

**Experimental Graphical Hazardous Weather Outlook (GHWO)**  
Product Description Document (PDD)  
**October 2022**

## **Part 1 – Mission Connection**

**1. Product / Service Description:** The NWS core mission is to provide accurate and timely hazardous weather information for the protection of life and property. Although the textual Hazardous Weather Outlook (HWO) plays a significant role in supporting the NWS mission, effectively conveying hazardous weather information in a textual or narrative format can prove challenging to an increasingly diverse customer base.

The experimental Graphical Hazardous Weather Outlook (GHWO), formally known as the Enhanced Hazardous Weather Outlook (EHWO) in previous comment periods (Previous Public Information Statement: [https://www.weather.gov/media/notification/pdf2/pns19-03ehwo\\_comments.pdf](https://www.weather.gov/media/notification/pdf2/pns19-03ehwo_comments.pdf)), is a decision aid that supports preparedness and response efforts prior to and during hazardous weather. In conjunction with the textual HWO, the GHWO produces clear and concise graphics that provide decision makers with convenient access to potential weather hazard information and associated risks out to seven days.

The GHWO packages multi-level color-coded hazard graphics and text within a comprehensive web page suite. Ultimately, workload is conserved through the use of existing local forecast data as well as outlooks from national centers such as the Storm Prediction Center (SPC) and the Weather Prediction Center (WPC). The use of consistent data input also supports a seamless office-to-office presentation, including the capability of state-based graphics.

Updates this year include an expansion to 117 offices, a change in the URL structure, the introduction of a tabbed interface, the allowance for multiple viewing selections, and new information buttons for element descriptions.

**2. Product Type:** Experimental

**3. Purpose/Intended Use:** The GHWO is designed to provide decision makers with convenient access to the expected type, severity, coverage and potential impacts of hazardous weather events. The GHWO and its integrated product suite can be utilized as a decision support tool that aids preparedness and response efforts both before and during hazardous weather events. The graphical approach to the GHWO, in conjunction with the textual HWO product, will provide end users with a comprehensive picture of current and expected hazards.

**4. Audience:** This service is intended to provide critical weather information to a wide range of decision makers, including emergency managers, media, and the general public. Any person with internet access will have the ability to utilize this service.

The GHWO also serves internal NWS operations by enhancing situational awareness and ensuring service consistency. The integration of local forecast information, national guidance,

warning and advisory thresholds, as well as impacts, results in a system that readily alerts forecasters when critical thresholds and impacts are being approached or exceeded.

**4. Presentation Format:** GHWO graphics are generated within the Graphical Forecast Editor (GFE). Plan view maps (one for each valid hazard and day) are uploaded to each Weather Forecast Office's (WFO's) website. These data are automatically ingested into a comprehensive web page consisting of integrated graphics, text, and links to supporting products, including threat level and impact definitions, safety information, packaged self-brief services, etc. WFO GHWO websites will depict threat levels for particular hazards and time periods in an all-encompassing situational awareness web display. For example, a single web page will display "chicklets" that depict the maximum County Warning Area (CWA) threat levels for each hazard risk out to seven days.

Offices may link to the GHWO graphics and disseminate in various ways. This may include the use of news story headlines, social media, briefing packages and more. WFOs may choose to customize the format (compliant with NWS Instruction 10-517 and related supplements) and terminology of the textual HWO to match the risk levels and criteria depicted in the GHWO.

**5. Feedback Method:** Continuous feedback is available via a web-based survey or email linked from the web page. User feedback from emergency managers, other government agencies, local media, and the public provide valuable suggestions that have been integrated into the product suite. Continuous feedback from users will be vital to ensuring that the GHWO presentation provides decision makers with the information they desire.

The comment period will run through April 30, 2023. At the end of the comment period, if feedback is favorable, the product will be evaluated for operational implementation.

An online survey is available at:

[https://www.surveymonkey.com/r/Exp\\_GHWO\\_2022\\_23](https://www.surveymonkey.com/r/Exp_GHWO_2022_23)

Technical or general comments for the GHWO product may be addressed to:

Brian Miretzky or Derek Deroche

[brian.miretzky@noaa.gov](mailto:brian.miretzky@noaa.gov)

[derek.deroche@noaa.gov](mailto:derek.deroche@noaa.gov)

## **Part 2 – Technical**

**1. Format and Science Basis:** The GHWO consists of a series of plan view maps depicting risk levels for multiple hazards out to seven days in the future.

GHWO elements will be initialized automatically within the Advanced Weather Interactive Processing System (AWIPS) Graphical Forecast Editor (GFE) utilizing model data, national center output, and existing office GFE grids, thus promoting a consistent message. Little to no additional workload is required in most cases. Offices may elect to manually edit GHWO

graphics if the automatic output does not match expected conditions. This initialization approach drastically reduces the time necessary to produce the array of hazard graphics.

Risk levels for each hazard should be defined based on factors such as likelihood and frequency of occurrence (climatology), magnitude, and the overall threat to life, property, and economic interests. Definitions of specific risk levels are generally aligned with advisory and warning criteria, as well as guidance from national agencies. Doing so will promote integrity amongst products and services, ranging from the GHWO to long-fused products and consistency of services between neighboring offices. The goal is to integrate impact-based information further to derive a spatial depiction of weather-related hazard risk levels over a forecast period.

New this year, there is a tabbed interface, multiple viewing selections, and information buttons for element descriptions.

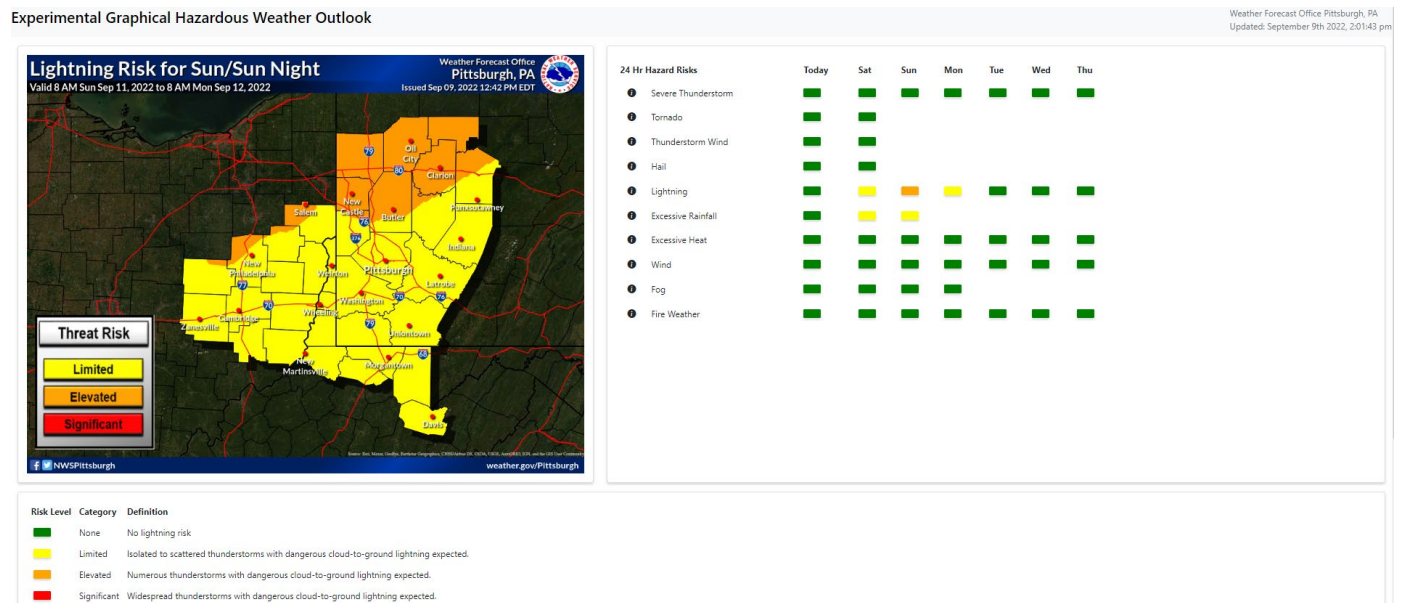


Figure 1 - An example of the GHWO for WFO Pittsburgh, PA.

## 2. Availability:

This service will be available 24 hours a day and seven days a week. Real-time access is available for 117 contiguous U.S. (CONUS) offices at the links below (in alphabetical order by State):

WFO Birmingham, AL - <https://www.weather.gov/erh/ghwo?wfo=bmx>

WFO Huntsville, AL - <https://www.weather.gov/erh/ghwo?wfo=hun>

WFO Mobile, AL - <https://www.weather.gov/erh/ghwo?wfo=mob>

WFO Flagstaff, AZ - <https://www.weather.gov/erh/ghwo?wfo=fgz>

WFO Phoenix, AZ - <https://www.weather.gov/erh/ghwo?wfo=psr>

WFO Tucson, AZ - <https://www.weather.gov/erh/ghwo?wfo=twc>

WFO Little Rock, AR - <https://www.weather.gov/erh/ghwo?wfo=lzk>

WFO Los Angeles/Oxnard, CA - <https://www.weather.gov/erh/ghwo?wfo=lox>

WFO Sacramento, CA - <https://www.weather.gov/erh/ghwo?wfo=sto>

WFO San Diego, CA - <https://www.weather.gov/erh/ghwo?wfo=sgx>  
WFO San Francisco/Monterey, CA - <https://www.weather.gov/erh/ghwo?wfo=mtr>  
WFO Boulder, CO - <https://www.weather.gov/erh/ghwo?wfo=bou>  
WFO Grand Junction, CO - <https://www.weather.gov/erh/ghwo?wfo=gjt>  
WFO Pueblo, CO - <https://www.weather.gov/erh/ghwo?wfo=pub>  
WFO Jacksonville, FL - <https://www.weather.gov/erh/ghwo?wfo=jax>  
WFO Key West, FL - <https://www.weather.gov/erh/ghwo?wfo=key>  
WFO Melbourne, FL - <https://www.weather.gov/erh/ghwo?wfo=mlb>  
WFO Miami, FL - <https://www.weather.gov/erh/ghwo?wfo=mfl>  
WFO Tallahassee, FL - <https://www.weather.gov/erh/ghwo?wfo=tae>  
WFO Tampa Bay/Ruskin, FL - <https://www.weather.gov/erh/ghwo?wfo=tbw>  
WFO Atlanta/Peachtree City, GA - <https://www.weather.gov/erh/ghwo?wfo=ffc>  
WFO Boise, ID - <https://www.weather.gov/erh/ghwo?wfo=boi>  
WFO Pocatello, ID - <https://www.weather.gov/erh/ghwo?wfo=pih>  
WFO Chicago, IL - <https://www.weather.gov/erh/ghwo?wfo=lot>  
WFO Lincoln, IL - <https://www.weather.gov/erh/ghwo?wfo=ilx>  
WFO Indianapolis, IN - <https://www.weather.gov/erh/ghwo?wfo=ind>  
WFO Northern Indiana, IN - <https://www.weather.gov/erh/ghwo?wfo=iwx>  
WFO Des Moines, IA - <https://www.weather.gov/erh/ghwo?wfo=dmx>  
WFO Quad Cities/Davenport, IA - <https://www.weather.gov/erh/ghwo?wfo=dvn>  
WFO Dodge City, KS - <https://www.weather.gov/erh/ghwo?wfo=ddc>  
WFO Goodland, KS - <https://www.weather.gov/erh/ghwo?wfo=gld>  
WFO Topeka, KS - <https://www.weather.gov/erh/ghwo?wfo=top>  
WFO Wichita, KS - <https://www.weather.gov/erh/ghwo?wfo=ict>  
WFO Jackson, KY - <https://www.weather.gov/erh/ghwo?wfo=jkl>  
WFO Louisville, KY - <https://www.weather.gov/erh/ghwo?wfo=lmk>  
WFO Paducah, KY - <https://www.weather.gov/erh/ghwo?wfo=pah>  
WFO Lake Charles, LA - <https://www.weather.gov/erh/ghwo?wfo=lch>  
WFO New Orleans/Baton Rouge, LA - <https://www.weather.gov/erh/ghwo?wfo=lix>  
WFO Shreveport, LA - <https://www.weather.gov/erh/ghwo?wfo=shv>  
WFO Caribou, ME - <https://www.weather.gov/erh/ghwo?wfo=car>  
WFO Gray/Portland, ME - <https://www.weather.gov/erh/ghwo?wfo=gyx>  
WFO Boston/Norton, MA - <https://www.weather.gov/erh/ghwo?wfo=box>  
WFO Detroit/Pontiac, MI - <https://www.weather.gov/erh/ghwo?wfo=dtx>  
WFO Gaylord, MI - <https://www.weather.gov/erh/ghwo?wfo=apx>  
WFO Grand Rapids, MI - <https://www.weather.gov/erh/ghwo?wfo=grr>  
WFO Marquette, MI - <https://www.weather.gov/erh/ghwo?wfo=mqt>  
WFO Duluth, MN - <https://www.weather.gov/erh/ghwo?wfo=dlh>  
WFO Twin Cities/Chanhassen, MN - <https://www.weather.gov/erh/ghwo?wfo=mpx>  
WFO Jackson, MS - <https://www.weather.gov/erh/ghwo?wfo=jan>  
WFO Pleasant Hill/Kansas City, MO - <https://www.weather.gov/erh/ghwo?wfo=eax>  
WFO Springfield, MO - <https://www.weather.gov/erh/ghwo?wfo=sgf>  
WFO St. Louis, MO - <https://www.weather.gov/erh/ghwo?wfo=lsx>  
WFO Billings, MT - <https://www.weather.gov/erh/ghwo?wfo=byz>  
WFO Glasgow, MT - <https://www.weather.gov/erh/ghwo?wfo=ggw>  
WFO Great Falls, MT - <https://www.weather.gov/erh/ghwo?wfo=tfx>

WFO Missoula, MT - <https://www.weather.gov/erh/ghwo?wfo=mso>  
WFO Hastings, NE - <https://www.weather.gov/erh/ghwo?wfo=gid>  
WFO North Platte, NE - <https://www.weather.gov/erh/ghwo?wfo=lbj>  
WFO Omaha/Valley, NE - <https://www.weather.gov/erh/ghwo?wfo=oax>  
WFO Elko, NV - <https://www.weather.gov/erh/ghwo?wfo=lkn>  
WFO Las Vegas, NV - <https://www.weather.gov/erh/ghwo?wfo=vef>  
WFO Reno, NV - <https://www.weather.gov/erh/ghwo?wfo=rev>  
WFO Philadelphia/Mt. Holly, NJ - <https://www.weather.gov/erh/ghwo?wfo=phi>  
WFO Albuquerque, NM - <https://www.weather.gov/erh/ghwo?wfo=abq>  
WFO Albany, NY - <https://www.weather.gov/erh/ghwo?wfo=aly>  
WFO Binghamton, NY - <https://www.weather.gov/erh/ghwo?wfo=bgm>  
WFO Buffalo, NY - <https://www.weather.gov/erh/ghwo?wfo=buf>  
WFO New York/Upton, NY - <https://www.weather.gov/erh/ghwo?wfo=okx>  
WFO Newport/Morehead City, NC - <https://www.weather.gov/erh/ghwo?wfo=mxh>  
WFO Raleigh, NC - <https://www.weather.gov/erh/ghwo?wfo=rah>  
WFO Wilmington, NC - <https://www.weather.gov/erh/ghwo?wfo=ilm>  
WFO Bismarck, ND - <https://www.weather.gov/erh/ghwo?wfo=bis>  
WFO Grand Forks, ND - <https://www.weather.gov/erh/ghwo?wfo=fgf>  
WFO Cleveland, OH - <https://www.weather.gov/erh/ghwo?wfo=cle>  
WFO Wilmington, OH - <https://www.weather.gov/erh/ghwo?wfo=iln>  
WFO Norman, OK - <https://www.weather.gov/erh/ghwo?wfo=oun>  
WFO Tulsa, OK - <https://www.weather.gov/erh/ghwo?wfo=tsa>  
WFO Medford, OR - <https://www.weather.gov/erh/ghwo?wfo=mfr>  
WFO Pendleton, OR - <https://www.weather.gov/erh/ghwo?wfo=ptd>  
WFO Portland, OR - <https://www.weather.gov/erh/ghwo?wfo=pqr>  
WFO Pittsburgh, PA - <https://www.weather.gov/erh/ghwo?wfo=pbz>  
WFO State College, PA - <https://www.weather.gov/erh/ghwo?wfo=ctp>  
WFO San Juan, PR - <https://www.weather.gov/erh/ghwo?wfo=sju>  
WFO Charleston, SC - <https://www.weather.gov/erh/ghwo?wfo=chs>  
WFO Columbia, SC - <https://www.weather.gov/erh/ghwo?wfo=cae>  
WFO Greenville-Spartanburg, SC - <https://www.weather.gov/erh/ghwo?wfo=gsp>  
WFO Aberdeen, SD - <https://www.weather.gov/erh/ghwo?wfo=abr>  
WFO Rapid City, SD - <https://www.weather.gov/erh/ghwo?wfo=unr>  
WFO Sioux Falls, SD - <https://www.weather.gov/erh/ghwo?wfo=fsd>  
WFO Memphis, TN - <https://www.weather.gov/erh/ghwo?wfo=meg>  
WFO Morristown, TN - <https://www.weather.gov/erh/ghwo?wfo=mrx>  
WFO Nashville, TN - <https://www.weather.gov/erh/ghwo?wfo=ohx>  
WFO Amarillo, TX - <https://www.weather.gov/erh/ghwo?wfo=ama>  
WFO Austin/San Antonio, TX - <https://www.weather.gov/erh/ghwo?wfo=ewx>  
WFO Brownsville, TX - <https://www.weather.gov/erh/ghwo?wfo=bro>  
WFO Corpus Christi, TX - <https://www.weather.gov/erh/ghwo?wfo=crp>  
WFO El Paso, TX - <https://www.weather.gov/erh/ghwo?wfo=epz>  
WFO Fort Worth/Dallas, TX - <https://www.weather.gov/erh/ghwo?wfo=fwd>  
WFO Houston/Galveston, TX - <https://www.weather.gov/erh/ghwo?wfo=hgx>  
WFO Lubbock, TX - <https://www.weather.gov/erh/ghwo?wfo=lub>  
WFO Midland/Odessa, TX - <https://www.weather.gov/erh/ghwo?wfo=maf>

WFO San Angelo, TX - <https://www.weather.gov/erh/ghwo?wfo=slt>  
WFO Salt Lake City, UT - <https://www.weather.gov/erh/ghwo?wfo=slc>  
WFO Burlington, VT - <https://www.weather.gov/erh/ghwo?wfo=btv>  
WFO Baltimore/Washington, VA - <https://www.weather.gov/erh/ghwo?wfo=lwx>  
WFO Blacksburg/Roanoke, VA - <https://www.weather.gov/erh/ghwo?wfo=rnk>  
WFO Wakefield, VA - <https://www.weather.gov/erh/ghwo?wfo=akq>  
WFO Seattle/Tacoma, WA - <https://www.weather.gov/erh/ghwo?wfo=sew>  
WFO Spokane, WA - <https://www.weather.gov/erh/ghwo?wfo=otx>  
WFO Charleston, WV - <https://www.weather.gov/erh/ghwo?wfo=rlx>  
WFO Green Bay, WI - <https://www.weather.gov/erh/ghwo?wfo=grb>  
WFO La Crosse, WI - <https://www.weather.gov/erh/ghwo?wfo=arx>  
WFO Milwaukee/Sullivan, WI - <https://www.weather.gov/erh/ghwo?wfo=mkx>  
WFO Cheyenne, WY - <https://www.weather.gov/erh/ghwo?wfo=cys>  
WFO Riverton, WY - <https://www.weather.gov/erh/ghwo?wfo=riw>