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# Transatlantic Fire Resource Guide

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International Association of Wildland Fire (IAWF)  
Mentoring Program



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# 1) Introduction

With the increasing number and intensity of wildfires becoming one of the imminent consequences of climate change worldwide, it is becoming increasingly important to be aware of the meteorological conditions that favour their destructive potential. As wildfires become more extreme, firefighters' ability to extinguish them directly and quickly is decreasing. Therefore, long-term forecasting and an understanding of state-of-the-art weather models and satellite data are necessary to support operations. Highly sophisticated fire weather and fire behaviour analysis, as used by the fire services in Australia, Spain and the United States, provides a useful and safe approach to decision-making. Learning about the available resources, their uses, and their capabilities enables those dealing with fires to develop a comprehensive understanding of state-of-the-art information systems and potential gaps in regional information coverage.

This resource guide introduces the wide range of knowledge and data networks available online related to wildfires. It aims to provide an overview of the vast resources available and give readers an insight into their contents. These include real-time fire information networks and seasonal outlooks including fire danger indices, as well as natural variables such as drought, precipitation, air quality and smoke. More sophisticated portals include satellite imagery, radar and observational data, and weather forecasting services. Additionally, some fire weather tools and software solutions are highlighted. The final section of the guide serves as a transatlantic knowledge exchange library, showcasing North American and European institutions and organisations committed to advancing and sharing knowledge on wildfires and wildland firefighting. The aim of this guide is not to provide a complete and detailed description of all available resources, but rather to offer readers an insight into the realm of wildfire information.

The Transatlantic Fire Resource Guide is the collaborative work of Aaron Arneke and Eric Evenson. Aaron is a Master's student at the University of Bremen in Germany and a volunteer wildland firefighter with the Waldbrandteam e.V. Eric is the Science Communications Specialist with the North Atlantic Fire Science Exchange (NAFSE), which is part of the Joint Fire Science Program's (JFSP) Fire Science Exchange Network (FSEN). He is also a former Incident Meteorologist (IMET) with the National Weather Service. They have worked together on this project through the International Association of Wildland Fire's (IAWF) Mentoring Program.

## 2) Fire Information



## **Canadian Interagency Forest Fire Centre (CIFFC)**

**Operator:** CIFFC (federally incorporated not-for-profit), owned and operated by federal, provincial, and territorial wildland fire management agencies of Canada

**Geographic Focus:** Canada (national)

**Tags:** Active Fire Detection · Real-Time Monitoring · Operational · Decision Support

**Access:** Free, public (situational products); operational access for member agencies

**URL:** <https://ciffc.net/>

CIFFC coordinates the sharing of firefighting resources — personnel, equipment, and aircraft — between Canadian federal, provincial, and territorial wildland fire agencies and international partners under the Canadian Interagency Mutual Aid Resources Sharing (MARS) Agreement and publishes a daily situation report during fire season providing national-level intelligence on fire activity, resource availability, and preparedness levels across all member agencies. The Centre is the Canadian analog to the U.S. NIFC/NICC, operating seven days a week during fire season and maintaining direct contact with NICC in Boise, Idaho to facilitate cross-border resource sharing under the Canada-U.S. Reciprocal Forest Fire Fighting Arrangement (CANUS). For Canadian fire managers, provincial coordination centers, and international partners, it is the authoritative source for national preparedness status, daily fire situation intelligence, and the operational coordination framework that governs the movement of suppression resources across jurisdictions at both domestic and international scale.

## **Canadian Wildland Fire Information System (CWFIS)**

**Operator:** Natural Resources Canada (NRCan), Canadian Forest Service, Northern Forestry Centre

**Geographic Focus:** Canada (national)

**Tags:** Fire Danger · Active Fire Detection · Index · Map · Real-Time Monitoring · Operational

**Access:** Free, public

**URL:** <https://cwfis.cfs.nrcan.gc.ca>

The CWFIS has provided daily national-level wildland fire maps, reports, and data products since 1994, integrating the Canadian Forest Fire Danger Rating System (CFFDRS) — including the Fire Weather Index (FWI) System and the Fire Behavior Prediction (FBP) System — with the Fire M3 satellite monitoring system that uses low-resolution satellite imagery to detect and locate actively burning fires, estimate daily and annual area burned, and model fire behavior and biomass consumption. Updated multiple times daily using weather data from approximately 2,500 stations across Canada and the U.S., the system produces gridded national maps of fire danger, fire weather indices, forecast fire behavior, and satellite-detected hotspots, alongside a weekly National Wildland Fire Situation Report and a 30-year historical fire climatology. For Canadian fire managers, researchers, and provincial/territorial agencies, CWFIS is the authoritative national fire information system — providing the FWI and FBP products that underpin operational fire danger assessment, resource pre-positioning decisions, and long-term fire season trend analysis across the country.

## European Forest Fire Information System (EFFIS)

**Operator:** European Commission Joint Research Centre (JRC), as part of the Copernicus Emergency Management Service

**Geographic Focus:** Europe, Middle East, North Africa (43 countries in the EFFIS network)

**Tags:** Fire Danger · Active Fire Detection · Post-Fire Assessment · Archive · Map · Operational

**Access:** Free, public

**URL:** <https://forest-fire.emergency.copernicus.eu/>

EFFIS supports national services responsible for forest fire protection across EU member states and neighboring countries by providing a comprehensive suite of operational products including fire danger forecasts (short-range, monthly, and seasonal), active fire detection, rapid and full damage assessment, fire severity mapping, fire emissions estimates, wildfire risk assessment, and the European Fire Database — with a current network of 43 countries in Europe, the Middle East, and North Africa contributing data and expertise since 1998. The system's fire danger component uses ECMWF's Global ECMWF Fire Forecasting model (GEFF) to generate multi-day and seasonal danger forecasts based on the Canadian FWI, U.S. NFDRS, and Australian McArthur rating systems, providing European fire managers with a consistent, science-based fire danger framework applicable across diverse Mediterranean, temperate, and boreal landscapes. For EU civil protection authorities, national forest fire services, researchers, and the European Parliament, EFFIS is the authoritative pan-European platform for current fire season monitoring, historical fire data analysis, and evidence-based fire risk assessment.

## Fire Information for Resource Management System (FIRMS)

**Operator:** NASA LANCE (Land, Atmosphere Near real-time Capability for EO) / originally developed by University of Maryland

**Geographic Focus:** Global (with enhanced real-time products for U.S. and Canada)

**Tags:** Active Fire Detection · Satellite Imagery · Real-Time Monitoring · Map · Operational

**Access:** Free, public (data download and web services available)

**URL:** <https://firms.modaps.eosdis.nasa.gov/>

FIRMS distributes near-real-time active fire and thermal anomaly detections from the MODIS instruments aboard Terra and Aqua satellites and VIIRS instruments aboard S-NPP, NOAA-20, and NOAA-21, with global data available within 3 hours of satellite observation and real-time U.S. and Canada data delivered through a dedicated partnership with the USFS — viewable via an interactive fire map and downloadable in SHP, KML, TXT, and WMS formats, with fire alert email subscriptions also available. The 375-meter VIIRS data provides the highest-resolution satellite fire detection operationally available at global scale, enabling confident detection of smaller fires and more precise hotspot locations than previous-generation products. FIRMS is the foundational global active fire data source — feeding directly into smoke dispersion models (including HRRR-Smoke and FireWork), driving emissions estimates, and providing the first satellite confirmation of new ignitions in remote or rapidly evolving fire situations.

## Global Wildfire Information System (GWIS)

**Operator:** European Commission Joint Research Centre (JRC), under the GEO and Copernicus Work Programs; supported by NASA and partner space agencies

**Geographic Focus:** Global (with regional focus tools for Latin America, the Amazon, Arctic, and country-level profiles)

**Tags:** Fire Danger · Active Fire Detection · Forecast · Archive · Map · Policy

**Access:** Free, public

**URL:** <https://gwis.jrc.ec.europa.eu/>

GWIS is a joint GEO and Copernicus initiative that consolidates regional and national wildfire information sources into a global-scale platform, offering five core applications: a Current Situation Viewer with 10-day fire danger forecasts, 1-day lightning forecasts, and near-real-time active fire data; a Current Statistics Portal with national and regional burned area statistics; a Country Profile tool with historical fire regime data at country and sub-national level for 2002–2019; a long-term monthly and seasonal fire weather forecast; and a Data and Services portal providing WMS access to all underlying datasets. Built on the foundation of EFFIS and complementing the GOFC-GOLD Fire Implementation Team's regional networks, GWIS uses ECMWF's Global ECMWF Fire Forecasting model (GEFF) to produce globally consistent fire danger assessments based on the Canadian FWI, U.S. NFDRS, and Australian McArthur rating systems — enabling cross-regional fire danger comparisons that no national system alone can provide. For international fire managers, civil protection authorities, researchers, and policy bodies requiring a globally standardized reference for current fire conditions, seasonal outlooks, and long-term fire regime analysis, GWIS is the most comprehensive freely available global wildfire intelligence platform in existence — and the direct global counterpart to EFFIS at European scale.

## Incident Information System – InciWeb

**Operator:** USDA Forest Service, in cooperation with all federal and state wildland fire agencies

**Geographic Focus:** United States (national)

**Tags:** Active Fire Detection · Real-Time Monitoring · Map · Public Outreach · Operational

**Access:** Free, public (not accessible from Germany)

**URL:** <https://inciweb.wildfire.gov/>

InciWeb is the official U.S. interagency platform for publishing public information on active wildland fire and other all-hazard incidents, providing standardized incident pages with current fire size, percent containment, perimeter maps, evacuation orders and warnings, road closures, air quality impacts, and official news releases from each incident's Public Information Officer. Updated directly by incident management teams, InciWeb is the single authoritative source for ground-truth operational status information on individual U.S. fires — information that is routinely referenced by media, emergency managers, neighboring agencies, and the public during active events. For fire managers and coordinators, InciWeb also provides a national overview of all simultaneously active incidents, supporting situational awareness and resource allocation decisions across the full scope of the fire season.

## **National Interagency Fire Center (NIFC)**

**Operator:** USDA Forest Service, USDI Bureau of Land Management, Bureau of Indian Affairs, National Park Service, Fish & Wildlife Service, National Association of State Foresters, FEMA, and NOAA

**Geographic Focus:** United States

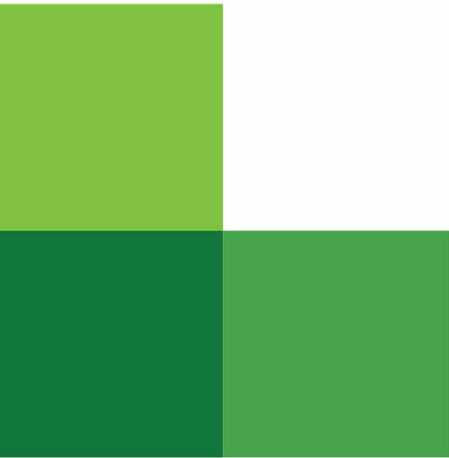
**Tags:** Fire Danger · Active Fire Detection · Decision Support · Operational · Policy

**Access:** Free, public

**URL:** <https://nifc.gov/>

NIFC is the nation's logistical support center for wildland fire management, providing national fire news, preparedness level information, access to the National Interagency Coordination Center (NICC), fire maps, news releases, and resources spanning fire prevention, mitigation, investigation, international and military support coordination, and public information officer tools. The site aggregates the authoritative national fire situation picture — including links to further resources. It is the primary federal reference hub for all stakeholders in U.S. wildland fire management. For fire managers, policymakers, media, and the public, NIFC serves as the definitive national entry point for understanding the current fire season status, accessing multi-agency fire management resources, and tracking the deployment of suppression assets at both regional and national scale.

### 3) Fire Outlooks



## Forest Fire Danger Index (WBI)

**Operator:** German Meteorological Service (DWD)

**Geographic Focus:** Germany

**Tags:** Fire Danger · Index · Forecast · Map · Short-Range · German

**Access:** Free, public

**URL:** <https://www.dwd.de/DE/leistungen/waldbrandgef/waldbrandgef.html>

The DWD publishes daily maps of the Forest Fire Danger Index (Waldbrandgefahrenindex, WBI), which rates fire danger on a five-level scale (1 = very low to 5 = very high) based on meteorological parameters including temperature, relative humidity, wind speed, and precipitation. Forecasts are available for up to four days ahead. The product is the authoritative fire danger tool for German forestry authorities, fire brigades, and state-level civil protection agencies, providing the meteorological basis for issuing public advisories, imposing access restrictions to forested areas, and coordinating prevention resources across federal states.

## Grassland Fire Index (GLFI)

**Operator:** German Meteorological Service (DWD)

**Geographic Focus:** Germany

**Tags:** Fire Danger · Index · Forecast · Map · Short-Range · German

**Access:** Free, public

**URL:** <https://www.dwd.de/DE/leistungen/graslandfi/graslandfi.html>

Where the DWD Forest Fire Danger Index (WBI) addresses fire danger in forested landscapes, the GLFI is its dedicated counterpart for open, unshaded terrain with dead grass cover and no green understorey — including road and railway embankments, heathland, and ripe or harvested grain fields. Like the WBI, the GLFI classifies weather-driven fire danger on a five-level scale (1 = very low to 5 = very high), incorporating hourly inputs of air temperature, relative humidity, wind speed, precipitation, incoming shortwave and longwave radiation, snow depth, dew formation, and litter moisture — outputting only the peak daytime value and updated once daily by 05:00 UTC. The model consistently represents a worst-case scenario by not accounting for grass greening, making it particularly applicable to the persistent dry-grass fire hazard found along transportation corridors. For fire brigades, railway operators, land managers, and civil protection authorities, the GLFI provides the meteorological basis for assessing open-land fire risk.

## **National Significant Wildland Fire Potential Outlook**

**Operator:** National Interagency Coordination Center (NICC) / National Interagency Fire Center (NIFC)

**Geographic Focus:** United States (national, with regional breakdown by Geographic Area)

**Tags:** Fire Danger · Forecast · Map · Seasonal Outlook · Archive · Decision Support

**Access:** Free, public

**URL:** <https://www.nifc.gov/nicc/predictive-services/outlooks>

This page provides two complementary forecast products: a 7-Day Significant Fire Potential outlook (updated daily by 12:00 MDT during fire season) and a monthly National Significant Wildland Fire Potential Outlook covering a rolling four-month window, both presented as color-coded maps. The monthly product synthesizes assessments from ten regional Predictive Services Units and classifies fire potential as above, near, or below normal relative to historical baselines. For fire managers, emergency planners, and resource coordinators, these tools are essential for proactive decision-making — enabling pre-positioning of crews and equipment, inter-agency resource allocation, and early situational awareness well before conditions deteriorate. An archive dating back to 2002 additionally supports trend analysis and after-action reviews.

## **Storm Prediction Center – Fire Weather Outlooks**

**Operator:** National Oceanic and Atmospheric Administration (NOAA) / National Weather Service (NWS)

**Geographic Focus:** Contiguous United States (CONUS)

**Tags:** Fire Weather · Fire Danger · Forecast · Map · Short-Range · Operational

**Access:** Free, public

**URL:** [https://www.spc.noaa.gov/products/fire\\_wx/overview.html](https://www.spc.noaa.gov/products/fire_wx/overview.html)

The SPC Fire Weather Outlooks provide operational short-term forecasts — typically out to eight days — identifying areas at risk of critical fire weather conditions such as low relative humidity, high temperatures, strong winds, and dry lightning. Products are issued in two categories: "Elevated" and "Critical/Extremely Critical," with the highest-risk areas corresponding closely to National Weather Service Red Flag Warning criteria. These outlooks are of direct operational value to fire weather meteorologists, incident commanders, and dispatch centers, as they support go/no-go decisions for prescribed burns and help anticipate rapid fire spread events before they occur.

## **Wildland Fire Assessment System (WFAS)**

**Operator:** USDA Forest Service, Rocky Mountain Research Station – Missoula Fire Sciences Laboratory

**Geographic Focus:** United States

**Tags:** Fire Danger · Drought · Index · Real-Time Monitoring · Archive · Operational

**Access:** Free, public

**URL:** <https://www.wfas.net/>

WFAS is an integrated, web-based platform providing real-time and forecasted national views of fire weather and fire potential across the United States, aggregating National Fire Danger Rating System (NFDRS) outputs, fuel moisture estimates across all timelag classes (1-hour through 1000-hour), drought indices including the Keetch-Byram Drought Index (KBDI) and Palmer Drought Severity Index, and satellite-derived vegetation condition data. Data are drawn from the national network of Remote Automated Weather Stations (RAWS) and presented as continuously updated national maps, enabling spatial comparison of fire danger conditions across geographic areas, regions, and time periods. For wildland firefighters, fire managers, and incident resource coordinators at all levels, WFAS is the primary national operational platform for fire danger intelligence — supporting daily dispatch readiness decisions, pre-positioning of suppression resources, prescribed burn go/no-go assessments, and trend analysis through historical percentile comparisons that contextualize current conditions against the long-term climatological record.

## 4) Drought and Precipitation



## **Climate Prediction Center (CPC) – United States Drought Information Portal**

**Operator:** NOAA Climate Prediction Center (CPC) / National Centers for Environmental Prediction (NCEP)

**Geographic Focus:** United States (national); selected products extend to global coverage

**Tags:** Drought · Index · Map · Climatology · Research

**Access:** Free, public

**URL:** <https://www.cpc.ncep.noaa.gov/products/Drought/>

The CPC Drought Information Portal is a comprehensive index-based drought monitoring and prediction hub consolidating a broad suite of products including the Standardized Precipitation Index (SPI) for U.S. and global monitoring with seasonal and sub-seasonal predictions, Palmer Drought Severity Indices (PDSI), Crop Moisture Indices, NLDAS-derived soil moisture percentiles, Standardized Runoff Index, Integrated Drought Index, Evaporative Demand Drought Index (EDDI), flash drought monitoring, surface temperature extremes, and multiple surface hydrology variables — alongside links to the weekly U.S. Drought Monitor, the Monthly Drought Outlook, and the Seasonal Drought Outlook. The range of indices available — spanning atmospheric, soil, hydrological, and evaporative demand perspectives — makes this portal uniquely valuable for users who need to go beyond a single drought metric to understand the multi-dimensional character of moisture deficits affecting fuel conditions. For fire weather analysts, land managers, and fire danger forecasters, the CPC Drought portal is the most analytically deep freely available U.S. drought monitoring resource, enabling differentiation between short-term surface drying (critical for fine fuel flammability) and deep hydrological drought (governing large-fuel moisture and long-term fire potential) — context that is essential for interpreting fire danger outlooks and anticipating elevated large-fire risk.

## **DWD – Regional Climate Center: Decadal Precipitation**

**Operator:** German Meteorological Service (DWD) – Regional Climate Centre for Climate Monitoring

**Geographic Focus:** Europe and surrounding regions (WMO RA VI coverage)

**Tags:** Drought · Map · Archive · Climatology

**Access:** Free, public

**URL:** [https://www.dwd.de/DE/leistungen/rcccm/int/rcccm\\_decad\\_rrr.html](https://www.dwd.de/DE/leistungen/rcccm/int/rcccm_decad_rrr.html)

As the WMO-designated Regional Climate Centre for Climate Monitoring (RCC-CM) for Europe, the DWD produces maps showing observed precipitation totals and anomalies aggregated over 10-day (decadal) periods, covering Europe, the North Atlantic, and adjacent regions. These products contextualize short-term rainfall deficits against climatological norms, supporting drought and dryness assessments across national boundaries. For transnational fire risk assessment — particularly in southern and central Europe — these maps offer a timely precipitation-deficit perspective that bridges weather monitoring and seasonal climate analysis.

## **High Plains Regional Climate Center (HPRCC) – ACIS Climate Maps**

**Operator:** High Plains Regional Climate Center (HPRCC) / University of Nebraska-Lincoln, in partnership with NOAA NCEI

**Geographic Focus:** United States (national CONUS coverage)

**Tags:** Drought · Map · Archive · Climatology · Decision Support

**Access:** Free, public

**URL:** <https://hprcc.unl.edu/maps.php?map=ACISClimateMaps>

The ACIS Climate Maps tool, developed by the High Plains Regional Climate Center in partnership with NOAA's National Centers for Environmental Information, provides routinely updated maps of recent weather and climate data for decision support — including temperature and precipitation departures from normal across a wide range of user-selectable timescales (daily, weekly, monthly, seasonal, and custom date ranges). Spatial coverage spans the entire CONUS, with data drawn from the Applied Climate Information System (ACIS), which integrates quality-controlled station observations. For fire weather analysts and drought monitors, these maps serve as a rapid diagnostic for identifying regions experiencing recent precipitation deficits or anomalous warmth — key antecedent conditions for elevated fuel flammability.

## **National Integrated Drought Information System (NIDIS)**

**Operator:** NOAA / National Integrated Drought Information System (NIDIS), multi-agency

**Geographic Focus:** United States (national, regional, and state level)

**Tags:** Drought · Real-Time Monitoring · Forecast · Map · Decision Support

**Access:** Free, public

**URL:** <https://drought.gov>

Drought.gov serves as the central U.S. government portal for drought information, aggregating data from multiple federal agencies — including NOAA, USDA, USGS, and FEMA — into a single interface covering current conditions, seasonal outlooks, historical records, and sector-specific impacts (agriculture, water supply, ecosystems, wildfire). The platform supports the National Integrated Drought Information System (NIDIS) mandate to enable early warning and preparedness across all relevant sectors. For fire managers and land use planners, it provides a one-stop resource to contextualize fire danger within broader drought and water-stress conditions, including regionally tailored tools and drought impact reporter submissions.

## UFZ Drought Monitor Germany

**Operator:** Helmholtz-Centre for Environmental Research (UFZ)

**Geographic Focus:** Germany (national, federal state and soil-depth resolution)

**Tags:** Drought · Index · Real-Time Monitoring · Map · Research · German

**Access:** Free, public

**URL:** <https://www.ufz.de/index.php?en=37937>

The UFZ Drought Monitor is produced by the Helmholtz Centre for Environmental Research and provides near-real-time maps of soil moisture anomalies across Germany at multiple depths — topsoil (0–25 cm), root zone (0–60 cm), and total soil column (0–180 cm) — classified on a percentile scale relative to a long-term climatological reference. By distinguishing shallow from deep soil moisture deficits, the monitor captures both short-term agricultural drought and the persistent hydrological drying that elevates forest fire susceptibility.

## U.S. Drought Monitor (USDM)

**Operator:** National Drought Mitigation Center (NDMC/UNL), NOAA, USDA

**Geographic Focus:** United States, Puerto Rico, Pacific Islands, U.S. Virgin Islands

**Tags:** Drought · Index · Real-Time Monitoring · Map · Archive

**Access:** Free, public

**URL:** <https://droughtmonitor.unl.edu/>

The USDM publishes weekly maps — released each Thursday at 8:30 a.m. ET based on data valid the preceding Tuesday — classifying drought intensity across five categories (D0 Abnormally Dry through D4 Exceptional Drought), with separate notations for short-term and long-term impact types. The maps synthesize dozens of meteorological, hydrological, and soil moisture indicators, and are produced by expert authors from NOAA's Climate Prediction Center. For wildfire professionals, the USDM is a critical reference for characterizing antecedent moisture deficits and long-term fuel drying trends that underpin elevated fire danger, particularly in transitioning from D2 upward — categories well correlated with elevated large-fire activity. Downloadable GIS layers, time series data, and a comprehensive archive back to 2000 further support analytical and operational use.

## **Weather Prediction Center (WPC) – Probabilistic Precipitation Forecasts**

**Operator:** NOAA Weather Prediction Center (WPC)

**Geographic Focus:** Contiguous United States (CONUS)

**Tags:** Forecast · Probabilistic Forecast · Map · Short-Range · Operational

**Access:** Free, public

**URL:** [https://www.wpc.ncep.noaa.gov/Prob\\_Precip/#](https://www.wpc.ncep.noaa.gov/Prob_Precip/#)

This product extends beyond deterministic forecasts by providing ensemble-derived probability maps showing the likelihood of exceeding specific precipitation thresholds (e.g.,  $\geq 0.01$ ",  $\geq 0.25$ ",  $\geq 1.00$ ") over forecast periods from Day 1 out to Day 7. Rather than showing a single expected rainfall amount, it communicates forecast uncertainty and the range of possible outcomes — highly valuable when assessing the reliability of forecast precipitation relief for fire operations. Fire weather meteorologists and incident teams can use these probabilities to weigh the credibility of a forecast rain event when planning suppression operations or prescribed burn windows.

## **Weather Prediction Center (WPC) – Quantitative Precipitation Forecast (QPF)**

**Operator:** NOAA Weather Prediction Center (WPC)

**Geographic Focus:** Contiguous United States (CONUS)

**Tags:** Forecast · Map · Short-Range · Operational

**Access:** Free, public

**URL:** <https://www.wpc.ncep.noaa.gov/qpf/qpf2.shtml>

The QPF products provide operational precipitation amount forecasts for the CONUS at daily intervals out to seven days, showing predicted rainfall totals across forecast periods (Day 1, Day 2, Day 3, and Days 4–7). Produced by WPC meteorologists using ensemble guidance and numerical weather prediction models, the maps indicate where and how much precipitation is expected, enabling assessment of both flood risk and potential fire weather relief. For fire operations, QPF is a critical tool for evaluating whether forecast precipitation is sufficient to meaningfully reduce fuel moisture and fire danger — or whether it falls below the threshold needed to affect ongoing fire behavior.

## 5) Air Quality and Smoke



## **AirFire Tools Portal**

**Operator:** USDA Forest Service PNW Research Station, Pacific Wildland Fire Sciences Laboratory (AirFire Team)

**Geographic Focus:** United States (national)

**Tags:** Smoke · Real-Time Monitoring · Model Output · Operational · Decision Support

**Access:** Free, public (some tools restricted to authorized users)

**URL:** <https://portal.airfire.org/>

The AirFire Tools portal aggregates links to the most recent versions of smoke monitoring and modelling tools produced by the USFS Pacific Wildland Fire Sciences Laboratory in support of the Wildland Fire Air Quality Response Program (IWFAQRP) and wildland fire operations, including real-time PM2.5 monitoring, historical air quality data, BlueSky model runs, and satellite-based fire and smoke analysis resources. The portal serves as a single access point for the full AirFire suite — from the BlueSky daily model viewer and Playground on-demand tool to the AirMonitor R package and EPA/IWFAQRP Fire & Smoke Map. It is an essential bookmark for smoke managers, air quality researchers, and Air Resource Advisors (ARAs) embedded with fire incident management teams.

## **AirNow – Wildfire Smoke and Air Quality**

**Operator:** U.S. EPA, in partnership with USFS, NOAA, NPS, tribal, state and local air agencies

**Geographic Focus:** United States (national, with some North American coverage)

**Tags:** Smoke · Real-Time Monitoring · Map · Public Outreach · Operational

**Access:** Free, public

**URL:** <https://www.airnow.gov/wildfires/>

AirNow's wildfire portal aggregates real-time PM2.5 measurements from EPA-certified regulatory monitors and low-cost sensors (via PurpleAir integration) into a national Fire and Smoke Map, displaying current Air Quality Index (AQI) values alongside active fire perimeters and smoke forecast overlays. It also provides actionable public health guidance, resources for local air agencies, and links to protective action information tailored to sensitive populations. For public health officials, emergency managers, and the general public, it is the authoritative one-stop resource connecting observed smoke concentrations directly to health risk communication.

## **AIRPACT – Pacific Northwest Air Quality Forecast**

**Operator:** Washington State University (WSU), Laboratory for Atmospheric Research (LAR); supported by EPA, USFS, and Northwest state agencies

**Geographic Focus:** Pacific Northwest U.S. (Washington, Oregon, Idaho, and parts of adjacent states)

**Tags:** Smoke · Forecast · Model Output · Map · Short-Range · Operational

**Access:** Free, public

**URL:** <https://airpact.wsu.edu/map.html>

The AIRPACT interactive map viewer provides regional air quality forecast outputs — including PM2.5, ozone, and emissions fields — with overlays of BlueSky fire data, HMS satellite fire detections, AirNow monitoring sites, and Class I wilderness area boundaries, covering the Pacific Northwest at fine spatial resolution. The underlying AIRPACT-5 system uses the CMAQ atmospheric chemistry model driven by WRF meteorology and daily-updated fire emission inputs, with GIS-downloadable outputs in geopackage format for advanced users. For state air quality agencies, tribal environmental programs, prescribed burn planners, and public health officials in the Pacific Northwest, AIRPACT provides the most regionally focused operational smoke and ozone forecast tool available, particularly valuable during the region's intense summer and fall wildfire seasons.

## **Air Quality Health Index (AQHI)**

**Operator:** Environment and Climate Change Canada (ECCC)

**Geographic Focus:** Canada

**Tags:** Smoke · Index · Public Outreach · Decision Support

**Access:** Free, public

**URL:**

<https://www.canada.ca/en/environment-climate-change/services/air-quality-health-index.html>

The AQHI is a Canadian health protection tool that communicates air quality on a scale from 1 to 10 (and above), designed to help the public — particularly sensitive individuals — make decisions to protect their health by adjusting outdoor activity levels in response to short-term air pollution exposure, with advice tailored to low, moderate, high, and very high health risk categories. Unlike the U.S. AQI, the AQHI is based on the combined health risk of a mixture of PM2.5, ozone, and NO2 rather than individual pollutant thresholds, reflecting Canadian epidemiological research. For fire and air quality communicators working across the Canada-U.S. border, understanding the AQHI framework is essential context for interpreting Canadian wildfire smoke advisories and messaging, as its scale and risk categories differ from the EPA AQI system used in the U.S.

## **AQmap.ca – Canadian Air Quality Map**

**Operator:** Environment and Climate Change Canada (ECCC)

**Geographic Focus:** Canada

**Tags:** Smoke · Real-Time Monitoring · Index · Map · Public Outreach

**Access:** Free, public

**URL:** <https://aqmap.ca>

AQmap.ca provides a real-time interactive map of air quality conditions across Canada, drawing on ECCC's national monitoring network to display current Air Quality Health Index (AQHI) readings and PM2.5 concentrations at station level. The platform is closely integrated with the AQHI communication framework and provides direct links to provincial and territorial air quality advisories and health guidance. During wildfire smoke events, it functions as a rapid national situational display for health authorities, emergency managers, and the public seeking current conditions at specific Canadian communities, complementing the 72-hour FireWork model forecasts with observed ground-truth data.

## **BlueSky Playground (AirFire / USFS)**

**Operator:** USDA Forest Service Pacific Wildland Fire Sciences Laboratory (AirFire Team)

**Geographic Focus:** United States (customizable user-defined locations)

**Tags:** Smoke · Prescribed Fire · Model Output · Point Forecast · Operational · Decision Support

**Access:** Free, public

**URL:** <https://tools.airfire.org/playground/v3.5/emissionsinputs.php>

BlueSky Playground is an ad-hoc, on-demand smoke modelling tool that allows users to create emissions scenarios for prescribed burns and wildfires, then model the resulting smoke dispersion; it offers both an Express version for rapid planning and a Full version using comprehensive fuel data with expert parameter customization. Users define a fire location, size, fuel type, burn timing, and meteorological inputs to generate point-specific PM2.5 dispersion forecasts keyed to EPA AQI thresholds. The tool is primarily designed for prescribed burn practitioners who need pre-burn smoke impact assessments to inform smoke management plans, determine acceptable burn windows, and anticipate off-site air quality impacts.

## **Copernicus Atmosphere Monitoring Service (CAMS)**

**Operator:** Copernicus Atmosphere Monitoring Service (CAMS) / ECMWF, EU

**Geographic Focus:** Global

**Tags:** Smoke · Forecast · Model Output · Map · Satellite Imagery · Medium-Range

**Access:** Free, public

**URL:** <https://atmosphere.copernicus.eu/charts/packages/cams/>

The CAMS chart packages provide near-real-time and forecast maps of atmospheric composition variables — including fire radiative power, aerosol optical depth, PM2.5, carbon monoxide, and smoke-layer heights — derived from ECMWF's global atmospheric model and satellite data assimilation. Forecasts extend to five days, updated twice daily, with global coverage at high horizontal resolution. For fire managers, air quality authorities, and emergency coordinators, CAMS offers a pan-continental perspective on wildfire smoke transport that is especially valuable when large fires generate transboundary plumes affecting air quality across entire continents.

## **Environment and Climate Change Canada – FireWork Air Quality Model**

**Operator:** Environment and Climate Change Canada (ECCC)

**Geographic Focus:** Canada and North America

**Tags:** Smoke · Forecast · Model Output · Map · Short-Range · Operational

**Access:** Free, public

**URL:** <https://weather.gc.ca/firework/>

The FireWork model, run twice daily by Environment and Climate Change Canada, generates 72-hour animated forecast maps showing hourly and 24-hour average surface PM2.5 concentrations from wildfire smoke plumes, total fine particulate matter (combining wildfire and anthropogenic sources), ground-level ozone, and nitrogen dioxide — the three pollutants used to calculate Canada's Air Quality Health Index (AQHI). FireWork uses active satellite fire detection to initialize wildfire emission inputs within ECCC's GEM-MACH atmospheric chemistry model, providing a nationally consistent smoke dispersion forecast across Canada and extending into the continental U.S. It is the authoritative Canadian government smoke forecast product, widely used by provincial and territorial air quality agencies, public health authorities, and fire management agencies to anticipate smoke-driven AQHI escalations.

## **FireSmoke Canada – Wildfire Smoke & Fire Weather Portal**

**Operator:** Weather Forecast Research Team (WFRT), University of British Columbia; supported by multiple Canadian federal and provincial agencies

**Geographic Focus:** Canada and North America

**Tags:** Smoke · Fire Weather · Forecast · Model Output · Operational · Decision Support

**Access:** Free, public

**URL:** <https://firesmoke.ca/>

FireSmoke Canada is the Canadian portal for wildland fire weather and smoke information, providing access to BlueSky Canada smoke forecasts, fire weather forecasts, the SmartFire fire data system, and the BlueSky Playground smoke modelling tool, serving professionals in air quality, health and safety, emergency management, and research. The smoke forecast component delivers high-resolution, hourly and daily-average PM2.5 ground-level concentration maps driven by active fire detections reconciled through SmartFire — a GIS database integrating satellite hotspot detections and ground-truth fire reports. For Canadian air quality managers, prescribed burn planners, and public health officials, FireSmoke.ca provides an integrated modelling and data platform that bridges operational fire intelligence with smoke dispersion forecasting.

## **IQAir – Global Air Quality Map**

**Operator:** IQAir AG (Switzerland)

**Geographic Focus:** Global

**Tags:** Smoke · Real-Time Monitoring · Map

**Access:** Free, public (commercial platform)

**URL:** <https://www.iqair.com/air-quality-map>

IQAir's interactive world air quality map aggregates real-time PM2.5 data from regulatory monitoring networks and low-cost sensors globally, displaying current AQI values (US EPA standard) with country and city rankings, updated continuously. The platform combines ground sensor data with satellite-derived aerosol information and model output to fill spatial gaps, providing one of the most globally comprehensive public-facing air quality interfaces available. For wildfire smoke tracking in regions with sparse official monitoring infrastructure — including parts of Africa, Asia, and South America — IQAir's map offers practical situational awareness, though users should be aware of data quality variability across sensor types and geographies.

## **NASA GEOS-5 – PM2.5 Surface Concentration Forecast**

**Operator:** NASA Global Modeling and Assimilation Office (GMAO)

**Geographic Focus:** Global (North America regional view available)

**Tags:** Smoke · Forecast · Model Output · Map · Satellite Imagery · Research

**Access:** Free, public

**URL:**

<https://fluid.nccs.nasa.gov/wxmaps/chem2d/?stream=G5FPFC&field=pm25sfc&level=0&region=nam>

This page provides near-real-time and forecast surface PM2.5 maps derived from NASA's GEOS-5 atmospheric model, which assimilates MODIS and VIIRS aerosol optical depth retrievals alongside fire radiative power from satellite observations to characterize wildfire smoke, dust, sea salt, and anthropogenic pollution simultaneously. The global coverage and multi-aerosol-species capability make it particularly valuable for tracking long-range transoceanic smoke transport events — such as Canadian or Siberian fire smoke reaching Europe or North America — that regional models may handle less accurately. Researchers and air quality specialists use the GEOS-5 viewer as an independent global reference, especially where no regional operational smoke forecast exists.

## **National Weather Service (NWS) Air Quality Forecast – PM2.5**

**Operator:** NOAA National Weather Service / Weather Prediction Center (WPC)

**Geographic Focus:** Contiguous United States (CONUS)

**Tags:** Smoke · Forecast · Model Output · Map · Short-Range · Operational

**Access:** Free, public

**URL:** <https://airquality.weather.gov/>

The NWS Air Quality Forecast Guidance page provides operational 48-hour forecasts of surface PM2.5 and ozone concentrations generated by NOAA's National Air Quality Forecast Capability (NAQFC), using the Community Multiscale Air Quality (CMAQ) model driven by NOAA meteorological inputs and emission inventories. Outputs are displayed as hourly animated maps with AQI color scales, enabling direct comparison of forecast smoke and pollution levels to health thresholds. For operational air quality forecasters at state agencies and NWS field offices, this product serves as the primary official guidance for issuing Air Quality Action Day advisories, complementing real-time monitoring data from AirNow.

## **NOAA HRRR-Smoke**

**Operator:** NOAA Global Systems Laboratory (GSL)

**Geographic Focus:** Contiguous United States (CONUS)

**Tags:** Smoke · Forecast · Model Output · Map · Short-Range · Operational

**Access:** Free, public

**URL:** <https://rapidrefresh.noaa.gov/hrrr/HRRRsmoke/>

HRRR-Smoke is an experimental smoke-aware extension of NOAA's operational High-Resolution Rapid Refresh (HRRR) model, running at 3 km horizontal resolution with hourly updates out to 48 hours, coupling near-real-time fire emission inputs (from MODIS/VIIRS satellite detections) with smoke aerosol transport and deposition physics. Forecast outputs include hourly surface PM<sub>2.5</sub> concentrations, column smoke fields, and aerosol optical depth, making it the highest-resolution operationally-cycling smoke forecast available for the U.S. For fire weather meteorologists, air quality forecasters, and incident management teams, HRRR-Smoke provides the spatial and temporal detail needed to anticipate smoke impacts on communities, roadways, and aviation corridors in near-real time.

## **NOAA HYSPLIT Trajectory Model**

**Operator:** NOAA Air Resources Laboratory (ARL)

**Geographic Focus:** Global

**Tags:** Smoke · Model Output · Point Forecast · Research · Operational

**Access:** Free, public (web interface)

**URL:** <https://www.ready.noaa.gov/HYSPLIT.php>

HYSPLIT is NOAA's widely used Lagrangian particle trajectory and dispersion model, enabling users to compute forward or backward air mass trajectories — and full concentration/deposition fields — from any location and time using archived or forecast meteorological fields. In a wildfire context, forward trajectories identify where smoke plumes are transported from an active fire, while back-trajectories help air quality analysts trace the origin of observed PM<sub>2.5</sub> spikes to a specific fire source. As a free, browser-accessible research and operational tool used globally by atmospheric scientists, emergency managers, and public health agencies, HYSPLIT remains one of the most cited and versatile tools in the smoke and air quality toolkit.

## **NOAA RRFS-SD (Rapid Refresh Forecast System – Smoke and Dust)**

**Operator:** NOAA Environmental Modeling Center (EMC) / Global Systems Laboratory (GSL)

**Geographic Focus:** Contiguous United States and North America

**Tags:** Smoke · Forecast · Model Output · Map · Short-Range · Research

**Access:** Free, public (experimental)

**URL:** <https://rapidrefresh.noaa.gov/RRFS-SD/>

RRFS-SD is an experimental next-generation numerical weather prediction system coupling the Rapid Refresh Forecast System — NOAA's planned successor to HRRR and RAP — with inline smoke and dust aerosol modules, running at convection-allowing resolution with frequent update cycles. It ingests near-real-time satellite fire detections for emission estimation and produces forecast fields of surface PM<sub>2.5</sub>, dust concentrations, and aerosol optical depth, representing the developmental trajectory for NOAA's future operational smoke and dust forecast capability. Fire weather meteorologists and researchers can use RRFS-SD to evaluate next-generation model performance and gain early access to improved smoke dispersion guidance ahead of eventual operational implementation.

## **PREV'AIR – French Air Quality Forecast System**

**Operator:** INERIS (National Institute for Industrial Environment and Risks), in consortium with Météo-France and LCSQA; funded by the French Ministry of Ecology

**Geographic Focus:** France and Europe

**Tags:** Smoke · Forecast · Model Output · Map · Short-Range · Archive · French

**Access:** Free, public (PREV'AIR+ extended data with registration)

**URL:** <https://www.prevoir.org/>

PREV'AIR is the French national air quality forecasting system providing forecasts of PM<sub>2.5</sub>, ozone, and nitrogen dioxide concentrations across France and Europe, alongside air quality health bulletins, regulatory context, historical data archives, and public guidance on pollutant health effects and protective measures. The system couples several atmospheric chemistry models with emission inventories and meteorological inputs to produce daily forecast maps and assessments, which are used by French air quality monitoring associations (AASQAs) and health authorities for issuing alerts. During southern European wildfire seasons, PREV'AIR is a key reference for tracking smoke plume impacts on French air quality, particularly from fires in the Mediterranean basin, Iberian Peninsula, and North Africa.

## PurpleAir – Air Quality Map

**Operator:** PurpleAir LLC

**Geographic Focus:** Global (sensor-dependent; densest coverage in U.S., Europe, Australia)

**Tags:** Smoke · Real-Time Monitoring · Map · Public Outreach

**Access:** Free, public

**URL:** <https://map.purpleair.com/>

PurpleAir operates a global network of thousands of low-cost optical particle counter sensors, displaying real-time PM<sub>2.5</sub> concentrations on an interactive map updated every two minutes, with AQI color coding and user-configurable averaging periods. While individual sensors carry greater uncertainty than regulatory-grade monitors and require correction factors (e.g., EPA's U.S.-Wide correction for wildfire smoke), the network's spatial density fills critical gaps in areas underserved by official monitoring — particularly rural and wildland-urban interface communities. During active wildfire events, PurpleAir has become an essential hyperlocal situational awareness tool for public health officials, emergency responders, and community members assessing smoke exposure in real time.

## Simple Smoke

**Operator:** Florida Department of Agriculture and Consumer Services (FDACS) / Florida Forest Service

**Geographic Focus:** Florida (primary), with broader U.S. applicability

**Tags:** Smoke · Prescribed Fire · Model Output · Point Forecast · Operational · Decision Support

**Access:** Free, public

**URL:** <https://weather.fdacs.gov/Simple-Smoke/index.html>

Simple Smoke is a streamlined, web-based smoke dispersion planning tool developed by the Florida Forest Service to help prescribed burn practitioners rapidly estimate downwind smoke impacts from planned burns. Like VSmoke-Web, it uses simplified Gaussian dispersion principles but is tailored to Florida's regulatory environment and common fuel types, outputting PM<sub>2.5</sub> and visibility estimates tied to AQI categories. The tool lowers the technical barrier for smoke management planning and supports compliance with Florida's smoke management permitting requirements, making it a key operational resource for the state's large, prescribed fire community.

## **System for Integrated modeLLing of Atmospheric coMposition (SILAM) – Finnish Meteorological Institute Air Quality Forecast**

**Operator:** Finnish Meteorological Institute (FMI)

**Geographic Focus:** Global, with regional domains including Europe and North America

**Tags:** Smoke · Forecast · Model Output · Map · Medium-Range · Research

**Access:** Free, public (scientific use disclaimer)

**URL:** <https://silam.fmi.fi/aqforecast.html>

SILAM (System for Integrated modeLLing of Atmospheric coMposition) is an Eulerian atmospheric dispersion model developed at the Finnish Meteorological Institute that produces air quality, fire smoke, and pollen forecasts using wildland fire emission inputs from the IS4FIRES system along with anthropogenic emissions, and provides outputs including surface concentrations and depositions of PM<sub>2.5</sub>, PM<sub>10</sub>, O<sub>3</sub>, NO<sub>2</sub>, SO<sub>2</sub>, and aerosol optical depth across multiple regional and global domains. The system is available as open-code for research applications and offers multi-height outputs and multi-species coverage rarely combined in a single publicly accessible viewer. For European and global fire and air quality researchers, SILAM provides a scientifically robust independent cross-check against operational forecast systems such as CAMS.

## **VSmoke-Web**

**Operator:** Georgia Forestry Commission (GFC) / USDA Forest Service (VSmoke model, Lavdas 1996)

**Geographic Focus:** United States, primarily the Southeast

**Tags:** Smoke · Prescribed Fire · Model Output · Point Forecast · Operational · Decision Support

**Access:** Free, public

**URL:** <https://weather.gfc.state.ga.us/GoogleVsmoke/vsmoke-Good2.html>

VSmoke-Web is a web-based implementation of the VSmoke Gaussian smoke dispersion model designed to assist with planning prescribed burns in the Southern United States, calculating isopleths of peak hourly PM<sub>2.5</sub> surface concentrations with output contour values corresponding to AQI health thresholds from Moderate to Hazardous. Users simply click a location on the map or enter coordinates, then specify fire and meteorological parameters to generate a rapid dispersion estimate requiring no specialist modelling software. Its simplicity makes it particularly well suited for land managers and prescribed burn practitioners in the Southeast who need a fast, low-barrier smoke impact screening tool before submitting burn permit applications or conducting operations near populated areas.

## 6) Satellite, Radar and Observations



## **Copernicus Browser – Sentinel Satellite Data Viewer**

**Operator:** European Space Agency (ESA) / Copernicus programme

**Geographic Focus:** Global

**Tags:** Satellite Imagery · Active Fire Detection · Post-Fire Assessment · Real-Time Monitoring

**Access:** Free, public (account required for some functions)

**URL:** <https://browser.dataspace.copernicus.eu/>

The Copernicus Browser provides on-demand access to the full archive of Sentinel satellite imagery — including Sentinel-2 high-resolution multispectral data (10 m), Sentinel-1 SAR, and Sentinel-3 fire radiative power products — through an interactive web interface supporting custom band combinations, spectral indices (NDVI, NBR, SWIR false color), and time-series comparisons. For wildfire applications, it is the premier free tool for mapping burn scars with the Normalized Burn Ratio (NBR), assessing post-fire vegetation recovery, delineating fire perimeters from SWIR imagery, and detecting active fires using Sentinel-3 SLSTR. Emergency managers, remote sensing analysts, and researchers can use the browser to generate before/after fire imagery comparisons within hours of a Sentinel-2 overpass, making it an essential resource for rapid damage assessment.

## **Environment and Climate Change Canada – Weather Information Portal**

**Operator:** Environment and Climate Change Canada (ECCC) / Meteorological Service of Canada (MSC)

**Geographic Focus:** Canada (national, provincial, and local)

**Tags:** Fire Weather · Real-Time Monitoring · Map · Operational · Public Outreach

**Access:** Free, public

**URL:** <https://weather.gc.ca/>

The main ECCC weather portal is Canada's authoritative public-facing weather service, providing local and regional forecasts, AQHI readings, active weather warnings and advisories (including Fire Weather Watches and Special Air Quality Statements), national radar and satellite imagery, seasonal climate outlooks, and links to specialized products including FireWork smoke forecasts. As the primary interface through which Canadians access official government weather and air quality guidance, it is the essential starting point for any fire-related situational awareness in Canada — particularly during wildfire season when concurrent weather extremes, smoke events, and fire weather warnings are issued across multiple regions simultaneously. For fire managers and emergency coordinators, the portal also links directly to Environment Canada's model output, marine forecasts, and the national weather warning map, consolidating the majority of operationally relevant MSC products in one location.

## EUMETSAT Product Viewer

**Operator:** EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites)

**Geographic Focus:** Europe, Africa, Atlantic, Indian Ocean, and global (Meteosat, Metop, MSG coverage)

**Tags:** Satellite Imagery · Active Fire Detection · Real-Time Monitoring · Map · Operational

**Access:** Free, public (some data requires registration)

**URL:** <https://view.eumetsat.int/productviewer?v=default>

EUMETView is EUMETSAT's official interactive satellite product viewer, providing real-time access to imagery and derived products from the Meteosat Second Generation (MSG) and Meteosat Third Generation (MTG) geostationary satellites, as well as Metop polar-orbiting platforms — including Natural Color, fire RGB, dust RGB, and fire radiative power products. For Europe and Africa, it is the primary source of operational geostationary satellite fire detection and smoke visualization, with Meteosat's rapid-scan mode providing imagery updates every 5 minutes over Europe. Fire managers, civil protection authorities, and meteorologists across the EU can use EUMETView to monitor active fire fronts, track smoke plume evolution, and assess day/night fire behavior in near-real time at continental scale.

## Kachelmannwetter

**Operator:** Kachelmann GmbH

**Geographic Focus:** Primarily Europe (Germany, Austria, Switzerland focus; broader European coverage)

**Tags:** Fire Weather · Real-Time Monitoring · Map · Forecast · Short-Range · German

**Access:** Free (core); premium subscription for extended features and data

**URL:** <https://kachelmannwetter.com/de>

Kachelmannwetter is a professional-grade meteorological platform widely used across the German-speaking world, offering high-quality radar animations, lightning detection data (BLIDS/EUCLID), wind and weather station observations, and multi-model NWP forecast charts (including ICON-D2, ECMWF, and GFS) with an emphasis on central European detail and accuracy. The platform integrates radar and lightning data in a single map interface that is particularly valuable for fire weather monitoring — especially for tracking dry convective storms producing lightning without significant precipitation, the primary ignition risk in central European forest landscapes. For German, Austrian, and Swiss fire weather forecasters, land managers, and emergency planners, Kachelmannwetter provides operationally useful high-resolution meteorological situational awareness that supplements official DWD products.

## **National Weather Service (NWS) – National Radar Mosaic**

**Operator:** NOAA National Weather Service (NWS)

**Geographic Focus:** Contiguous United States (CONUS)

**Tags:** Fire Weather · Real-Time Monitoring · Map · Operational

**Access:** Free, public

**URL:** <https://radar.weather.gov/region/conus/standard>

The NWS national radar mosaic stitches together observations from the U.S. network of WSR-88D (NEXRAD) Doppler radars into a continuously updated continental-scale reflectivity display, showing current precipitation location, intensity, and movement across the CONUS. In a wildfire context, the radar mosaic is an essential tool for monitoring convective activity — particularly dry thunderstorm cells producing lightning with little or no precipitation reaching the ground — which represent the primary natural ignition mechanism across much of the western U.S. Fire weather meteorologists rely on this product to track incoming storm lines, assess precipitation-to-fire risk ratios in real time, and inform spot weather forecasts during active ignition threat windows.

## **National Weather Service (NWS) Weather and Hazards Data Viewer**

**Operator:** NOAA National Weather Service (NWS) / Western Region

**Geographic Focus:** United States (national)

**Tags:** Fire Weather · Fire Danger · Real-Time Monitoring · Map · Operational

**Access:** Free, public

**URL:** <https://www.weather.gov/wrh/hazards>

The NWS Weather and Hazards Data Viewer is an interactive map tool that aggregates and displays the full range of NWS hazard products — including watches, warnings, and advisories across weather, fire, hydrology, and other hazard categories — alongside forecast and observational overlays. Users can simultaneously view active Red Flag Warnings, Fire Weather Watches, and other critical alerts spatially, with the ability to layer additional data such as radar, satellite, and model output in a single interface. For fire managers, emergency coordinators, and local officials, this viewer provides a rapid, map-based situational picture of concurrent weather hazards affecting fire operations — especially useful during complex, multi-region fire events where overlapping meteorological threats must be tracked simultaneously.

## **NOAA/NESDIS GOES Imagery Viewer**

**Operator:** NOAA / NESDIS / Center for Satellite Applications and Research (STAR)

**Geographic Focus:** Western Hemisphere (CONUS, Alaska, Hawaii, Caribbean, Pacific, full disk)

**Tags:** Satellite Imagery · Active Fire Detection · Real-Time Monitoring · Map · Operational

**Access:** Free, public

**URL:** <https://www.star.nesdis.noaa.gov/GOES/index.php>

The NOAA/NESDIS GOES Imagery Viewer provides real-time and animated access to the full suite of GOES-East and GOES-West satellite products — including GeoColor true-color imagery, the Fire Temperature RGB composite for fire identification, GLM lightning flash extent density, Air Mass RGB, Sandwich RGB, and derived motion winds — across CONUS, mesoscale, and full-disk domains. The Fire Temperature RGB product is particularly valuable for fire operations, as it differentiates active fire areas from cooler smoke and clouds by highlighting high-temperature pixels in distinct colors, enabling rapid detection of new ignitions and fire perimeter changes even through partial cloud cover. Updated as frequently as every 30 seconds in mesoscale mode, the viewer gives fire weather meteorologists and aviation safety officers the near-real-time satellite situational awareness needed during rapidly evolving fire events.

## **Weather Underground – Wundermap**

**Operator:** Weather Underground / The Weather Company (IBM)

**Geographic Focus:** Global (densest coverage in U.S., Europe, Australia)

**Tags:** Fire Weather · Real-Time Monitoring · Map · Operational

**Access:** Free, public (account optional)

**URL:** <https://www.wunderground.com/wundermap>

Wundermap is an interactive weather data platform aggregating real-time observations from Weather Underground's extensive Personal Weather Station (PWS) network — numbering hundreds of thousands of citizen-operated stations globally — alongside official NWS/ASOS data, live radar, satellite, and surface analysis overlays. Its primary value lies in hyperlocal surface weather data density: in populated areas and wildland-urban interface zones, PWS stations can provide temperature, relative humidity, and wind data at spatial resolutions far exceeding official station networks, which is critical for fire weather monitoring in terrain-complex areas where conditions vary sharply over short distances. Fire behavior analysts, prescribed burn practitioners, and local emergency managers can use Wundermap to identify microclimatic fire weather conditions — such as localized low humidity or channeled wind — that may not be captured by the nearest official RAWS or ASOS station.

## **Weather.us – NWP Model Chart Viewer**

**Operator:** Kachelmann GmbH

**Geographic Focus:** Global and regional (with specialized domains for Europe, North America, and beyond)

**Tags:** Fire Weather · Forecast · Model Output · Map · Short-Range · Operational

**Access:** Free (core access); premium subscription for extended ECMWF data

**URL:** <https://weather.us>

Weather.us provides model chart output from all major global and local numerical weather prediction models — including ECMWF, ICON, GFS, UKMO, ACCESS-G, GEM at global scale and HRRR, NAM, ICON-D2, EURO4, and Swiss HD at regional/local scale — covering a wide range of meteorological parameters including surface wind, temperature, relative humidity, geopotential height, and precipitation. The platform's multi-model comparison capability makes it a valuable tool for fire weather meteorologists seeking to cross-check forecasts from different modeling systems for parameters directly relevant to fire behavior — particularly in scenarios where model uncertainty is high. Its combination of ECMWF-quality guidance with high-resolution mesoscale models in a single, cleanly presented interface makes it a popular choice among European and North American fire weather professionals.

## **Zoom Earth**

**Operator:** Neave Interactive

**Geographic Focus:** Global

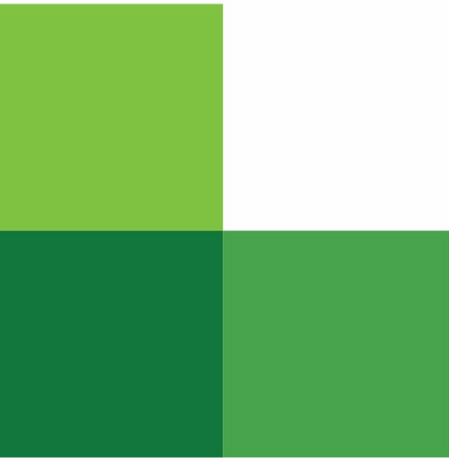
**Tags:** Satellite Imagery · Real-Time Monitoring · Map · Forecast

**Access:** Free, public

**URL:** <https://zoom.earth/places/europe/>

Zoom Earth provides live satellite imagery from GOES, Himawari, and Meteosat geostationary satellites alongside interactive weather overlays for precipitation, wind speed, temperature, and forecast model output (ICON, GFS), with additional layers for fire burnt area, cyclone tracking, and weather warnings, presented in a globally navigable map interface. The platform refreshes satellite imagery every 10–20 minutes and offers animation loops, making it accessible for users without specialist GIS tools who need a fast visual check on fire activity, smoke plume movement, or approaching weather systems. For public communicators, journalists, emergency managers, and situationally aware professionals, Zoom Earth provides an intuitive, browser-based satellite monitoring tool that requires no training and is available globally without login.

## 7) Forecast Information



## **Earth.nullschool.net – Global Wind and Weather Visualization**

**Operator:** Cameron Beccario (independent developer, Japan)

**Geographic Focus:** Global

**Tags:** Map · Model Output · Real-Time Monitoring · Public Outreach

**Access:** Free, public

**URL:** <https://earth.nullschool.net/>

Earth.nullschool.net is an elegantly rendered interactive globe displaying animated wind flow fields at selectable atmospheric levels (surface through 10 hPa) derived from GFS model output, updated every three hours, with additional overlays for temperature, relative humidity, total precipitable water, ocean currents, wave height, and chemical tracers including CO, SO<sub>2</sub>, and aerosol optical depth from GEOS-5. The surface wind animation is particularly intuitive for visualizing large-scale wind patterns affecting fire spread — including synoptic-scale flow driving offshore wind events (Santa Ana, Diablo winds), foehn conditions in Europe, and smoke transport corridors — in a visually compelling and immediately interpretable format. While not a precision operational tool, earth.nullschool provides an unmatched global overview of atmospheric dynamics that is widely used by fire educators, communicators, and situational awareness briefers to convey wind and smoke transport conditions to broad audiences.

## **Meteograma Pyrocast**

**Operator:** CONAF – Corporación Nacional Forestal (Chilean National Forestry Corporation)

**Geographic Focus:** Global (with operational focus on Chile and South America)

**Tags:** Fire Weather · Active Fire Detection · Index · Point Forecast · Archive · Operational · Spanish

**Access:** Free, public

**URL:** <https://meteograma.deigeprif.com/>

Meteograma Pyrocast is a fire weather forecasting tool developed by CONAF that generates point-location meteograms for any location worldwide using both GFS and ECMWF IFS model data, displaying key meteorological parameters alongside the Hot-Dry-Windy Index (HDWI) — a composite fire weather index combining temperature, relative humidity, and wind speed into a single fire danger metric. The platform uniquely supports hindcast analysis, allowing users to reproduce past model forecasts for post-fire event reconstruction and validation — a capability rarely available in public-facing fire weather tools. Integration of NASA FIRMS active fire detection data further enriches the platform's situational picture, enabling users to correlate observed fire activity with concurrent and forecast fire weather conditions. For fire weather forecasters, fire behavior analysts, and researchers — particularly across Latin America — Pyrocast offers an accessible, multilayered point-forecast tool that combines operational forecasting, post-event analysis, and satellite fire intelligence in a single interface.

## **National GACC Website Portal**

**Operator:** National Interagency Fire Center (NIFC) / Geographic Area Coordination Centers

**Geographic Focus:** United States (national; ten regional GACCs)

**Tags:** Fire Danger · Forecast · Decision Support · Operational · Seasonal Outlook

**Access:** Free, public

**URL:** <https://gacc.nifc.gov/>

The national GACC portal serves as the web gateway to all ten U.S. Geographic Area Coordination Centers — Alaska, Eastern Area, Great Basin, Northern California, Northern Rockies, Northwest, Rocky Mountain, Southern Area, Southern California, and Southwest — providing links to each GACC's Predictive Services intelligence, weather, fuels/fire danger, and fire potential outlook products, as well as current national and regional preparedness levels. Each GACC produces region-specific fire weather and fire danger products tailored to local fuel types, terrain, and climate patterns that complement the national NIFC products with finer geographic resolution and operational context. For fire managers, incident commanders, and resource coordinators, the GACC portal is the authoritative entry point for regionally calibrated situational intelligence — including 7-day outlooks, resource availability summaries, and preparedness level decisions that govern pre-positioning of firefighting assets across the U.S.

## **National Weather Service (NWS) – Fire Weather Portal**

**Operator:** National Oceanic and Atmospheric Administration (NOAA) / National Weather Service (NWS)

**Geographic Focus:** United States, territories, and adjacent waters (national)

**Tags:** Fire Weather · Fire Danger · Forecast · Operational · Decision Support

**Access:** Free, public

**URL:** <https://www.weather.gov/fire>

The NWS Fire Weather portal is the fire-specific sub-portal of weather.gov, consolidating direct links to all NWS fire weather operational products — including fire weather zone forecasts (FWF), NFDRS forecasts, Fire Weather Watch and Red Flag Warning products, issued and on-demand spot forecasts, the Fire Weather GIS Viewer, and SPC fire weather outlooks — alongside NIFC Predictive Services intelligence products and CPC medium- to long-range outlooks relevant to fire season planning. Where the main weather.gov portal serves the full range of NWS hazard types and public weather services, this page is purpose-built for fire weather professionals who need rapid, unambiguous navigation directly to fire-relevant products without traversing the broader NWS product catalog. It is best understood as the operational bookmark for fire managers, IMETs, prescribed burn practitioners, and agency fire weather liaisons who work daily within the NWS fire weather product ecosystem and need a single, stable entry point to the complete suite.

## **National Weather Service (NWS) – Main Portal**

**Operator:** National Oceanic and Atmospheric Administration (NOAA) / National Weather Service (NWS)

**Geographic Focus:** United States, territories, and adjacent waters (national)

**Tags:** Fire Weather · Fire Danger · Forecast · Public Outreach · Operational

**Access:** Free, public

**URL:** <https://www.weather.gov/>

Weather.gov is the authoritative U.S. government weather information portal, providing local and national forecasts, active watches/warnings/advisories (including Red Flag Warnings and Fire Weather Watches), satellite and radar imagery, river and flood guidance, aviation weather, and links to all NWS national centers — including the SPC, WPC, and CPC. From a fire science perspective, it serves as the central gateway to spot weather forecast requests, fire weather zone forecasts, and the full suite of NWS fire weather products issued by local forecast offices, which feed directly into incident weather briefings and resource deployment decisions. As the single authoritative government source for life-safety weather information in the U.S., weather.gov is the foundational reference platform for all fire weather operations, from prescribed burn planning to large-incident management.

## **SpotWx**

**Operator:** Independent developer (Garth Hoepfner, Manitoba Wildfire Service fire weather meteorologist), hosted in Canada

**Geographic Focus:** Canada and North America (multiple NWP models with global data availability)

**Tags:** Fire Weather · Forecast · Model Output · Point Forecast · Short-Range · Operational

**Access:** Free, public (optional account for saved locations)

**URL:** <https://spotwx.com/>

SpotWx was developed by a fire weather meteorologist from Manitoba's Wildfire Service to fill a gap in accessible, transparent point-location weather forecasting tools — providing detailed numerical model output and visualizations for any user-selected coordinates from a wide range of NWP models, going well beyond the condensed surface parameters typically exposed by general weather platforms. The site extracts and presents hourly model data (including ECCC's RDPS and HRDPS, GFS, HRRR, and others) as tabular and graphical meteorograms covering temperature, relative humidity, wind speed and direction, precipitation, and Canadian Forest Fire Weather Index (FWI) components. For fire weather meteorologists, prescribed burn practitioners, and wildfire analysts, SpotWx is a highly practical tool for quickly generating spot forecasts at any point on the landscape — including remote areas lacking nearby weather stations — and is integrated into the Wildfire Analyst fire behavior modeling platform.

## **Storm Prediction Center (SPC) – High-Resolution Ensemble Framework (HREF)**

**Operator:** National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center (SPC) / Environmental Modeling Center (EMC)

**Geographic Focus:** Contiguous United States (CONUS)

**Tags:** Fire Weather · Forecast · Model Output · Probabilistic Forecast · Short-Range

**Access:** Free, public (experimental)

**URL:** <https://www.spc.noaa.gov/exper/href/>

The HREF viewer provides access to high-resolution ensemble model output from multiple convection-allowing models (CAMs), including probability-matched means, paintball plots, and individual member solutions for parameters such as precipitation, convective initiation, and severe weather indicators. For fire weather applications, the HREF is particularly valuable for forecasting dry and mixed-phase convection — scenarios where lightning reaches the surface without sufficient rainfall to wet fuels, a leading cause of ignition in the western U.S. Its spatial detail and ensemble spread visualization help fire weather meteorologists assess both the likelihood and spatial confidence of lightning-ignition threat in a way that coarser operational models cannot match.

## **Tropical Tidbits – Forecast Model Viewer**

**Operator:** Levi Cowan (independent developer / meteorologist)

**Geographic Focus:** Global and regional (U.S., tropics, Atlantic, Pacific, and worldwide domains)

**Tags:** Fire Weather · Forecast · Model Output · Map · Medium-Range · Operational

**Access:** Free, public

**URL:** <https://www.tropicaltidbits.com/analysis/models/>

Tropical Tidbits provides clean, fast-loading forecast model charts from all major global NWP systems — including ECMWF, EC-AIFS, GFS, AI-GFS, CMC/GEM, ICON, and JMA — as well as ensemble products (ECMWF EPS, GEFS, GEPS) and hurricane track models, across a wide range of global and regional domains and meteorological parameters. The site is renowned in the professional meteorology community for its interface efficiency: users can rapidly cycle through multiple models and forecast hours to compare solutions — a critical workflow when assessing divergent model scenarios for fire weather parameters such as offshore wind onset timing, precipitation timing, or synoptic pattern evolution. For fire weather meteorologists and fire behavior analysts requiring quick multi-model comparison without institutional data access, Tropical Tidbits is among the best-designed freely available model chart platforms available.

## **Windy.com**

**Operator:** Windy.com a.s.

**Geographic Focus:** Global

**Tags:** Fire Weather · Forecast · Map · Short-Range · Public Outreach · Operational

**Access:** Free (core); Windy Premium for extended features

**URL:** <https://windy.com>

Windy is one of the most widely used global weather visualization platforms, providing interactive, animated maps of wind, temperature, relative humidity, precipitation, atmospheric pressure, and dozens of additional meteorological parameters drawn from multiple NWP models including ECMWF, GFS, ICON, and AROME, with forecast lead times up to 10–15 days. The platform also integrates smoke and aerosol layers (from ECMWF CAMS), radar composites, lightning detection, and webcam overlays, making it a versatile situational awareness tool for fire practitioners who need a quick, visually intuitive check on surface wind fields, upper-level flow, or approaching precipitation. Its accessibility — requiring no training and available via browser or mobile app — makes Windy the go-to meteorological overview tool for a broad audience from professional fire managers to the public seeking to understand fire weather conditions.

## 8) Fire Weather Tools



## Bufkit

**Operator:** Original Bufkit software developed by National Weather Service (NWS) Buffalo, New York and the Warning Decision Training Branch (WDTB)

**Geographic Focus:** United States (primary); global sounding data available

**Tags:** Fire Weather · Model Output · Point Forecast · Operational · Decision Support

**Access:** Free, public (Windows desktop software)

**URL:** <https://www.meteor.iastate.edu/~ckarsten/bufkit/instructions.html>

Bufkit is a free desktop software application for Windows that allows meteorologists to load, visualize, and analyze vertical atmospheric profile soundings extracted from NWP model output — including NAM, GFS, RAP, and HRRR — for any available station location, displaying parameters such as temperature, dewpoint, wind speed, wind direction, and derived stability indices across the full atmospheric column. In the fire weather context, Bufkit is widely used by fire weather meteorologists and Air Resource Advisors (ARAs) to examine forecast atmospheric mixing height, transport wind speed and direction, ventilation index, and lower-atmosphere instability — all critical parameters for smoke dispersion assessment and fire behavior anticipation. The ISU installation page provides the most accessible entry point to acquiring and installing Bufkit for users unfamiliar with the software, making it a practical starting reference for fire weather professionals adopting vertical sounding analysis into their workflow.

## Bufkit Data Distribution System

**Operator:** Pennsylvania State University (PSU)

**Geographic Focus:** Contiguous United States (CONUS); multiple model domains available

**Tags:** Fire Weather · Model Output · Point Forecast · Archive · Operational

**Access:** Free, public

**URL:** [https://www.meteo.psu.edu/bufkit/CONUS\\_NAM\\_12.html](https://www.meteo.psu.edu/bufkit/CONUS_NAM_12.html)

The PSU Bufkit Data Distribution page provides a clickable CONUS station map for downloading Bufkit-format vertical sounding profile files (.buf) extracted from NWP model runs — including the NAM 12km, GFS, RAP, and HRRR — for hundreds of locations across the contiguous United States, with files updated operationally following each model cycle. It is one of the two primary public mirrors for Bufkit profile data alongside the Iowa State University Bufkit Warehouse, and its interactive station map interface makes locating and downloading the correct station file faster and more intuitive than navigating directory-based alternatives. For fire weather meteorologists, Air Resource Advisors (ARAs), and smoke management specialists who rely on Bufkit for mixing height, transport wind, and ventilation index analysis, the PSU distribution page is an essential and reliable data source — particularly as a backup or complement to the ISU mirror, and well suited for users who prefer to select stations visually from a map rather than a text directory.

## **Bufkit Warehouse – Data Sources (Iowa State University)**

**Operator:** Iowa State University, with contributions from NWS offices and Penn State

**Geographic Focus:** United States (national network); international profiles available via global map

**Tags:** Fire Weather · Model Output · Point Forecast · Archive · Operational

**Access:** Free, public

**URL:** <https://www.meteor.iastate.edu/~ckarsten/bufkit/data/>

The Bufkit Warehouse Data Sources page provides a global interactive map for selecting and downloading Bufkit vertical sounding profile files (.buf format) from multiple NWP model runs — including GFS, NAM, and others — for hundreds of station locations, alongside links to NWS office Bufkit data pages, a national profile selection tool from Penn State, and an archive of ISU-generated profiles dating back to December 2010. This page is the primary data-access companion to the Bufkit software itself, enabling users to locate and retrieve the specific model sounding files needed for their location of interest without navigating complex government data portals. For fire weather meteorologists and smoke management specialists who rely on Bufkit for mixing height, ventilation index, and transport wind analysis, the Bufkit Warehouse removes the main friction point — finding and downloading profile data — making it an indispensable reference alongside the software installation page.

## **Hot-Dry-Windy Index (HDWI)**

**Operator:** USDA Forest Service (FS2C), in collaboration with St. Cloud State University (SCSU) and Michigan State University (MSU)

**Geographic Focus:** Contiguous United States and Alaska

**Tags:** Fire Weather · Fire Danger · Index · Probabilistic Forecast · Climatology · Decision Support · Research · Operational

**Access:** Free, public (products in active development)

**URL:** <https://hdwindex.fs2c.usda.gov/>

The HDWI Real-Time Product Suite provides interactive, map-based access to forecasts and analysis of the Hot-Dry-Windy Index — a composite fire weather metric integrating vapor pressure deficit and wind speed to capture the simultaneous atmospheric conditions most associated with rapid fire growth — using GEFS ensemble output for 7-day forecasts, a 30-day GEFS analysis archive, and a 30-year CFSR climatology for percentile-based context, with a separate product suite for Alaska. Users can query HDWI values for any grid point across the CONUS via a clickable map or coordinate dropdown, enabling both operational fire weather assessment and historical baseline comparison at a given location. For fire weather forecasters, fire danger analysts, and researchers, the HDWI portal offers a statistically grounded, ensemble-based perspective on fire weather threat that complements traditional indices like the Energy Release Component (ERC) or Fire Weather Index (FWI) — and its probabilistic framing makes it particularly valuable for communicating the likelihood and magnitude of dangerous fire weather conditions to decision-makers.

## WindNinja – Terrain-Driven Wind Simulation Tool

**Operator:** USDA Forest Service Missoula Fire Sciences Laboratory (FireLab)

**Geographic Focus:** Global (terrain-based; applicable anywhere with elevation data)

**Tags:** Fire Behavior · Fire Weather · Model Output · Operational · Decision Support

**Access:** Free, public (desktop software download; online version available)

**URL:** <https://research.fs.usda.gov/firelab/products/dataandtools/windninja>

WindNinja is a diagnostic terrain wind model developed by the USFS Missoula Fire Sciences Laboratory that computes high-resolution (sub-100 m) surface wind fields by adjusting coarser NWP model output or user-specified inputs to account for topographic effects such as slope channeling, valley drainage flows, ridgeline acceleration, and thermal-driven upslope/downslope winds. It ingests digital elevation model (DEM) data for any user-defined domain and can ingest forecasts from NDFD, NOMADS, or custom inputs to produce spatially detailed wind grids compatible with fire behavior models such as FlamMap, FARSITE, and Prometheus. For fire behavior analysts, prescribed burn planners, and incident meteorologists, WindNinja is an essential downscaling tool that bridges the gap between coarse NWP wind forecasts and the fine-scale terrain-driven wind reality that governs fire spread — particularly in complex topography where standard weather station data or model output can badly misrepresent actual surface flow.

## 9) Research Institutions and Programs

### Canada Wildfire (CWFC Research Network)

**Operator:** Canadian Partnership for Wildland Fire Science / University of Alberta

**Geographic Focus:** Canada

**Tags:** Research · Education · Network

**Access:** Free, public

**URL:** <https://www.canadawildfire.org/>

Canada Wildfire is a national research network connecting fire scientists and practitioners to advance wildland fire management through collaborative research, knowledge synthesis, and practitioner engagement. It links academia, government agencies, and industry across Canada's fire management community.

### CEIF-ADAI – Forest Fire Research Center

**Operator:** University of Coimbra / ADAI

**Geographic Focus:** Portugal, Southern Europe

**Tags:** Research

**Access:** Free, public

**URL:** <https://www.uc.pt/en/adai/ceif/>

CEIF is a leading Portuguese research center specializing in wildland fire behavior, combustion physics, and prescribed burning, with internationally recognized experimental and modeling capabilities. It plays a central role in fire research across the Iberian Peninsula and the broader Mediterranean region.

### Centre for Technological Risk Studies (CERTEC) – Wildland Fire Research Program

**Operator:** Centre for Technological Risk Studies (CERTEC), Universitat Politècnica de Catalunya

**Geographic Focus:** Spain, Mediterranean Europe (global relevance)

**Tags:** Research · Prevention

**Access:** Free, public

**URL:** <https://certec.upc.edu/en/research/wildland-fire>

CERTEC's wildland fire research program at UPC covers experimental and computational fire behavior research, WUI fire dynamics, compartment fires, and technological risk, offering PhD programs, master's degrees, and postgraduate training courses alongside active research projects. It is one of the leading technical universities in Europe for wildland and WUI fire science.

## **Joint Fire Science Program (JFSP)**

**Operator:** USDA Forest Service / US Department of the Interior

**Geographic Focus:** United States

**Tags:** Research · Network

**Access:** Free, public

**URL:** [https://www.firescience.gov/ords/prd/jf\\_jfsp/r/jfspublic/home](https://www.firescience.gov/ords/prd/jf_jfsp/r/jfspublic/home)

The JFSP is the primary U.S. federal program funding applied wildland fire science research, managing a competitive grants program and synthesizing findings for delivery to managers and practitioners. It bridges the gap between fire research and operational management needs across federal agencies.

## **Joint Fire Science Program (JFSP) – Fire Science Exchange Network**

**Operator:** USDA Forest Service / US Department of the Interior

**Geographic Focus:** United States

**Tags:** Research · Education · Network

**Access:** Free, public

**URL:** [https://www.firescience.gov/ords/prd/jf\\_jfsp/r/jfspublic/jfsp-exchanges](https://www.firescience.gov/ords/prd/jf_jfsp/r/jfspublic/jfsp-exchanges)

The JFSP Science Exchanges are regionally based programs connecting fire researchers with land managers to co-produce and deliver science relevant to local management challenges. They are a core mechanism for translating fire research into on-the-ground management decisions across the U.S.

## **Missoula Fire Sciences Laboratory (FireLab)**

**Operator:** USDA Forest Service, Rocky Mountain Research Station

**Geographic Focus:** United States (global relevance)

**Tags:** Research

**Access:** Free, public

**URL:** <https://research.fs.usda.gov/firelab>

The FireLab is the USFS's flagship fire science research facility in Missoula, Montana, producing foundational research on fire behavior, fire weather, smoke, fuels, and firefighter safety, and developing widely used tools including WindNinja, FlamMap, and FARSITE.

### **North Atlantic Fire Science Exchange (NAFSE)**

**Operator:** Joint Fire Science Program (JFSP)

**Geographic Focus:** Northeastern United States

**Tags:** Research · Network · Education

**Access:** Free, public

**URL:** <https://www.firesciencenorthatlantic.org/>

NAFSE connects fire scientists and practitioners in the northeastern U.S. through events, webinars, working groups, and research briefs focused on fire ecology, prescribed fire, and fire management in a region where fire has historically been underrepresented in science and practice.

### **United States Forest Service (USFS) Research Stations**

**Operator:** USDA Forest Service

**Geographic Focus:** United States

**Tags:** Research · Policy

**Access:** Free, public

**URL:** <https://www.fs.usda.gov/about-agency/contact-us/research-stations>

The portal for USFS's network of research stations conducting wildland fire, ecology, and forest management science across the U.S. It provides contact information and entry points to each station's research programs and publications.

## 10) Knowledge Portals

### European Network on Extreme Fire Behavior (NERO)

**Operator:** European Cooperation in Science and Technology (COST) / EU

**Geographic Focus:** Europe (international partnerships)

**Tags:** Research · Network · Education

**Access:** Free, public

**URL:** <https://nero-network.eu/>

NERO is a European COST Action network focused on improving the scientific understanding of extreme wildfire events and novel fire regimes, connecting researchers across Europe through working groups, training schools, short-term scientific missions, and the X-Fire conference series.

### Fire Research and Management Exchange System (FRAMES)

**Operator:** USDA Forest Service / University of Montana

**Geographic Focus:** United States

**Tags:** Research · Network

**Access:** Free, public

**URL:** <https://www.frames.gov/>

FRAMES is the primary U.S. repository for wildland fire science literature, data, and management resources, aggregating publications, tools, and products from research stations, federal agencies, and cooperative programs. It is an essential reference hub for researchers and practitioners seeking peer-reviewed and grey literature across all fire science disciplines.

### National Oceanic and Atmospheric Administration (NOAA) Fire Research

**Operator:** NOAA Climate Program Office (CPO)

**Geographic Focus:** United States (global relevance)

**Tags:** Education

**Access:** Free, public

**URL:** <https://cpo.noaa.gov/webinar-series/noaa-fire-research-from-conditions-to-impacts/>

NOAA's fire research webinar series presents current scientific findings spanning fire weather conditions, fire behavior, smoke impacts, and climate-fire interactions from NOAA researchers and collaborators. It is a valuable continuing education resource for fire scientists, fire weather forecasters, and agency professionals following the latest NOAA-funded fire research.

## **SmokeD – Webinar Series**

**Operator:** SmokeD (commercial, Poland)

**Geographic Focus:** Global

**Tags:** Education

**Access:** Commercial (products and services)

**URL:** <https://smokedsystem.com/webinars/>

SmokeD provides an automated wildfire and smoke detection system combining AI-powered software, PTZ cameras, drone integration, and a mobile alert application for early fire detection in forests, industrial sites, and private land. It represents the commercial application of computer vision technology to operational wildfire early warning.

## **Wildfire Data Portal (WDP)**

**Operator:** European research consortium

**Geographic Focus:** Europe (global fire-atmosphere data)

**Tags:** Research · Education

**Access:** Free, public

**URL:** <https://wildfiredataportal.eu>

A scientific portal providing access to observational data, scientific publications, plume visualizations, and modelling resources focused on fire-atmosphere interactions. It serves researchers and practitioners seeking open data and knowledge on wildfire smoke dynamics and combustion behavior.

## **Wildland Fire Learning Portal (WFLP)**

**Operator:** National Wildfire Coordinating Group (NWCG) / National Interagency Fire Center (NIFC)

**Geographic Focus:** United States

**Tags:** Education

**Access:** Free, registered users

**URL:** <https://www.wildlandfirelearningportal.net/>

The WFLP is the U.S. interagency online learning management system for wildland fire training, hosting NWCG-approved eLearning courses, position task book tracking, and training records for fire personnel across all cooperating agencies.

## **Wildland Fire Lessons Learned Center (LLC)**

**Operator:** USDA Forest Service (FS2C)

**Geographic Focus:** United States

**Tags:** Education · Operational

**Access:** Free, public

**URL:** <https://lessons.fs2c.usda.gov/>

The LLC collects and disseminates wildland fire safety and operational lessons through incident review summaries, the Two More Chains publication, podcasts, a YouTube channel, and a searchable incident review database, fostering a learning culture across the U.S. wildland fire community.

## **Wildland Fire Resources Library**

**Operator:** Max Levy and Eric Evenson (IAWF Mentee/Mentor Partnership)

**Geographic Focus:** United States (primarily)

**Tags:** Network · Education

**Access:** Free, public

**URL:** <https://wildlandfire.org/>

A community-maintained, centralized library linking the wildland fire community to resources spanning community resilience, fire information, smoke monitoring, climate and weather, student assistance, employment, training, and fire and forestry organizations — with particular emphasis on supporting early-career professionals entering the field.

# 11) Operational Training

## **Bureau of Land Management (BLM) Fire Training**

**Operator:** Bureau of Land Management (BLM) / National Interagency Fire Center (NIFC)

**Geographic Focus:** United States

**Tags:** Education · Operational

**Access:** Free, public

**URL:** <https://www.nifc.gov/about-us/our-partners/blm/training>

BLM's training portal provides information on wildland fire training opportunities, qualification requirements, and professional development resources for BLM fire personnel and interagency cooperators. It serves as an entry point for training pathways within the federal wildland fire system.

## **Federal Emergency Management Agency (FEMA) – National Preparedness Training**

**Operator:** Federal Emergency Management Agency (FEMA)

**Geographic Focus:** United States

**Tags:** Education · Prevention · Operational

**Access:** Free, public

**URL:** <https://www.fema.gov/emergency-managers/national-preparedness/training>

FEMA's national training portal aggregates preparedness and emergency management training opportunities — including Independent Study courses, NFA programs, and CERT resources — relevant to all hazard types including wildfire. It supports emergency managers, first responders, and community leaders in building preparedness capacity.

## **National Fire Academy (NFA / USFA)**

**Operator:** U.S. Fire Administration (USFA) / Federal Emergency Management Agency (FEMA)

**Geographic Focus:** United States

**Tags:** Education · Operational

**Access:** Free / subsidized for eligible participants

**URL:** <https://www.usfa.fema.gov/nfa/>

The NFA delivers professional development training for fire and emergency services personnel, including wildland fire and WUI-focused courses, both on-campus in Emmitsburg, Maryland and online. It serves as the national continuing education hub for the broader U.S. fire service community.

## **National Wildfire Coordinating Group (NWCG) Training**

**Operator:** National Wildfire Coordinating Group (NWCG)

**Geographic Focus:** United States

**Tags:** Education · Operational

**Access:** Free, public

**URL:** <https://www.nwcg.gov/nwcg-training>

The authoritative source for U.S. wildland fire training standards, course catalogs, position task books, and certification requirements across all interagency qualification levels. It governs the training framework used by all federal and cooperating state wildland fire agencies.

## **The Emergency Program (TEP)**

**Operator:** The Emergency Program (commercial)

**Geographic Focus:** Global (Spanish-language origin; English available)

**Tags:** Education · Operational

**Access:** Paid subscription (free trial available)

**URL:** <https://www.emerprogram.com/en>

TEP describes itself as a global online wildland firefighting training program, delivered by international experts through a microlearning methodology covering case studies, tactics, and operational knowledge accessible from anywhere. It targets professional wildland firefighters and fire managers seeking internationally oriented, flexible online training.

## 12) Community Resilience and Preparedness

### **Fire Adapted Communities – Community Wildfire Protection Plan (CWPP) Database**

**Operator:** Fire Adapted Communities Learning Network (FAC Net)

**Geographic Focus:** United States

**Tags:** Prevention · Public Outreach

**Access:** Free, public

**URL:** <https://fireadapted.org/cwpp-database/>

A searchable national database of Community Wildfire Protection Plans (CWPPs) — the foundational planning documents for WUI communities in the U.S. identifying local fire risks and mitigation priorities. It supports planners, local governments, and community organizations in developing and benchmarking their own CWPPs.

### **FireSmart Canada**

**Operator:** Partners in Protection / CIFFC member agencies

**Geographic Focus:** Canada

**Tags:** Prevention · Public Outreach

**Access:** Free, public

**URL:** <https://firesmartcanada.ca/>

FireSmart Canada is the national program supporting communities, homeowners, and municipalities in reducing wildfire risk through landscape management, home hardening, and community planning. It is the Canadian counterpart to the U.S. Firewise USA program.

### **FIREPRIME (EU Civil Protection Knowledge Network)**

**Operator:** European Commission / Union Civil Protection Mechanism

**Geographic Focus:** Europe (Mediterranean focus)

**Tags:** Research · Prevention · Public Outreach

**Access:** Partial public access; full access requires UCPKN registration

**URL:** <https://civil-protection-knowledge-network.europa.eu/projects/fireprime>

FIREPRIME was an EU-funded project focused on promoting the use of prescribed fire as a preventive management tool in Mediterranean Europe, producing guidelines, training materials, and cross-country practitioner exchanges. Its outputs are hosted on the EU Civil Protection Knowledge Network platform.

## **Firewise USA (NFPA)**

**Operator:** National Fire Protection Association (NFPA)

**Geographic Focus:** United States

**Tags:** Prevention · Public Outreach

**Access:** Free, public

**URL:** <https://www.nfpa.org/education-and-research/wildfire/firewise-usa/firewise-usa-resources>

Firewise USA is NFPA's community wildfire preparedness program, providing resources, toolkits, and a site recognition framework to help communities in the wildland-urban interface reduce their vulnerability to wildfire. It is the primary U.S. voluntary community-level WUI preparedness initiative.

## **Ready, Set, Go! Program**

**Operator:** International Association of Fire Chiefs (IAFC)

**Geographic Focus:** United States

**Tags:** Prevention · Public Outreach

**Access:** Free, public

**URL:** [https://gacc.nifc.gov/gbcc/dispatch/ut-cdc/prevention/doc/ready\\_set\\_go.pdf](https://gacc.nifc.gov/gbcc/dispatch/ut-cdc/prevention/doc/ready_set_go.pdf)

Ready, Set, Go! is a nationally recognized U.S. program providing residents in wildfire-prone areas with an action-oriented framework for personal preparedness, defensible space creation, and timely evacuation. The PDF document serves as a core public education resource distributed through fire agencies, local governments, and community programs.

## **Waldbrand Klima Resilienz (WKR)**

**Operator:** WKR Project consortium (Germany)

**Geographic Focus:** Germany

**Tags:** Research · Prevention · Education

**Access:** Free, public

**URL:** <https://www.waldbrand-klima-resilienz.com/>

WKR (Forest Fire Climate Resilience) is a German project developing and demonstrating preventive forest fire management measures — including prescribed burning — through demonstration areas that serve as practical communication, training, and discussion platforms for fire management in different forest types.

## 13) Networks and Initiatives

### **@fire – Internationaler Katastrophenschutz Deutschland e.V.**

**Operator:** @fire e.V. (registered association, Germany)

**Geographic Focus:** Germany, international deployments

**Tags:** Operational

**Access:** Free, public

**URL:** <https://www.at-fire.de/>

@fire is a German volunteer organization providing rapid international disaster relief including Urban Search and Rescue (USAR) and wildland firefighting deployments, operating a 24-hour alarm hotline. It represents one of Germany's primary volunteer capacities for wildland firefighting.

### **European Forest Institute (EFI)**

**Operator:** European Forest Institute

**Geographic Focus:** Europe (global partnerships)

**Tags:** Research · Policy

**Access:** Free, public

**URL:** <https://efi.int/>

An international organization providing science-based knowledge and policy advice on European forest management, climate adaptation, and disturbance ecology including fire. EFI bridges research and forest policy at the pan-European level.

### **FAO Global Fire Management Hub**

**Operator:** Food and Agriculture Organization of the United Nations (FAO)

**Geographic Focus:** Global (developing country focus)

**Tags:** Policy · Education

**Access:** Free, public

**URL:** <https://www.fao.org/partnerships/fire-hub/en>

The FAO Global Fire Management Hub brings together international partners to strengthen countries' capacities to implement integrated fire management, shifting emphasis from reactive suppression to prevention, and provides publications, a call to action on wildfire resilience, and information toolkits supporting policy development globally.

## **Fire Networks (FLN / TREX / FAC NET)**

**Operator:** Fire Networks / The Nature Conservancy and partners

**Geographic Focus:** United States and global

**Tags:** Network · Education

**Access:** Free, public

**URL:** <https://firenetworks.org/>

Fire Networks hosts multiple interconnected programs — including the Fire Learning Network (FLN), the Training Exchanges (TREX), and the Fire Adapted Communities Learning Network (FAC NET) — each focused on expanding the pace and scale of prescribed fire use and building fire-adapted communities through practitioner networks and on-the-ground exchanges.

## **International Association of Wildland Fire (IAWF)**

**Operator:** International Association of Wildland Fire (IAWF)

**Geographic Focus:** Global

**Tags:** Research · Network · Education

**Access:** Membership-based; some content public

**URL:** <https://www.iawfonline.org/>

The IAWF is the leading global professional society for wildland fire science and management, organizing the premier international wildfire conferences, publishing the International Journal of Wildland Fire, and connecting practitioners and researchers across more than 60 countries. They are also the initiators of the IAWF Mentoring program.

## **Northeastern Forest Fire Protection Compact (NFFPC)**

**Operator:** NFFPC (member agencies from northeastern U.S. and eastern Canada)

**Geographic Focus:** Northeastern United States, Eastern Canada

**Tags:** Education · Network · Prevention

**Access:** Free, public

**URL:** <https://www.nffpc.org/en>

The NFFPC is a regional compact coordinating forest fire protection, resource sharing, training, equipment standards, and fire science cooperation among member agencies from northeastern U.S. states and eastern Canadian provinces. It functions as a regional mutual aid and coordination body analogous to a GACC for the northeastern North American fire management community.

## **Pau Costa Foundation**

**Operator:** Pau Costa Foundation (non-profit, Spain)

**Geographic Focus:** Mediterranean Europe, global partnerships

**Tags:** Research · Network · Education

**Access:** Free, public

**URL:** <https://www.paucostafoundation.org/en/>

The Pau Costa Foundation is a Spanish non-profit advancing wildfire prevention, training, and resilient landscape management through applied research projects, professional training, international networking events, and a pool of expert consultants and trainers. It is one of the most active civil society organizations bridging fire science and operational practice in the Mediterranean region.

## **Pyrocene Alliance**

**Operator:** Pyrocene Alliance (non-profit NGO)

**Geographic Focus:** Global

**Tags:** Education · Prevention · Network

**Access:** Free, public

**URL:** <https://pyrocene-alliance.org/>

A non-governmental organization of wildland fire practitioners united around restoring a balanced human relationship with fire through prescribed burning, cross-cultural knowledge exchange, and practical projects spanning Germany, South Africa, Portugal, and beyond.

## **Waldbrandteam e.V.**

**Operator:** Waldbrandteam – Verein für Wald- und Flächenbrandbekämpfung e.V. (registered association, Germany)

**Geographic Focus:** Germany, international deployments

**Tags:** Operational **Access:** Free, public

**URL:** <https://www.waldbrandteam.de/>

A German non-profit association of volunteer wildland firefighters offering firefighting capacities and training in wildland fire, prescribed burning, and operational advisory services for fire brigades and land managers. It is one of the few organizations in Germany actively bridging the gap between structural firefighting traditions and specialized wildland fire tactics.