"National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard"

Chris Landsea – National Hurricane Center/Tropical Analysis and Forecast Branch Chief

Greg Schoor – Analyze, Forecast and Support Office's Marine, Tropical and Tsunami Service Branch Chief

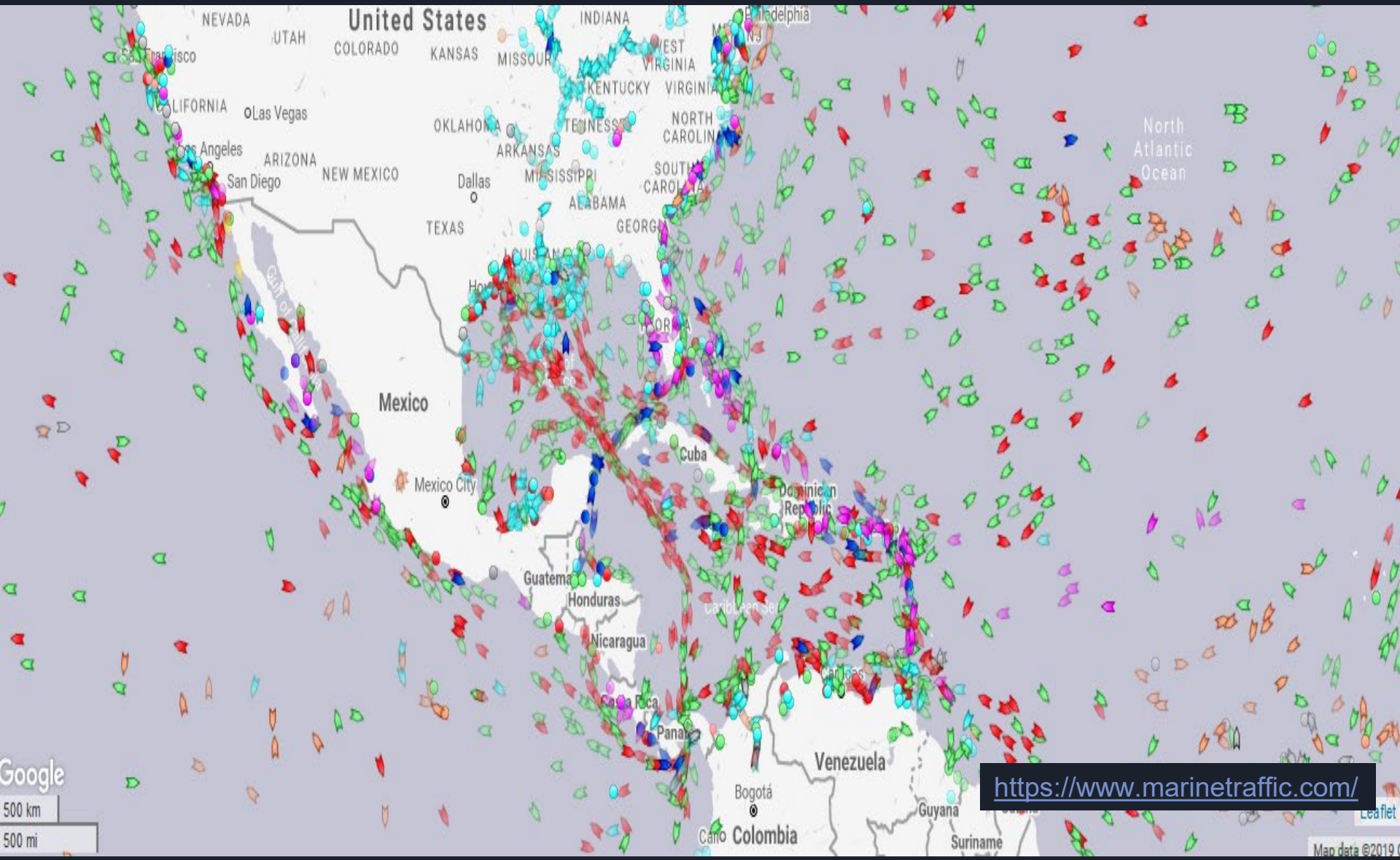
John Kuhn – AFS Marine

NWS All Hands

17 April, 2023

UNITED STATES COAST GUARD 1790

Ships over NWS' Areas of Responsibility



How many of the U.S. Coast Guard's 58,000 men and women are meteorologists?

MEMORANDUM OF AGREEMENT BETWEEN THE UNITED STATES COAST GUARD AND THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE REGARDING THE MANAGEMENT OF MARINE WEATHER INFORMATION

APPROVED: 03/30/2020

Louis W. Uccellini
NOAA Assistant Administrator
for Weather Services

APPROVED: 3/31/20

Richard V. Timme
Rear Admiral, USCG
Assistant Commandant for
Prevention Policy

https://www.weather.gov/media/marine/uscgmoa2020.pdf

The national-level MOA between NWS and USCG includes high-level requirements for:

1) **USCG using NWS forecasts/products**
2) **NWS providing USCG IDSS (Spot Forecasts and Briefings)**
3) **NWS providing USCG training**
4) **NWS Office and USCG Unit visits**
5) **Familiarization Floats for NWS forecasters**

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MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES CO UARD

TH D
N

But at a visit in 2020 to a USCG District, the US Coast Guard was observed using private sector company products for routine weather forecasts during their weekly briefing!

APPROVED: 3/31/20

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To accompany the 2020 MOA, a **"CONOPS" (Concept of Operations)** is needed from NWS to flesh out the details:

- Apr 2020 – Marine Service Program Team approved drafting a CONOPS via a Tiger Team:

William Ahue – WFO Portland
Debra Blondin – AWC
John Bravender – WFO Honolulu
Scott Carpenter – Western Region
Eric Christensen – NHC/TAFB
Darin Figurskey – OPC
Rebecca Heim – Alaska Region
Melissa Huffman – WFO Corpus Christi
Jason Krekeler – OPC
Brian Kyle – WFO Houston
Eric Lau – Pacific Region
Katie Nguyen – Southern Region
Liz Sommerville – WFO Corpus Christi
Elizabeth Vickery – Pacific Region
Kenneth Widelski – NWSOC
Anna Wolverton – WFO Jackson

Allison Allen – AFS
Chris Birchfield – Eastern Region
John Cannon – WFO Portland
Hector Casanova – NOAA's USCG Liaison
Leigh Eaton – Pacific Region
Chris Franks – Central Region
Brian Hirsch – Central Region
Stephen Konarik – NHC/TAFB
John Kuhn – AFS Marine
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Matt Solum – Western Region
Matt Strahan - AWC
Wayne Weeks – AFS Marine
Ronald Williams – Port Meteorologist
Darren Wright – AFS Marine

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- Apr 2020 – Marine Service Program Team approved drafting a CONOPS via a Tiger Team
- Oct-Nov 2020 – Survey conducted NWS-wide on current "NWS-US Coast Guard Engagement"
- Feb 2021 (first draft)/Sep 2022 (final version) – "National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/Outreach to the U.S. Coast Guard"
- Apr 2021 (first draft)/Sep 2022 (final version) – "NWS/USCG Interactive Map"

"National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard"

National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/Outreach to the U.S. Coast Guard

13 September, 2022[1]

Table of Contents

[1] This document was developed by William Ahue, Allison Allen, Chris Birchfield, John Bravender, John Cannon, Scott Carpenter, Eric Christensen, Katherine Edwards, Darin Figurskey, Rebecca Heim, Brian Hirsch, Melissa Huffman, Liz Vickery, Chip Kasper, David Kochevar, John Kuhn, Brian Kyle, Chris Landsea, Eric Lau, Jeff Lorens, Summer Ohlendorf, David Snider, Matt Solum, Suzanne Van Cooten, Wayne Weeks, Reid Wolcott, and Darren Wright.

OVERVIEW

In March 2020, Dr. Louis Uccellini (former National Oceanic and Atmospheric Administration [NOAA] Assistant Administrator for Weather Services) and Rear Admiral Richard V. Timme (U.S. Coast Guard [USCG] Assistant Commandant for Prevention Policy) signed a national-level "*Memorandum of Agreement between USCG and NOAA/National Weather Service (NWS) Regarding the Management of Marine Weather Information*". Through this agreement (reference page 4), NWS provides USCG field units with weather information necessary for the safe and successful accomplishment of their assigned missions. While this document provides an overarching framework for interactions between USCG and NWS, it does not provide the detail necessary to carry out the objectives within. In addition, the USCG has no meteorology/forecasting arm internally. Thus, NWS has developed this Concept of Operations (CONOPS) for weather forecasting, Impact-based Decision Support Services (IDSS), and training that NWS will provide USCG nationwide in order to facilitate a comprehensive and consistent level of support to our USCG colleagues.

The NWS launched its Evolve effort in 2017, in recognition of increased vulnerability to extreme weather events and the need to provide enhanced IDSS. NWS Evolve focused on five objectives to help achieve a Weather-Ready Nation: 1) enhancing quality and consistency of IDSS at all levels of the organization; 2) building a flexible and nimble workforce the NWS needs to deliver science-based services through enhancing skills today and hiring for tomorrow; 3) improving effectiveness of forecasting in support of IDSS through a collaborative process that makes the best use of technology, reduces duplication, and ensures consistency of the forecast; 4) matching workforce to workload across the organization and building a stronger organizational structure to better meet the needs of NWS partners; and 5) supporting the innovation, science, technology, and culture required for NWS to continue improving over time.

During the development of this CONOPS, NWS Service Program Teams (SPTs) were tasked with identifying what IDSS was currently being provided to our partners. This team led an effort to solicit what IDSS was being provided to the USCG nationwide through an internal NWS survey. Marine SPT completed a milestone to document the IDSS Management System (IMS) - Marine Specific Impact Identification and Forecasting Requirements. By better understanding what the NWS is doing throughout the various service programs, we can help better define a more consistent IDSS outreach to our partners.

GOALS

1. To develop a document of detailed "best practices" for NWS to adopt nationwide in order to support the USCG's mission. These best practices fall into the following categories:
   a. NWS Forecast and Warning Products, Services, and Information Sources
   b. IDSS, and
   c. Training/Outreach.
2. To establish NWS as the primary source of weather information and support for the U.S. Coast Guard.

"National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard"

Cross-Organizational Responsibilities and Collaboration

The missions of the NWS and USCG align when it comes to safety of life and property. As agencies, the NWS and USCG have been working together since NOAA started in the early 1970's and earlier when the NWS used to be called the Weather Bureau. The NWS is the national expert on weather conditions and forecasting. As specified in the MOA, the USCG should be using NWS forecasts for all operational situations. This section will focus on the organizational structures of both agencies and what the cross-organizational responsibilities and collaboration look like at each level.

Beyond the transmission of weather information to vessels, this CONOPS endeavors to also assure the USCG is supplied with accurate weather and water information for daily and emergency operations. Imperative to NWS providing a consistent level of support is the ability for NWS to build relationships with appropriate USCG personnel to effectively serve their specific needs. NWS offices should know and regularly engage with USCG facilities and personnel in their area of responsibility, so they can provide Impact-based Decision Support Services (i.e., forecasts, briefings, and training) when needed. Conversely, the USCG should be able to easily reference their serving NWS office to request assistance with meeting their life-saving mission. This document provides that framework.

USCG also interacts significantly with the U.S. Navy for some of USCG's requirements. Specifically, the U.S. Navy provides marine and aviation enroute weather forecasts and Optimum Track Ship Routing (OTSR) to individual USCG vessels, upon request by the USCG. This CONOPS document from the NWS to USCG does not supersede or interfere with this ongoing service.

NWS and USCG Headquarters Collaboration

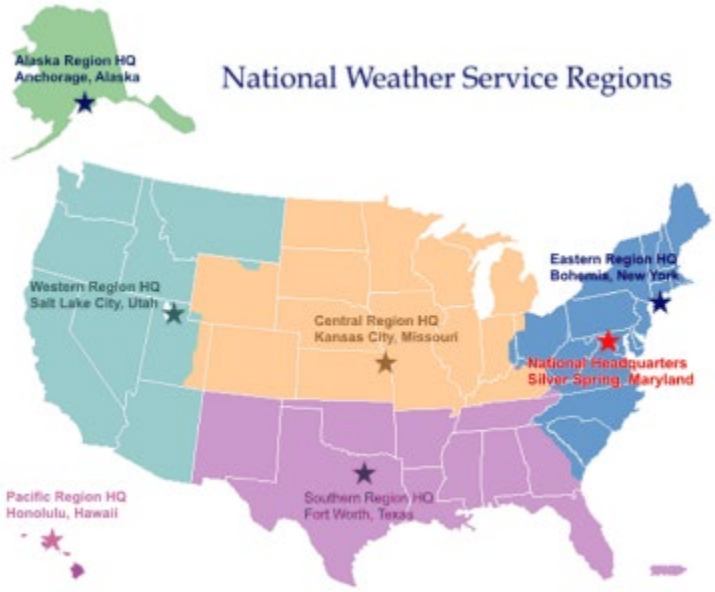
The Memorandum of Agreement (MOA) discussed in the opening paragraph focuses on high level responsibilities and collaboration of each agency, where the NWS creates forecast products for inland rivers, marine and open ocean areas and the USCG transmits this information to vessels via their radio transmission equipment. The NWS does not have this dissemination capability so the NWS relies on the USCG to relay important forecast information to ships. To assure this transmission capability is running at top efficiency and there is collaboration and communication when there are issues, the NWS and USCG established a team called the USCG/NWS Coordination Liaison Group (UNCLOG). This team meets quarterly to discuss any systematic or transmission issues. Establishing a line of communication is also a goal of the team to assure situational awareness of any issues that arise. NWS HQ has also utilized the USCG "Notice to Mariners" to announce national product changes or to solicit feedback.

USCG/NWS Coordination Liaison Group (UNCLOG)

"National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard"

NWS and USCG Field Office Collaboration

In general, NWS and USCG have similar organizational structures. NWS has an NWS Operations Center, National Centers, Regions/Regional Operations Centers, River Forecast Centers, and local Weather Forecast Offices:



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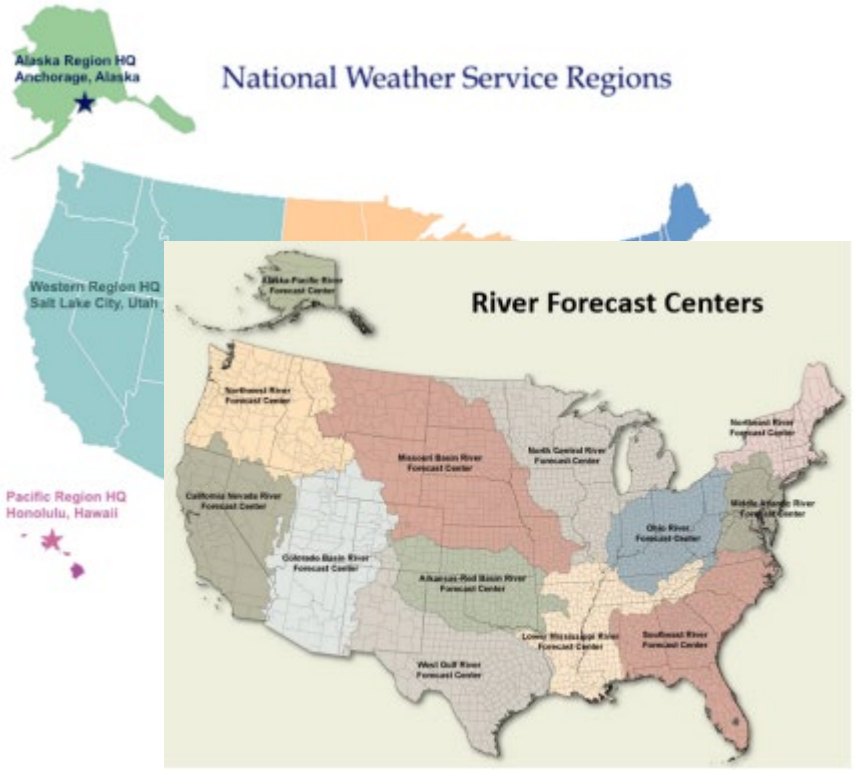

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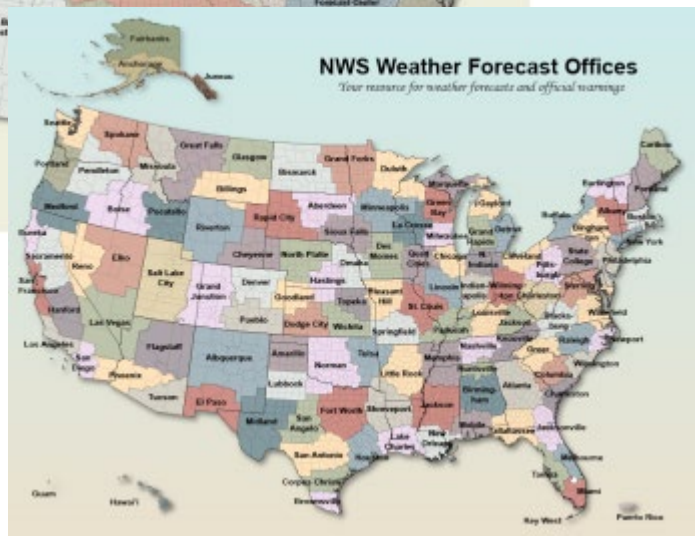

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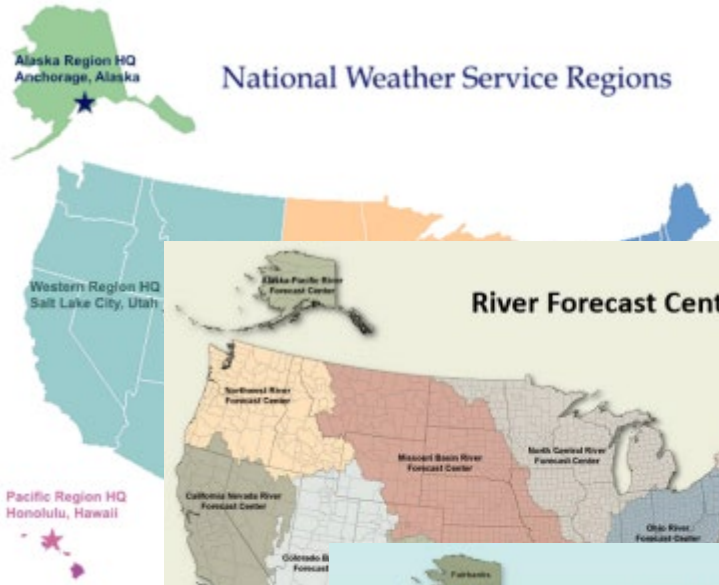

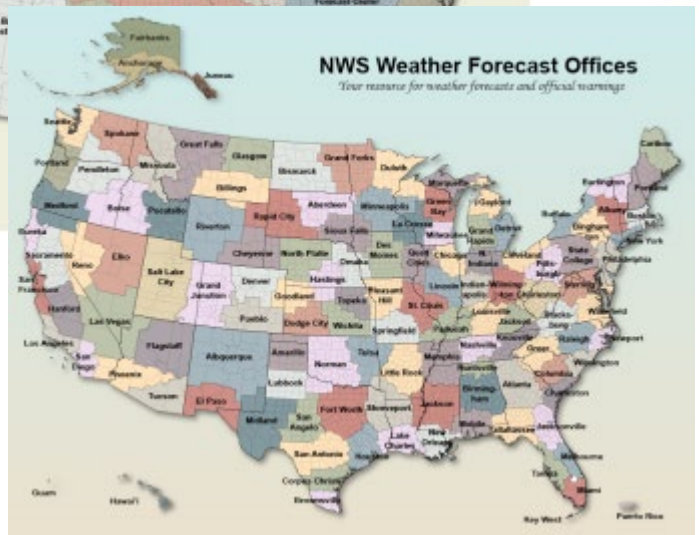

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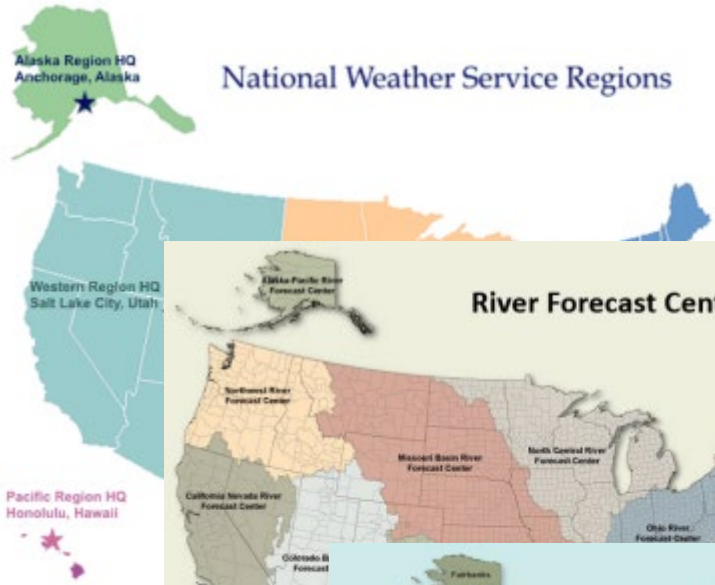

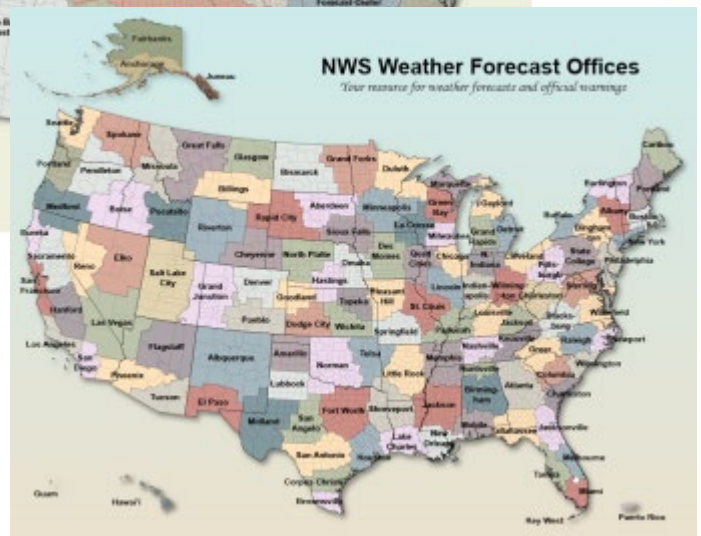

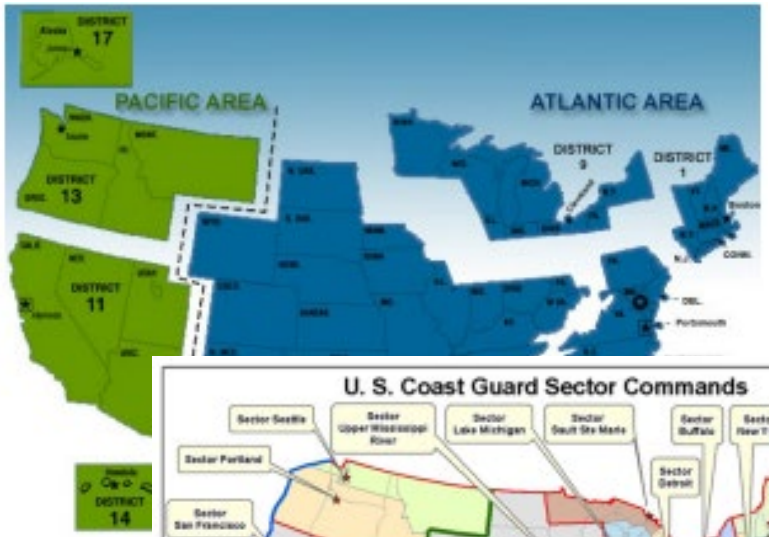

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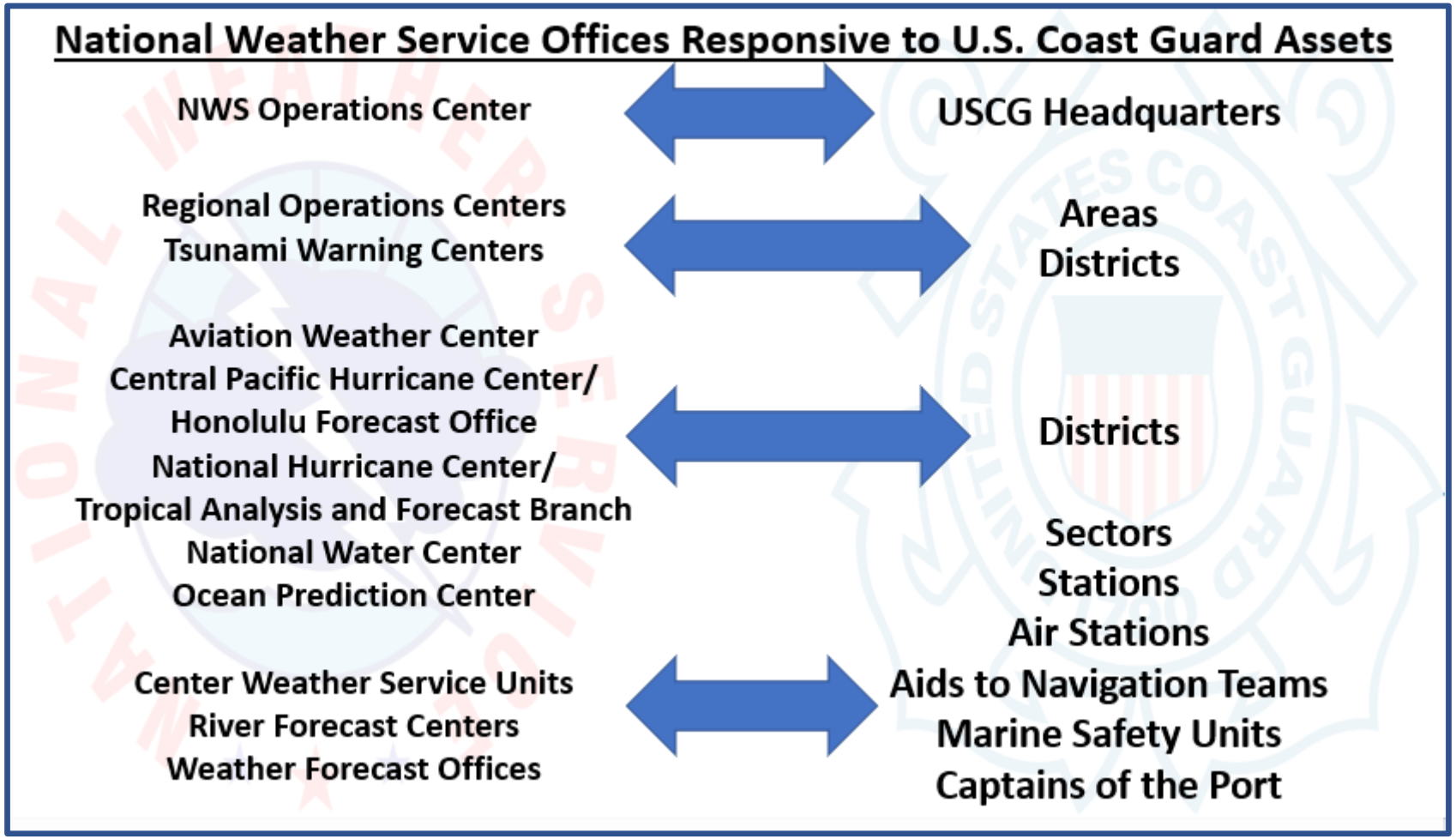

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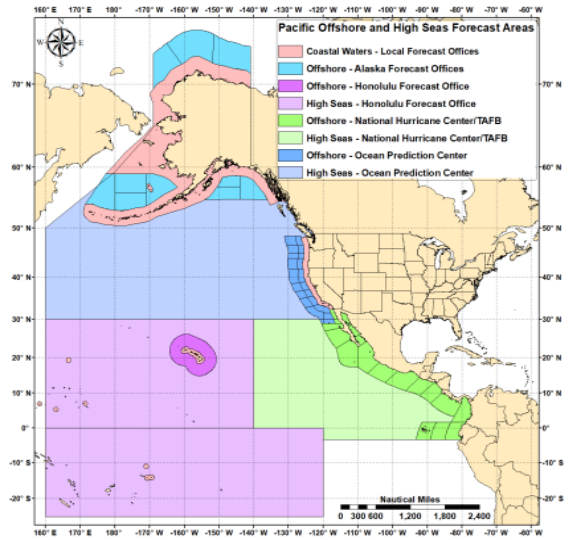

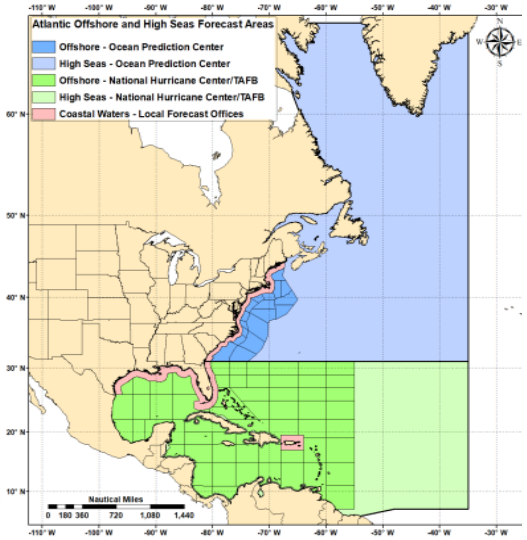

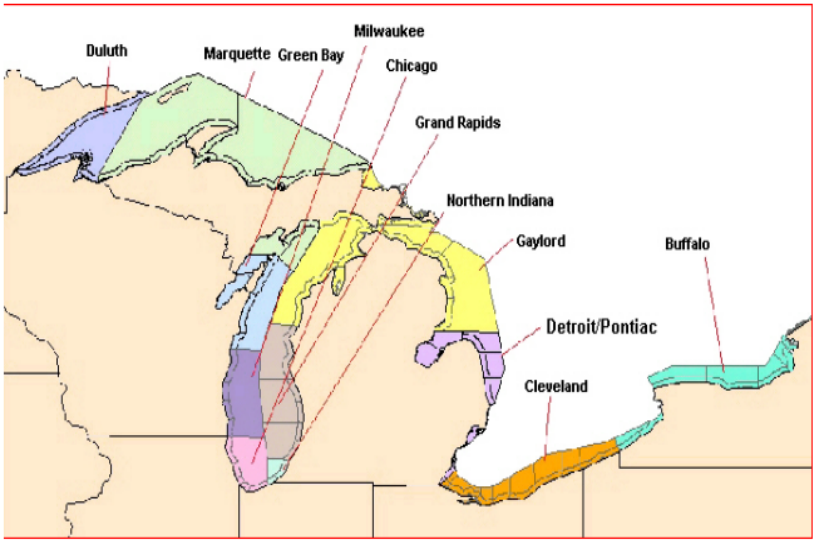

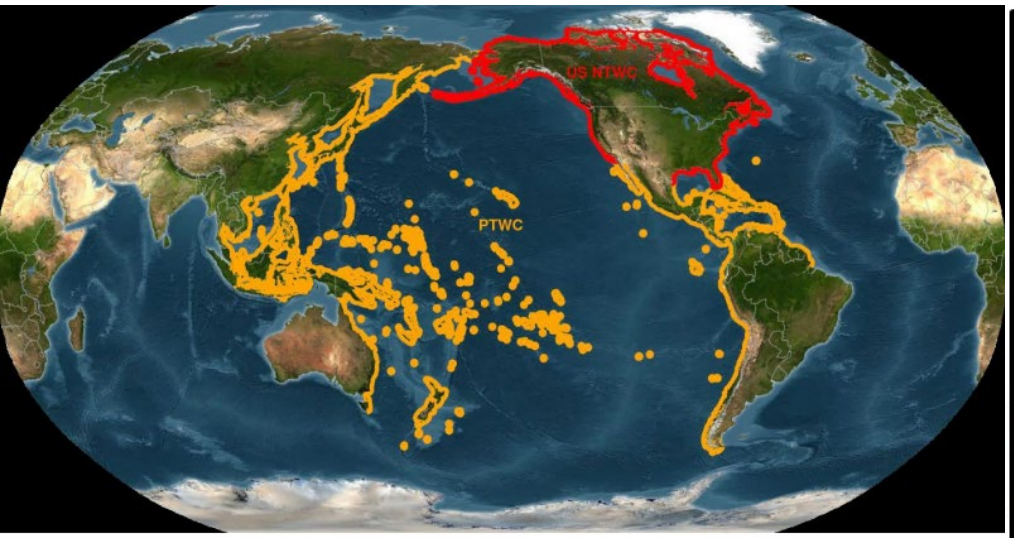

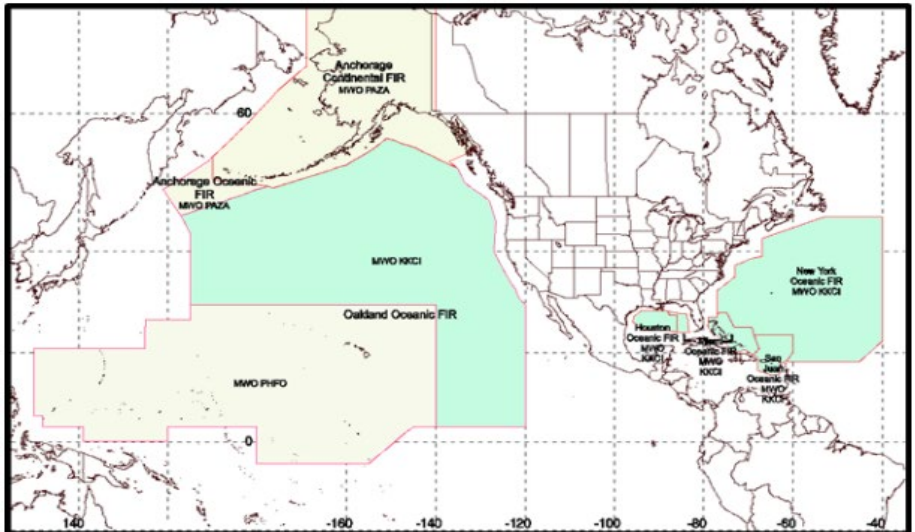

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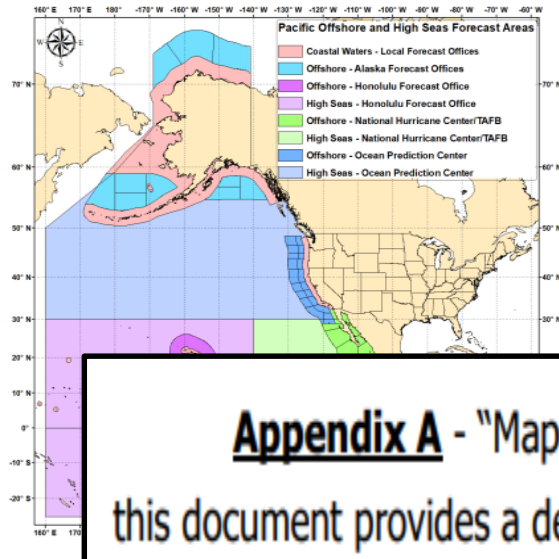
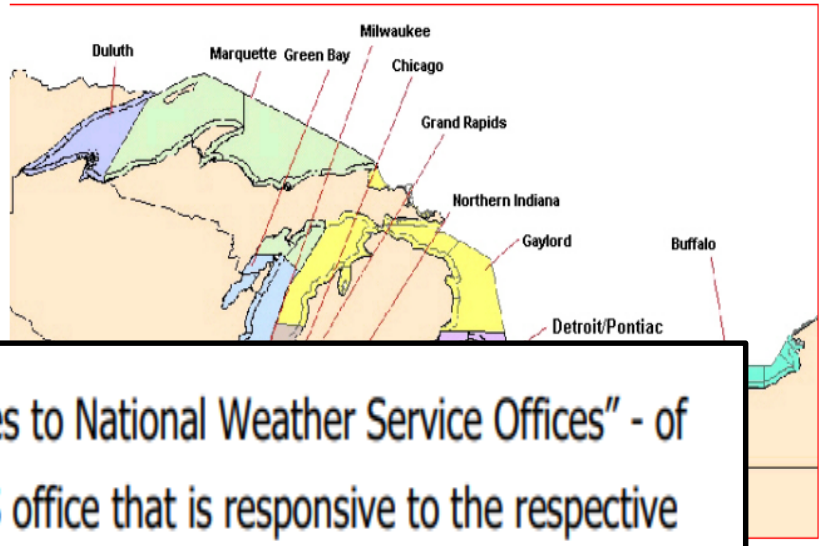
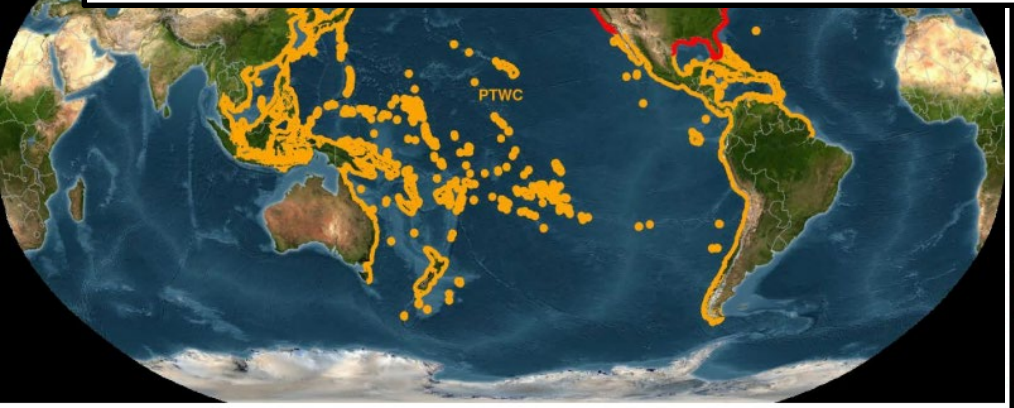
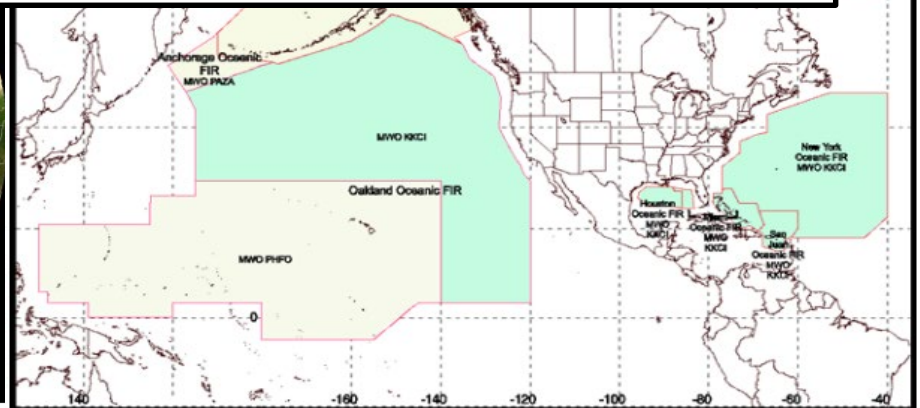




Appendix A - "Mapping of U.S. Coast Guard Facilities to National Weather Service Offices" - of this document provides a detailed listing of the specific NWS office that is responsive to the respective USCG asset.

Appendix A





"National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard"

A detailed listing of NWS products from NCEPs and WFOs is available in **Appendix B: National Weather Service Products.**

Appendix B

Weather Forecasting Products

The USCG-NWS MOA states: "THE USCG AGREES TO primarily use NOAA/NWS analysis and forecast products for USCG field unit decision making, such as weekly weather briefings and extraordinary events, such as hurricanes, winter storms, major oil spills, rescues, large-scale exercises, or other incidents of that caliber. NOAA/NWS will assist in identifying appropriate existing products for use in these purposes."

The National Centers for Environmental Prediction (NCEP) and NWC deliver national and global weather, water, climate and space weather guidance, forecasts, warnings and analyses to its partners and external user communities. These products and services are based on a service-science legacy and respond to user needs to protect life and property, enhance our nation's economy and support the growing need for environmental information. NCEP comprises nine centers, seven of which provide official NWS forecasts and/or warnings.

A variety of weather and water products are also produced by NWS Weather Forecast Offices (WFOs), Weather Service Offices (WSOs), and River Forecast Centers (RFCs) serving U.S. coastal and Great Lakes areas and coastal and inland rivers. WFOs are responsible for the provision of marine weather information for the waters immediately adjacent to the coastline (and Great Lakes shorelines), bays, sounds, etc. out to a set distance from shore. RFCs are responsible for the provision of flow and stage information for both inland and coastal rivers, creeks, and streams as well as hydrologic information to support navigation for coastal and inland waterways. These products are of both a routine (produced and disseminated on a predetermined schedule) and non-routine nature (produced and disseminated when needed, depending on the situation). Routine products are mostly "forecasts" or "informational" in nature.

Of critical importance to the USCG is the use of NWS ocean model current data and surface wind forecast data (including directly from NWS' National Digital Forecast Database [NDFD]) for the drift modeling and simulation in their Search and Rescue Optimal Planning System (SAROPS) to predict

“National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard”

Observations

The MOA states: "THE NOAA/NWS AGREES TO provide the software, training and instrumentation for those USCG ships and coastal units actively participating in the NOAA/NWS Voluntary Observing Ship (VOS) program. Local NOAA/NWS offices should work in coordination with USCG units to establish criteria for which NOAA/NWS should be notified of inaccurate forecasts and significant events (for example: loss of life, vessel accidents, and hazardous material spills, especially for those cases where an inaccurate forecast, rapidly changing conditions, or hazardous weather may be involved). Local NOAA/NWS offices should assist local USCG personnel through training efforts and encouraging visits to NOAA/NWS forecast offices."

Observations are essential to the weather forecast process. They provide the ground truth to verify current forecasts and data to build future forecasts. Accurate marine forecasts increase mariner safety and mission effectiveness and are built from ship weather observations. NOAA/NWS forecast offices are open to visits from USCG personnel and will provide weather training to USCG personnel in a locally agreed manner.

Under the Voluntary Observing Ship (VOS) program, NOAA shares with USCG the position reports of participating vessels through the USCG Automated Mutual-Assistance Vessel Rescue (AMVER) program to support search and rescue operations. This function is specifically addressed and managed under a separate agreement.

"National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard"

Impact-based Decision Support Services

The MOA states: "THE NOAA/NWS AGREES TO provide USCG field units with weather information necessary for the safe and successful accomplishment of their assigned missions. Normally, this will be accomplished through routine/existing telecommunication channels. However, specific forecasts (e.g., Spot Forecasts) and briefings may be provided for extraordinary events, such as hurricanes, winter storms, flooding, major hazardous materials spills, search and rescue operations, large-scale exercises, or other incidents of that caliber."

This is a critical level of interaction. Forecasts and briefings are needed when the USCG is engaged in their life-saving missions including 1) Ports, Waterways & Coastal Security; 2) Drug Interdiction; 3) Aids to Navigation; 4) Search & Rescue; 5) Living Marine Resources; 6) Marine Safety; 7) Defense Readiness; 8) Migrant Interdiction, 9) Maritime Environmental Protection; 10) Polar, Ice & Alaska Operations, and 11) Law Enforcement[2]. Most often, the WFO Warning Coordination Meteorologists, RFC Service Coordination Hydrologists and/or WFO Marine Focal Points will be leading the IDSS coordination with the corresponding USCG Emergency Management Specialist at the affected Sectors, Stations, Air Stations, Aids to Navigation Teams, and Marine Safety Units. Below are suggested guidelines for NWS IDSS delivery to a USCG entity:

1. Know which USCG assets the NWS office is responsible for. See the section **Cross-Organizational Responsibilities and Collaboration** which details the suggested delineation of IDSS responsibilities and **Appendix A: Mapping of U.S. Coast Guard Facilities to National Weather Service Offices**. This **interactive map** allows for easy visualization of both USCG and NWS offices and areas of responsibility.
2. NWS Headquarters, NCEP, Regions, RFCs and WFOs are encouraged to visit USCG Headquarters, Districts, Sectors, Stations, Air Stations, Aids to Navigation Teams, and Marine Safety Units within their area of responsibility, either in person or virtually, on a routine basis. USCG Emergency Management Specialists, Captains of the Port, and Command Staff are a few key contacts that can provide additional information regarding units and personnel that rely upon weather information within their organization. Building a trusted relationship between the NWS and USCG personnel on a local level is critical for successful IDSS Delivery.

1. Each NWS office should **know which USCG assets they are responsible** for.
2. NWS personnel are encouraged to **visit USCG offices** (Headquarters, Districts, Sectors, Stations, Air Stations, Aids to Navigation Teams, and Marine Safety Units) within their area of responsibility, either in person or virtually, on a routine basis.
3. NWS offices should **obtain and document important water and weather decision thresholds** that may affect USCG operations and assets.
4. NWS offices should **maintain and share a standing document** (a "playbook") describing the office functions, its area of responsibility, products produced, and additional weather support available and how to obtain it, and 24/7/365 office contact information.

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IDSS Opportunities:

1. Routine and Episodic Briefings
2. Websites dedicated to USCG weather support
3. Blogs and other communication support pieces
4. Spot Forecast webpage
5. Marine Point Forecast webpage
6. Various Weather Portals
7. HYSPLIT and ALOHA (plume modeling)
8. Depending on the event, NWS may be able to provide dedicated on-site personnel to support USCG operations, such as during larger-scale weather events and/or hazardous material events.

2022 Impact-based Decision Support Services to U.S. Coast Guard Districts by Tropical Analysis and Forecast Branch (TAFB)/ National Hurricane Center (NHC)

54 Spot Forecasts by NHC/TAFB for 2022 U.S. Coast Guard District Operations

"National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard"

Impact-based Decision Support Services

The MOA states: "THE NOAA/NWS AGREES TO provide USCG field units with weather information necessary for the safe and successful accomplishment of their assigned missions. Normally, this will be accomplished through routine/existing telecommunication channels. However, specific forecasts (e.g., Spot Forecasts) and briefings may be provided for extraordinary events, such as hurricanes, winter storms, flooding, major hazardous materials spills, search and rescue operations, large-scale exercises, or other incidents of that caliber."

This is a critical level of interaction. Forecasts and briefings are needed when the USCG is engaged in their life-saving missions including 1) Ports, Waterways & Coastal Security; 2) Drug Interdiction; 3) Aids to Navigation; 4) Search & Rescue; 5) Living Marine Resources; 6) Marine Safety; 7) Defense Readiness; 8) Migrant Interdiction, 9) Maritime Environmental Protection; 10) Polar, Ice & Alaska Operations, and 11) Law Enforcement[2]. Most often, the WFO Warning Coordination Meteorologists, RFC Service Coordination Hydrologists and/or WFO Marine Focal Points will be leading the IDSS coordination with the corresponding USCG Emergency Management Specialist at the affected Sectors, Stations, Air Stations, Aids to Navigation Teams, and Marine Safety Units. Below are suggested guidelines for NWS IDSS delivery to a USCG entity:

1. Know which USCG assets the NWS office is responsible for. See the section **Cross-Organizational Responsibilities and Collaboration** which details the suggested delineation of IDSS responsibilities and **Appendix A: Mapping of U.S. Coast Guard Facilities to National Weather Service Offices**. This **interactive map** allows for easy visualization of both USCG and NWS offices and areas of responsibility.
2. NWS Headquarters, NCEP, Regions, RFCs and WFOs are encouraged to visit USCG Headquarters, Districts, Sectors, Stations, Air Stations, Aids to Navigation Teams, and Marine Safety Units within their area of responsibility, either in person or virtually, on a routine basis. USCG Emergency Management Specialists, Captains of the Port, and Command Staff are a few key contacts that can provide additional information regarding units and personnel that rely upon weather information within their organization. Building a trusted relationship between the NWS and USCG personnel on a local level is critical for successful IDSS Delivery.

IDSS Opportunities:

1. Routine and Episodic Briefings
2. Websites dedicated to USCG weather support
3. Blogs and other communication support pieces
4. Spot Forecast webpage
5. Marine Point Forecast webpage
6. Various Weather Portals
7. HYSPLIT and ALOHA (plume modeling)
8. Depending on the event, NWS may be able to provide dedicated on-site personnel to support USCG operations, such as during larger-scale weather events and/or hazardous material events.

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Training/Outreach

The USCG-NWS MOA states: "Local NOAA/NWS offices should assist local USCG personnel through training efforts and encouraging visits to NOAA/NWS forecast offices...USCG should support NOAA/NWS training efforts by, whenever possible, encouraging NOAA/NWS staff to ... [conduct] visits to USCG coastal units.....USCG should support NOAA/NWS training efforts by, whenever possible, encouraging NOAA/NWS staff to accompany them on short at sea missions."

Training and Outreach by NWS to our USCG partners is critical to the success of this MOA. NWS is obligated to not just provide routine forecasts, extreme weather warnings, Spot Forecasts, and briefings, but also to ensure that USCG colleagues are familiar with and know how to utilize NWS products and services.

Thus, a robust training and outreach program is essential. **All NWS offices that have USCG assets in their area of responsibility should engage with the USCG on training.** It is recommended that NWS offices provide **annual training** on NWS products and services and to update points-of-contact for both the USCG and the NWS, given the two-to-four-year turnover in USCG personnel and more limited movement of NWS forecasters. If the USCG is to rely upon the NWS for products and services, this training is essential to keep a consistent relationship between the NWS and USCG as well as USCG personnel knowing what products are available to them. Ideally, training should be done **in-person at a minimum of once yearly** to facilitate efficient learning as well as the opportunity for NWS forecasters to meet face-to-face USCG officers, though there are circumstances like the COVID-19 pandemic or extremely large areas of responsibility where virtual training can be used. Training should include some or all of the following (as needed for specific USCG partners):

- Requesting/using Spot Forecasts;
- Requesting briefings for planned events and extreme weather;
- Local weather hazards;
- River forecasting and hydrology fundamentals;
- Ocean wave hazards;

Training of USCG personnel on:

- Requesting/using Spot Forecasts;
- Requesting briefings for planned events and extreme weather;
- Local weather hazards;
- River forecasting and hydrology fundamentals;
- Ocean wave hazards;
- Aviation hazards;
- Rip current forecast process;
- NWS/NOAA websites and products;
- Submitting weather observations;
- Seasonal outlooks;
- Sea ice and Great Lakes ice hazards; and
- Tsunami detection and alerting.

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Visits to USCG/NWS Offices:

- General office familiarization;
- Training opportunities;
- In-person briefings;
- Tabletop Exercises/Drills;
- Hot Washes (post-event evaluations);
- Integrated Warning Team (IWT) meetings;
- Meteorology equipment maintenance;
- Open house events;
- Port/maritime security meetings; and
- Other workshops/meetings

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All NWS offices that have USCG assets in their area of responsibility should engage with the USCG on **training** …should be done in-person at a minimum of **once yearly**.

It is recommended that NWS offices invite the USCG offices in their area of responsibility to become part of the **Weather Ready Nation Marine Ambassador** program.

NWS offices with USCG assets in their area of responsibility should schedule reciprocal **visits** on **(at least) an annual basis**.

NWS offices are encouraged to reach out to their USCG counterparts in their area of responsibility for the opportunity for NWS forecasters to join a **Familiarization Float**.

“National Weather Service CONOPS for Products, Impact-based Decision Support Services, and Training/ Outreach to the U.S. Coast Guard”

Summary

The Mission Statement of NWS, which guides all of our products and services, is the following:

“Provide weather, water and climate data, forecasts, warnings, and impact-based decision support services for the protection of life and property and enhancement of the national economy.”

This USCG-NWS CONOPS endeavors to assure the USCG is supplied with accurate weather and water information for daily and emergency operations by providing details needed for successful support by NWS offices. Imperative to NWS providing a consistent level of support is the ability for NWS to build relationships with appropriate USCG personnel to effectively serve their specific needs. NWS offices should know and regularly engage with USCG facilities and personnel in their area of responsibility, so they can provide Impact-based Decision Support Services (i.e., forecasts, briefings, outreach and training) when needed. It is by engaging with our USCG colleagues that NWS will be successful in our IDSS efforts with this deep core governmental partner. Conversely, the USCG should be able to easily reference their serving NWS office to request assistance with meeting their life-saving mission.

Request for all NWS Operational Offices with USCG Assets in their Area of Responsibility:

- Have all forecasters/managers check out the NWS-USCG CONOPS website and read through the CONOPS;
- Have all forecasters/managers check out the NWS/USCG interactive map and know which USCG assets you are responsible for;
- Implement the best practices within the CONOPS over the next few months into your office;
- Provide world-class, consistent IDSS to our U.S. Coast Guard colleagues in support of their life-saving mission!