Terrestrial Wildlife Responses to Climate Change and Management Challenges

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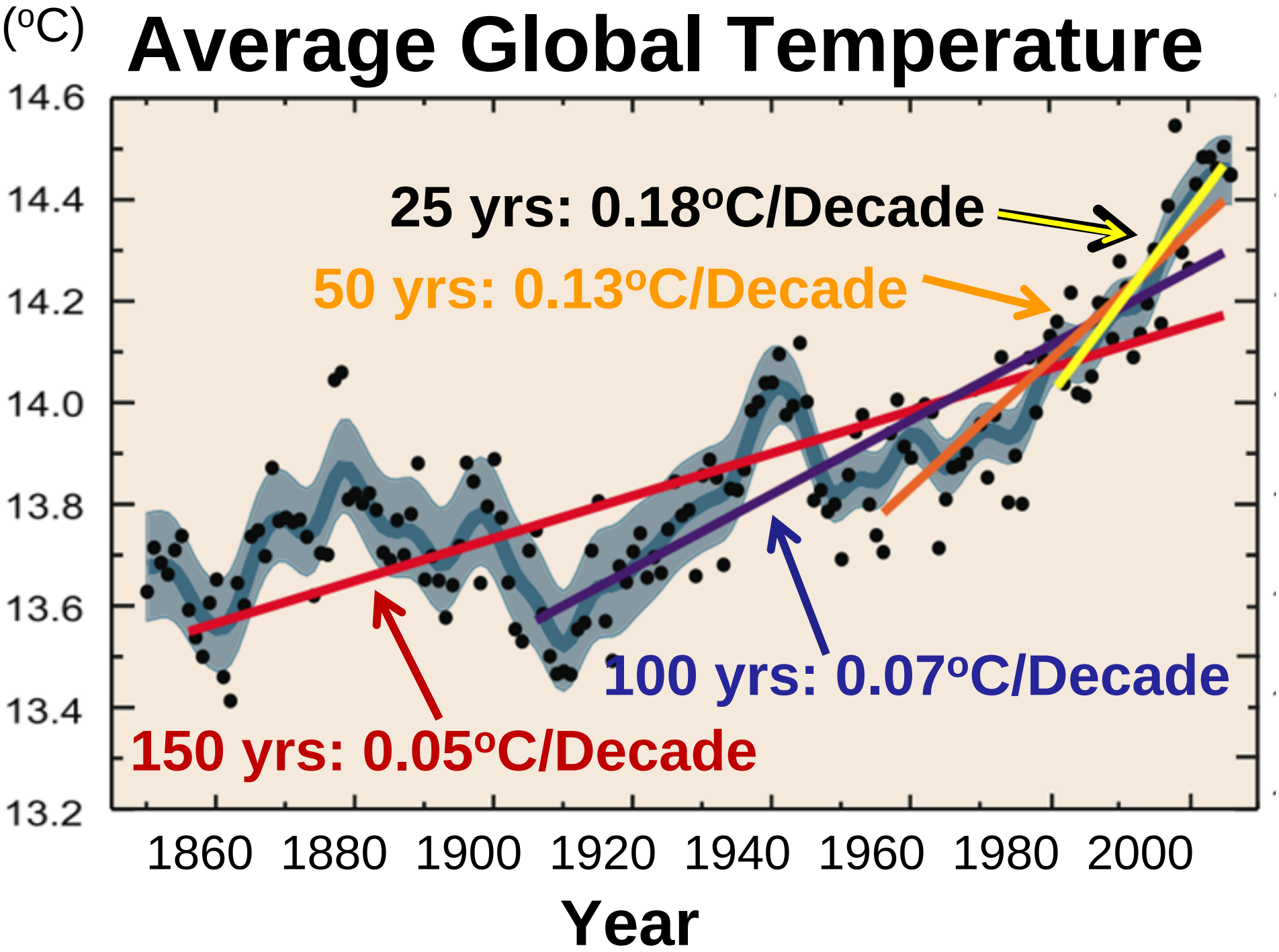
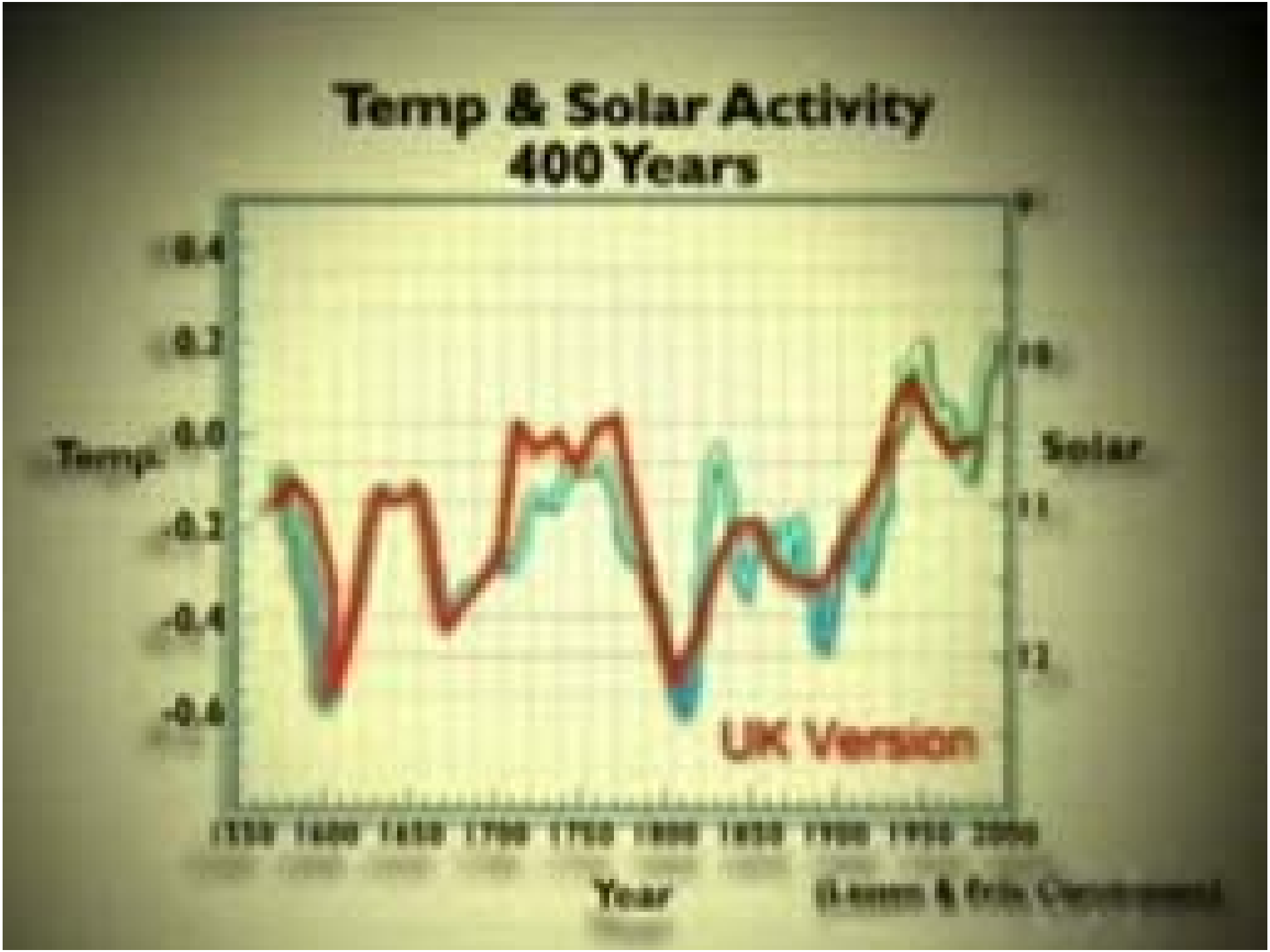
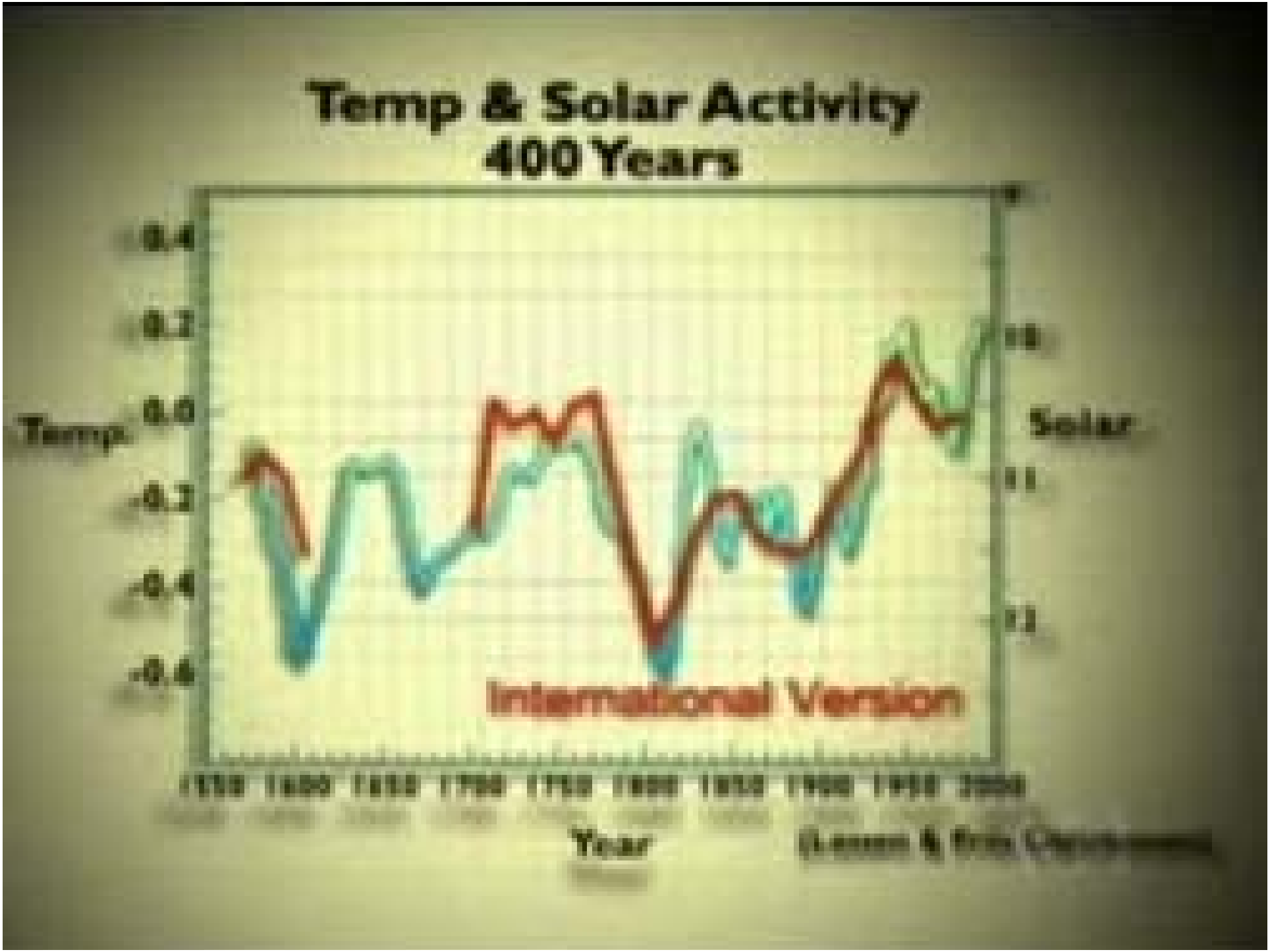
Climate Change
Natural Resources & Coastal Management
San Francisco, CA
30 January 2009

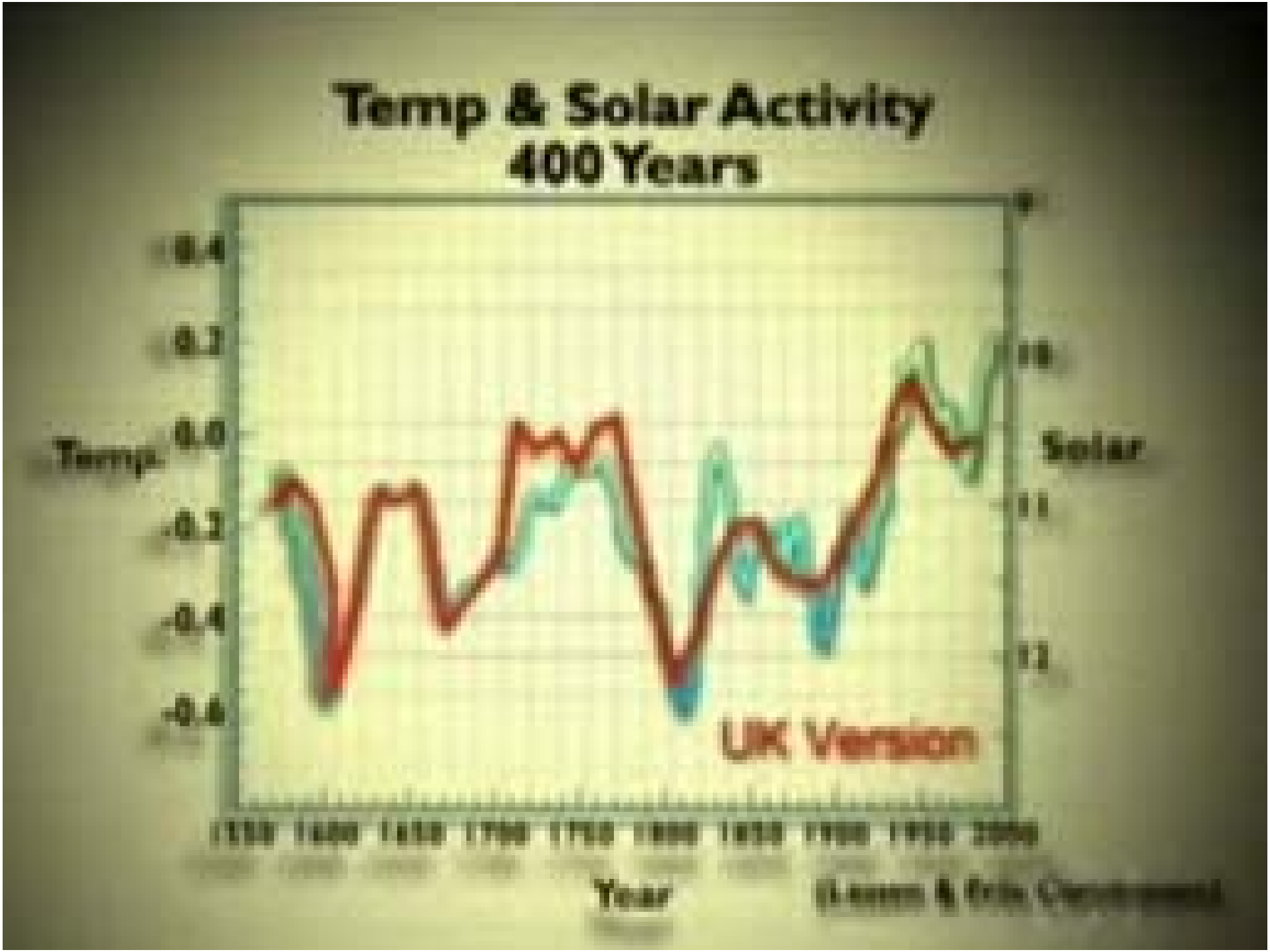
1. Our Rapidly Warming World
2. How Species Adapt
3. If Species Cannot Adapt


(°C)
Average Global Temperature
14.6
14.4
14.2
14.0
13.8
13.6
13.4
13.2
25 yrs: 0.18°C/Decade
50 yrs: 0.13°C/Decade
100 yrs: 0.07°C/Decade
150 yrs: 0.05°C/Decade
1860
1880
1900
1920
1940
1960
1980
2000
Year

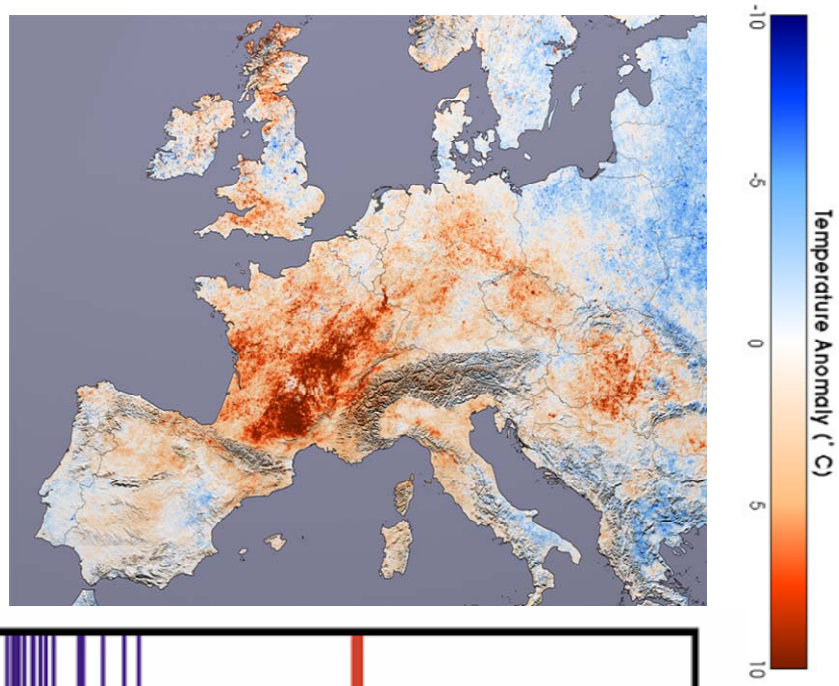
The Great Global Warming Swindle


Temp & Solar Activity
400 Years
Temp.
Solar
UK Version
Year

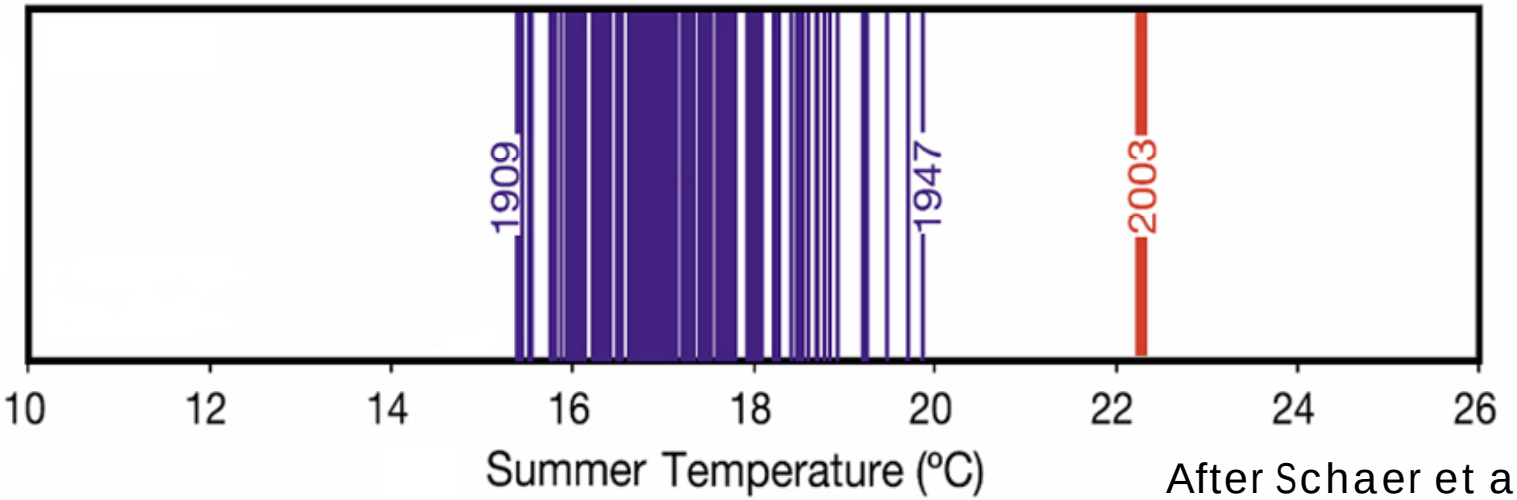

Temp & Solar Activity
400 Years
Temp.
Solar
International Version
Year


Temp & Solar Activity
400 Years
Temp.
Solar
UK Version
Year

Extreme Events: Heat



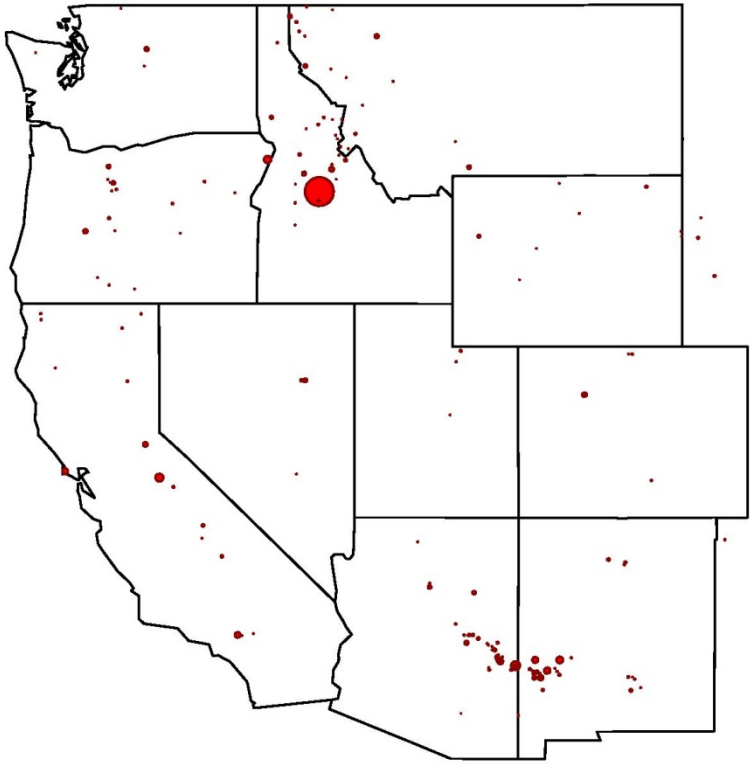
Switzerland Summer T, 1860-2003



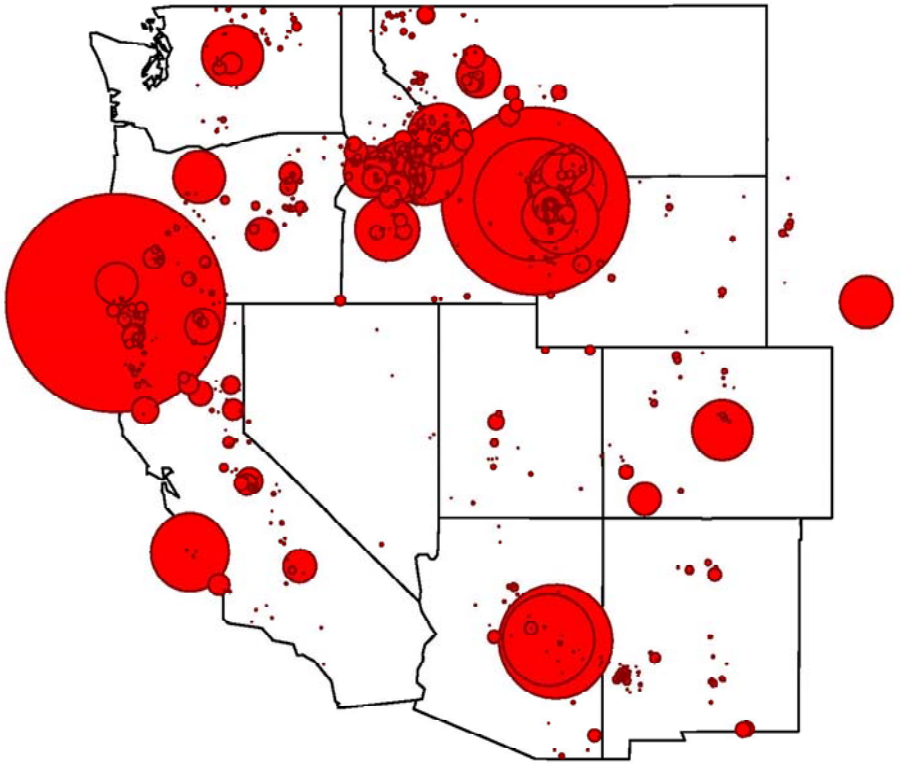
After Schaer et al., 2004

Extreme Events: Wildfires

Fewer, smaller fires



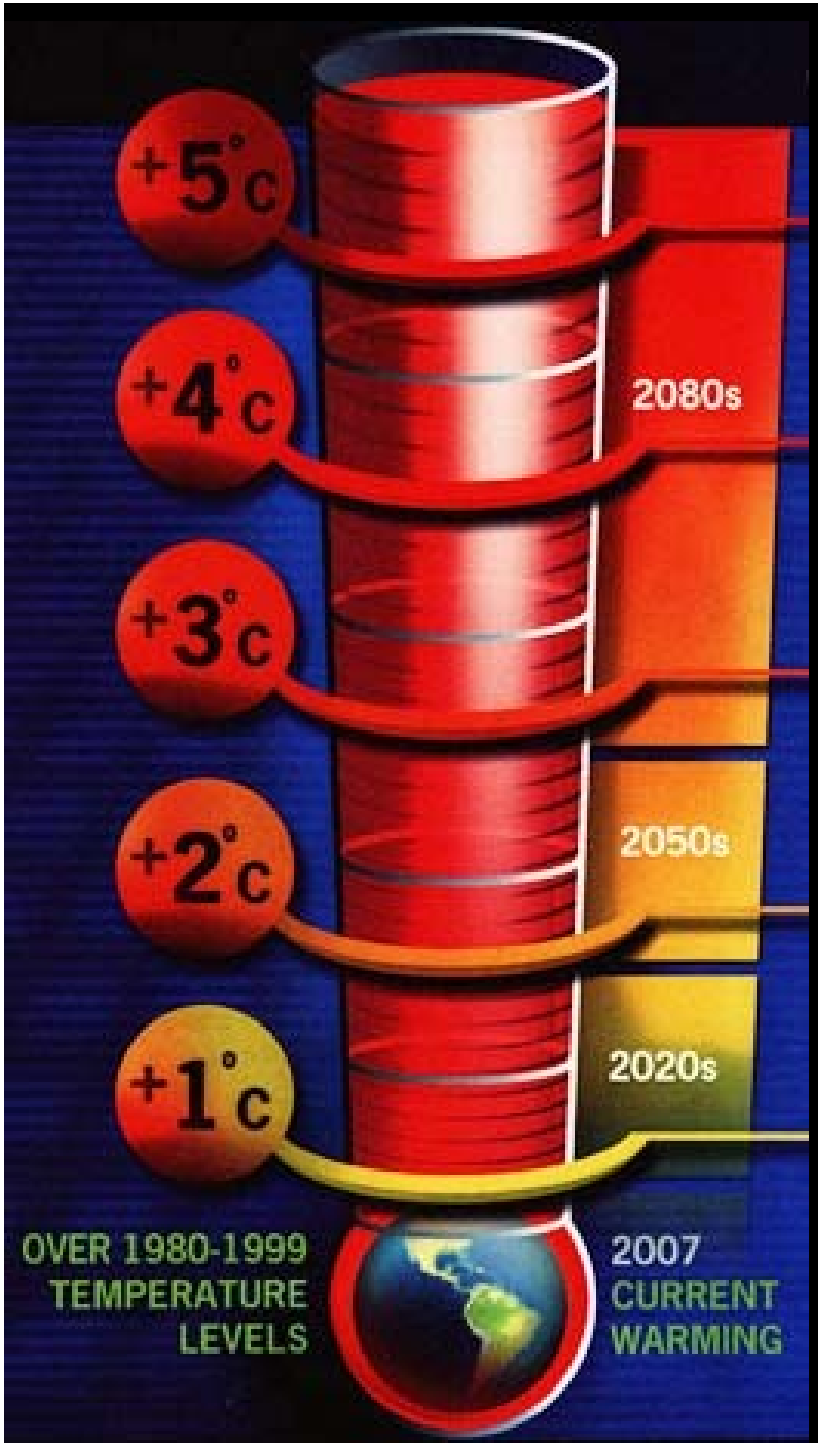
More, larger fires



Late Snowmelt Years

Early Snowmelt Years

Westerling



Impacts of Global Warming

Extinction (>40% known sp),
partial melting ice sheets,
↑ sea level 7-12 feet

~30% of Global Wetlands lost,
↓ Global Food Production

Major Changes in Natural Systems:
↓ Biodiversity, Coral Mortality

↑ Risk Extinction (20-30% known sp)
Most Coral Bleach, ↑ Flood+Drought

} ↑ 0.7°C

↑ Drought, ↑ Fire Risk

www.net.org

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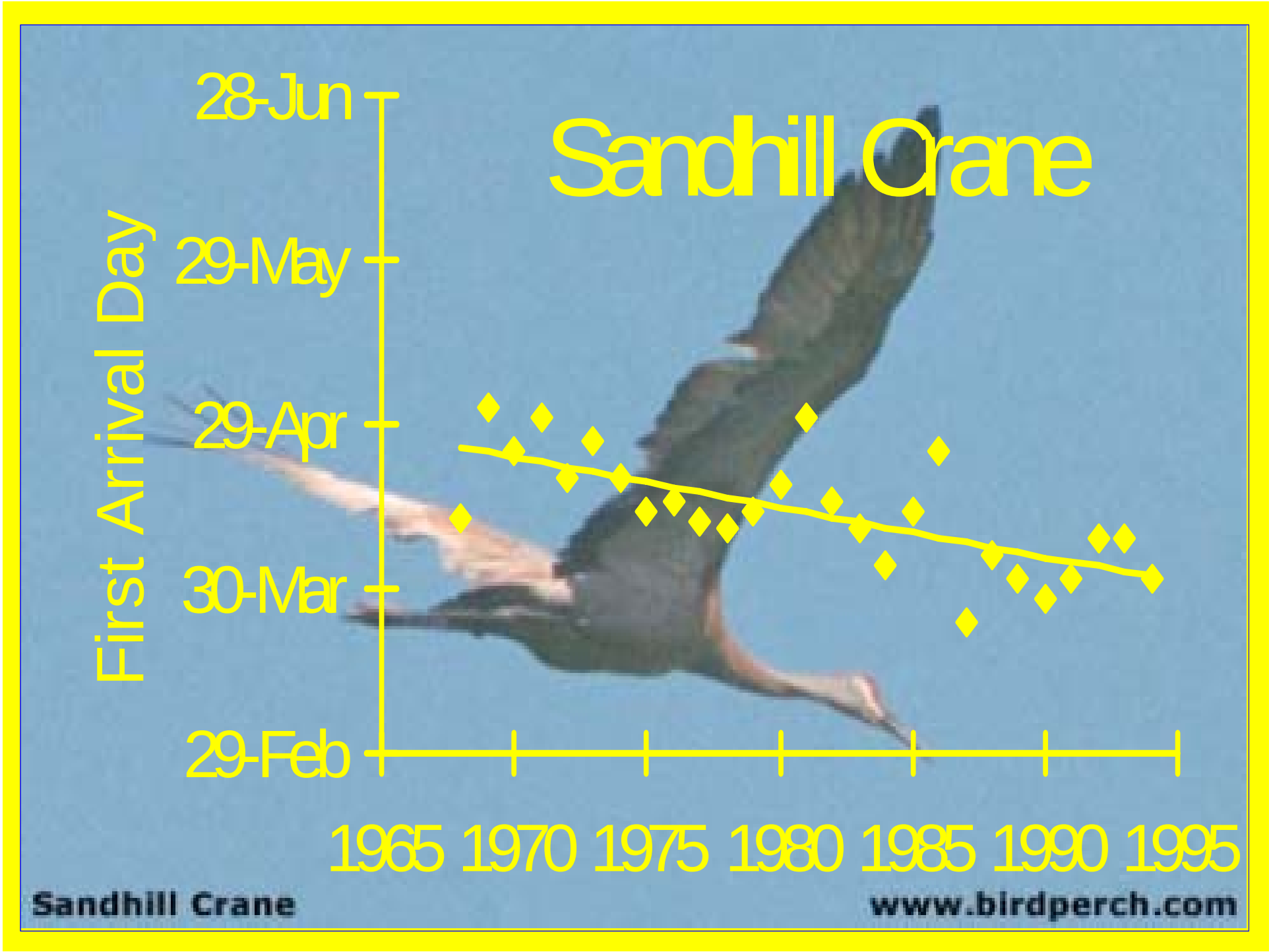
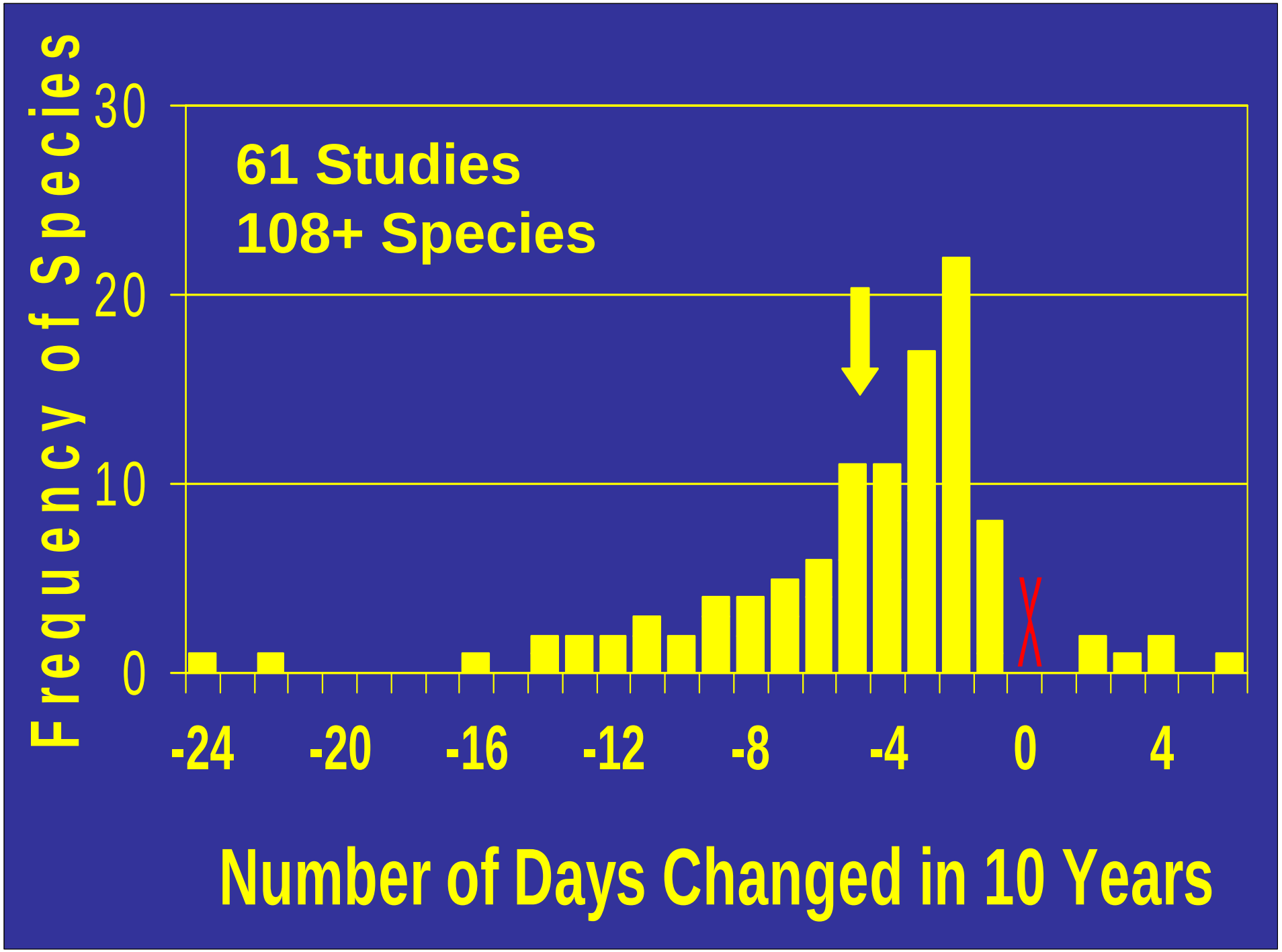
2. How Species Adapt
3. If Species Cannot Adapt

A
B
N

Pika: 1900 - 7,800 ft
2004- 9,500 ft


Sandhill Crane
First Arrival Day
28-Jun
29-May
29-Apr
30-Mar
29-Feb
1965 1970 1975 1980 1985 1990 1995
Sandhill Crane
www.birdperch.com


61 Studies
108+ Species
Frequency of Species
30
20
10
0
-24
-20
-16
-12
-8
-4
0
4
Number of Days Changed in 10 Years

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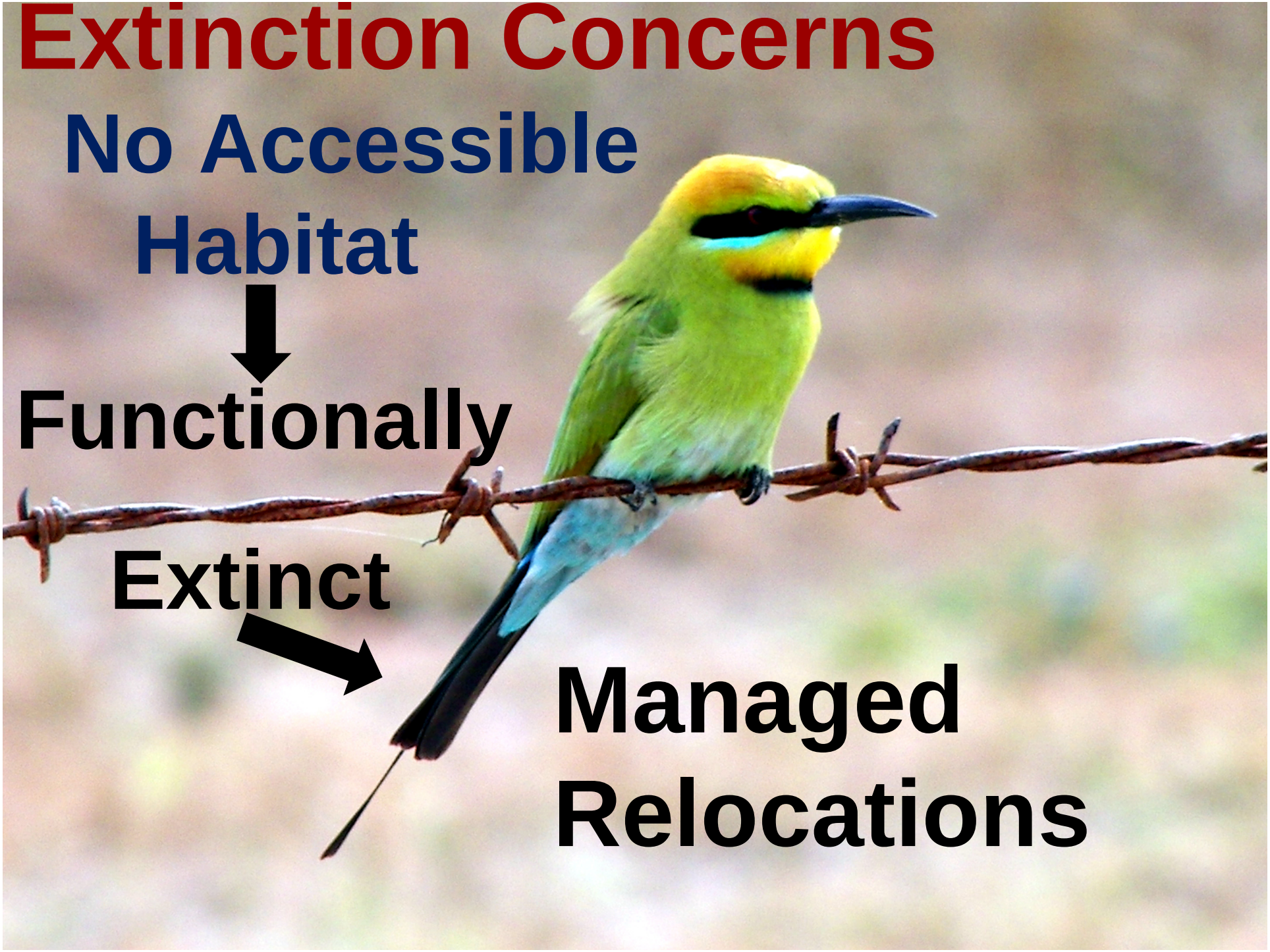
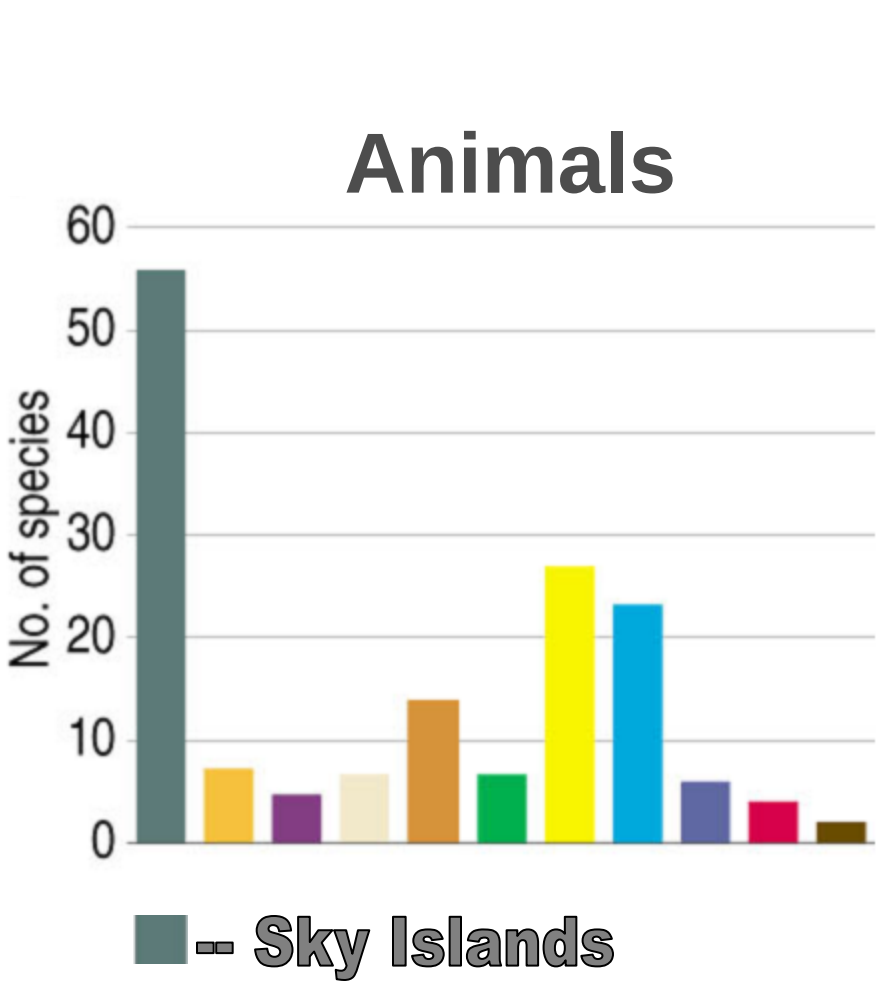
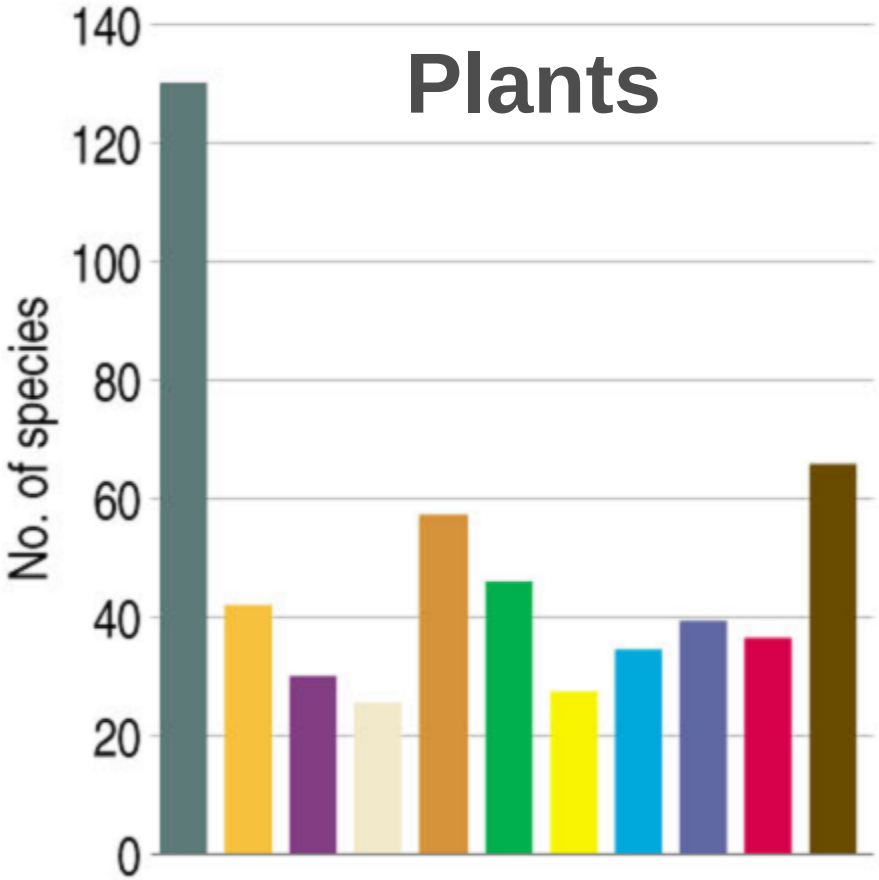

Extinction Concerns
No Accessible Habitat
Functionally
Extinct
Managed Relocations

Sky Islands in NM & AZ

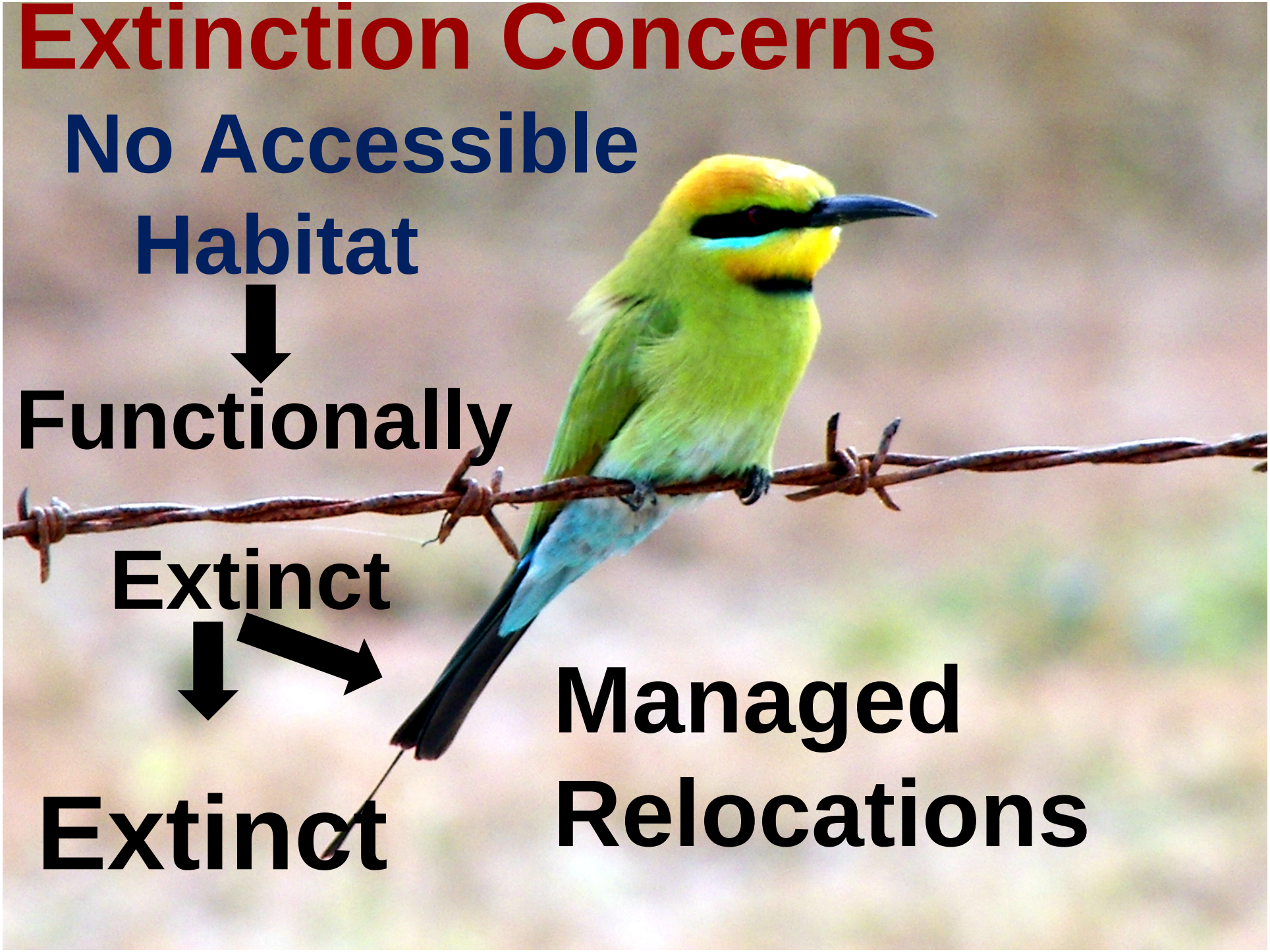
Threatened, Endangered & Sensitive Species in SW National Forests





Extinction

- Managed Relocations
  - Can We
  - Should We


Extinction Concerns
No Accessible Habitat
Functionally Extinct
Extinct
Managed Relocations

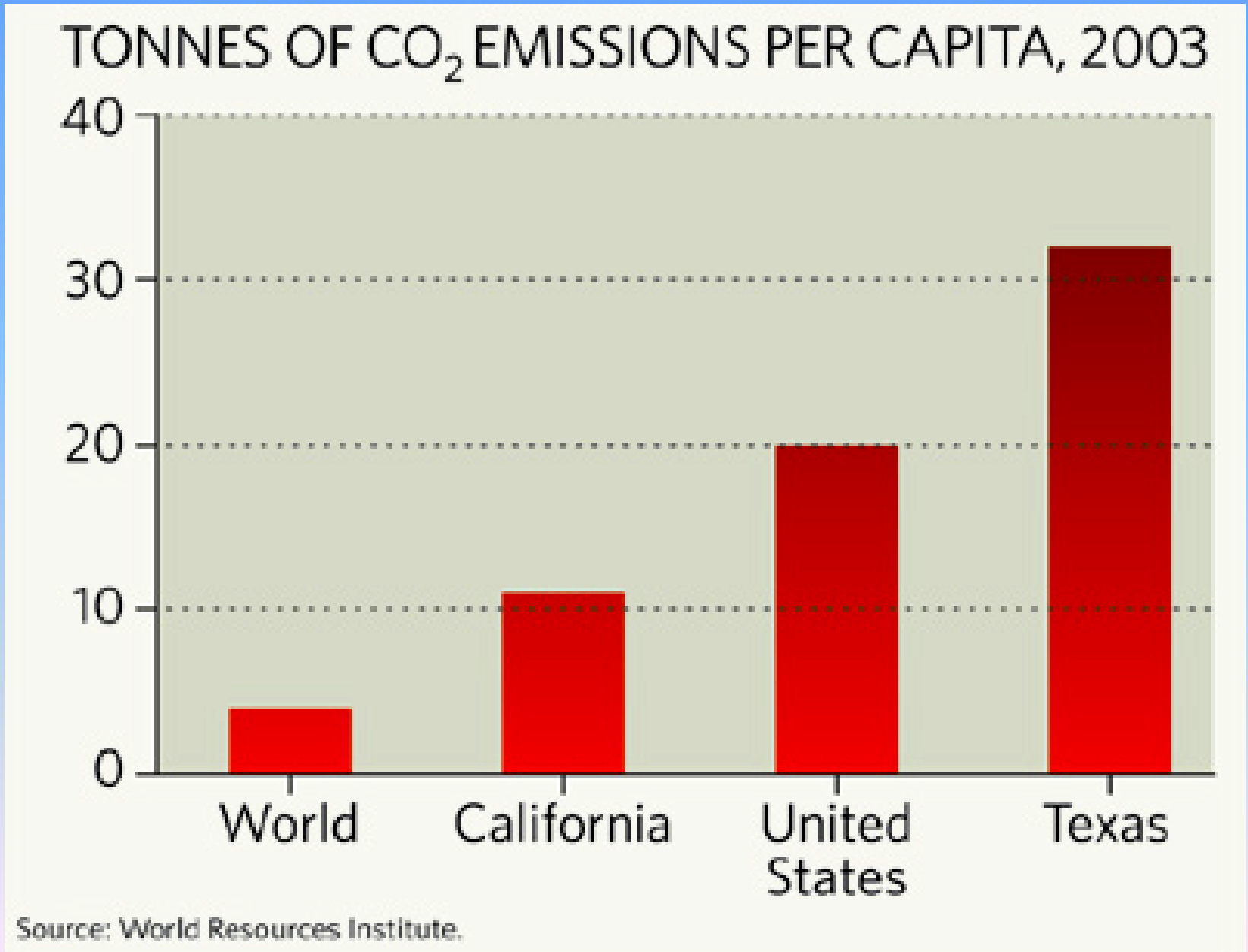
Edith’s Bay Checkerspot

Wait for
Speciation
I Don't Think So!

BICCCA

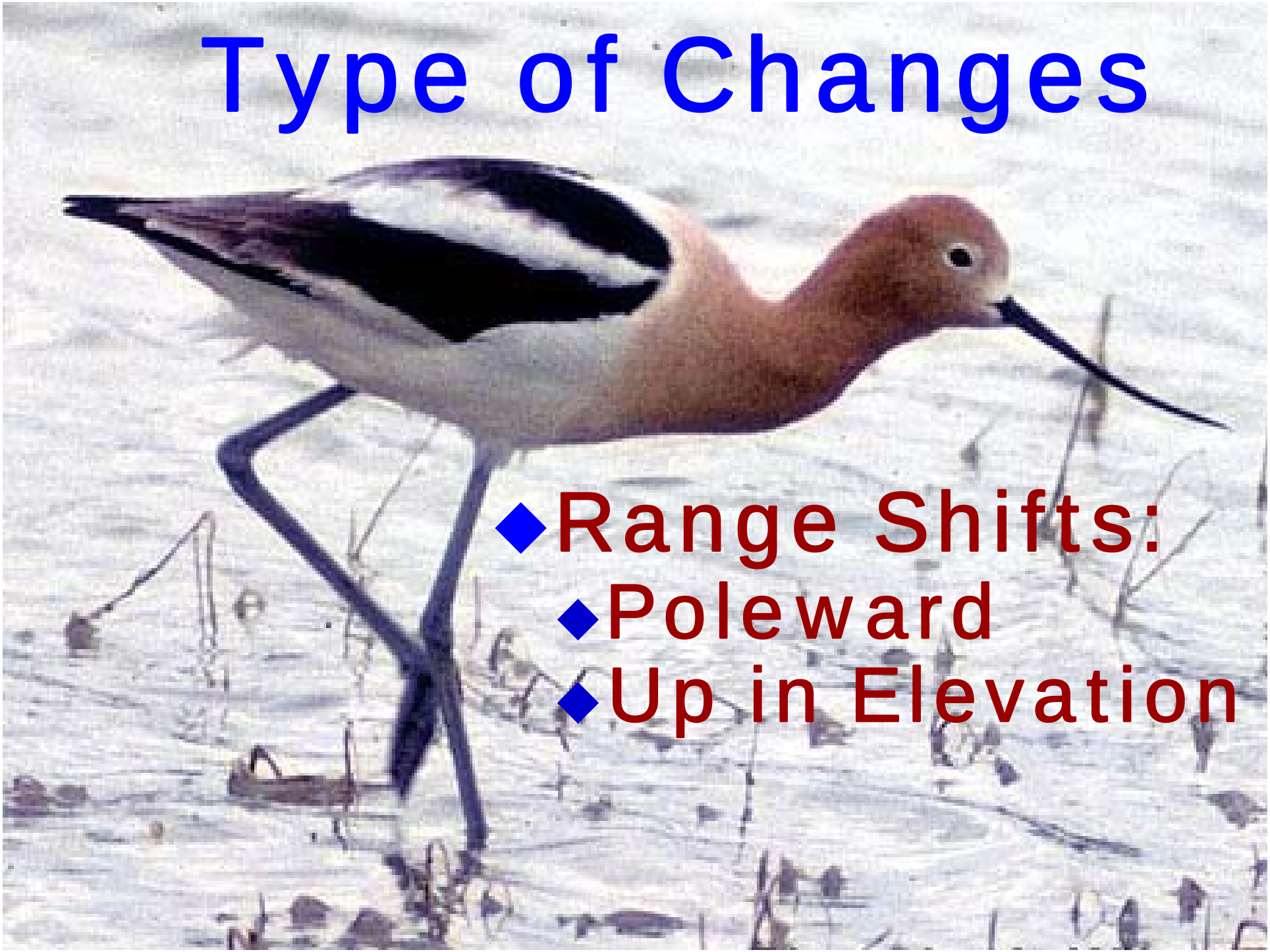
BIOLOGICAL IMPACTS OF CLIMATE CHANGE IN CALIFORNIA

Thanks
for
Listening


TONNES OF CO_2 EMISSIONS PER CAPITA, 2003
40
30
20
10
0
World
California
United States
Texas
Source: World Resources Institute.

Pika: 1900 - 7,800 ft; 2004- 9,500 ft
Alpine species: Nowhere to go
but EXTINCT

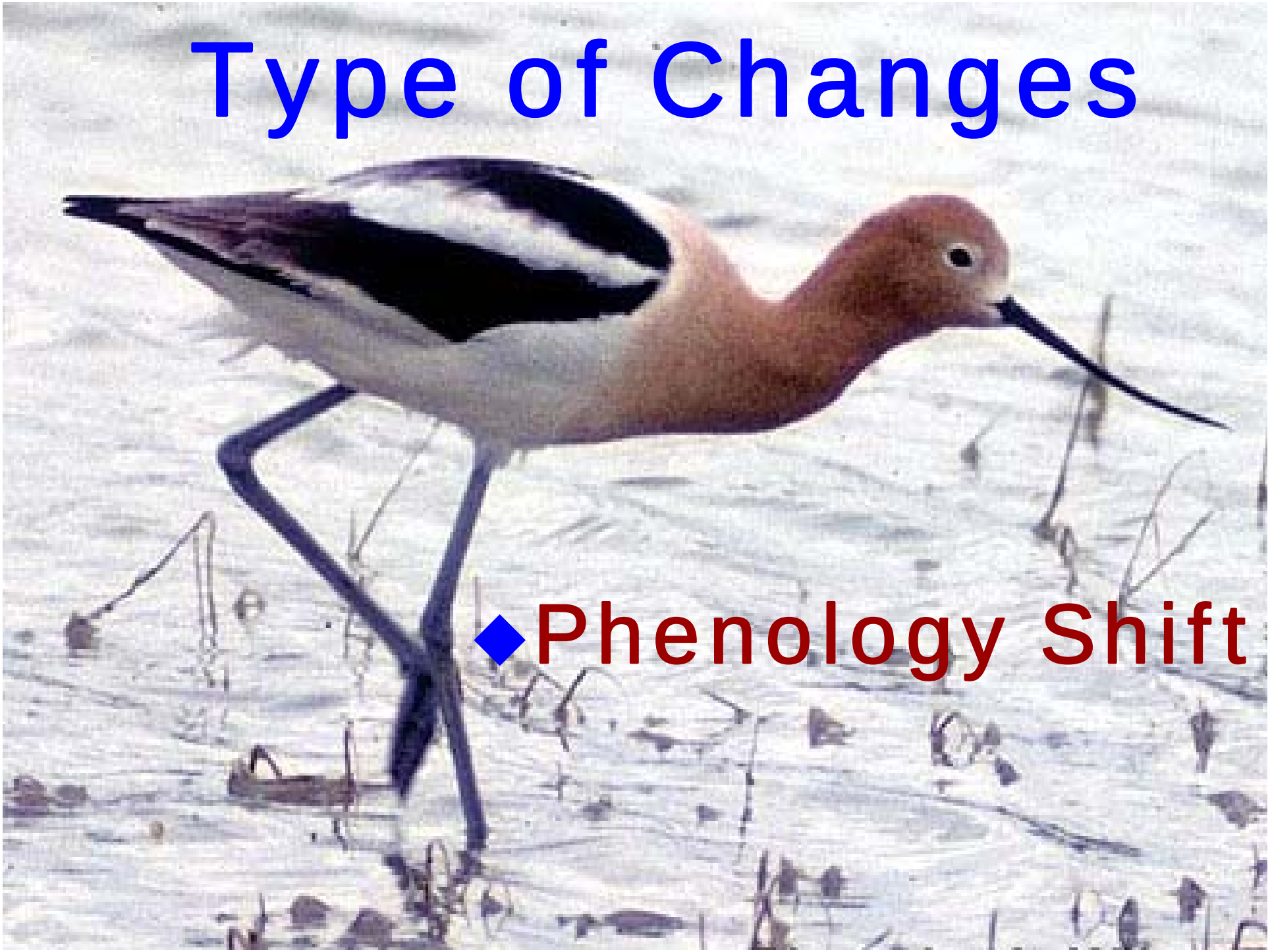
Type of Changes



- Range Shifts:
  - Poleward
  - Up in Elevation

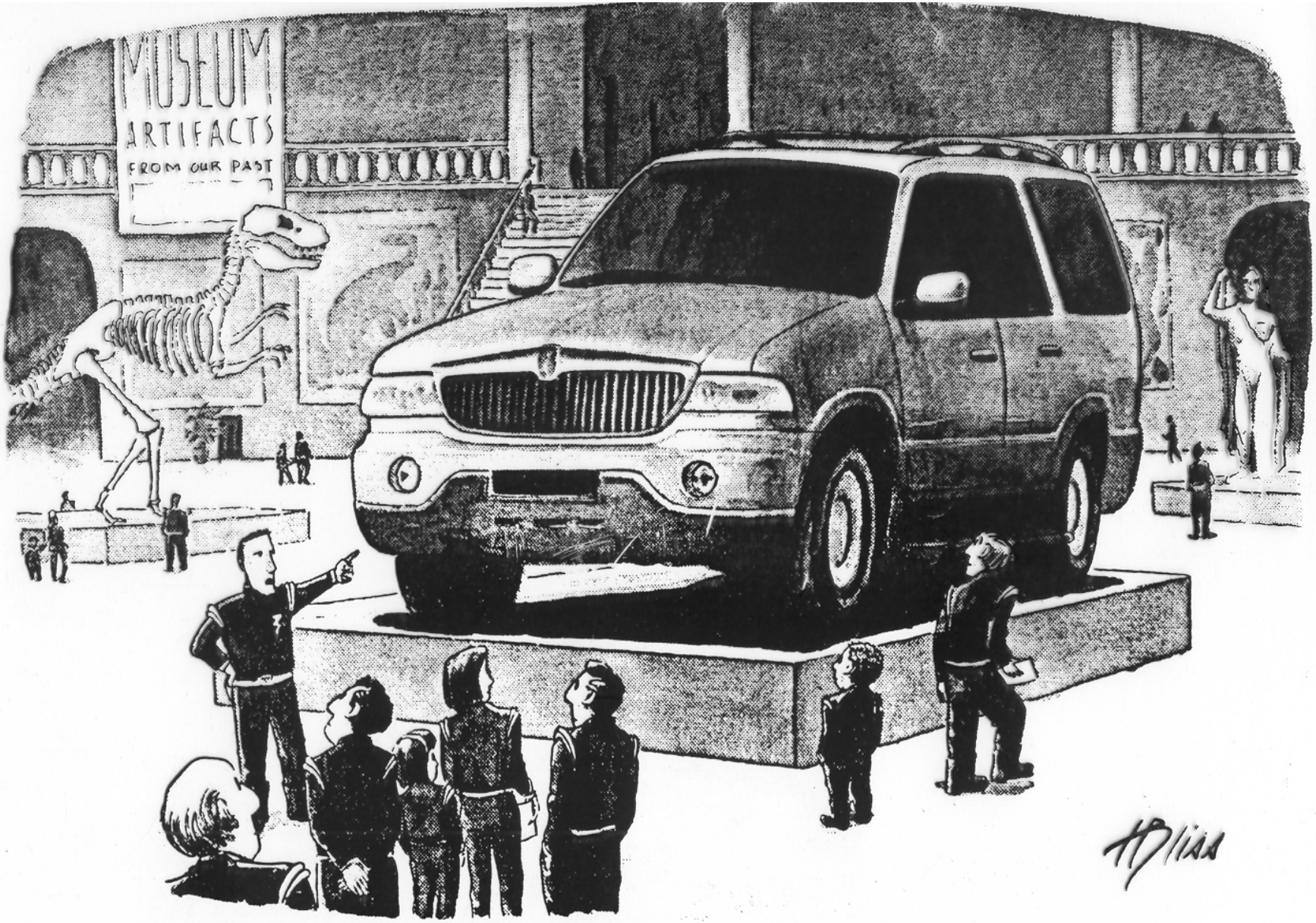
What can we do?

Type of Changes



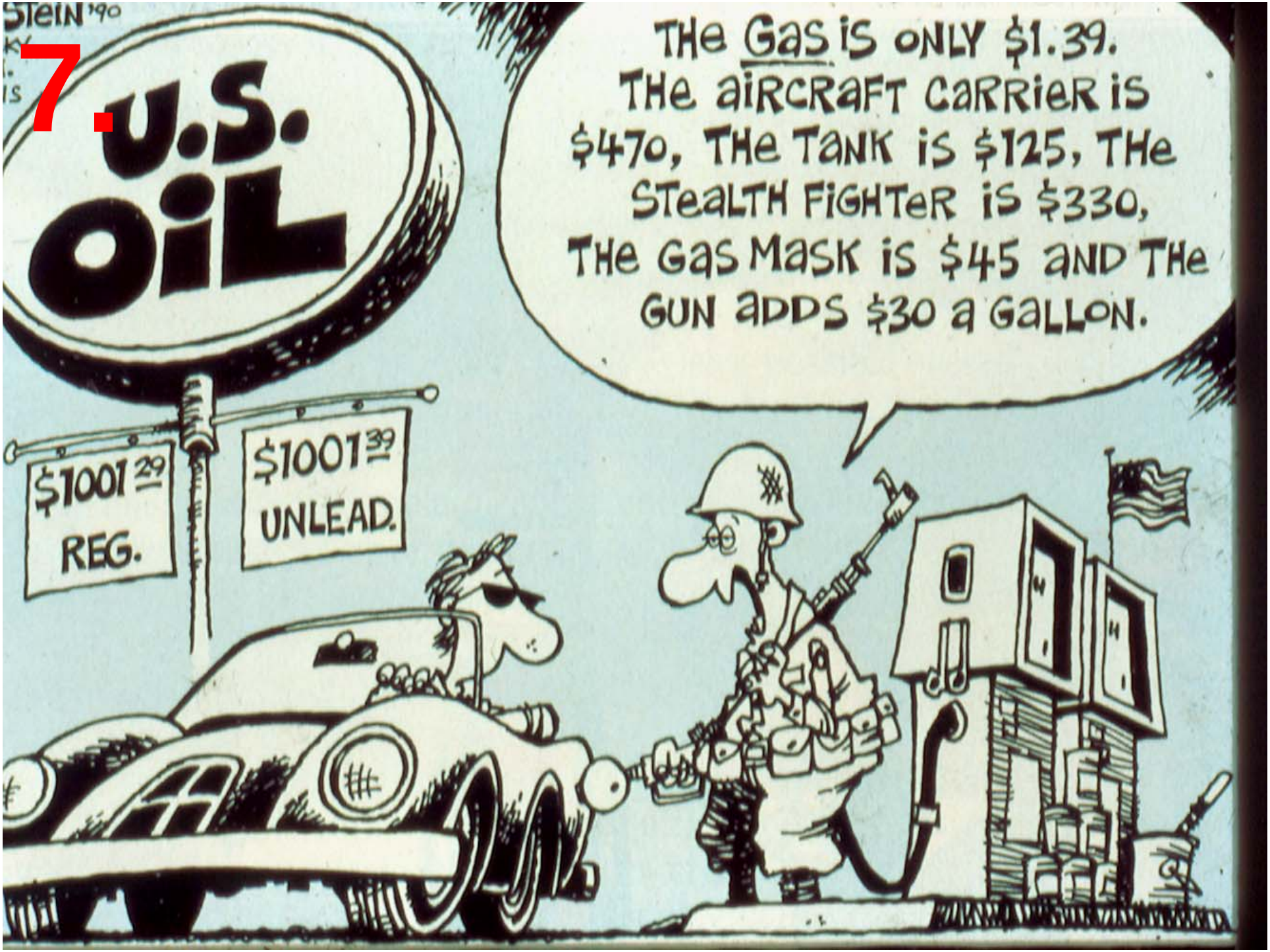
- Phenology Shift

1.

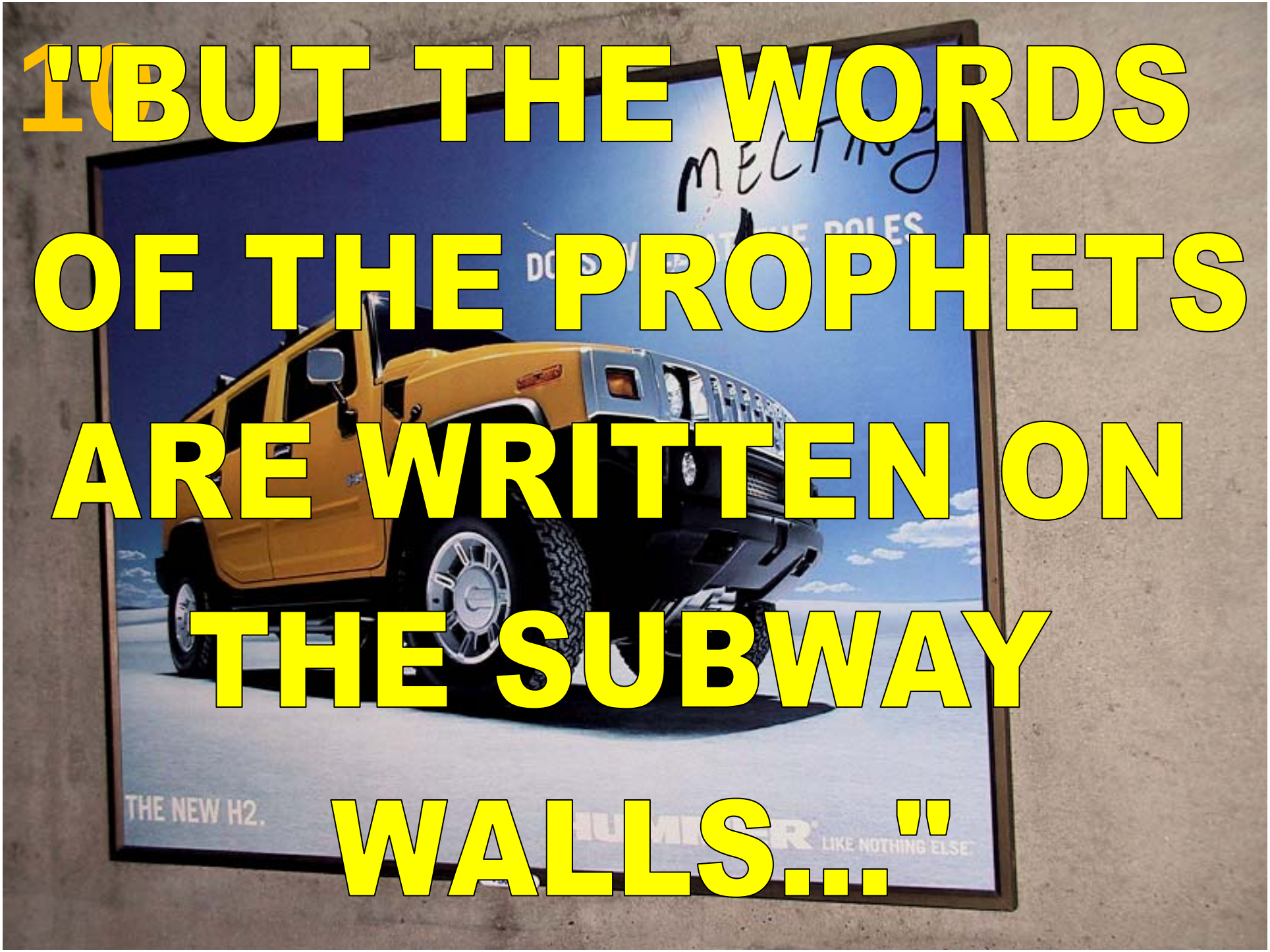


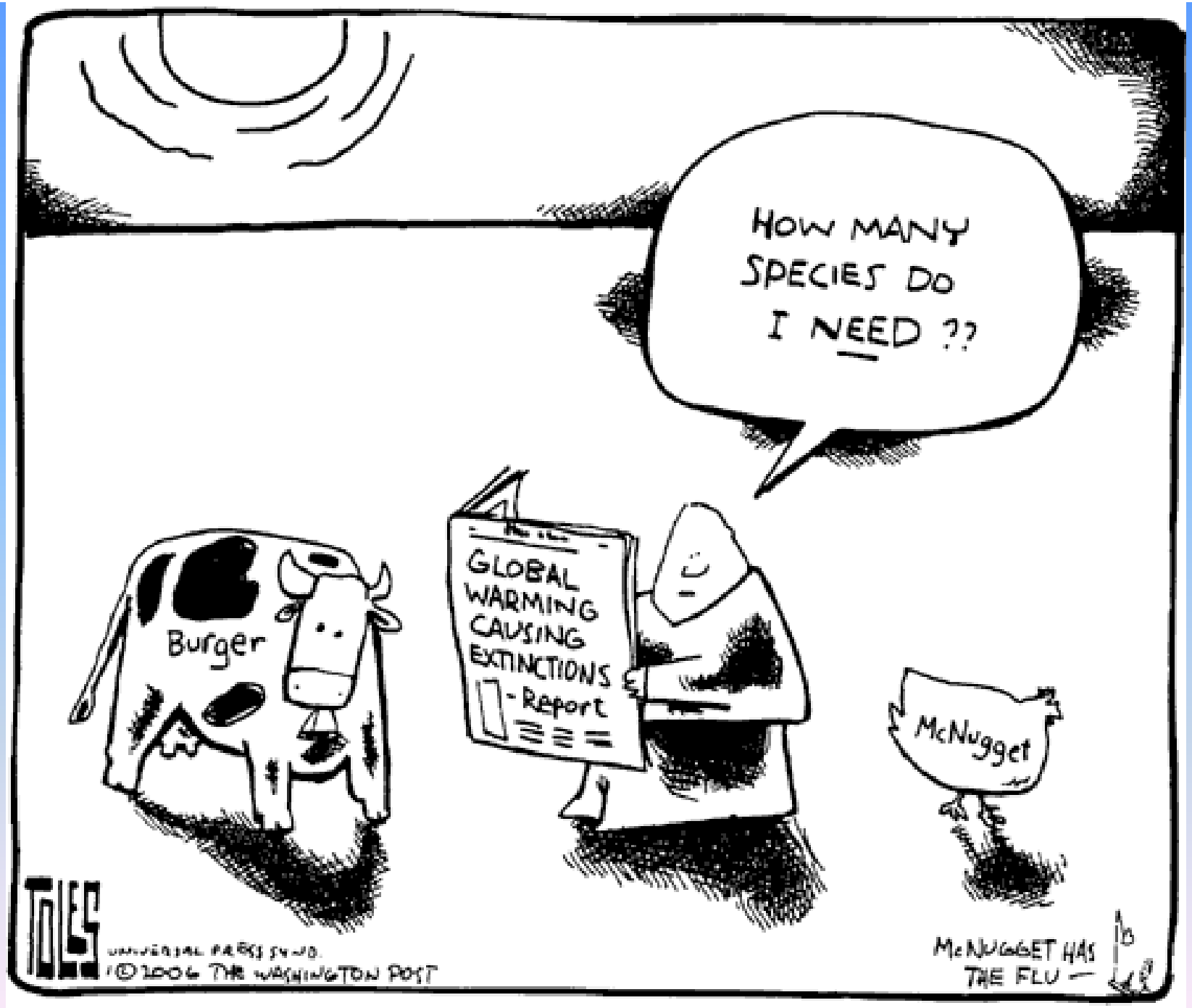
"We're not certain why they disappeared, but archeologists speculate that it may have had something to do with their size."

Extinction


7.
STEIN '90
U.S. OIL
THE GAS IS ONLY $1.39. THE AIRCRAFT CARRIER IS $470, THE TANK IS $125, THE STEALTH FIGHTER IS $330, THE GAS MASK IS $45 AND THE GUN ADDS $30 A GALLON.
$1001 29 REG.
$1001 39 UNLEAD.

"BUT THE WORDS OF THE PROPHETS ARE WRITTEN ON THE SUBWAY WALLS..."



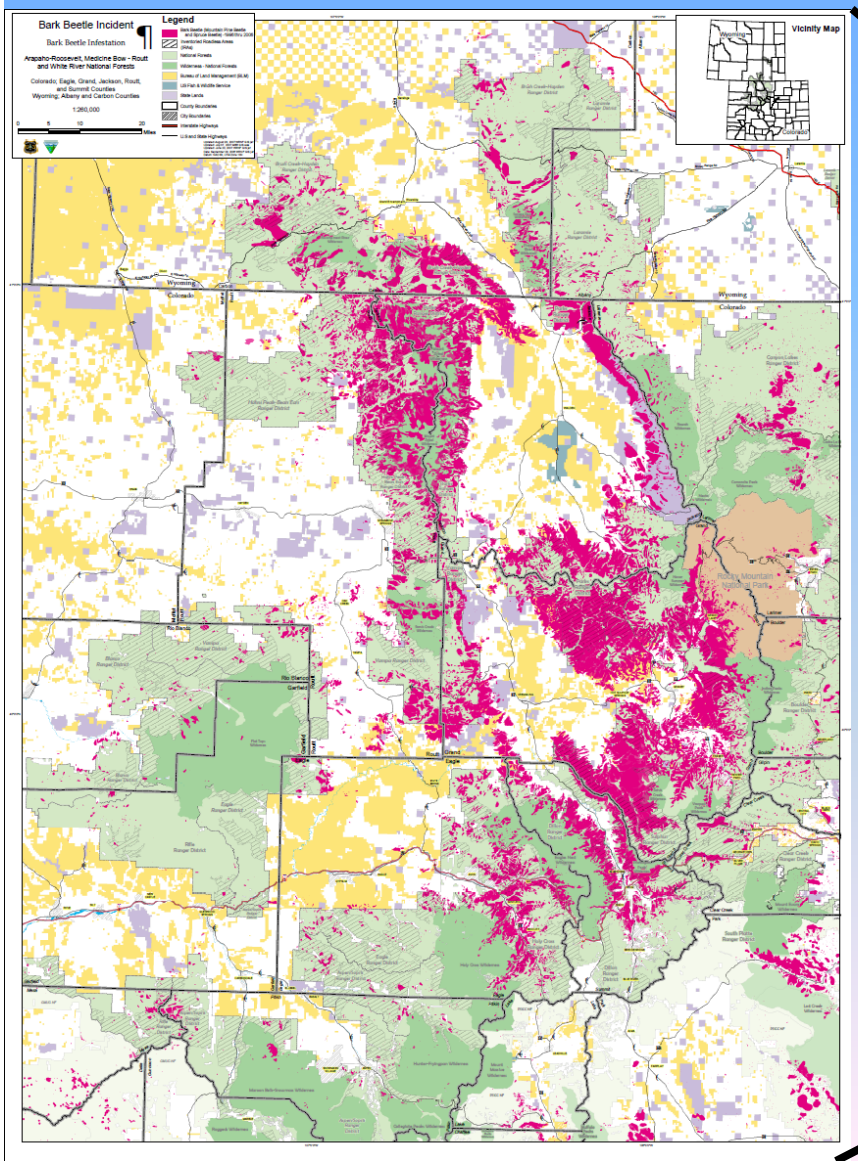

HOW MANY SPECIES DO I NEED ??
Burger
GLOBAL WARMING CAUSING EXTINCTIONS - Report
McNugget
TOLES
UNIVERSAL PRESS SYND.
©2006 THE WASHINGTON POST
McNUGGET HAS THE FLU —

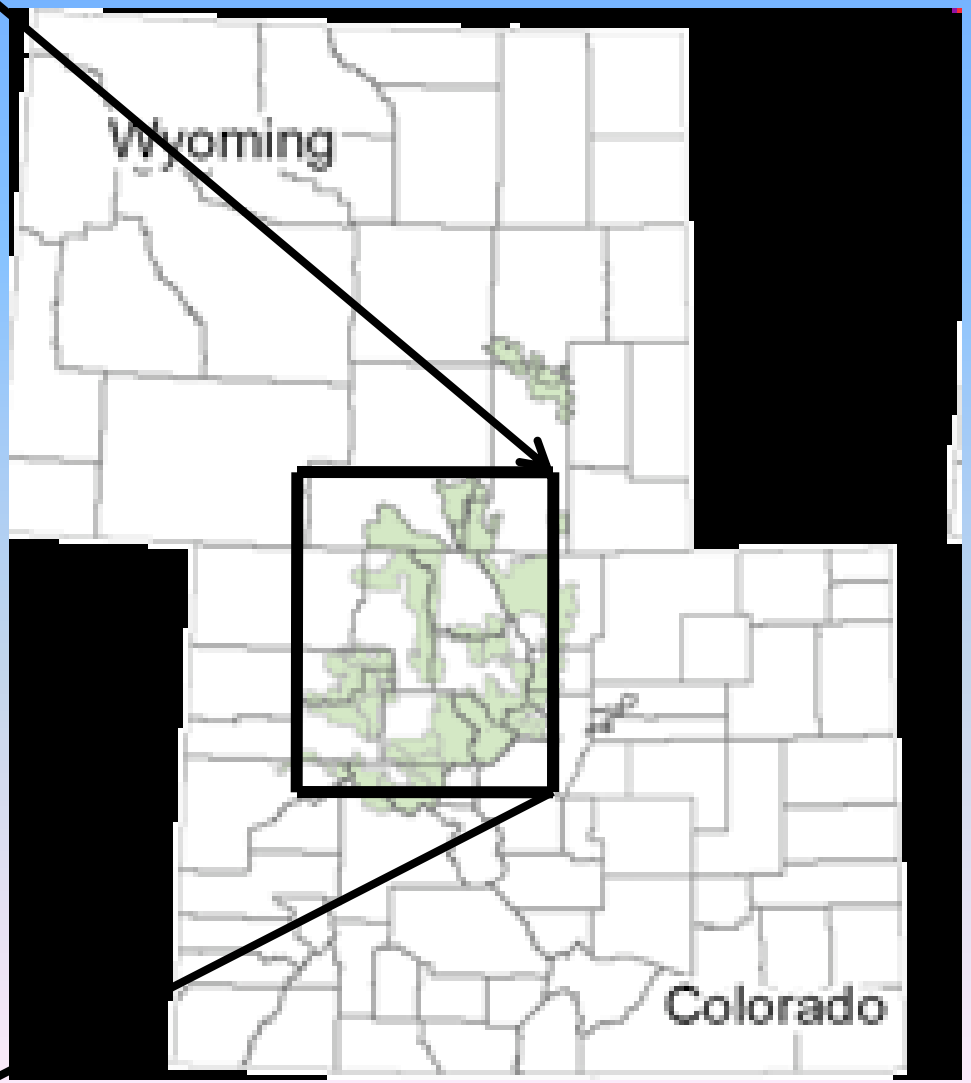
1·13·06

10.

MELTING
DOES WELL AT THE POLES.
THE NEW H2.
HUMMER
LIKE NOTHING ELSE.
VIACOM

Bark Beetle Infestation

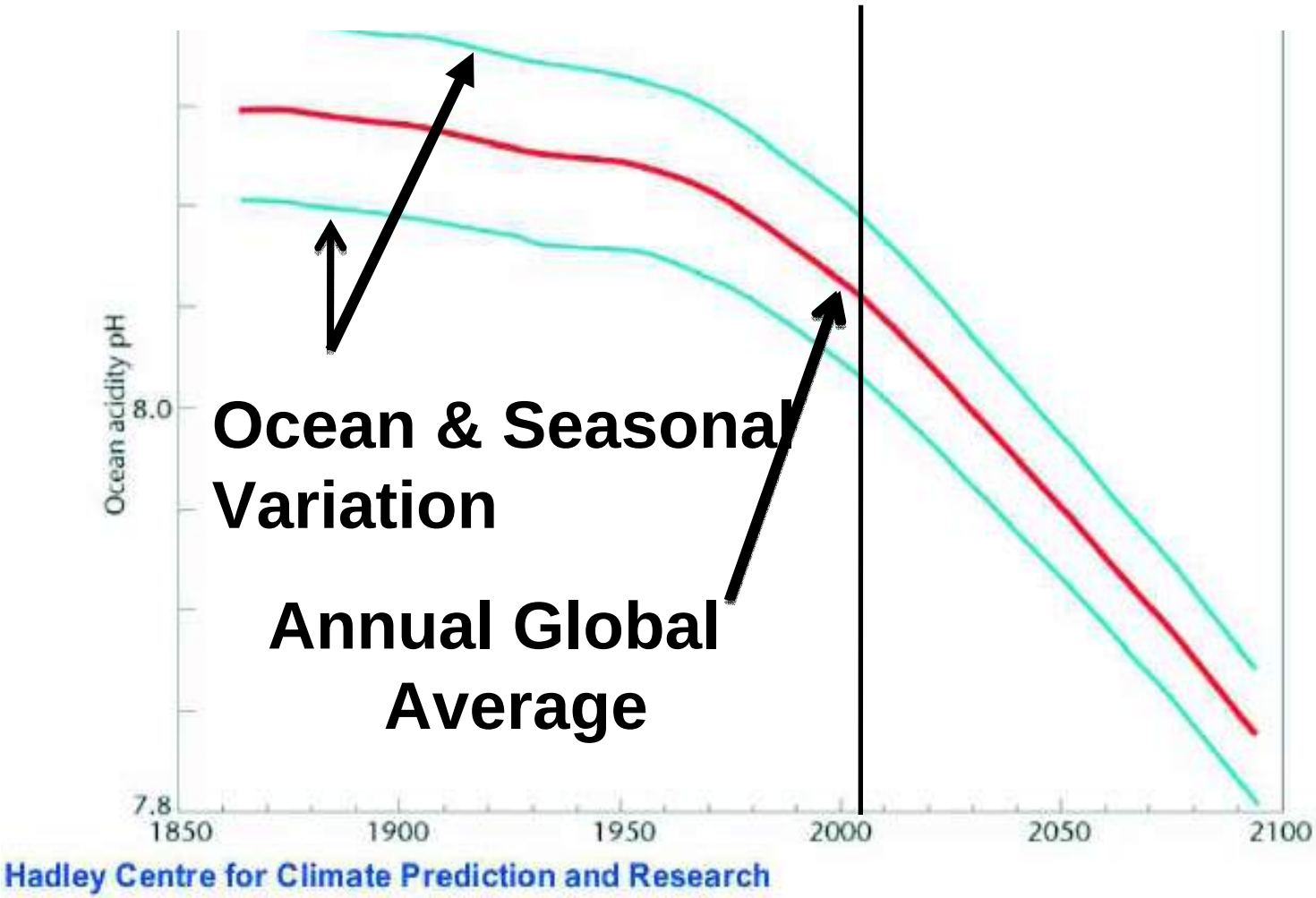




Extinction—Examples

- Range Shifts

Ocean Acidification



Hadley Centre for Climate Prediction and Research

Extinction—Examples

- Synergistic Affects
- Global Warming
- Habitat change
- Invasive species
- Toxins
- Elimination of top predators
- Feral cats

UGA0949030