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NOAA REPORT

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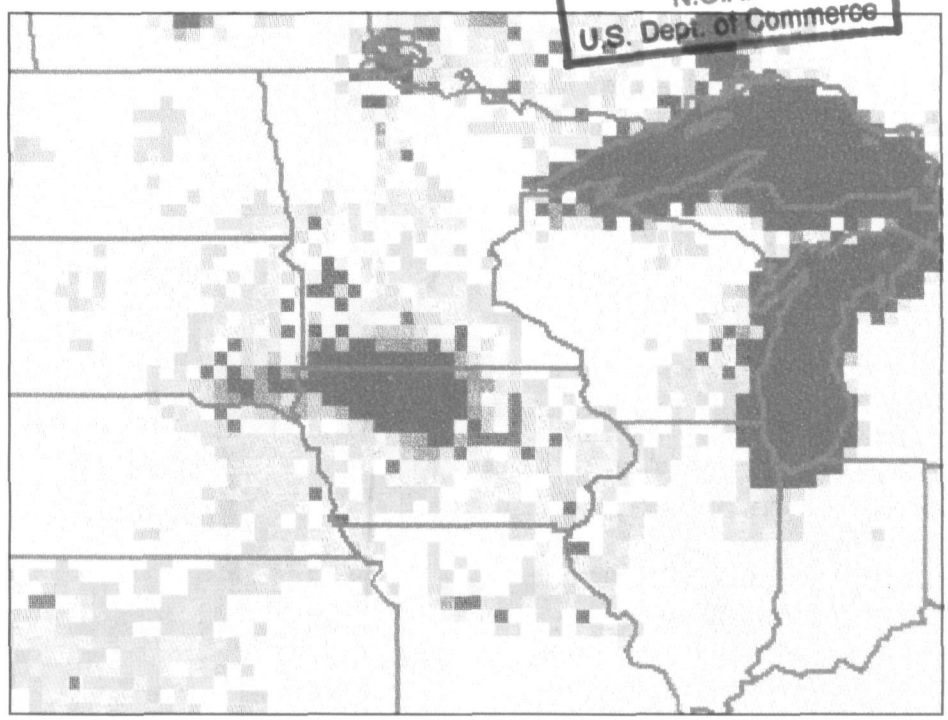

A "new Great Lake," courtesy of the Midwest floods, opens up on the Iowa-Minnesota state line in this graphic of the Midwest's Soil Wetness Index on July 14, 1993. The Index, a measurement tool developed by NOAA, uses data from Defense Department polar orbiting satellites to monitor soil wetness and flooding. The darker the area, the wetter the soil.

Midwest Rains, Flooding Showcase NOAA Science

Take an unusually strong El Niño, add last winter's blizzards and storms, combine that with a high spring snow melt, and you've got the makings of this year's mammoth Midwest floods, which are still affecting low lying areas in Iowa, Missouri, Kansas, Illinois and Nebraska.

During this trying time, many aspects of NOAA's mission come into play. The flood's effects, some of which may linger a long time, are being studied by NOAA's National Weather Service, National Ocean Service, National Marine Fisheries Service and National Environmental Satellite, Data and Information Service. NOAA is also cooperating with a number of other federal agencies to help alleviate the storm's aftermath.

NWS field offices across the Midwest are collecting and analyzing data from river and rain gauges. This

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NEWS BRIEFS

Marine Mammal Stranding Handbook Announced: A manual of instructions for responding to marine mammal strandings is now available. The 316-page handbook, *Marine Mammals Ashore: A Field Guide for Strandings,* describes options available to federally-authorized volunteers when caring for four major groups of stranded marine mammals. NOAA's National Marine Fisheries Service, the agency responsible for managing and protecting the Nation's marine mammals, sponsored the manual to guide marine mammal stranding network volunteers in rescuing and rehabilitating live stranded animals and collecting scientific information from dead animals. To order the field guide, write Sea Grant Program, Texas A&M University, P.O. Box 1675, Galveston, Texas 77553-1675.

Emergency Regulations for 1993 Salmon Off Pacific Coast: NOAA has issued emergency regulations for the 1993 Pacific ocean salmon fisheries that implement a management plan agreed to by Commerce Secretary Ronald H. Brown and Interior Secretary Bruce Babbitt. The regulations are designed to improve conservation measures and increase the future stock size of Klamath River fall chinook salmon while providing an equitable share of the salmon harvest for Klamath River Indian tribes. The regulations implement 1993 salmon seasons, beginning June 1, and are a follow-up to emer-

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Effect on Fisheries, Lower Mississippi Being Studied

NOAA Shines as Rains Flood Midwest

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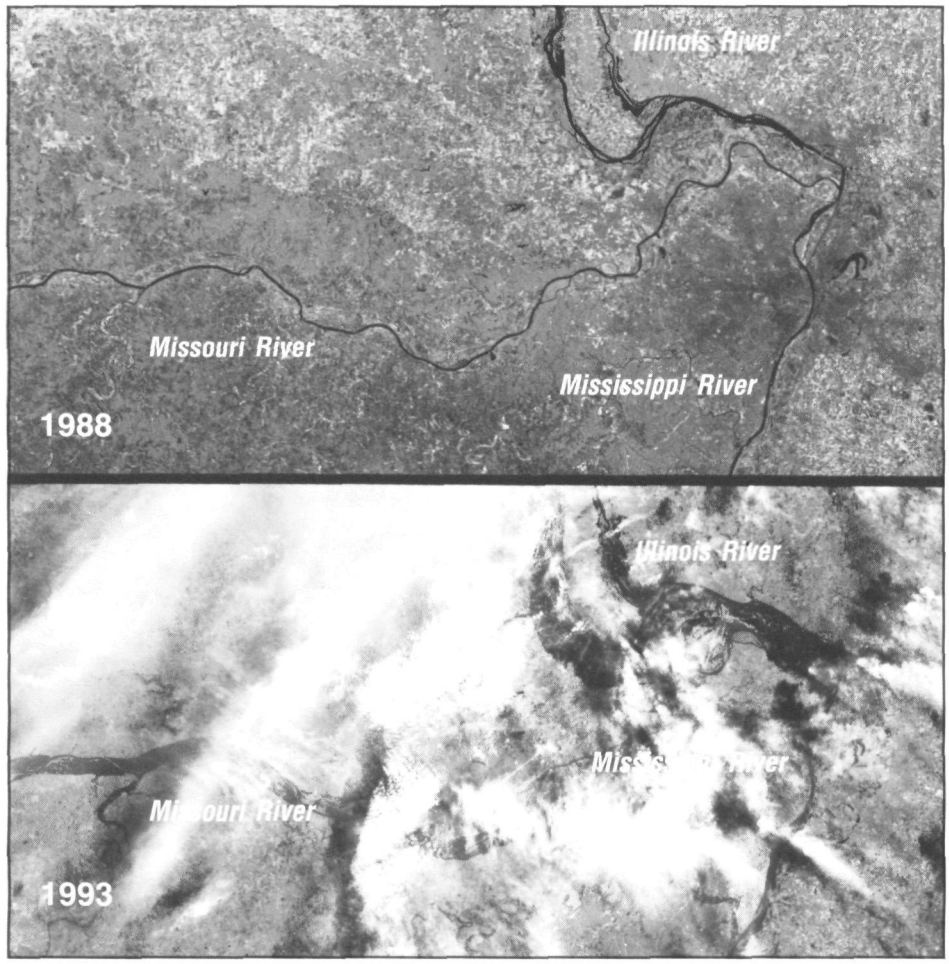
information is sent to the Army Corps of Engineers, which has the responsibility of deciding how much water to release from reservoirs in the flooded area, according to Ken King, a NWS Field Operations Hydrologist in Kansas City. "If too much is drained, you'll have flooding downstream," he said, while if too little is let out, the reservoirs themselves will flood.

The data come from a wide range of sources, King said, including NWS's cooperative observers—citizens who operate small weather stations with rain gauges and phone in the levels to a NWS office. Other devices used include a LARC, or Limited Automated Remote Collector, a river gauge operated by the U.S. Geological Survey that transmits its information automatically by phone, and a Data Collection Platform, which transmits its readings by satellite. This information eventually reaches a NESDIS ground station in Wallops Island, Va., from where it is relayed around the country.



EOSAT

Satellite images of the St. Louis, Mo., area on July 4, 1988, during a drought, and on July 10, 1993, during the recent floods. The three main rivers in the area—the Missouri, the Mississippi and the Illinois—are heavily swollen.

Experimental Wetness Index

NESDIS scientists are also monitoring the flooding using data from the Defense Meteorological Satellite Program (DMSP) F-10 and F-11 series of polar orbiting satellites.

The experimental NOAA-developed Soil Wetness Index uses data from the satellites' Special Sensor Microwave Imager, which can see through clouds and measure radiation emanating from the surface. The imager can easily detect the difference between dry land and bodies of water such as flooded fields to a depth of 10 centimeters. *(See graphic, page one.)*

Data from the DMSP are read out by the Air Force at Offutt Air Force Base, Neb. The data are then sent to NOAA's satellite processing facility in Suitland, Md., as part of a shared processing program that provides for the exchange of data between the Commerce and Defense Departments.

Meanwhile, NMFS and NOS scientists are studying the potential effects of the flood waters on estuaries downstream, and on fisheries in the Gulf of Mexico. So far, though, findings have been inconclusive.

Floods Are Tragic, But a 'Challenge'

The flooding in the Midwest presents the Weather Service with a challenge, according to Dr. Joe Friday, assistant administrator for NWS.

"[The flooding is] a great tragedy, but also a great challenge" for the Weatther Service, he said in an interview. Nearly 8,000 hours of overtime have been logged by NWS Midwest staffers, and other NWS employees have been brought in from all over the country to keep NWS offices usually staffed for only eight to 10 hours a day open longer, he added.

While no NWS offices have

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Hurricanes Pose Economic Threat, Too

Damaging hurricanes pose a continuing and growing threat to the well-being of the entire U.S. economy, Robert C. Sheets, director of the National Hurricane Center, told a lunchtime audience at the National Press Club in Washington last month.

"Fortunately, during the two to three decades before Hurricanes Hugo and Andrew, strong hurricanes striking the U.S. coastline were infrequent events. However, recent research indicates we are likely to return to a frequency of hurricanes similar to that experienced in the 1940s, 1950s and 1960s," he told a luncheon meeting. Together, Hugo and Andrew caused $32 billion in damages.

NOAA National Hurricane Center director Dr. Robert Sheets at Washington's National Press Club last month.

The coastal population from Texas to Maine now exceeds 44 million. Besides the threat to life, considerable property is at risk. The value of insured property in coastal counties, apart from flood insurance, approaches $2 trillion, Sheets reported.

Insured losses for Hurricane Andrew are estimated at $18 billion, more than four times the record payout for Hugo. As a result, Sheets said, eight insurance companies failed and others have either withdrawn from coastal markets or are limiting market shares, making private insurance difficult to obtain.

As populations increase in coastal counties, evacuation becomes more and more difficult. Among many of Sheets's recommendations for improving the odds for public safety, were higher standards and tighter controls on construction in coastal counties, improving tools for tracking hurricanes and more funds for research.

NOAA operates the NHC through its National Weather Service. Its hurricane hunter airplanes, among other devices, track and forecast the paths of these violent storms.

Montreal Pact Cited in Slowed CFC Atmospheric Growth Rate

Concentration levels of two ozone-destroying, man-made chemical substances in the atmosphere are still increasing but at a much slower rate than in the past, reflecting international agreements to limit their manufacture, a NOAA study reveals.

The growth rates of two chlorofluorocarbons—CFC-11 and CFC-12—have been decreasing significantly for the last several years, according to James W. Elkins of the NOAA Climate Monitoring and Diagnostics Laboratory in Boulder, Colo.

If this pattern of growth decline continues at present rates, Elkins reported in last month's *Nature* magazine, the atmospheric concentrations of the two chemicals will reach their maximum before the turn of the century and then begin a decline.

Agreement Cited in Slowdown

The slowdown in growth rate is attributed to the Montreal Protocol, an international agreement to eliminate CFC production by the end of 1995, as well as to voluntary cutbacks by producers and users of the chemicals.

The two compounds carry chlorine into the stratosphere where, Elkins said, they initiate destruction of ozone, as shown conclusively in the scientific literature. The CFCs are used in refrigeration, air conditioning, and the production of aerosols and foams. Together, CFC-11 and CFC-12 represent about 50 percent of all chlorine introduced into the stratosphere.

A scientific team led by Elkins examined tropospheric growth rates of the compounds over the past 16 years. They analyzed more than 4,980 flask

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gency regulations previously issued only for the month of May.

In response to a Commerce Department request, the Pacific Fishery Management Council considered measures for the balance of the 1993 salmon season that would have achieved a spawning escapement goal of 38,000 naturally spawning Klamath River fall chinook salmon and a tribal fishery harvest of 18,500 fish. Although the Council did not recommend revised salmon fishery regulations, it agreed that these regulations, based on an alternative season structure developed by the states of Oregon and California, would meet the two Secretaries' goals with the least harm to the West Coast salmon industry. The emergency regulations provide for a spawning escapement level exceeding the Council's recommendations by 3,000 naturally spawning Klamath River fall chinook salmon, but remaining 5,000 fish below the 43,000 fish suggested by the Council's salmon technical team.

NEWS BRIEFS

New International Aviation Weather Codes: NOAA's National Weather Service began to provide increased operational support for the global aviation industry last month when it introduced internationally standardized weather codes for U.S. international airports. The code is a series of letters and numbers that describes local weather conditions in shorthand form. It provides wind speed and direction, visibility, clouds, temperature, altimeter settings and current weather observations and forecasts. Pilots, flight dispatchers and air traffic controllers use the encoded descriptions to plan flight operations to airports around the world. Adopting internationally recognized standards should improve the efficiency of operations for pilots and dispatchers.

Midwest Floods are 'Tragic,' But Also A 'Challenge' for Weather Service: Friday

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been damaged, the Weather Service Forecast Office in Des Moines, Ia. was without water for much of July, and cables running from an Automated Surface Observing System (ASOS) unit at the Jefferson City, Mo. airport were waterlogged when the airport was flooded. The ASOS unit, which had not yet been commissioned, was not on line.

CFC Atmospheric Growth Rate Slows

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samples of air, and collected data from ground-based instruments at NOAA monitoring stations in Alaska, Hawaii, American Samoa and Antarctica, and from cooperative sites in Colorado, Canada and Australia.

Between 1977 and 1984, the mean global growth rate for CFC-11 was about 9 parts per trillion per year (ppt/yr), and for CFC-12 about 17 ppt/yr. Between 1985 and 1988, the growth rate increased to about 11 ppt/yr for CFC-11 and about 20 ppt/yr for CFC-12, reflecting greater use of these chemicals.

Decline Began in '88

Since 1988—shortly after the Montreal Protocol was first signed—the growth rates have been decelerating rapidly, the research team reported. In March of this year, the global growth rate had dropped to 3 ppt/yr for CFC-11 and 11 ppt/yr for CFC-12.

The 1987 international agreement called for cutting the production of CFCs in half by the year 2000.

Sea Turtles Found Mutilated off NC

Two dead sea turtles, one with a gunshot wound to its head, and the mutilated parts of at least one other, washed up on North Carolina beaches last month.

The mutilated parts, first reported on North Topsail Beach, near Wilmington, appear to have been sliced with a sharp object but are not likely the result of an encounter with a boat's propeller. A 20-inch loggerhead turtle had been shot in the head at point-blank range. A second turtle's flippers had been amputated.

"We take these mutilations very seriously," said Nancy Foster, acting director of NOAA's National Marine Fisheries Service. "Anyone who mutilates a sea turtle, even one already dead, runs the risk of a substantial fine or a prison term."

Foster said enforcement off North Carolina would be stepped up, with the assistance of the state's Department of Marine Fisheries. Foster added that there was no evidence that commercial fishermen are responsible for the mutilations.

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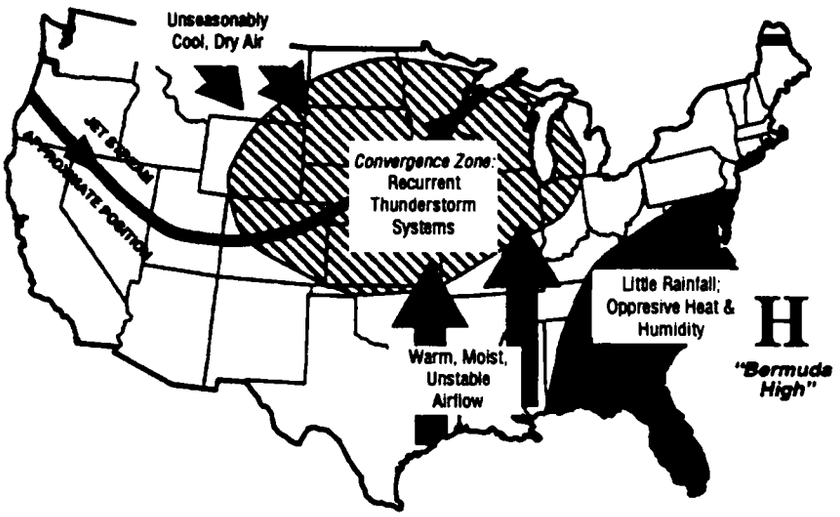
NOAA NOW

August 1993

Floods, Droughts Detailed in Climate Summary

The Midwest was inundated by more than two and one-half feet of precipitation during the past four months. At the same time, some Southeastern areas experienced severe drought and record July heat, according to a Special Climate Summary issued by NOAA's Climate Analysis Center.

The summary, issued earlier this month, updates the climate conditions that prompted floods in the Midwest and heat and drought in the Southeast, along with impacts of these phenomena.



Weather patterns in June and July for the United States.

12-18 Inches of Rain

Since NOAA's last Special Climate Summary of July 12, heavy summer rains continued to fall in many areas of the upper Midwest and east-central Great Plains. Much of the rain occurred during late June and July, with 12-18 inches reported across a large swath of the central United States. Iowa and the Dakotas experienced their wettest July ever; five other Midwestern states had near-record July wetness.

By early August, a change in the upper-air weather patterns finally brought drier conditions to most of the Midwest, and river levels began to drop slowly. The summary says, however, that the region is still extremely vulnerable to additional flooding. Soil remains saturated, levees are weakened and hundreds of miles of the Missouri and Mississippi Rivers and their tributaries are expected to remain above flood stage for several more weeks.

Hot and Dry in June

In contrast, hot and dry weather since June 1 enveloped much of the Southeast and the Atlantic Coast, producing moderate to extreme drought conditions, particularly in Alabama, Georgia, the Carolinas, Virginia, Delaware and eastern Maryland.

During the past two months, much of the Southeast received less than 50 percent of its normal rainfall, while temperatures averaged 3-5 degrees F above normal, intensifying the dryness.

Silver Spring Child Care Center to Open

Little Explorers and NOAA are pleased to announce that Bright Horizons Children's Centers will operate a child care center on-site at the NOAA campus in Silver Spring. Bright Horizons is an organization based in Cambridge, Massachusetts and specializes in work-site child care programs. Bright Horizons was named the leading work-site child care organization in the country by Child Care Information Exchange (Sept. 1991), and has received national

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NOAA NOW is a monthly supplement to **NOAA REPORT**, produced by NOAA Public Affairs, Washington, Tim Tomastik, *acting director*

Sub-Tracking Detects Deep-Sea Volcanic Eruption

Using a military system designed to track submarines, NOAA scientists have become the first to detect, locate, monitor and verify the eruption of a deep-sea volcano.

The volcanic eruption 270 miles off the northern Oregon coast was detected June 26 by NOAA Hydrothermal Vents Program researchers in Newport, Ore., using real-time data from the U.S. Navy's submarine hydrophone surveillance system. The eruption continued sporadically for several days.

Although deep-sea eruptions account for more than 80 percent of the earth's volcanic activity, until now scientists could not detect, locate or monitor them or confirm deep-sea eruption activity. While the effects of deep-sea volcanoes on ocean chemistry and temperature are known to be significant, they have never before been quantified.

At NOAA's request, scientists aboard the Canadian Survey Ship *Tully*, who happened to be conducting marine surveys in the area of eruption, sampled a water column above the volcano July 1-3.

On July 9, the NOAA Ship *Discoverer* arrived on the scene with the Canadian remotely operated vehicle *ROPOS* and confirmed the eruption. *ROPOS* was used to photograph and sample the recently solidified lava flow and measure the water column above the volcano.

Boy Scouts Qualify for NOAA Merit Badges

In keeping with a tradition spanning two decades, the National Oceanic and Atmospheric Administration will be exhibiting at this year's National Boy Scout Jamboree. Since its inception in 1970, NOAA has participated in every subsequent Jamboree.

At this year's Jamboree, held August 4-10 at Fort A.P. Hill near Fredericksburg, Va., and billed as "A Bridge to the Future," NOAA awarded a special badge to Boy Scouts who successfully complete the NOAA training offered at the NOAA exhibition area.

"The Boy Scout Jamboree provides NOAA with a unique opportunity to stimulate the interest of these exceptional young men in scientific research and stewardship of our natural resources," said D. James Baker, NOAA administrator. "I am delighted that we are an active participant in this effort to educate our young people about the applications of science and conservation to our global community."

NOAA officials anticipate that about 3,000 of the estimated 35,000 Boy Scouts attending the Jamboree will attend the NOAA training. To qualify for the NOAA badge, Scouts will attend ten-minute seminars describing the research and conservation missions of each of NOAA's five line offices. After each seminar, Scouts will be tested on the material presented; those passing the test will qualify for the NOAA badge. This award can be applied towards obtaining Boy Scout merit badges in environmental and science areas.

Commercial Salmon Season to Open Off Calif.

Commercial fishing for 7,400 chinook salmon will be allowed in federal waters south of Point Arena, Calif., for 25 days in September under an emergency rule.

Commercial fishermen will be able to fish and land their catch from Point Arena, Calif., south to the U.S.- Mexico border starting September 6 through September 30, or until the quota of 7,400 chinook salmon is reached.

"This measure will provide some relief to the commercial salmon fishermen without adversely impacting this valuable resource," said Doug Hall, NOAA's Deputy Administrator.

The September season will provide commercial fishermen the opportunity to catch additional salmon and increase the 1993 salmon season value by nearly $250,000 while still complying with the spawning escapement goals for fall chinook salmon in the Klamath and Sacramento rivers.

During this season, all salmon caught south of Point Arena must be landed south of Point Arena and will be counted toward the quota. Additionally, all current 1993 size limits and fishing gear restrictions apply to this area. The ban on fishing for coho salmon continues and the winter chinook conservation zone #3 remains closed.

Child Care Center in Silver Spring to Open

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recognition for quality programming through accreditation by the National Academy of Early Childhood Programs. Bright Horizons operates more than 53 work-site child care centers for corporations, hospitals, and governments on the East Coast and in the Midwest. Please watch for meeting announcements and newsletter information. The facility is slated to open September 1993.

National Oceanic and Atmospheric Administration

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