

# BUILDING A NEXT GENERATION GEOSPATIAL INFRASTRUCTURE FOR OPERATIONAL HARMFUL



## ALGAL BLOOM FORECASTING

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### INTRODUCTION

Since 2004, NOAA has maintained the Gulf of Mexico Harmful Algal Bloom Operational Forecast System (HAB-OFS) to assist early *Karenia brevis* identification and response efforts. As the HAB-OFS matures and expands nationally, a next-generation infrastructure is required to manage new datasets and handle increasingly complex data processing and analyses, incorporate new technologies, and display near-real time data. The HAB-OFS team proposes a new platform to increase the efficiency and reliability of data ingestion and analysis to streamline existing procedures. This system will enable dissemination of HAB bulletins as geo-referenced PDFs which enhances the user experience by enabling better visualization of GIS layers and access to metadata for easier interpretation. An interactive web map is also being explored to update data layers dynamically in near-real time, further supporting well-informed and timely response to HAB events. With this new infrastructure, HAB-OFS will be better positioned to keep pace with the evolution of HAB science and technology and the national expansion of NOAA's HAB forecasting program.

**TO VIEW AN INTERACTIVE EXAMPLE OF THIS NEXT-GENERATION FORECAST, PLEASE VISIT: [WWW.TIDESANDCURRENTS.NOAA.GOV/HAB/EXAMPLE](http://WWW.TIDESANDCURRENTS.NOAA.GOV/HAB/EXAMPLE)**

Water Temperature Data

HABIT Tool

Environmental Sample Processor

The next-generation HAB-OFS will enable greater data compatibility as NOAA expands forecasting to Lake Erie, the Gulf of Maine, and beyond.

The HABIT tool automatically identifies the highest *Karenia brevis* sample in each forecast region and determines the potential level of respiratory irritation by querying the real-time NWS wind forecast.

ID	Cell Count	Latitude	Longitude	Sample Time	Wind Speed	Wind Direction	Wind Time
0	0	26.4794	-82.0226	2015-09-13T10:10:00-05:00			
1	0	28.1505	-80.6350	2015-09-13T07:00:00-05:00			
2	0	25.9116	-81.7280	2015-09-14T04:25:00-05:00			
3	0	25.9117	-81.7280	2015-09-14T04:25:00-05:00			

The HABIT tool automatically identifies the highest *Karenia brevis* sample in each forecast region and determines the potential level of respiratory irritation by querying the real-time NWS wind forecast.

The georeferenced PDF bulletin consisting of geospatial layers including the most recent satellite imagery and *Karenia brevis* sample data. Sample location, depth, and cell concentration can be accessed by clicking on a sample.

### Ingestion

- The new system will automatically ingest:
  - Water temperature data
  - Environmental models
  - Reports of fish kills and respiratory irritation
  - Real-time wind data
  - Cell count and toxicity data
- Improvements in sample technology will enable real time ingestion of field samples through a mobile app.

### Analysis

- Tools will automatically compute levels of respiratory irritation in real-time, immediately alerting analysts when conditions change.
- Algorithms will be adaptable to enable improvements to existing tools and expansion to additional regions.

### Web Map

- Visualization of regions affected by respiratory irritation.
- Interactive display that includes a time slider feature.
- Automatically updated with the latest NWS wind forecast.

### Georeferenced PDF

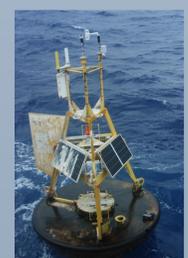
- Sample metadata such as location, depth, and cell concentration enables GIS data exploration.
- Map tools allow point-to-point measuring.

### Short Term Data Storage:

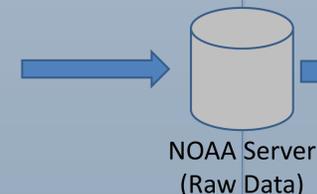
- Forecasts and their supporting data will be stored on the CO-OPS server for 1 year to support assessment.
- Accessible to the public 1 week after dissemination.

### Long Term Data Archival:

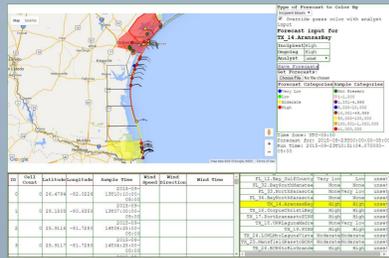
- All bulletins and supporting data over 1 year old will be archived and publicly accessible from NOAA's National Center for Environmental Information (NCEI).
- Improved data accessibility will support research and development.



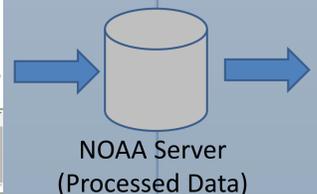
Observations



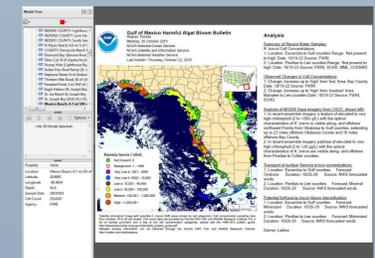
NOAA Server (Raw Data)



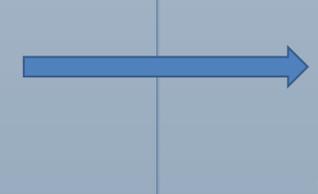
Integrated Forecasting Tools



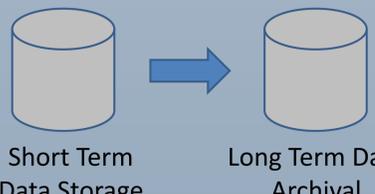
NOAA Server (Processed Data)



Published Forecast Products



Short Term Data Storage on CO-OPS server



Long Term Data Archival on NCEI server

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