

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Vegetation-Related Transmission Outages

2022 Annual Report

May 9, 2023

RELIABILITY | RESILIENCE | SECURITY



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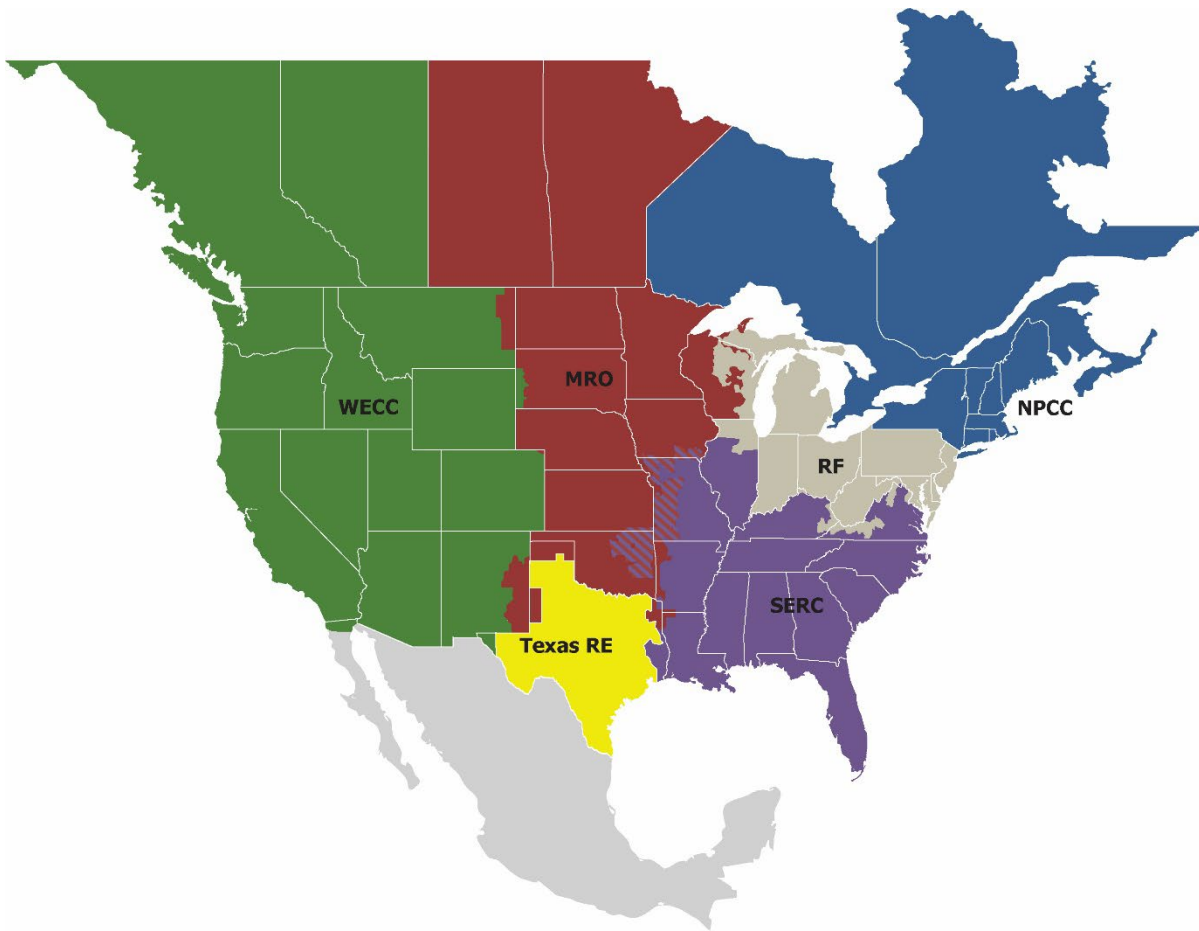
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Preface

Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of NERC and the six Regional Entities, is a highly reliable, resilient, and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security
Because nearly 400 million citizens in North America are counting on us

The North American BPS is made up of six Regional Entity boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Regional Entity while associated Transmission Owners/Operators participate in another.



MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	ReliabilityFirst
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	WECC

Executive Summary

This report summarizes the vegetation-related transmission outages in 2022 that were reported to the ERO Enterprise.

Reliability Standard FAC-003 requires that applicable Transmission Owners and Generator Owners submit quarterly reports to their Regional Entities identifying all Sustained Outages of applicable lines caused by vegetation.

In 2022, the Regional Entities reported 31 vegetation-related outages due to vegetation contact from outside the right-of-way (ROW). The majority of the outages, 94 percent, were caused by weather-related activities in the area. The registered entities have taken appropriate actions to remediate the issues and minimize reoccurrence.¹

No Full Notices of Penalty were filed in 2022 that involved vegetation encroachments or contact from inside the ROW.

¹ For more information, refer to the quarterly vegetation-related transmission outages here:
<https://www.nerc.com/pa/comp/CE/Pages/CMEP%20and%20Vegetation%20Reports.aspx>

Introduction

Background

The purpose of the Transmission Vegetation Management Reliability Standard is to maintain a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located on transmission ROWs and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation-related outages that could lead to Cascading. Additionally, the Reliability Standard requires the applicable registered entities to submit all Sustained Outages of applicable lines to their Regional Entities on a quarterly basis through Periodic Data Submittals.

Each of the reportable Sustained Outages is categorized in the Reliability Standard as one of the following:

- Category 1A — Grow-ins: Sustained Outages caused by vegetation growing into applicable lines, that are identified as an element of an Interconnection Reliability Operating Limit (IROL) or Major WECC Transfer Path, by vegetation inside and/or outside of the ROW;
- Category 1B — Grow-ins: Sustained Outages caused by vegetation growing into applicable lines, but are not identified as an element of an IROL or Major WECC Transfer Path, by vegetation inside and/or outside of the ROW;
- Category 2A — Fall-ins: Sustained Outages caused by vegetation falling into applicable lines that are identified as an element of an IROL or Major WECC Transfer Path, from within the ROW;
- Category 2B — Fall-ins: Sustained Outages caused by vegetation falling into applicable lines, but are not identified as an element of an IROL or Major WECC Transfer Path, from within the ROW;
- Category 3 — Fall-ins: Sustained Outages caused by vegetation falling into applicable lines from outside the ROW;
- Category 4A — Blowing together: Sustained Outages caused by vegetation and applicable lines that are identified as an element of an IROL or Major WECC Transfer Path, blowing together from within the ROW; and
- Category 4B — Blowing together: Sustained Outages caused by vegetation and applicable lines, but are not identified as an element of an IROL or Major WECC Transfer Path, blowing together from within the ROW.

Sustained Outages in 2022

Regional Entities reported 31 Sustained Outages from outside the ROW, a decrease from the 40 reported in 2021. The five-year average of reported Sustained Outages from outside the ROW has been around 31.

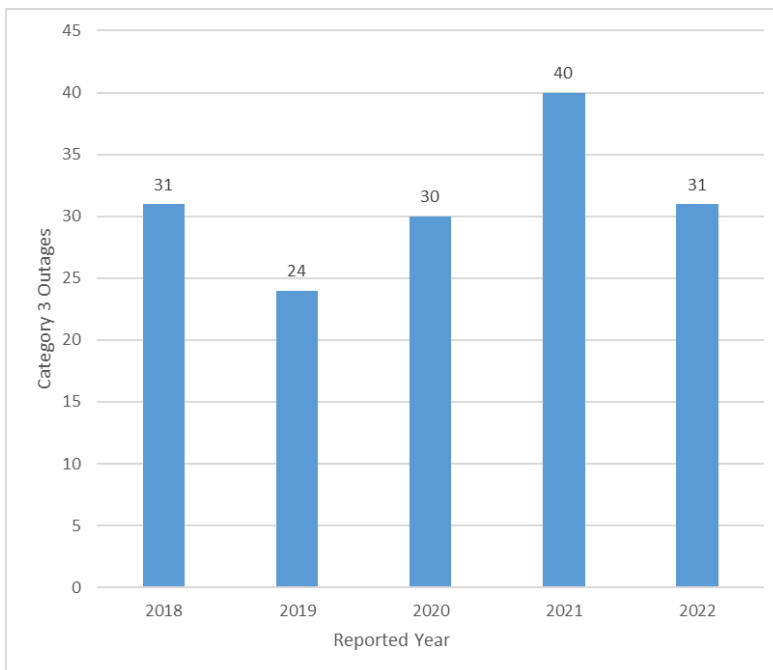


Figure 1: Vegetation-related Sustained Outages from Outside the ROW (2018-2022)

Twenty-nine (94 percent) of the reported outages were due to weather-related events while there were no known weather-related issues for the remainder of the reported outages.

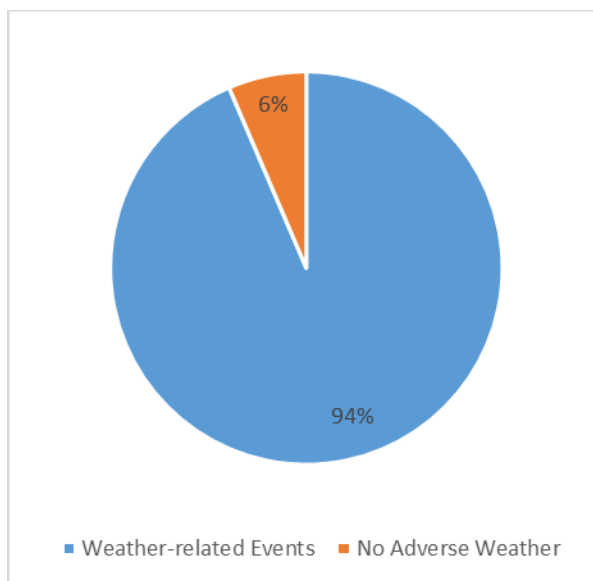


Figure 2: Percentage of Weather-related Sustained Outages (2022)

The majority of the outages occurred on 230 kV transmission lines, which are the most common voltage class in the United States.

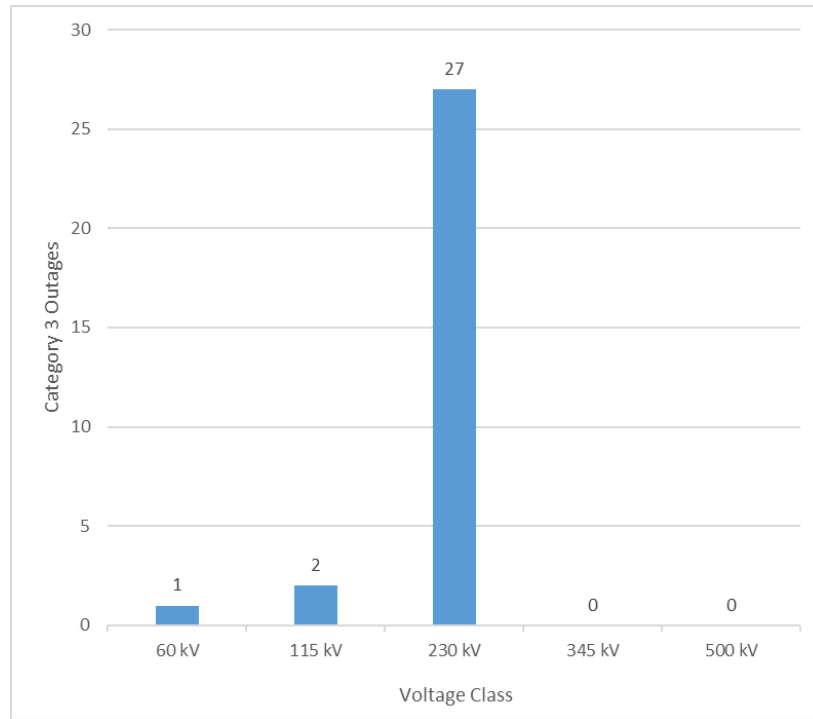


Figure 3: Vegetation-related Sustained Outages by Voltage Class

Nearly 65 percent of the Category 3 outages reported in 2022 occurred in the Eastern Interconnection compared to nearly 53 percent from 2021. As noted in Figure 5, climate anomalies and weather events in 2022 could have been contributing factors to some of these sustained outages.

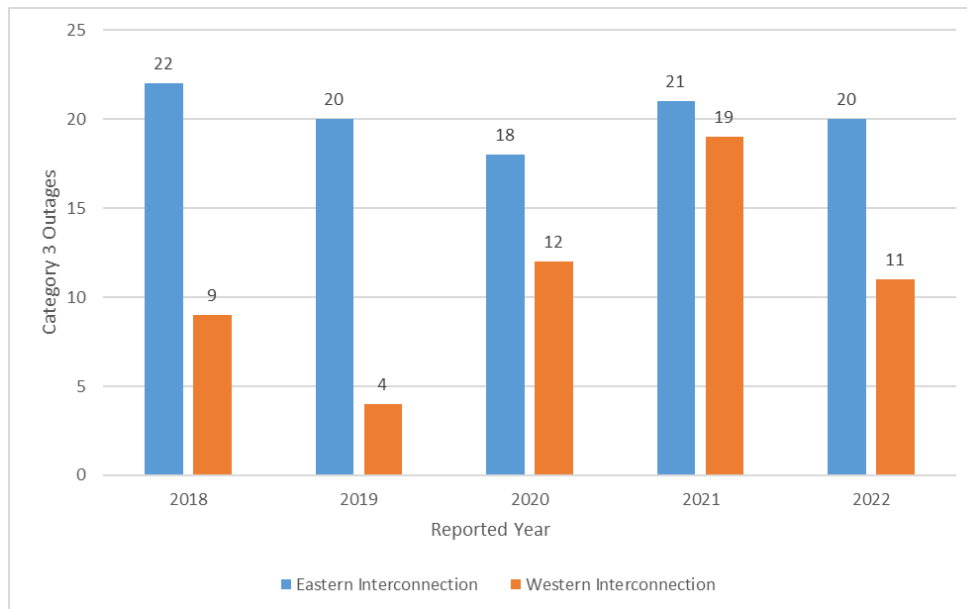


Figure 4: Vegetation-related Sustained Outages by Eastern and Western Interconnections (2018-2022)

U.S. Selected Significant Climate Anomalies and Events for 2022



On Sep 17, remnants of Typhoon Merbok pounded Alaska's western coast, becoming the strongest storm to enter the Bering Sea during Sep in 70 years.



More than 3.1M acres burned in AK this year — the highest since 2015 and the seventh-highest total since 1950.

CONUS drought coverage remained significant for the second year in a row with a minimum extent of 44% occurring on Sep 6 and a maximum coverage of 63% on Oct 25 — the largest CONUS footprint since the drought of 2012. Drought impacted much of the western half of the U.S. and southern and central Plains for a majority of the year. Parts of the Northeast, Mid-Atlantic, Great Lakes, Southeast and Northwest were some of the only regions that remained drought-free across the CONUS throughout 2022.



In Nov and Dec, lake-effect snowstorms slammed parts of NY with record amounts of snowfall causing road closures, travel bans, power outages and loss of life.



On Dec 21-25, a powerful arctic front wreaked havoc across much of the nation, bringing heavy rains, snow, ice and high winds that sent temperatures plummeting at record speed. More than 200M people were under a winter weather advisory or warning and more than a million customers, from TX to ME, were left without power.



During Jul-Sep, four separate significant rainfall events caused major flooding in St. Louis, MO, southern IL, eastern KY and the Dallas metro area, leading to flooded roads, delayed flights and many residents trapped in their homes.



A heatwave settled over the West the first week of Sep and brought scorching temperatures that set all-time record highs. On Sep 9, nearly 1,000 heat records were broken.



The Hermits Peak Fire became the largest wildfire on record in NM at more than 341K acres consumed between Apr and Jun. Over 66K fires burned around 7.5M acres across the U.S. this year, which is near average.

On Jul 16-17, the remnants of TS Darby brought historic surf conditions to HI, causing major flooding and road closures. In Keauhou-Kona, a giant wave crashed over two-story condos.



During Sep 28-30, Hurricane Ian made landfall in FL as a strong Cat 4 hurricane, resulting in major flooding, damage and loss of life. Ian created additional damage as it made a second landfall in SC as a Cat 1 hurricane.



Hurricane Fiona brought massive flooding to Puerto Rico in Sep. One station reported 27.14 in. of rain in 24 hrs while other locations reported 12-18 in.

2022 ranked 18th warmest year on record; the average U.S. temperature was 53.4°F, 1.4°F above average. The 2022 U.S. precipitation average was 28.35 in., 1.59 in. below average, ranking 27th driest on record.



Please Note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: <https://www.ncei.noaa.gov/access/monitoring/monthly-report/>

Figure 5: 2022 Significant Weather Events in the US²

² National Oceanic and Atmospheric Administration, National Centers for Environmental Information, National Climate Report – Annual 2022, available here: <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202213>

Conclusion

The ERO Enterprise will continue to monitor and review all reported vegetation-related outage issues and work with various internal and external groups to identify and mitigate risk. While ERO Enterprise continues to monitor vegetation related outages, FAC-003 is not an area of focus for the 2023 ERO Enterprise Compliance Monitoring and Enforcement Implementation Plan.³

³ 2023 ERO Enterprise Compliance Monitoring and Enforcement Program Implementation Plan, available here: <https://www.nerc.com/pa/comp/CAOneStopShop/ERO%20CMEP%20Implementation%20Plan%20v1.0%20-%202023.pdf>