

Product/Service Description Document
Experimental Impact-Based Marine Hazard Grids
July 14, 2015

Part I - Mission Connection

- a. **Product Description** – Impact-based marine hazard grids (IBH) provide the marine community with a detailed depiction of expected adverse weather conditions. Unlike zone-based hazards, IBH also show parts of zones where no hazard is expected which allows for continued marine operations. The Weather-Ready Nation concept calls for improving information to customers and partners to enhance decision support. Providing additional hazard details fills that requirement. The details, combined with the separation of hazards, allow mariners to make informed decisions based upon their vessel capabilities and personal level of skill. Impact-based hazard grids are now being used for beach hazards and are increasingly being used for hazards on land areas.
- b. **Purpose** - The purpose of this procedure is to provide all customers and partners with enhanced detail on weather hazards on the coastal waters to aid their operations decisions. Zone-based hazards by their nature misrepresent the extent of hazardous conditions which can either restrict activities of the fishing and recreational marine communities or place those communities at risk by not describing the full extent of hazards. The detailed hazard grids can be displayed on Weather Forecast Office (WFO) webpages and be made available via kml file. The grids are also used in the generation of the Marine Weather Message (MWW) and Coastal Waters Forecast (CWF) text products. Detailed descriptions of the impacted areas should be included in the text products. The added information allows for more informed decisions, which increases safety and supports more economical operations. Examples of where enhanced detail on hazards can be used for marine safety include: wave stacking in the Gulf Stream, wind acceleration around points/capes, and wind flow around islands.
- c. **Audience** - The audience is any marine customer/partner in the WFO forecast area needing or desiring access to enhanced marine hazard information. The United States Coast Guard has expressed support for the procedure since it will aid their operations. Fishermen need to know if their desired destination for work is safe or even approachable. Recreational mariners want to know if conditions will make for a pleasant journey.
- d. **Presentation Format** – The impact-based hazard information will be presented in a tiered concept that utilizes both text and graphics. The hazard grid information will be provided via the existing MWW and CWF text products. Greater detail on hazard extent

is included in an “areas affected” bullet in the MWW text product. A bullet may also be included with a shortened URL to the digital.weather.gov webpage. Headlines in both text products (MWW and CWF) will be limited to the highest level hazard for winds and seas, respectively. This will give a maximum of two headlines in each text product but in most cases there will be a single headline. Sea state hazards will only be issued when this is the only hazard or when seas are at a higher level (small craft advisory level winds with hazardous seas warning). For all other hazards, seas will be included with the wind event. The MWW headline may contain a short description of the impacted area. Concurrent hazards that are not included in the headlines will be described in the body of the MWW.

The information is presented in several formats to better meet the full spectrum of needs of the marine community. Mariners can check on weather via a computer and webpages from home and increasingly from mobile devices while underway. Others continue to utilize broadcasts via NOAA Weather Radio (NWR). While a radio broadcast of text cannot provide the explicit detail of a graphic, the inclusion of the “areas affected” bullet in the MWW and the brief description of the area affected in the headline still provide additional details for decision support.

The existing Graphical Forecast Editor (GFE) on the Advanced Weather Interactive Processing System (AWIPS) has the capability to provide this detail with no modifications. Webpage displays of the hazards will be made available via digital.weather.gov and a webpage with kml versions of the hazards with wind and sea hazards in layers.

- e. **Feedback Method** - Comments regarding the Impact-Based Marine Hazard Grids may be submitted via a short survey: www.nws.noaa.gov/survey/nws-survey.php?code=IBMHG, or via email to the WFO Webmaster at <http://www.wrh.noaa.gov/mfr/>.

Comments will be received through June 30, 2016. The marine hazard grid procedure will then be evaluated for implementation as a national procedure.

Part II - Technical Description

- a. **Format and Science Basis** - This procedure is being developed to provide customers and partners detailed hazard information to enhance decision support services in support of a Weather-Ready Nation. Marine zones can vary greatly in size depending upon the area of the country. While zones are climatologically homogeneous, larger ones can have significantly varied weather conditions within the zone. The enhanced detail provided to the marine community informs them where hazards are expected so their operations can be adjusted to maximize safety while still allowing voyages. Increased model resolution and satellite estimates of surface winds provide forecasters with the guidance and confidence to fine-tune wind hazard grids. Near-shore wave modelling likewise provides the guidance for wave hazard grids. GFE smart tools have been developed to provide initial hazard area guidance for forecasters. This first estimate is then adjusted by the forecaster to provide a more homogeneous hazard grid in both area and time. An example of a hazard grid progression from GFE starts in Figure 1.

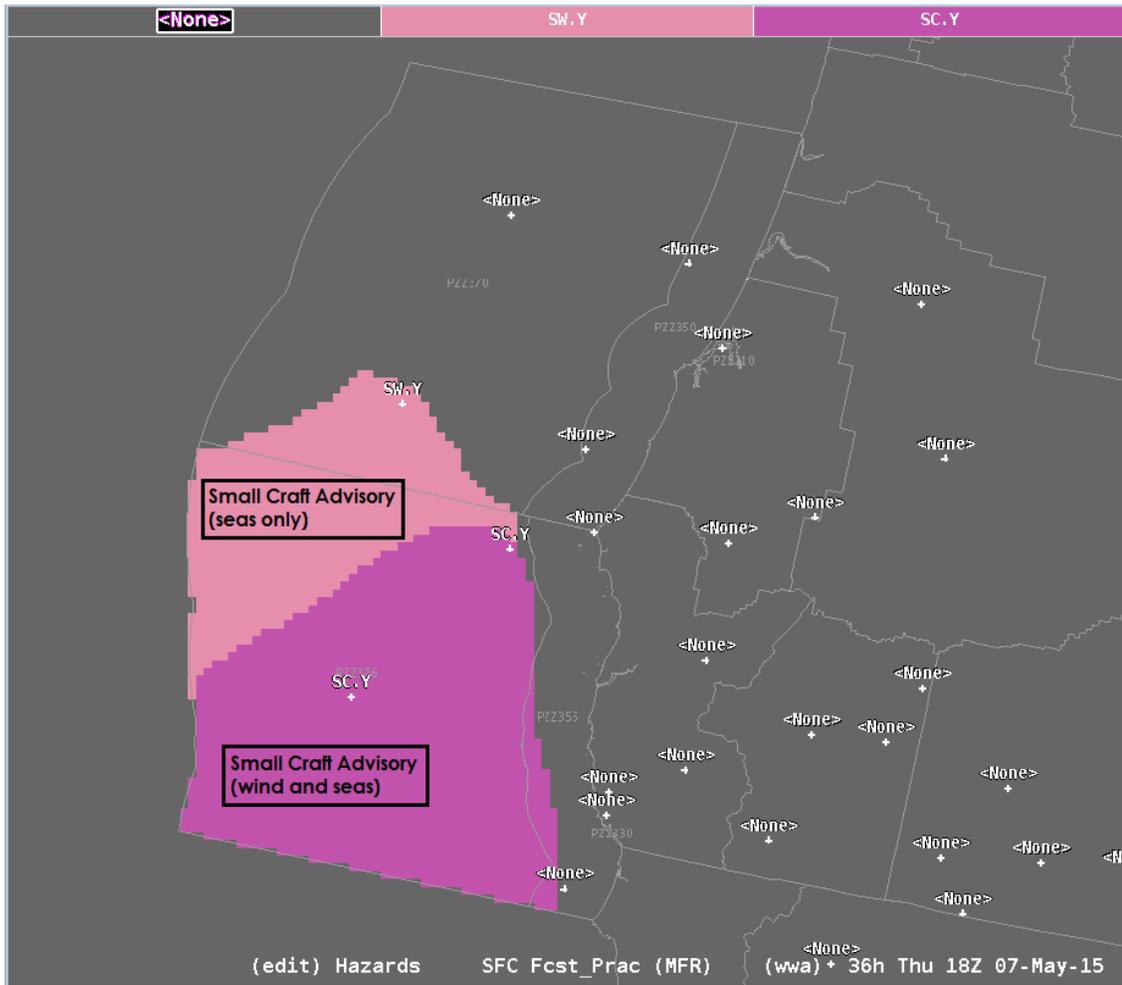


Figure 1

Here, a north wind event near Cape Blanco, Oregon has a wind acceleration area south of the cape. A small craft advisory for both winds and seas covers much of the southern outer water zone. Surrounding this area is a small craft advisory for hazardous seas since seas are steep but winds have not reached criteria. The text MWW product contains a bullet to describe the area covered by each hazard. Additionally, an area descriptor can be added to the headline. A bullet may also be added to the MWW to provide a link to digital.weather.com. This link may or may not be active depending upon the method of viewing the text product. Figure 2 shows a later time in the same developing storm. Here, a Gale Warning has been issued for much of zone PZZ376 but some areas remain below criteria.

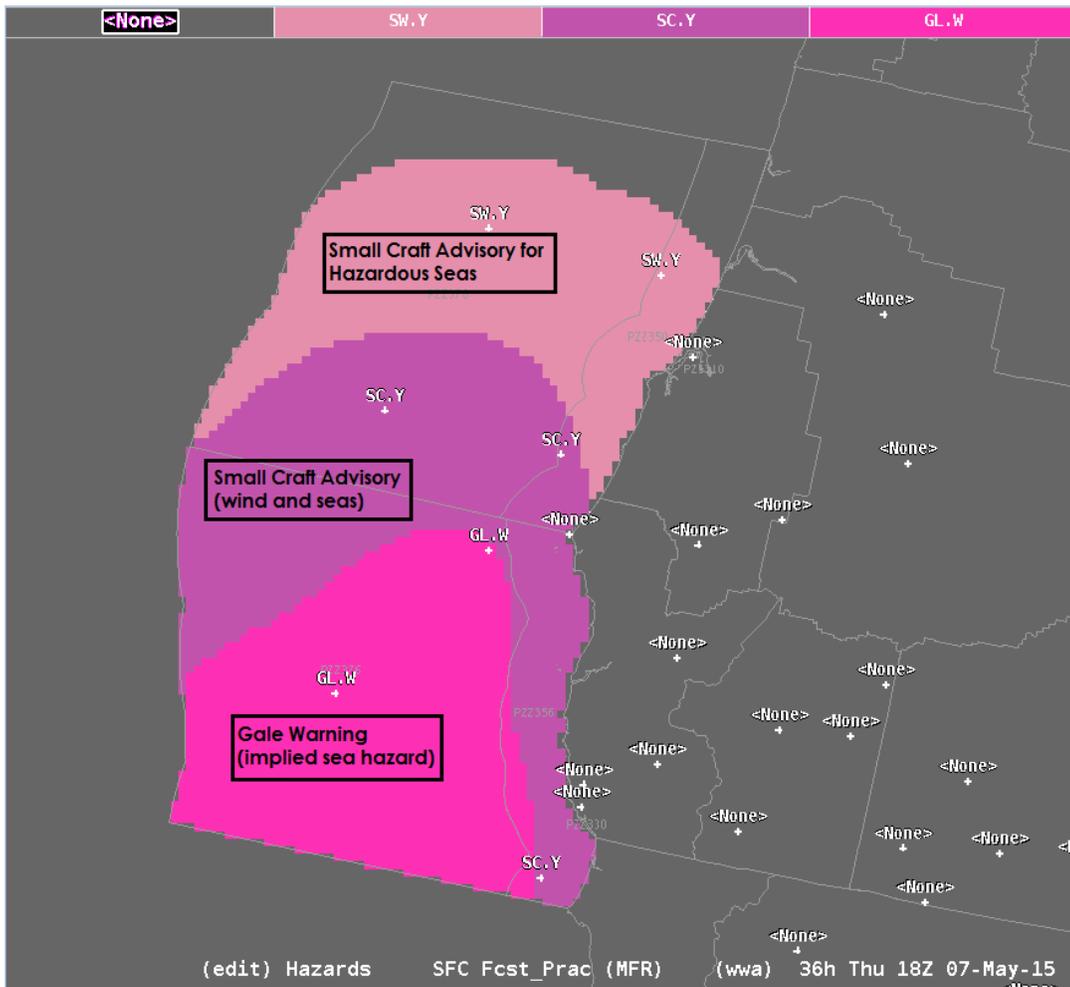


Figure 2

Figure 3 shows when the winds have subsided but seas remain steep and hazardous. Here, a hazardous seas warning is coincident with a small craft advisory for winds. A combined small craft advisory surrounds this area. Finally in Figure 4, all winds have subsided leaving only a small craft advisory for hazardous seas.

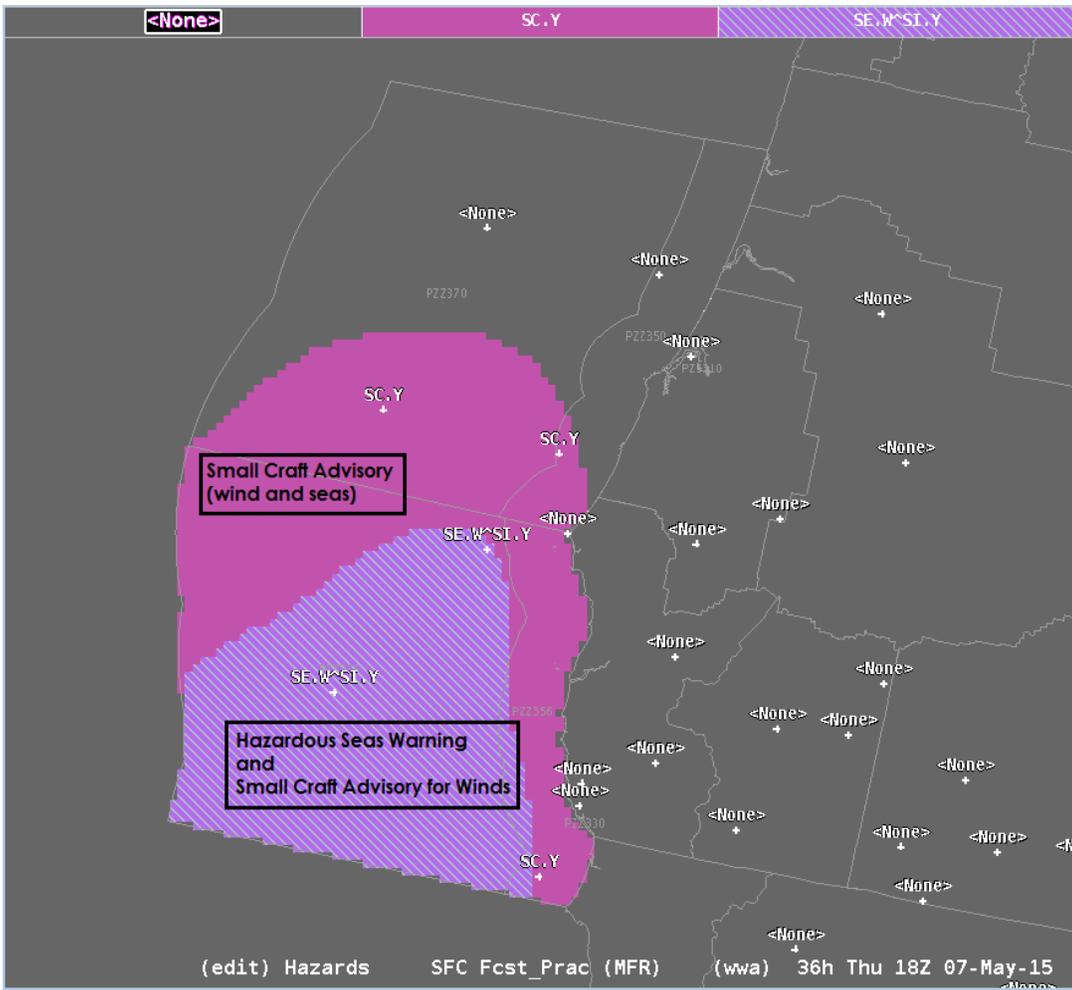


Figure 3

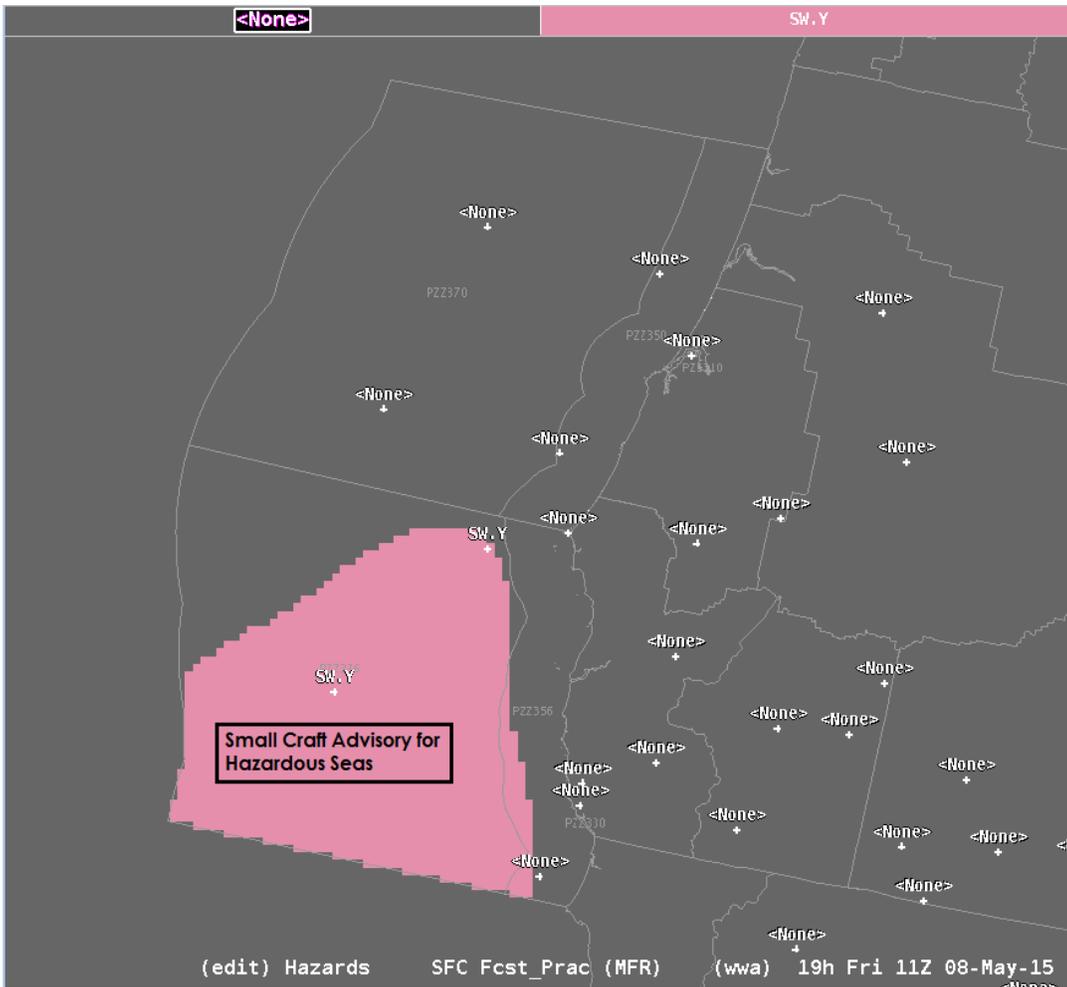


Figure 4

- b. The hazard grid is available via the internet in several locations. The URL for the NWS hazard viewer is <http://digital.weather.gov>. Shortened URLs can be provided in the MWW to the hazard viewer to an area focusing on a particular WFO. These shortened URLs are then read over NWR. One caveat for this URL is that the section after the last forward slash (/) must be in upper case letters and/or numbers only. This is due to the continued use of all caps in legacy text products. A kml webpage has been developed allowing the separate display of wave and wind hazard grids in separate map displays. The text products are available 24/7. The MWW can be broadcast over NWR. The graphics and legacy text are continuously available via the internet webpages.
- c. **Additional Information** – Samples of the MWW and CWF products are given below. Figure 5 shows the display of the forecast on the Point and Click webpage. This is the display after the first click. Figure 6 shows the Point and Click that is shown after a second click on the map. Please note that the webpage examples are for illustrative purposes only and do not exactly match with hazard grid and text product examples.

PZZ376-200600-
/O.CON.KMFR.SC.Y.0081.141219T1800Z-141220T1200Z/
/O.CON.KMFR.GL.W.0060.141220T1200Z-141221T0000Z/
WATERS FROM CAPE BLANCO OR TO PT. ST. GEORGE CA FROM 10 TO 60 NM-
852 AM PST FRI DEC 19 2014

...GALE WARNING REMAINS IN EFFECT FROM 4 AM TO 4 PM PST
SATURDAY MAINLY BEYOND 5 NM...

A GALE WARNING IS IN EFFECT FROM 4 AM TO 4 PM PST SATURDAY. A SMALL CRAFT ADVISORY
REMAINS IN EFFECT FROM 10 PM THIS EVENING TO 4 PM PST SATURDAY.

* SEAS: WEST 20 TO 22 FEET AT 18 SECONDS THIS AFTERNOON AND
EVENING. NORTHERLY CHOP WILL INCREASE SATURDAY...CREATING VERY
STEEP AND CHAOTIC SEAS OF 20 TO 21 FEET THROUGH SATURDAY
EVENING.

* WINDS: NORTH 20 TO 30 KT...INCREASING TO 30 TO 40 KT WITH GUSTS
UP TO 50 KT SATURDAY MORNING THROUGH THE AFTERNOON MAINLY BEYOND 10 NM FROM
SHORE.

* AREAS AFFECTED: GALE FORCE WINDS ARE EXPECTED IN THE ENTIRE ZONE EXCEPT BEYOND
30 NM IN THE VICINITY OF CAPE BLANCO WHERE SMALL CRAFT ADVISORY WINDS WILL
OCCUR. ALL AREAS WILL HAVE STEEP TO VERY STEEP WAVES.

* VIEW THE HAZARD AREA IN DETAIL AT [HTTP://WEATHER.GOV/MEDFORD/HAZARD](http://weather.gov/medford/hazard)

PRECAUTIONARY/PREPAREDNESS ACTIONS...

Text Sample 1 Marine Weather Message (MWW)

PZZ376-192300-

WATERS FROM CAPE BLANCO OR TO PT. ST. GEORGE CA FROM 10 TO 60 NM-
852 AM PST FRI DEC 19 2014

...GALE WARNING IN EFFECT FROM LATE TONIGHT THROUGH SATURDAY
AFTERNOON...

.TODAY...SW WIND 10 TO 20 KT. WIND WAVES 4 TO 5 FT. W SWELL 4 TO
6 FT AT 20 SECONDS...BUILDING TO 10 TO 11 FT AT 19 SECONDS IN THE
AFTERNOON. SHOWERS LIKELY.

.TONIGHT...SW WIND 15 TO 20 KT...BACKING TO S 30 KT. WIND WAVES
5 TO 7 FT...BUILDING TO 7 TO 10 FT AFTER MIDNIGHT. SWELL W 18 TO
21 FT AT 17 SECONDS. RAIN.

.SAT...S GALES 35 KT...BECOMING SW 30 KT IN THE AFTERNOON. WIND
WAVES 9 TO 11 FT. SWELL W 17 FT AT 16 SECONDS. RAIN.

.SAT NIGHT...SW WIND 25 KT...EASING TO 20 KT AFTER MIDNIGHT. WIND
WAVES 8 FT...SUBSIDING TO 5 TO 7 FT AFTER MIDNIGHT. SWELL W 14 TO
17 FT. RAIN.

.SUN...SW WIND 15 TO 20 KT. WIND WAVES 4 TO 6 FT. SWELL W 13 TO
14 FT. RAIN LIKELY.

.SUN NIGHT...SW WIND 15 KT. WIND WAVES 3 TO 5 FT. W SWELL 11 TO
13 FT. CHANCE OF RAIN.

.MON...SW WIND 10 KT...VEERING TO W. WIND WAVES 2 FT OR LESS.
SWELL W 12 FT...SUBSIDING TO W 10 FT.

.TUE...NW WIND 5 TO 10 KT. WIND WAVES 2 FT OR LESS. W SWELL
12 FT.

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Text Sample 2 Coastal Waters Forecast (CWF)

HAZARDOUS WEATHER CONDITIONS

[Gale Warning in effect from December 20, 04:00 AM PST until December 20, 04:00 PM PST](#)
[Small Craft Advisory For Winds in effect from December 19, 10:00 PM PST until December 20, 04:00 PM PST](#)
[Hazardous Seas Warning in effect from December 19, 10:00 AM PST until December 20, 10:00 PM PST](#)
[Marine Weather Statement is in effect](#)

Last Update: 8:52 AM PST FRI DEC 19 2014

[View Nearby Observations](#)

Waters from Cape Blanco OR to Pt. St. George CA from 10 to 60 nm

Marine Zone Forecast

For More Weather Information:
[Medford, OR Local Forecast Office](#)

...GALE WARNING IN EFFECT FROM LATE TONIGHT THROUGH SATURDAY...

Synopsis HEAVY WEST SWELL WILL BUILD TODAY...PEAKING AROUND 20 FEET AT 18 SECONDS THIS EVENING. HEAVY LONG PERIOD SWELL WILL REMAIN THROUGH SATURDAY. MEANWHILE...ANOTHER ROUND OF GALE FORCE WINDS WILL ARRIVE WITH A STRONG WARM FRONT. THE FRONT WILL LINGER ALONG THE COAST NORTH OF CAPE BLANCO INTO MONDAY AS SEAS SUBSIDE AND WINDS GRADUALLY DIMINISH. THE NEXT FRONT IS EXPECTED ON WEDNESDAY. AS A RESULT...MODERATE TO STRONG AND GUSTY NORTH WINDS ARE EXPECTED CHRISTMAS EVE INTO CHRISTMAS DAY.

Today SW wind 10 to 20 kt. Wind waves 4 to 5 ft. W swell 4 to 6 ft at 20 seconds...building to 10 to 11 ft at 19 seconds in the afternoon. Showers likely.

Tonight SW wind 15 to 20 kt...backing to S 30 kt. Wind waves 5 to 7 ft...building to 7 to 10 ft after midnight. Swell W 18 to 21 ft at 17 seconds. Rain.

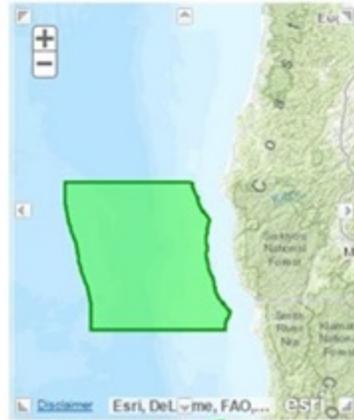
Sat S gales 35 kt...becoming SW 30 kt in the afternoon. Wind waves 9 to 11 ft. Swell W 17 ft at 16 seconds. Rain.

Sat Night SW wind 25 kt...easing to 20 kt after midnight. Wind waves 8 ft...subsiding to 5 to 7 ft after midnight. Swell W 14 to 17 ft. Rain.

Sun SW wind 15 to 20 kt. Wind waves 4 to 6 ft. Swell W 13 to 14 ft. Rain likely.

Topographic

[Click Map For Detailed Forecast](#)



Requested Location Forecast Area

Figure 5 Point and Click Forecast - First Click

HAZARDOUS WEATHER CONDITIONS

Gale Warning in effect from December 20, 04:00 AM PST until December 20, 04:00 PM PST

67NM NNW Crescent City CA

Marine Point Forecast **[NOTICE]**

For More Weather Information:

[Medford, OR Local Forecast Office](#)

TODAY	TONIGHT	SATURDAY	SATURDAY NIGHT	SUNDAY	SUNDAY NIGHT	MONDAY	MONDAY NIGHT	TUESDAY
SSW 15kt 17ft	SSW 25kt 20-22ft Gale Warning	S 35kt 20ft Gale Warning	SW 25kt 17-18ft Haz. Seas Warning	SW 20kt 15ft	SW 18kt 13-14ft	SSW 12kt 11ft	Light Wind 11ft	Light Wind 11-12ft

[Associated Zone Forecast which includes this point](#)

Last Update: 9:10 am PST Dec 19, 2014
Forecast Valid: 11am PST Dec 19, 2014-6pm PST Dec 25, 2014

[View Nearby Observations](#)

Detailed Forecast

... GALE WARNING FROM LATE TONIGHT THROUGH SATURDAY ...

Synopsis	HEAVY WEST SWELL WILL BUILD TODAY...PEAKING AROUND 20 FEET AT 18 SECONDS THIS EVENING. HEAVY LONG PERIOD SWELL WILL REMAIN THROUGH SATURDAY. MEANWHILE...ANOTHER ROUND OF GALE FORCE WINDS WILL ARRIVE WITH A STRONG WARM FRONT. THE FRONT WILL LINGER ALONG THE COAST NORTH OF CAPE BLANCO INTO MONDAY AS SEAS SUBSIDE AND WINDS GRADUALLY DIMINISH. THE NEXT FRONT IS EXPECTED ON WEDNESDAY. AS A RESULT...MODERATE TO STRONG AND GUSTY NORTH WINDS ARE EXPECTED CHRISTMAS EVE INTO CHRISTMAS DAY.
Today	SSW wind around 15 kt, with gusts as high as 22 kt. Showers. Mixed swell...W 11 ft at 19 seconds and W 13 ft at 13 seconds. Wind waves around 4 ft.
Tonight	SSW wind 20 to 25 kt, with gusts as high as 31 kt. Rain. Mixed swell...W 19 to 21 ft at 17 seconds and SSW 1 ft at 13 seconds. Wind waves 5 to 7 ft.
Saturday	S wind 29 to 35 kt, with gusts as high as 44 kt. Rain. The rain could be heavy at times. Mixed swell...W 17 ft at 16 seconds and SSW 1 ft at 13 seconds. Wind waves 10 to 11 ft.
Saturday Night	SW wind 22 to 25 kt, with gusts as high as 33 kt. Rain. Mixed swell...W 15 to 16 ft and SSW 1 ft. Wind waves 7 to 8 ft.
Sunday	SW wind around 20 kt, with gusts as high as 26 kt. Rain likely. Mixed swell...W 14 ft and SSW 1 ft. Wind waves around 5 ft.
Sunday Night	SW wind 16 to 18 kt. Rain likely. Mixed swell...W 12 to 13 ft and SSW 1 ft becoming WNW. Wind waves around 4 ft.

Topographic Select Another Point

Disclaimer Esri, HERE DeLorm... esri

+ Requested Location Forecast Area

Figure 6 Point and Click Forecast - Second Click – NE corner of Zone PZZ376