National Weather Service Product Description Document (PDD)
Experimental Surf Forecast Matrix at select NWS Eastern
and Southern Region Weather Forecast Offices
March 2024

Part I – Mission Connection

a. Product Description:

Rip currents are one of the main weather-related causes of fatalities along the East Coast. In recent years, there has been tremendous effort by the NWS to increase awareness and provide vital forecast information to help mitigate this hazard. The Surf Zone Forecast (SRF) product issued by coastal and Great Lakes Weather Forecast Offices (WFOs) contains a full two-day forecast, with only one forecast value provided for each day per coastal county. That forecast is based on the maximum threat expected during the day. However, the current SRF does not describe the timing or expected duration of the threat, nor does it provide detailed extended outlooks of beach threats at specific beaches. With recent improvements in wave modeling and rip current forecasting, including the Nearshore Wave Prediction System (NWPS) probabilistic rip current model, there is increased ability to add detail to the current SRF forecast method.

The Experimental Surf Forecast Matrix will provide a 6-day forecast, broken into 3-hourly and 6-hourly increments, and include similar forecast parameters as the operational SRF product, with an individual matrix for popular beaches in the Wilmington, NC, Wakefield, VA, Boston, MA, Philadelphia, PA, Brownsville, TX, Miami, FL and Mobile, AL County Warning Areas.

b. Purpose and Intended Use:

The Experimental Surf Forecast Matrix is designed to supplement the official SRF forecast product by providing additional details to our partners and the public. The matrix will provide lifeguard/beach services and emergency managers with important information on the timing and location of hazardous surf conditions to enhance public safety decision making processes and to meet their recent demands. The product is intended for planning purposes and should not be substituted for the official SRF.

c. Audience:

The Experimental Surf Forecast Matrix is targeted towards a wide range of users, from the general public to beach community officials and NWS core partners.

d. Presentation Format:

The Experimental Surf Forecast Matrix will be in a text format on forecast office webpages. The top of the webpage will include a statement emphasizing that this product is *experimental* and for *planning* purposes only, and to refer to the official SRF product for the current beach forecast. The webpage will also include information on how to interpret NWPS rip current probabilities. The product will be issued in tandem with the primary SRF product issuance times, consistent with local policies. An example of the Experimental Surf Forecast Matrix can be seen in Part II Section A below.

e. Feedback Method:

Feedback on this experiment will be solicited from the public and emergency management partners throughout 2024. If feedback is positive, we will consider expanding this experimental product to additional forecast offices in 2025. The link to the feedback survey is available here:

If you have questions or comments, please contact:

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Part II – Technical

a. Format and Science Basis:

The Experimental Surf Forecast Matrix is currently modeled after similar NWS matrix text products, including the Point Forecast Matrix (PFM) and Fire Weather Point Forecast Matrix (PFW). The new experimental matrix will be structured into 3-hourly increments to best represent trends during the initial forecast period, then 6-hourly segments for the extended outlook. The matrix will include the official Rip Risk forecasted in the SRF product, as well as Rip Probability values from the NWPS model to highlight variations and timing of the Rip Risk for the entire forecast period. The other variables within the matrix will be taken from forecast grids already being produced at the local forecast offices.

Below is a list of the available Surf Forecast Matrix variables (*Please note, Longshore Strength* and *Waterspout Risk* are optional forecast elements):

Rip Current Risk: Official rip current risk for the day as forecasted in the SRF product

Rip Probability: % chance of a hazardous rip current occurring as predicted by the NWPS rip current model

Surf Height (ft): Height of breaking waves in the surf zone

Dom Period (s): Dominant wave period in the local wave spectrum

Chance Precip: % chance of precipitation

TSTM Potential: Potential for thunderstorm at location, associated with lightning risk to beachgoers (None, Low, Moderate, High)

Cloud Cover: Category of cloud coverage (Clr/Clear, Mclr/Mostly Clear, Pcld/Partly Cloudy, Mcld/Mostly Cloudy, Ovc/Overcast)

Temperature: Air temperature in degrees Fahrenheit

Heat Index: Heat index in degrees Fahrenheit; Only shown if at least 4°F higher than Temperature

Wind (mph): Sustained wind direction and speed at the surface in mph

Wind Gust: Wind gust in mph; Only shown if wind gust is 5+ mph greater than sustained wind speed

Longshore (*optional*): Forecasted strength of longshore current in the surf zone, which runs parallel to shore (None, Weak, Moderate, Strong)

Waterspout Risk (*optional*): Potential for a non-convective waterspout to form near the coast (None, Low, Moderate, High)

Below is an example of the Experimental Surf Forecast Matrix from NWS Wilmington, NC:

Surf City, NC

Date	Thu 05/27						Fri 05/28						
EDT 3hrly	08	11	14	17	20	23	02	05	08	11	14	17	20
Rip Current Risk	Mod							Mod					
Rip Probability	28	39	70	69	23	22	56	70	31	33	73	84	43
Surf Height (ft)	2	2	2	2	3	3	2	2	2	2	3	3	3
Dom Period (s)	9	9	9	9	9	9	9	9	8	8	7	5	5
Chance Precip	0	10	10	10	0	0	0	0	0	10	10	10	20
TSTM Potential	None	None	None	None	None	None	None	None	None	None	None	None	Low
Cloud Cover	Mclr	Mclr	Mclr	Mclr	Mclr	Mclr	Clr	Clr	Clr	Clr	Mclr	Mclr	Mclr
Temperature	74	80	80	78	77	75	74	73	75	80	79	78	77
Heat Index													
Wind (mph)	W 13	SW 14	S 14	S 13	SW 12	SW 13	SW 14	SW 13	SW 12	S 16	S 21	S 20	SW 20
Wind Gust										21	26	25	
Longshore	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Strng	Strng	Strng
Waterspout Risk	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

Date	Sat 05/29				Sun 05/30				Mon 05/31				Tue 06/01		
EDT 6hrly	02	08	14	20	02	08	14	20	02	08	14	20	02	08	14
Rip Probability	61	71	72	55	35	58	42	57	27	65	23	43	12	29	7
Surf Height (ft)	3	3	3	3	2	2	2	2	2	2	2	2	2	2	1
Dom Period (s)	5	6	6	6	6	6	6	6	6	6	5	5	5	7	8
Chance Precip	20	50	50	60	60	50	50	30	30	20	20	20	20	20	20
TSTM Potential	Low	Mod	Mod	High	High	Mod	Mod	Mod	Mod	Low	Low	Low	Low	Low	Low
Cloud Cover	Pcld	Pcld	Pcld	Mcld	Mcld	Mcld	Mcld	Mcld	Mcld	Pcld	Pcld	Pcld	Pcld	Pcld	Pcld
Temperature	76	77	83	77	70	67	73	68	63	63	75	71	66	67	77
Heat Index			87												
Wind (mph)	SW 18	SW 15	SW 15	SW 12	W 8	N 7	N 7	N 13	N 10	N 10	NE 8	E 9	E 6	E 7	SE 9
Wind Gust		21	22								13				14
Longshore	Strng	Strng	Strng	Mod	Weak	None	None	Mod	Mod	Mod	Weak	Weak	None	Weak	None
Waterspout Risk	Low	Low	Low	Low	Low	None	None	None	None	None	None	None	None	None	None

b. Product Availability:
The matrix will be issued/updated at the same time as the official local SRF product, with times based on local policies. The Experimental Surf Forecast Matrix will be available on NWS office webpages:

Wilmington, NC www.weather.gov/ilm/surfmatrices
Wakefield, VA www.weather.gov/akq/surfmatrices
Boston, MA www.weather.gov/box/surfmatrices
Philadelphia, PA www.weather.gov/phi/surfmatrices
Brownsville, TX www.weather.gov/bro/surfmatrices
Miami, FL www.weather.gov/mfl/surfmatrices
Mobile, AL www.weather.gov/mob/surfmatrices