

# National Weather Service

## NWS GIS Enterprise Viewer Overview

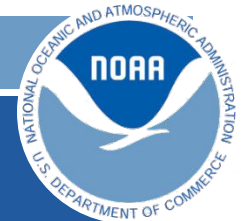
Kari Sheets

Geographic Information Systems (GIS) Team Lead

Office of Dissemination

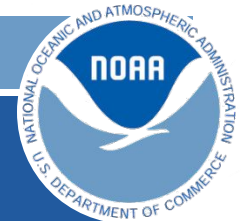
vLab Seminar

July 24, 2019



## Briefing Purpose – *Informational*

- Briefing purpose is to:
  - To provide a high level overview of the plans for the NWS Enterprise Viewer for which the need was validated as CaRDS 16-037



## Background of Mission Need or Requirement

- [CaRDS 16-037](#)
- MDC validated CaRDS request in November 2017
- A common web design to display and disseminate map-based graphics and text information would allow NWS partners and the public to more seamlessly access information across multiple CWAs. This will improve DSS in states and localities that span multiple CWAs. In addition, users would not have to learn how to navigate several different web designs to find the products they need to make decisions.
- While the initial effort may be substantial, establishing a common design and code base for the display of map-based graphics and related text information will ultimately reduce the work required to design and maintain sites to support different NWS products and services. Display of future products and services could be planned to fit the common web design when possible.

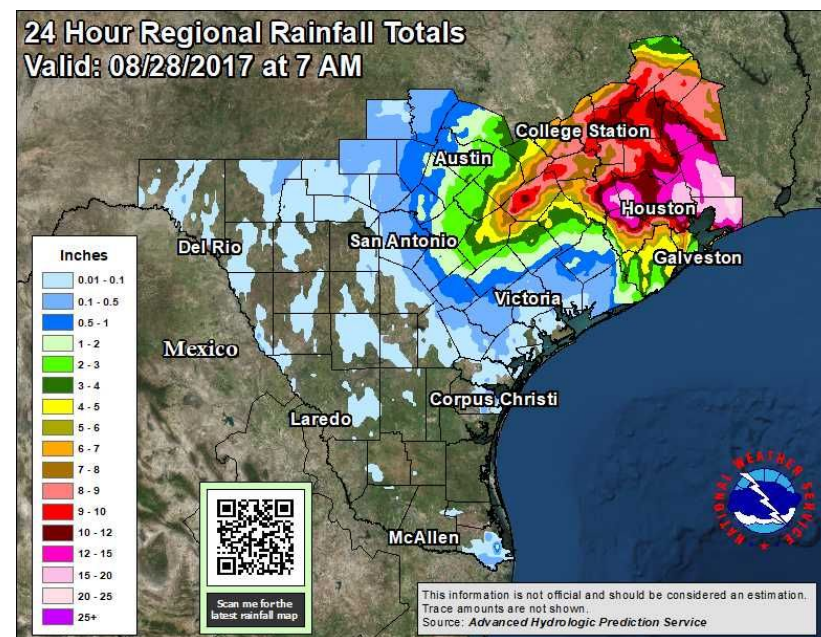
## Background of Mission Need or Requirement

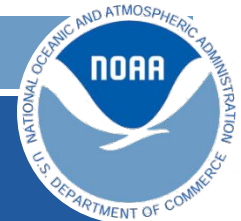
### Hurricane Supplemental: Scalable National Web-Based GIS Viewer / CaRDS 16-037

Improve public access, end user experience and Decision Support Services (DSS) in states and localities that span multiple County Watch Areas (CWAs)

Provide a reliably consistent and common design and software code base to display GIS map-based graphics and related text information

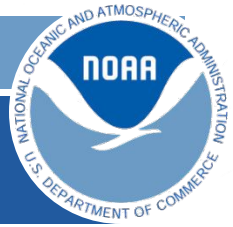
Provide consistent and reliable display and data access for flood inundation mapping, excessive rainfall products, and quantitative precipitation forecasts





## Background of Mission Need or Requirement

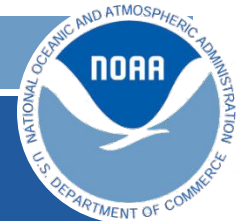
- The GIS D2O team (June 2017-Nov 2018) identified at least 30 NWS websites which provide geospatial data and information. Each site has been developed independently.
- Additionally through the NOAA esri ELA independent arcgis online (AGOL) sites are being developed by individuals, offices and regions for IDSS purposes with little to no consistency in design or approach.
- The DIS GIS team and NWS GIS D2O team [documented and validated](#) the technical and functional requirements based on the functionality of the existing websites and shared these requirements in the CaRDS system as well as with AFS policy teams.
- The provision of data in GIS formats is separate from this CaRDS request, but also managed by the Dissemination Office and was worked on by the D2O team
- The NWS GIS D2O has been reinstated and real time virtual training will be held July 30-Aug 1. The plan is to record these trainings for those not able to participate. If you are interested in joining the D2O team email [Kari.sheets@noaa.gov](mailto:Kari.sheets@noaa.gov) for more information.



## Strategic Alignment

A single code base for NWS web based GIS contributes to 2 of the “5 Key Ways Forward” for evolving NWS:

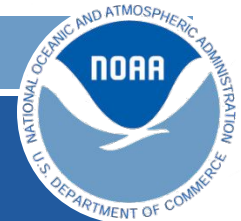
- 1) **Better Serving Partners** by providing key IDSS information as GIS web services so NWS IDSS staff can brief using NWS tools while also providing the data so it can be efficiently integrated into the GIS or common operating pictures of our partners.
- 2) Improve **consistency of NWS forecast & product display and dissemination in support of IDSS** through a collaborative R2O process that makes best use of technology, reduces duplication, and ensures consistency of IDSS experience across the NWS’ 11 service areas.



# Timeline

- **What it does:** Displays NWS IDSS data across multiple County Warning Areas and other geographies
- **What we need to do:** Develop a common code base focusing on large precipitation events (inundation, QPE, etc) of national interest

GIS Viewer	FY 2019				FY 2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Planning	█	█	█	█	█			
Development				█	█	█	█	█
Quality Assurance						█	█	
Implementation								█



# Requirements Documentation

- <https://docs.google.com/spreadsheets/d/14fatfg6C28MGQKAv06u2Uqlc3nVPvUZYrvZrVhGkFqs/edit?usp=sharing>
- 268 requirements

NWS National Viewer (CaRDS 16-037) Requirements ☆

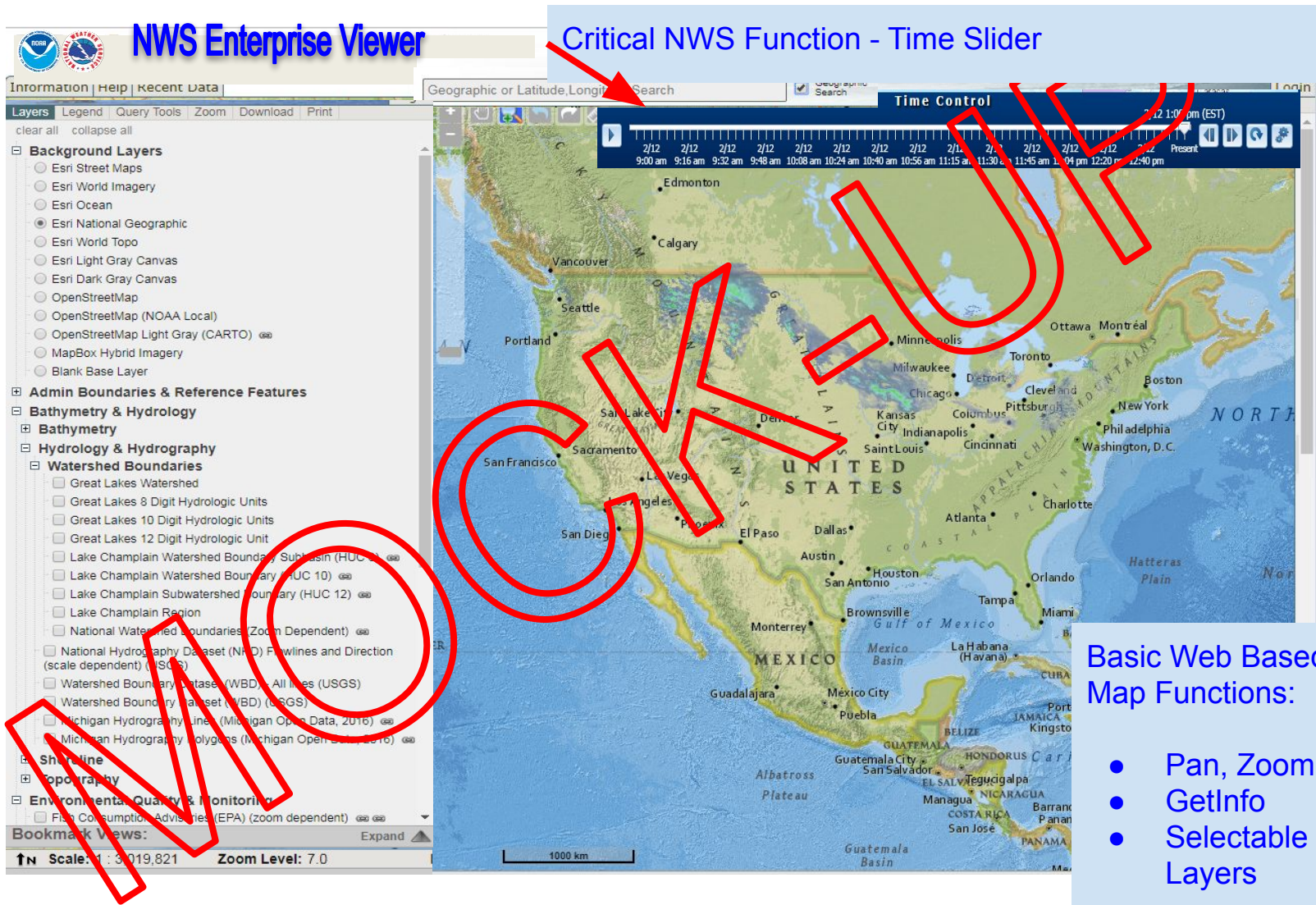
File Edit View Insert Format Data Tools Add-ons Help Last edit was on June 22, 2018

100% Arial 9 B I A

Req#	Req#	Requirement	Comments	Priority	Date Validated	Date Req Verified	SME Reviewed / Approved	Planned Release
2		Sym = Symbology/colors/map feature aesthetics; CD = Custom Display; CC = Common Code; IN = infrastructure; QC = quality control; OM = Operations & maintenance; SS = Social Science						
3	CC_001	The system must have text wrap control and be able to scale to screen sizes		1				
4	CC_002	The system must be capable of orienting the map based on a user's location (if shared.)	<a href="#">AK Requirements</a>	1				
5	CC_003	The system must allow for a default map extent for each presentation layer or API instances for cases when location is not available or geolocation desired. for example and/or allow region/WFO pages to have the office location set a default center of map for their Area of responsibility.	<a href="#">AK Requirements</a>					
6	CC_004	The system must allow for location search by city name, zip code, and lat, lon	The user should then be able to pan/zoom to adjust to a final extent					
7	CC_005	The system must allow for hyperlinks from data layers (or from a "right click" menu from the layer) to metadata records.	This is a link to the full xml ISO compliant metadata					
8	CC_006	The system must allow for hyperlinks from data layers (or from a "right click" menu from the layer) to source data.	This may be grib files, an office web page, etc.					



# NWS Enterprise Viewer MOCK-UP



The screenshot shows the NWS Enterprise Viewer interface. On the left is a layers panel with categories like Background Layers, Admin Boundaries & Reference Features, Bathymetry & Hydrology, and Environmental Quality & Monitoring. At the top right is a 'Time Control' slider with a play button and a timeline from 9:00 am to 12:40 pm. A search bar is located above the map. The map itself shows a topographic view of the United States with various cities and geographical features labeled. Red hand-drawn annotations highlight the search bar, the time slider, and several layers in the left panel.

Critical NWS Function - Time Slider

Basic Web Based Map Functions:

- Pan, Zoom
- GetInfo
- Selectable Data Layers

# NWS Enterprise Viewer Mock-Up

**NWS Enterprise Viewer**

Information | Help | Recent Data

Geographic or Latitude, Longitude Search  Geographic Search

Layers Legend Query Tools Zoom Download Print

**5-Day Graphical Tropical Weather Outlook**

5-Day Graphical Tropical Weather Outlook

- 30% or Less Chance
- 40%-60% Chance
- 70% or Greater Chance

**NWS Warnings (NOAA)**

NWS Warnings (NOAA)

- Flash Flood Warning
- Special Marine Warning
- Severe Thunderstorm Warning
- Tornado Warning

**Tropical Cyclone & Hurricane Location and Forecast (NOAA)**

Tropical Cyclone & Hurricane Location and Forecast (NOAA)

Atlantic, Central Pacific and Eastern Pacific Ocean Regions

Tropical Cyclone Watches and Warnings for Coast

- Hurricane Watch
- Hurricane Warning
- Tropical Storm Watch
- Tropical Storm Warning

Tropical Cyclone Center Position Forecasts

- Major Hurricane (Category 3-5)
- Hurricane (Category 1-2)
- Tropical Storm
- Tropical Depression
- Potential Tropical Cyclone, Subtropical Depression, Subtropical Storm, Post-Tropical Cyclone, or Remnants
- Tropical Cyclone Track Line Forecasts
- 30-60-h Forecast Track Line
- Tropical Cyclone Cone of Uncertainty for Track Forecasts

Scale: 1 : 3,019,821 Zoom Level: 7.0

Time Control: 2/12 1:00 pm (EST)

Basic Web Based Map Functions:

- Legend

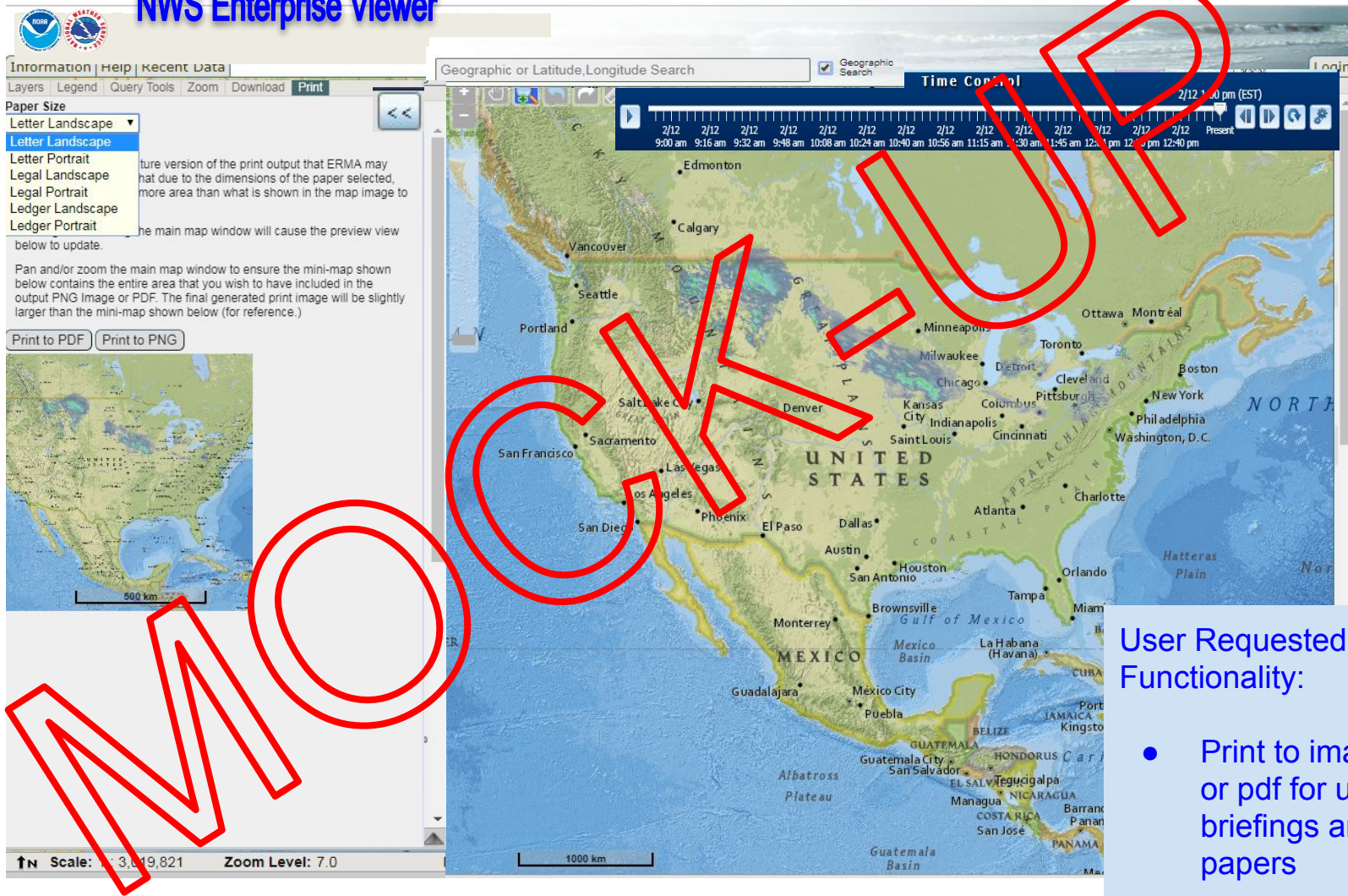
# NWS Enterprise Viewer Mock-Up

User Requested Functionality:

- download shapefiles of data layers when allowable by data provider

# NWS Enterprise Viewer Mock-Up

## NWS Enterprise Viewer



### User Requested Functionality:

- Print to image or pdf for use in briefings and papers

# NWS Enterprise Viewer Mock-Up

**NWS Enterprise Viewer**

Geographic or Latitude, Longitude Search Geographic

**Time Control** 2/12, 1:00 pm (EST)

Active View: Hurricane Harvey - Weather info

clear all collapse all show all layers

**Weather, Oceanography, & Natural Hazards**

- Hazardous Weather, Earthquakes, & Tsunamis
  - Tropical Cyclone & Hurricane Location and Forecast (NOAA)
  - Potential Storm Surge Flooding - With Intertidal Mask (visible through zoom level 12 only) (NOAA)
  - Natural Hazards in the last 24 hours (TNEMA)
  - NWS Warnings (NOAA)
  - 5-Day Graphical Tropical Weather Outlook
  - Wind Speed Probability - 34kt (NOAA)
  - Wind Speed Probability - 50kt (NOAA)
  - Wind Speed Probability - 64kt (NOAA)
- Precipitation**
  - NEXRAD Radar Base Reflectivity (IA State)
    - NEXRAD Radar Base Reflectivity 1 hour animation
    - 72-hr NEXRAD Radar Cumulative Precipitation (CONUS) (IAState/NWS)
    - NEXRAD Radar Current Base Reflectivity (IA State)

**Bookmark Views:** Hide

- Shared Views**
  - Deepwater Horizon
    - default
    - Gulf of Mexico Area of Interest Weather (realtime)
  - Hurricane Harvey
    - Houston Infrastructure
    - Hurricane Harvey - Weather
    - NOAA-NGS Response Imagery
  - Natural Resources
    - Cetacean Biologically Important Areas
    - Gulf of Mexico GAPS Analysis & Longterm Monitoring
  - Response Planning
    - Standard Default
  - Weather
    - Standard Default

play slideshow interval clean

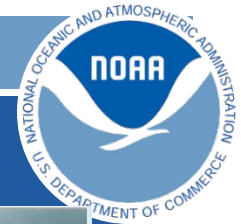
Hide (<<) / Show (>>) the control panel.

9:00 am 9:16 am 9:32 am 9:48 am 10:08 am 10:24 am 10:40 am 10:56 am 11:15 am 11:30 am 11:45 am 12:00 pm 12:15 pm 12:30 pm 12:40 pm Present

1000 km

User Requested Functionality:

- “bookmarks” for sets of layers in 1 click



# NWS Enterprise Viewer Mock-Up

## NWS Enterprise Viewer

Information | Help | Recent Data | Search Layers, Folders, and Bookmarks | Geographic Search

Geographic or Latitude, Longitude Search  Geographic Search

Time Control

Hide (<<)/ Show(>>) the control panel.

Scale: 1 : 3,019,821    Zoom Level: 7.0    Location: 27.3824°, -90.4936°

User Requested Functionality:

- hide the "navigation panel"

# NWS Enterprise Viewer Mock-Up

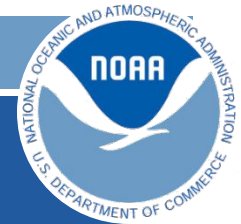
The screenshot shows the NWS Enterprise Viewer interface. At the top, there is a search bar labeled 'Search Layers, Folders, and Bookmarks' and a 'Geographic Search' checkbox. Below this is a 'Time Control' panel with a timeline for the month of February 2012, showing dates from 2/12 9:00 am to 2/12 12:00 pm. A large red watermark 'MAY 2012' is overlaid on the map. The map displays North America with various cities and geographical features. On the left side, there is a 'Layers' panel with a list of categories such as 'Background Layers', 'Hurricane Irma', 'Admin Boundaries & Reference Features', 'Bathymetry & Hydrology', 'Environmental Quality & Monitoring', 'Marine Debris', 'Imagery & Remote Sensing', 'Natural Resources, Habitats, & Managed Areas', 'Navigation & Marine Infrastructure', 'Public Safety & Infrastructure', 'Response Planning', 'Restoration', 'Weather, Oceanography, & Natural Hazards', 'Buoys & Gliders', 'Currents', 'Flood Zones', 'Hazardous Weather, Earthquakes, & Tsunamis', and 'Precipitation'. At the bottom, there is a status bar with 'Scale: 1:3,138,21', 'Zoom Level: 7.0', 'Location: 27.3824, -90.4936', and 'Like 3.2K'.

User Requested Functionality:

- search for data layers not default in the “presentation layer”







# NWS Mock-Up of View Mock-Up



## NWS Enterprise Viewer

Geographic or Latitude, Longitude Search  Geographic Search

**Time Control** 2/12 1:00 am (EST)

2/12 9:00 am 2/12 9:16 am 2/12 9:32 am 2/12 9:48 am 2/12 10:08 am 2/12 10:24 am 2/12 10:40 am 2/12 10:56 am 2/12 11:15 am 2/12 11:30 am 2/12 11:45 am 2/12 12:04 pm 2/12 12:20 pm 2/12 12:40 pm

**Layers** Legend Query Tools Zoom Download Print

clear all collapse all

- Background Layers
- Hurricane Irma
- Admin Boundaries & Reference Features
- Bathymetry & Hydrology
- Environmental Quality & Monitoring
- Marine Debris
- Imagery & Remote Sensing
- Natural Resources, Habitats, & Managed Areas
- Navigation & Marine Infrastructure
- Public Safety & Infrastructure
- Response Planning
- Restoration
- Weather, Oceanography, & Natural Hazards
  - Near Real-Time Weather Observations (NOAA)
  - NWS National Weather Forecast Chart
- Buoys & Gliders
- Currents
- Flood Zones
- Hazardous Weather, Earthquakes, & Tsunamis
- Precipitation

More Layers Quick Links

Interface: Basic

Enable Left Click Forecast

Layer Tree

Opacity: 0

Search for a layer by name

Layers

- Aviation
- Boundaries
- Climate
- Demographics
- Experimental
- Firm Weather
- Historical

NWS Chat

States Counties Storm Reports Save/Share Like 3.2K

### Basic Web Based Map Functionality:

- search for presentation layer data or search for location

# Similarities with existing tools

- Common Look & Feel w/customized skins
  - potentially with tabbed navigation similar to [interim NWS GIS page](#)

## NWS GIS Portal

[Weather.gov](#) > GIS

GIS  
National Program

[Web Services](#) [KMLs](#) [Shapefiles](#) [AWIPS Basemaps](#) [NWS GIS Homepage](#)

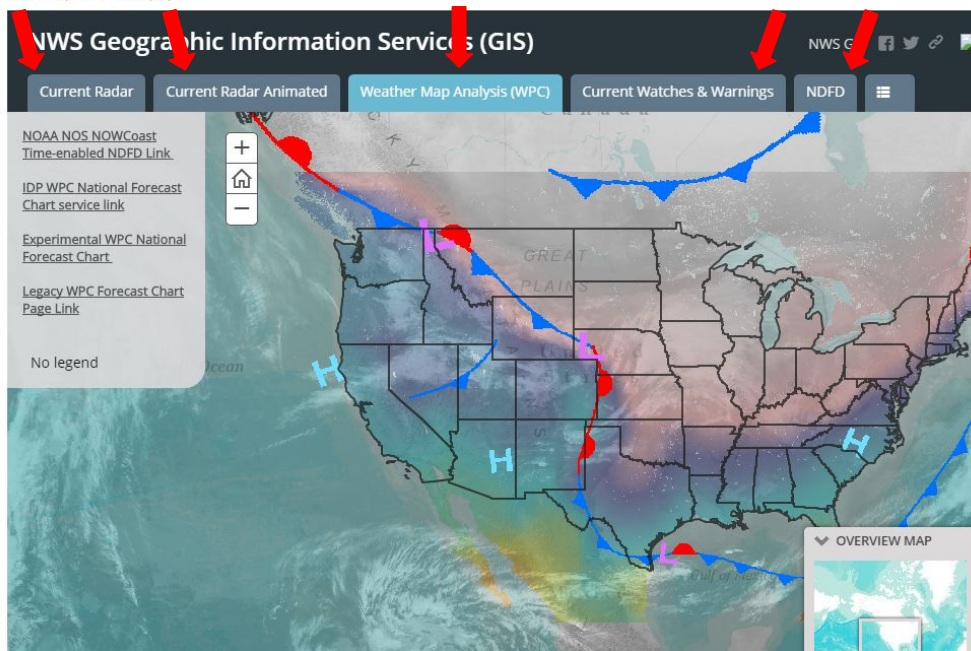
Many of the National Weather Service data sets are available in formats that are able to be imported directly into Geographic Information Systems (GIS) or your own custom map viewers or web pages. Data formats include downloadable shapefiles, web services, KML files and geo-referenced images.

As more data is made available in these formats, links to the data will be added to these pages. Click one of the GIS format links above to start exploring the NWS GIS data currently available!

The display below utilizes an [ESRI Story Map](#) to show various types of NWS data that are available for public use. There are many links within the Story Map that can provide you with additional information about how you can use NWS data for yourself.

Please [email us](mailto:email.us) if you have any comments or questions.

[Link](#) if map does not display.

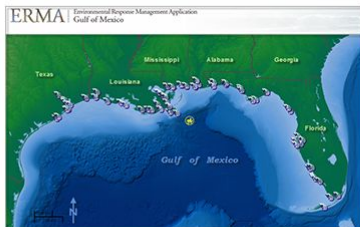


# Similarities with existing tools

- Common Look & Feel w/customized presentation layers
  - similar to [NOS ERMA application](#)



## Environmental Response Management Application (ERMA)



ERMA<sup>®</sup> is an online mapping tool that integrates both static and real-time data, such as Environmental Sensitivity Index (ESI) maps, ship locations, weather, and ocean currents, in a centralized, easy-to-use format for environmental responders and decision makers. ERMA is designed to:

- Aid in spill preparedness and planning.
- Assist in coordinating emergency response efforts and situational awareness for human and natural disasters.
- Support the Natural Resource Damage Assessment process.

## On Our Radar

### Response Tools for Spills



### Preparing for Hurricane Season



### How Does NOAA Model Oil Spills?



### Meet the New CAMEO Chemicals Mobile App



Here, ERMA displays sampling locations in the Gulf of Mexico for the NOAA Mussel Watch Program, levels from mussels before and after the Macondo well blow-out in 2010 (well site shown in yellow).

## Video: An Introduction to the Environmental Response Management Application (ERMA)

This instructional video introduces first-time users to ERMA, NOAA's online mapping tool for environmental disaster response, and walks you through the basic features and tools within it.

## Technical Information about ERMA

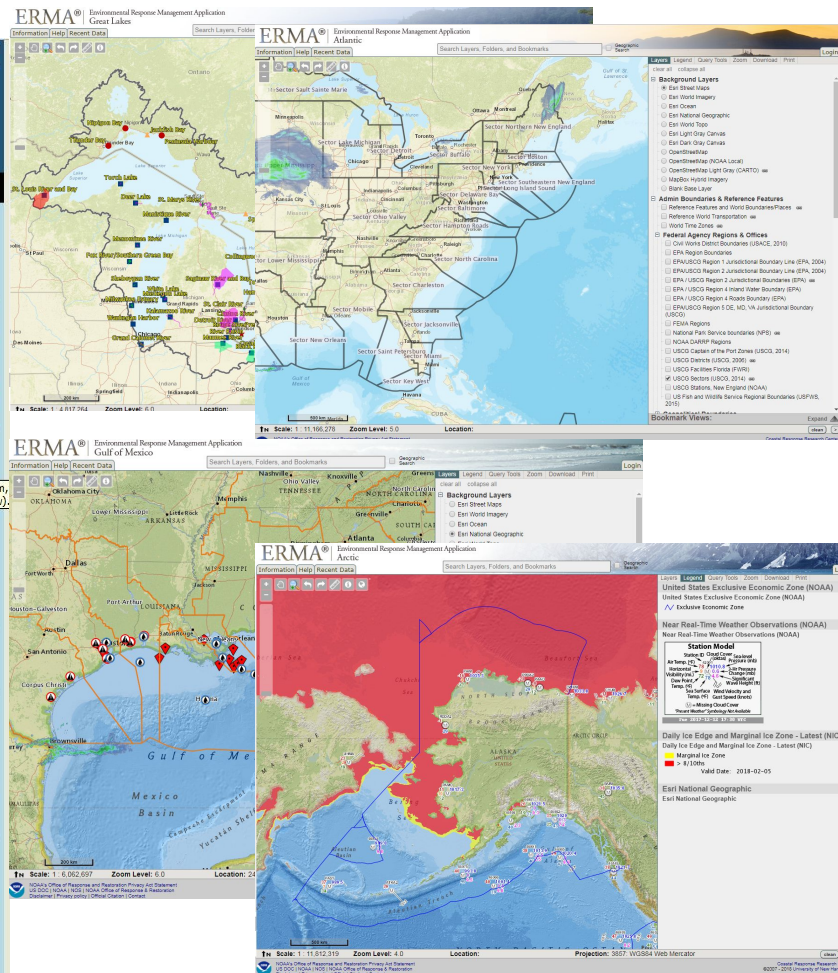
The Environmental Response Management Application (ERMA<sup>®</sup>) enables a user to quickly and securely upload, manipulate, export, and display both static and real-time geographic data sets.

## Great Lakes ERMA

Great Lakes ERMA is an online mapping tool facilitating coastal pollution cleanup, restoration, and response efforts in the Great Lakes Basin, from Minnesota to New York in the United States, and from Ontario to Quebec in Canada.

## Arctic ERMA

Find out how NOAA is using the online mapping tool ERMA to help the Arctic region prepare for climate change and possible oil spills.



# Similarities with existing tools

- Common Look & Feel w/customized presentation layers
  - similar to [NOS nowCOAST](#)

nowCOAST™ NOAA's Web Mapping Portal to Real-Time Coastal Observations, Forecasts, and Warnings

nowCOAST™ for Mariners

General Use

nowCOAST™ NOAA's Web Mapping Portal to Real-Time Coastal Observations, Forecasts, and Warnings

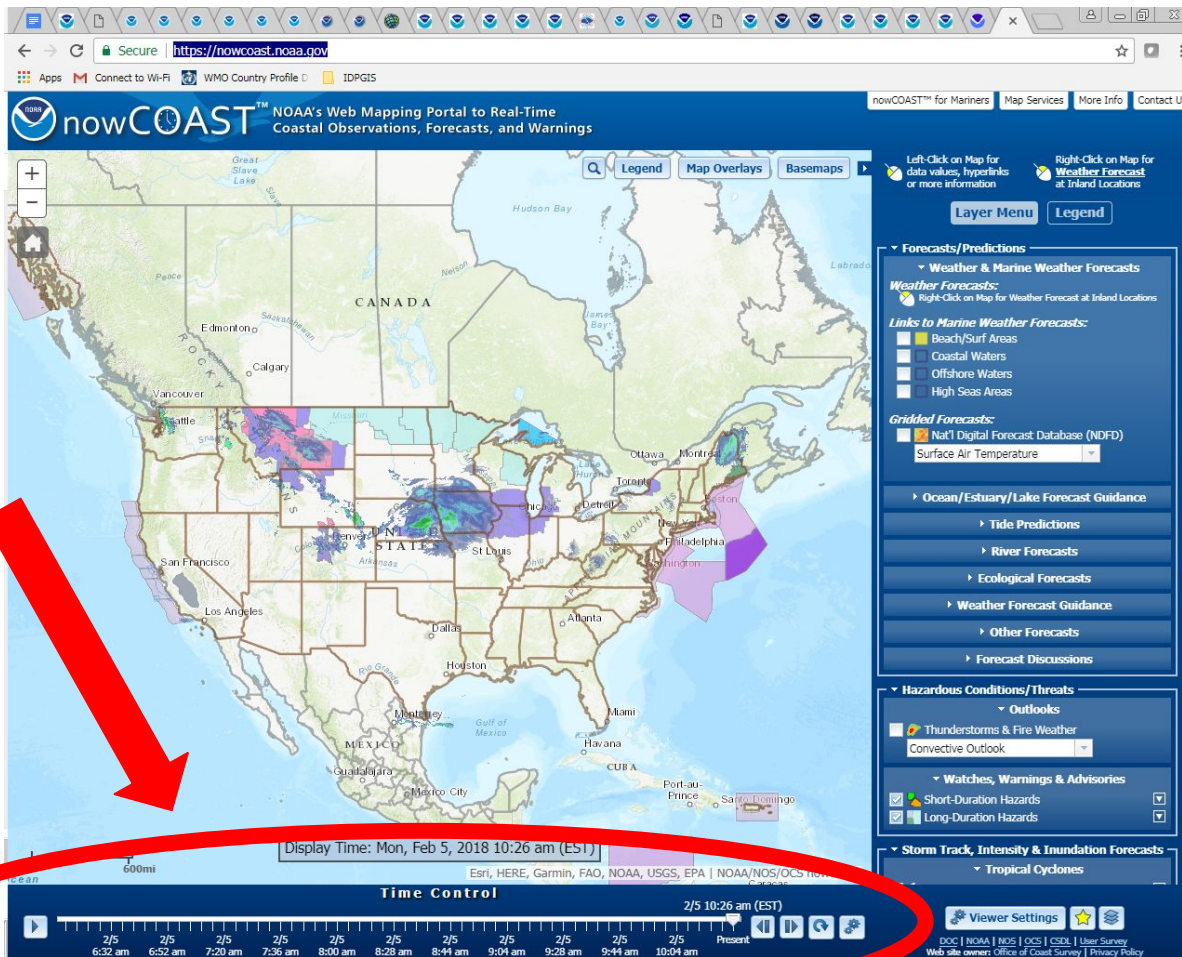
Mariner Version

nowCOAST™ for General Use

# Similarities with existing tools

- Key Functionality from current applications

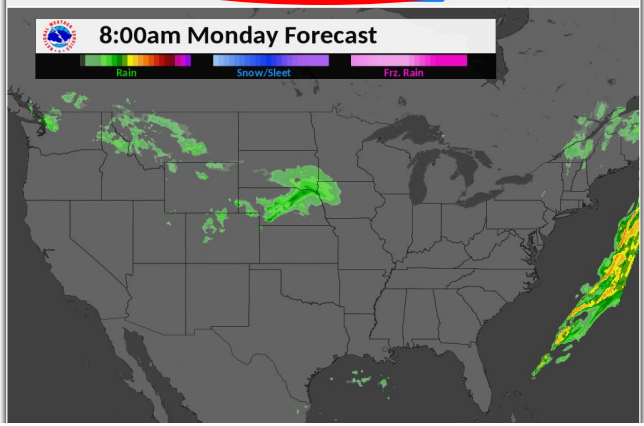
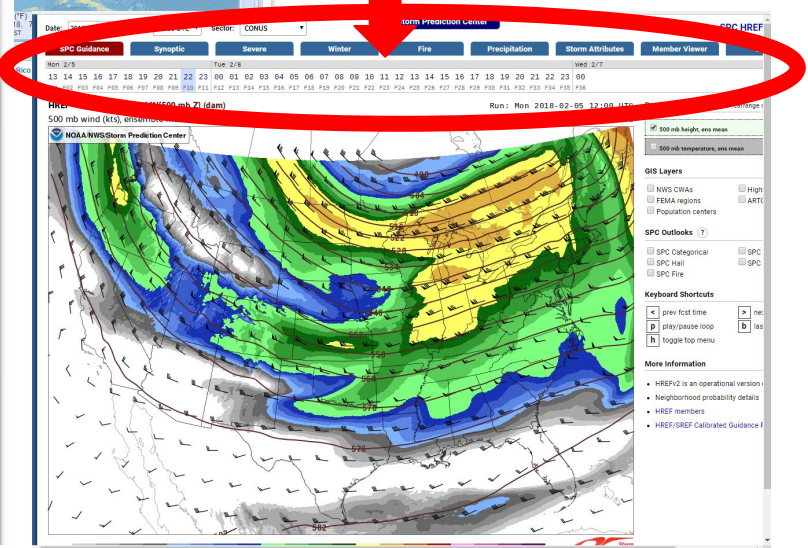
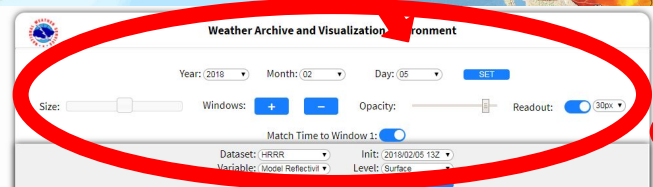
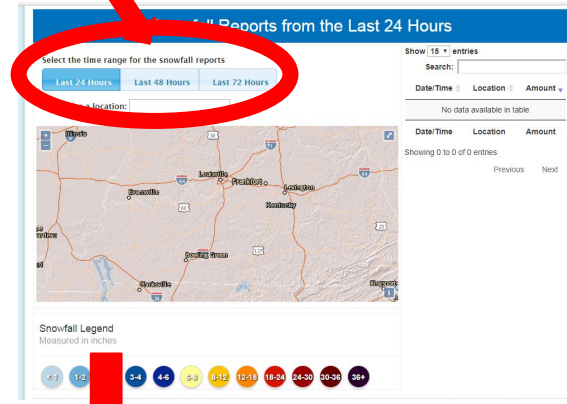
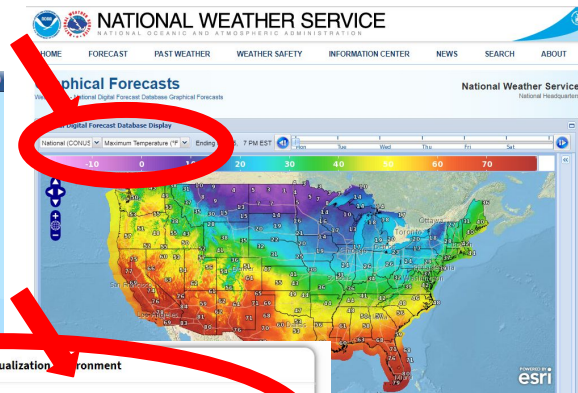
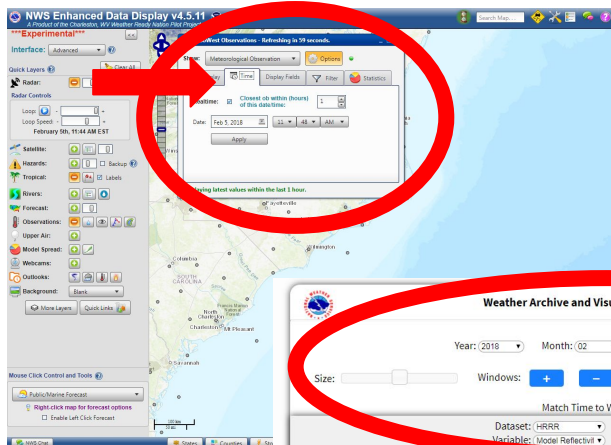
- time slider NOS nowCOAST



# Similarities with existing tools

- Key Functionality from current applications - Display Data by Valid Time

- [EDD](#), [NDFD](#), [WAVE](#), [SPC Viewer](#), [Snowfall Reports](#)

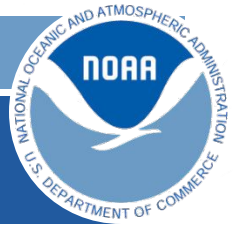


# Similarities with existing tools

- Key Functionality from current applications - Selectable, Concurrent Layers
  - [EDD](#), [Severe Weather Event Maps](#), [SPC Viewer](#), [Aviation Weather Overview](#), [AHPS](#)

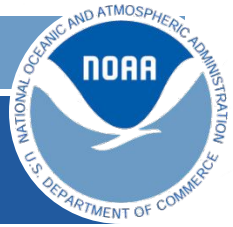
The collage consists of five screenshots from different weather tools, each with a red circle highlighting a specific feature and a red arrow pointing to it:

- Top Left:** A weather radar interface. A red circle highlights the 'Layers' panel on the right side of the map, which lists various data layers like 'Oneonta Structure Damage' and 'January 19th-22nd Alabama Severe Weather'.
- Top Right:** A map titled 'January 19-22, 2017 Alabama Severe Weather'. A red circle highlights the 'Layers' panel on the right, showing a list of event categories and their locations on the map.
- Middle:** The 'Aviation Weather Overview' page. A red circle highlights the map area, which is overlaid with various data points and layers. A red arrow points from the 'Layers' panel in the top right towards this map.
- Bottom Left:** A 'Weather Hazards Data Viewer' interface. A red circle highlights the legend and map area, with a red arrow pointing from the 'Layers' panel in the top left towards this map.
- Bottom Right:** A 'Storm Prediction Center' (SPC) outlook map. A red circle highlights the map area, with a red arrow pointing from the 'Layers' panel in the top right towards this map.



BACKUP

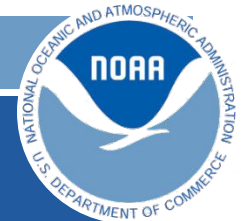




Interested in participating in developing the NWS Enterprise GIS Viewer with 30% of your time over the next 18 months as part of the Development to Operations (D2O) Team?

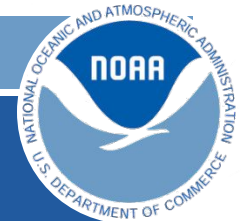
Email [Kari.sheets@noaa.gov](mailto:Kari.sheets@noaa.gov) and [andrea.hardy@noaa.gov](mailto:andrea.hardy@noaa.gov) for more information.

Questions?



## Benefits

- The NWS benefits from an interactive web-based common map interface, such as the one being described in the following ways:
  - Consistency for IDSS mission and partners
    - Availability & Reliability
      - supported by NWS 24/7/365 operational teams
      - real-time data ingest ensures data updates as NWS releases new products
    - Experience
      - “Look & Feel” is similar between service areas and geographic regions of the NWS
      - Leverages, & when possible provides access to, NWS data in international geospatial data standards (Open Geospatial Consortium - OGC)
    - Flexible
      - Allows for tailoring of content to service areas and regions
      - Allows data being displayed (layers) to be selected “on-the-fly”
  - Consistency for NWS O&M staff
    - Common code and content form the “back-end” for “skins” customized for service areas = only 1 thing to maintain and monitor
    - Streamlines training (internal & external) since both the the front and back-end will be consistent web map experiences across the NWS



## Success Criteria

- Collaborative development for updates
  - NWS staff request & contribute functional updates rather than building something else to achieve their goals (less silos/"one-offs")
- Usage Statistics
  - Meet or exceed current usage of "silo" applications via Google web stats or other NWS web monitoring tools
- User Feedback
  - Positive Feedback (including requests for additional functionality) will show that mission need is being met
    - Feedback from Weather Enterprise, other customers, and NWS staff