

The Innards of Seagull

TECHNICAL OVERVIEW and 2023 UPDATES

IOOS DMAC Annual Meeting | Sept 25 - 29, 2023
Joe Smith, Tim Kearns



GLOS built a **technology platform**

that supports **Smart** devices, drives information and delivers
actionable intelligence.

Technology platform

A **platform** is a set of **software** and a **surrounding ecosystem** of **resources** that helps you to grow your business.

A platform **enables growth through connection**: its value comes not only from its own features, but from its **ability to connect** external tools, teams, data, and processes.

ENGAGE



Notify



Report



Share

DISCOVER



Visualize



Analyze



Configure

OBSERVE



Deploy



Measure



Transmit

CONNECT



Check



Integrate



Distribute

Seagull reimagines how data becomes information and insights in observers' hands.

CODESPRINT FEUD CODESPRINT FEUD CODESPRINT FEUD CODESPRINT



PRINT FEUD CODESPRINT FEUD CODESPRINT FEUD CODESPRINT FEUD



Forecasting model rendering issues
Data issues; platform configuration issues
Front end bugs

Fixed Bugs



New UI for quicker access, Line plots updates to include data points, Updated default units, Added sponsor logos

Enhancements



NDBC to GLOS Data Flow, OMICS, Gliders/Drifters
New platforms/data from mini-grants, NCEI,

Pipeline Dev



Setting up user preferences for units, Pin parameters
Visualizing drift paths on Seagull map

New Features

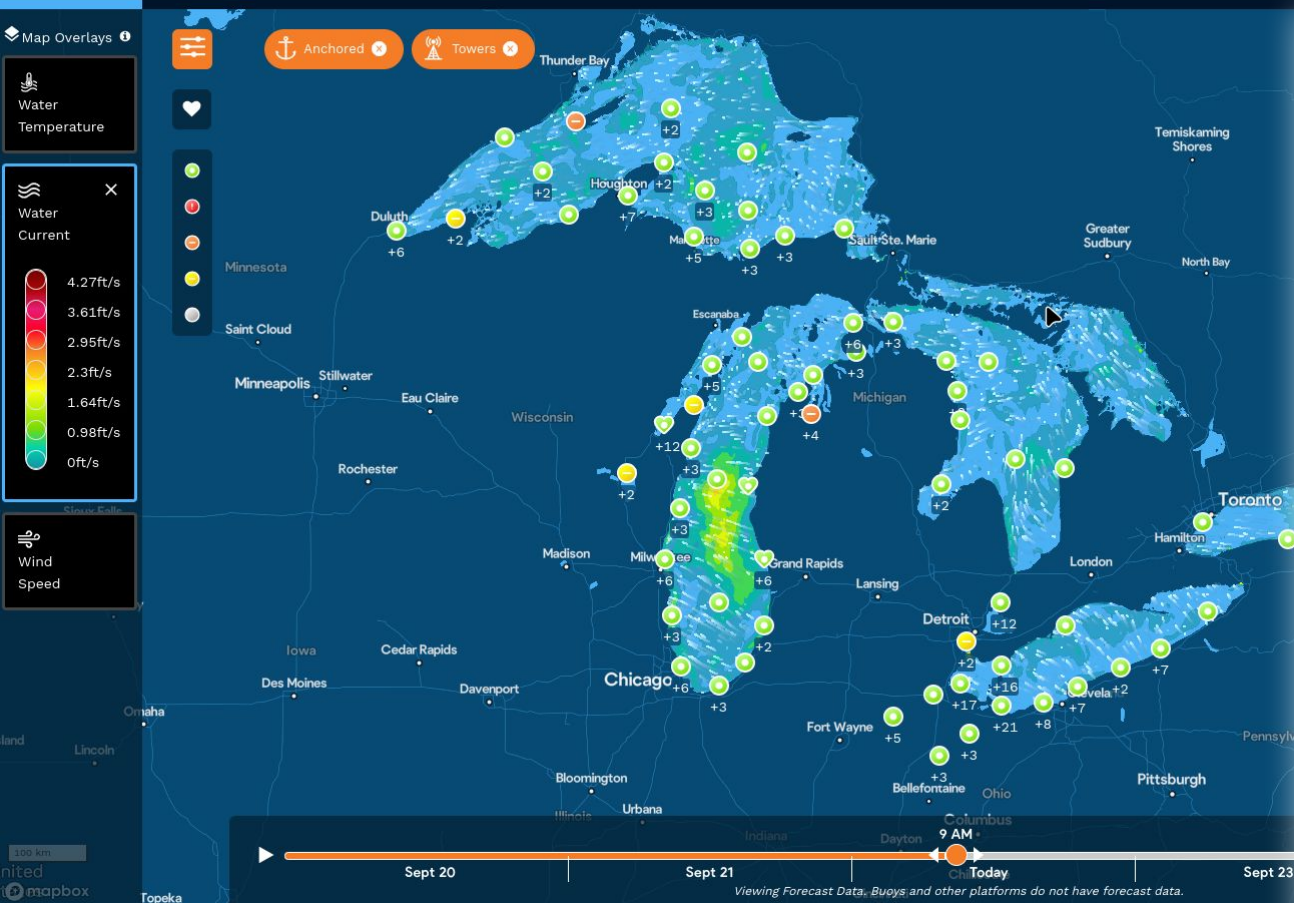


Staging env. Set up System updates

Backend Dev



Map Overlays

Water
TemperatureWater
CurrentWind
Speed

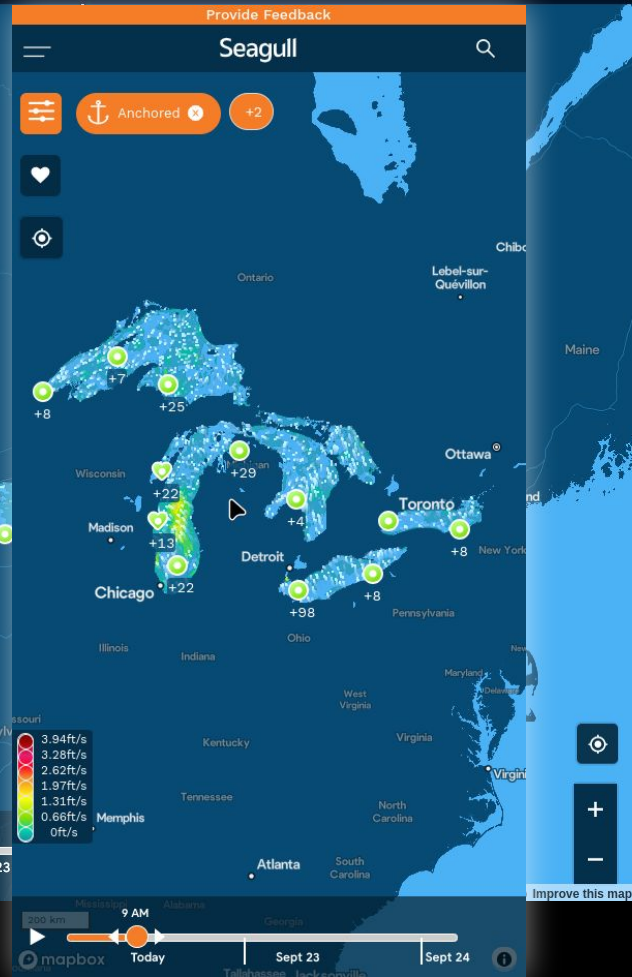
Sept 20

Sept 21

Today

Sept 23

Viewing Forecast Data. Buys and other platforms do not have forecast data.



Improve this map

Observing Platforms / Ludington buoy

45024

Ludington buoy

Buoy

University of Michigan CIGLR

Active



Diagnostics Water Quality Water Temperature Water Property **Wind** Waves Currents Air Quality

SURFACE

ESE (103°)

Wind direction (from)

21 minutes ago

5.22 kts

Wind speed

21 minutes ago



6.29 kts

Wind Gust Speed

21 minutes ago

Provide Feedback

Seagull

Observing Platforms / Ludington buoy

45024

Ludington buoy

Buoy

University of Michigan CIGLR

Provide Feedback

Seagull

Observing Platforms / Ludington buoy

45024

Ludington buoy

Buoy

University of Michigan CIGLR

Active

Data

Diagnostics Water Quality Water Temperature Water Property **Wind** Waves Currents Air QualityDiagnostics Water Quality Water Temperature Water Property **Wind** Waves Currents Air QualityDiagnostics Water Quality Water Temperature Water Property **Wind** Waves Currents Air Quality

SURFACE

30.21 inHg

Air pressure at mean sea level

12 minutes ago

64.65 °F

Air temperature

12 minutes ago

Diagnostics Water Quality Water Temperature Water Property **Wind** Waves Currents Air QualityWater Property **Wind** Waves Currents

Air Quality

SURFACE

ESE (103°)

Wind direction (from)

13 minutes ago

6.29 kts

Wind Gust Speed

13 minutes ago



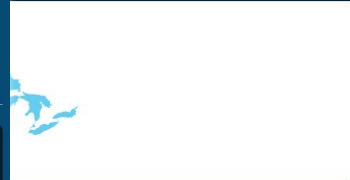
5.22 kts

Notifications

0

About

GLOS in-situ buoy in Lake Michigan near Ludington operated by the University of Michigan CIGLR.





All Types



All Great Lakes



1 Status



Sort By:



45161

Muskegon Buoy

🕒 21 hours ago

♥ Active

30.24 inHg

☁ Air pressure at mean sea level

70.33 °F

☁ Air temperature

⚓ Moored Buoy

■ Compare

45024

Ludington buoy

🕒 24 minutes ago

♥ Active

30.21 inHg

☁ Air pressure at mean sea level

65.21 °F

☁ Air temperature

⚓ Moored Buoy

■ Compare

GBEL

Green Bay Entrance Light

🕒 24 minutes ago

♥ Active

30.27 inHg

☁ Air pressure at mean sea level

65.48 °F

☁ Air temperature

⚓ Moored Buoy

■ Compare



Preferences

Units

Units of Measurement

☒ Imperial ☐ Metric

Temperature

☒ Fahrenheit ☐ Celsius

Units

Pin

Air pressure Pa inHg mbar



Air pressure at mean sea level Pa inHg mbar



Air temperature K °C °F



Albedo



Altitude m ft



Ammonia µg/L as N mg/L as N



Ammonium µg/L as N mg/L as N



Anabaena abundance %



Anabaena cell count cells/mL



Aphanizomenon abundance %



Aphanizomenon count cells/mL



Atmospheric visibility m ft



Backscatter m-1





Search Platforms

All Types

All Great Lakes

Sort By:

ID	Name	Type	Status	Updated
45001	Mid Lake Superior buoy	Moored Buoy	Active	2 months ago
45002	North Lake Michigan buoy	Moored Buoy	Active	1 hour ago
45003	North Lake Huron buoy	Moored Buoy	Active	1 hour ago
45004	East Lake Superior buoy	Moored Buoy	Active	1 hour ago
45005	West Lake Erie buoy	Moored Buoy	Active	1 hour ago
45006	West Lake Superior buoy	Moored Buoy	Active	1 hour ago
45007	South Lake Michigan buoy	Moored Buoy	Active	1 hour ago
45008	South Lake Huron buoy	Moored Buoy	Active	1 hour ago
45012	East Lake Ontario buoy	Moored Buoy	Active	1 hour ago
45013	Atwater 20-meter buoy (ATW20)	Moored Buoy	Active	32 minutes ago
45014	Green Bay buoy (GB17)	Moored Buoy	Active	1 hour ago
45022	Little Traverse Bay buoy	Moored Buoy	Active	22 minutes ago
45023	North Entry Buoy, North Keweenaw Peninsula	Moored Buoy	Active	22 minutes ago
45024	Ludington buoy	Moored Buoy	Active	22 minutes ago
45025	South Entry Buoy, South Keweenaw Peninsula	Moored Buoy	Active	22 minutes ago
45026	Cook Nuclear Plant buoy	Moored Buoy	Active	32 minutes ago
45027	Duluth-Nearshore Buoy	Moored Buoy	Active	32 minutes ago

Provide Feedback

Seagull

My Favorites (3)

Platforms (250)

Filters

ID	Updated	Water
45001	2 mo	
45002	1 h	
45003	1 h	
45004	1 h	
45005	1 h	
45006	1 h	
45007	1 h	
45008	1 h	
45012	1 h	
45013	33 min	
45014	1 h	67.19°F
45022	23 min	64.06°F
45023	23 min	57.49°F
45024	23 min	64.15°F
45025	23 min	61.74°F
45026	33 min	69.21°F
45027	33 min	

Provide Feedback

Seagull

My Favorites (3)

Platforms (250)

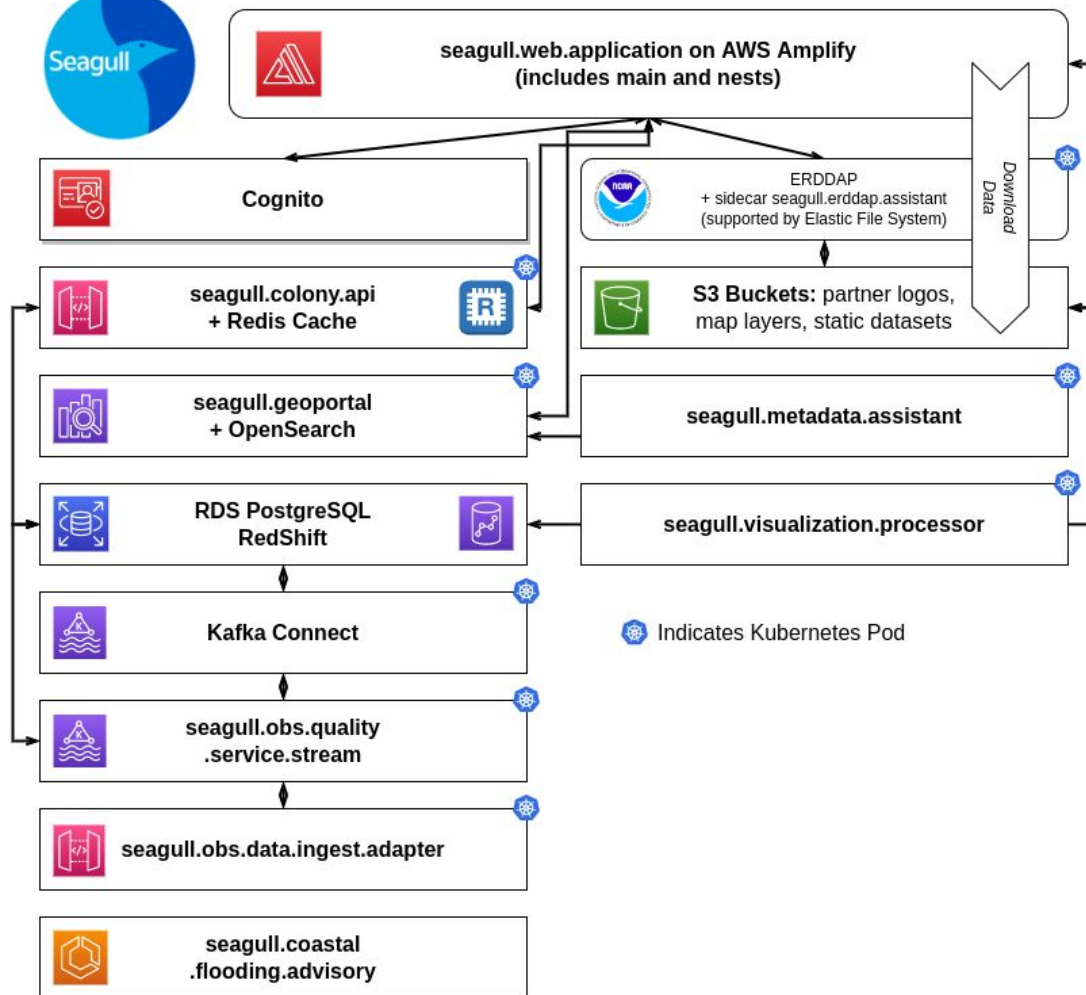
Filters

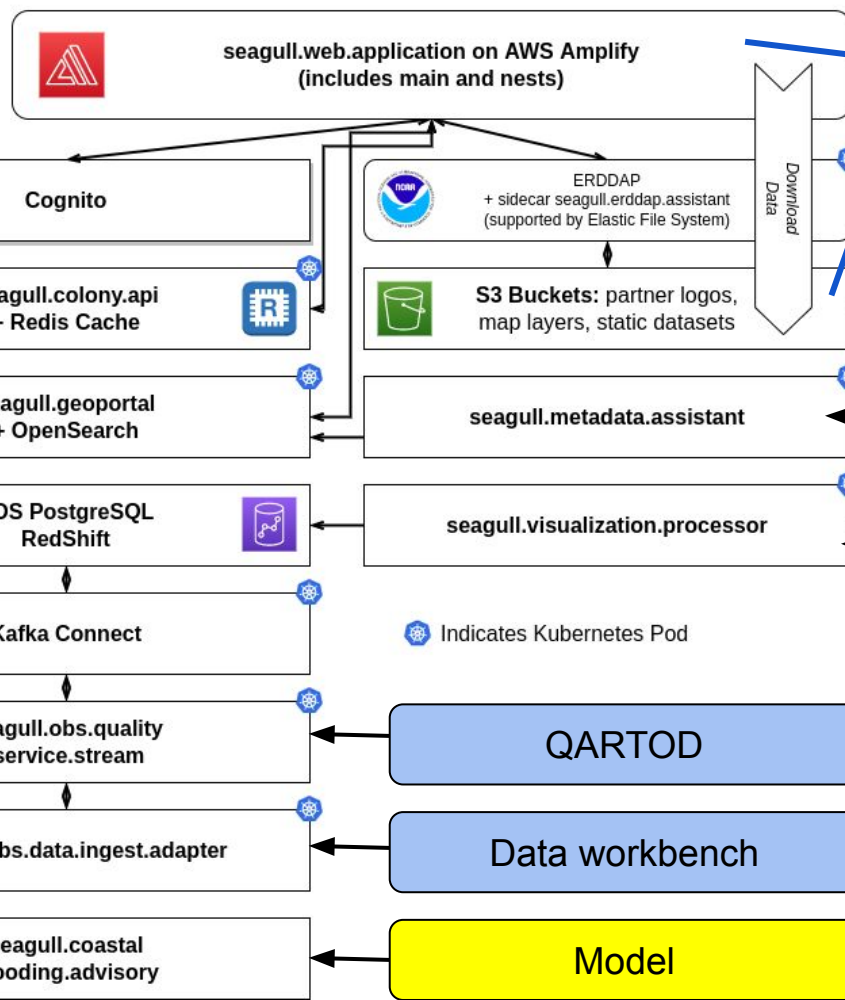
ID	Updated	Water	Wind	Air	Wave	Co
45161	21 h	66.01°F	4.53kts	70.33°F	0.62ft	
45024	25 min	64.11°F	5.38kts	65.21°F	0.82ft	
GBEL	25 min		8.16kts	65.48°F		



But how does it work?

Let's dissect it...





Great for consistently formatted data

ISO - 19115

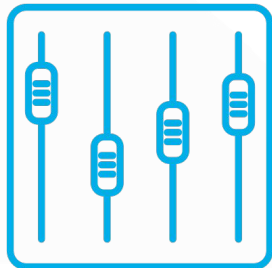
Great for a model that just needs output to GeoJSON

Kafka is a high speed, high density bulletin board, sticky board, cork board, etc...

Major Backend Updates



Platform
Migration



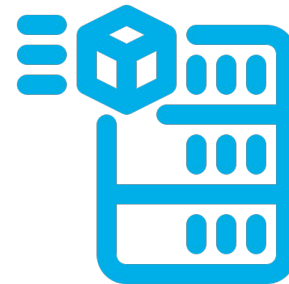
ERDDAP
Configuration



Timeout
Adjustments



Fetch
Size



Observation
Caching

Backend Planned Updates



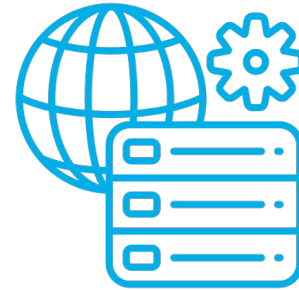
Kubernetes
Upgrade



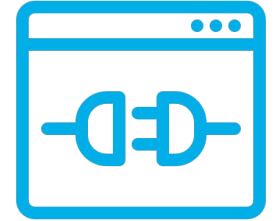
NCEI
Pipeline



S3
Buckets



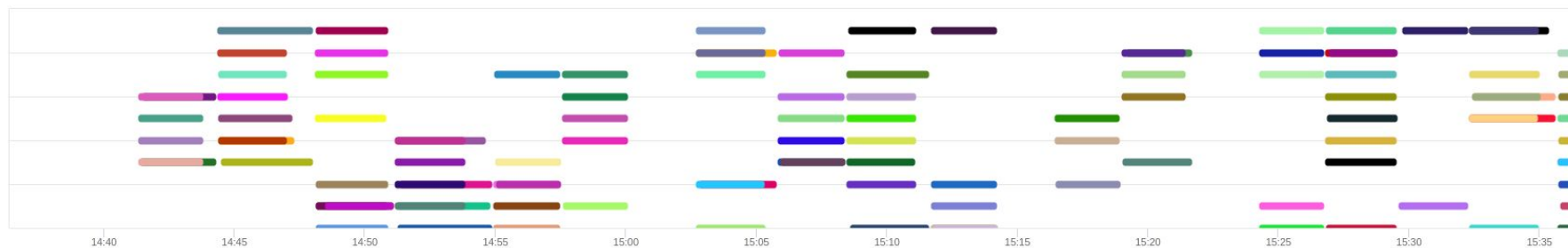
2nd ERDDAP



New API's

Query runtime

The query activity on a timeline. Use this graph to see which queries are running in the same timeframe. Choose a query to view more query execution details.





Services

Search

[Alt+S]



Ohio

Joemsmith @ glos-seagull

Queries and loads (109)

















Terminate query

Filter queries

< 1 2 > ⚙

<input type="checkbox"/>	Start time	Query	Status	Duration	SQL	User
<input type="checkbox"/>	Sep 18th, 2023 03:35:40 PM a few seconds ago	37215434	Running...	0 ms estimated	SELECT "time", "latitude", "longitude" FROM erddap.obs_29	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:35:48 PM a few seconds ago	37215469,37215474	Running...	20 sec estimated	refresh materialized view obs_datasets_proxy;	root
<input type="checkbox"/>	Sep 18th, 2023 03:35:42 PM a few seconds ago	37215455	Running...	692 ms estimated	SELECT "time", "longitude", "latitude", "badcp1_depth", "badcp2_depth", "badcp3_depth", "badcp4_depth", "badcp5_depth", "badcp6_d epth", "badcp7_depth", "badcp8_depth", "badcp9_depth", "badcp10_depth", "badcp11_depth", "badcp12_depth", "badcp13_depth", "ba ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:35:40 PM a few seconds ago	37215441	Running...	657 ms estimated	SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_c hange_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:35:43 PM a few seconds ago	37215458	Running...	376 ms estimated	SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_c hange_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:35:40 PM a few seconds ago	37215442	Running...	631 ms estimated	SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_c hange_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:35:43 PM a few seconds ago	37215456	Running...	0 ms estimated	SELECT "time", "longitude", "latitude", "battery_voltage", "chlorophyll_fluorescence", "eastward_sea_water_velocity_0", "eastward_sea water_velocity_1", "eastward_sea_water_velocity_2", "fluorescent_dissolved_organic_matter", "fractional_saturation_of_oxygen_in_sea ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:35:43 PM a few seconds ago	37215460	Running...	47 ms estimated	SELECT "time", "longitude", "latitude", "sea_surface_wave_from_direction", "sea_surface_wave_period_at_variance_spectral_density_ma ximum", "sea_surface_wave_significant_height", "air_temperature", "air_pressure_at_mean_sea_level", "relative_humidity", "sea_surface ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:35:40 PM a few seconds ago	37215448	Running...	2 sec estimated	SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_c hange_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:44:20 PM an hour ago	37213758	Completed	4 min	SELECT "time", "latitude", "longitude", "sea_water_velocity_28_depth" FROM erddap.obs_44	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:51:14 PM an hour ago	37214004	Completed	4 min	SELECT "time", "latitude", "longitude", "sea_water_temperature_20_depth" FROM erddap.obs_46	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:51:12 PM an hour ago	37214001	Completed	4 min	SELECT "time", "latitude", "longitude", "sea_water_turbidity_bottom_fixed_depth" FROM erddap.obs_72	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:51:18 PM an hour ago	37214008,37214007	Completed	4 min	refresh materialized view obs_datasets_proxy;	root
<input type="checkbox"/>	Sep 18th, 2023 02:44:28 PM an hour ago	37213780,37213779	Completed	4 min	refresh materialized view obs_datasets_proxy;	root

<input type="checkbox"/>	Sep 18th, 2023 02:48:06 PM an hour ago	37213891	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "chlorophyll_fluorescence", "fluorescent_dissolved_organic_matter", "fractional_saturation_of_oxygen_in_sea_water", "mass_concentration_of_blue_green_algae_in_sea_water", "mass_concentration_of_blue_green_algae_in_sea_wat ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:48:07 PM an hour ago	37213898	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_change_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:48:06 PM an hour ago	37213892	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "sea_surface_temperature", "sea_surface_temperature_gross_range_test", "sea_surface_temperature_spike_test", "sea_surface_temperature_rate_of_change_test", "sea_surface_temperature_flat_line_test", "sea_surface_temperature_aggregate", "sea_surface_temperature_at_mean_sea_level", "sea_surface_temperature ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:26:46 PM 14 minutes ago	37215178	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_change_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:26:46 PM 14 minutes ago	37215172	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "chlorophyll_fluorescence", "fractional_saturation_of_oxygen_in_sea_water", "phycocyanin_fluorescence", "sea_surface_temperature", "sea_surface_temperature_gross_range_test", "sea_surface_temperature_spike_test", "sea_surface ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:48:04 PM an hour ago	37213881	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "air_temperature", "air_temperature_gross_range_test", "air_temperature_spike_test", "air_temperature_rate_of_change_test", "air_temperature_flat_line_test", "air_temperature_aggregate", "wind_from_direction", "wind_from_direct ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:26:46 PM 14 minutes ago	37215173	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "air_temperature", "air_temperature_gross_range_test", "air_temperature_spike_test", "air_temperature_rate_of_change_test", "air_temperature_flat_line_test", "air_temperature_aggregate", "dew_point_temperature", "dew_point_te ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:26:46 PM 14 minutes ago	37215174	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_change_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:26:46 PM 14 minutes ago	37215167	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "fractional_saturation_of_oxygen_in_sea_water", "mass_concentration_of_oxygen_in_sea_water", "nitrate", "sea_water_specific_conductivity", "sea_water_temperature", "sea_water_temperature_gross_range_test", "sea_water_temperature_spike_test", "sea_water_temperature_rate_of_change_test", "sea_water_temperature_flat_line_test", "sea_water_temperature_aggregate", "sea_water_temperature_at_mean_sea_level", "sea_water_temperature ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:26:48 PM 14 minutes ago	37215180	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "air_pressure_at_mean_sea_level", "air_temperature", "air_temperature_gross_range_test", "air_temperature_spike_test", "air_temperature_rate_of_change_test", "air_temperature_flat_line_test", "air_temperature_aggregate", "eastw ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 03:26:48 PM 14 minutes ago	37215176	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "concentration_of_fluorescent_dissolved_organic_matter_rfu", "fractional_saturation_of_oxygen_in_sea_water", "mass_concentration_of_oxygen_in_sea_water", "nitrate", "oxidation_reduction_potential", "sea_surface_temperature", " ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:51:09 PM an hour ago	37213985	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "fractional_saturation_of_oxygen_in_sea_water", "mass_concentration_of_oxygen_in_sea_water", "nitrate", "sea_surface_temperature", "sea_surface_temperature_gross_range_test", "sea_surface_temperature_spike_test", "sea_surf ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:51:09 PM an hour ago	37213991	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "air_pressure", "air_pressure_gross_range_test", "air_pressure_spike_test", "air_pressure_rate_of_change_test", "air_pressure_flat_line_test", "air_pressure_aggregate", "air_pressure_at_mean_sea_level", "air_temperature", "air_tempera ...	erddap_user
<input type="checkbox"/>	Sep 18th, 2023 02:51:09 PM an hour ago	37213980	✔ Completed	3 min	 SELECT "time", "longitude", "latitude", "chlorophyll_fluorescence", "mass_concentration_of_oxygen_in_sea_water", "phycocyanin_concentration", "phycocyanin_fluorescence", "sea_water_electrical_conductivity", "sea_water_ph_reported_on_total_scale", "sea_water_specif ...	erddap_user

Next steps

- Seagull continues to evolve
- GLOS continues to develop Seagull to support all users: recreational, operational, research, etc.
- Focus for the next year is on lighter weight front-end features and general operations and maintenance



Thank you!



great lakes
observing system

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