Appendix B: National Weather Service Products

National Centers for Environmental Prediction (NCEP)

Aviation Weather Center

The Aviation Weather Center (AWC) provides aviation warnings and forecasts of hazardous flight conditions at all levels within domestic and international air space. Products and services from the AWC can assist USCG in search, rescue, and recovery missions where flight operations are required. Forecasts for convection (thunderstorms), turbulence, icing, and upper-level winds and temperatures, along with aviation advisories such as AIRMETs (Airman's Meteorological Information) and SIGMETs (Significant Meteorological Information), are available. Graphical forecasts and tools are available at the AWC web site (https://www.aviationweather.gov), along with a standard briefing page and Graphical Forecasts for Aviation page that is designed to assist pilots and aircrews for flight planning and familiarization, to be used in conjunction with other pre-flight information sources. Short-fused critical-decision support can be obtained from the AWC by contacting the AWC lead forecaster at 816 584 7269.

Climate Prediction Center

The Climate Prediction Center (CPC) monitors and forecasts short-term climate fluctuations and provides information on the effects climate patterns can have on the nation. General outlooks from six-to-ten days to three months in advance can assist the USCG particularly for planned exercises. Eight-to-fourteen day hazards outlooks and global tropics hazards outlooks can help inform critical decision-makers' planning activities. Long-term critical-decision support can be obtained from the CPC by contacting a CPC meteorologist.

National Hurricane Center/Tropical Analysis and Forecast Branch

The National Hurricane Center (NHC) provides forecasts of the movement and strength of tropical weather systems and issues watches and warnings for the U.S. and surrounding areas. As part of the NHC, the Tropical Analysis and Forecast Branch (TAFB) generates analyses and forecasts over the tropical and subtropical portions of the eastern North and South Pacific, and the North Atlantic, basins. TAFB products include but are not limited to high seas and offshore forecasts, a tropical weather discussion, and graphical surface and ocean weather analyses and forecasts. The Storm Surge Unit, part of the NHC Technology & Science Branch (TSB), forecasts the abnormal rise in sea level accompanying tropical cyclones, and, among other initiatives, prepares storm surge atlases for use by emergency managers in developing evacuation

procedures for coastal areas. Short-fused critical-decision support can be obtained from the NHC by first contacting the TAFB senior marine forecaster at 305 229 4424.

Ocean Prediction Center

The Ocean Prediction Center (OPC) issues weather warnings and forecasts out to five days for the Atlantic and Pacific Oceans north of 30 degrees North in the Pacific, and 31 degrees North in the Atlantic. OPC products for the Atlantic, Pacific, and parts of the Arctic include but are not limited to high seas and offshore forecasts, graphical surface and ocean weather analyses and forecasts, Atlantic iceberg analysis and outlook products courtesy of the USCG International Ice Patrol, and experimental freezing spray guidance. The NOAA component of the U.S. National Ice Center is part of the Ice Services Branch of the OPC, and U.S. National Ice Center products cover regions around the globe with a main focus on areas of ice and snow. Short-fused critical-decision support can be obtained from the OPC by contacting the senior marine forecaster at 301 683 1520. Short-fused critical-decision support specifically for the U.S. National Ice Center can be obtained at 301 943 6977.

Space Weather Prediction Center

The Space Weather Prediction Center (SWPC) provides space weather alerts and warnings for disturbances that can affect people and equipment working in space and on earth. Different types of space weather can affect different technologies on earth. Solar flares, solar energetic particles, and geomagnetic storms can adversely affect radio communication, satellite electronics, and radio navigation systems such as global positioning systems (GPS). SWPC offers dashboards specific to data sets and information that may be of importance to include aviation, emergency management, radio, and GPS. Short-fused critical-decision support specifically for the SWPC can be obtained at 303 497 3029.

Storm Prediction Center

The Storm Prediction Center (SPC) provides tornado and severe weather watches for the contiguous United States along with a suite of hazardous weather forecasts. SPC products include, in addition to tornado and severe weather watches, severe thunderstorm outlooks and fire weather outlooks through eight days, thunderstorm outlooks, and mesoscale discussions. Products and services from the SPC can assist USCG in search, rescue, and recovery mission planning over or near the contiguous United States where severe weather could have an impact. Short-fused critical-decision support can be obtained from the SPC by contacting the SPC lead forecaster at 816 584 7220.

Weather Prediction Center

The Weather Prediction Center (WPC) provides nationwide analysis and forecast guidance products out through seven days. In addition to its surface analyses, the WPC provides quantitative precipitation forecasts and winter weather forecasts through seven days, and excessive rainfall outlooks through three days. WPC is available to answer questions about these products if they would assist USCG in search, rescue, and recovery mission planning. The WPC lead forecaster can be contacted at 301 683 1530.

National Water Center

The National Water Center (NWC), in collaboration with NOAA field offices and other federal water agencies, is responsible for the delivery of forecast guidance and analyses, and inundation information - as well as other information that augments services provided at local, regional, or national levels - for hydrologic events in the United States. This includes flash flooding, riverine flooding, and water resources outlooks; and providing decision-support services to inform emergency and water resources management decisions (https://water.noaa.gov/map). The NWC senior forecaster can be reached at 205-347-1511.

River Forecast Centers

The 13 regional RFCs provide hydrologic/river forecast guidance for time scales that vary from hours (flash flood guidance and support to Local Flood Warning Systems), to days (traditional flood forecasts), to weeks (snowmelt forecasts), to months (seasonal water supply). Forecasters at the RFCs prepare hourly rainfall assimilation and forecast future rainfall and temperatures as the forcings for their hydrologic modeling. The resulting daily river forecasts as well as long range river forecast risk guidance are available via the Advanced Hydrologic Prediction Service (AHPS).

Local Weather Forecast Office (WFO) Products

All local forecast and warning products are accessible at: https://www.weather.gov/ The products below list WFO products and services primarily for the marine environment. Aviation and public forecasts can be utilized depending on the event; consult the WFO for the complete suite of products useful for critical decision-making.

1. Routine WFO products:
    a. Forecasts:
        i. Coastal and Offshore Waters Forecast: Marine forecast for areas, including bays, harbors, and sounds, from a line approximating the mean high-water mark (average height of high water over a 19-year period) along the mainland or near shore islands extending out to as much as 100 NM.

ii. Nearshore Marine Forecast (Great Lakes): The marine forecast for an area of the Great Lakes from a line approximating mean low water datum along the coast or an island, including bays, harbors, and sounds, out to five NM.
iii. Open Lake Forecast (Great Lakes): The marine forecast for the U.S. waters within a Great Lake, not including the waters covered by an existing Nearshore Waters Forecast.
iv. Surf Zone Forecast: A forecast issued for the very narrow area of water between the high tide level on the beach and the seaward side of breaking waves. Notes: Some WFOs do not issue these products. Additionally, some of these products are issued only seasonally.

2. Non-routine WFO products:
    a. Marine Advisories, Watches, and Warnings:
        i. Small Craft Advisory: An advisory issued by coastal and Great Lakes WFOs for areas included in the Coastal Waters Forecast or Nearshore Marine Forecast products. Thresholds governing the issuance of small craft advisories are specific to geographic areas.
        ii. Gale Warning/Watch:
            1. Gale Warning: Marine warning for sustained surface winds, or frequent gusts, in the range of 34 knots (39 miles per hour (mph)) to 47 knots (54 mph) inclusive, either predicted or occurring, and not directly associated with a tropical cyclone.
            2. Gale Watch: Marine watch for an increased risk of a gale force wind event, but its occurrence, location, and/or timing is still uncertain.
        iii. Storm Warning/Watch:
            1. Storm Warning: A marine warning of sustained surface winds, or frequent gusts, in the range of 48 knots (55 mph) to 63 knots (73 mph) inclusive, either predicted or occurring, and not directly associated with a tropical cyclone
            2. Storm Watch: A watch for an increased risk of a storm force wind event, but its occurrence, location, and/or timing is still uncertain.
        iv. Hazardous Seas Warning/Watch (not issued by all WFOs):
            1. Hazardous Seas Warning: A marine warning for wave heights and/or wave steepness values meeting or exceeding locally defined warning criteria.
            2. Hazardous Seas Watch: A marine watch for an increased risk of a hazardous seas event, but its occurrence, location, and/or timing is still uncertain.
        v. Hurricane Force Wind Warning/Watch:
            1. Hazardous Seas Warning: A marine warning for sustained winds, or frequent gusts, of 64 knots (74 mph) or greater, either predicted or occurring, and not directly associated with a tropical cyclone.

2. Hurricane Force Wind Watch: A marine watch for an increased risk of a hurricane force wind warning event, but its occurrence, location, and/or timing is still uncertain.

vi. Freezing Spray Watch/Warning/Advisory
   1. Heavy Freezing Spray Warning: A warning for an accumulation of freezing water droplets on a vessel at a rate of two centimeters per hour or greater, caused by a combination of cold water, wind, cold air temperature, and vessel movement.
   2. Heavy Freezing Spray Watch: A marine warning for an increased risk of a heavy freezing spray event, but its occurrence, location, and/or timing is still uncertain.
   3. Freezing Spray Advisory: A marine advisory for an accumulation of freezing water droplets on a vessel at a rate of less than two centimeters per hour caused by a combination of cold water, wind, cold air temperature, and vessel movement

vii. Marine products for Volcanic eruptions:
   1. Special Marine Warning: A marine warning issued for a volcano undergoing a major eruption where there is the likelihood that mariners could be affected significantly by hazards such as greater than or equal to 0.03 inches of ashfall accumulation, significant debris, lava, or lahar flows (if near river/stream entrance).
   2. Marine Weather Statement: A marine advisory issued for a volcano undergoing a minor eruption where there is the potential mariners could be affected significantly by hazards such as less than 0.03 inches of ashfall accumulation

viii. Dense Fog Advisory / Dense Smoke Advisory: An advisory for widespread or localized fog (or smoke) significantly reducing visibilities.

ix. Low Water Advisory (not issued by all WFOs): A marine advisory to describe water levels which are significantly below average levels over the Great Lakes, coastal marine zones, and any tidal marine area, waterway, or river inlet within or adjacent to a marine zone that would potentially be impacted by low water conditions creating a hazard to navigation.

b. Coastal Watches, Warnings, and Advisories (Note: Issued for land areas along U.S. coastlines):

i. Coastal/Lakeshore (Great Lakes) Flood Advisories, Watches, and Warnings:
   1. Coastal/Lakeshore Flood Watch: Issued for flooding with significant impacts possible.
   2. Coastal/Lakeshore Flood Warning: Issued for flooding which poses a serious threat to life and property (occurring, imminent, or highly likely).

3. Coastal/ Lakeshore Flood Advisory: Issued when minor flooding is possible (i.e., over and above normal high tide levels).

ii. High Surf Warning/Advisory:
   1. High Surf Warning: Issued when breaking wave action results in an especially heightened threat to life and property within the surf zone.
   2. High Surf Advisory: Issued when breaking wave action poses a threat to life and property within the surf zone.

iii. Rip Current Statement: A message used to inform the public and public safety officials that life threatening rip currents are expected to occur (note: used when rip currents are the primary hazard -- occurring or expected).

iv. Beach Hazard Statement: A message used to inform the public and public safety officials about a combination of hazards affecting beach areas (occurring or expected).

c. Special Marine Warning: A warning of potentially hazardous weather conditions, usually of short duration (two hours or less), producing sustained marine thunderstorm winds or associated gusts of 34 knots or greater; and/or hail 3/4 inch or more in diameter; and/or waterspouts. Also used for short duration events such as dangerous winds associated with a strong cold front or squall line, lasting two hours or less and producing winds or gusts of 34 knots or greater.

d. Marine Weather Statement: Provides mariners with details on significant or potentially hazardous conditions (including tsunami/HAZMAT events) not otherwise covered in existing marine warnings and forecasts.

3. Tropical cyclone products issued by WFOs:

i. Hurricane Local Statement: Locally-issued product containing discussion and preparedness information in association with a tropical cyclone.

ii. WFO Tropical Cyclone Local Watch/Warning: Locally-issued product containing land-based tropical cyclone wind and storm surge watches/warnings in effect, meteorological information, hazards (wind, storm surge, flooding rain, tornadoes), and their potential threats and impacts.

Gridded marine weather information: National Digital Forecast Database (NDFD)

The NDFD is a central database storing geospatially referenced (GIS compatible) digital forecast elements from WFOs and NCEP. The local database is comprised of gridded weather elements for the office's geographic area of responsibility. At a WFO, information is produced for adjacent coastal/Great Lakes waters. Marine forecast data includes: wind (speed, direction, and gusts); wave heights; and, hazards. See: https://digital.weather.gov/.

Tides and Currents

NOAA's National Ocean Service (NOS) provides tide and current data (observed and forecast) at many U.S. coastal and Great Lakes locations. See: NOAA Tides and Currents

Marine Surface Weather Observations

Current and past surface weather information from environmental data buoys and select coastal sites (Coastal and Marine Automated Network (C-MAN)) is available from the National Data Buoy Center (NDBC). See: National Data Buoy Center

Voluntary Observing Ship Program (VOS)

THE USCG AGREES TO participate in the NOAA/NWS Voluntary Observing Ship (VOS) program to levels commensurate with necessary security measures and available resources. For those ships and units which are identified by NOAA/NWS as being no longer active or required participants, the USCG will assist NOAA/NWS in the return of loaned instrumentation. The USCG agrees to forward VOS observations received from non-USCG ships via radio to the NOAA/NWS telecommunications system. USCG units should establish means to quickly inform local NOAA/NWS offices of inaccurate forecasts and significant weather-related events commensurate with necessary security measures and available resources. See: Voluntary Observing Ship Program

NWS Alaska Sea Ice Program (ASIP) Products

Sea ice analysis and forecast products are produced routinely throughout the year by the NWS ASIP based out of the Anchorage WFO for the waters surrounding Alaska. Lake ice, river ice, and icebergs, or glacier ice detached from glaciers and floating in seawater, are excluded. All products are available on the NWS ASIP webpage: NWS Alaska Sea Ice Program (ASIP)

1. Sea Ice Forecast for Western and Arctic Alaskan Coastal Waters: The Sea Ice Forecast is an alphanumeric product that provides a description of the current sea ice conditions and a forecast of changes to the pack ice, marginal ice zone, shorefast ice extent and sea ice free waters surrounding Alaska for the five-day time period. The product is issued every Monday, Wednesday, and Friday.
2. Sea Ice Outlook: The Sea Ice Outlook is a text product issued on the fourth Thursday of every month and covers the three-month time frame following the issue date. The objective of the outlook is to provide a three-month sea ice outlook based on climate patterns and trends, current upper ocean and sea ice conditions, and historical sea ice conditions.
3. Sea Ice Concentration Analysis Map: A graphical analysis of the sea ice concentration and sea ice stage over the waters surrounding Alaska including Cook Inlet, the Bering Sea, the Chukchi Sea, and Beaufort Seas. The domain of the analysis has a western boundary

of 175E and the US Exclusive Economic Zone (EEZ) near the Western Aleutian Islands, a northern boundary of 80N, an eastern boundary of 135W, and a southern boundary of 50N. These graphics are produced daily in WMO standard color charts and also as grayscale charts for marine radiofax.

4. Sea Ice Concentration and Stage Analysis Maps for Cook Inlet: Detailed graphical analysis, produced daily, of the sea ice concentration and sea ice stage over the waters of the Cook Inlet.
5. 5-Day Sea Ice Forecast Map: A graphical five day forecast, produced every Monday, Wednesday, and Friday, focused on expected changes to the ice pack, the marginal ice zone, the shorefast ice extent, and sea ice free conditions for waters surrounding Alaska.
6. Alaska Sea Surface Temperature Analysis Map: A daily analysis, and graphical depiction of sea surface water temperatures for the areas surrounding Alaska, which includes the latest sea ice coverage.

NWS Tsunami Warning Center Products

NWS operates two "Tsunami Warning Centers": The National Tsunami Warning Center (NTWC), located in Palmer, AK; and, the Pacific Tsunami Warning Center (PTWC), located on Ford Island (Pearl Harbor) in Hawaii. Each center has separate/distinct areas of responsibility, but their mission is the same -- protection of life and property from tsunamis. NTWC serves the continental United States, Alaska, and Canada. PTWC serves the Hawaiian Islands, the U.S. Pacific and Caribbean territories, and the British Virgin Islands. See: US Tsunami Warning Centers

1. Tsunami Watch/Warning/Advisory/Information Messages: Messages for initial notification and updates for potential or known tsunami events:
    a. Tsunami Watch: A Tsunami Watch is issued when a tsunami may later impact the watch area. The Watch may be upgraded to a Warning or Advisory (or canceled) based on updated information and analysis. Emergency management officials and the public should prepare to act.
    b. Tsunami Warning: A Tsunami Warning is issued when a tsunami with the potential to generate widespread inundation is imminent, expected, or occurring. Tsunami Warnings alert the public that dangerous coastal flooding accompanied by powerful currents is possible and may continue for several hours after initial arrival. Warnings alert emergency management officials to act for the entire tsunami hazard zone. Appropriate actions to be taken by local officials may include the evacuation of low-lying coastal areas, and the repositioning of ships to deep waters when there is time to safely do so. Warnings may be updated, adjusted geographically, downgraded, or canceled based on updated information and analysis.
    c. Tsunami Advisory: A Tsunami Advisory is issued when a tsunami with the potential to generate strong currents or waves dangerous to those in or very near

the water is imminent, expected, or occurring. The threat may continue for several hours after initial arrival, but significant inundation is not expected for areas under an advisory. Appropriate actions to be taken by local officials may include closing beaches, evacuating harbors and marinas, and the repositioning of ships to deep waters when there is time to safely do so. Tsunami Advisories may be updated, adjusted geographically, upgraded to a warning, or canceled based on updated information and analysis.

d. Tsunami Information Statements: A Tsunami Information Statement is issued when an earthquake or tsunami has occurred of interest to the message recipients. In most cases, Information Statements are issued to indicate there is no threat of a destructive basin-wide tsunami and to prevent unnecessary evacuations. Information statements for distant events requiring further evaluation may be upgraded to a Tsunami Warning, Tsunami Advisory, or Tsunami Watch based on updated information and analysis.