

GREENHOUSE EFFECTS

Global warming is well underway. Here are some telltale signs



CARBON DIOXIDE AND OTHER GASES FROM the burning of fossil fuels collect in the atmosphere and act like the glass walls of a greenhouse, trapping heat on the earth's surface. Scientists predict that the planet's average temperature could rise as much as 6.3°F (3.5°C) over the next century, and we are already seeing heat waves, melting polar ice and rising seas. Local impact remains unpredictable: some areas could suffer stronger storms and other places severe drought. Seven environmental groups—Environmental Defense Fund, Natural Resources Defense Council, Sierra Club, Union of Concerned Scientists, U.S. Public Interest Research Group, World Resources Institute and World Wildlife Fund—have put together a world map showing

“early-warning signs” of global warming. Reviewed by a team of scientists, the signs fall into two categories: direct manifestations of warming, called fingerprints, and events that could become more frequent and widespread with climate change, which are labeled harbingers. Here's an exclusive look at the highlights of the map. A more detailed version is posted at www.climatehotmap.org.

T H E H A R B I N G E R S

Vanishing Animals

1 CALIFORNIA Edith's Checkerspot Butterfly has disappeared from the lower elevations and southern limits of its range.

2 ANTARCTICA Adelie penguin populations have

declined 33% in 25 years because the sea ice where they live is shrinking.

3 CANADIAN ARCTIC Peary caribou numbers dropped from 24,000 in 1961 to as few as 1,100 in 1997, mostly because heavy snowfalls and freezing rain covered their food supply.

Storms and Floods

4 AUSTRALIA During August 15 to 17, 1998, a storm dumped nearly 1 ft. of rain on Sydney, three times as much as normally falls during that month.

5 KOREA Severe flooding struck during July and August 1998. On some days rainfall exceeded 10 in.

6 CALIFORNIA In February 1998, 21.74 in. of rain fell on Santa Barbara, its highest monthly total on record.

Spreading Disease

7 KENYA In 1997 hundreds of people died of malaria in highlands where the population had not previously been exposed.

8 COLOMBIA In the Andes, mosquitoes that can carry dengue and yellow fever, once limited to altitudes no higher than 3,300 ft., appeared at altitudes of 7,200 ft.

9 INDONESIA In 1997 malaria was detected for the first time as high as 6,900 ft. in Irian Jaya province.

Droughts and Fires

10 SPAIN More than 1.2 million acres of forest burned in 1994.

11 MEXICO In 1998 1.25 million acres went up in flames during a severe drought.

12 INDONESIA Up to 2 million acres of land burned in 1998, including parts of the already devastated rain-forest habitat of the Kalimantan orangutan.

Earlier Spring

13 ENGLAND 31% of 65 bird species studied in 1995 laid their eggs earlier than in 1971 by an average of 8.8 days.

14 ALASKA During 82 years on record, four out of the five earliest thaws on the Tanana River have occurred in the 1990s.

15 NEW HAMPSHIRE The length of time Mirror Lake is covered with ice has declined about half a day per year during the past 30 years.

THE FINGERPRINTS

Heat Waves

16 TIBET In 1998 Lhasa had its warmest June on record. Temperatures exceeded 77°F for 23 days.

17 CAIRO 1998 brought the warmest August since data have been kept. Temperatures reached 105.8°F on August 6.

18 NEW YORK CITY In 1999 the city had its warmest and driest July on record, with temperatures climbing above 95°F for 11 days.

Rising Seas

19 BERMUDA Saltwater inundation from the intruding ocean is killing coastal mangrove forests.

20 HAWAII Sea-level rise at Waimea Bay, along with coastal development, has contributed to considerable beach loss over the past 90 years.

21 FIJI The shoreline has receded half a foot per year for 90 years, according to local reports.

Melting Glaciers

22 INDIA The Gangotri Glacier is retreating 98 ft. per year.

23 RUSSIA In the Caucasus Mountains half of all glacial ice has disappeared in the past 100 years.

24 PERU The Qori Kalis glacier in the Andes Mountains is receding about 100 ft. per year, a sevenfold increase in rate since the 1960s and 1970s.

Polar Warming

25 ALASKA In Barrow the average number of snowless days in summer has increased from fewer than 80 in the 1950s to more than 100 in the 1990s.

26 ARCTIC OCEAN The area covered by sea ice declined about 6% from 1978 to 1995.

27 ANTARCTICA Nearly 1,150 sq. mi. of the Larson B and Wilkins ice shelves collapsed from March 1998 to March 1999. ■

Questions

1. What is the greenhouse effect?
2. In your view, which of the “harbingers” and “fingerprints” presented here present the greatest cause for concern? Why?