Climate Change and the Role of Conservation in Securing our Future

World Affairs Council Sonoma County
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Today’s CO₂ Concentration

Projected Concentration After 50 More Years of Unrestricted Fossil Fuel Burning

Age (yr BP)

CO₂ [ppmv]

Temp. in °C
After 45 More Years of current energy use patterns

Today’s CO₂ Concentration

CO₂ Concentration

Temp. in °C

CO₂ [ppmv]

Age (yr BP)
Record Breaking Loss of Sea Ice, September 16, 2007

Sea Ice Extent
Sep 2007

Total extent = 4.3 million sq km
Who Owns the Arctic?

As global warming shrinks the ice to record lows, the global battle for resources heats up.
Seismic magnitudes range 4.6 to 5.1


From Dr. Jim Hansen, NASA, CA Climate Change Conference 2006, September 13, 2006
Adelie Penguins
Winds = Sea Ice, Breeding Success
Land-based Ice Loss = Sea Level Rise

West Antarctic Ice Sheet
Glacier AX010, Nepal
June 1978

Photo courtesy of Koji Fujita, Nagoya University
Glacier AX010, Nepal
August 2004

Photo courtesy of Koji Fujita, Nagoya University
Warming Ocean and Lag Time

Hurricane Katrina, August, 2005
Rate of Climate Change

CO2 into atmosphere – 3x faster
Arctic melting – 3x faster, 30 years earlier
Greenland melting – 3x faster
Antarctica melting -- faster
Sea level rise – 2x faster

than current models predict

IMPLICATIONS?
Sea Level Rise, Coastal & River Flooding
Intense Precipitation
Up to 120 extreme heat days per year
Fires
70%- 90% loss of Sierra snow pack
Upper Jones Tract Levee Break in the Sacramento-San Joaquin Delta
DWR Website  June 2004  12, 153 Acres, 6 months cleanup, $90m
Water Shortages

CA Climate Change Center  www.climatechange.ca.gov
~20–30% species face extinction with 2.7 F increase

~40–70% with 6.3 F increase

Edith’s Bay Checkerspot- local populations extinct

IPCC 4th Assessment Final Report Nov. 2007
Alpine Species -- Nowhere to Go

Pika or rock rabbit

Elevation at Yosemite
Up ~ 2000 ft over past 100 years

- 1900- 7,800 ft
- 2004- 9,500 ft
- Functionally extinct

UC Berkeley, Grinnell Project
Drought = No Breeding

Chrissal Thrasher

–Sonoran Desert

Phainopepla
Earlier Spring Arrivals = ?

- ~ 2/3 have changes in arrival dates
- Mismatch in timing between birds and food?

MacMynowski et al., Global Change Biology, 2007

Western Kingbird

Black-headed Grosbeak

Barn Swallow
Seabird Breeding Failure

Cassin’s Auklet

Graph showing the trend of Cassin’s Auklet breeding success from 1970 to 2005.
Blue Whales and Krill Swarms in Monterey Bay
CHANGED CONDITIONS AHEAD
Humans Rely on Healthy Ecosystems

- Food
- Freshwater
- Wood and Fiber
- Fuel

- Climate
- Flood
- Disease
- Water quality

- Recreational
- Educational
- Spiritual
How do we preserve ecosystems in this quickly changing world?
SWEDEN—end oil dependency by 2020

- E85 - 85% renewable ethanol in Vaxjo “climate cities network”
- Carbon tax - 80 cents/liter or ~$3.20 per gallon
Australia– wildlife corridor across continent
Protect Food Web Hotspots and Fisheries

Black Footed Albatross

Cordell Bank

Density (birds/km²)
- 0
- 0.1 - 5
- 5.1 - 10
- 10.1 - 50
- > 50

NMFS 1996-97, 2000-2004
Black-footed Albatross
Site Connectivity of Migrating Western Sandpipers

YK Delta
Copper River
Grays Harbor
San Francisco
Bahía Santa María
PRBO Conservation Science
Conserve Future Wetlands

Assumptions:
• 1m sea level rise
• Increased salinity

PREDICT species and habitat shifts

Northern SF Bay Delta
Widen Floodplains = ↑ Water + ↑ Wildlife

Cosumnes Preserve

Yellow Warbler
Oh, okay, I see your point. But you have to balance that against the conveniences of my lifestyle.
Global warming is 'unequivocal'... and human activity is largely responsible.

The longer action is delayed, the more it will cost.
WHAT YOU CAN DO

• Kick the carbon habit entirely by 2020
• Make protecting ecosystems an equal priority
WHAT YOU CAN DO
Support conservation!
Title: Climate: A Crisis Averted ©2055

Synopsis: A riveting documentary on how human beings overcame the greatest challenge the species ever faced.

Director: Ken Burns III | USA | Running Time: 4min 04 sec
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Riparian Habitat Joint Venture
San Francisco Bay Joint Venture
The Climate Project/ Al Gore
The Nature Conservancy
U.S. Fish and Wildlife Service
USDA Forest Service
Reduce your footprint!
YES, VIRGINIA, THERE IS GLOBAL WARMING!
• Global warming is 'unequivocal'... [and] human activity is largely responsible.

• Even if GHG stabilized, earth will keep warming, sea levels keep rising.

• Hundreds of millions of people will suffer water shortages, coastal flooding by 2020...

• Extreme, deadly weather (e.g. flooding, drought, hurricanes) will be more common.

• The longer action is delayed, the more it will cost.

Associated Press, Summary, November 18, 2007
Coastal Flooding and Damage

Ocean Beach, California, February 1983

Dan Cayan, Scripps Institute of Oceanography, Sept. 2006