Nova Scotia Offshore Wind
A First Look
Storybook Assessment

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MGC

MARINE GEOSCIENCE CONSULTING LLC

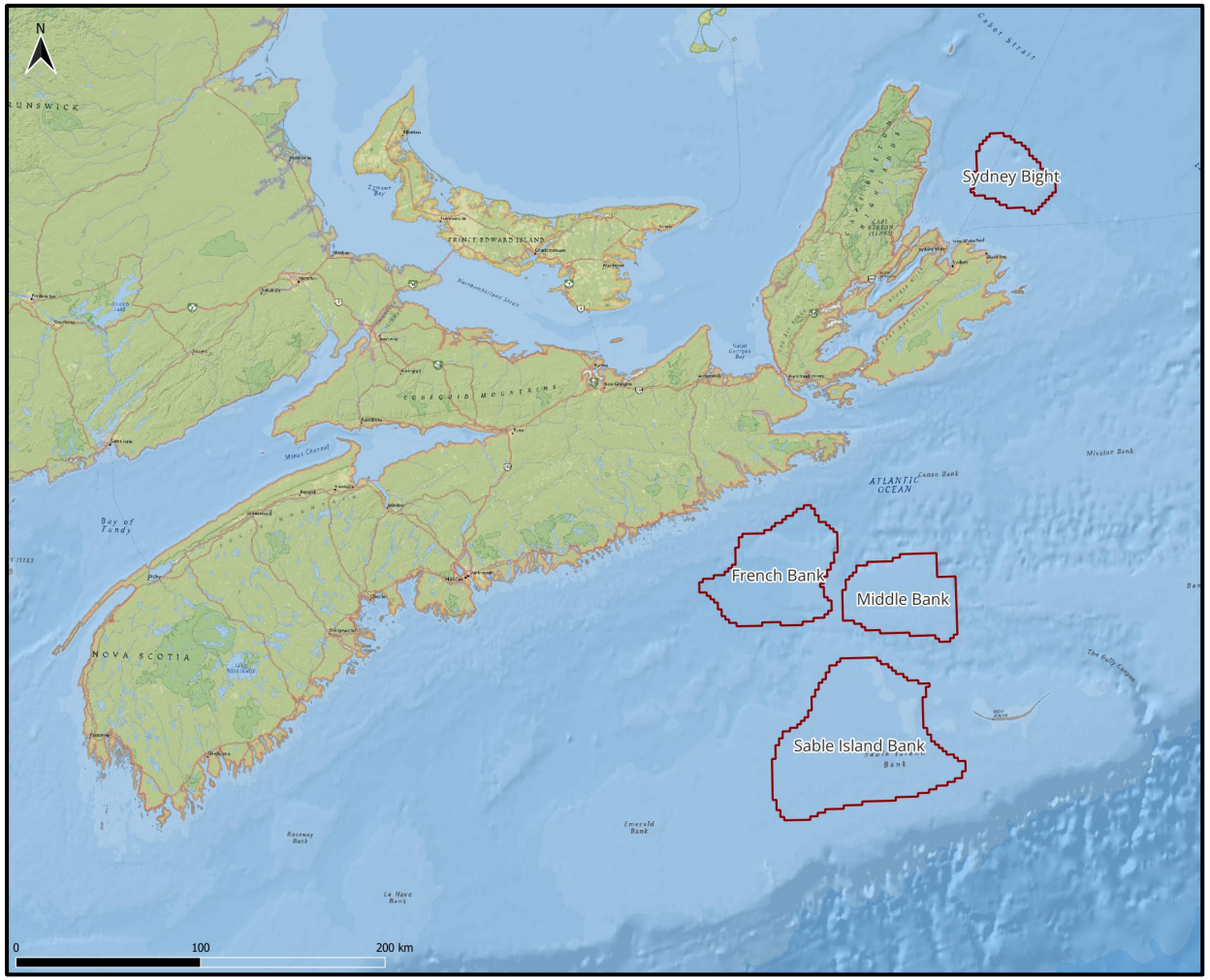
Introduction

Marine Geoscience Consulting's (MGC) initial assessment of the Nova Scotia Wind Energy Areas (WEA) show amazing potential for Offshore Wind Turbine Generators (WTG), although further surveys and desktop studies should be conducted to inform project siting.

The WEAs assessed are:

- ***French Bank***
- ***Middle Bank***
- ***Sable Island Bank***
- ***Sydney Bight***

A modeled WTG layout is proposed at each WEA. French Bank appears to be too deep for fixed WTG locations, so a floating WTG layout was proposed for this site. Fixed WTG layouts are based on 2km spacing (>8x turbine diameter).



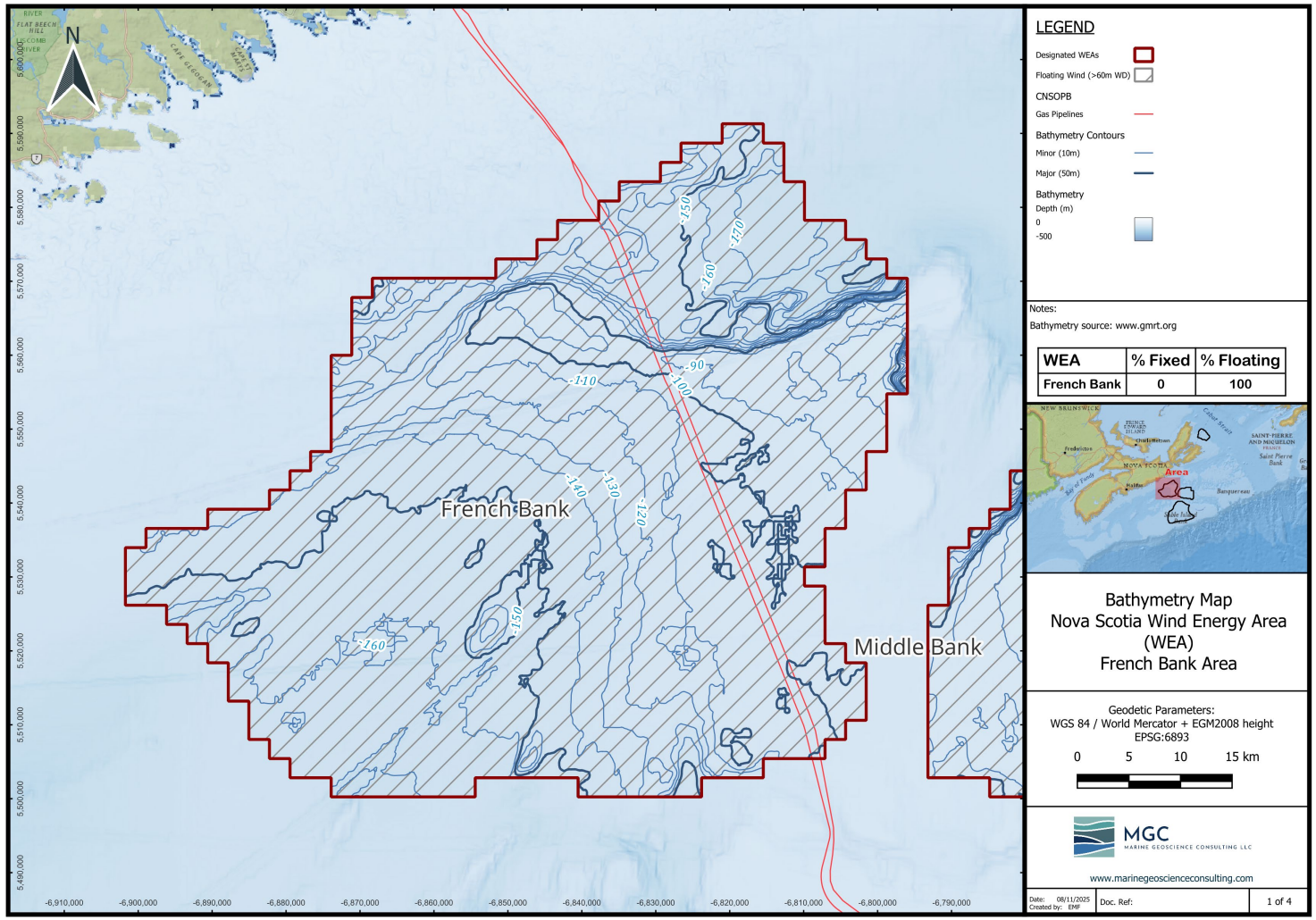
MGC reviewed the recently designated Wind Energy Areas (WEA) offshore Nova Scotia, Canada and generated the following results for each area:

- **Bathymetry maps** - Distinguishing areas with water depth suitable for fixed vs floating WTG (i.e. >60m floating wind).
- **Surficial Geology maps** - showing the seafloor sediment types at each area.
- **Seabed Stability Risk maps** - (MGC's proprietary tool) use Multi-Criteria Decision Analysis (MCDA) to assess slope failure risk by integrating weighted factors like slope, flow density, and morphometric traits, highlighting terrain and sediment transport vulnerabilities.
- **Vessel Density maps** – detailing areas of high vessel traffic that must be considered.
- **Sea Conditions Data** - An assessment of available wave and current data can inform project operational planning (survey, T&I, O&M, etc.). This assessment was used with a proprietary MGC tool, generating data at the location of each site.

French Bank

Bathymetry Map

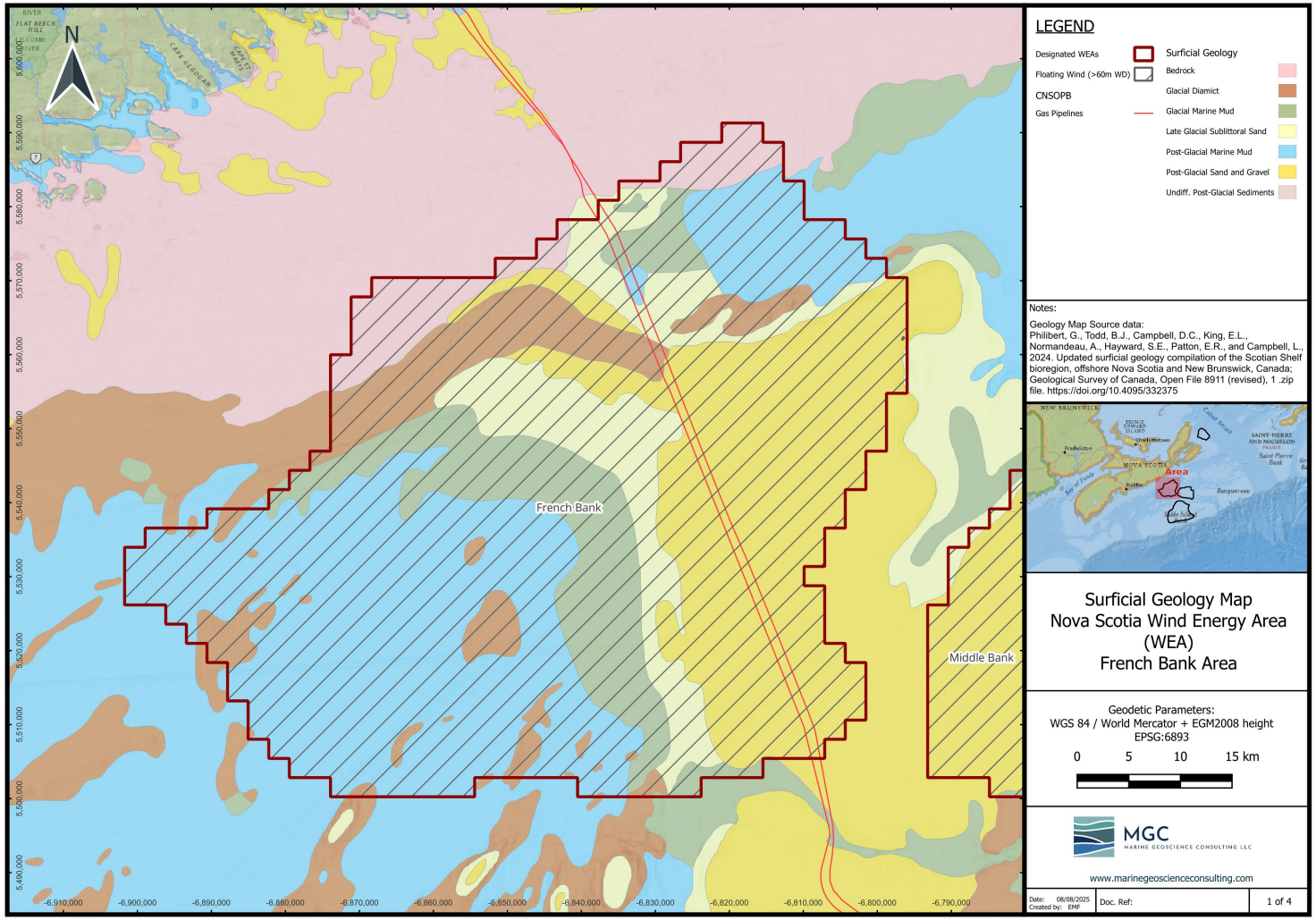
- The entire area (100%) is deeper than 60m and thereby is likely suited for floating wind development only.
- Slopes >2° exist in the Northeast corner of the area.



French Bank

Surficial Geology Map

- Variable surficial geology, which will likely require different anchoring types.
- Regions of sand/gravel (yellow and orange in map) may not support suction type anchors.

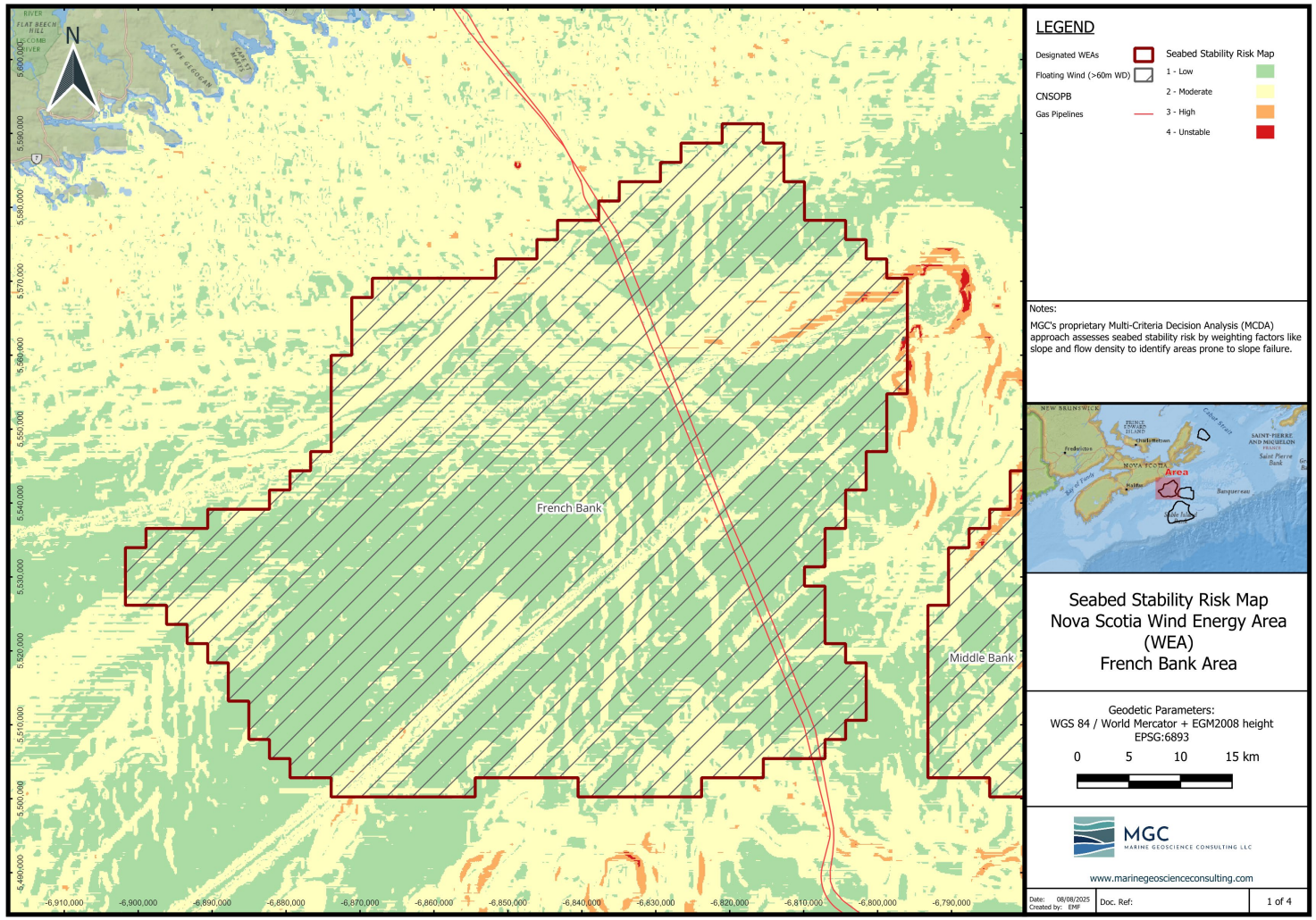


French Bank

Seabed Stability Risk Assessment Map

- Most of the area has a low/moderate seabed stability risk.
- The Northeast corner has higher seabed stability risk; primarily due to higher slopes in these areas.
- This area has existing oil and gas pipelines that must be accounted for in foundation and installation design.

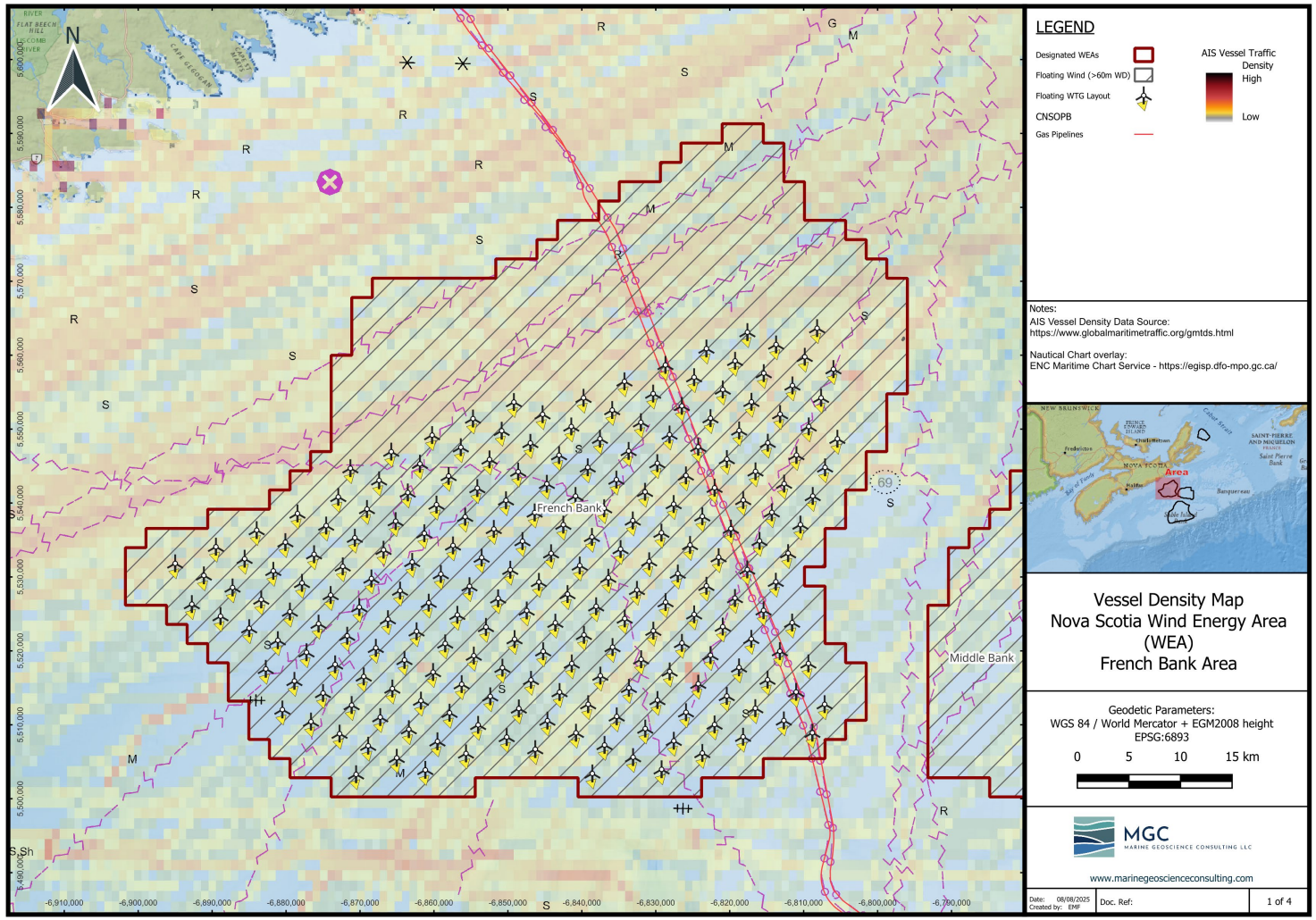
*Risk Assessment Map generated by MGC's proprietary Seabed Stability Risk Assessment Tool



French Bank

Vessel Traffic Density

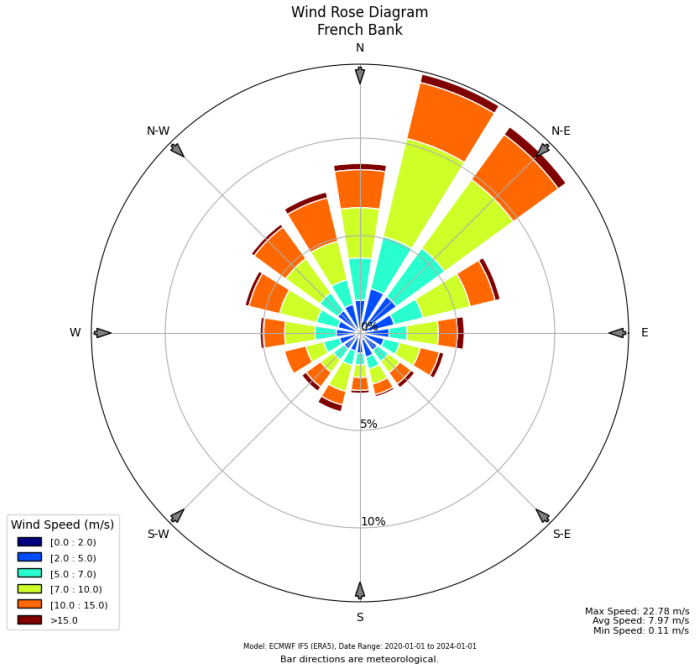
- An assessment of available AIS data can inform project siting for floating WTG locations.
- The northern end of the WEA has a higher density of vessel traffic, which may limit the potential for installations.
- High traffic regions are removed from WTG assessed area.

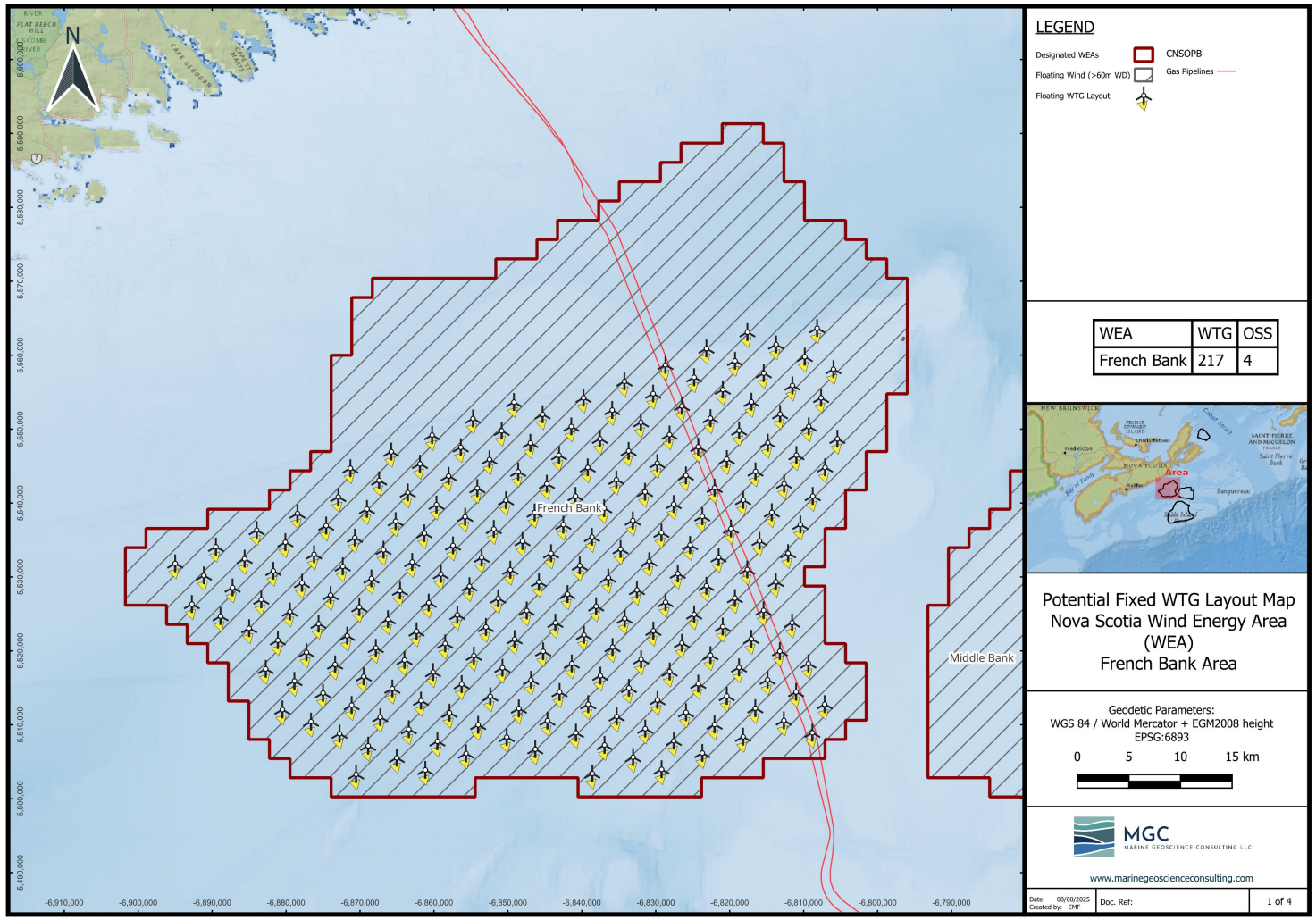


French Bank

Potential WTG Layout Map

- A floating WTG layout was modeled a 22° orientation and 3km spacing to account for wind direction and potential anchoring, respectively.

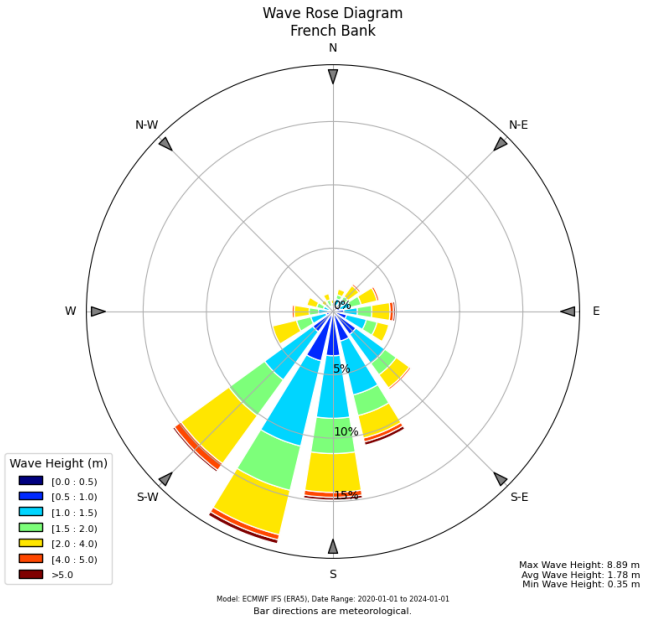


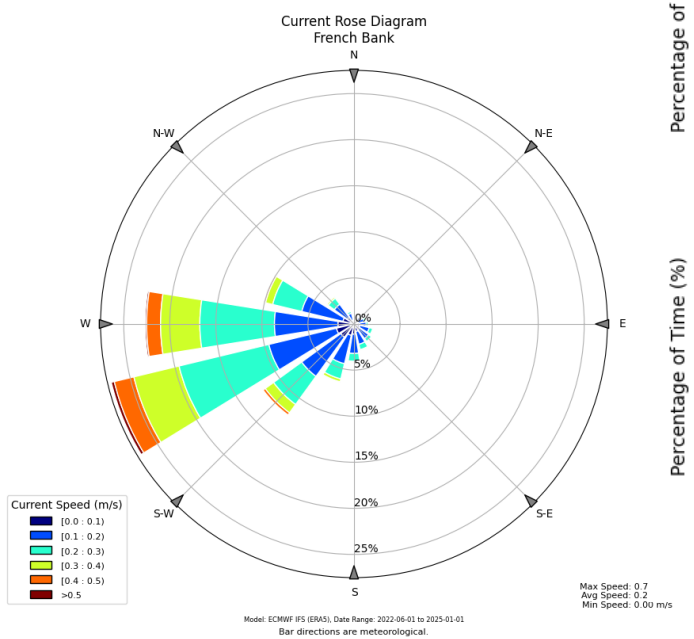


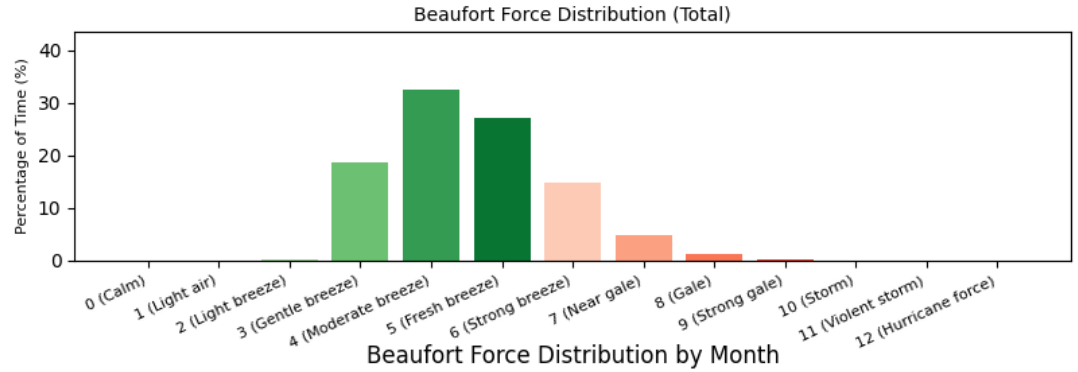
French Bank

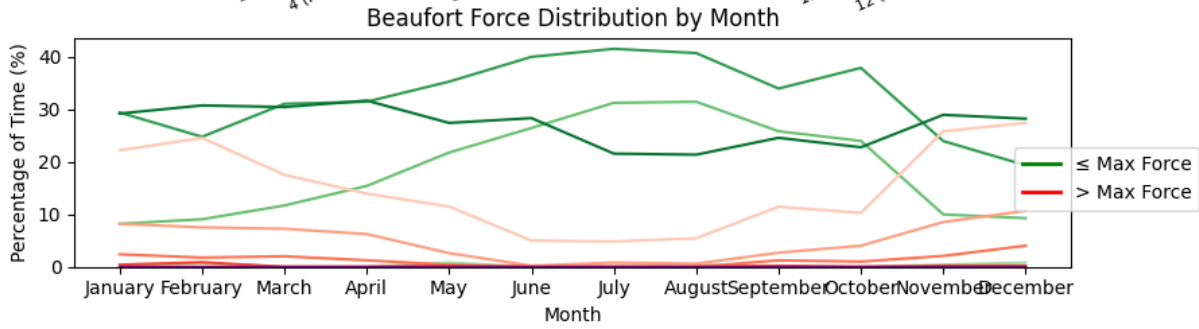
Sea Conditions

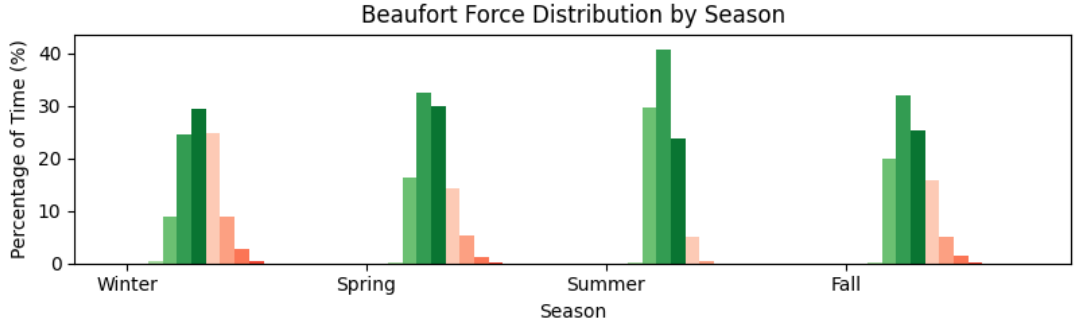
- The data for this WEA indicates summer is the best season for offshore operations.
- Wave and Current data below:









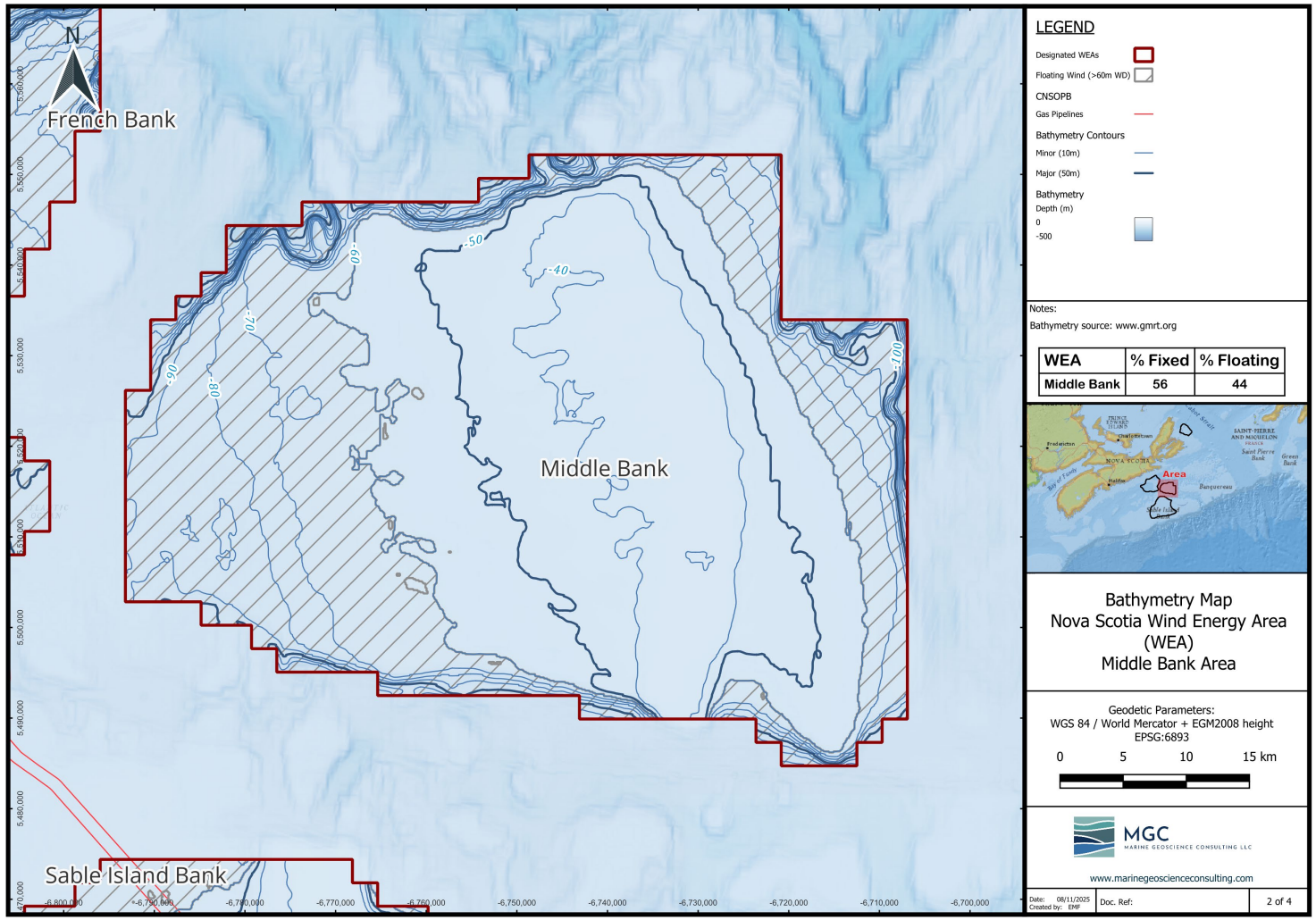


Date Range: 2020-01-01 to 2024-01-01, Model: ECMWF - reanalysis-era5-single-levels

Middle Bank

Bathymetry Map

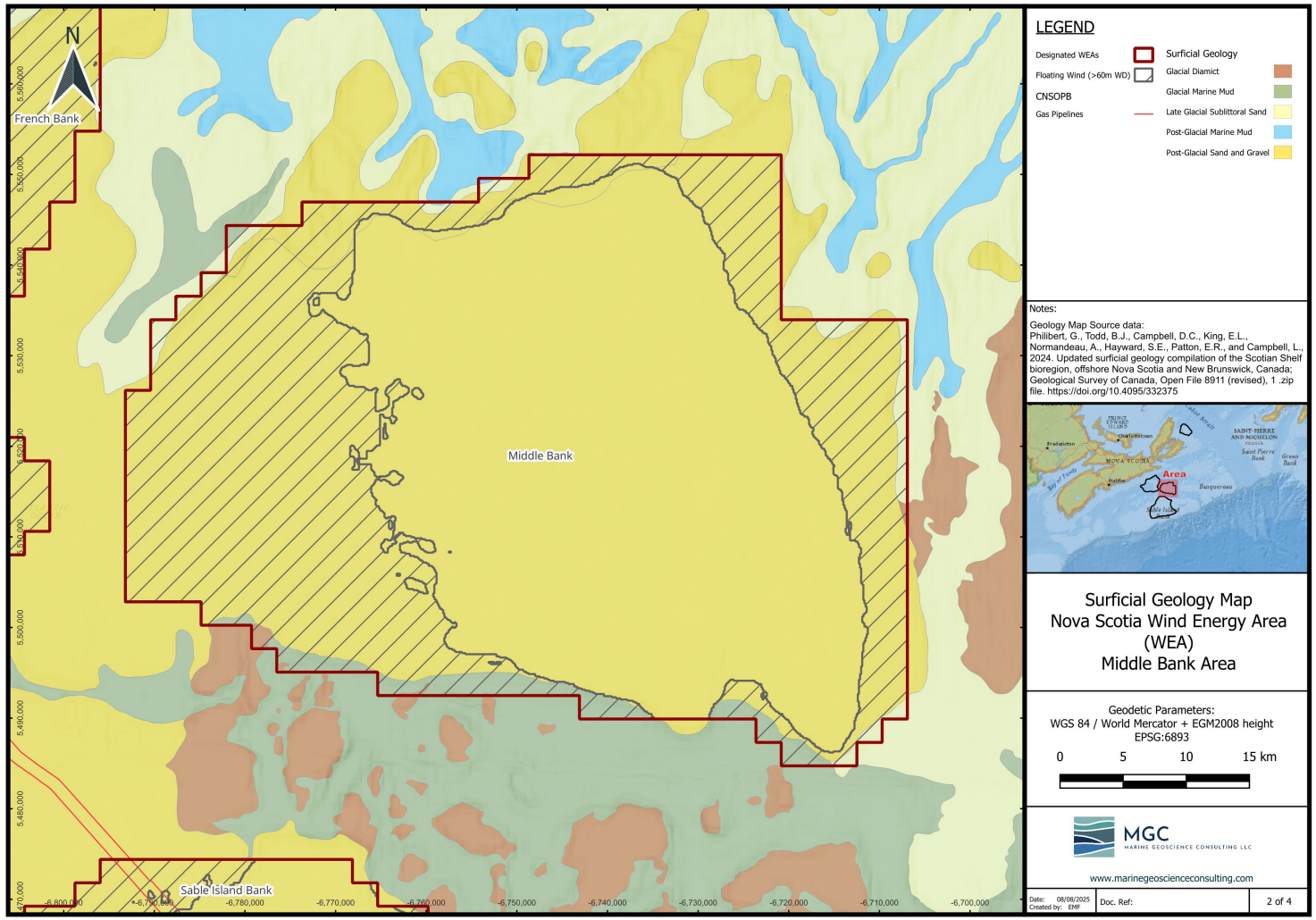
- The majority (56%) of the central area is shallower than 60m and likely suited for fixed wind development.
- 44% (on the east and west extremes) are deep enough to require floating wind development.



Middle Bank

Surficial Geology Map

- In the area of >60m depth, the geology is dominated by Post-glacial sand and gravel surficial sediments.

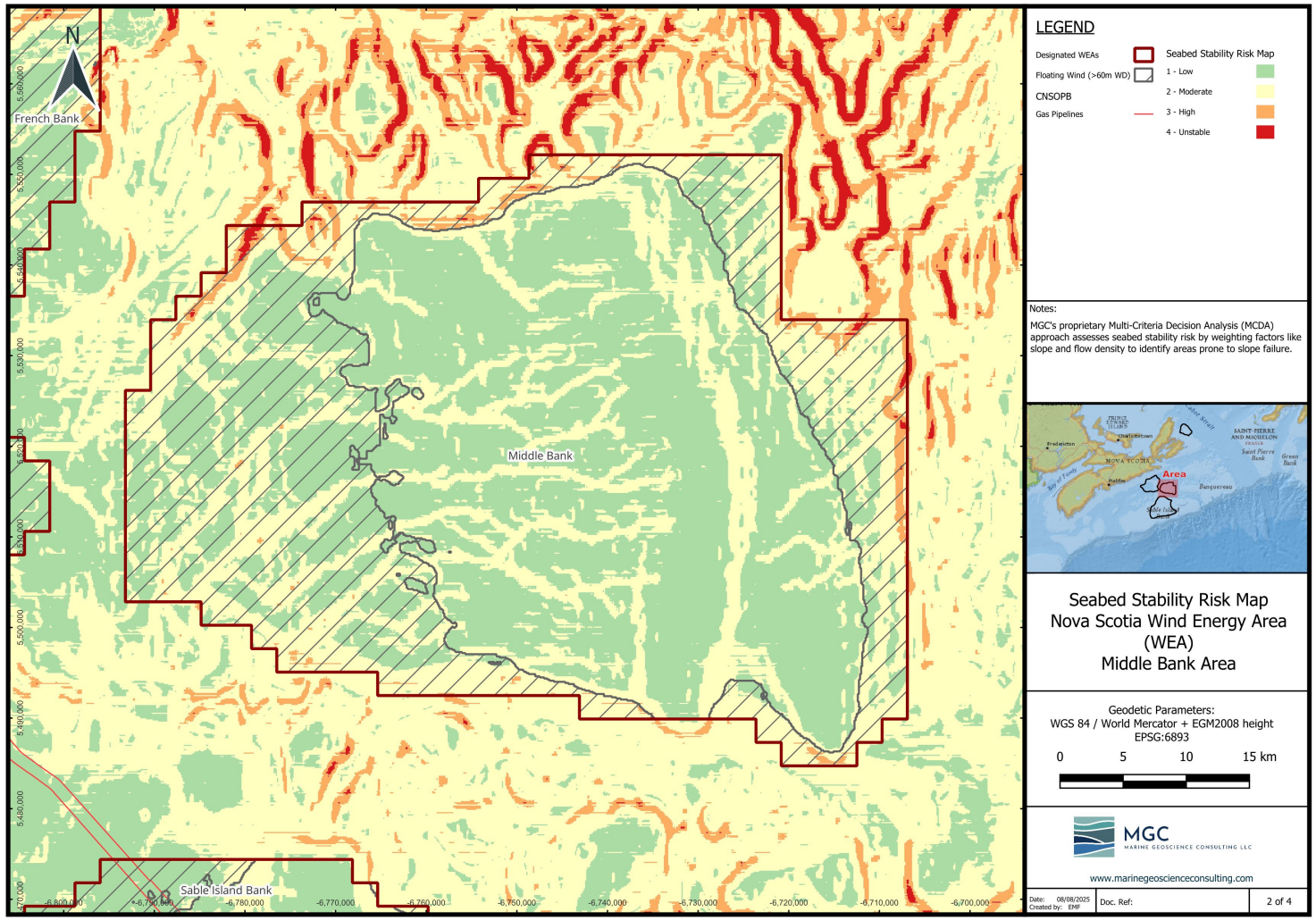


Middle Bank

Seabed Stability Risk Assessment Map

- The majority of the area has a low/moderate seabed stability risk.
- The outer edges in the deeper water show higher seabed stability risk; primarily due to higher slopes in these areas.

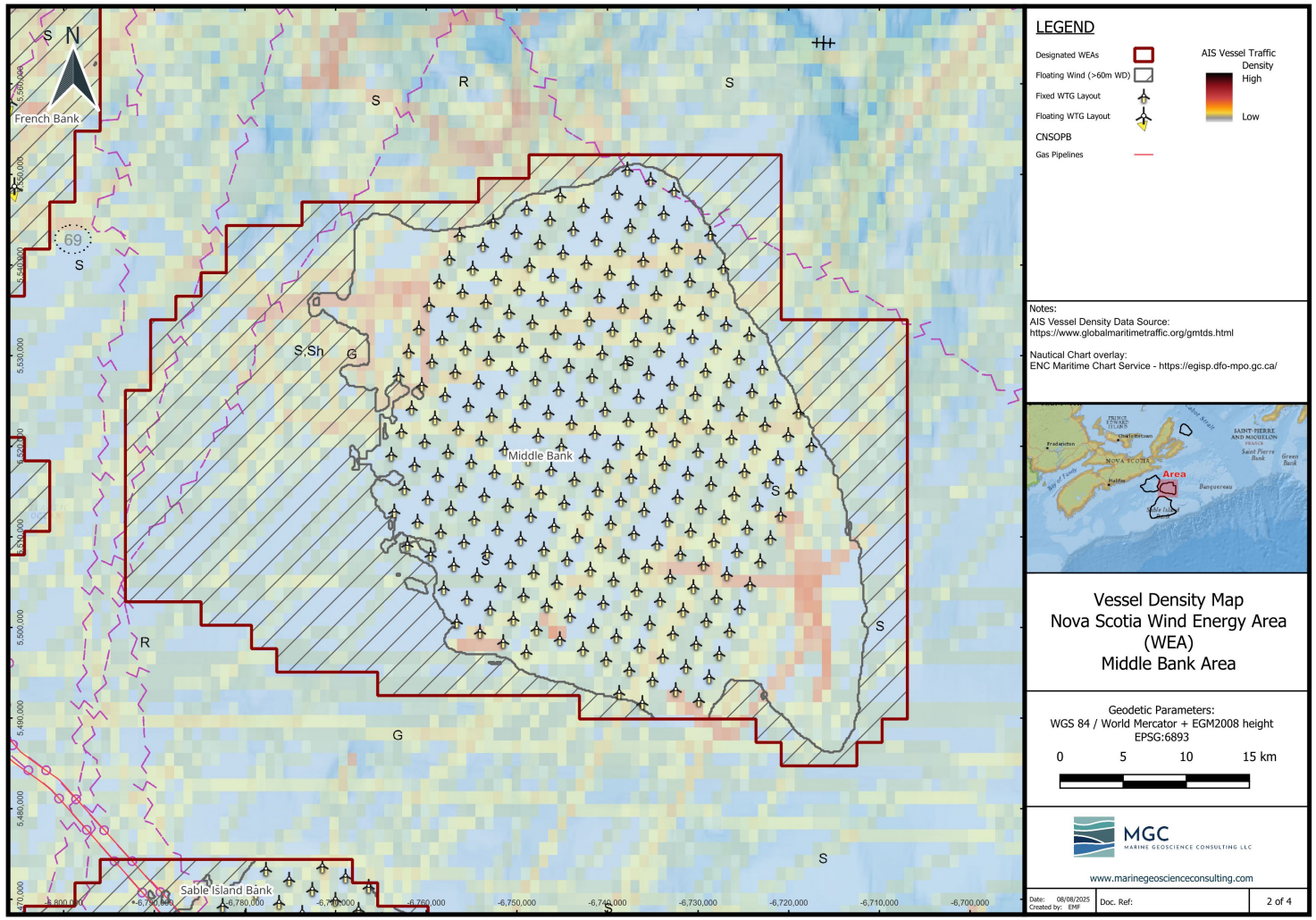
*Risk Assessment Map generated by MGC's proprietary Seabed Stability Risk Assessment Tool



Middle Bank

Vessel Traffic Density

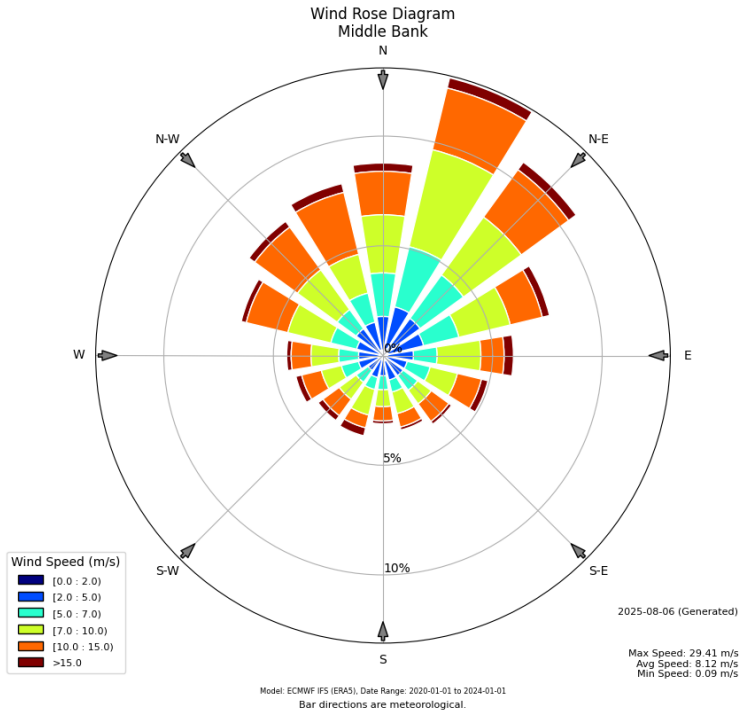
- An assessment of available AIS data can inform project siting for fixed WTG locations.
- The NW and SE ends of the WEA have a higher density of vessel traffic, which may limit the potential for installations.
- High traffic regions are removed from WTG assessed area.

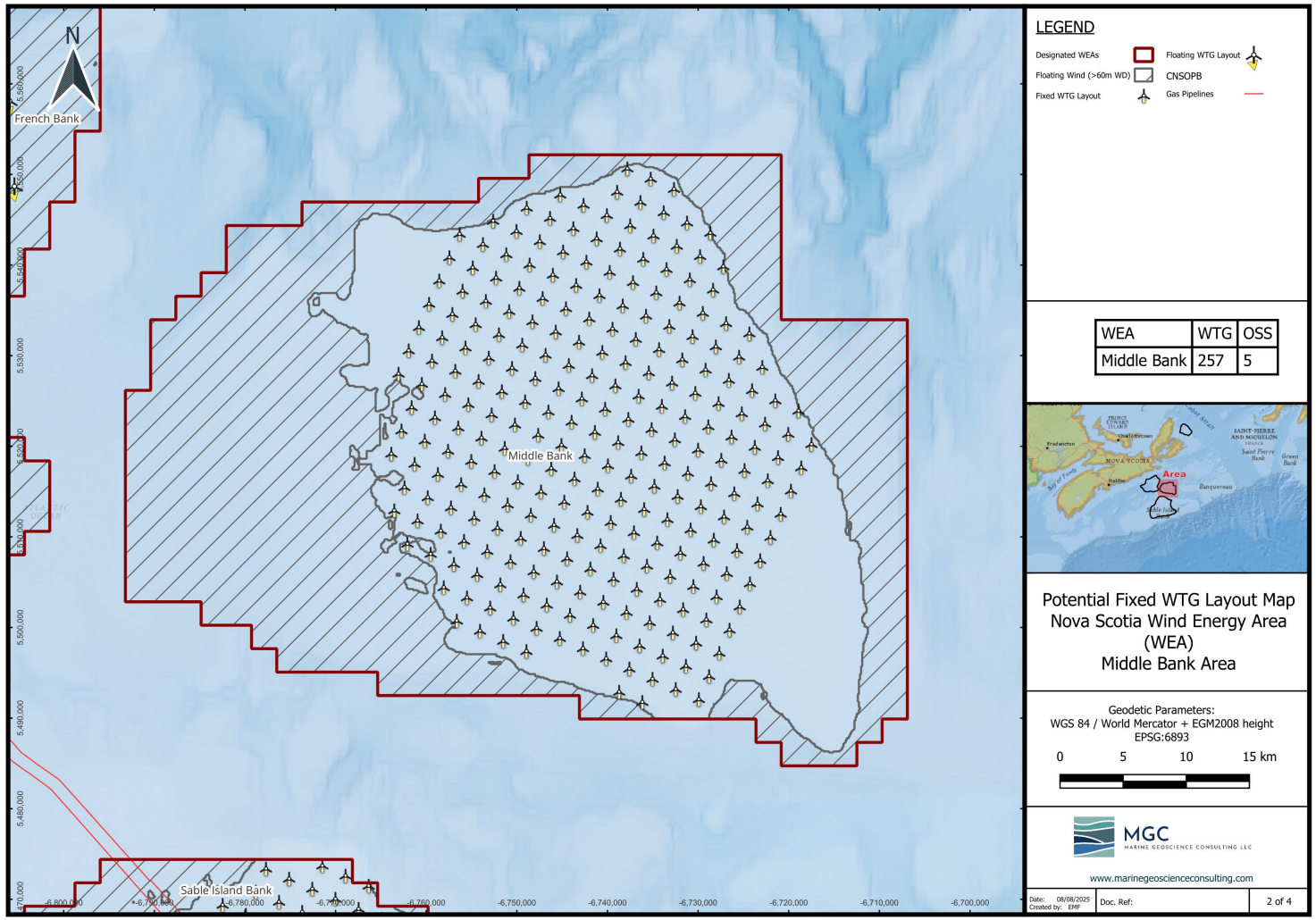


Middle Bank

Potential WTG Layout

- Modeled at 22° orientation based on the wind rose for the area (below)

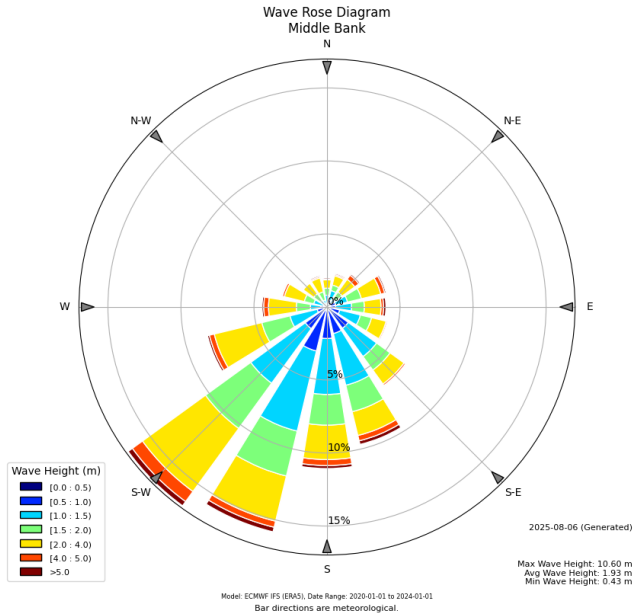


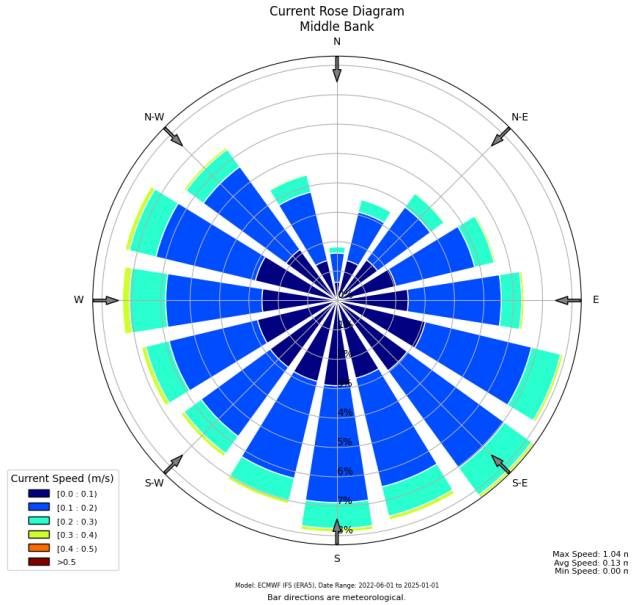


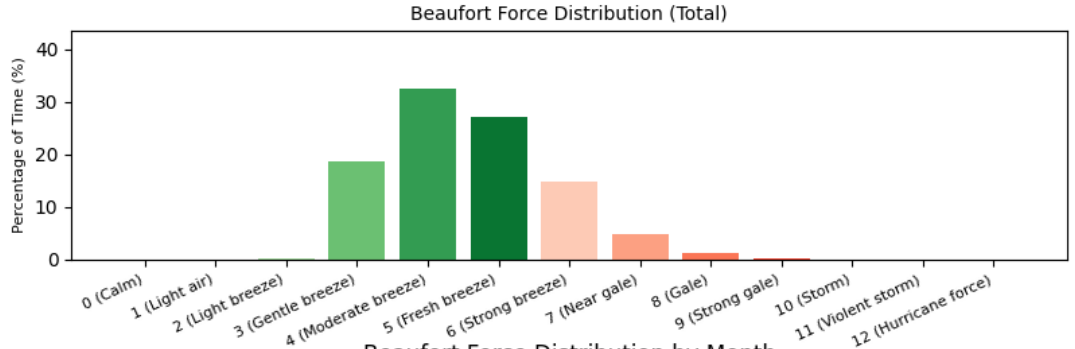
Middle Bank

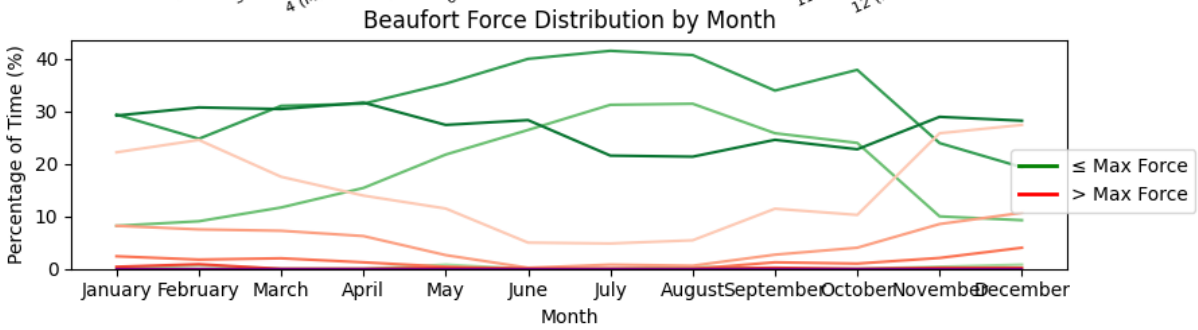
Sea Conditions

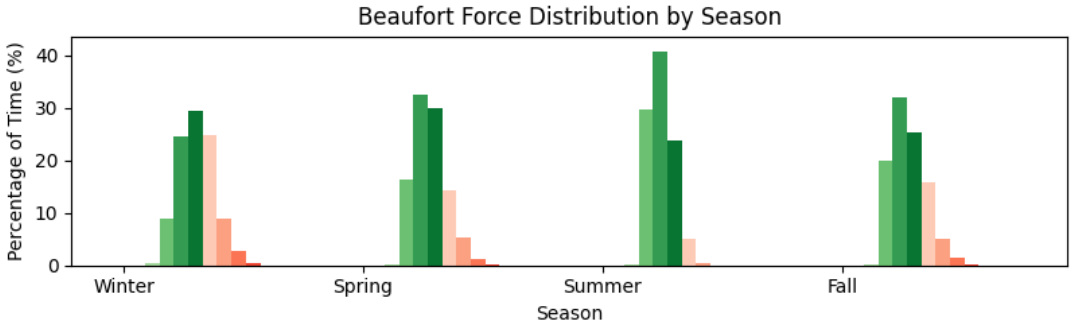
- The data for this WEA indicates summer is the best season for offshore operations.
- Wave and Current data below:









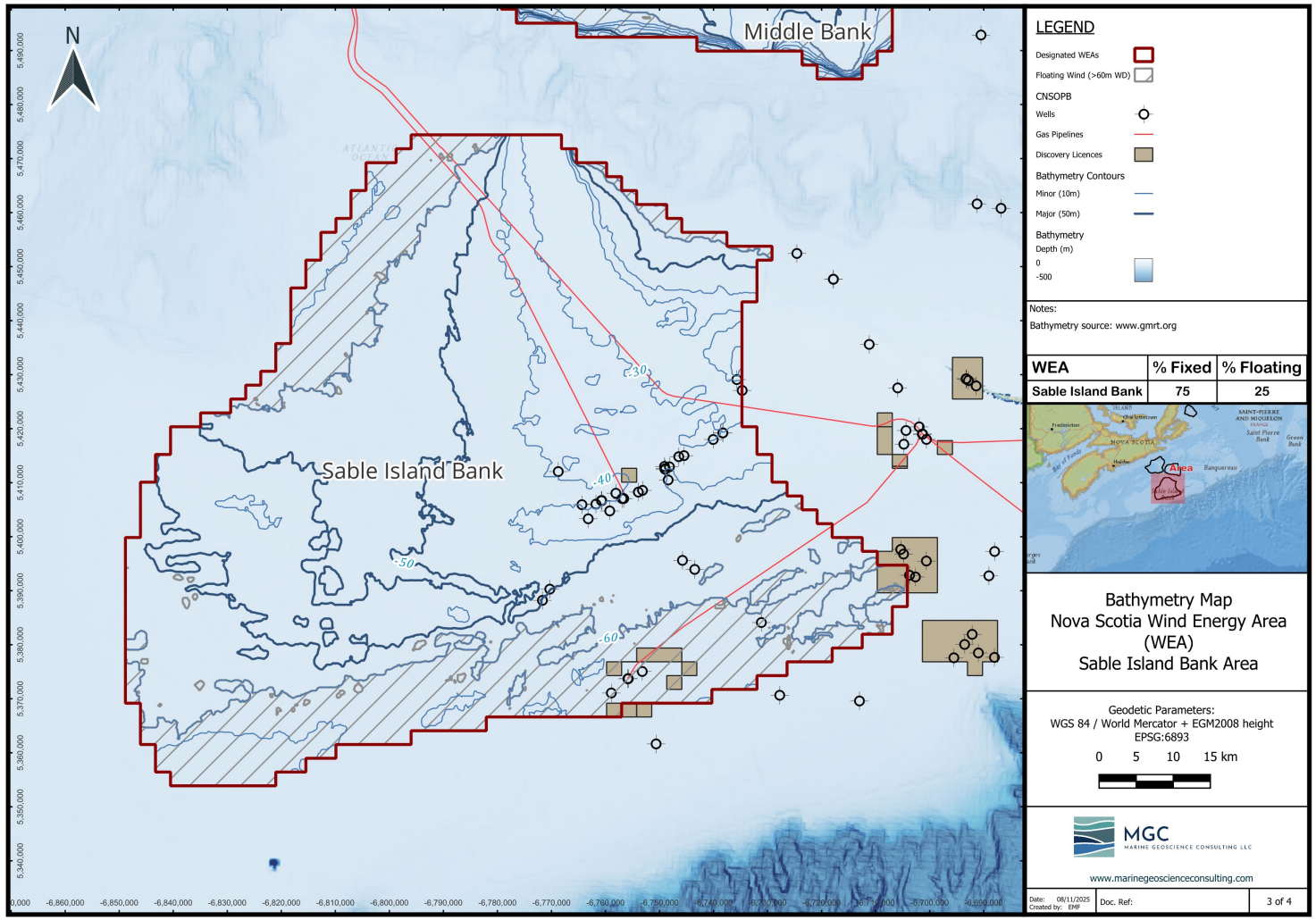


Date Range: 2020-01-01 to 2024-01-01, Model: ECMWF - reanalysis-era5-single-levels

Sable Island

Bathymetry Map

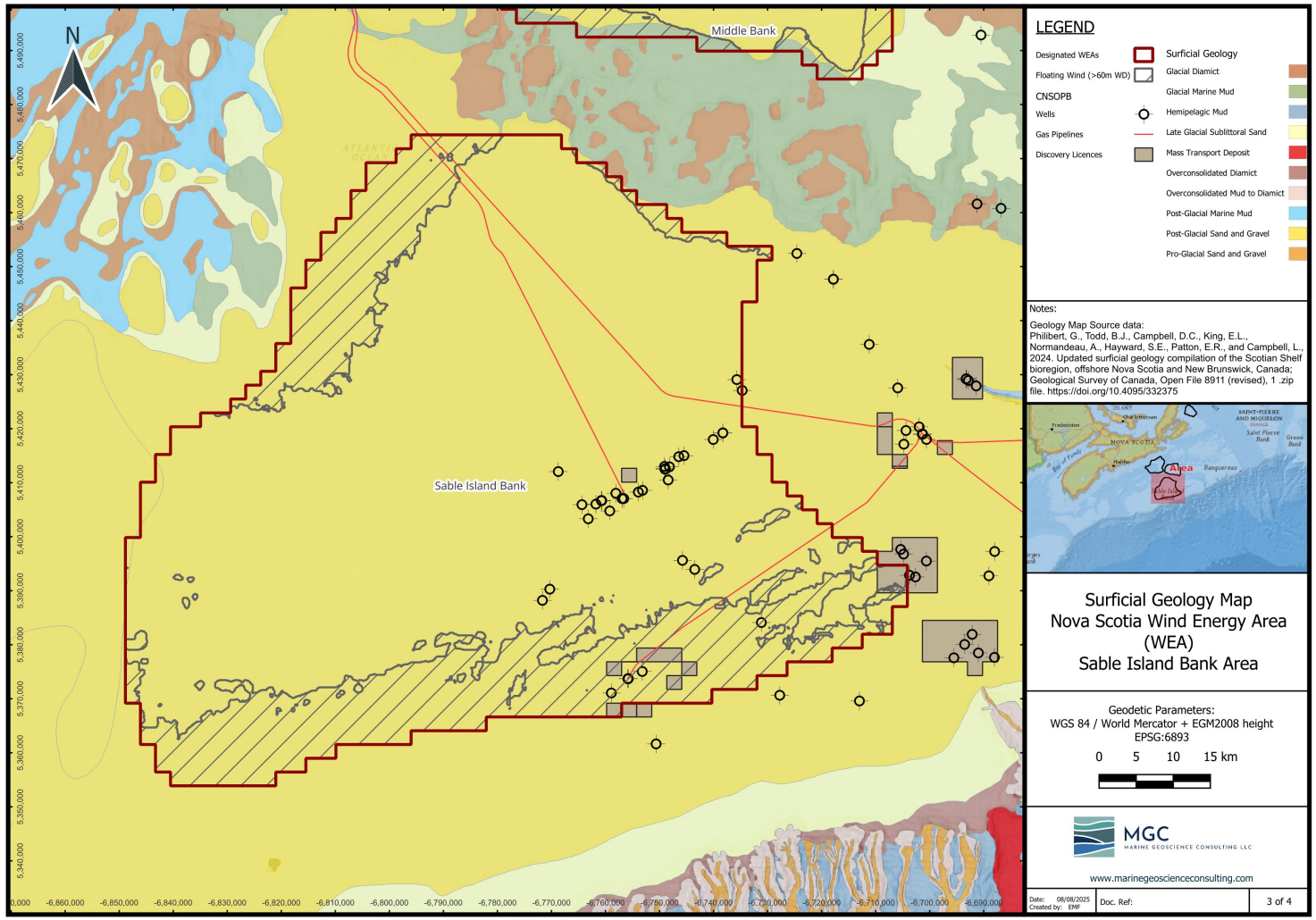
- The majority (75%) of the area is shallower than 60m and is suited for fixed wind development.
- Only 25% is deep enough to require floating wind development



Sable Island

Surficial Geology Map

- In the area of >60m depth, the geology is dominated by Post-glacial sand and gravel surficial sediments.

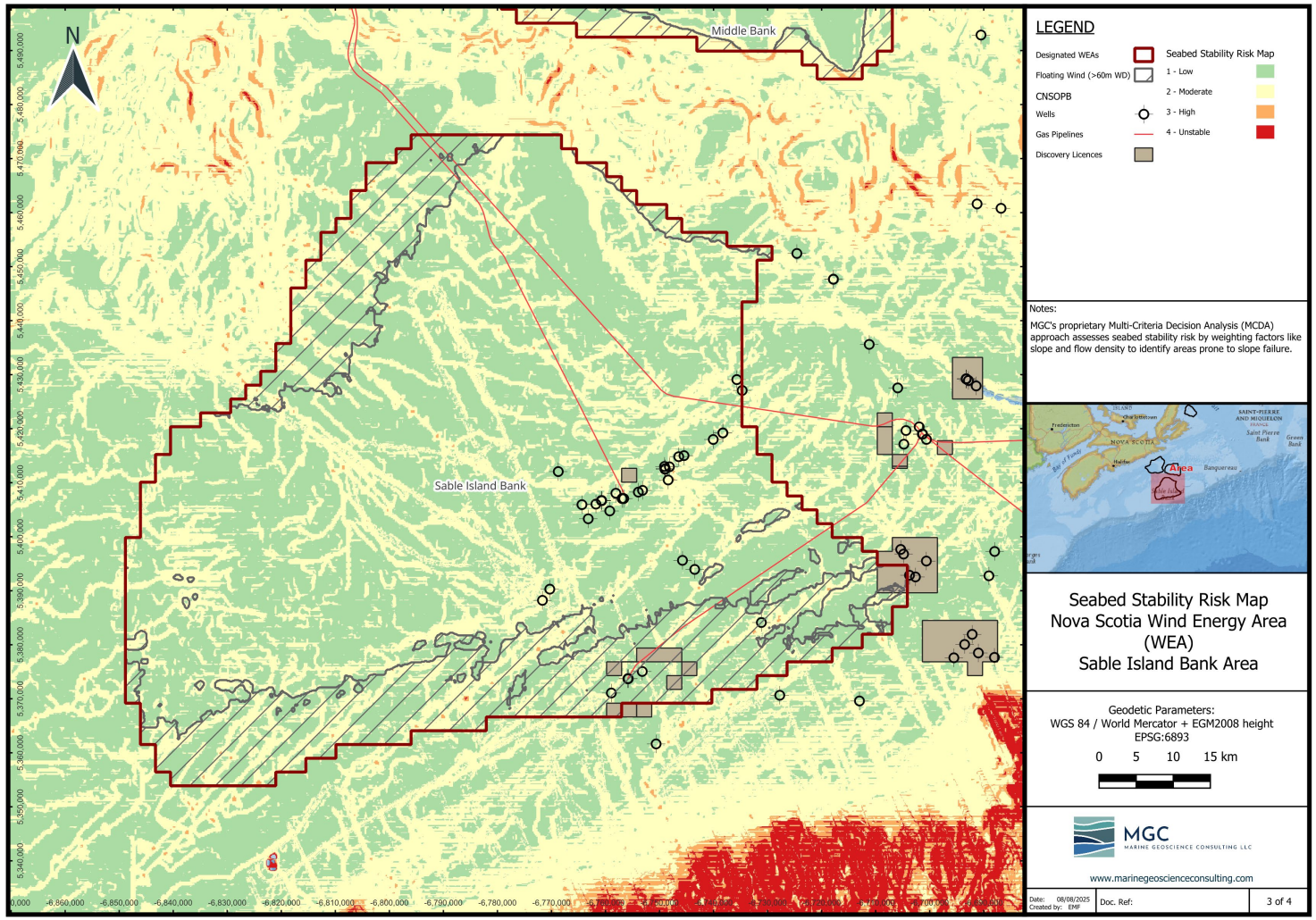


Sable Island

Seabed Stability Risk Assessment Map

- The majority of the area has a low/moderate seabed stability risk
- This area has numerous existing oil and gas infrastructure (pipelines, wells, etc.) that must be accounted for in foundation and installation design.

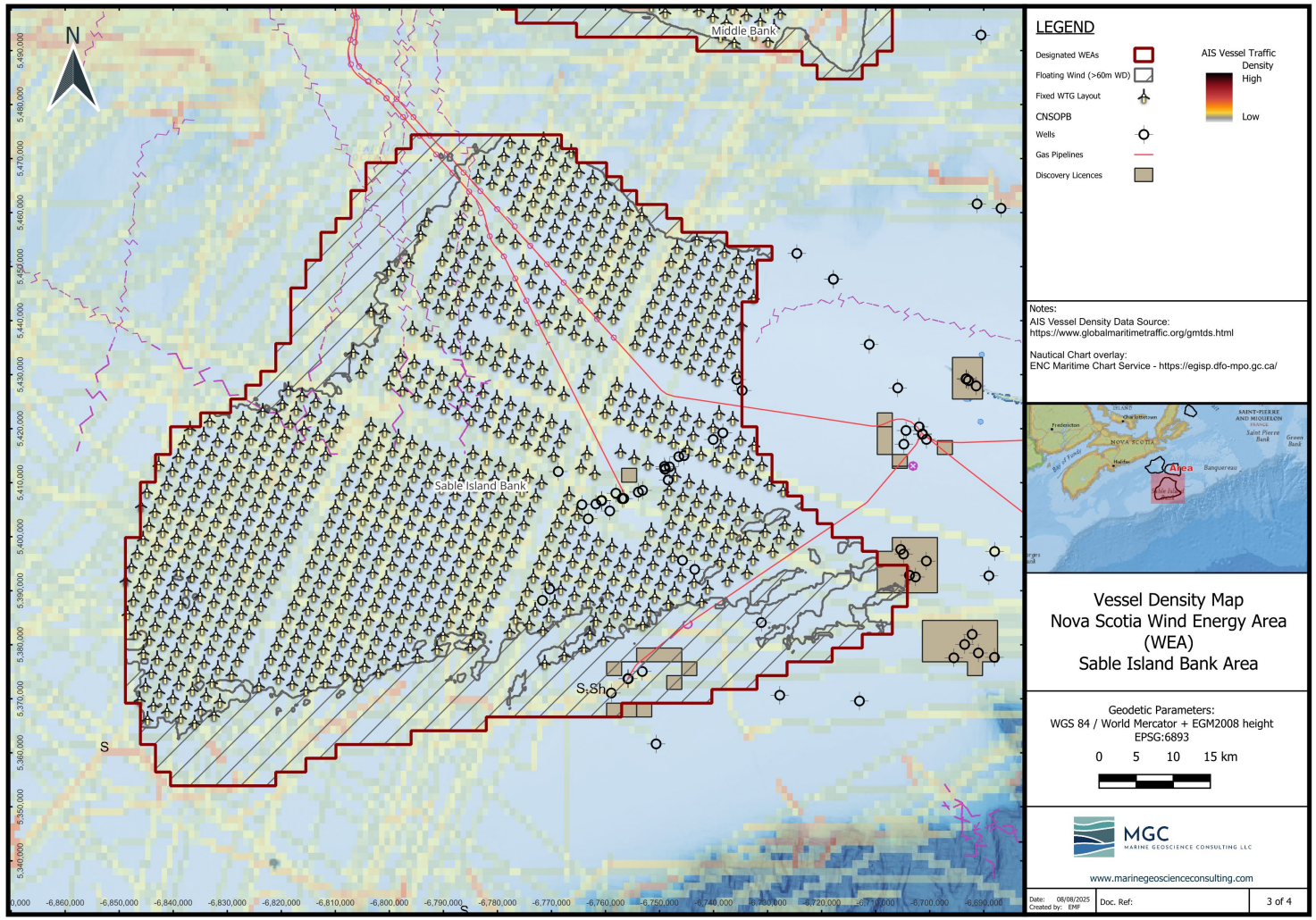
*Risk Assessment Map generated by MGC's proprietary Seabed Stability Risk Assessment Tool



Sable Island Bank

Vessel Traffic Density

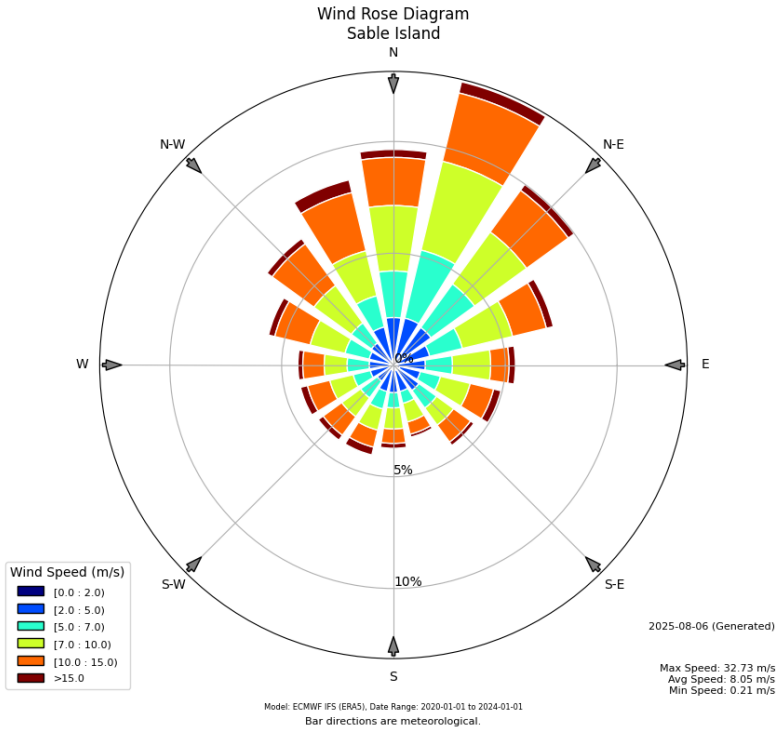
- An assessment of available AIS data can inform project siting for fixed WTG locations.
- Areas of the WEA with a higher density of vessel traffic may limit the potential for installations.
- High traffic regions are removed from WTG assessed area.

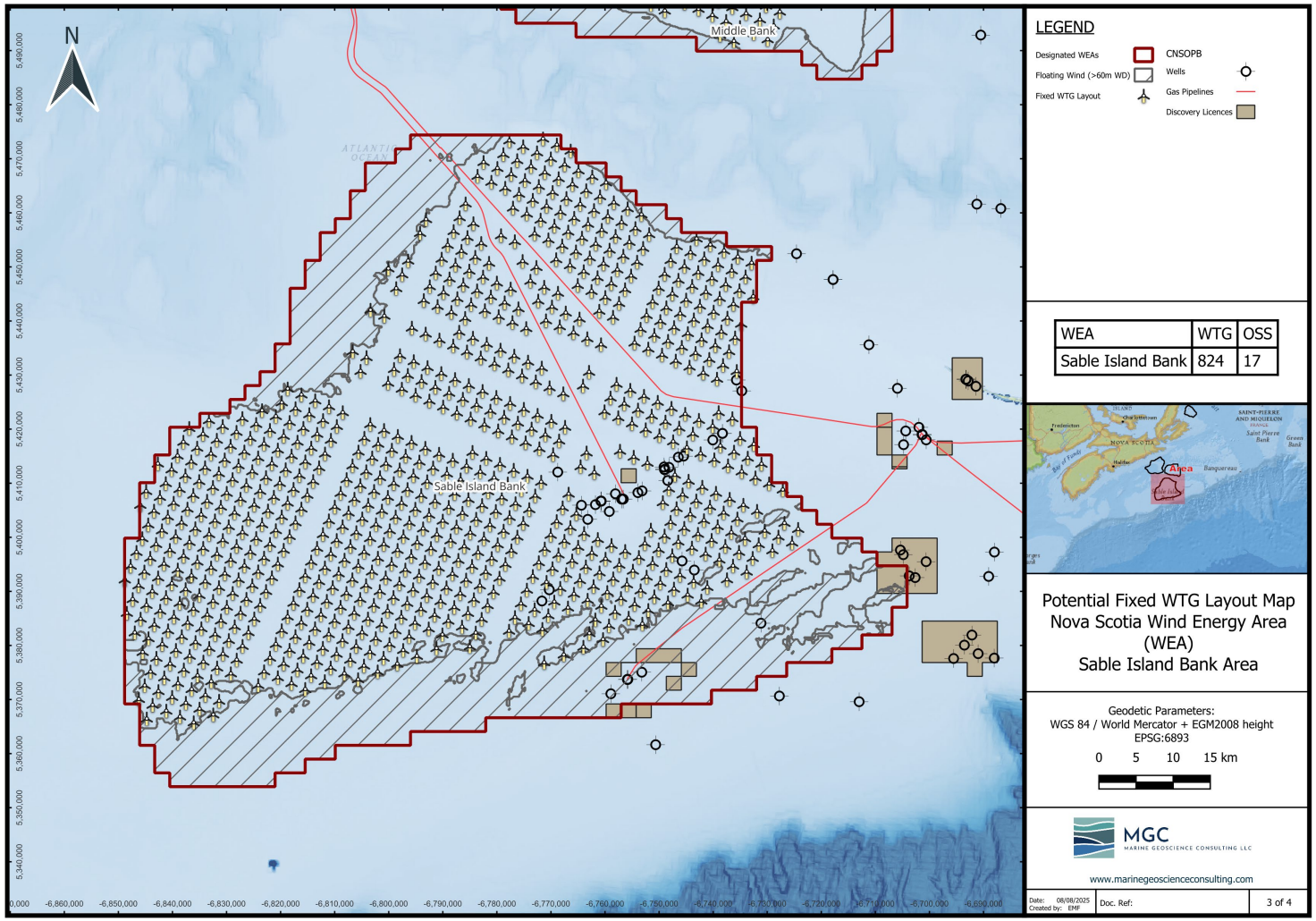


Sable Island Bank

Potential WTG Layout

- Modeled at 22° orientation based on the wind rose for the area (below)

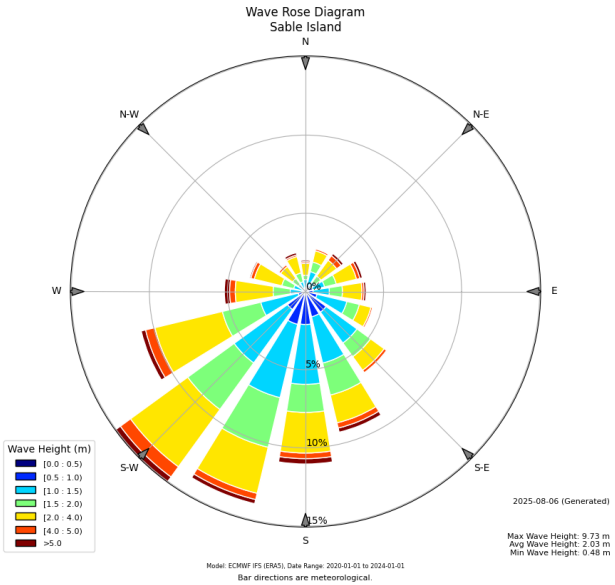


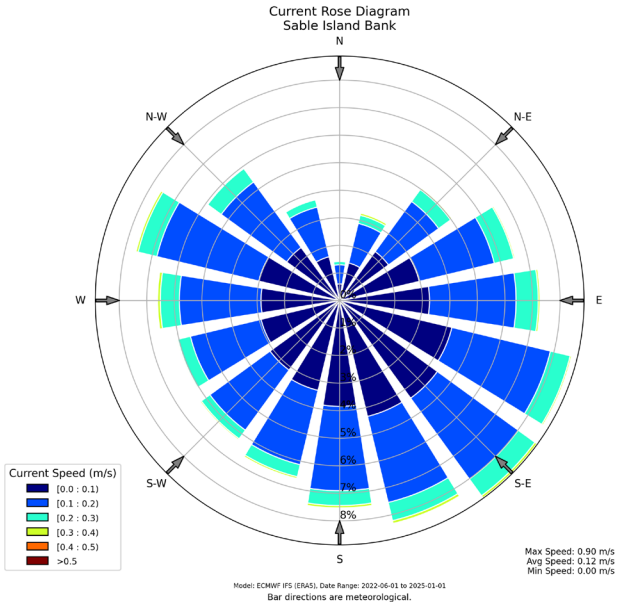


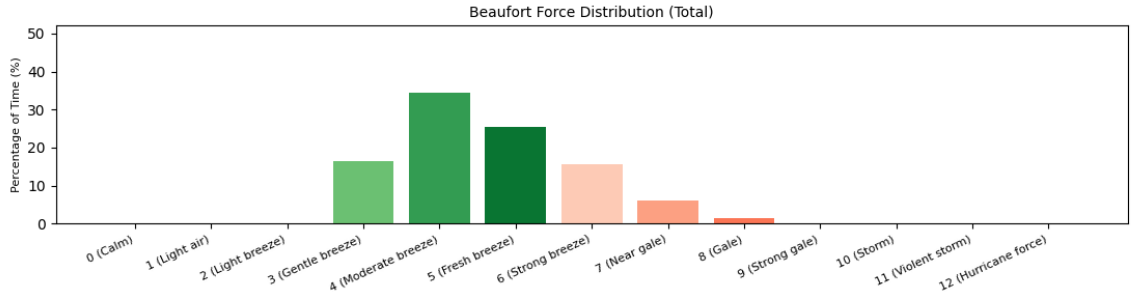
Sable Island Bank

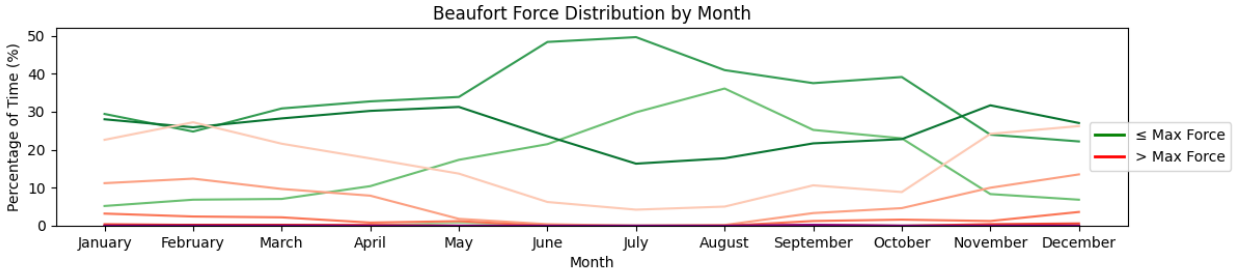
Sea Conditions

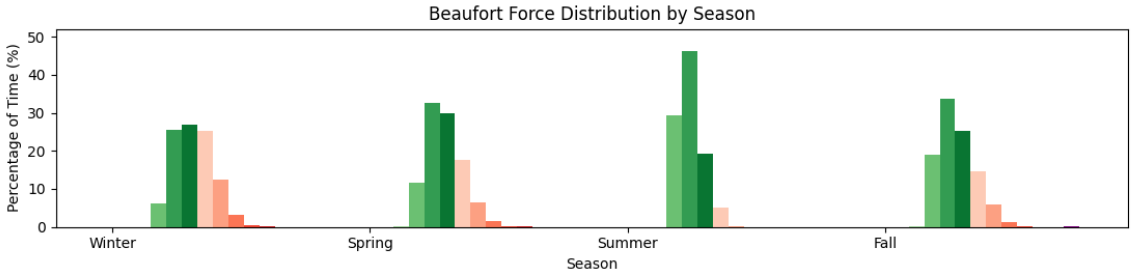
- The data for this WEA indicates summer is the best season for offshore operations.
- Wave and Current data below:









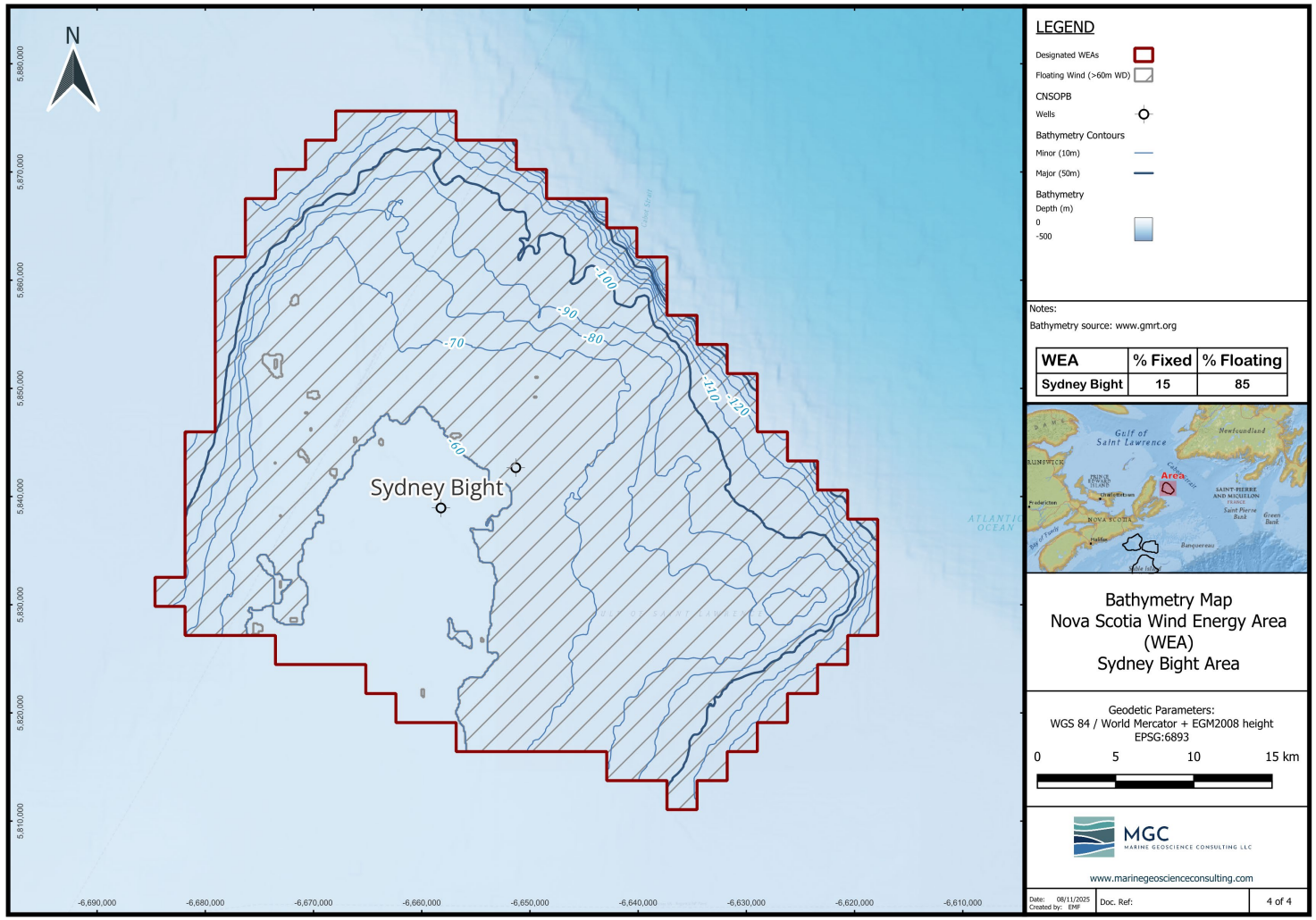


Date Range: 2020-01-01 to 2024-01-01, Model: ECMWF - reanalysis-era5-single-levels

Sydney Bight

Bathymetry Map

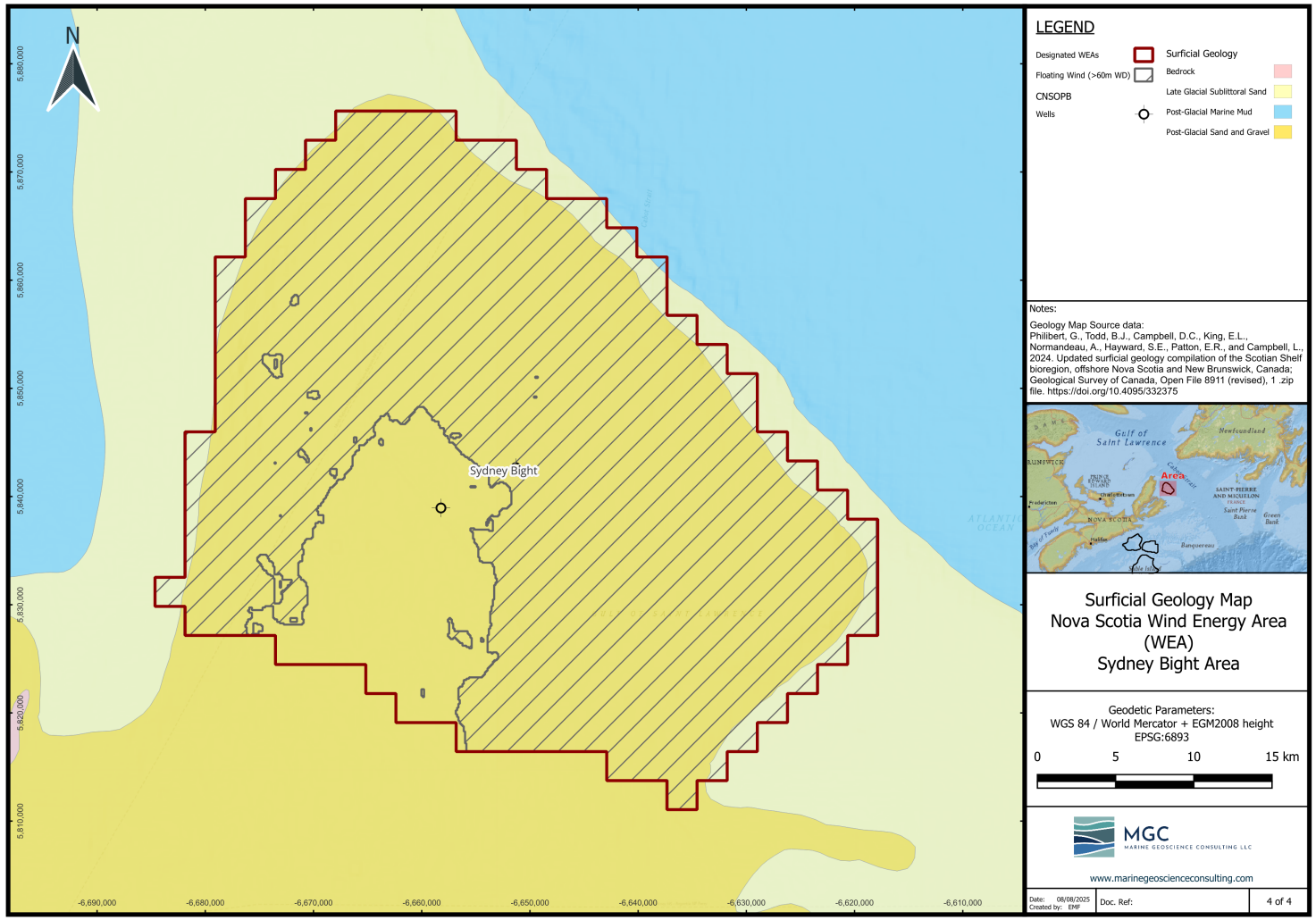
- The majority (85%) of the area is deeper than 60m and is suited for floating wind development.
- Only 15% is suitable for fixed wind development



Sydney Bight

Surficial Geology Map

- In the area of >60m depth, the geology is dominated by Post-glacial sand and gravel surficial sediments.

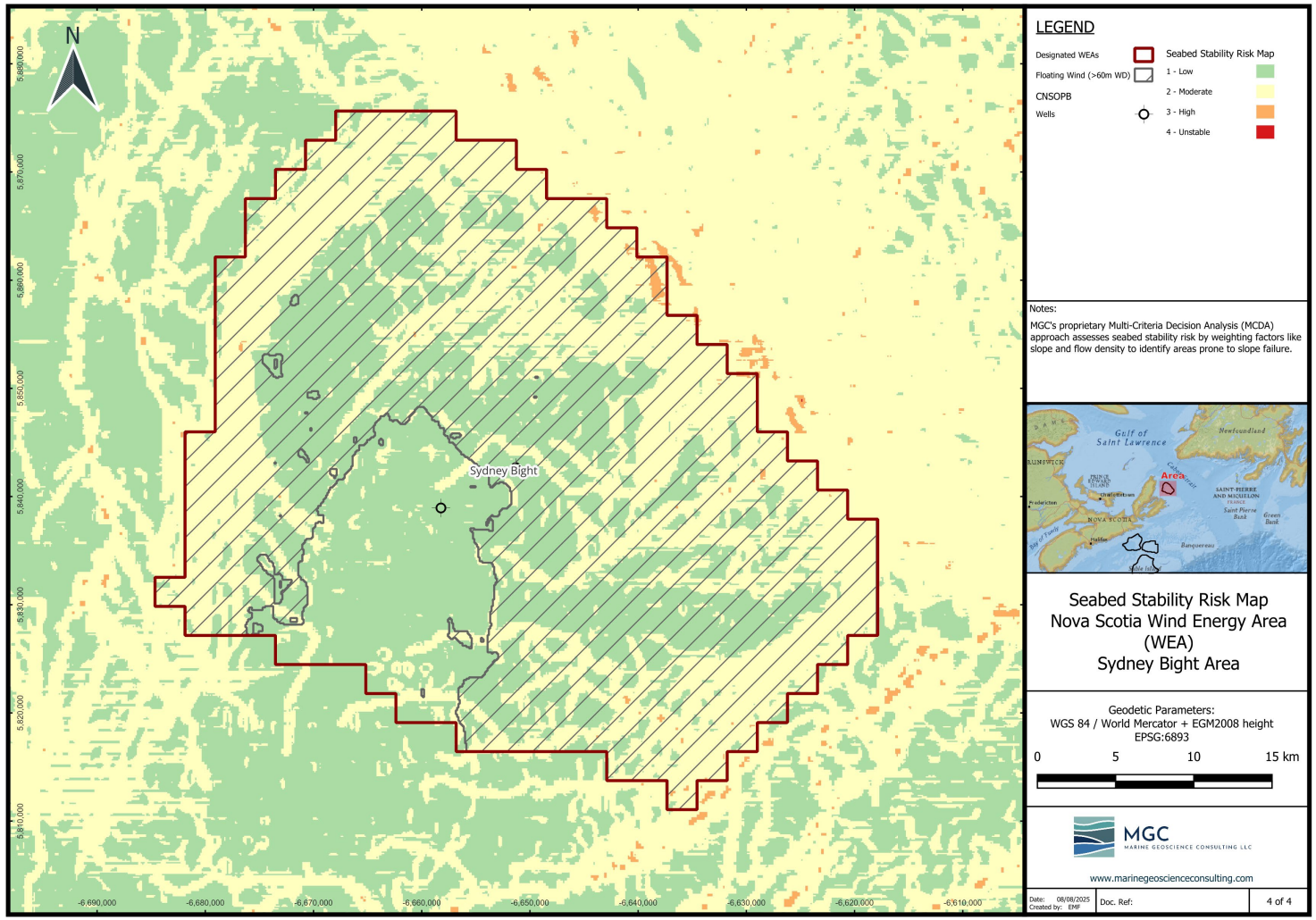


Sydney Bight

Seabed Stability Risk Assessment Map

- Most of the area has a low/moderate seabed stability risk
- The area for fixed wind is primarily low risk

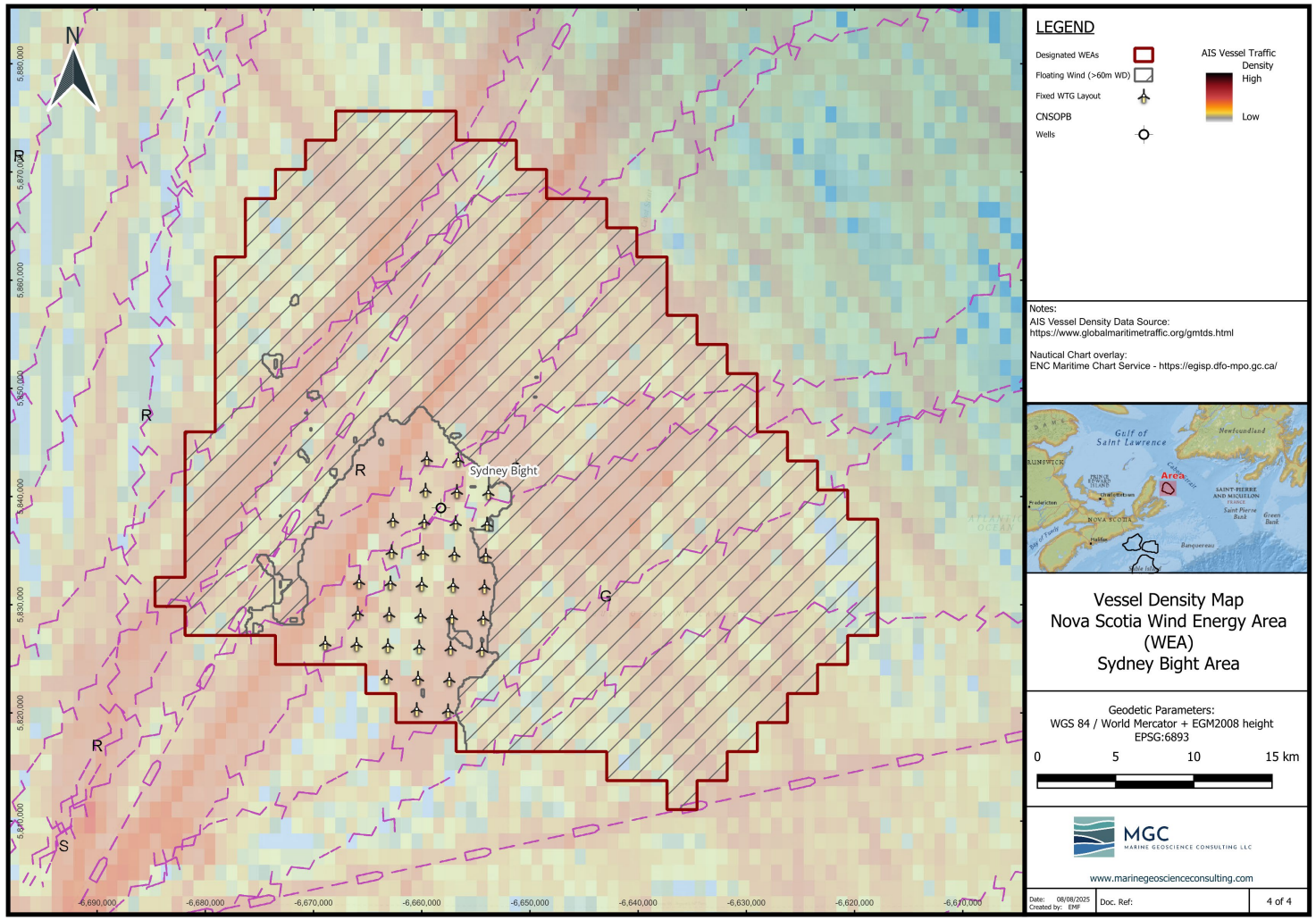
*Risk Assessment Map generated by MGC's proprietary Seabed Stability Risk Assessment Tool



Sydney Bight

Vessel Traffic Density

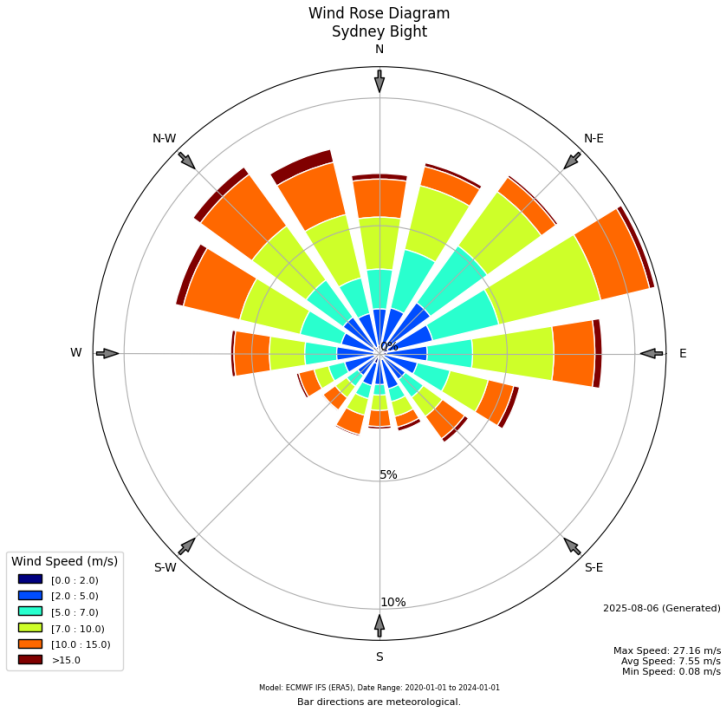
- An assessment of available AIS data can inform project siting for fixed WTG locations.
- The entire area shows a relatively high vessel traffic density.
- The western end has a ferry path, which accounts for the highest density, and may limit installation.
- High traffic regions are removed from WTG assessed area.

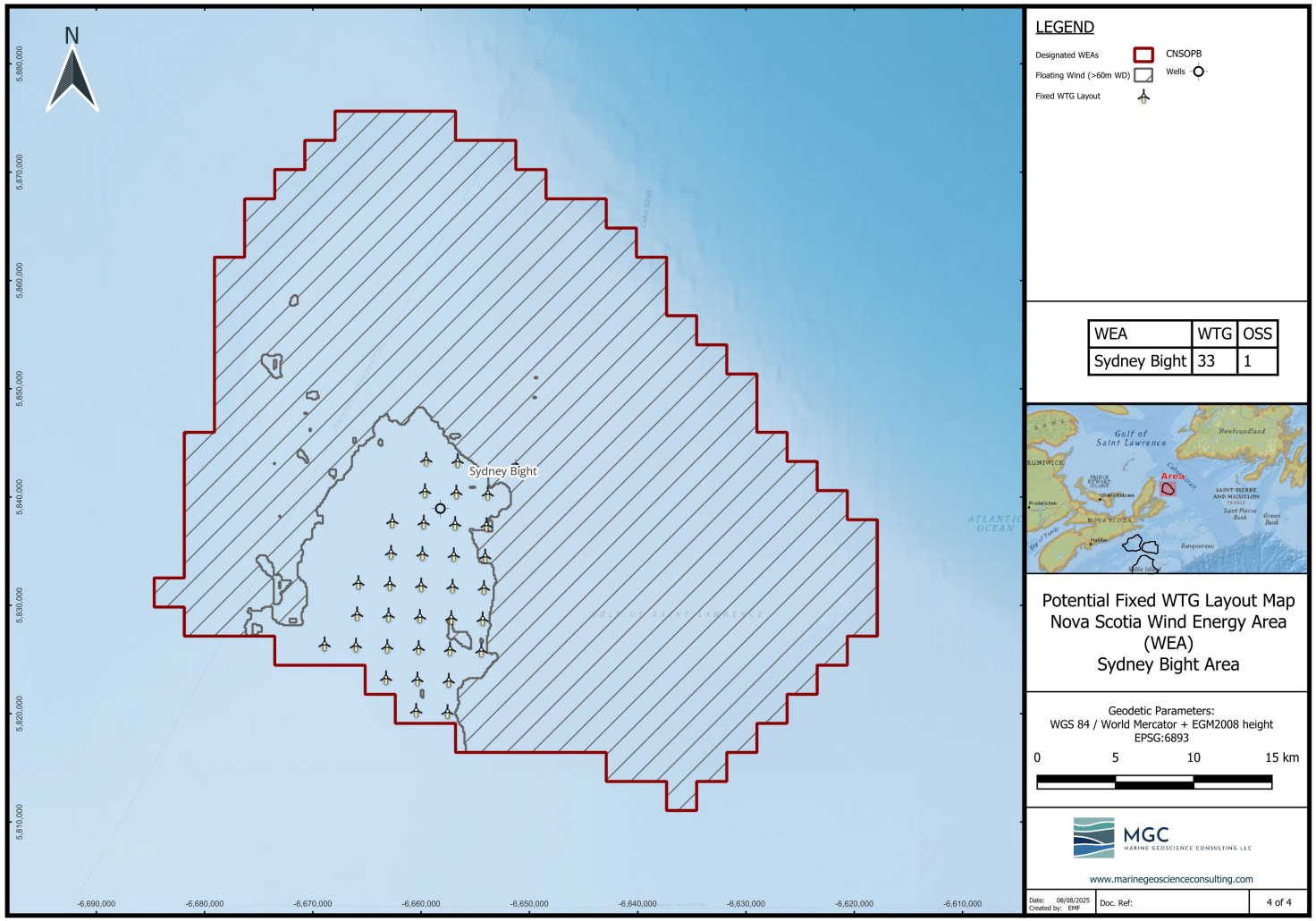


Sydney Bight

Potential WTG Layout

- Modeled at a North orientation based on the wind rose for the area (below)

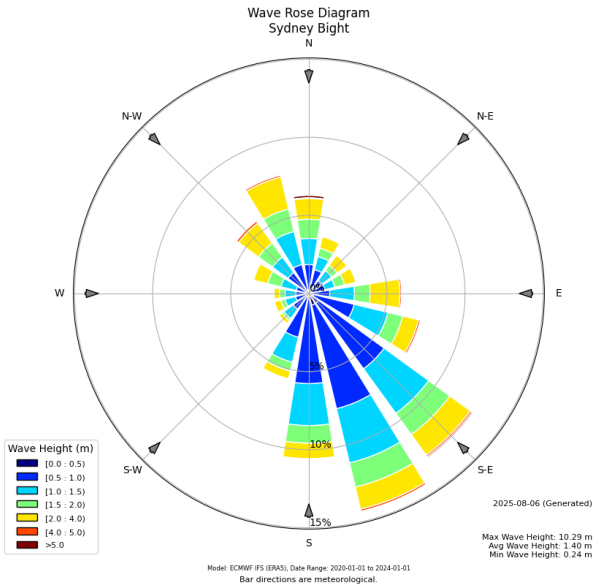


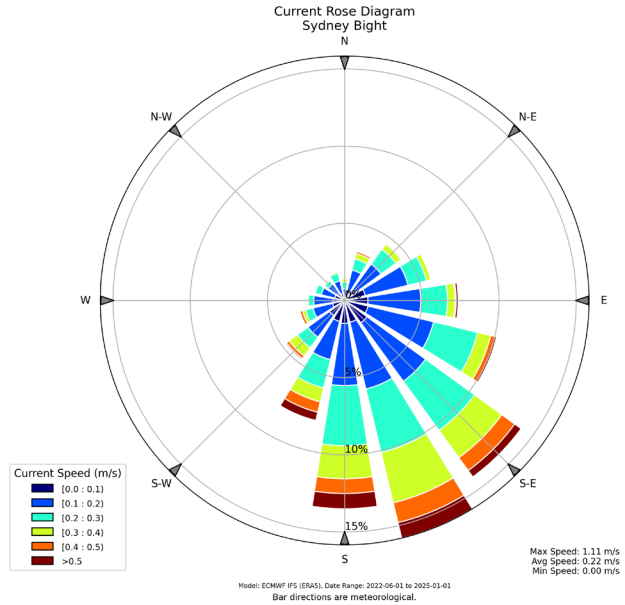


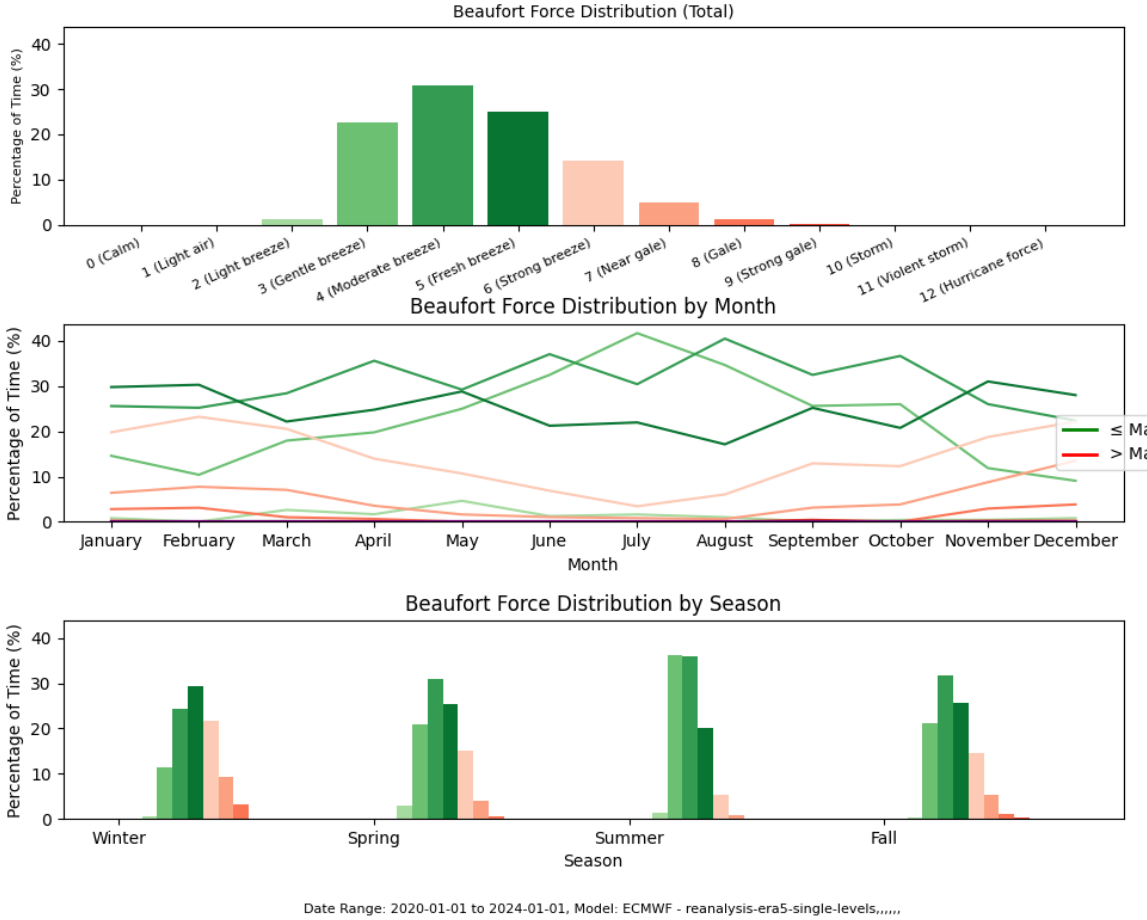
Sydney Bight

Sea Conditions

- The data for this WEA indicates summer is the best season for offshore operations.
- Wave and Current data below:



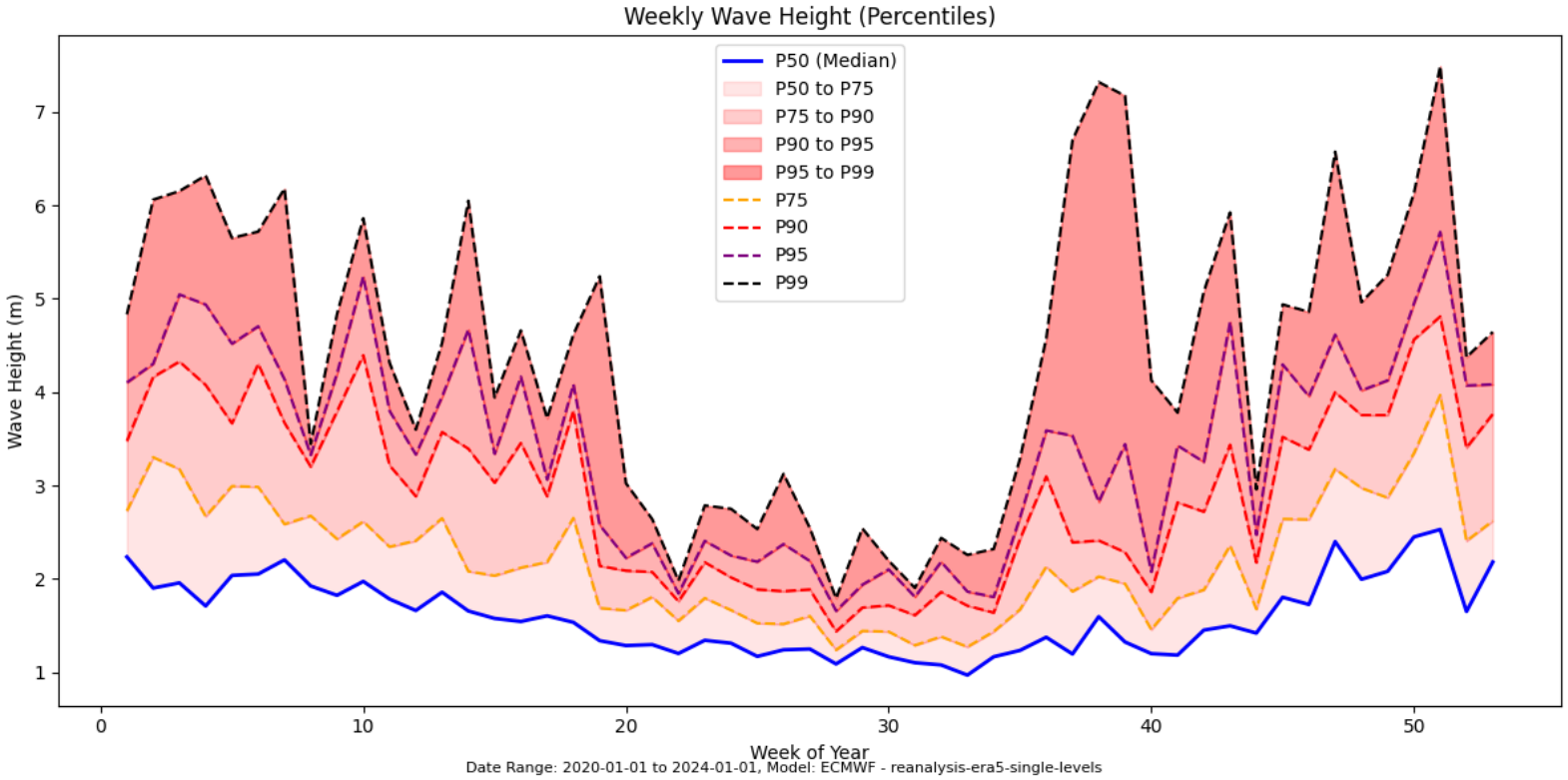




Regional Waves

Wave heights Data Assessment

- A multi-year assessment of wave height data is displayed in the graph.
- Weeks 20-35 appear to be the lowest wave heights annually.
- Late May to late August (summer) are the prime months for offshore operations (survey , T&I, etc.).
- While each location is slightly different, they all follow this same trend.



Summary Assessment

Modeling Assumptions

- 15MW fixed WTG at 2km spacing
- 1 Offshore Substation (OSS) for every 50 WTGs

WEA	WEA Area (km^2)	Area for Fixed WTG (km^2)	Modeled # WTGs	Modeled # OSS	Total Potential Power Output
French Bank*	3125	0	217	4	~3.2GW
Middle Bank	2289	1287	257	5	~3.8GW
Sable Island	5850	4397	824	17	~12.3GW
Sydney Bight	1091	194	33	1	~0.5GW

**Floating Wind only, 3km spacing*

References

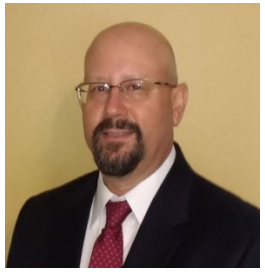
- **Bathymetry –** www.gmrt.org
- **Canadian Offshore wind –** https://www.canada.ca/en/natural-resources-canada/news/2025/07/canadas-first-four-offshore-wind-energy-areas-have-been-designated-on-nova-scotias-offshore.html
- **Geology -** https://publications.gc.ca/collections/collection_2024/rncan-nrcan/m183-2/M183-2-8911-eng-1.pdf
- **Seafloor Stability Risk** – MGC whitepaper *"Assessing Seafloor Stability Risks Using a Novel GIS-Based Weight-of-Evidence Tool: Implications for Offshore Asset Management"* To be released August 2025
- **Sea Condition data -** Mercator Ocean International. (2025). 10 years of Copernicus Marine Service: Ocean data for a sustainable future. https://marine.copernicus.eu/

MGC Introduction

Marine Geoscience Consulting (MGC) is provider of integrated geoscience solutions for the offshore renewables sector, specializing in site investigation package management, project management, survey management, ground modeling, environmental assessments, and regulatory compliance to drive sustainable energy development.

Our multidisciplinary team excels in project management, delivering pragmatic, risk-aware strategies that align technical deliverables—like ground models, CBRA, and sediment mobility studies—with regulatory demands and commercial objectives, ensuring projects are executable, compliant, and resilient.

Contact Us



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