SDG&E Weather Technology

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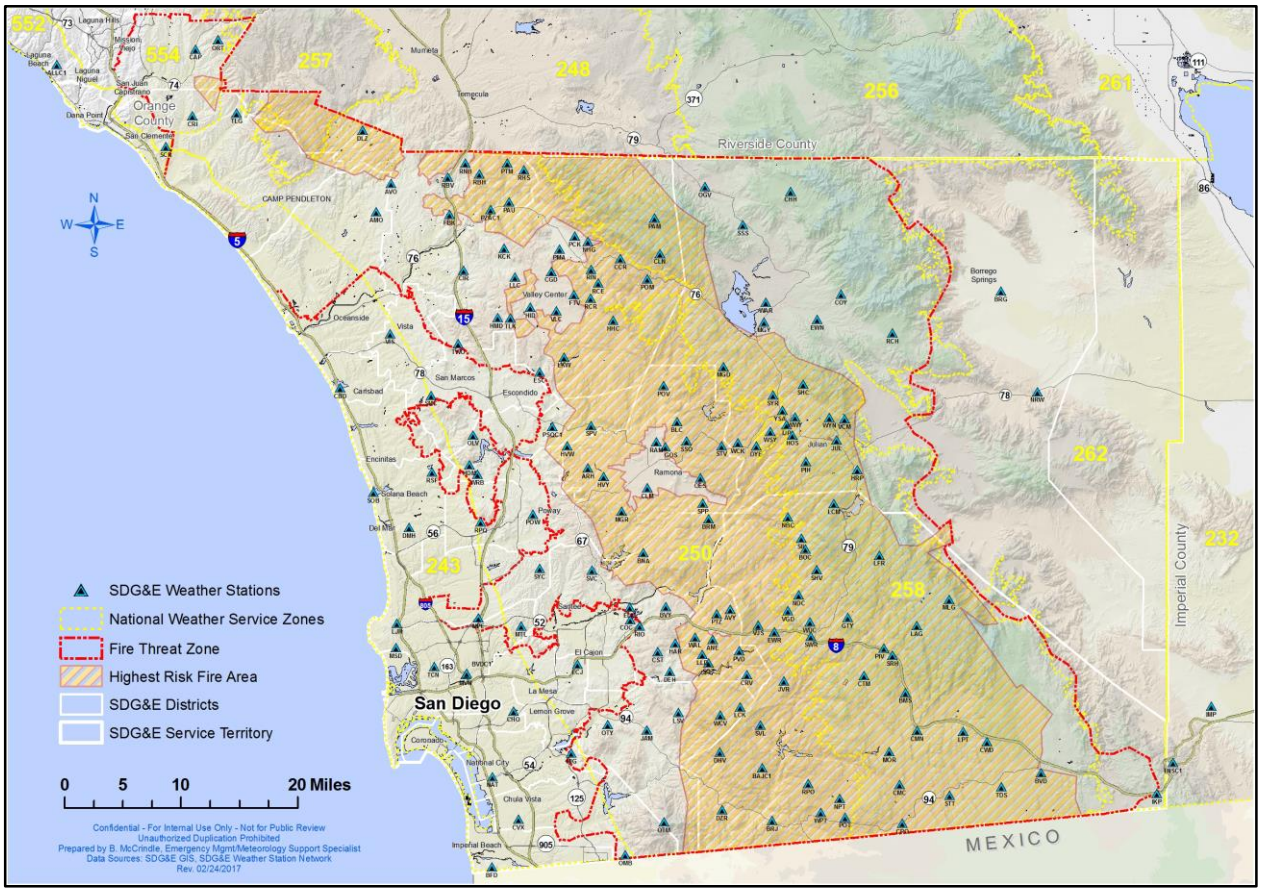
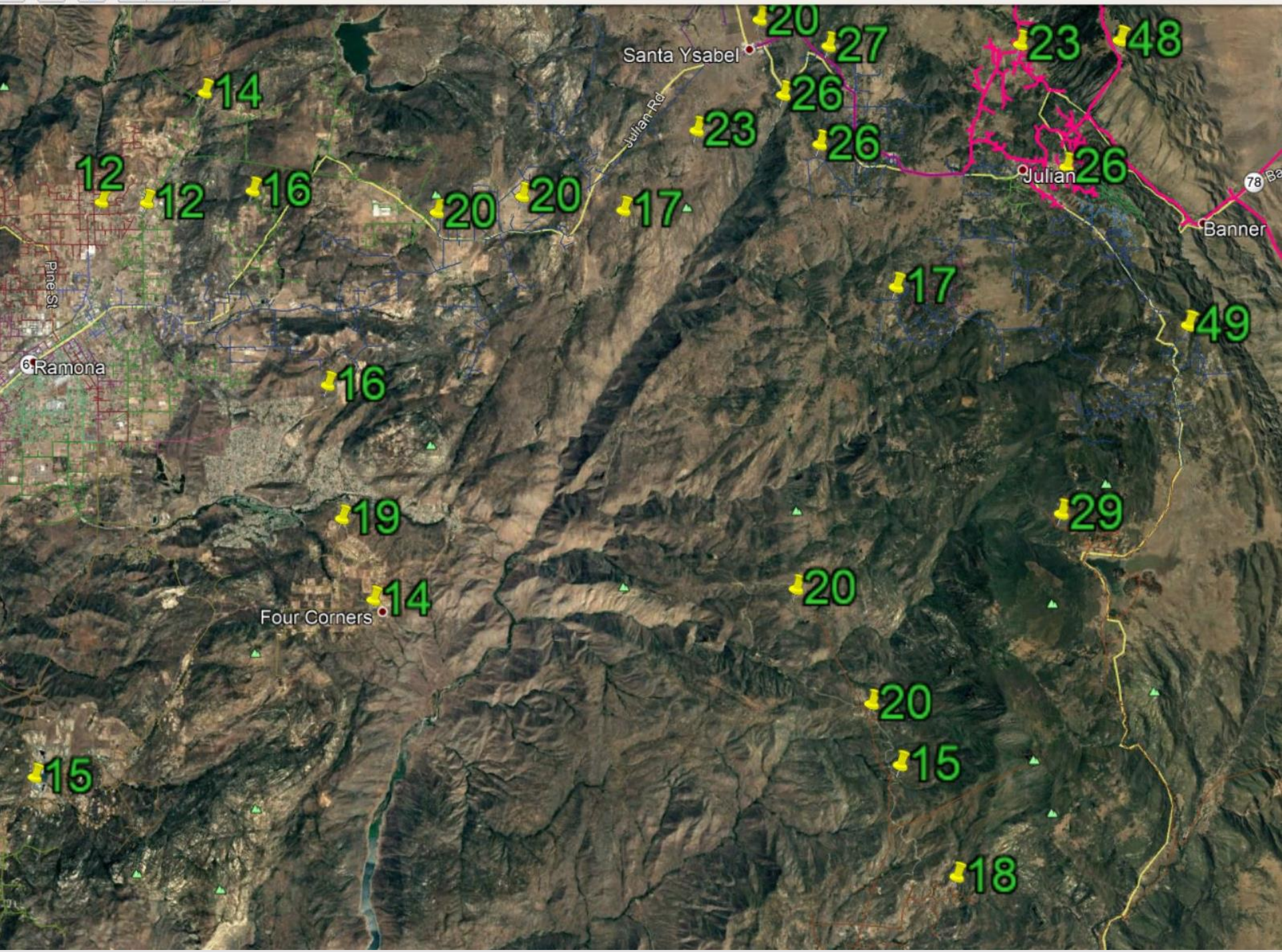
SDG&E Weather Network: 191 Weather Stations



SDG&E owns and operates the densest utility weather network in the nation


20
27
23
48
Santa Ysabel
14
26
Julian Rd
23
26
Julian
26
78
Banner
12
12
16
20
20
17
Pine St
17
49
6
Ramona
16
19
29
14
Four Corners
20
20
15
15
18

Public Safety Power Shutoff Program (PSPS)

7-10 Days ahead

- Forecasts indicate extreme weather;
- SDG&E begins predictive modeling;
- Assessment potential impact;

3-6 Days ahead

- Monitor Fire Weather Watches from the National Weather Service (NWS);
- Monitor the Santa Ana Wildfire Threat Index (SAWTI) from the United States Forest Service;
- Fire weather forecasts are refined accordingly;

2 Days ahead

- Extreme fire weather conditions forecasted, and;
- NWS Red Flag Warning issued;
- Begin communicating with customers affected by possible power shutoff;
- Coordinate with local government agencies and emergency responders;

1 Day ahead

- Extreme fire weather conditions imminent;
- Continued modeling and more accurate forecasts determine affected areas;
- Ongoing communication with customers about possible power shutoff;
- Continue coordination with first responders and public agencies;

Day of power shutoff

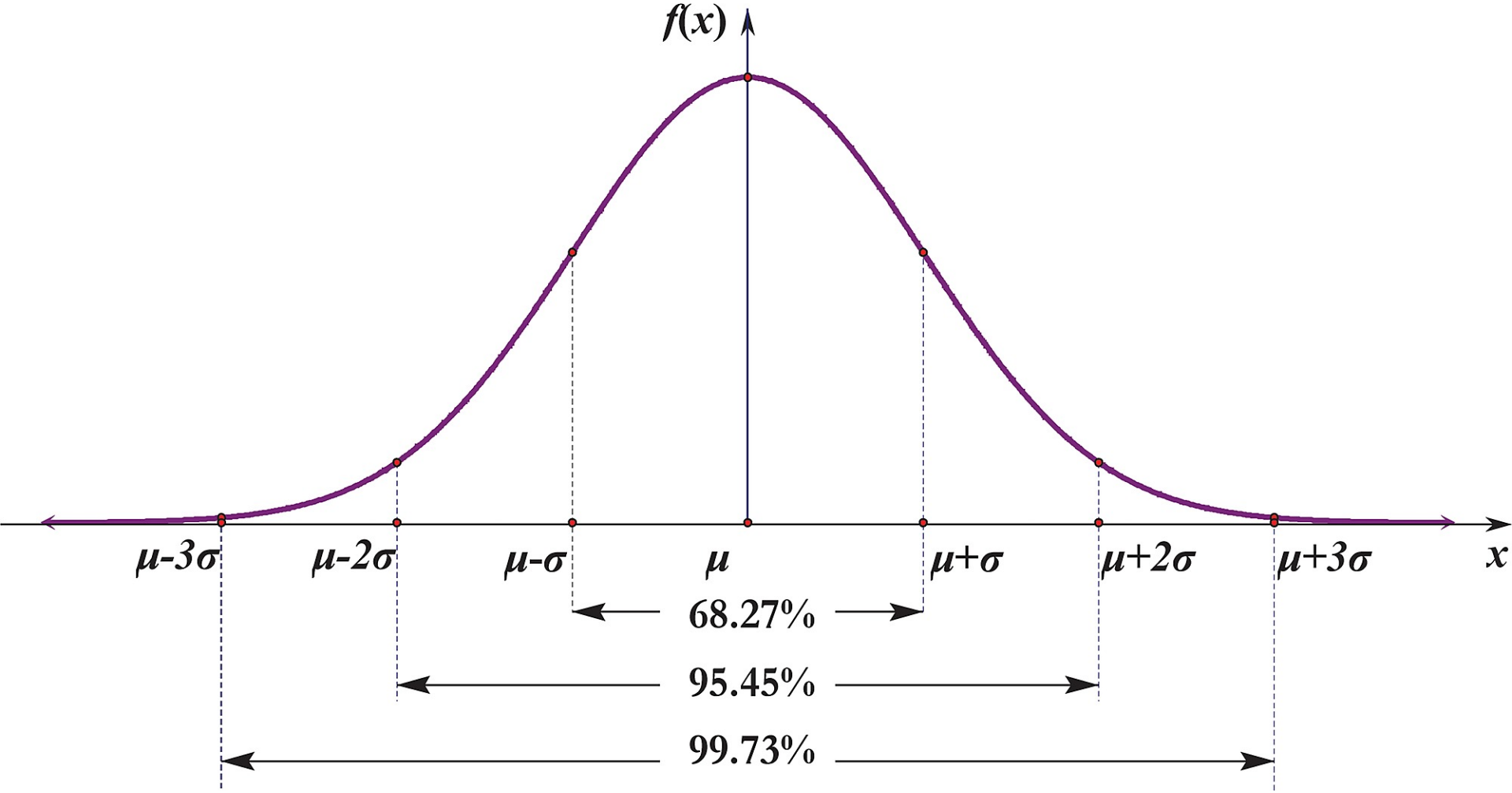
- Extreme fire weather present, and;
- Dangerous conditions validated by field crews;
- Notify customers, local government and public agencies of power shutoff;
- Community Resource Centers opened if shutoff is lengthy;

Power Restored

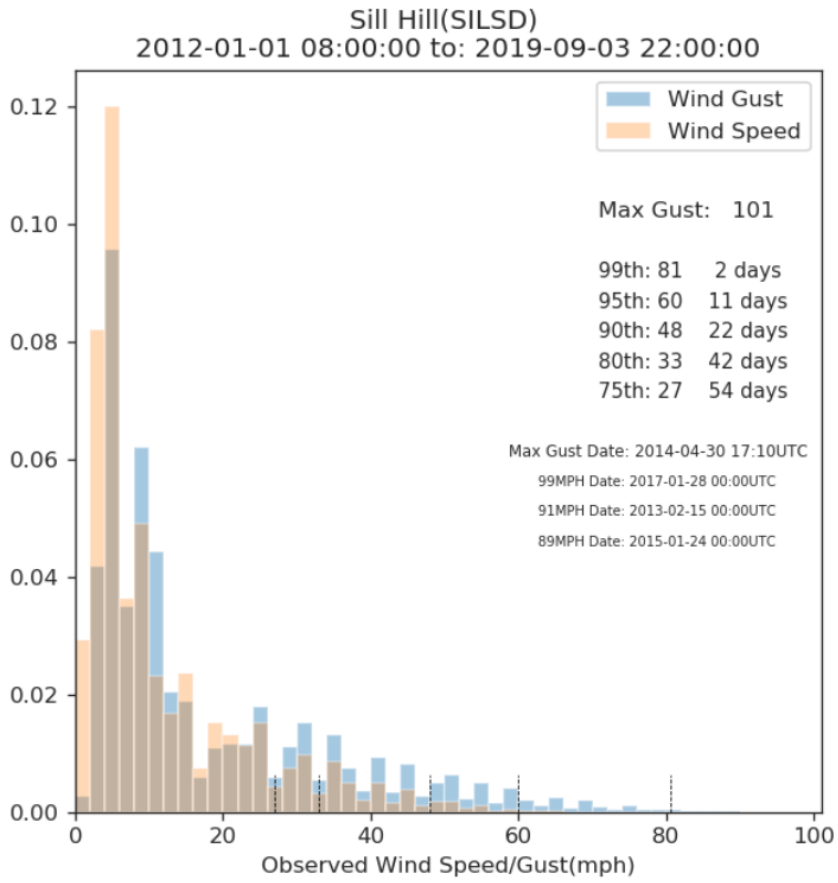
- Extreme fire weather subsides;
- Equipment inspections and patrols of the electric system by field crews begin during daylight hours;
- Power is restored to affected communities and customers;
- Customers and public agencies are notified the power is back on;

Planning and Monitoring | **Outage** | **Restoration**

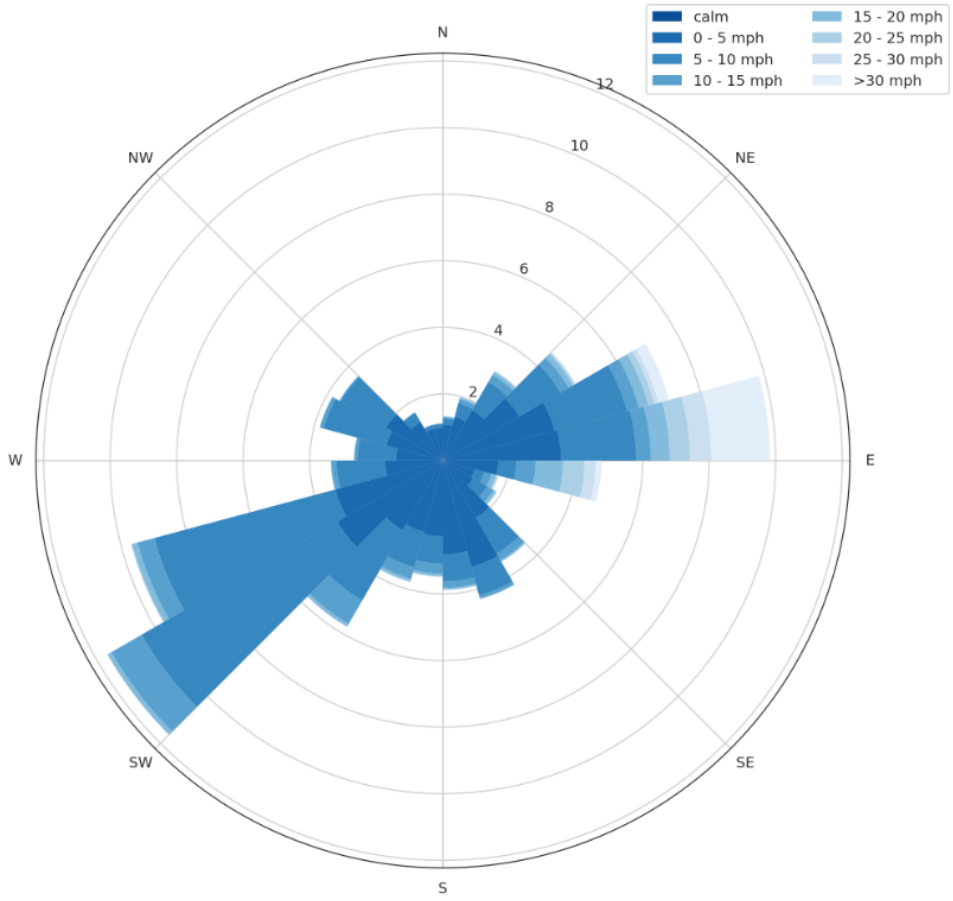
Normal Distribution



Sill Hill Weather Station

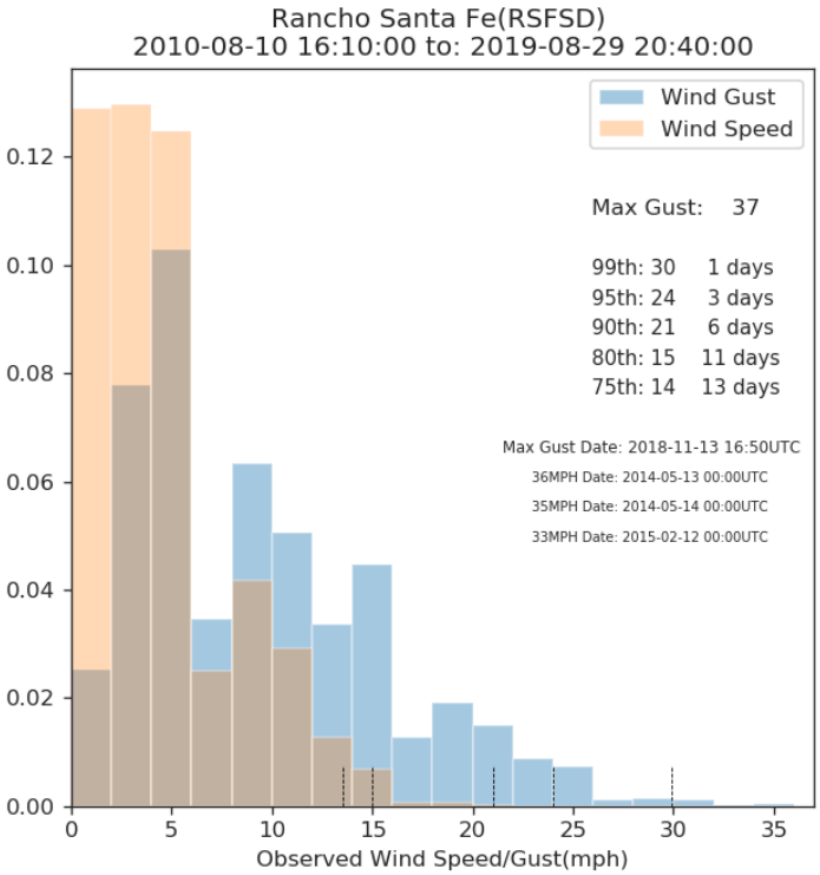


Wind Histogram (Santa Ana Winds)

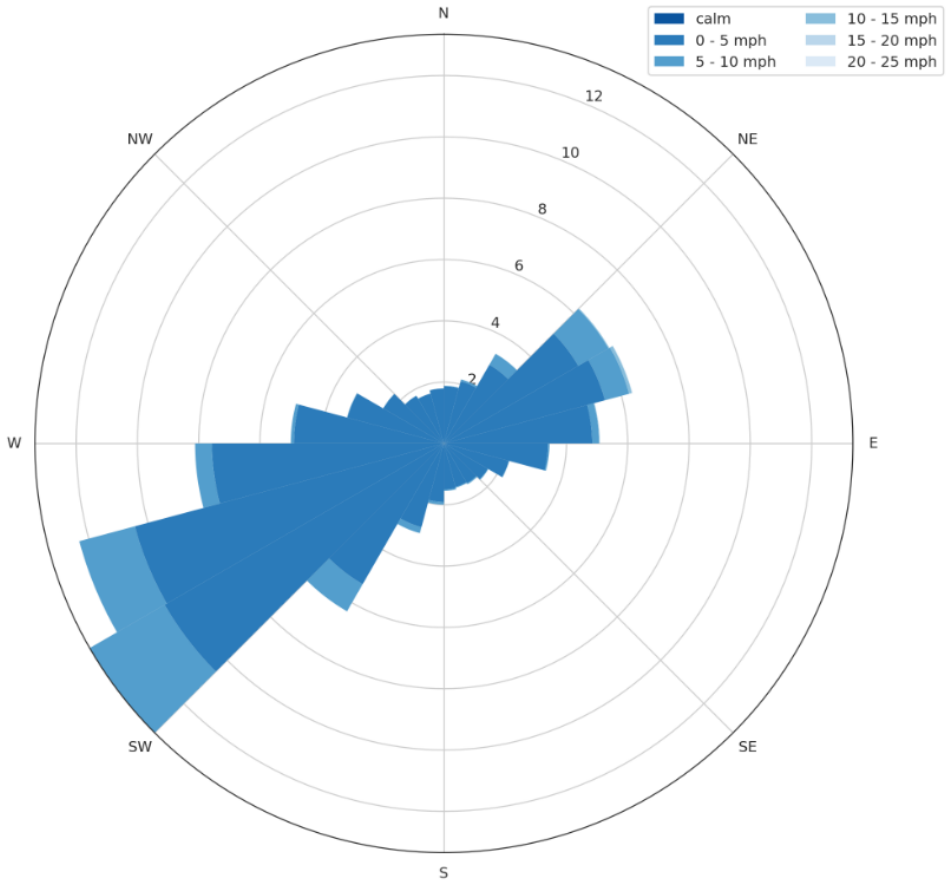


Wind Rose (Full Record)

Rancho Santa Fe Weather Station

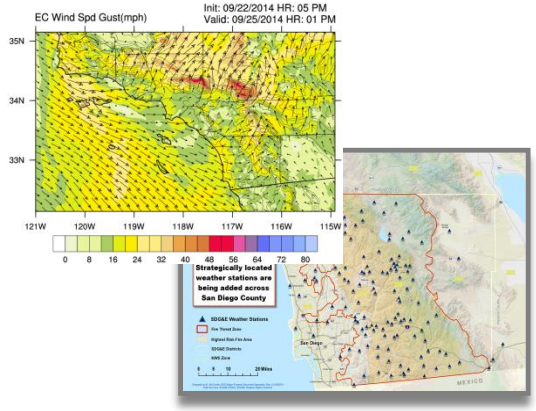


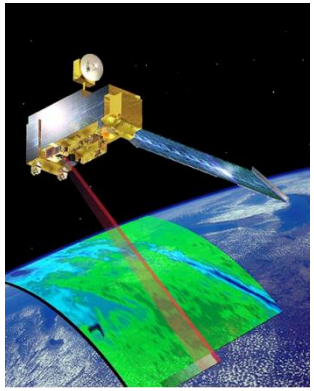
Wind Histogram (Santa Ana Winds)

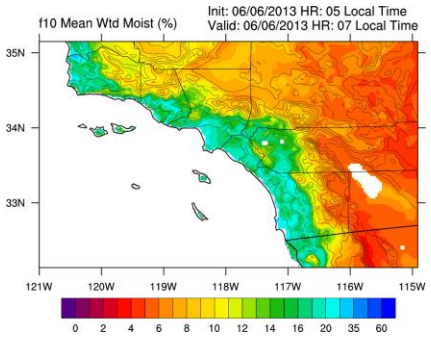


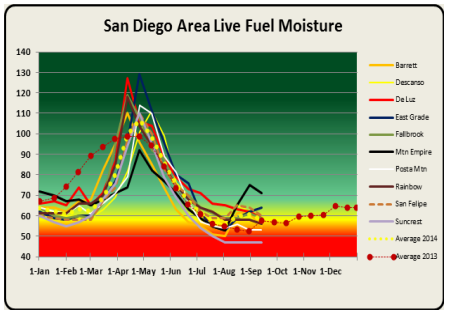
Wind Rose (Full Record)

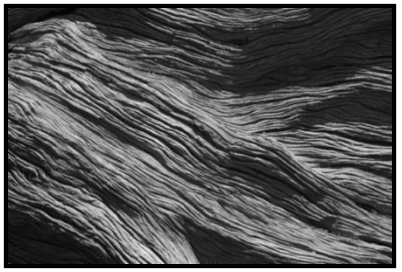
SDG&E's Fire Potential Index











Weather (wind speed & humidity)

Grasses **Dead Fuels** **Live Fuels**

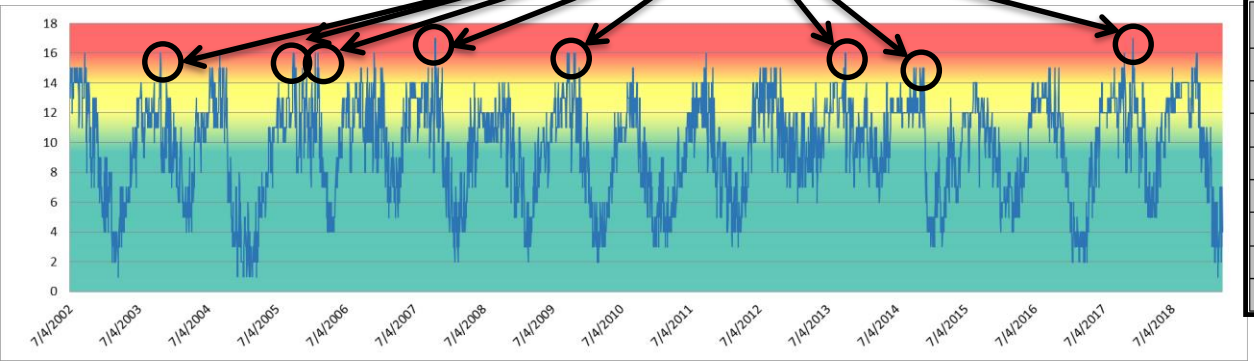
Fuel Moisture

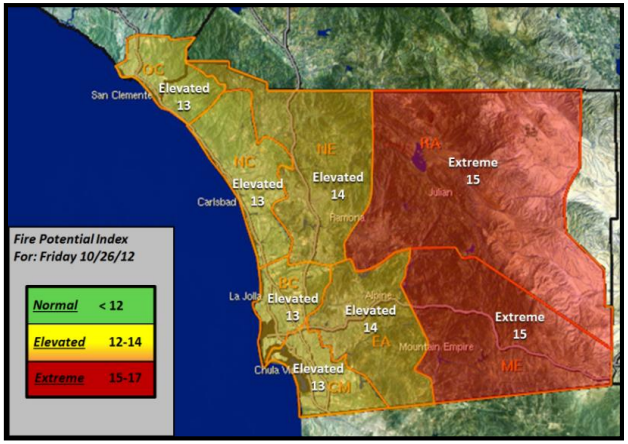
SDG&E's Fire Potential Index

The Fire Potential Index is a planning and decision support tool designed to reduce the risk of a wildfire while improving efficiency and reliability

- Incorporates weather, live fuel moisture, dead fuel moisture, and greenness of the annual grasses
- Calculated at the district level
- Issued 12:30 pm daily
- Used to inform operational decisions, work restrictions, resource allocation
- Shared broadly within the community

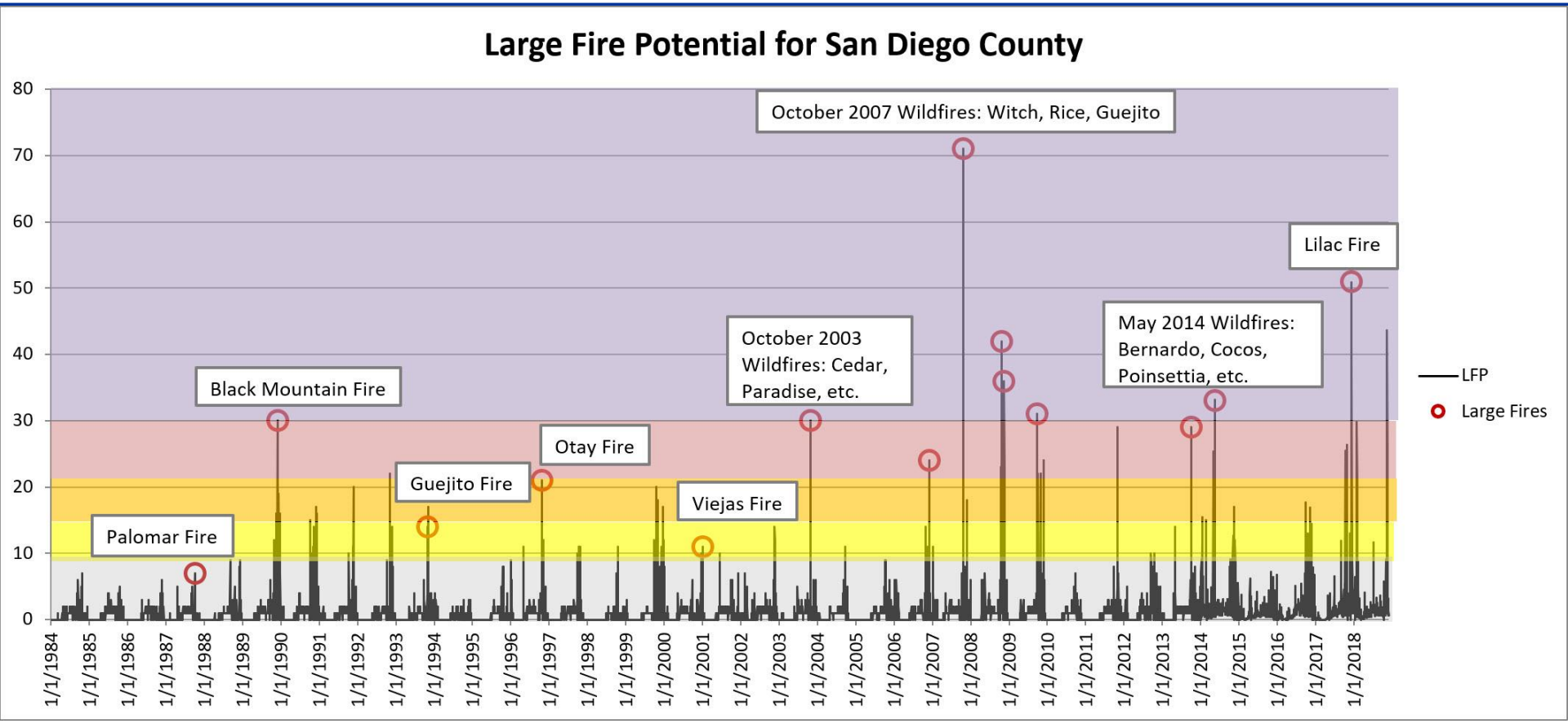
Major Wildfire





	Thu 10/25	Fri 10/26	Sat 10/27	Sun 10/28	Mon 10/29	Tue 10/30	Wed 10/31	Thu 11/01
ME	Normal 11	Extreme 15	Elevated 13	Elevated 12	Normal 11	Normal 11	Normal 11	Normal 10
RA	Normal 11	Extreme 15	Elevated 13	Elevated 12	Normal 11	Normal 11	Normal 11	Normal 10
EA	Normal 10	Elevated 14	Elevated 12	Normal 11	Normal 11	Normal 10	Normal 10	Normal 10
NE	Normal 10	Elevated 14	Elevated 12	Normal 11	Normal 11	Normal 10	Normal 10	Normal 10
OC	Normal 10	Elevated 13	Normal 11	Normal 11	Normal 10	Normal 9	Normal 9	Normal 9
NC	Normal 10	Elevated 13	Normal 11	Normal 11	Normal 10	Normal 9	Normal 9	Normal 9
BC	Normal 10	Elevated 13	Normal 11	Normal 11	Normal 10	Normal 9	Normal 9	Normal 9
CM	Normal 10	Elevated 13	Normal 11	Normal 11	Normal 10	Normal 9	Normal 9	Normal 9

Santa Ana Wildfire Threat Index



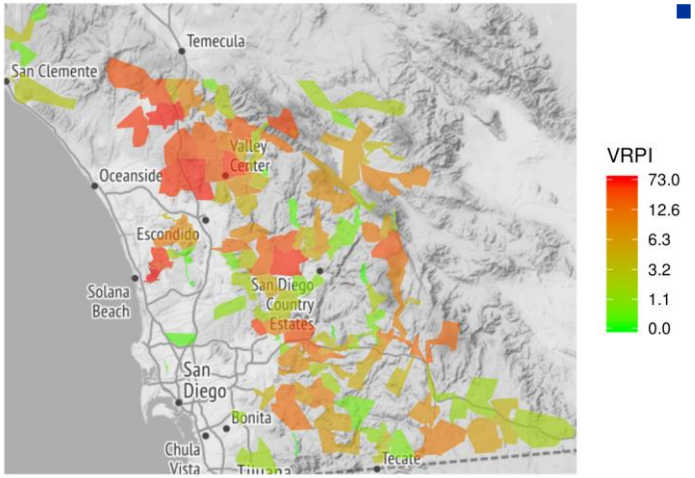
No-Rating	Marginal	Moderate	High	Extreme
Santa Ana winds are not expected or will not contribute to significant fire activity.	Upon ignition, fires *may* grow rapidly.	Upon ignition, fires *will* grow rapidly and *will* be difficult to control.	Upon ignition, fires will grow *very* rapidly and will be *very* difficult to control.	Upon ignition, fires will have extreme growth and will be uncontrollable

Vegetation Risk Index

SDG&E Fire Scientists and Vegetation Managers have analyzed data from hundreds of thousands of trees, historical power outages, and historical weather data to help prevent tree-related outages, and tree related ignitions before they ever happen, reducing the risk of wildfires.

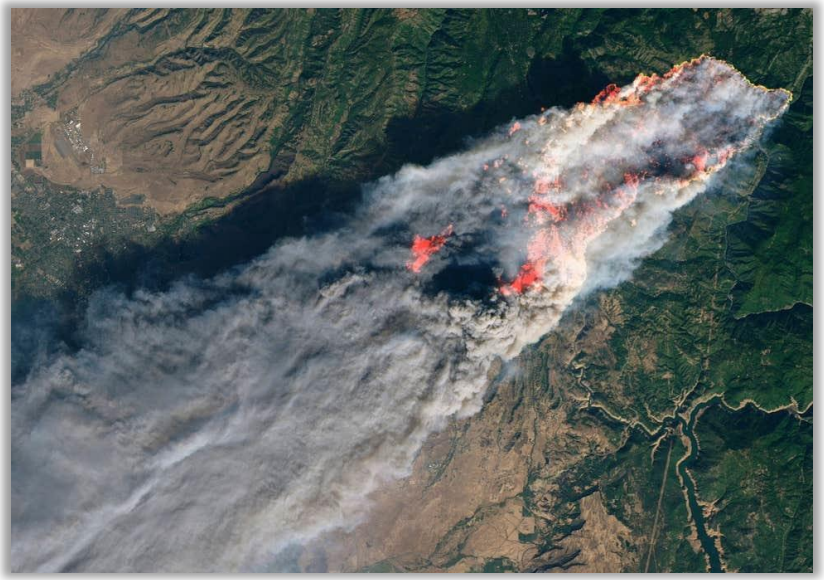
- **VRI quantifies the risk by analyzing:**
  - Total number of trees in the vicinity of a circuit
  - Height of trees
  - Tree species
  - Historical tree related outages

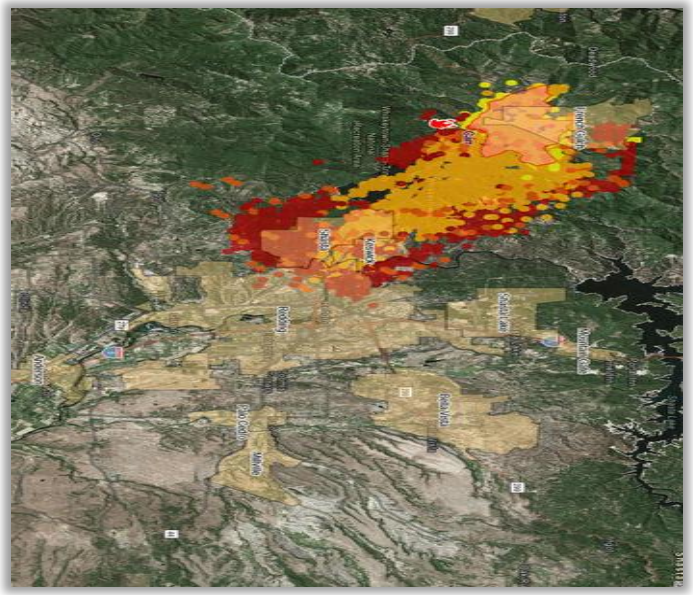
Vegetation Risk Plot for All Circuit Sections



- **Key Benefits:**
  - Assist in operational decision during fire weather events
  - Prioritize vegetation management efforts
  - Inform potential strategic undergrounding or covered conductor solutions

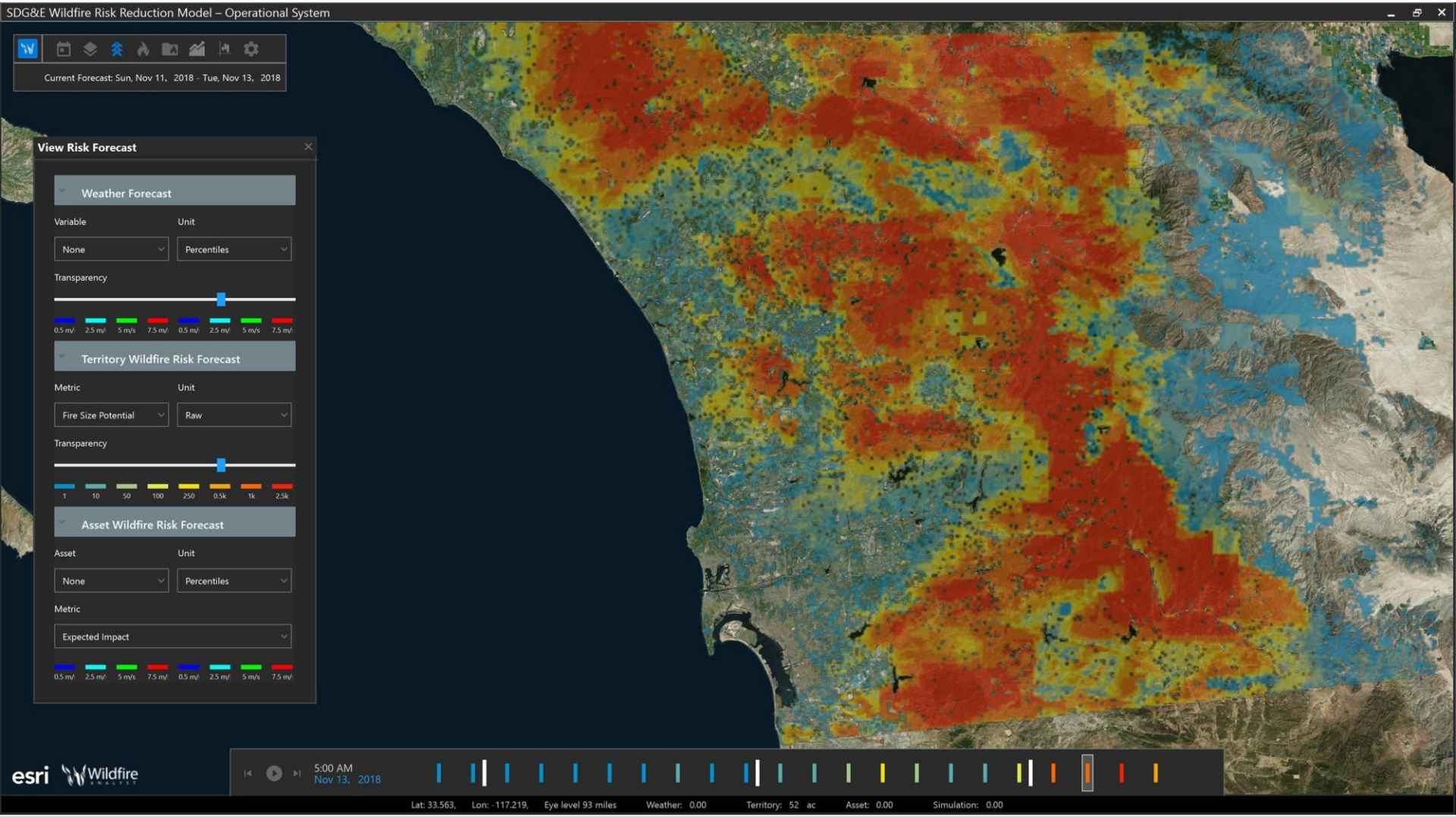
Satellite Wildfire Alerts





- The new Geostationary Operational Environmental Satellites (GOES) carry the Advanced Baseline Imager (ABI), a next-generation fire detection and characterization at 2 km spatial resolution and 1-5 minute temporal resolutions.
- The Wildfire Automated Biomass Burning Algorithm (WFABBA) flags every earth-navigated pixel that has a potential fire.
- Six categories of fire detection based on confidence and environmental factors.
- The WFABBA took 4 minutes from ignition to first detection of the Kincade Fire.

Wildfire Risk Reduction Model – Operational System (WRRM-OPS)



SDGE A Sempra Energy utility®

Lilac Fire - December 7, 2017, at 11:15am