Summary of Natural Disasters Across NEON Sites with Aerial Remote Sensing Data

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NEON Airborne Observation Platform

Background: NEON remote sensing data is well suited for quantifying change due to natural disasters because repeat data are collected with the same sensors, at the same spatial resolution, and processed with consistent standardized algorithms. These data can be available prior to the natural disasters, which eliminates a common source of uncertainty that typically affects natural disaster monitoring. Often legacy data sets of poorer quality are necessarily introduced for pre-event landscape characterization.

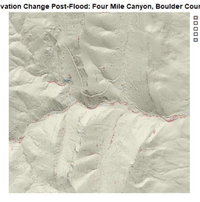
NEON Remote Sensing imagery at Yellowstone (YELL)
QR code: Blog on Natural Disasters at NEON sites

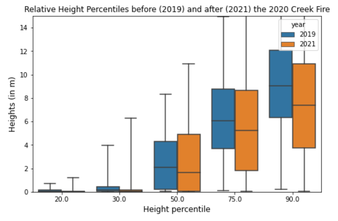
Educational Resources

Check out these tutorials and resources in R, Python, and Google Earth Engine (GEE) that highlight natural-disaster applications using NEON remote sensing data:

https://www.neonscience.org/resources/learning-hub/tutorials

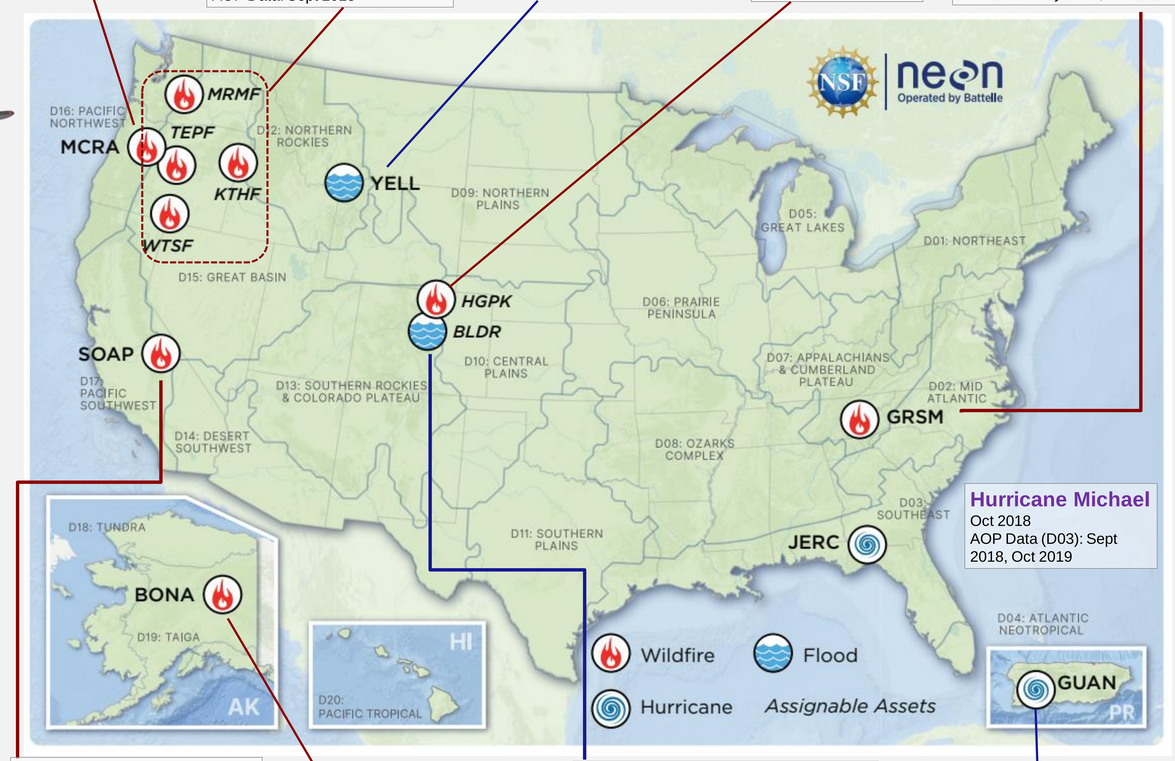
- 2013 Boulder Floods (R)
- 2016 Great Smokey Mountains Wildfire (GEE)
- 2020 Soaproot Saddle Wildfire (Python)
  NEON Data Skills Webinar March 26, 2024 →





Interactive GEE App - explore the spectral signatures of sites impacted by wildfires →

Natural Disasters Captured by NEON AOP



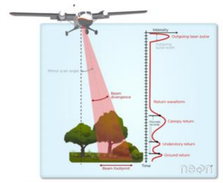
- **Data collected from 2012-2023**
- **Up to 8 years of repeat AOP data available at each NEON site**
- **Natural disaster events captured at 6 NEON sites + 6 other sites**

AOP Assignable Asset Flights

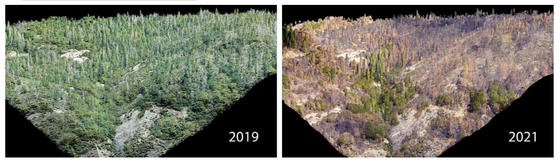
If you are interested in collecting AOP remote sensing data at another site, you can request this through NEON's Assignable Asset program.

Past examples – wildfires:
- High Park Fire (CO)
- BB-FLUX (Burned Biomass Flux) Rapid Response

Discrete and Waveform Lidar



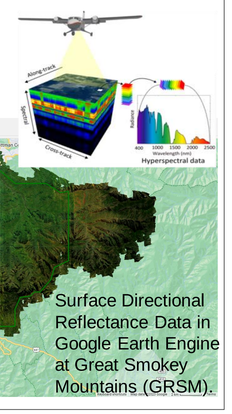
Lidar data provide structural information which is well-suited for characterizing large-scale ecosystem disturbances. Rasterized data products derived from the lidar point clouds include Digital Elevation, Terrain, and Canopy Height models. These make it simple to quantify tree-height and elevation differences before and after natural disasters.



Lidar point clouds colorized by camera imagery at the Soaproot Saddle (SOAP) site before and after the 2020 Creek Fire.

Hyperspectral Imagery

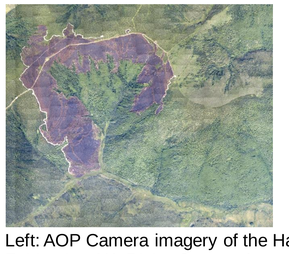
Hyperspectral data provide information about the chemical composition of vegetation. This facilitates mapping disturbances such as wildfire or drought, where spectral indices can be used as a proxy for burn severity, eg.

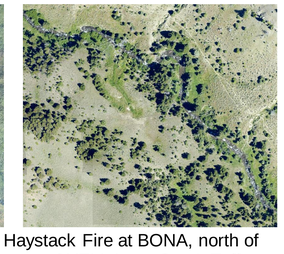


Surface Directional Reflectance Data in Google Earth Engine at Great Smokey Mountains (GRSM).

RGB Camera Imagery

AOP RGB (Red-Green-Blue) camera data are available at <10cm resolution and provide contextual information at the individual plant scale.





Left: AOP Camera imagery of the Haystack Fire at BONA, north of Fairbanks, AK. Right: Camera Imagery of YELL Lava Creek Tuff.

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