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WestFAST News

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Chair – Roger Gorke; Federal Liaison Officer – Heather Hofman

NIDIS Launches New Interactive Maps on Drought.gov

NOAA/NIDIS 8/10/21

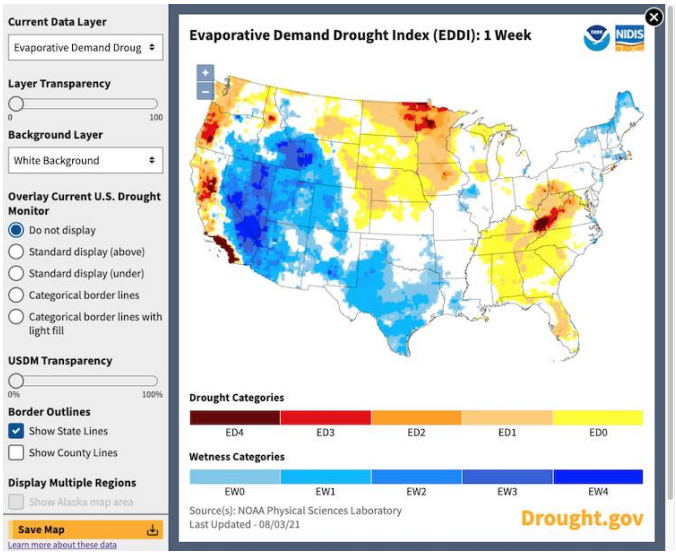
The National Integrated Drought Information System (NIDIS) is pleased to announce two new interactive features on Drought.gov that will make it easier for decision makers and the public across the U.S. to share timely, reliable drought information. These new maps further the goal of making Drought.gov a one-stop shop for data, decision-support products, and resources.

First, new customization and sharing options for all maps make it easier than ever to create custom, high-quality maps to include in drought or risk mitigation plans, share on social media or in media briefings, communicate with stakeholders, or report on drought impacts across the United States. Second, interactive economic sector maps that show sector-specific information alongside key drought and climate indicators provide vital information for private and public sector decision makers to monitor, plan for, and mitigate the impacts of drought.

Together, these new communication tools will help decision makers and the public respond to the current drought, prepare for future drought conditions, and improve the nation's long-term drought resilience. These tools were launched in collaboration with NOAA's National Centers for Environmental Information.

Interactive, Customizable Maps for Easy Sharing
All maps throughout Drought.gov now have new customization options, allowing users to zoom in on any map to view local conditions and to download high-quality, shareable map images. Users can click the download icon in the top left corner of any map to view a larger, interactive version, which they can customize, download, and share, plus:

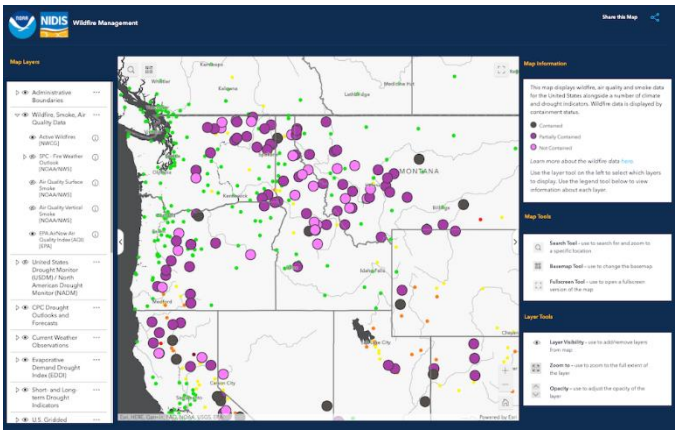
- Zoom in to your geographic region
- View any map layer alongside the current U.S. Drought Monitor
- Add state or county boundary lines, or change the background map layer
- Adjust the transparency of map layers
- Display Alaska, Hawaii, and Puerto Rico conditions alongside the contiguous U.S.
- Download a high-quality map image



New Interactive Sector Maps

In addition to the enhanced map features, NIDIS also worked with NCEI to launch new interactive sector maps in the "By Sector" section of Drought.gov. On each sector page, users can click the gold button to "View Interactive Map" to view the new interactive sector maps.

These GIS maps display data for different economic sectors—from agriculture to water utilities to public health—alongside key climate and drought indicators from partners across government, academia, and the private sector.



Wildfire Management Sector Map on Drought.gov, displaying active wildfires from the National Wildfire Coordinating Group alongside air quality data from the Environmental Protection Agency.
With these interactive maps, users can:

- View current conditions and/or forecasts for drought indices, precipitation, soil moisture, water supply, evaporative demand, and more
- View drought conditions and impacts side by side (e.g., drought and wildfires)
- Easily compare data at different timescales, such as 7-day, 14-day, and 28-day average streamflow conditions
- Adjust the transparency of map layers and change the basemap
- Add boundary lines for states, counties, tribal nations, watersheds, and congressional districts

For example, the Wildfire Management Sector map allows decision makers to view up-to-date active wildfire information alongside drought indicators, fire weather outlooks, air quality and smoke data, and more. This can provide vital information about drought impacts and inform future planning.

Drought is a significant threat to communities and businesses across the nation, with unique challenges, cascading impacts, and associated hazards. These new tools for visualizing and communicating drought are just one way that NIDIS is working with partners to provide accurate, timely, and integrated information on drought conditions and associated risks to facilitate proactive decision making.

Want to learn more about these two new features? Watch this short video on the new map customization options throughout Drought.gov and the new interactive sector maps. Or, reach out to the U.S. Drought Portal team with questions or feedback at drought.portal@noaa.gov.

International report confirms 2020 was among three warmest years on record

NOAA 8/25/21

Courtesy of Pixabay.com

A new *State of the Climate* report confirmed that 2020 was among the three warmest years in records dating to the mid-1800s, even with a cooling La Niña influence in the second half of the year. New high temperature records were set across the globe. The report found that the major indicators of climate change continued to reflect trends consistent with a warming planet. Several markers such as sea level, ocean heat content, and permafrost once again broke records set just one year prior. Notably, carbon dioxide (CO_2) levels in the atmosphere also reached record highs in 2020, even with an estimated 6%–7% reduction of CO_2 emissions due

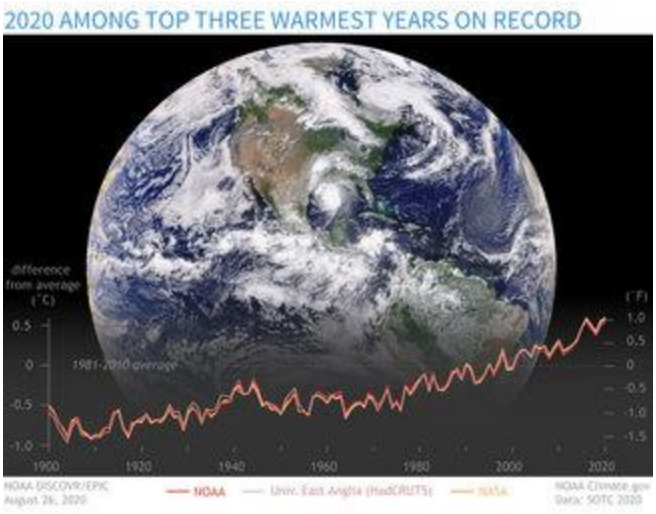
to the economic slowdown from the global pandemic.

These key findings and others are available from the *State of the Climate in 2020* report released online today by the American Meteorological Society (AMS). *It provides a detailed update on global climate indicators, notable weather events and other data*

The 31st annual issuance of the report, led by NOAA National Centers for Environmental Information, is based on contributions from more than 530 scientists from over 60 countries around the world and reflects tens of thousands of measurements from multiple independent datasets (highlights, full report). It provides a detailed update on global climate indicators, notable weather events and other data collected by environmental monitoring stations and instruments located on land, water, ice and in space.

The report's climate indicators show patterns, changes and trends of the global climate system. Examples of the indicators include various types of greenhouse gases; temperatures throughout the atmosphere, ocean, and land; cloud cover; sea level; ocean salinity; sea ice extent and snow cover. Report highlights include these indications of a warming planet:

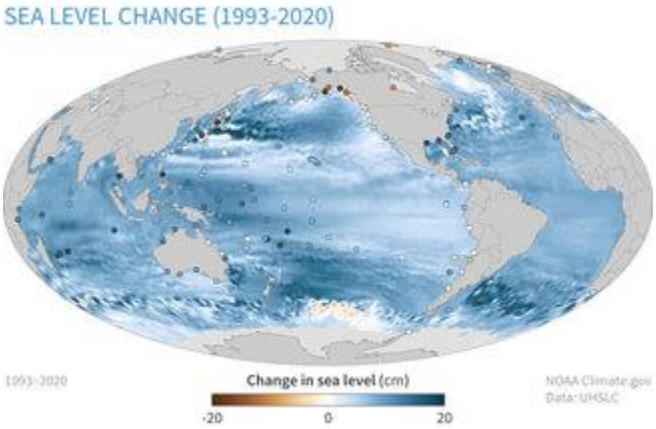
- Greenhouse gases were the highest on record. As they do each year, and again in the midst of a global pandemic that slowed economic activity around the world, the major greenhouse gas concentrations, including CO_2, methane (CH_4) and nitrous oxide, rose to new record high values during 2020. The global annual average atmospheric CO_2 concentration was 412.5 parts per million. This was 2.5 parts per million greater than 2019 amounts and was the highest in the modern 62-year measurement record and in ice core records dating back as far as 800,000 years. The year over year increase of methane (14.8 parts per billion) was the highest such increase since systematic measurements began.



- Global surface temperature was near-record high. Annual global surface temperatures were 0.97°–1.12°F (0.54°–0.62°C above the 1981–2010 average, depending upon the dataset used). This places 2020 among the three warmest years since records began in the mid- to late 1800s. This was the warmest year on record without the presence of El Niño. The seven warmest years on record have all occurred in the past seven years, since 2014. The global average surface temperature has increased at an average rate of 0.14°F (0.08°C) per decade since the start of the record; since 1981, the rate of increase has been more than twice as high.
- Upper atmospheric temperatures were record or near-record setting. In the region of the atmosphere just above Earth's surface, the globally averaged annual lower troposphere temperature equaled the record high of 2016. In the layer above that, the lower stratosphere temperature continued to decline, as expected in a warming world.
- Sea surface temperatures were near-record high. The globally averaged 2020 sea surface temperature was the third highest on record, surpassed only by 2016 and 2019, both of which were associated with El Niño conditions.
- Global upper ocean heat content was record high. Globally, upper ocean heat content reached record highs in 2020 in the upper layer measured from the surface to 2,300 feet (700 meters), according to four of the five datasets analyzed in the report. This record heat reflects the continuing accumulation of thermal energy in the top 2,300 feet of the ocean. Ocean heat content

was also record high in the deeper layer beneath, from 700 to 2,000 meter depth, according to all five datasets. Oceans absorb more than 90% of Earth's excess heat from global warming. The warmer upper ocean waters can drive stronger hurricanes and increase melting rates of ice sheet glaciers around Greenland and Antarctica.

- Global sea level was highest on record. For the ninth consecutive year, global average sea level rose to a new record high and was about 3.6 inches (91.3 millimeter) higher than the 1993 average, the year that marks the beginning of the satellite altimeter record. Global sea level is rising at an average rate of 1.2 inches (3.0 centimeter) per decade due to changes in climate. Melting of glaciers and ice sheets, along with warming oceans, account for the trend in rising global mean sea level.



- Oceans absorbed a record amount of CO_2.The ocean absorbed about 3.0 billion metric tons more CO_2 than it released in 2020. This is the highest amount since the start of the record in 1982 and almost 30% higher than the average of the past two decades. More CO_2 stored in the ocean means less remains in the atmosphere, but this also leads to increasing acidification of the waters, which can greatly harm or shift ecosystems.

The report also documents key regional climate and climate-related events.

- The Arctic continued to warm; minimum sea ice extent was near-record low.*The Arctic continues to warm at a faster pace than lower latitudes* The annual mean surface air temperature for the Arctic land areas was the highest in the 121-year record, at 3.8°F (2.1°C) above the 1981–2010 average. This was the seventh straight year with an annual temperature more than 1°C higher than the 1981–2010 average. On June 20, a temperature of 38°C was observed at Verkhoyansk, Russia (67.6°N), provisionally the highest temperature ever measured within the Arctic Circle. The Arctic continues to warm at a faster pace than lower latitudes. With the warmth came fires. The Arctic experienced its highest fire year in terms of the amount of carbon released into the atmosphere, surpassing the record set in 2019 by 34%. The majority of the fires occurred in northeastern Siberia where abnormally high temperatures also occurred. In March, when sea ice reached its annual maximum extent, thin, first-year ice comprised ~70% of the ice; the thickest ice—usually more than four years old—had declined by more than 86% since 1985 to make up just 2% of total ice in 2020. When the minimum sea ice extent was reached in September, it was the second smallest in the 42-year satellite record, behind 2012. The Northern Sea Route along the Siberian coast was open for about 2.5 months, from late July through mid-October, compared to less than a month typically.
- Antarctica saw extreme heat and a record-long ozone hole. Extreme warmth was observed across parts of Antarctica during austral summer, contributing to a major heat wave. On February 6, Esperanza Station reached 64.9°F (18.3°C), the highest temperature ever recorded on the continent, surpassing the previous record set in 2015 by 2.0°F (1.1°C). The warmth also led to the largest late-summer surface melt event in the 43-year record, affecting more than 50% of the Antarctic Peninsula and impacting elevations as high as 1,700 meters. Later in the year, the Antarctic polar vortex was unusually strong and persistent, with polar temperatures in the stratosphere at record low levels throughout November and December. This strong vortex was linked to the longest-lived ozone hole over the Antarctic region, which lasted to the end of December. Record-low ozone values in late

austral spring and early summer led to unusually high levels of UV radiation across the Antarctic region.

- Tropical cyclones were well-above average overall. There were 102 named tropical storms during the Northern and Southern Hemisphere storm seasons, well above the 1981–2010 average of 85. Three tropical cyclones reached Saffir–Simpson scale Category 5 intensity. The North Atlantic hurricane basin recorded a record 30 named storms, surpassing the previous record of 28 in 2005. Seven of those storms became major hurricanes, matching 2005 for a record number. Major Hurricanes Eta and Iota made landfall along the eastern coast of Nicaragua in nearly the same location within a two-week period, impacting over seven million people across Central America. In the western North Pacific, Super Typhoon Goni was the strongest tropical cyclone to make landfall in the historical record and led to the evacuation of almost one million people in the Philippines. Very Severe Cyclonic Storm Gati made landfall over Somalia, the first storm of such intensity to do so.

Selected significant climate anomalies and events in 2020 (Credit: NOAA NCEI)

Geographical Regional Highlights
Additional geographical regional highlights include:

- North America
    - Mexico reported its warmest year in its 49-year record, tied with 2017 and 2019.
    - The contiguous United States reported its fifth-warmest year. Alaska reported its coolest year since 2012, although it was still warmer than its 1981–2010 average. The annual temperature for Alaska has increased at an average rate of 0.50°C per decade over the past half century.
    - Most of Mexico was drier than average in 2020 due to the late onset of a weak North American Monsoon and a lack of tropical cyclones on the Pacific side. The United States was dominated by warm, dry air in the West and an active storm track that brought wet conditions to much of the East.In Canada, the Avalon Peninsula in Newfoundland was hit by a strong blizzard with hurricane force winds in January. The storm contributed to the snowiest January on record for Saint John's.

The *State of the Climate in 2020* is the 31st edition in a peer-reviewed series published annually as a special supplement to the *Bulletin of the American Meteorological Society*.

New trial for using advanced weather forecasts to retain more water proves successful

ACOE 8/25/21

Aerial view of the Prado Dam (Photo courtesy of the Orange County Water District)

U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER

As drought persists in the state of California, the need to increase water supply reliability is an essential issue facing water managers.

A new report evaluating a pilot program to use advanced weather and streamflow forecasts to enhance water storage capabilities at a Riverside County, California, dam found that enough water could be conserved to supply an additional 60,000 people per year.

The pilot program, called Forecast-Informed Reservoir Operations (FIRO), led by research meteorologists from the Center for Western Weather and Water Extremes at UC San Diego's Scripps Institution of Oceanography, found that 7,000 acre-feet per year of stormwater could potentially be added to groundwater recharge in Orange County. One acre-foot is equivalent to about 325,000 gallons. The program was supported by a combination of funds from the U.S. Army Corps of Engineers (USACE), Orange County Water District, and the California Department of Water Resources (DWR).

"We are excited to partner with Scripps and the USACE on this project, which increases water supply and reliability for the region," said Orange County Water District President Steve Sheldon. "Local stormwater capture is important because it lessens demand on imported water supplies, which are more costly and less reliable than groundwater."

The district manages the Orange County Groundwater Basin, which provides 77 percent of the water supply to 2.5 million people in north and central Orange County. It also manages a six-mile stretch of the Santa Ana River between Prado Dam and its recharge basins in Anaheim.

"The Prado Dam FIRO project is an example of the continued partnerships between state, federal and local agencies. The FIRO program has shown that by better utilizing emerging technologies in observations and forecasts to create an adaptive strategy, we can improve water management, not only during the wet years, but during drought conditions as well," said Kris Tjernell, DWR's Deputy Director for Integrated Watershed Management. "This type of project perfectly aligns with the goals described in the Governor's Water Resilience Portfolio and is also the type of multi-benefit project that uses common sense approaches, combined with the latest science, to embrace innovation and new technologies, and increase resilience to climate change."

Prado Dam was constructed in 1941 by USACE for flood risk management with a secondary use of stormwater capture for water supply. Many dams in the west, including Prado Dam, are regulated by USACE-issued water control manuals, which do not take advantage of modern precipitation and streamflow forecasting capabilities.

FIRO is a research and operations partnership that uses data from watershed monitoring, and modern weather and hydrologic forecasting, specifically the study of atmospheric rivers, to help water managers selectively retain or release water from reservoirs in a manner that reflects current and forecasted conditions.

"Atmospheric river storms cause 25 to 50 percent of annual precipitation in key parts of the west, which can replenish water supply, but can also lead to hazardous and costly flooding," said research meteorologist Marty Ralph, director of the Center for Western Weather and Water Extremes. "When atmospheric rivers make landfall, they can release a staggering amount of rain and snow; however, their absence can lead to drought."

The science of forecasting atmospheric rivers has continued to advance. Research conducted by Scripps Oceanography includes atmospheric and soil moisture observations; data collection over the Pacific Ocean, including measurements from buoys and dropsonde deployments into approaching storms; and advanced modeling that allows for better assessment of uncertainty in forecasts.

Using models to simulate reservoir operations under FIRO conditions, the assessment found that temporarily storing water to higher elevations can enhance groundwater recharge. The improvements in atmospheric river forecasts show high reliability at up to five days' lead time, which allows dam operators to make timely water releases and could enhance flood-risk management.

"Completion of the preliminary viability assessment for Prado Dam is an important milestone for the U.S. Army Corps of Engineers as it builds our understanding of how to safely and effectively implement this important policy change across the agency," said Cary A. Talbot, a division chief at the U.S. Army Engineer Research and Development Center and FIRO program manager for the Corps.

"FIRO pilot sites like Prado Dam add to our agency's ability to find a better balance between flood-risk management, water supply and ecological benefits, and makes us more resilient for the challenges of a changing climate."

The USACE's Los Angeles District, which maintains Prado Dam, agreed with the potential for FIRO to enhance operations.
"For several decades, Prado Dam has served its purpose well," said David Van Dorpe, deputy district engineer for USACE Los Angeles District. "The dam has reduced the flood risk for Orange County, while also balancing water conservation, ecological and recreational benefits. FIRO provides an opportunity to further enhance our operations to meet all of these needs."

The report comes on the heels of the successful final viability assessment at Lake Mendocino earlier this year, with FIRO operations that resulted in 20 percent increased water. USACE and the Center for Western Weather and Water Extremes also are actively assessing FIRO opportunities in other watersheds where atmospheric rivers are dominant, including New Bullards Bar Reservoir in Yuba County, California, Lake Oroville in Butte County, California, as well as the Howard Hanson Dam near Seattle, Washington.

Upcoming Meetings

The New Drought.Gov: Advancing Drought Resilience Through Innovation and Collaboration
WestFAST Webinar 9/08/21 10 am – 11 am MT

WSWC Fall 2021 (197th) Meetings
WSWC 9/14-16/21

Other Federal News

EPA 8/2/21. EPA Releases Dredged Material Decision Tool to Help with Sediment Disposal Decisions

NOAA 8/3/21. Larger-than-average Gulf of Mexico 'dead zone' measured

NOAA 8/9/21. Statement from NOAA Administrator Rick Spinrad on new IPCC report

NOAA 8/9/21. U.S. West hit with extreme heat, drought and unrelenting wildfires in July

NPS 8/10/21. National Park Service grants $16 million to bolster locally led conservation and recreation improvements in 13 states

NOAA 8/13/21. It's official: July was Earth's hottest month on record

EPA 8/16/21. EPA Receives 50 New Requests for WIFIA Financing Totaling Over $8 Billion

USGS 8/17/21. Next Generation Monitoring Location Pages Go Live Soon!

BOR 8/21/21. Reclamation awards $5.5 million to 82 water improvement projects in 16 western states

EPA 8/25/21. EPA Announces $25 Million in Grants to Improve Drinking Water Quality for Underserved, Small, and Disadvantaged Communities

FWS 8/30/21. Interior Announces Largest Expansion of Fishing and Hunting on U.S. Fish and Wildlife Managed Lands and Waters

NOAA 8/31/21. NOAA announces aquaculture literacy mini-grant awardees

People

DOI 8/18/21. White House Announces Nomination of Charles F. Sams III as National Park Service Director