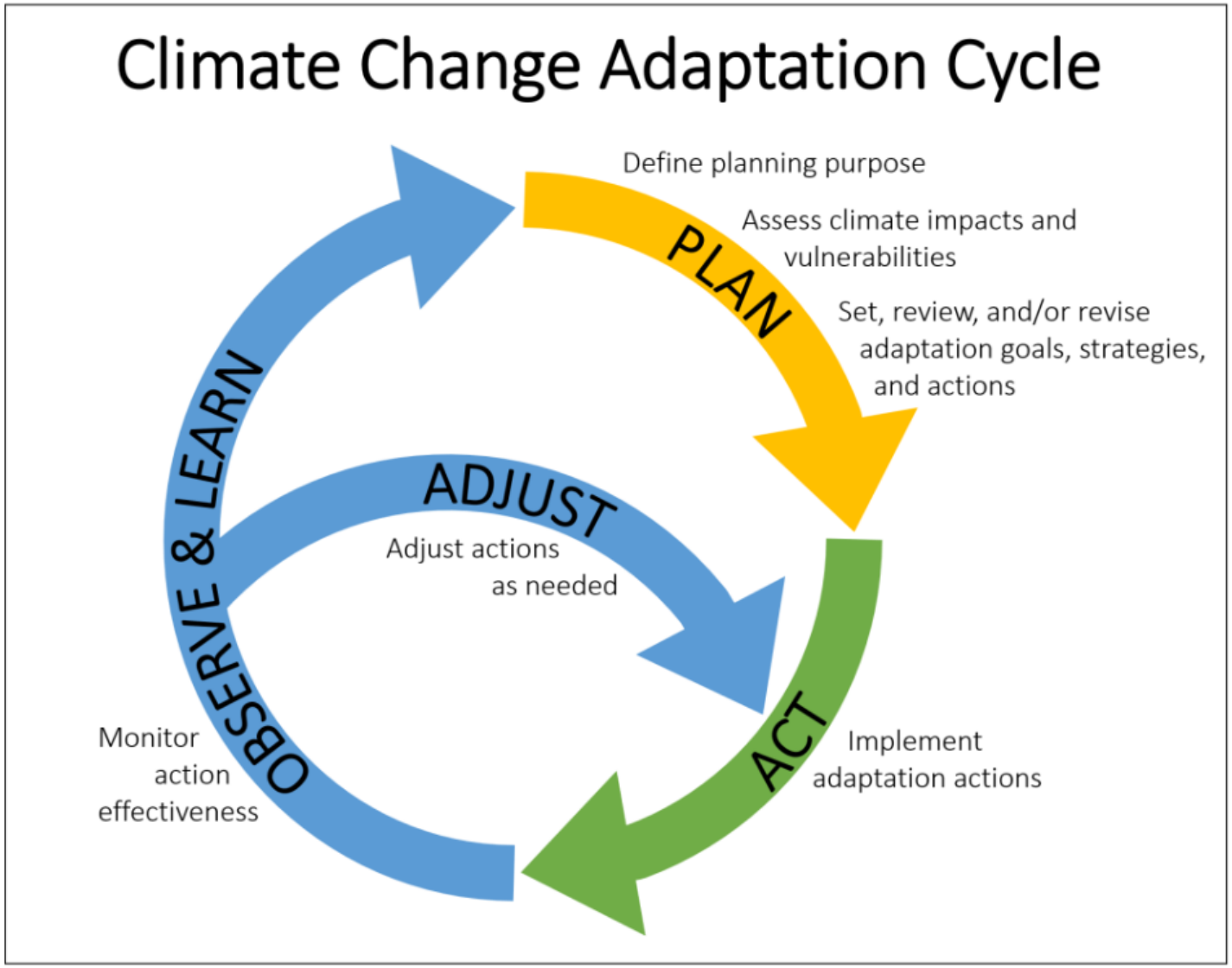
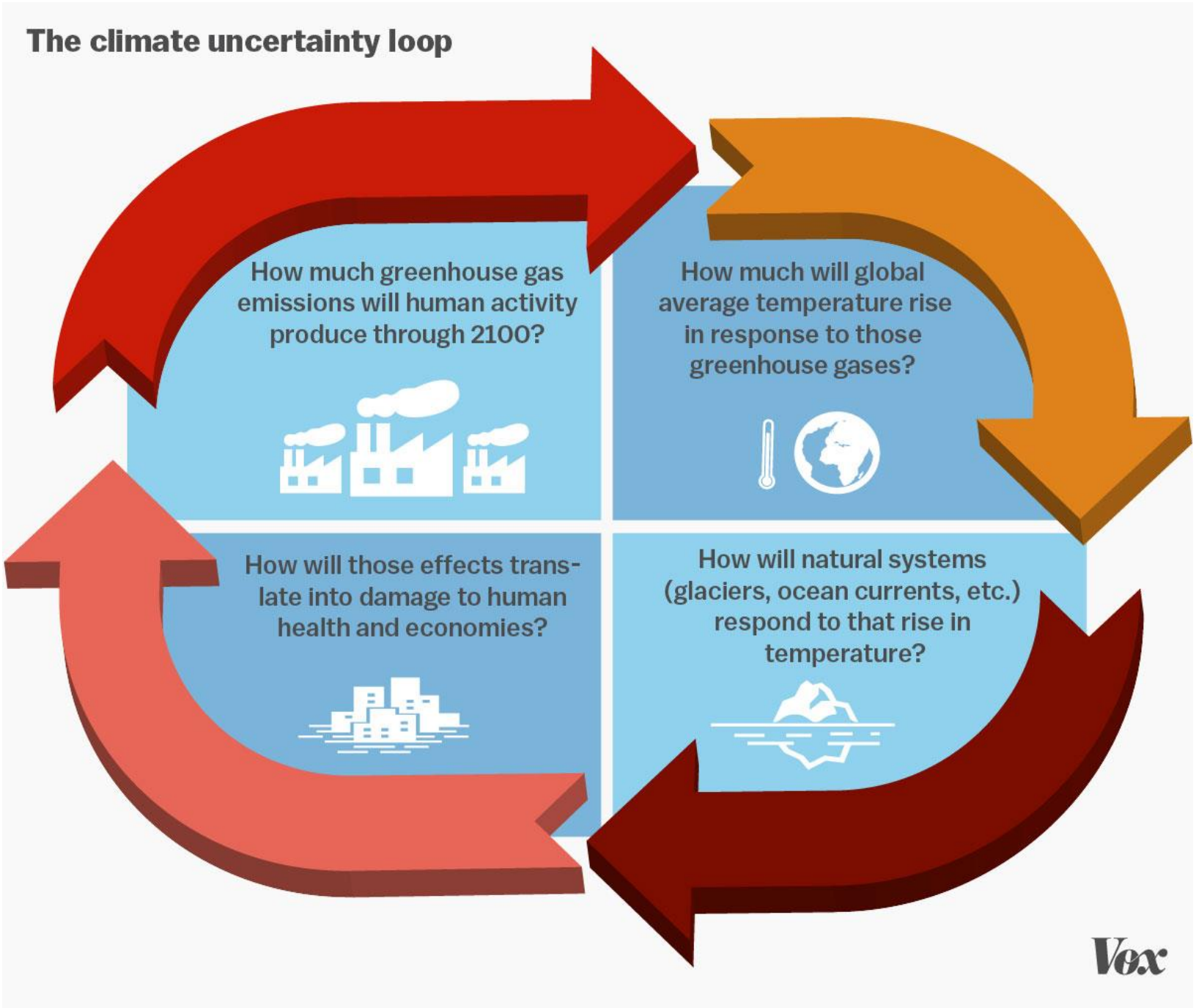


Diagram modified from Climate Smart Conservation Cycle Framework in Climate-Smart Conservation: Putting Adaptation Principles into Practice and DPIPWE 2014 after Jones 2005, 2009.

Questions?


The climate uncertainty loop
How much greenhouse gas emissions will human activity produce through 2100?
How much will global average temperature rise in response to those greenhouse gases?
How will those effects trans-late into damage to human health and economies?
How will natural systems (glaciers, ocean currents, etc.) respond to that rise in temperature?
Vox