

# National Environmental Satellite, Data, and Information Service (NESDIS)

# Why Now? More Disasters, Greater Severity

## KEEPING US SECURE

The estimated value of NASA and NOAA information services to the U.S. Navy's operational effectiveness is **\$2 billion** per year.

The U.S. Navy and other U.S. defense agencies partner with NASA and NOAA to use satellites data, to access operational services, and to leverage their scientific progress.

## MITIGATING NATURAL DISASTERS

Extreme weather and fires have cost the federal government more than **\$350 billion** over the past decade.

Satellite measurements play a critical role in tracking the paths of hurricanes and wildfires so that we can warn populations at risk, assess the damages, and avoid future costs.

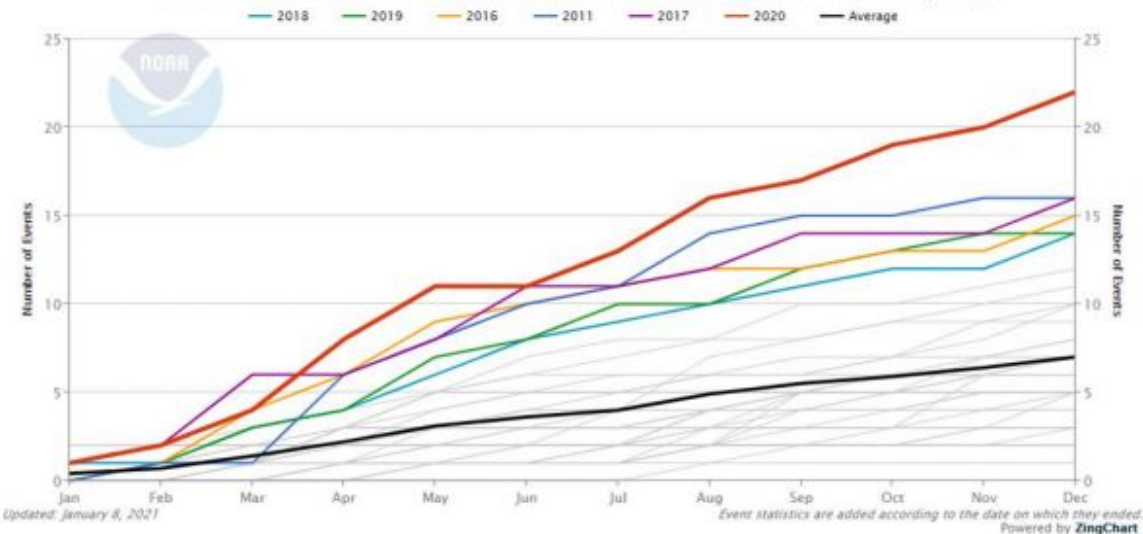
## ENSURING RESOURCE AVAILABILITY

Advanced technology, including many types of Earth information will unlock up to **\$1.6 trillion** in economic savings for energy generation and use by 2035.









Satellite observations can also help ensure water availability, which is particularly important to the 20% of the world now living in areas of water scarcity.

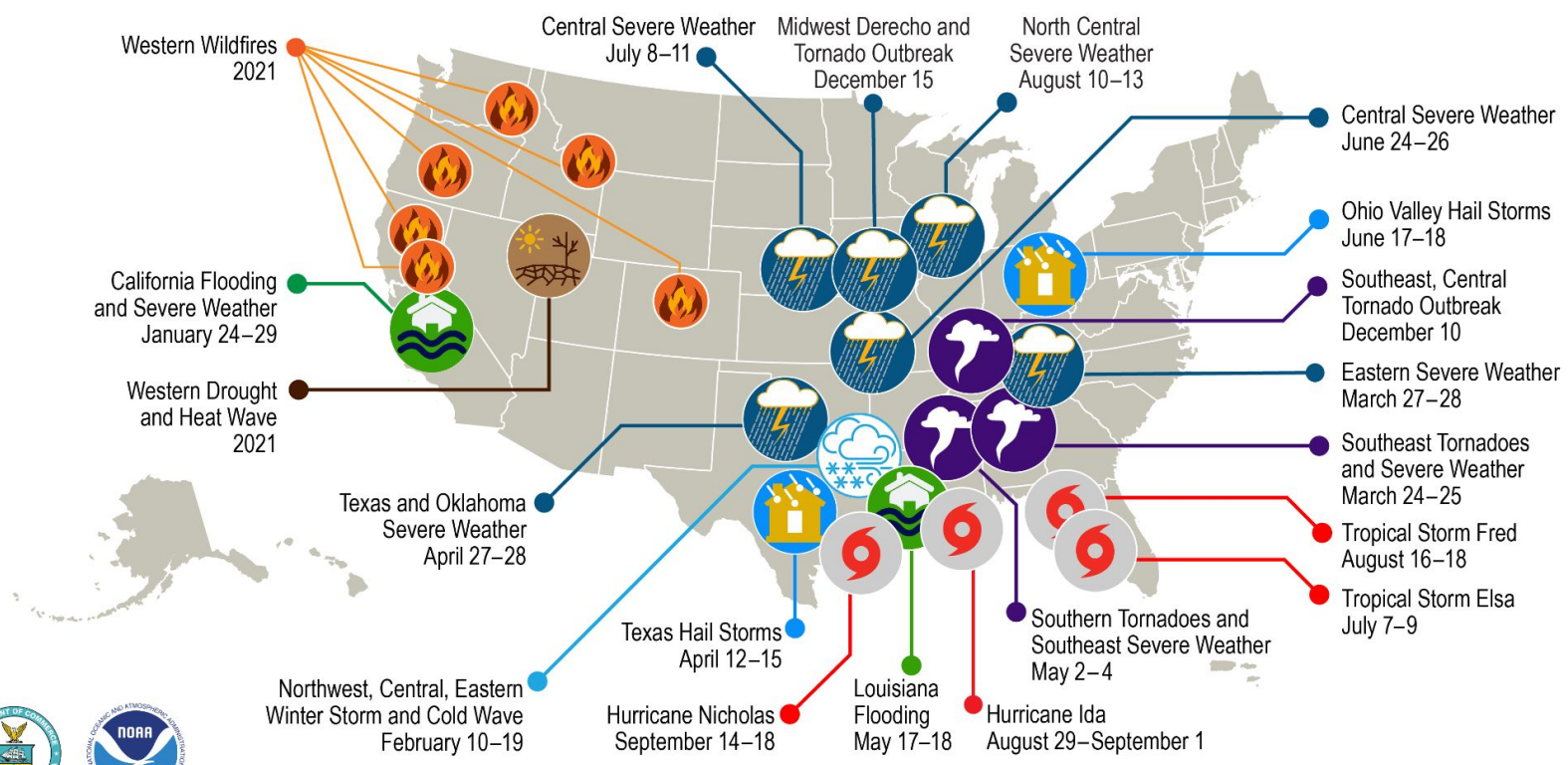
NOAA's Earth observations add a **value of \$315 billion** to the nation's economy, protecting and improving weather-vulnerable industries such as farming, shipping, and utilities.

1980-2020 Year-to-Date United States Billion-Dollar Disaster Event Count (CPI-Adjusted)



# U.S. 2021 Billion-Dollar Weather and Climate Disasters

-  Drought/Heat Wave
-  Flooding
-  Hail
-  Hurricane
-  Tornado Outbreak
-  Severe Weather
-  Wildfire
-  Winter Storm/Cold Wave

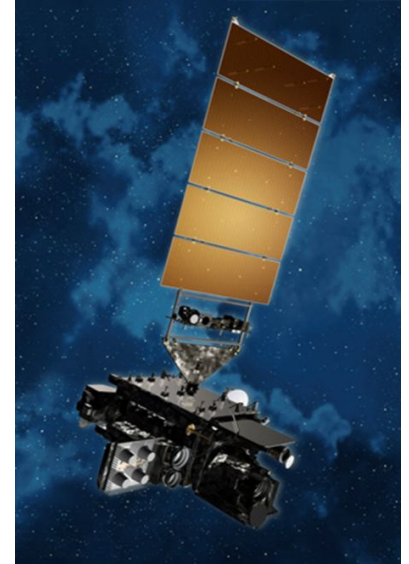


This map denotes the approximate location for each of the 20 separate billion-dollar weather and climate disasters that impacted the United States in 2021



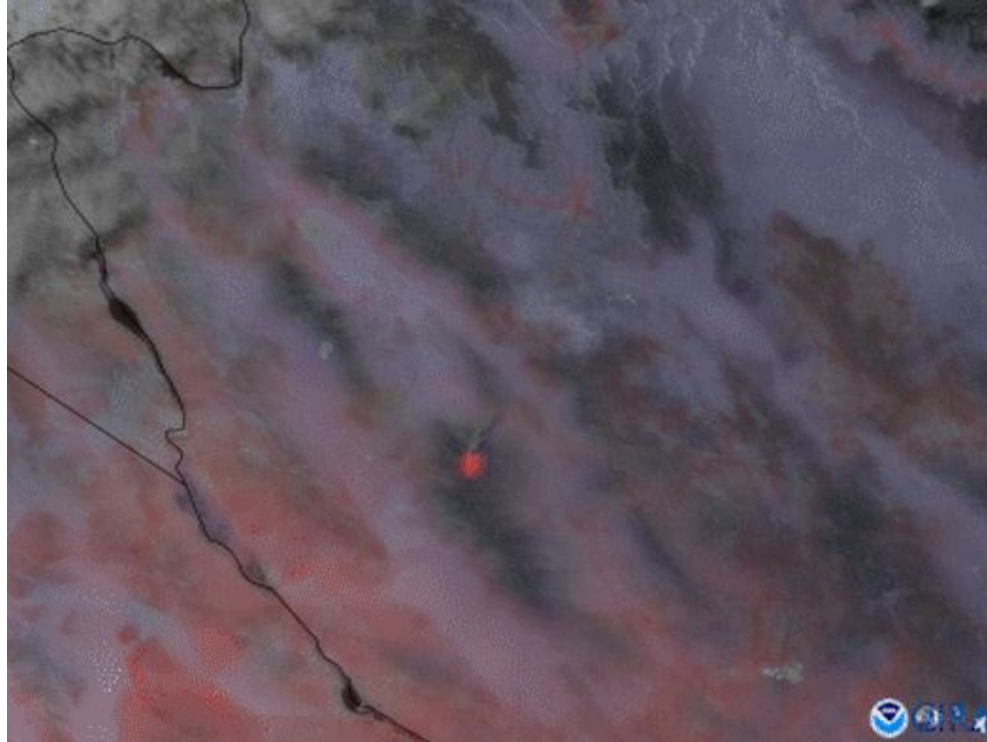
# National Security, Safety, and Prosperity

- NESDIS operates the Nation's weather satellites, 24/7
- Acquires next-generation satellites to observe the Earth
- Provides data and imagery for environmental and atmospheric modeling
- Assesses the U.S. and global climate
- Maintains one of the most significant archives of environmental data on Earth



95 percent of the data used in weather forecast models come from satellites.

# We are a trusted source of environmental information for the United States...

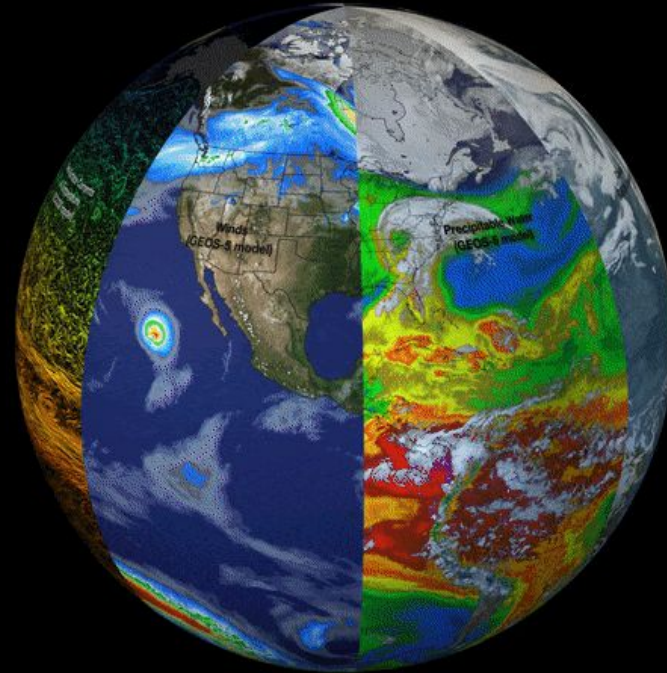


Satellite imagery of the April 2021 Flag Fire in Arizona. (GOES West)

# ... with a global perspective

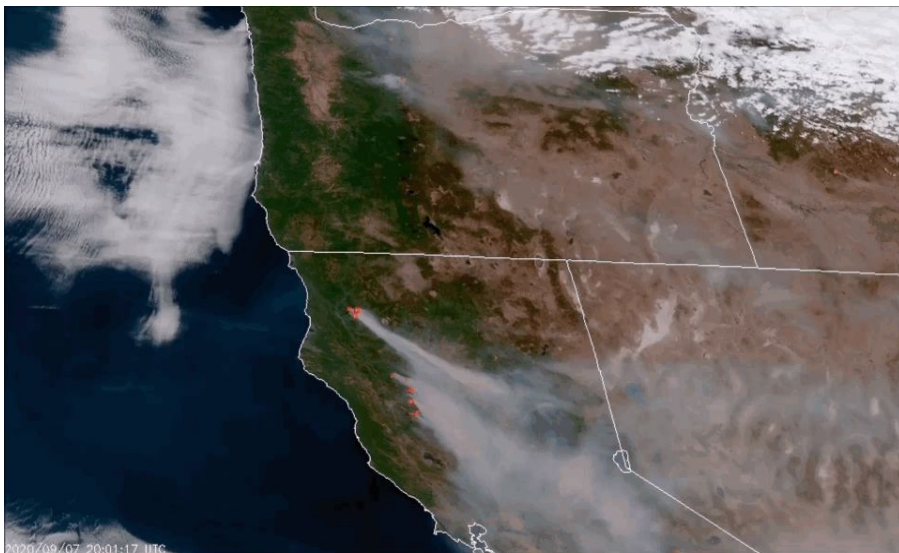
## NESDIS Mission

Provide a truly integrated digital understanding of our earth environment that can evolve quickly to meet changing user expectations by leveraging our own capabilities and partnerships



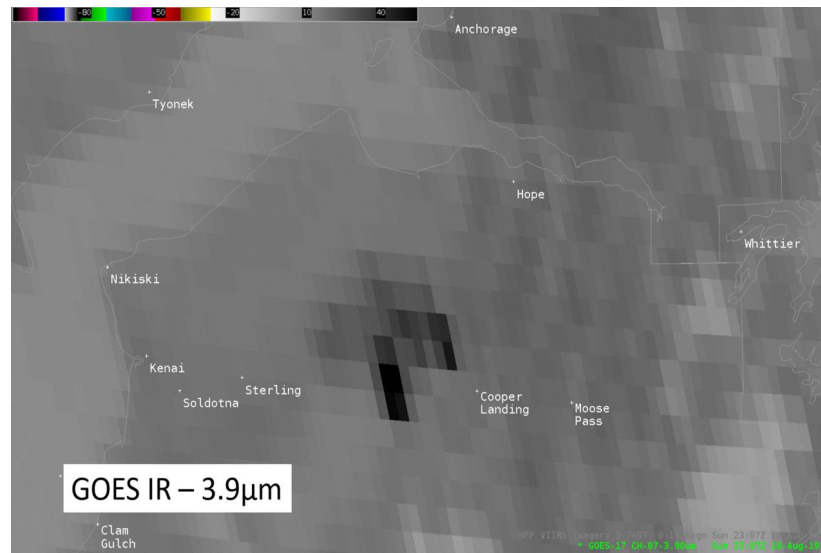
# NOAA Satellite Capabilities

## GOES-R Series - Geostationary



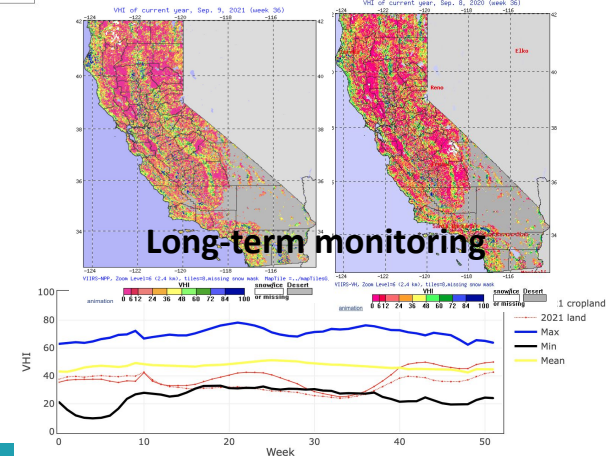
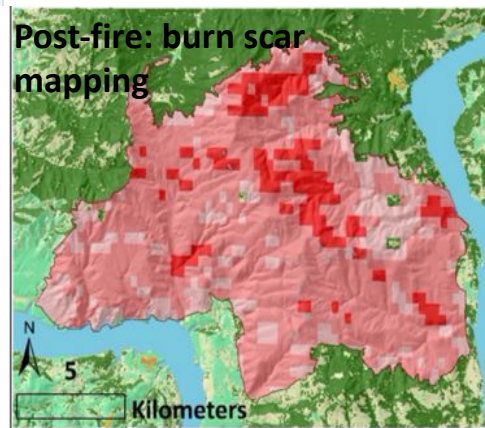
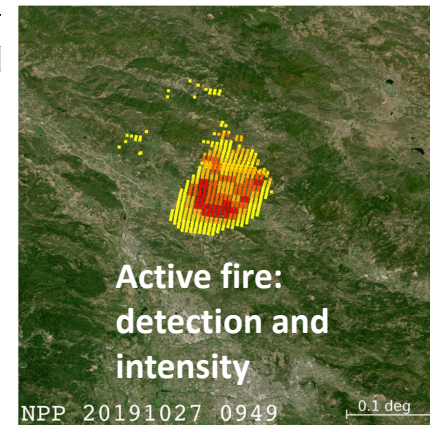
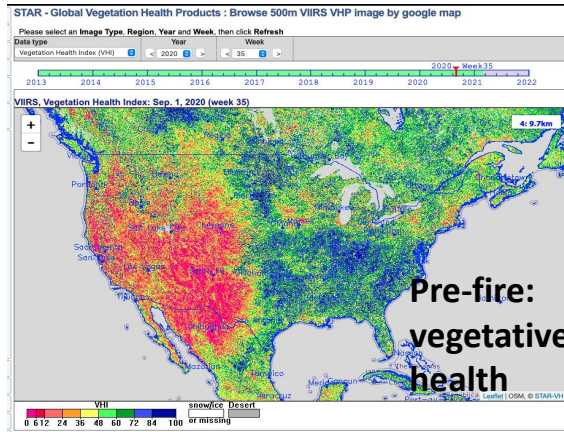
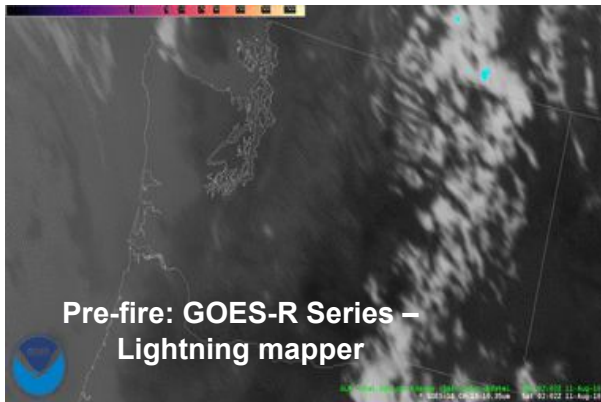
Oregon and California Fires, September 7 – 9, 2020  
GOES-East and West provides nearly continuous observations of fires at a 2-3 km resolution (function of latitude ~6 km in central Alaska)

## JPSS Series - Polar orbiting



Spatial resolution is important - JPSS polar orbiting satellites are particularly critical for higher latitudes - Next generation GEO-XO will improve GOES-R spatial resolution by 4X

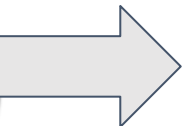
# NOAA Satellites for Fire Information



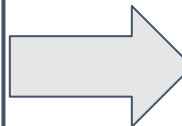


# Future: Dedicated Wildfire Information System

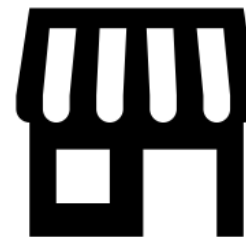
Single or multi-source GEO or LEO satellite data + supplemental data



NOAA/NESDIS Wildfire Information System



NOAA/NESDIS Wildfire Storefront



Event-based product access



# Fire Information Needs of the Insurance Industry

- What products or information are you looking for that we have NOT presented?
- Are there any research questions that would help the insurance industry better incorporate the drought context?
- How can insurance products be developed and utilized to better build resilience to fire? Do you have incentives for actions to minimize fire risk?
- Would you be interested in having a smaller follow up discussion to inform NESDIS Fire Program investments in support of the Insurance Industry?

# Data Access



# NESDIS Operational Active fire products: geostationary

- Geostationary Operational Environmental Satellite – R (GOES-R): Advanced Baseline Imager (ABI)
  - GOES-16 (East); GOES-17 and GOES-18 (West)
  - 2km (at sub-satellite point) Fire Detection and Characterization (FDC)
  - full fire mask (fire detections, with confidence classes, clear land, water, cloud, etc.); fire radiative power (FRP)
  - Full Disk: 10 min; Conterminous / Pacific US (CONUS / PACUS): 5 min; Mesoscale: 30 or 60 sec

- Data access

- Amazon Web Services

<https://noaa-goes16.s3.amazonaws.com/index.html>

<https://noaa-goes17.s3.amazonaws.com/index.html>

- NOAA CLASS (Comprehensive Large Array – Data Stewardship System): GOES-R Series ABI Products (GRABIPRD) -> Fire/Hot Spot Characterization

<https://www.avl.class.noaa.gov/saa/products/welcome>

- NOAA Hazard Mapping System (pre-screened fire data and visualization)

<https://www.ospo.noaa.gov/Products/land/hms.html>

- NOAA AerosolWatch: visualization (including aerosol/smoke products)

<https://www.star.nesdis.noaa.gov/smcd/spb/aq/AerosolWatch/>



GOES-16 ABI, August 31,  
2021

- Joint Polar Satellite System (JPSS): Visible Infrared Imaging Radiometer Suite (VIIRS)
  - Currently Suomi NPP and NOAA-20 (50 minutes apart on the 1:30 am/pm orbit); JPSS-2 -> NOAA-21 to be launched on 11/2/2022
  - 375m (updated; recommended); and 750m (MODIS heritage); daytime and nighttime; ~86 second granules
  - full fire mask (fire detections with confidence classes, clear land, water, cloud, etc.); fire radiative power (FRP); persistent anomaly flag (likely detection due to non-biomass burning sources of signal)

- Data access
  - NOAA CLASS (Comprehensive Large Array – Data Stewardship System): JPSS VIIRS Products (Granule)(JPSS\_GRAN) -> VIIRS Active Fires I-band (or M-band) EDR

<https://www.avl.class.noaa.gov/saa/products/welcome>

- NOAA Hazard Mapping System: pre-screened fire data and visualization

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- JSTAR Mapper: visualization of operational VIIRS fire products (and additional products)

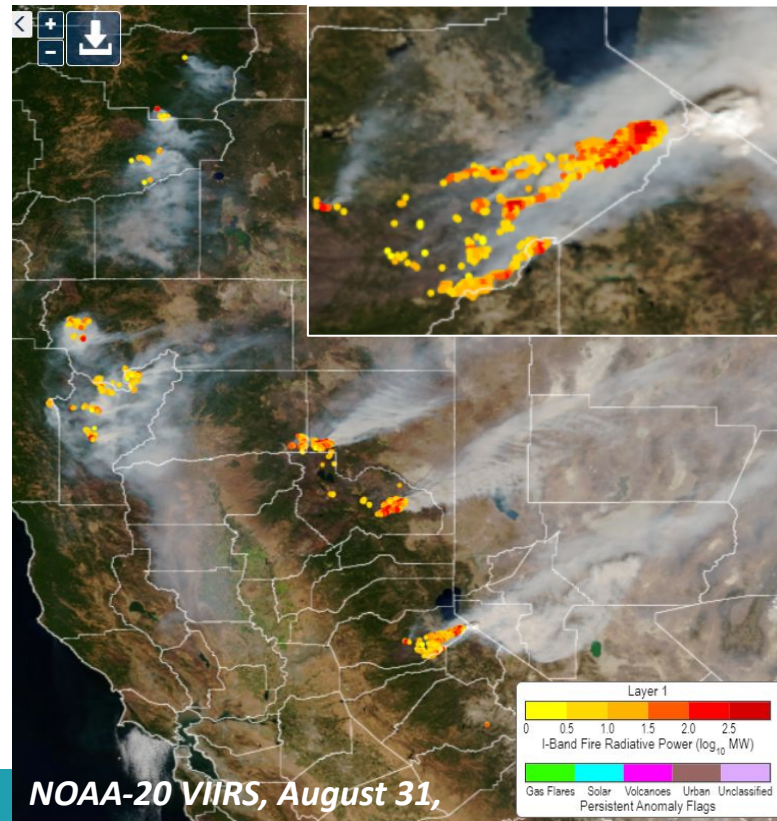
<https://www.star.nesdis.noaa.gov/jpss/mapper/>

- NOAA AerosolWatch: visualization (including aerosol/smoke products)

<https://www.star.nesdis.noaa.gov/smcd/spb/aq/AerosolWatch/>

- AWS access is forthcoming

# NESDIS Operational Active fire products: polar



NOAA-20 VIIRS, August 31,



# NESDIS Operational Products for pre- and post-fire assessment

- Vegetation Health / Drought / Fire Risk (16 km, 4km, 1km)

<https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/index.php>

- Evapotranspiration (2km)

[https://www.star.nesdis.noaa.gov/smcd/emb/droughtMon/products\\_droughtMon.php](https://www.star.nesdis.noaa.gov/smcd/emb/droughtMon/products_droughtMon.php)

- Soil Moisture

- NOAA Soil Moisture Products System (SMOPS; 0.25 x 0.25 degree grid)

- near-real-time: <https://www.ospo.noaa.gov/Products/land/smops/>
- archive: NOAA CLASS - Soil Moisture Operational Product System (SMOPS)

<https://www.avl.class.noaa.gov/saa/products/welcome>

- JPSS Land Environmental Data Records

- Annual Land Cover / Surface Type (1km)

<https://www.ncei.noaa.gov/metadata/geoportal/rest/metadata/item/gov.noaa.ncdc:C01472/html>

- Vegetation Indices, Land Surface Temperature (1km, 4km)

- NOAA CLASS - JPSS VIIRS Products (Non-Granule)(JPSS\_NGRN)

<https://www.avl.class.noaa.gov/saa/products/welcome>

