

# Precise Navigation and the demand for Coastal Intelligence

*NOAA's focus is on providing accurate and timely environmental intelligence to the maritime community and delivering that data to the location where the decisions need to be made.*

# Precise Navigation

*The ability to navigate where sea room is limited in four dimensions (X, Y, Z, and Time), with statistical certainty.*



M.V. MESABI MINER

MESABI MINER

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INTERLAKE  
STEAMSHIP CO.

MESABI MINER

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STEAMSHIP CO.

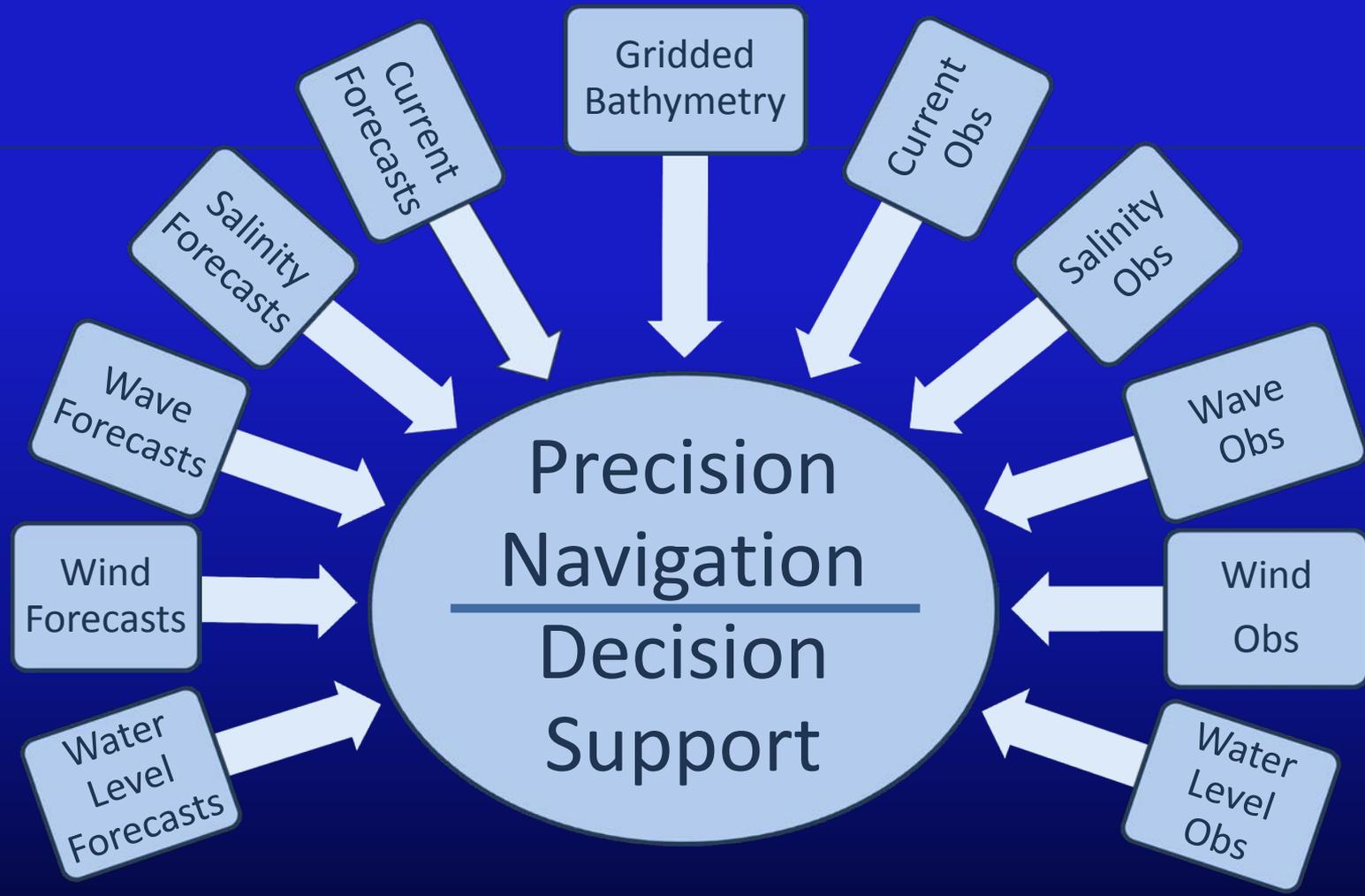


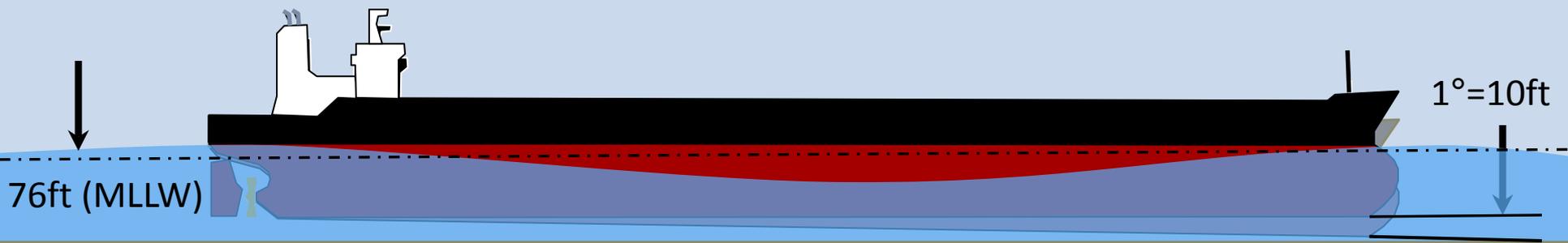


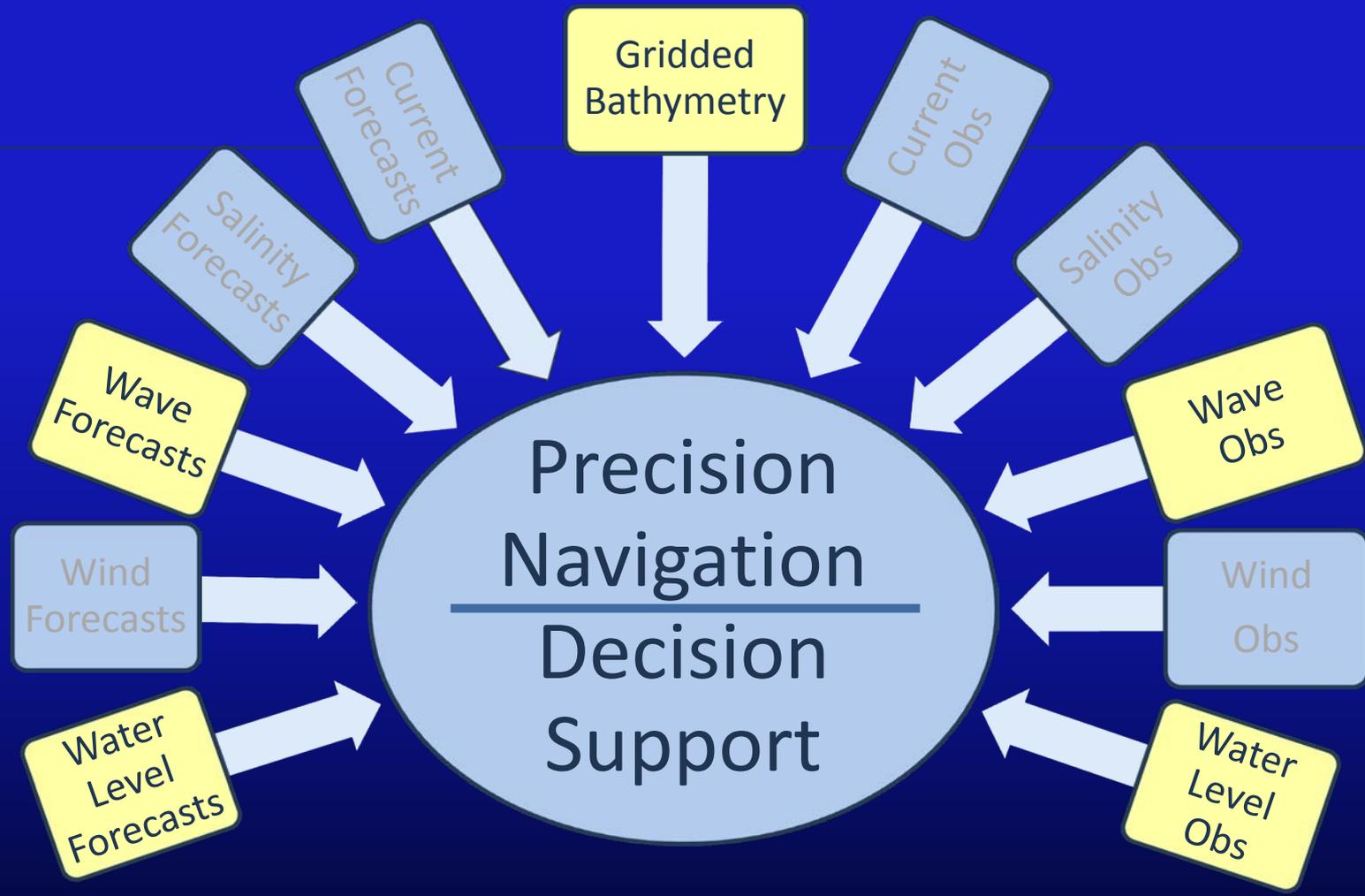
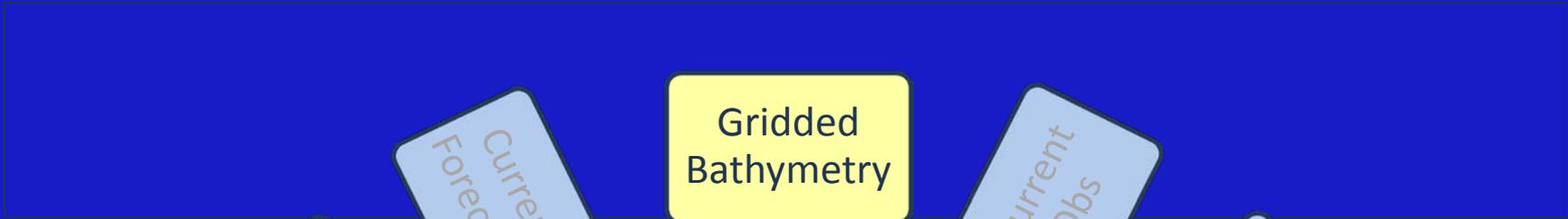


GENERAL VICTORY

GENERAL VICTORY







## Tanker 006

Advice 15 (Inbound)

### Request

Request ID	11
Ship	Tanker 006 (6 / T006)
Ship dimensions l / w / dwt	285 m 49 m 250000 tons
Draft l / m / s	20.46 m 20.46 m 20.46 m
Berth	Harbor entrance (23.16 m / inbound)
Requested time of departure	2014-08-22 02:00
Water displacement	234294 tons
GM	7.78 m
OG'	0.4 m
Roll period	13.71 s
Estimation method used	Yes
Submitted by	Take Roes (2014-08-27 09:29)

### Calculation

Settings	Long Beach 0.017% probability
Vertical motion calculation method	Amarcon - 2d spectrum
Earliest route start time	-
Speed regime	Average
Use manual predictions	No
Use channel bottom elevations	No
Calculated by	Take Roes (2014-08-27 09:29)

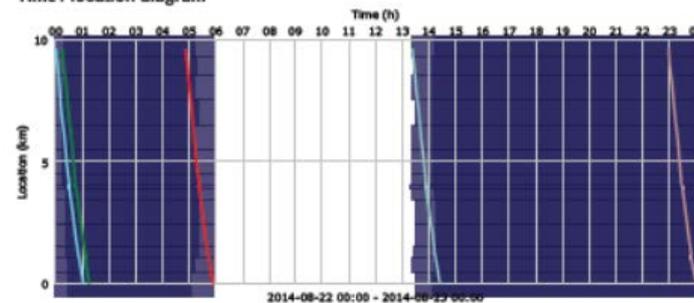
### Advice

Location	Km	Open	Reference	Close
Outside breakwater	9.65	2014-08-22 02:00	2014-08-22 00:15	2014-08-22 04:52
Breakwater entrance	4.06	2014-08-22 02:30	2014-08-22 00:45	2014-08-22 05:22
Breakwater entrance	3.89	2014-08-22 02:31	2014-08-22 00:46	2014-08-22 05:23
Inside breakwater	1.17	2014-08-22 02:50	2014-08-22 01:05	2014-08-22 05:43
Harbor entrance	0	2014-08-22 01:01	2014-08-22 01:16	2014-08-22 05:53

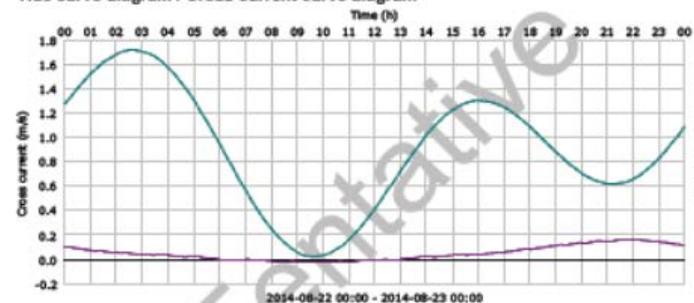
### Statistics

Maximum bottom touch probability (upper bound of reliability)	7.7E-05
Mean under keel clearance	4.15 m
Mean under keel clearance with squat reduction	3.97 m
Wait time	00:15
Down time	31.51%

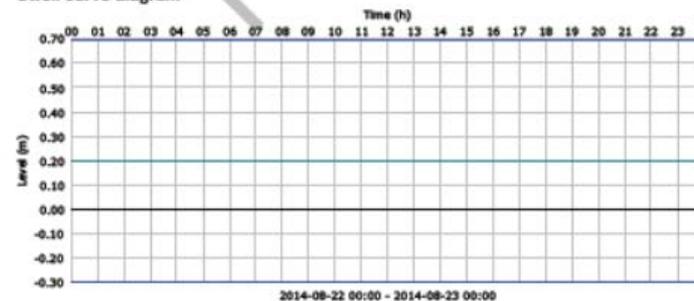
### Time / location diagram



### Tide curve diagram / Cross current curve diagram



### Swell curve diagram



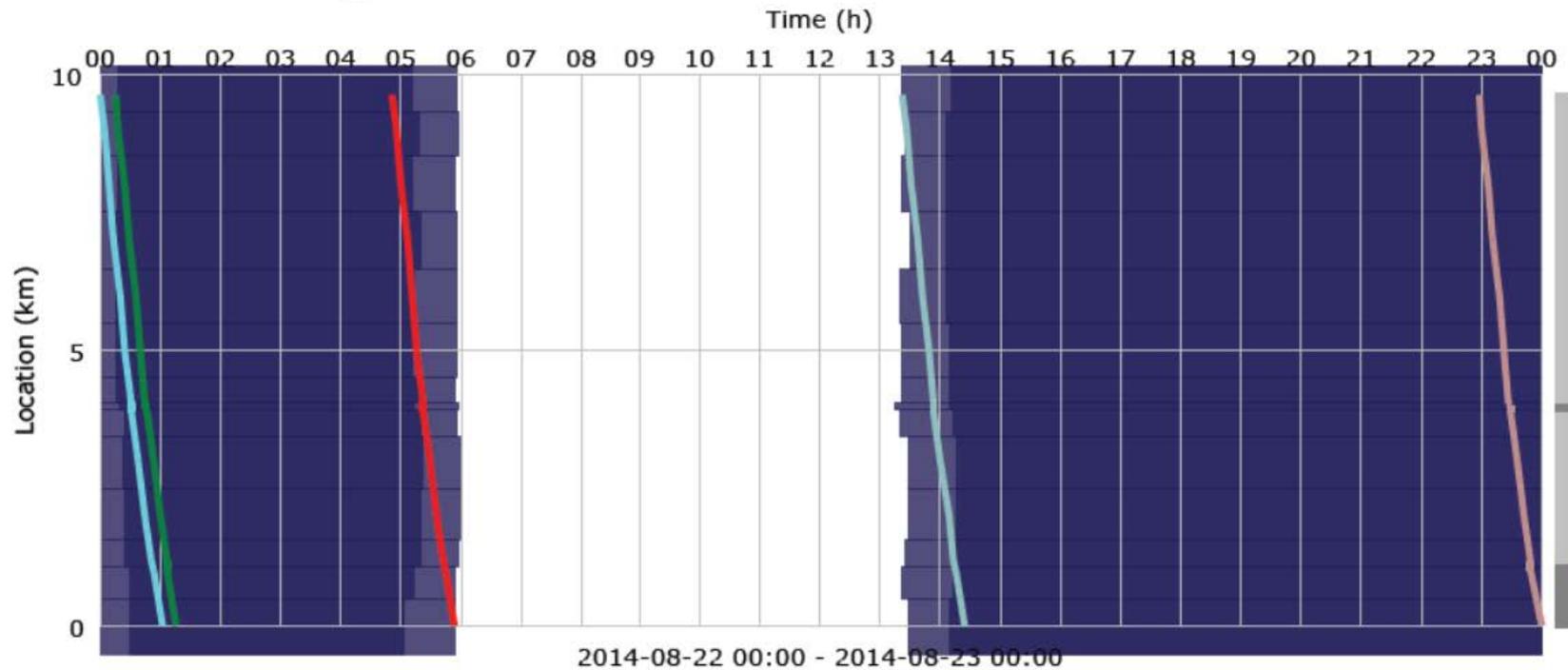
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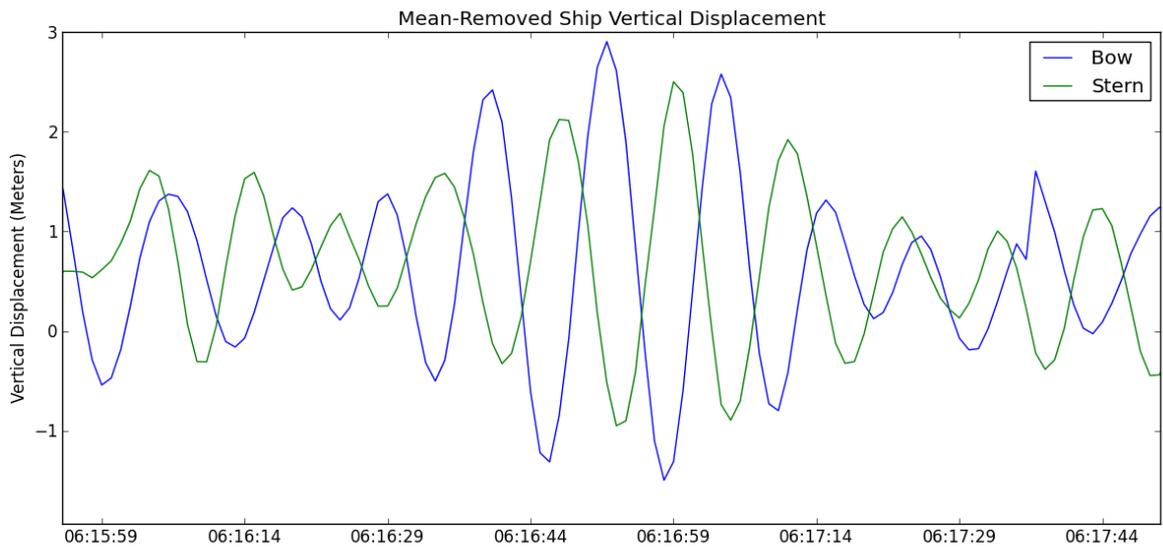
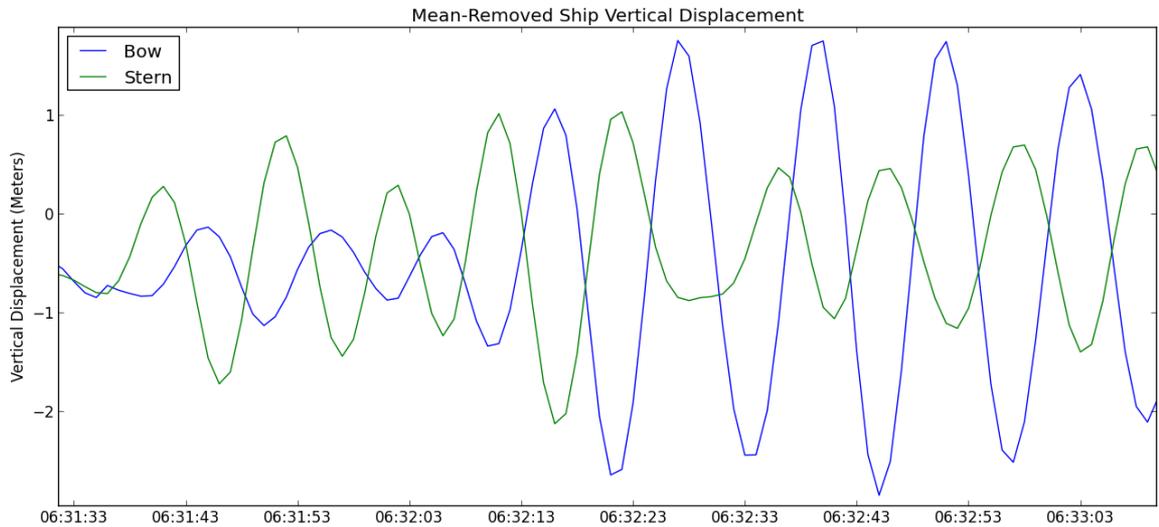
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## Statistics

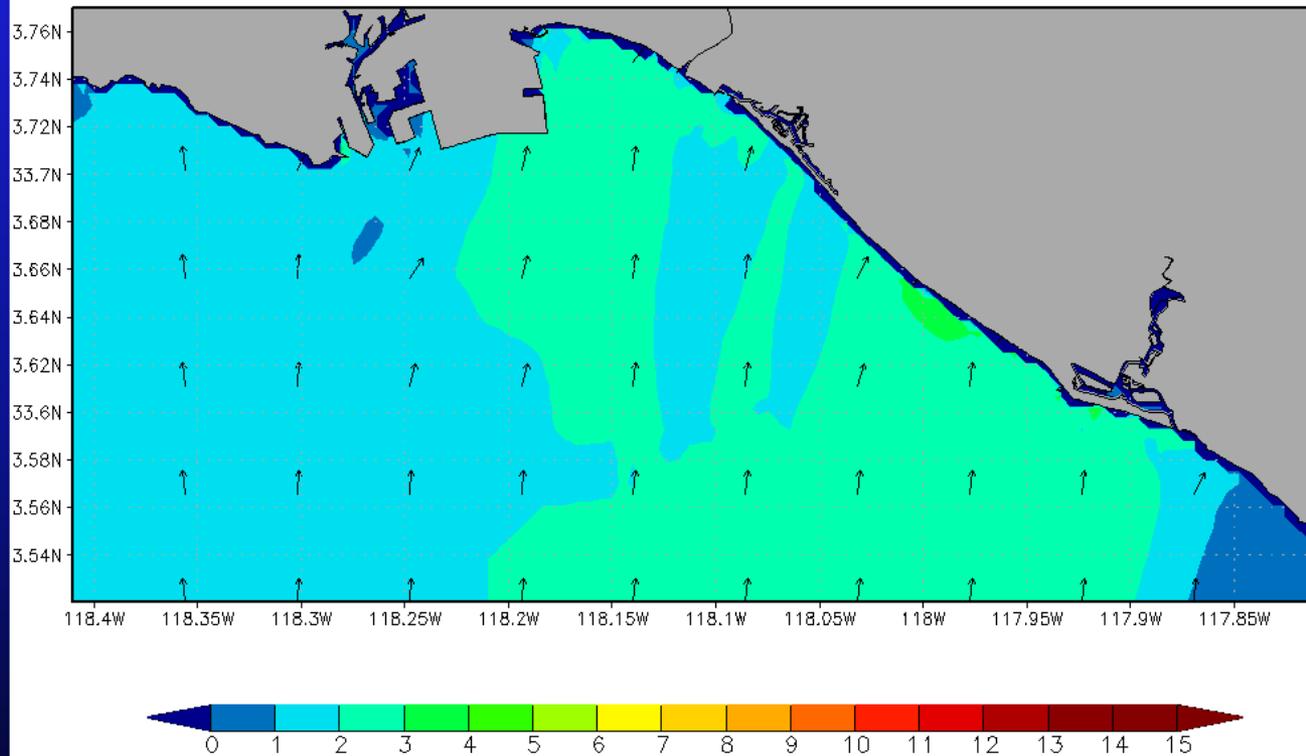
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# Time / location diagram





# NWPS Significant Wave Height (ft) and Peak Wave Direction Hour 3 (09Z04MAR2015)



\*\*EXPERIMENTAL\*\*

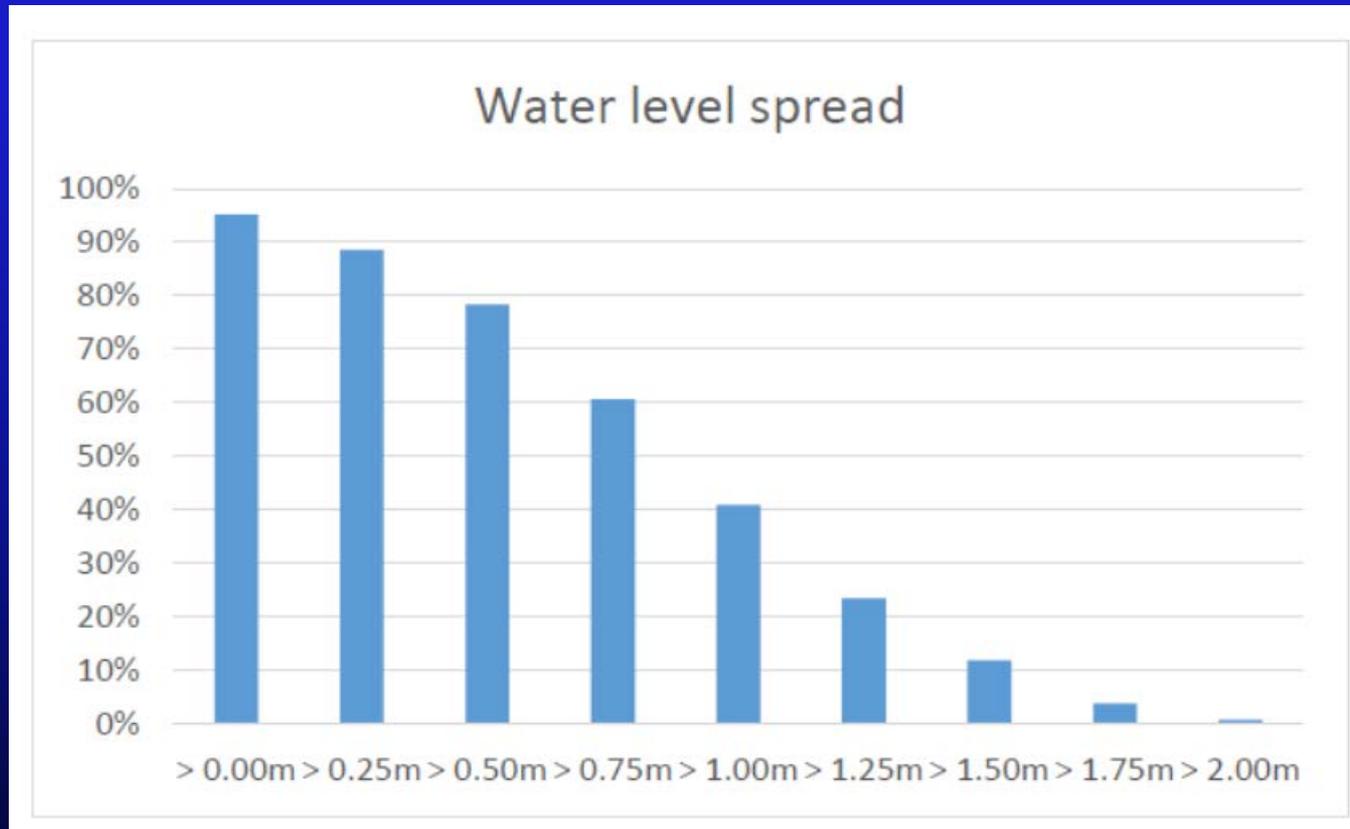




Office of Coast Survey



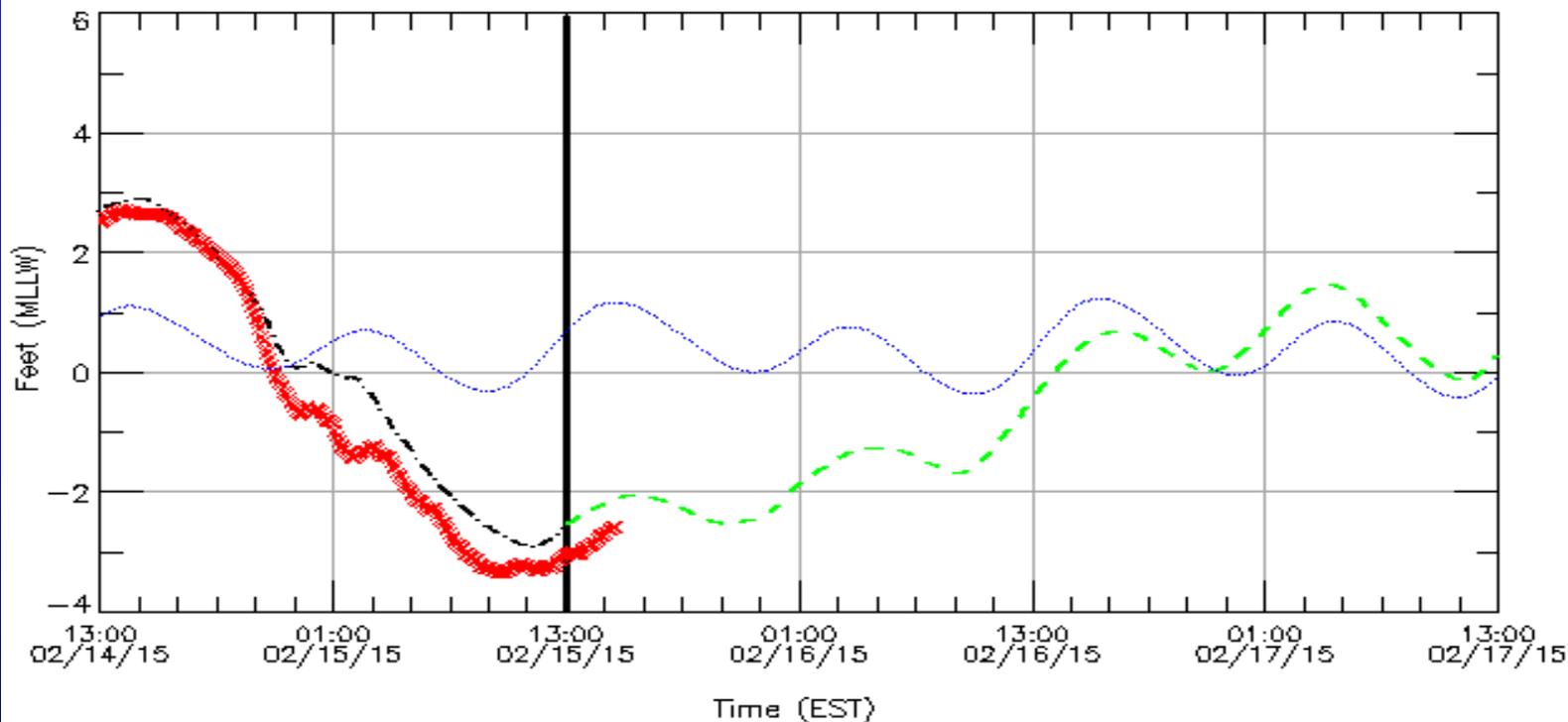
# 41% of Water Levels in LA/LB are greater than 1 meter.

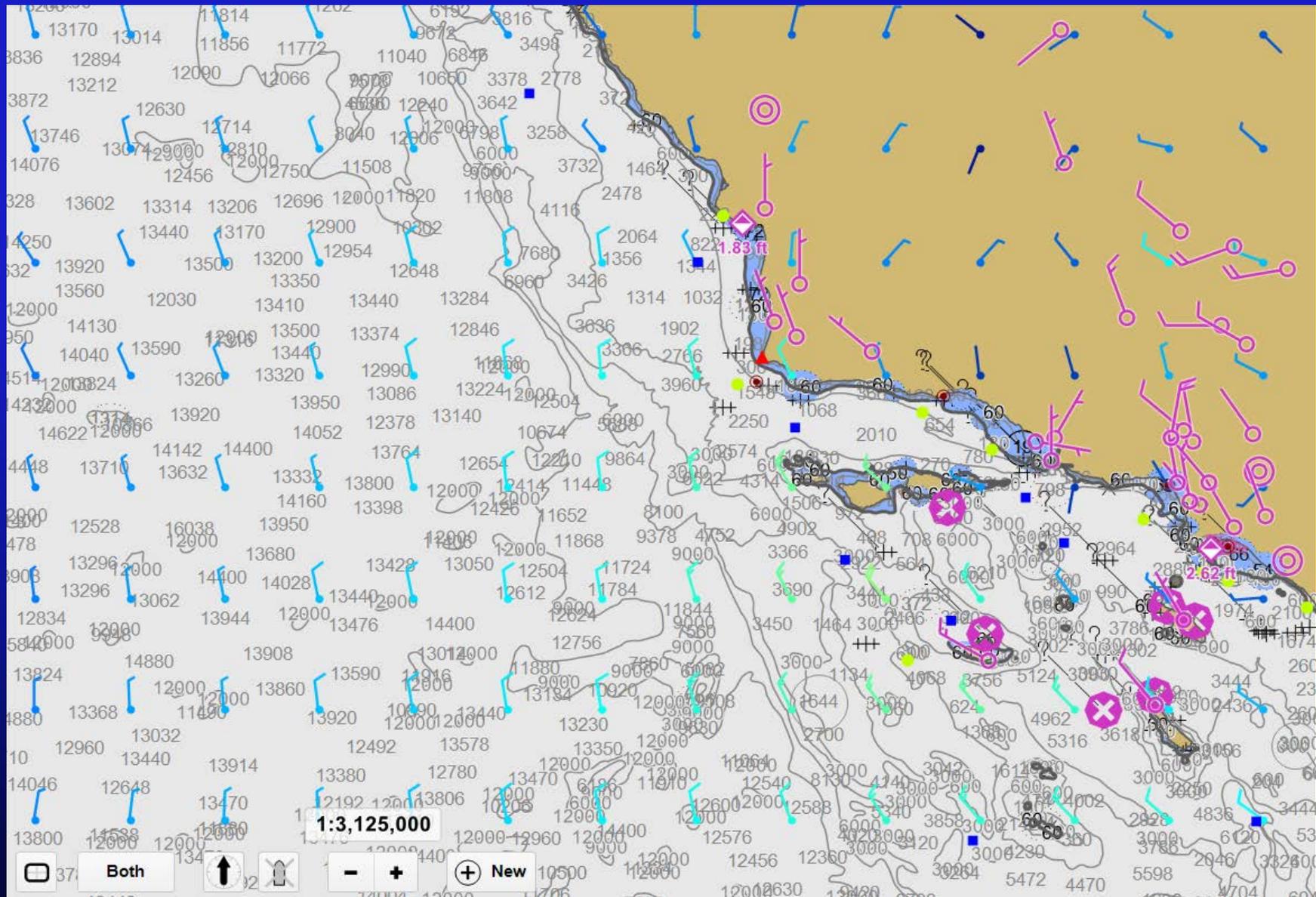


NOAA/National Ocean Service  
Chesapeake Bay Operational  
Forecast System (CBOFS2)

Observation: XXXXXX  
Tidal Prediction: .....  
Nowcast: - - - -  
Forecast Guidance: - - - -

Baltimore Water Levels





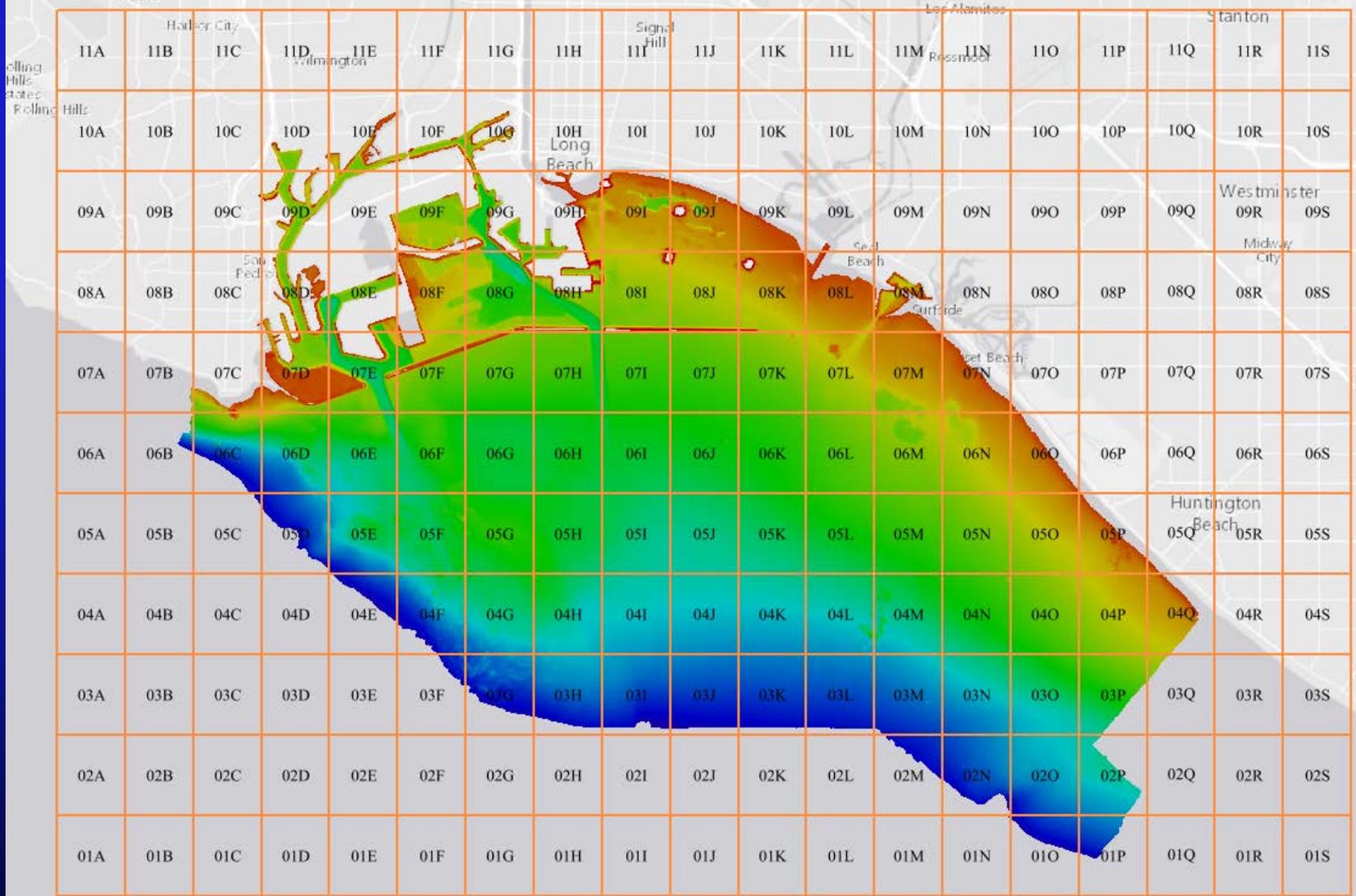
Both New

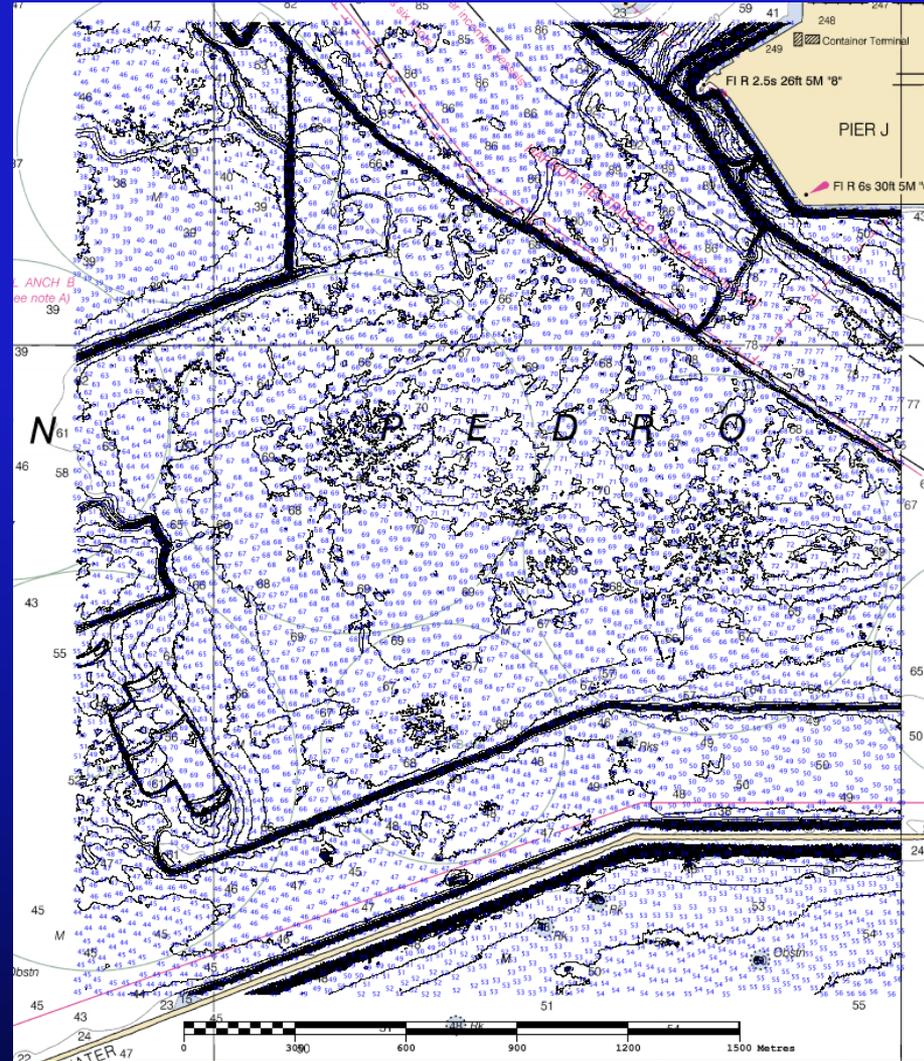
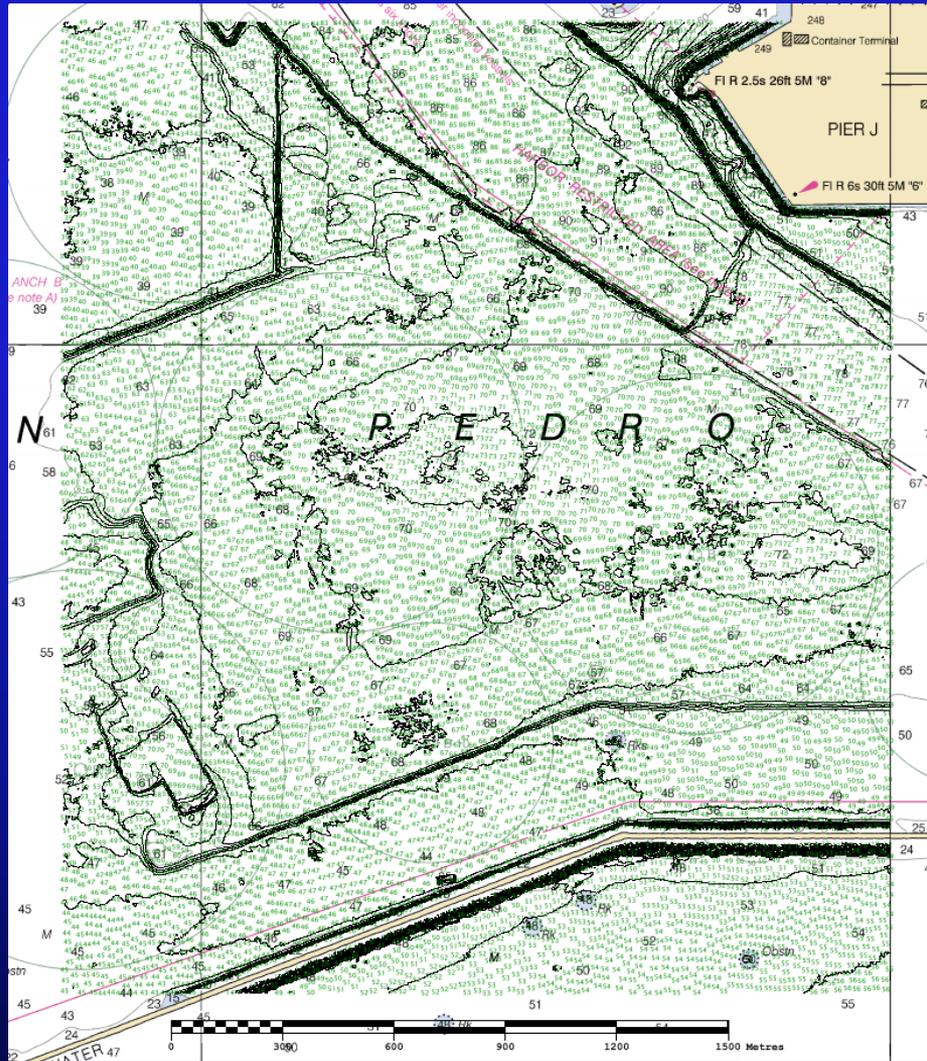
1:3,125,000



# NOAA's commitment:

- Create 500 meter resolution Nearshore Wave Prediction System (NWPS).
- Operationalize high-resolution bathymetry database for 5 years.
- Provide prototype high-resolution navigational products to pilots for evaluation.
- Provide prototype visualization tools to assist port in decision support.





# Precision Navigation Tool Demo



# Intended Outcomes:

- Gain operational experience maintaining a gridded bathymetry database and producing products from it.
- Opportunity to educate mariners on the benefits of high resolution data and its fusion with meteorological and oceanographic data.
- Encourage the use of the S-100 standards and gain practical experience creating products in this standard.

# Begin with the end in mind...

- How will high accuracy GPS positioning change maritime navigation particularly with respect to vertical positioning?
- Data → Information → Knowledge → Wisdom.
- How do we support 24/7 operations in our ports?
- How do we support deeper drafts and reduced UKC.
- How must products change to support the demand for precision?