PLANET UNDER SIEGE: CLIMATE CHANGE

Don Nardo

Printed in the United States

For more information, contact:
ReferencePoint Press, Inc.
PO Box 27779
San Diego, CA 92198
www.ReferencePointPress.com

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

Name: Nardo, Don, 1947– author.
Title: Planet Under Siege: Climate Change/Don Nardo.
Other titles: Climate change
Description: San Diego: ReferencePoint Press, 2019. | Includes bibliographical references and index. | Audience: Grades 10-12.
Identifiers: LCCN 2019023443 (print) | LCCN 2019023444 (ebook) | ISBN 9781682827574 (library binding) | ISBN 9781682827581 (ebook)
Subjects: LCSH: Climatic changes—Juvenile literature. | Climatic extremes—Environmental aspects—Juvenile literature.
Classification: LCC QC903.15 .N3725 2019 (print) | LCC QC903.15 (ebook) | DDC 363.738/74—dc23
LC record available at https://lccn.loc.gov/2019023443
LC ebook record available at https://lccn.loc.gov/2019023444

CONTENTS

CHAPTER 1

An Onslaught of Extreme Weather Events

Climate change is affecting the planet and human communities in numerous ways, large and small. Of those, the most visible signs of change are episodes of extreme weather and the sometimes-calamitous results of extreme weather conditions. Among them are abnormal heat waves that kill hundreds of people and hospitalize thousands more; massive droughts and disastrous wildfires stoked by those unusually dry conditions; devastating floods that cover hundreds of square miles and cause billions of dollars of damage; and monster hurricanes and other storms driven by rising ocean temperatures. Extreme weather events are causing devastation worldwide. And that, says climate scientist Deepti Singh, "is representative of climate change."[6]

Heat Records Are Continually Broken

As Earth's atmosphere has steadily warmed, heat waves have been happening more often in recent years than in the past several centuries. Around the world, warm days are getting warmer and more frequent. In fact, according to Skeptical Science (a website written by an international team of scientists), record-breaking heat waves are occurring five times more often than they would if human-caused climate change was not involved.

Heat waves are not a new phenomenon; they have occurred off and on throughout the planet's history. When they did occur in the past, however, they tended to be random, localized, and much less frequent than they are now. Also, they were never part

of a pattern of consistently rising temperatures over large sectors of the globe, as is the case today. Heat records have been repeatedly broken in many places on the planet in the past few decades and certain years have stood out as extreme. Extreme conditions of this nature occurred in various countries in 1980, 1988, 2003, 2013, and 2018, to name only a few.

Europe suffered a horrendous heat wave in 2003, for instance. For most of the month of August, temperatures hovered daily between 90°F and 100°F (32°C and 38°C) and they soared to 118°F (48°C) in some areas. Europe's hottest summer in five centuries, it caused serious crop failures and forest fires across the continent. In addition, the abnormal heat generated a terrible human death toll. More than twenty thousand people perished in Italy alone, according to Italy's national statistics institute. Nearly every other European nation recorded thousands of heat-related deaths during this same period.

Although the death toll from the 2018 heat event was lower than in 2003, similar temperatures were recorded over a more widespread area in 2018. Los Angeles, California, set new records for high temperatures in July 2018, with consistent readings of 111°F (44°C). On the other side of the world, for the first time in recorded history, areas above the Arctic Circle in Finland experienced temperatures near 90°F (32°C). Overall, May 2018 was the hottest month on record across both Europe and the United States. At the same time, hotter-than-normal temperatures lingered in Canada, Japan, North Africa, Korea, and numerous other parts of the world.

Increasingly Widespread Drought

Climate scientists expect such massive heat events to grow more intense. An outgrowth of these events is the increasing occurrence of large-scale droughts. Dozens of scientific studies have confirmed that droughts began to grow larger and more numerous worldwide during the second half of the twentieth century. Those episodes of unusually dry weather were particularly pronounced in about half a dozen locations.

Hotter air temperatures mean drier vegetation, and in turn, larger and more devastating fires. The 2018 Carr fire, seen here, destroyed parts of California in July 2018.

Among those unusually hard-hit areas have been central and northern Africa and the western United States. The latter recorded increasingly severe drought conditions between 2000 and 2019. Moreover, between 2011 and 2016 one western state, California, underwent its worst sustained drought in recorded history. The year 2018 was especially dry in the southwestern states. The long drought resulted in billions of dollars in crop and livestock losses for farmers. Other impacts have been seen in various western states. NOAA science editor Rebecca Lindsey describes some of those problems:

> Endangered fish in the Rio Grande had to be rescued and relocated to wetter stretches as parts of the river in New Mexico dried up. In Arizona and New Mexico, birds and elk have been observed coming to stock ponds and yards for water and food as natural sources of surface

water and vegetation become scarce. In Colorado, livestock operators are hauling water for cows and sheep as stock ponds and streams dry up, and farmers along the Middle Rio Grande in New Mexico have been told to expect half their normal irrigation allotment.[7]

Many thousands of miles to the east, meanwhile, prolonged drought linked by scientists to climate change has adversely affected the lives of tens of millions of people in central Africa. In that region, Lake Chad has long been a major source of drinking water and irrigation for the countries of Chad, Cameroon, Niger, and Nigeria. But the lake is shrinking. During the 1960s, it was the world's sixth-largest lake, with a surface area of over 10,000 square miles (26,000 sq km). The combination of climate change and population growth (leading to increased demand for water) has caused Lake Chad to shrink to less than a tenth its original size. In 2019, only a few hundred square miles of it were left. By then, lack of irrigation water had caused the soil in thousands of surrounding farms to dry out. In turn, crop losses, poverty, and starvation in the area have rapidly increased.

> **"Endangered fish in the Rio Grande had to be rescued and relocated to wetter stretches as parts of the river in New Mexico dried up."[7]**
>
> **—NOAA science editor Rebecca Lindsey**

Gone in a Single Generation

Among the more dangerous effects of extreme heat events and droughts related to climate change are giant wildfires that destroy both forests and human communities. Long periods of extreme heat and drought—brought about by climate change—have left entire forests and grasslands bone dry and susceptible to devastating blazes that can spread with astonishing speed. Several western US states experienced record numbers of forest and

brush fires between 2006 and 2017, and these events reached a terrifying peak in 2018. In California, which had the most numerous as well as the largest fires during these years, the flames scorched thousands of square miles of woodlands and destroyed thousands of homes and businesses.

Of the dozens of big fires that hit California in 2018, the two most severe were the Carr and Camp fires—both of which occurred in the northern part of the state. The Carr fire, which raged during July and August, killed eight people, three of them firefighters. The fire destroyed more than 229,000 acres (92,673 ha) of forest and did an estimated $800 million worth of damage. It also generated a rare secondary weather effect—an enormous tornado-like vortex that scientists call a "firenado." According to

Ranking the Megahurricanes

In light of the increasing number of monster storms that are a product of climate change, the question has arisen: Should scientists add a category 6 to the 1-to-5 scale that measures the strength of hurricanes? Former National Science Foundation member Jeff Nesbit comments on this idea:

> Meteorologists and scientists never imagined that there would be a need for a category 6 storm, with winds that exceed 200 miles per hour [161 kmh] on a sustained basis, sweeping away everything in its path. Until now, such a storm wasn't possible, so there was no need for a new category above category 5. Right now, however, there is anywhere from 5% to 8% more water vapor circulating throughout the atmosphere than there was a generation ago. This, combined with warmer temperatures that are driving water up from the deep ocean in places where hurricanes typically form, has created the potential for superstorms that we haven't seen before and aren't really prepared for. . . . No one in America has ever experienced the wrath and fury of a category 6 hurricane, which now genuinely seems possible and realistic, [and] it's only a matter of time before one hits the US.

Jeff Nesbit, "This Is the Way the World Ends: Will We Soon See Category 6 Hurricanes?," *Guardian,* September 15, 2018. www.theguardian.com.

SOURCE NOTES

Introduction: Climate Change Is Already Happening

1. Quoted in GlobalChange.gov, "Climate Change." www.globalchange.gov.
2. Quoted in Alejandro de la Garza, "President Trump Renews Climate Change Denial Days After Defense Department Releases Daunting Report on Its Effects," *Time,* January 20, 2019. https://time.com.
3. NASA, "What Is the Greenhouse Effect?," June 2019. https://climatekids.nasa.gov.
4. National Oceanic and Atmospheric Association (NOAA), "2018 Was 4th Hottest Year on Record for the Globe," February 2019. www.noaa.gov.
5. Quoted in World Wildlife Fund, "10 Myths About Climate Change." www.wwf.org.uk.

Chapter 1: An Onslaught of Extreme Weather Events

6. Quoted in Marie D. Aronsohn, "What Do Cold Snaps Have to Do with Climate Change?," January 2018. https://phys.org.
7. Rebecca Lindsey, "Exceptional Drought in Parts of Seven States in U.S. Southwest," NOAA, April 2018. www.climate.gov.
8. Quoted in Zoeann Murphy and Chris Mooney, "Gone in a Generation: Across America Climate Change Is Already Disrupting Lives," *Washington Post,* January 2019. www.washingtonpost.com.
9. Union of Concerned Scientists, "Hurricanes and Climate Change." www.ucsusa.org.
10. Quoted in Senate Democrats, "What Will It Take for Senate Republicans to Recognize Climate Change Is Real and Finally Do Something About It?," March 2019. www.democrats.senate.gov.

ORGANIZATIONS TO CONTACT

Center for Climate and Energy Solutions (C2ES) — www.c2es.org

C2ES, formerly called the Pew Center on Global Climate Change, promotes reducing carbon dioxide emissions and adopting cleaner energy solutions. The website features links to information on how both individuals and groups can support the C2ES and thereby help fight climate change.

GlobalChange.gov — www.globalchange.gov

This website includes the colorful, graphics-filled article "Climate Change," which presents the main findings of climate scientists on the present climate crisis. The website contains many links to related topics.

Intergovernmental Panel on Climate Change (IPCC) — www.ipcc.ch

The IPCC is the leading international organization presently studying and fighting climate change. The website provides up-to-date reports on the activities of several IPCC working groups, and also tells how students and other everyday people can get involved in efforts to stop climate change.

National Aeronautics and Space Administration (NASA) — https://climate.nasa.gov

This section of the NASA website, "Global Climate Change: Vital Signs of the Planet," provides excellent facts, explanations, articles, graphics, and more on the topic of climate change.

National Center for Atmospheric Research (NCAR) — https://ncar.ucar.edu

FOR FURTHER RESEARCH

Books

Anthony McMichael, *Climate Change and the Health of Nations.* New York: Oxford University Press, 2019.

New York Times Editorial Staff, *Climate Change*. New York: New York Times Educational and Rosen, 2019.

New York Times Editorial Staff, *Climate Refugees: How Climate Change Is Displacing Millions*. New York: New York Times Educational and Rosen, 2019.

Joseph Romm, *Climate Change: What Everyone Needs to Know.* New York: Oxford University Press, 2018.

Internet Sources

Alejandra Borunda, "2018 Was the U.S.'s Third-Wettest Year on Record—Here's Why," *National Geographic,* February 7, 2019. www.nationalgeographic.com.

Daniel Glick, "The Big Thaw: As the Climate Warms, How Much, and How Quickly, Will Earth's Glaciers Melt?," *National Geographic.* www.nationalgeographic.com.

International Research Group for Science and Society, "Adapting Agriculture to Climate Today, for Tomorrow." https://iri.columbia.edu.

Matt McGrath, "Final Call to Save the World from 'Climate Catastrophe,'" BBC News, October 8, 2018. www.bbc.com.

Christina Nunez, "Ocean Species Are Disappearing Faster than Those on Land," *National Geographic,* April 24, 2019. www.nationalgeographic.com.

Kendra Pierre-Louis, "The World Is Losing Fish to Eat as Oceans Warm, Study Finds," *New York Times,* February 28, 2019. www.nytimes.com.

Reuters, “Ocean Shock: The Climate Crisis Beneath the Waves.” www.reuters.com.

Nassos Stylianou et al., “Climate Change: Where We are in Seven Charts and What You Can Do to Help,” BBC News, April 18, 2019. www.bbc.com.

Reports

American Meteorological Society, “Explaining Extreme Events from a Climate Perspective,” 2018. www.ametsoc.org.

IPCC, *Special Report: Global Warming of 1.5 ºC*, 2018. www.ipcc.ch.

United Nations Environment Programme, “Global Environment Outlook: Healthy Planet, Healthy People,” Cambridge University, 2019. https://content.yudu.com/web/2y3n2/0A2y3n3/GEO6/html/index.html?origin=reader.

US Global Change Research Program, *Fourth National Climate Assessment,* 2018. https://nca2018.globalchange.gov.

World Health Organization, *COP24 Special Report: Health & Climate Change*, 2018. www.who.int.

INDEX

Note: Boldface page numbers indicate illustrations.