

Predictive Services: Current and Future Decision Support Products and Services for Strategic Planning and Resource Allocation

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Abstract

The United States has implemented an interagency Predictive Services program to integrate fire weather, climate, fuels, fire danger, and resource information to provide decision support for enhancing a proactive approach to fire management. Predictive Services units are comprised of fire weather meteorologists, intelligence officers and, in some cases, wildland fire analysts. These units, which are an integral part of the national and geographic area coordination centers, deliver fire potential products and services for short-term resource movements (e.g., airtanker, crew and incident management team pre-positioning), mid-range fire potential forecasts out to seven days, and long term assessments of monthly and seasonal wildfire risk. Predictive Services specialize in providing forecasts of critical fire weather events, predicting trends in fuel dryness and fire danger indices, and estimating the number of wildfires during dry lightning episodes.

Current products and services include daily graphics which combine weather and fire danger, 7-day projections of significant wildland fire potential (including numerical forecasts of weather and fire danger), 15-day numerical model forecasts of fire danger indices, monthly and seasonal fire outlooks, along with daily weather and fire potential briefings. Future program activities will likely include the development of 5-km gridded fire potential and weather forecasts out to 10 days, integration of numerical canopy greenness model outputs into fire potential products, improved forecasts of dry lightning episodes and quantitative resource forecasts for fire episodes.

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Introduction

Predictive Services is a United States federal interagency program which integrates fire weather, climate, fuels, fire danger, and resource information into decision-support products and services for fire managers. For the purpose of fire support, the nation is divided into eleven Geographic Areas with corresponding Geographic Area Coordination Centers (GACCs) and a National Interagency Coordination Center (NICC). Each of the eleven GACCs and the NICC has a Predictive Service unit staffed by fire weather meteorologists, intelligence specialists and, in some locations, a wildfire fire analyst. These units provide:

- Forecasts of fire danger, fuel assessments and critical fire weather events;
- Predicted areas of significant fire potential for the next seven days;
- Monthly and seasonal fire potential outlooks.

Predictive Services allows for a pro-active approach to strategic resource allocation and prioritization. By pre-positioning firefighting assets ahead of a high risk weather event, fire managers can maximize firefighter and public safety, realize significant cost-savings and reduce losses.

Current Products and Services

Predictive Services distills large amounts of current and predicted weather, fire danger and intelligence information into concise fire potential products. Products include, but are not limited to:

Daily Fire Weather Outlook - This product is issued by most GACCs and displays forecasted surface winds, humidity and weather for the days 1-2 along with a weather/fire potential discussion. Some GACCs also include areas of significant fire potential, red flag warnings, and fire weather watches on the graphic.

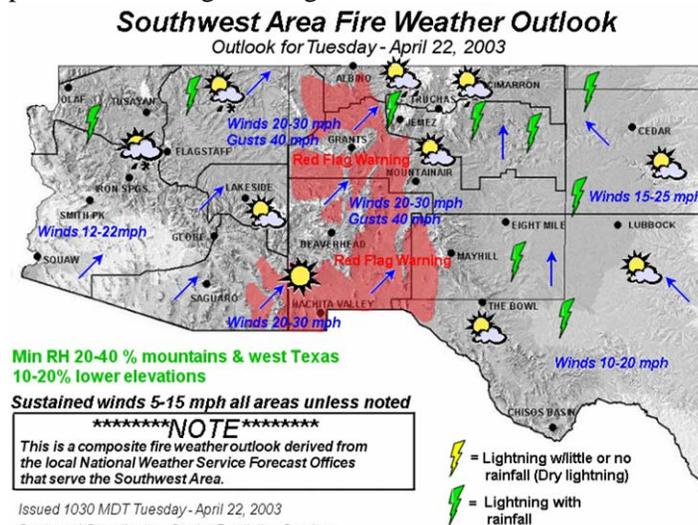


Figure 1—Example of Daily Fire Weather Outlook.

7 Day Significant Fire Potential - This product shows predicted significant fire potential (based on fuel dryness levels and any significant weather triggers such as high winds, dry lightning, and hot/dry/unstable conditions) for each Predictive Service Area (PSA) for the next seven days. Fire potential is based on a sum of factors including fuel conditions, ignition triggers and resource capability, while significant fire potential is defined as the likelihood a fire situation will require mobilization of additional resources from outside the area in which the fire situation originates. Short discussions of weather patterns, fire potential and resource capability are also included in the 7 Day Significant Fire Potential product.

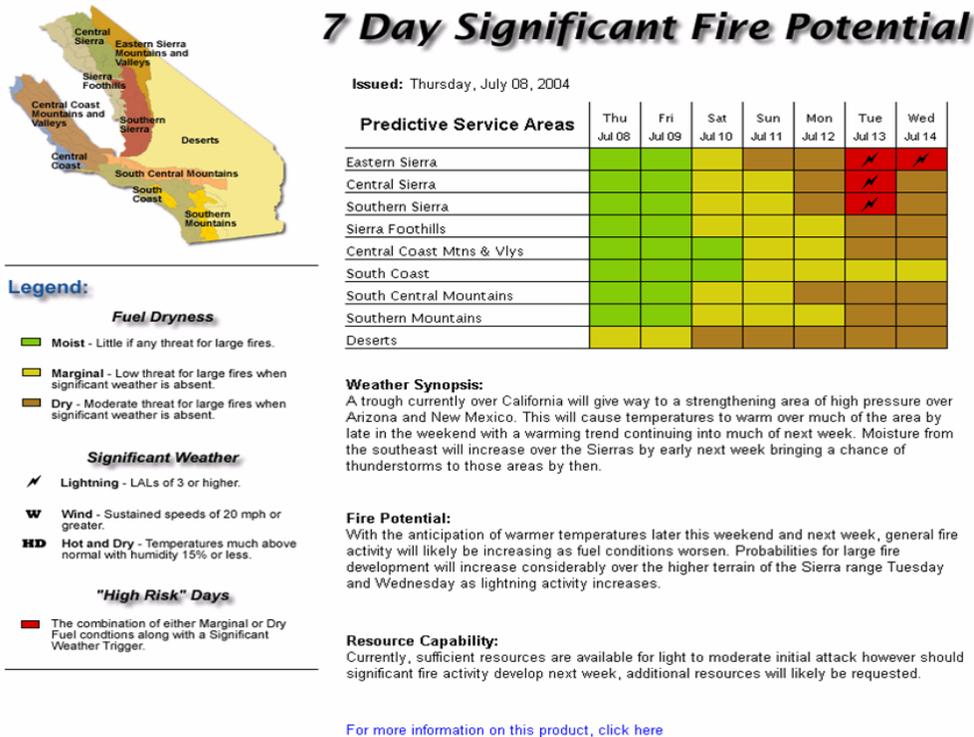


Figure 2—Example of 7 Day Significant Fire Potential.

Monthly and Seasonal Wildland Fire Outlooks – Monthly and seasonal wildland fire potential projections are forecast with respect to normal conditions across the country (i.e. above normal, normal, and below normal fire potential). Monthly and seasonal wildland fire outlooks are produced by each GACC and combined into national products shown below by the NICC.

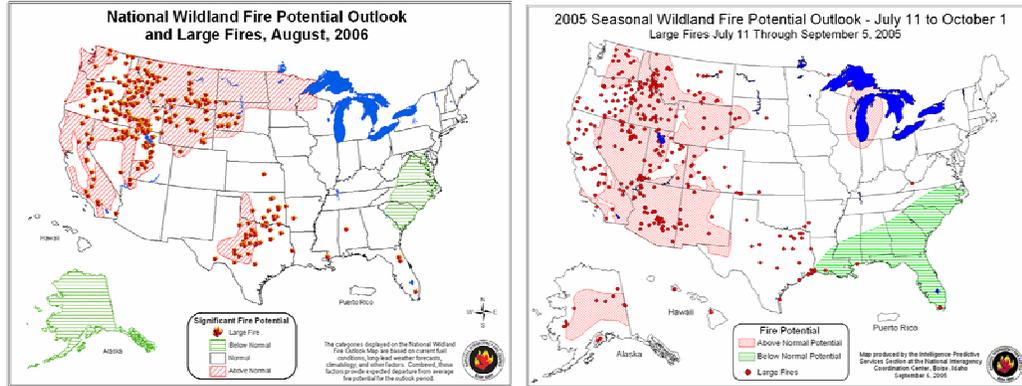


Figure 3—Examples of monthly (left) and seasonal (right) wildland fire potential are overlaid with large fires (40+ hectares in timber, 120+ hectares in grass/brush fuels).

Some other products and services provided include 15-day numerical model forecasts of fire danger indices, daily weather and fire potential briefings and consultations with fire managers on daily movements of air tankers, crews and other resources. More information, as well as current products and links to individual GACC websites, are available at <http://www.nifc.gov/nicc/index.htm>

Future Products and Services

The advent of gridded weather forecasts by the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) and gridded fuel/fire danger information has now provided the capability of developing 5-km resolution fire potential products. The National Weather Service produces forecasts of surface temperature, dew point/relative humidity, winds, cloud cover, precipitation, and other weather parameters out to seven days. This data can be combined with numerical canopy greenness model data, improved fuel moisture data and high resolution fuel type gridded information to produce greater spatial and temporal forecasts of fire potential. However, as fire potential is heavily influenced by resource availability, much work is needed in the area of resource capability in order to integrate resource location and availability into fire potential forecasts. Other areas of development include improved forecasts of location, timing and amount of dry lightning and quantitative forecasts of resource needs for fire episodes.

Summary

By integrating weather, fuel and resource information, Predictive Services plays an increasingly valuable decision-support role for the allocation of firefighting resources. Current products range from daily to seasonal fire potential forecasts along with consultation on resource pre-positioning. Future products will incorporate gridded weather, fuels and fire danger fields to produce higher spatial and temporal resolution fire potential forecasts. Other improvements will include improved dry lightning forecast algorithms and quantitative forecasts of resource allocations.