

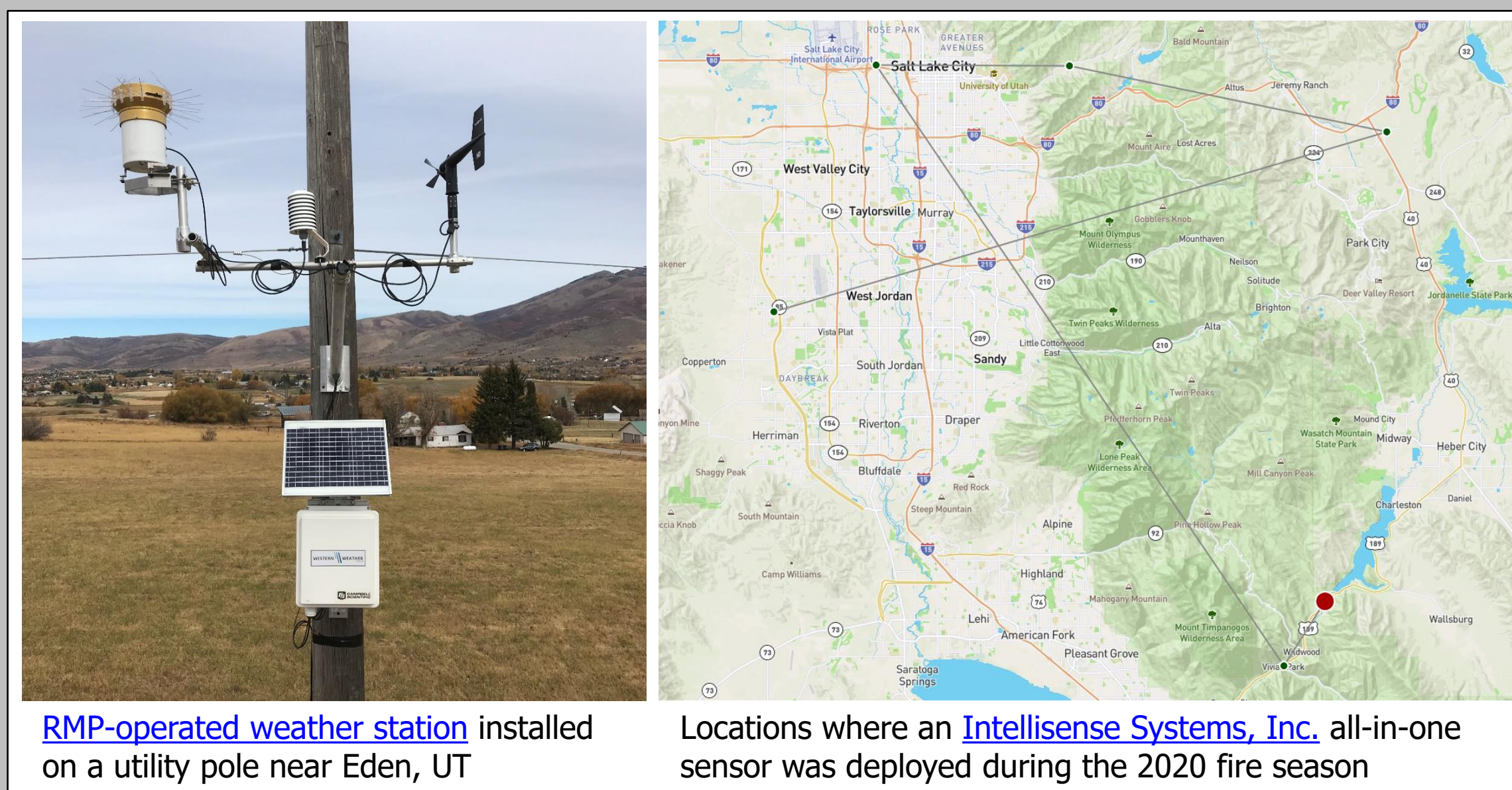
Project Motivation and Objectives

- Pilot project with utility company Rocky Mountain Power (RMP) to evaluate fire weather/danger/behavior assessment tools in the state of Utah
- Hosted virtual workshop bringing together government agencies, commercial firms, and researchers to discuss wildfire mitigation techniques (April 2020)
- Summarized current and future situational awareness tools available:
 - Surface weather station assets and derivable climatologies
 - Digitized land-use characteristics in vicinity of utility infrastructure
- Evaluation of possible "fire potential indices":
 - Defined for assessment of critical atmospheric and fuel conditions
 - Utilization by RMP for Public Safety Power Shutoff (PSPS) scenarios

Primary Datasets

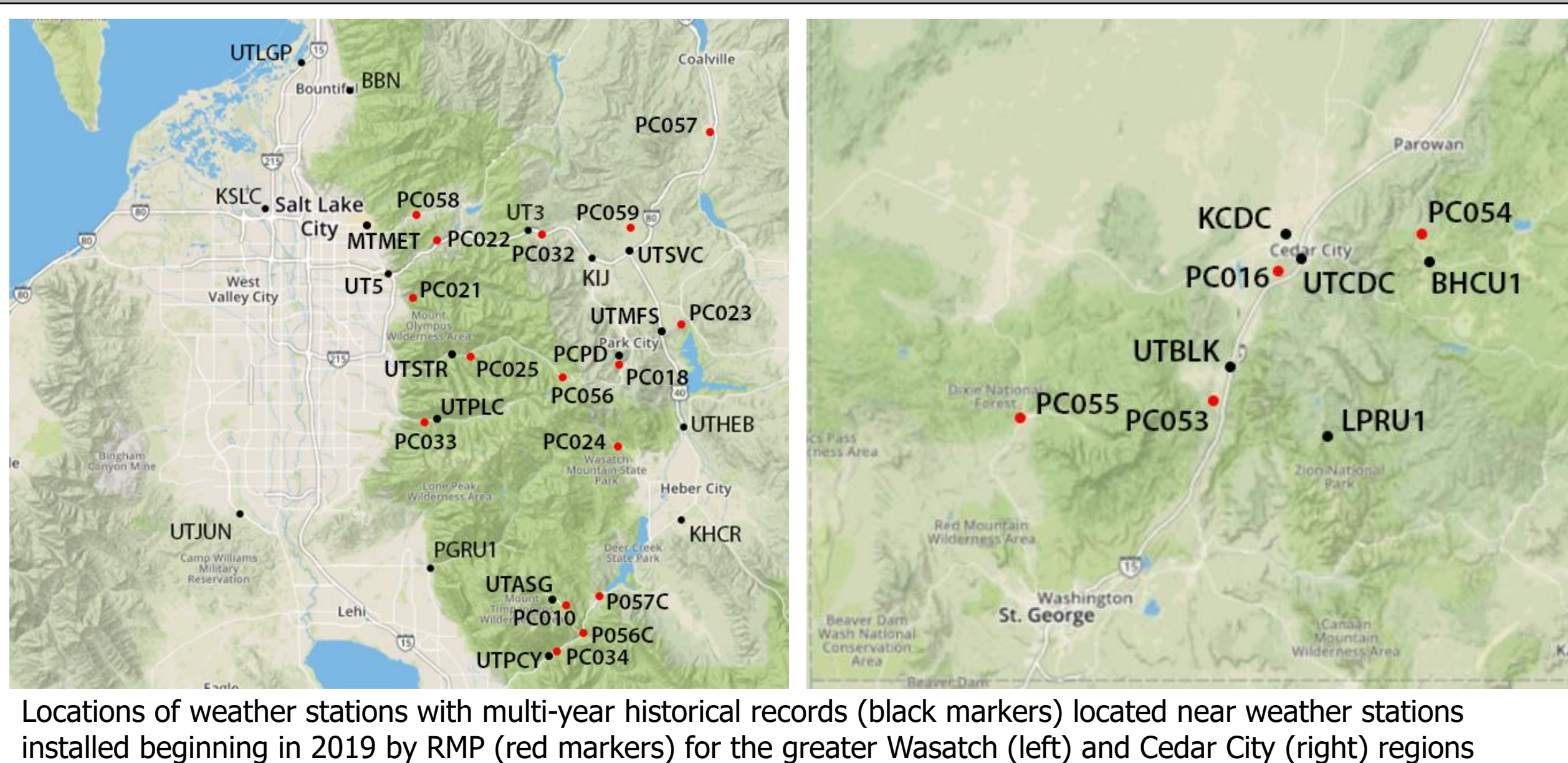
RMP Surface Weather Station Installments

- 11 stations installed in 2019, with additional 10 installed during 2020 season
 - Observations recorded every 10 minutes
 - Air temp, RH, wind, fuel temp, fuel moisture sensors
 - Station-calculated Fosberg Fire Weather Index (FFWI)
- 2 portable all-in-one sensor systems also deployed during 2020 fire season



Additional Surface Weather Station Historical Records

- [MesoWest](#) and [Synoptic Data PBC](#) contain multi-year histories for weather stations installed by several data providers in Utah:
 - Utah Department of Transportation
 - BLM Remote Automated Weather Stations (RAWS)
 - National Weather Service ASOS/AWOS

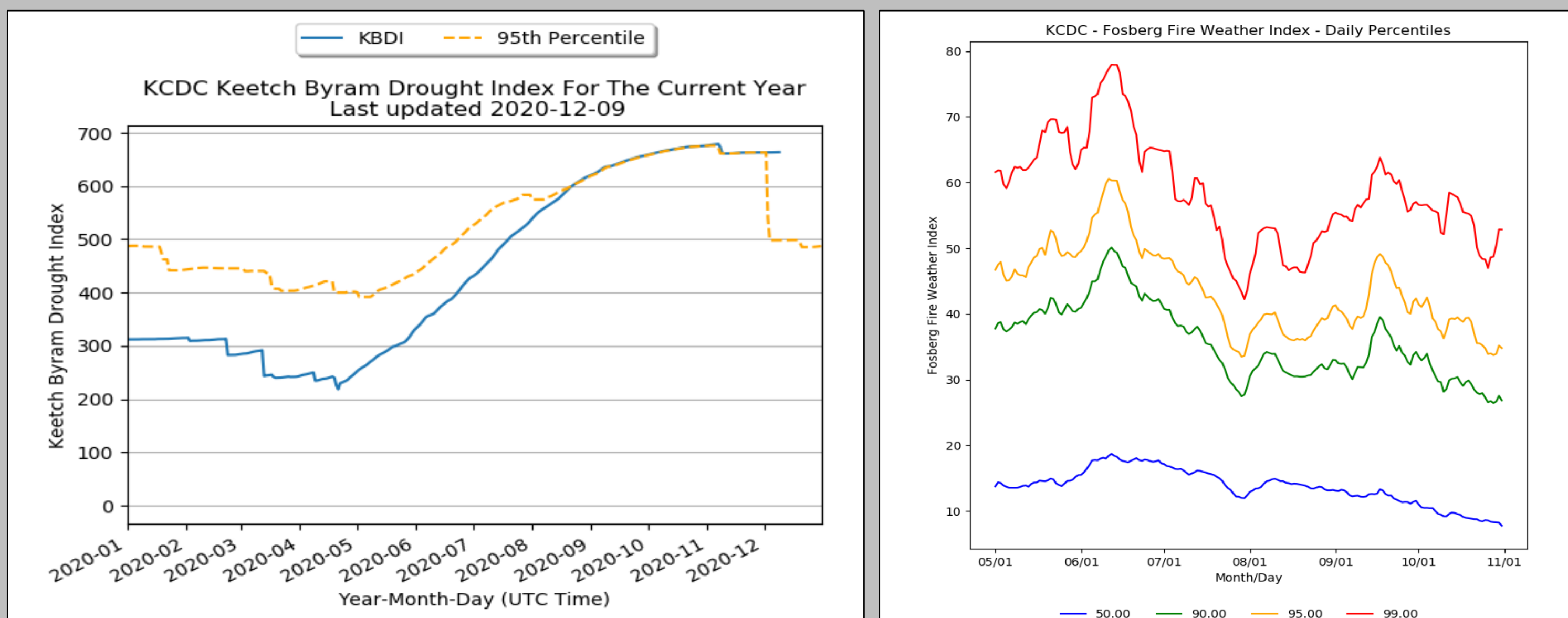


GIS and Land Surface Characteristic Resources

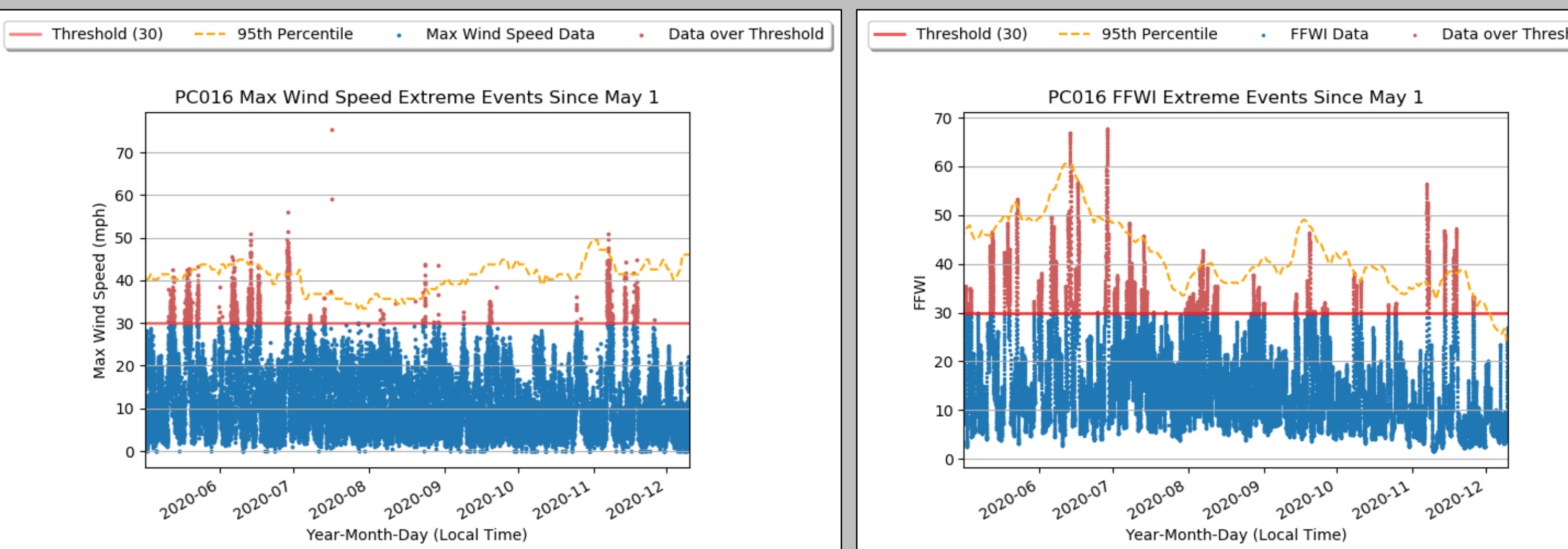
- GIS information for Fire High Consequence Area (FHCA) boundaries and relevant power grid assets provided by RMP
- Land Surface Vegetation Characteristic datasets

2020 Season vs. Climatology Assessments

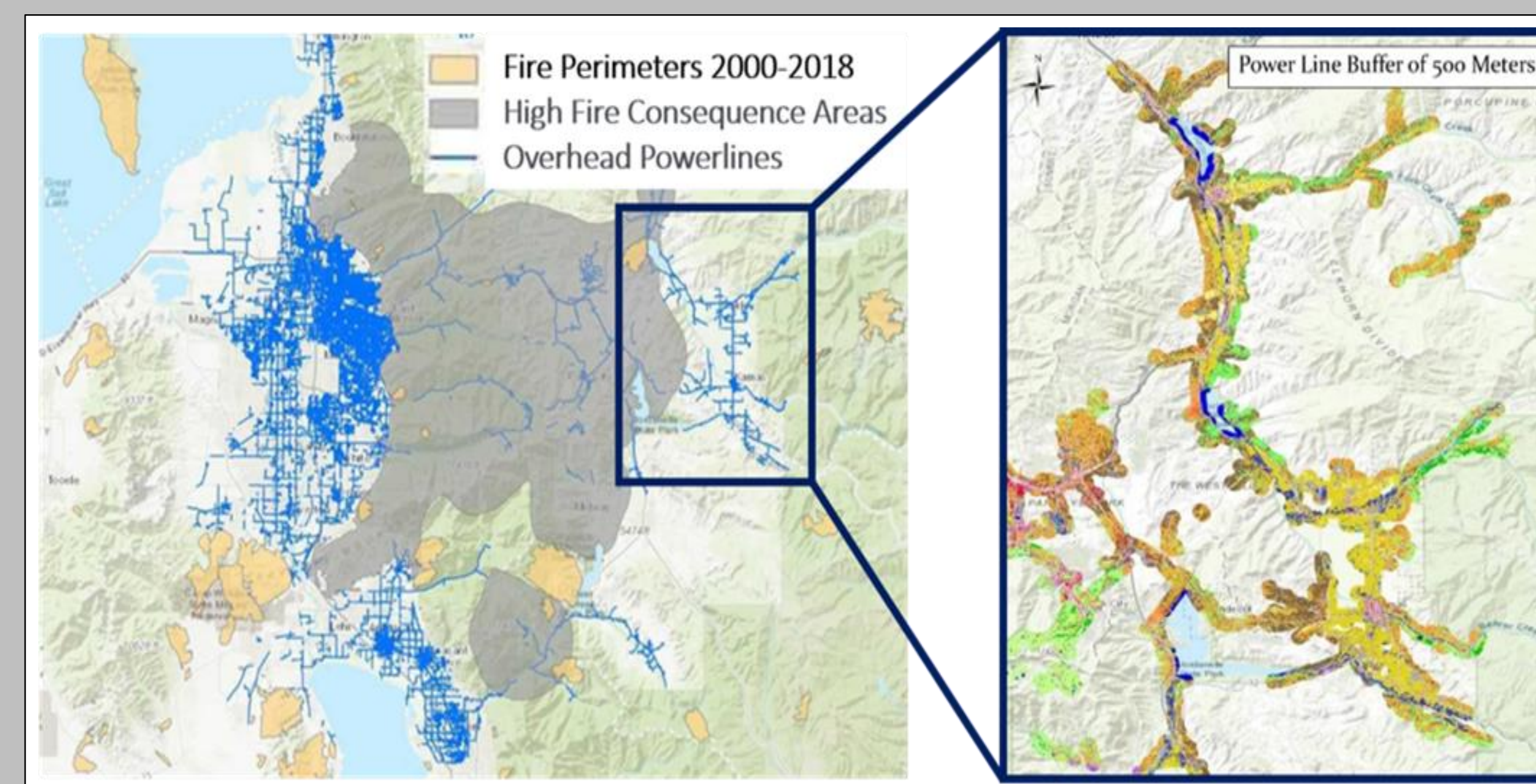
- Weather station records of 10+ years used to derive historical percentiles for observed quantities (RH, wind), 6-hour average FFWI, and daily Keetch-Byram Drought Index (KBDI)
- Real-time observations and calculations of the same quantities for nearby RMP assets then overlaid to provide indication of when conditions eclipsed historical percentile thresholds
- Graphical products created for real-time access through a [pilot project webpage](#)



- Very dry summer/autumn in has led to calculated KBDI for the Cedar City Airport (KCDC) to be very near the 95th percentile beyond August 2020 (top left)
- Calculated FFWI percentiles show a threshold above 30 is achieved >10% of the time throughout the fire season (May-October) with peaks during early/late season (top right)
 - Synoptic-scale pressure gradients/frontal passages more frequent in early/late season
 - FFWI calculation is more sensitive to wind speed
- RMP Cedar City site (PC016) shows many instances where set wind thresholds >30 mph (bottom left) and FFWI > 30 (bottom right) were eclipsed, with less instances occurring when considering a percentile-based approach using the historical dataset from nearby KCDC



Historical Wildfire Reviews



Perimeters of past fires acquired and compared with FHCA boundaries denoted by RMP (left). GIS assessments also utilized to determine prominent vegetation types in the vicinity of RMP overhead power assets (right). Graphics courtesy Alesha Schulzke.

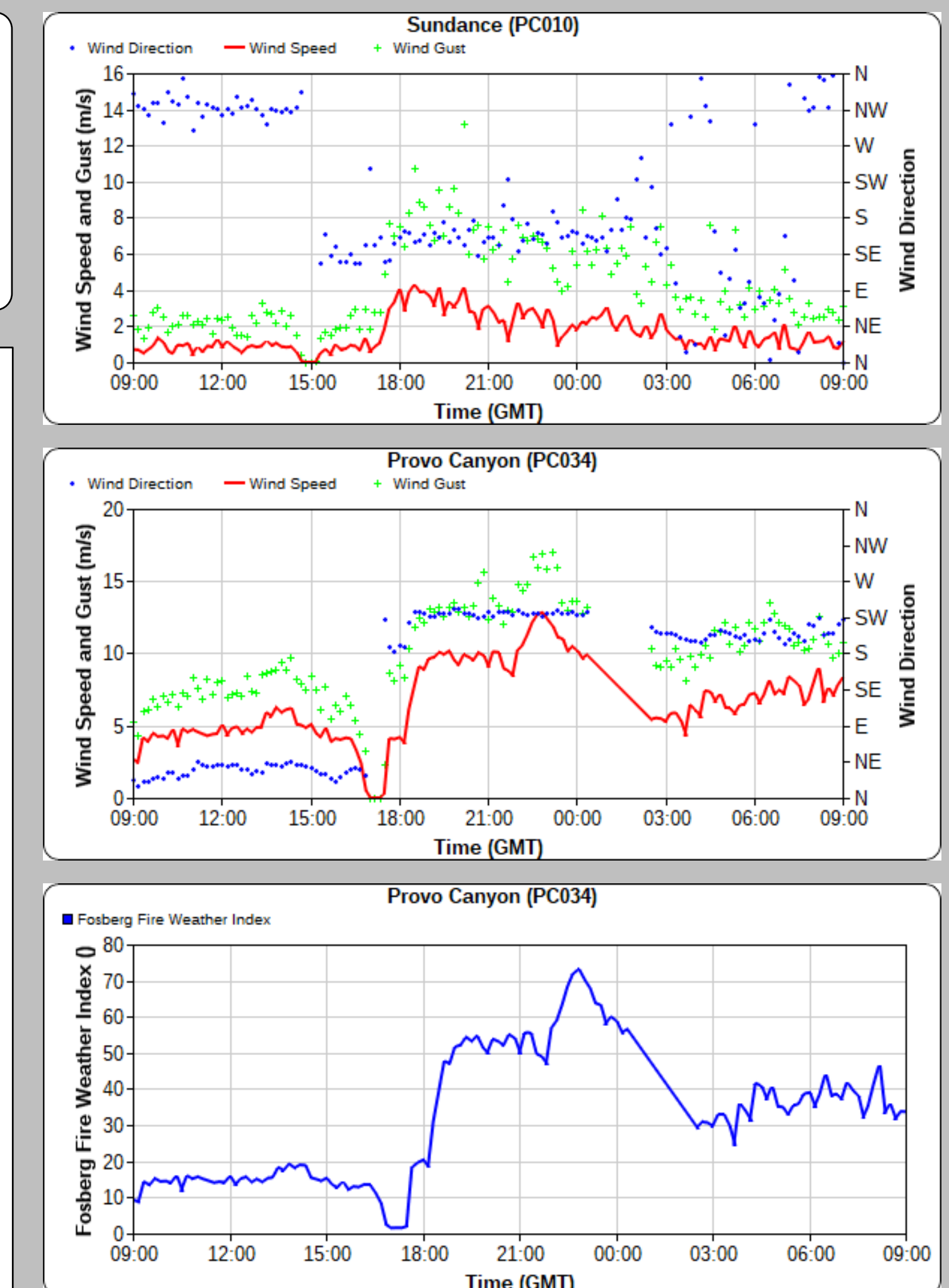
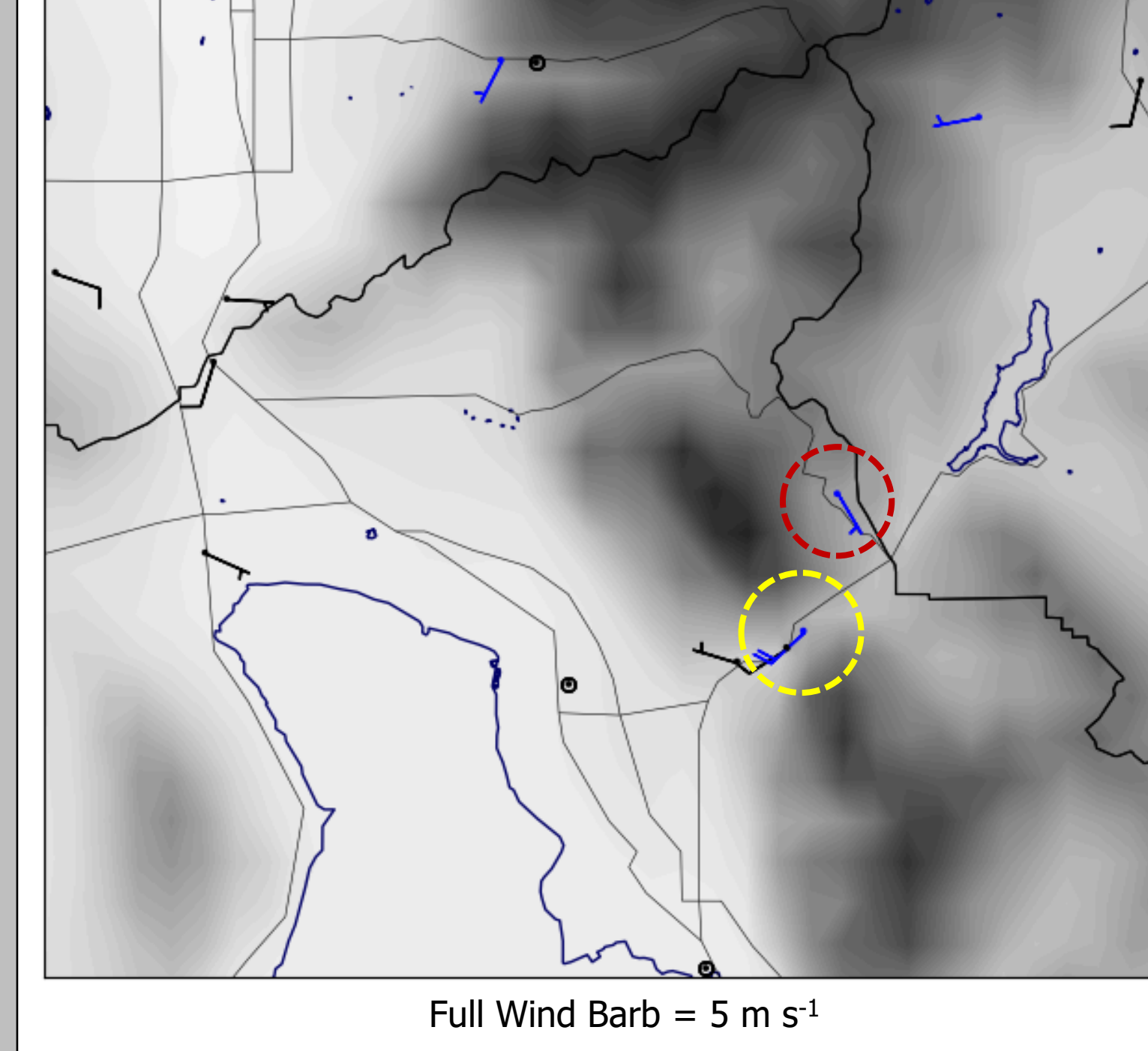
2020 Fire Season Case Evaluations

21-22 October – Greater Provo Canyon Area

- Pre-frontal W/SW flow, low humidity, dry vegetation resulted in critical fire weather conditions
- Public alerted about potential for power disruption around Provo Canyon and Sundance areas

- Topography and favorable SW-NE orientation of canyon helped enhance SW'ly winds at Provo Canyon site (PC034 - yellow circle)
- Sundance (PC010 - red circle) recorded lighter winds as behind large topographic barrier

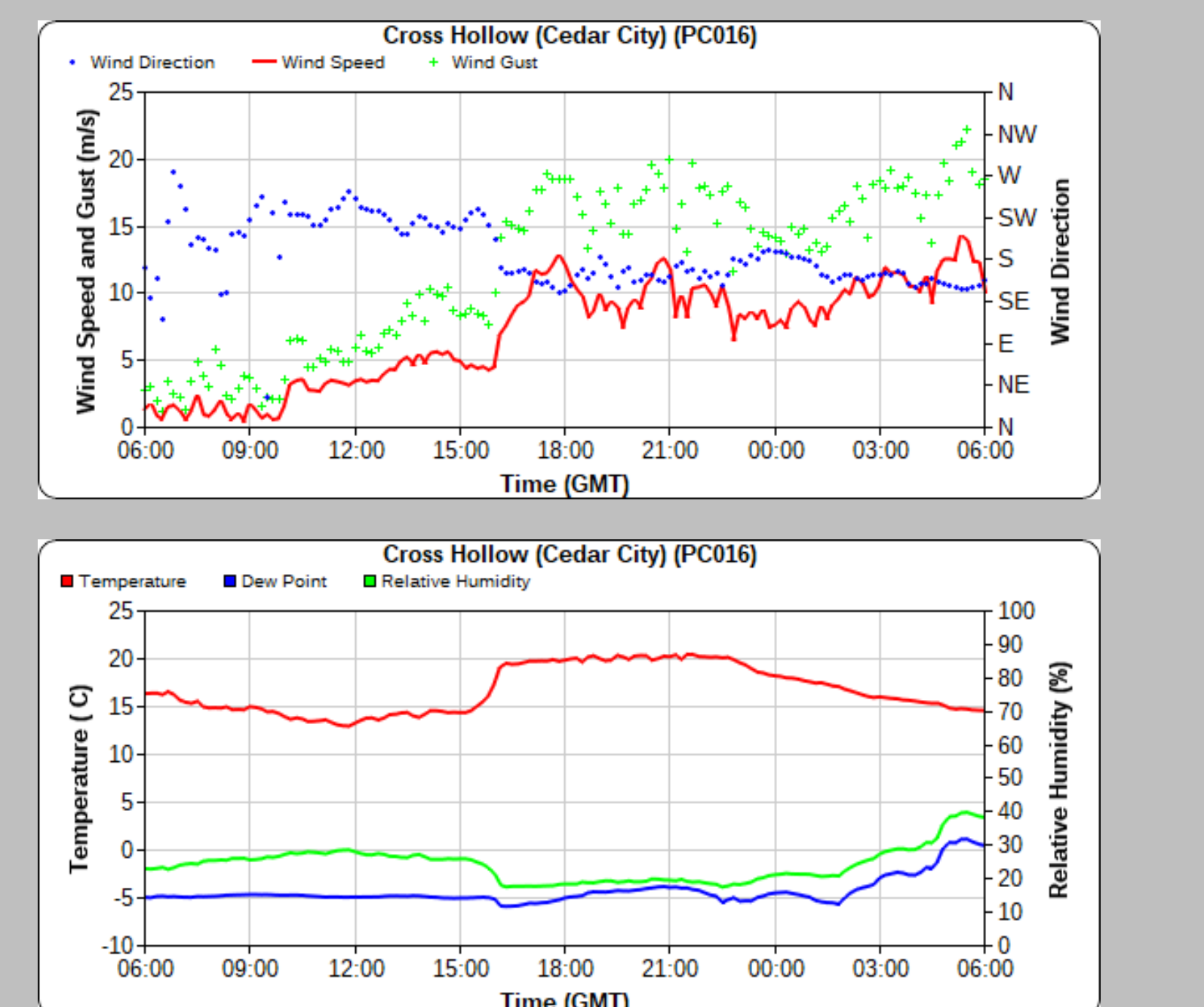
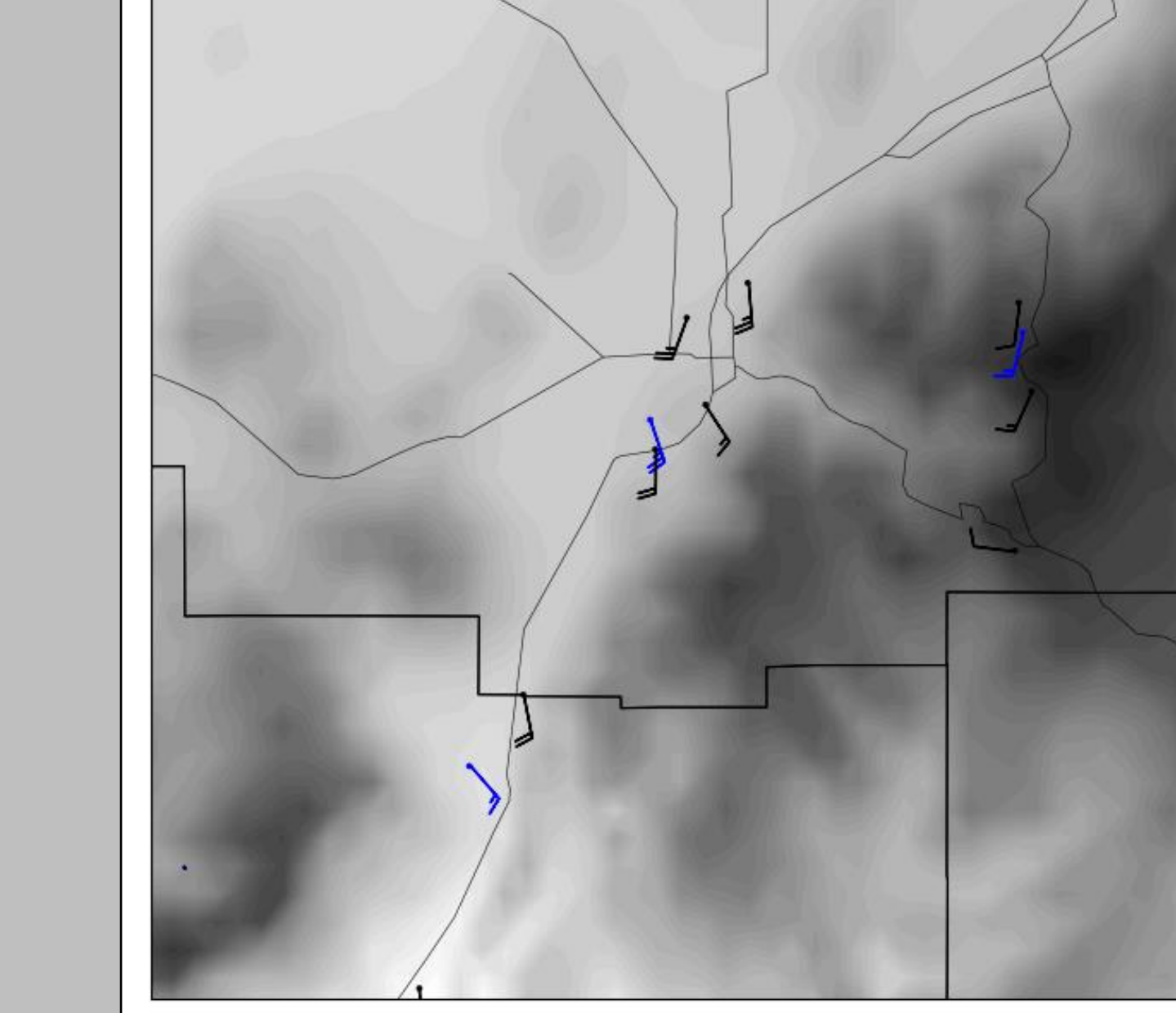
2050 UTC Oct 21 2020 - RMP (Blue) and Other Mesonet (Black) Winds



6 November – Cedar City Area

- Extension of fire season late into 2020 calendar year partially due to lack of precipitation
- Gusty S/SW'ly winds and critical FFWI values in Cedar City region prior to storm system

2100 UTC Nov 06 2020 - RMP (Blue) and Other Mesonet (Black) Winds



Summary

- FFWI percentiles derived from historical weather station data show two peaks near the beginning and end of typical fire season (May-June and September-October)
 - Often associated with extended periods of enhanced pre-frontal winds
 - Very high FFWI less typical in mid-summer (mesoscale processes dominate)
- KBDI sensitive to winter precipitation: low values typical for first half of fire season
- Consider further fire index and meteorological parameters to help forecast PSPS scenarios

Acknowledgements

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