



15th Meeting of the Hydrographic Services and Standards Committee

S-412 Weather and Wave Warnings and S-98 Interoperability

Agenda Item 5.11

HSSC-15, Helsinki, Finland, 5 – 9 June 2023



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INTRODUCTION AND BACKGROUND

International
Hydrographic
Organization

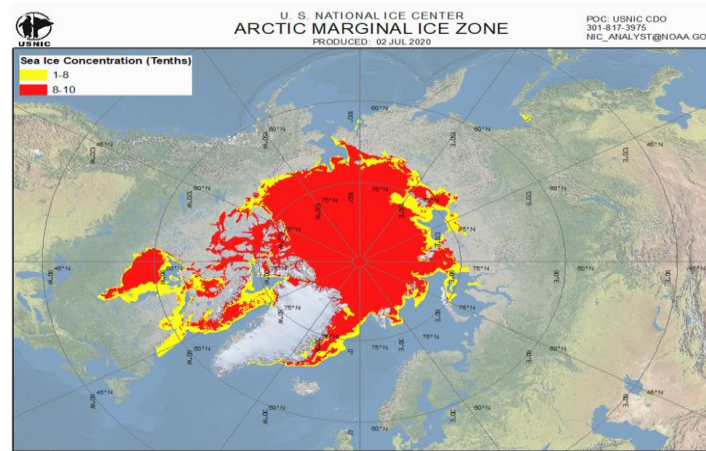
- World Meteorological Organization is leading the development of S-412 Weather and Wave Warnings (Polygons) for the use in ECDIS as part of the Marine Safety Information infrastructure.
- S-412 will be a polygon based warning product that will produce 24 hour swaths of information that will eventually replace the traditional NAVTEX information, and enhance GMDSS.
- The concept behind S-412 is similar to that of S-124 Navigation Warnings

S-41X Wave & Weather Overlays

S - 411

Ice Hazards and Information

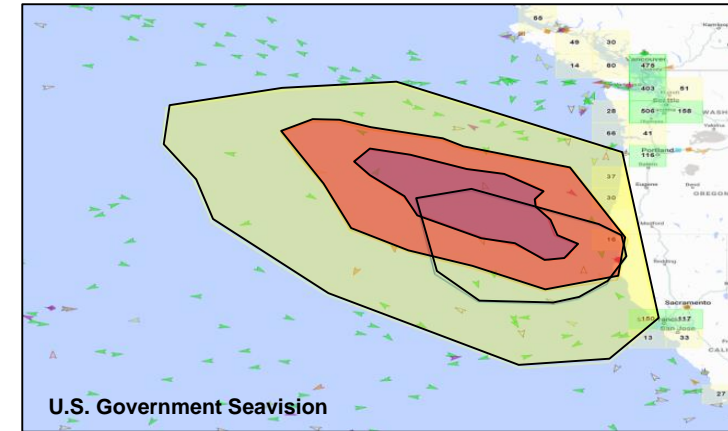
Portrayal Pending



S - 412

Weather and Wave Warnings

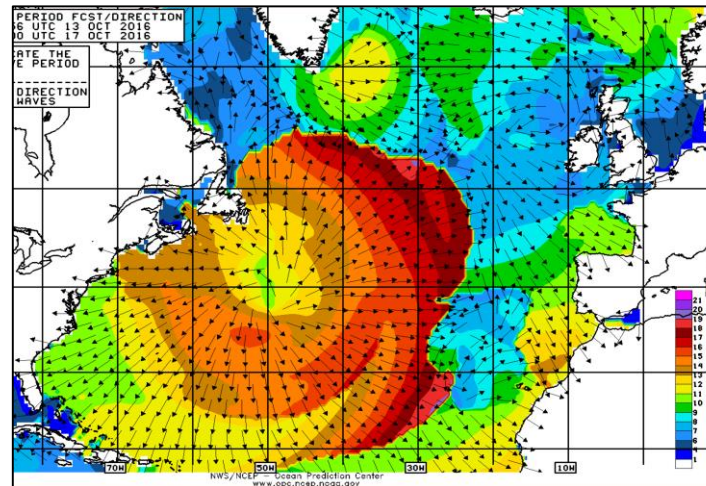
Polygons



S - 413

Weather and Wave Conditions

Graphics & Gridded Data



S - 414

Weather and Wave Observations

Point Based Data





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ANALYSIS/DISCUSSION

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- S-412 will help those responsible for METAREAs to comply with SOLAS regulation 5 – Meteorological Services and Warnings

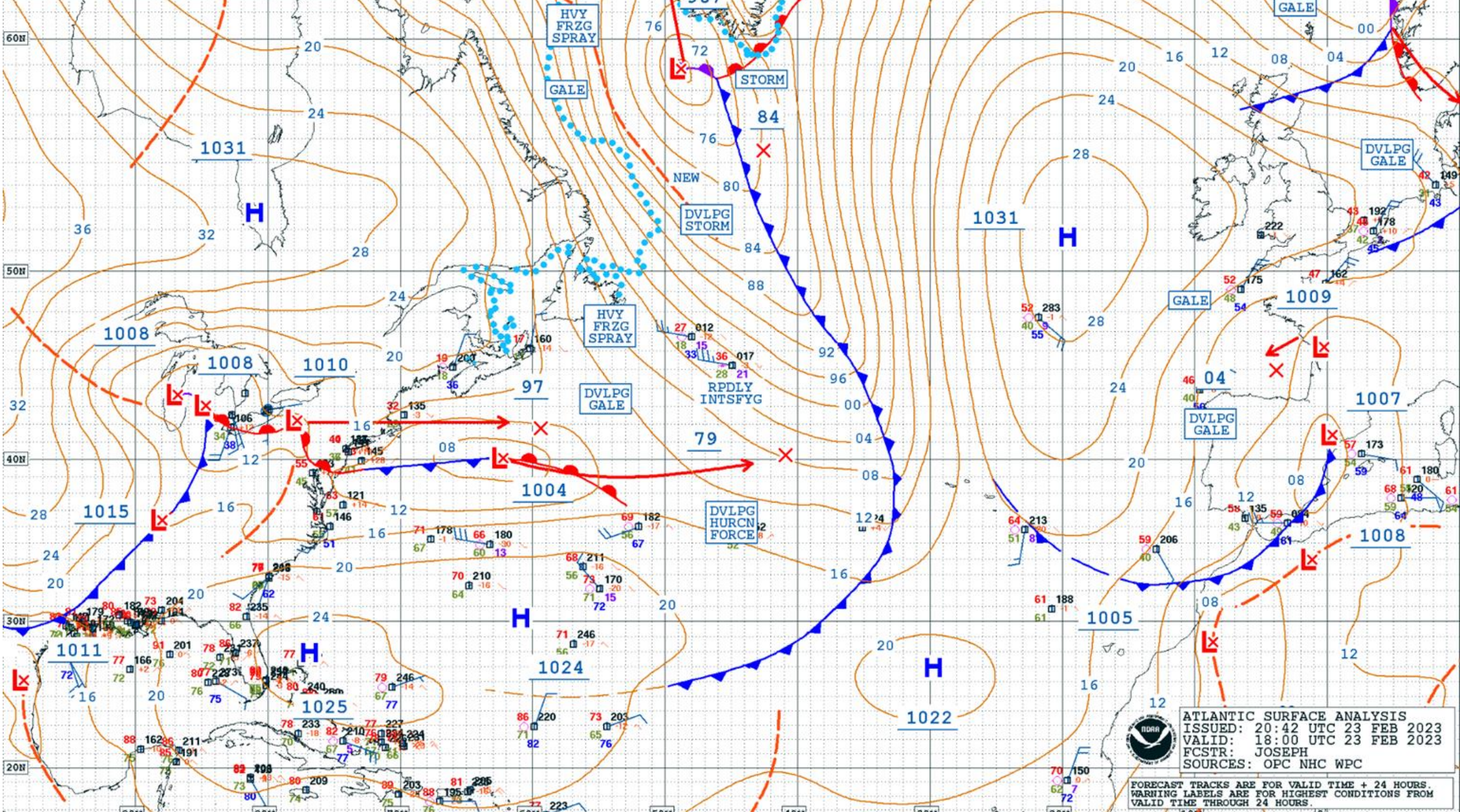
1 Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation. ...

.2 to issue, at least twice daily, by terrestrial and space radiocommunication services^{[footnote](#)}, as appropriate, weather information suitable for shipping containing data, analyses, warnings and forecasts of weather, waves and ice. Such information shall be transmitted in text and, as far as practicable, graphic form including meteorological analysis and prognosis charts transmitted by facsimile or in digital form for reconstitution on board the ship's data processing system

ATLANTIC SURFACE ANALYSIS
ISSUED: 20:42 UTC 23 FEB 2023
VALID: 18:00 UTC 23 FEB 2023
FCSTR: JOSEPH
SOURCES: OPC NHC WPC



FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS.
WARNING LABELS ARE FOR HIGHEST CONDITIONS FROM
VALID TIME THROUGH 24 HOURS.



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S-412 Polygon–Based Warnings

- Warnings

- Hurricane Force Wind Warning: 64+ knots (Beaufort Force 12)
- Storm Force Wind Warning: 48-63 knots (Beaufort Force 10-11)
- Gale Force Wind Warning: 34 to 47 knots (Beaufort Force 8-9)
- Freezing Spray Warning

- Proposed

- Seas Warnings – tiered criteria, and other conditions (Dangerous Seas)
- Thunderstorm Warnings
- Near Gale Wind Warning
- Visibility
- Reference - WMO Pub. 558 High Seas, Offshore, Coastal and Local Services
- Consideration - S-124 Nav Warnings - Drifting hazards (icebergs, volcanic), tsunami, abnormal changes in water level, space weather impact to communications

Seas Warning Criteria
Significant Wave Height (meters)
4 - 6
6 - 9
9 - 14
14 +

Introducing Polygon-Based Warnings

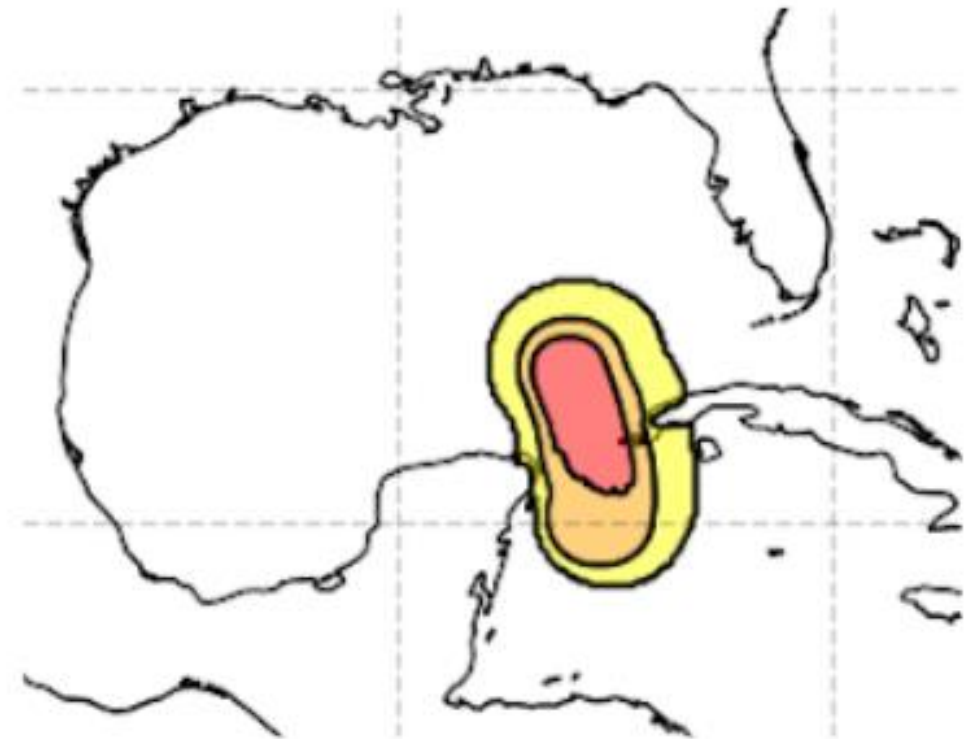
- *24-hour swaths, not snapshots as we currently do*
- *The polygons will serve as sort of a “check engine light”*
- *This puts the emphasis on the impacts, not what is causing the impacts.*

Timely “heads up” of potentially adverse to extreme weather through the next 00-24 hours, and 24-48 hours

Warning period is 48 hours per WWMIWS

Beyond 48 hours – S-413 warning criteria, conditions, gridded data and graphics

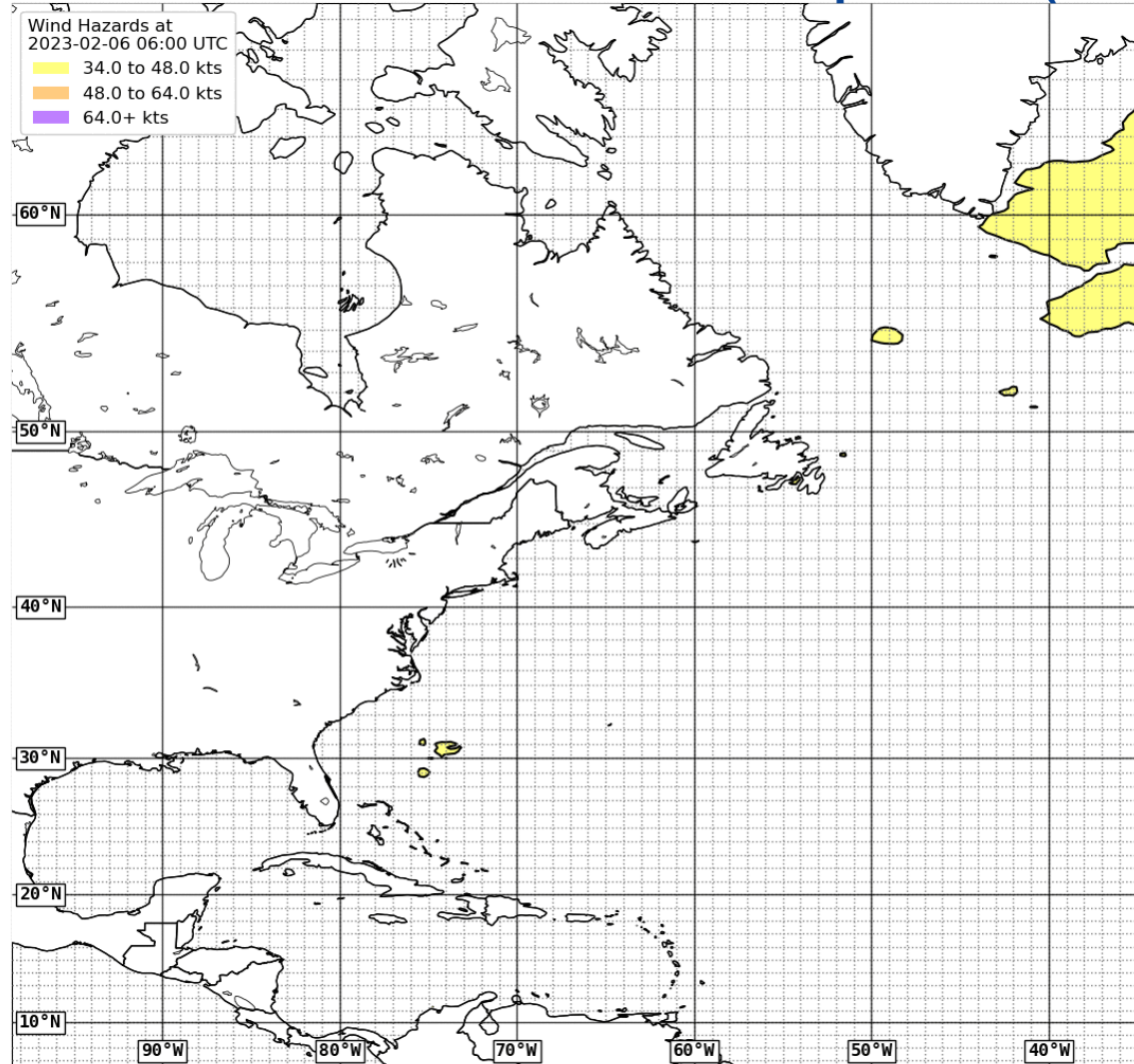
Forecaster will have an active role
Warnings will need to be updated as needed



Wind Warning Polygons - Derivation

Issued: 13 Feb 2023 19:17

24 Hour Maximum Winds
Gale, Storm, Hurricane Force
Components (hourly)

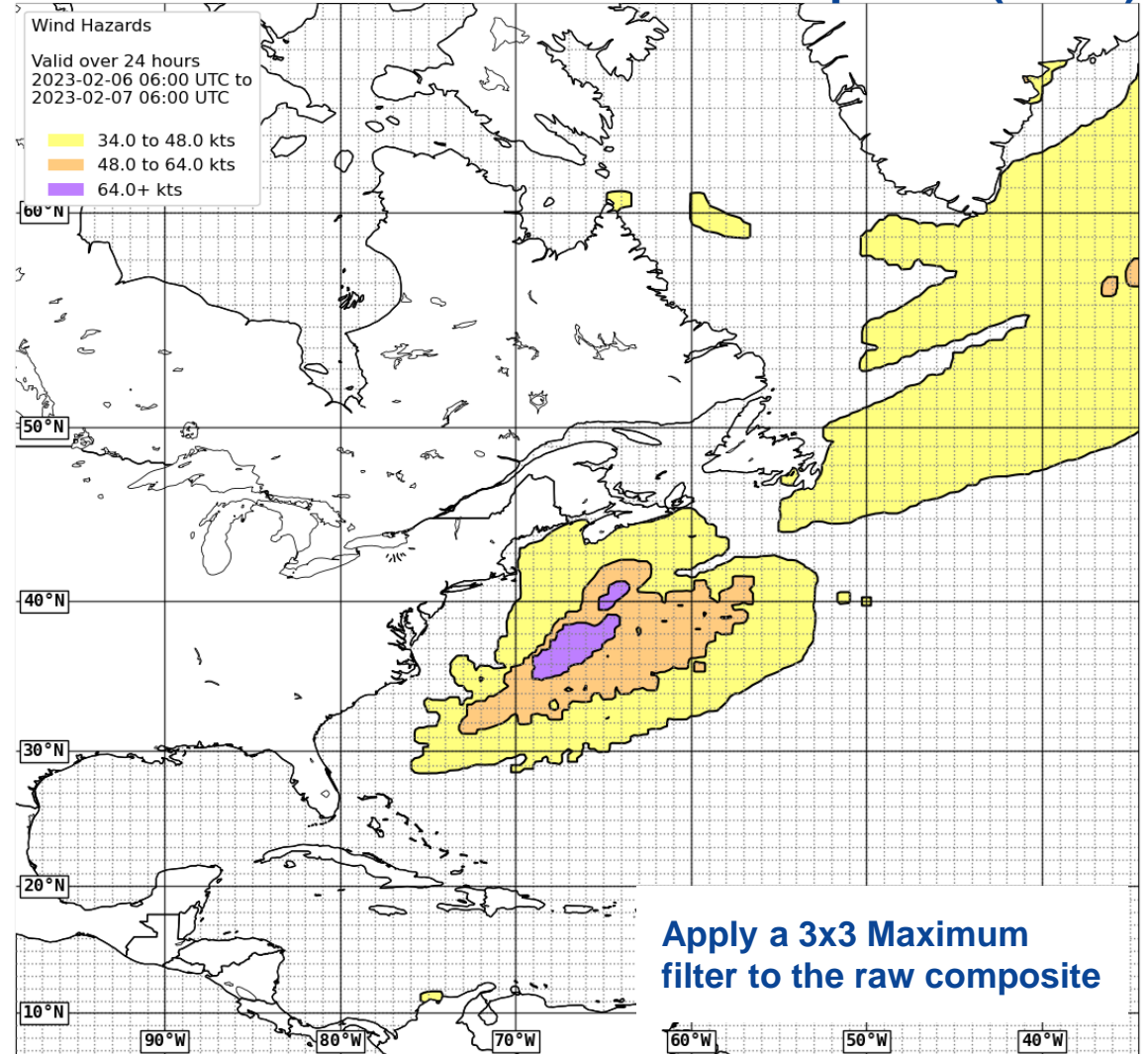


<https://ocean.weather.gov>

NOAA NWS Ocean Prediction Center

Issued: 13 Feb 2023 19:33

24 Hour Maximum Winds
Gale, Storm, Hurricane Force
Composite (24-hr)



<https://ocean.weather.gov>

NOAA NWS Ocean Prediction Center

NOAA Global Forecast System



GMDSS Text and S-412 Warning Polygons



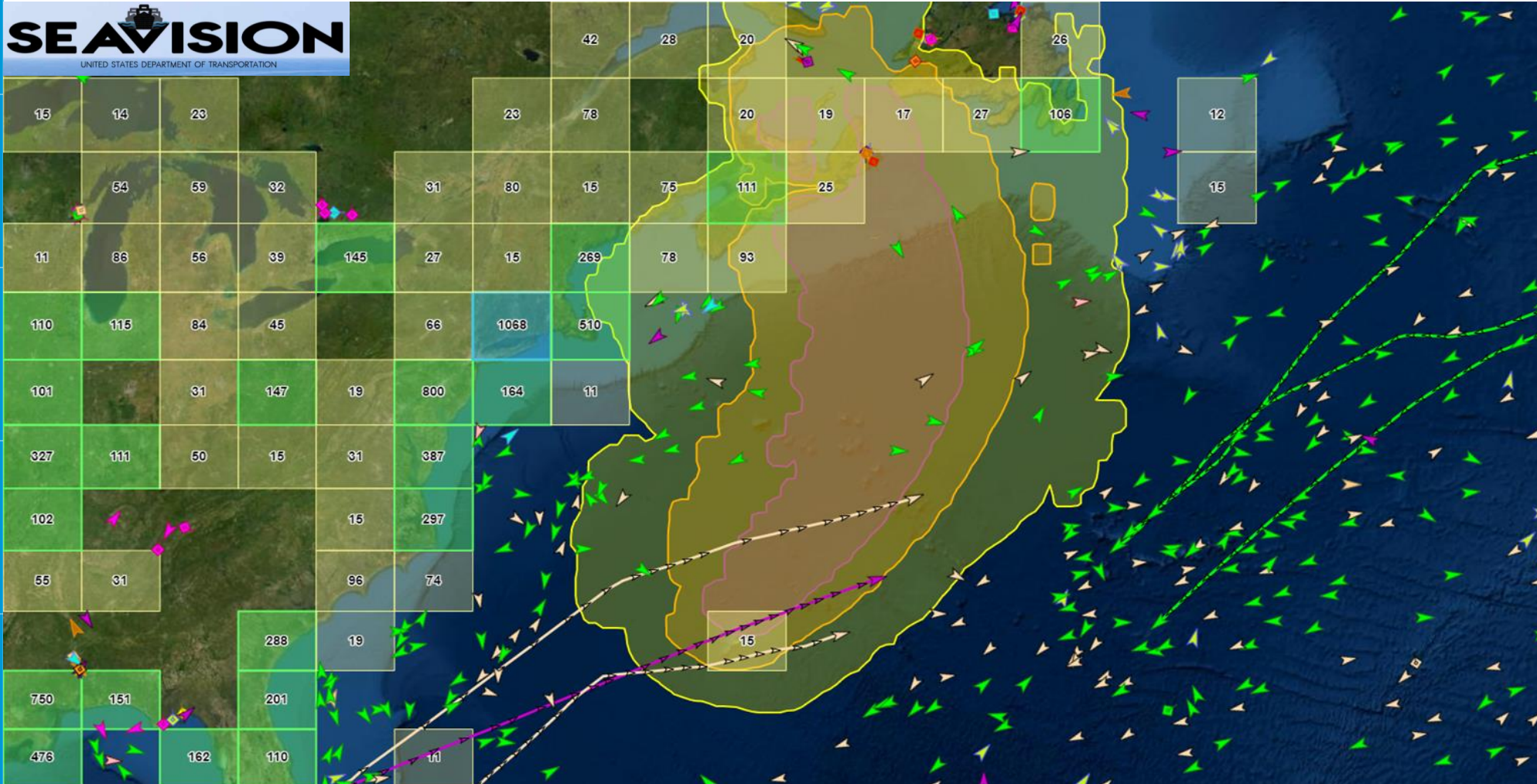
High Seas Forecasts (Metarea Bulletins)

- Sections:
 - Warnings Summary (all ongoing warnings)
 - Synopsis (describes major weather features)
 - Forecasts
 - Near-gale force winds (28-33 knots)
 - Significant wave height (2.5 to 4 meters)
 - Visibility (if 5 nm or less)
- Individual warning area bulletins, summation bulletin
- 00-24 hour and 24-48 hour swaths
- Warning criteria based, not weather feature based, nor defined zone based.



Wind Warning Polygons For Hurricane Fiona Sep 23rd 1400Z

SEA VISION
UNITED STATES DEPARTMENT OF TRANSPORTATION



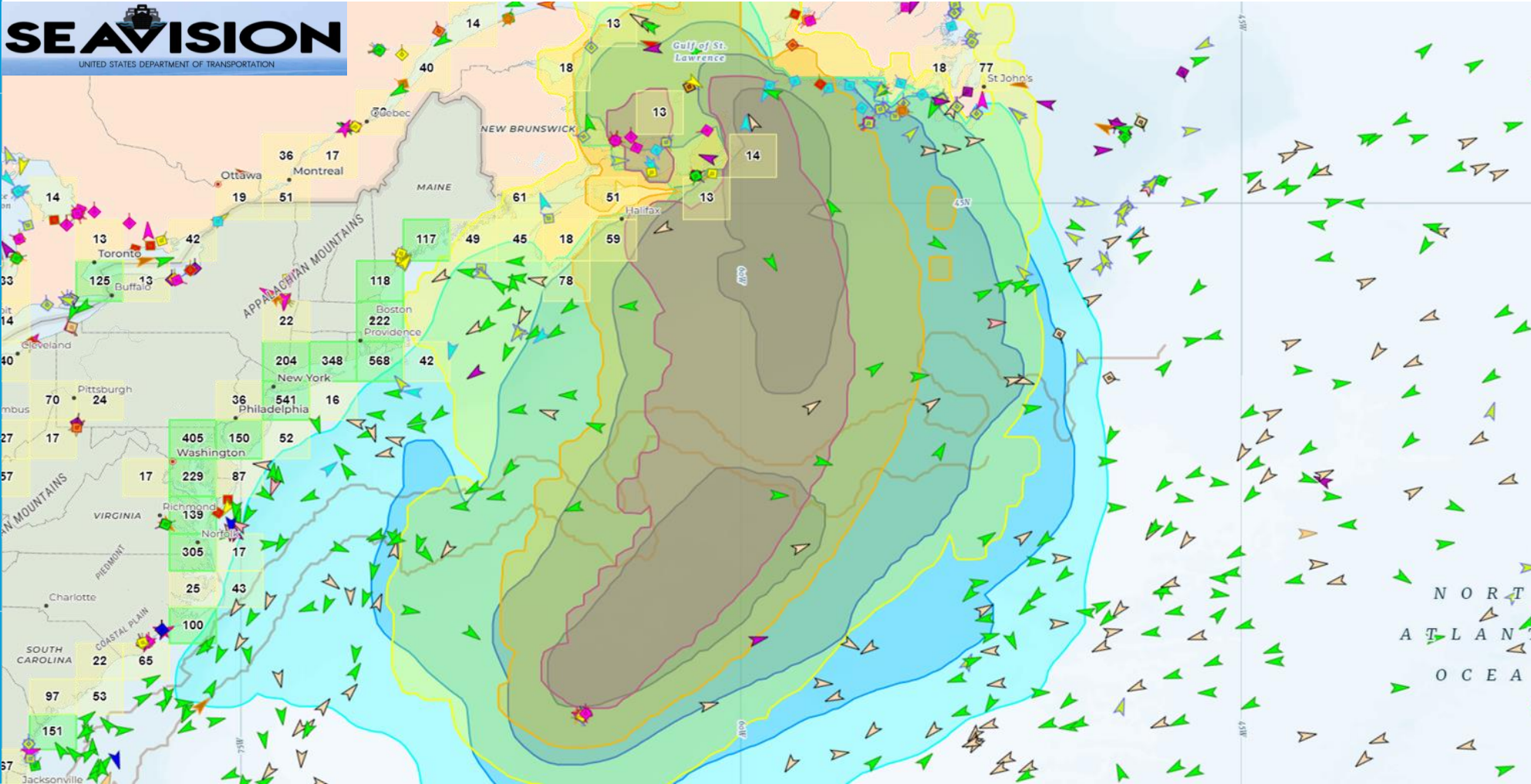
Wind Warnings:

- Gale Force
- Storm Force
- Hurricane Force



Wind and Wave Warning Polygons For Hurricane Fiona Sep 23rd 1530Z

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UNITED STATES DEPARTMENT OF TRANSPORTATION



Wind Warnings:

- Gale Force
- Storm Force
- Hurricane Force

Wave Warnings:

- 4-6 M
- 6-9 M
- 9-14 M
- 14+ M





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ANALYSIS/DISCUSSION

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- Inclusion of S-100 Based Product Specifications for use in ECDIS is controlled via S-98 – Data Product Interoperability in S-100 Navigation Systems
- Weather related MSI from S-412 will need to be included as an overlay function in S-98 for use in ECDIS



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ANALYSIS/DISCUSSION

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- Currently S-98 is focusing on the First Step – Route Monitoring
- S-412 is leveraging the IHO S-100 Infrastructure and closely liaise with the S-100WG

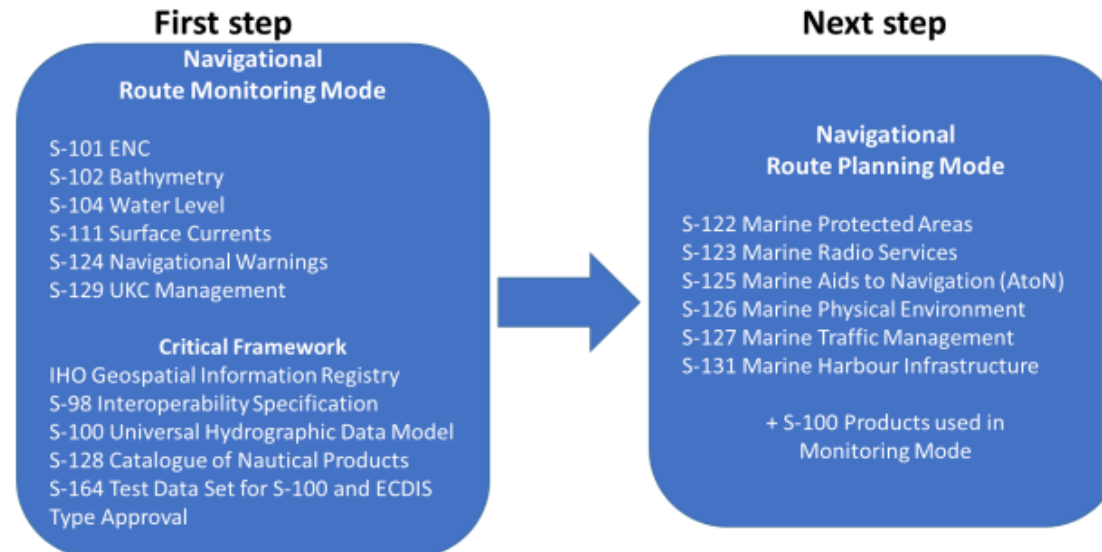


Figure 2 The IHO Navigational Package to be handled by the Interoperability Specification S-98. Additional layers may be added in the future.



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CONCLUSION AND RECOMMENDATIONS

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Organization

- **S-412 is a cornerstone of MSI information that should be part of S-98**
- **Weather Information is governed by IMO SOLAS**
- **S-412 should be included as part of the Phase 2 work for S-98 (Route Planning)**



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ACTIONS REQUESTED FROM HSSC

International
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Organization

- a. Note the paper
- b. endorse the proposal to include S-412 as part of S-98 route planning
- c. agree to include S-412 into S-98 as part of the route planning updates expected to commence in 2026.