

# Program Requirement Summary

- The Atlantic Zone Monitoring Programs (AZMPs)
- Benthic program
- North Atlantic Right Whale monitoring and tagging
- **Additional science programs with similar requirements as above**

# The Atlantic Zone Monitoring Programs

## Program Goal:

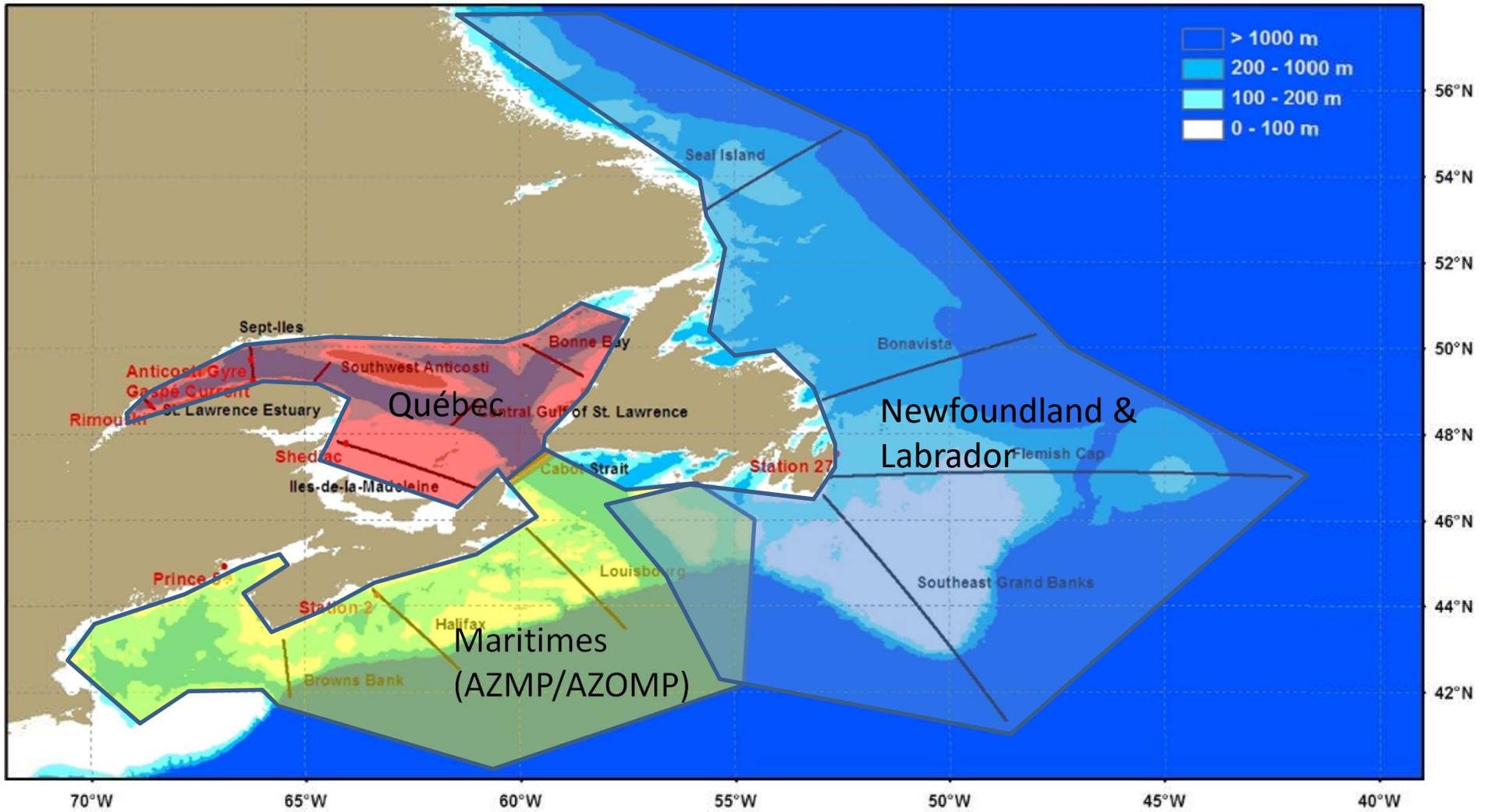
- Increase DFO's capacity to understand, describe, and forecast the state of the marine ecosystem and to quantify the changes in the ocean's physical, chemical, and biological properties.

# 4 Regions Coordinate

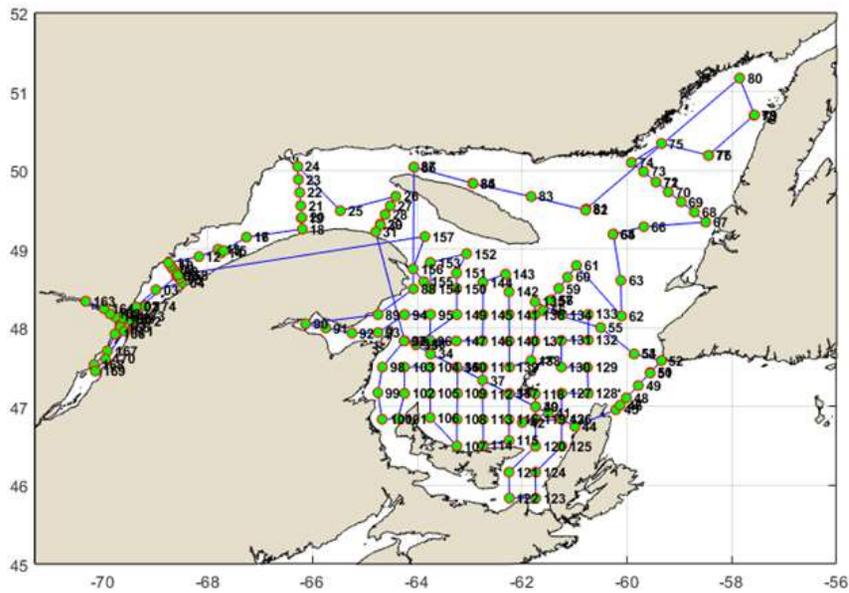
- Coordinated program between four DFO Regions (Gulf\*, Maritimes, Newfoundland and Labrador, and Quebec)
- Labrador Sea Atlantic Zone Off-shelf Monitoring Program run by Maritimes Region
- Each region conducts measurements following common protocols in addition to other regional work of interest

\*Gulf Region doesn't conduct the surveys like the other Regions. <sub>3</sub>

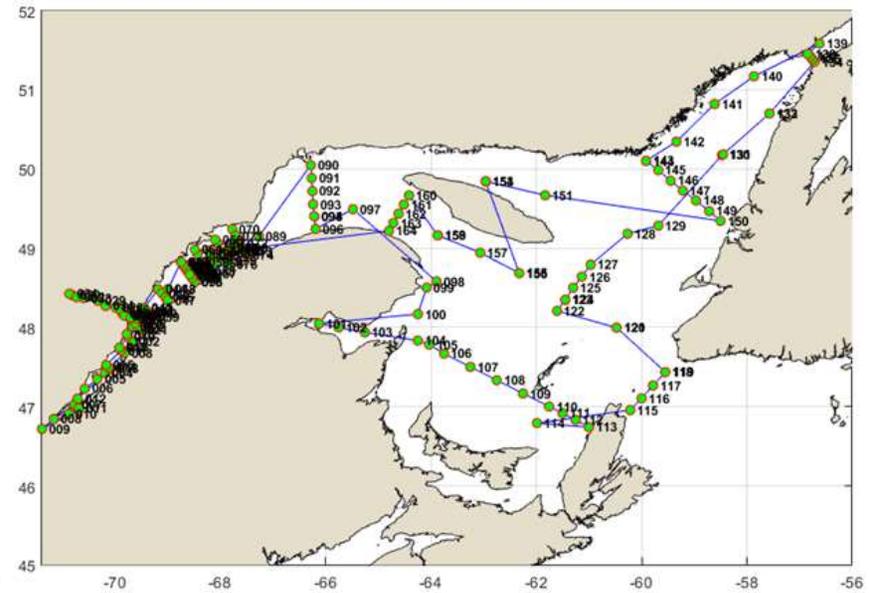
# Regional Areas of Interest



# Québec Region Timing

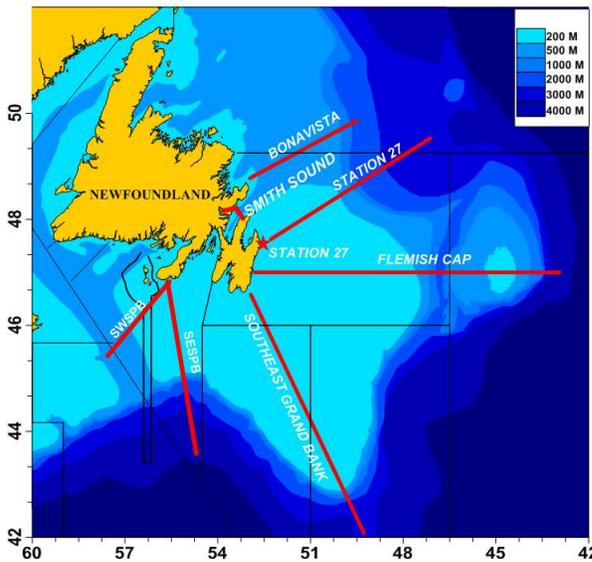


**Spring**  
**May**  
**23 days**  
**+4 days for mob/demob**

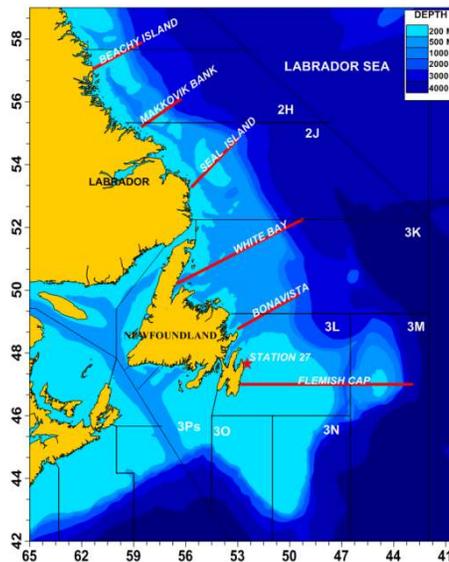


**Fall**  
**Nov**  
**23 days**  
**+ 4 days for mob/demob**

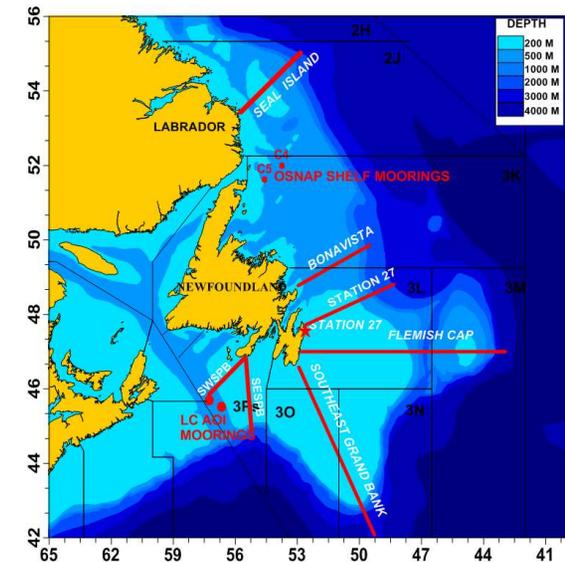
# NL Region Timing



**Spring**  
**Apr**  
**23 days**  
**+4 days for mob/demob**



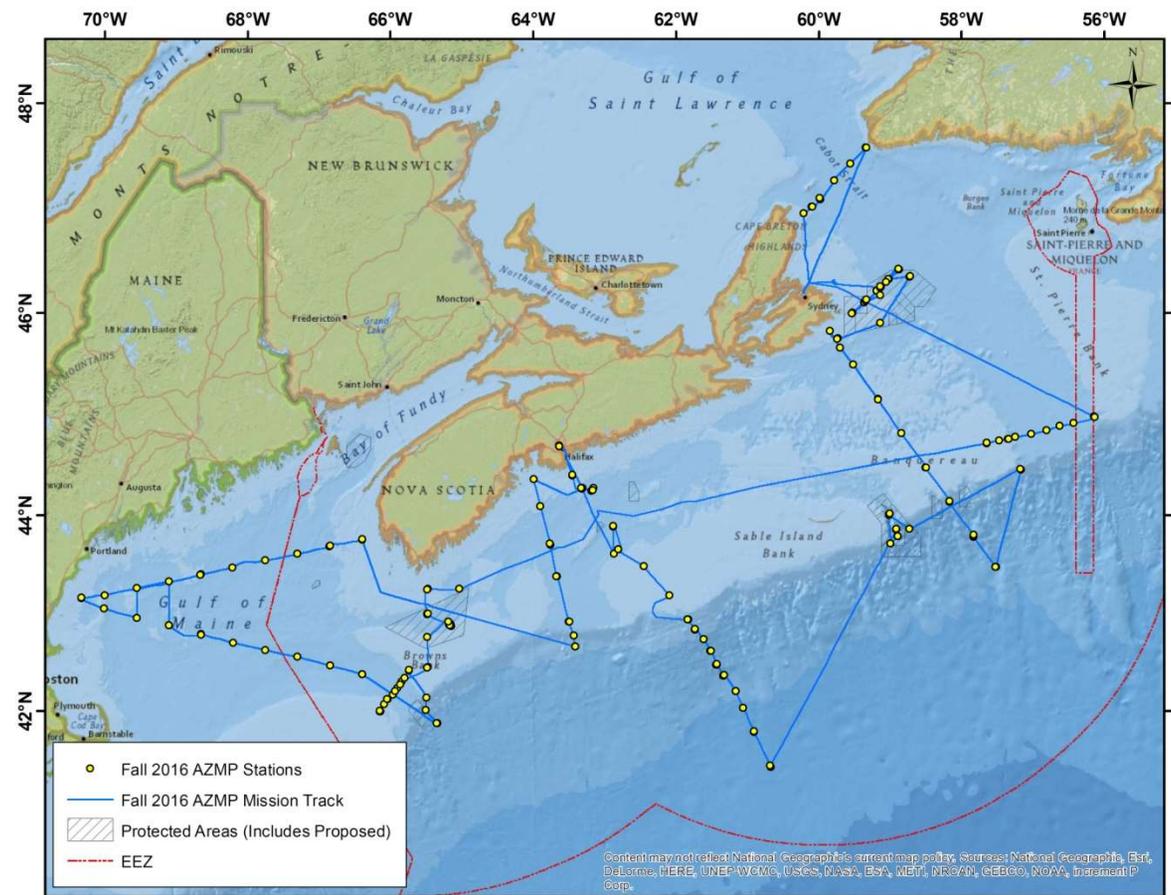
**Summer**  
**Jul**  
**23 days**  
**+4 days for mob/demob**



**Fall**  
**Dec**  
**23 days**  
**+ 4 days for mob/demob**

# Maritimes Region Timing

- Spring (Apr)
- Fall (Sep – Oct)
- Missions 23 days (+ 2 days mob / 2 days demob)



**Slide 7**

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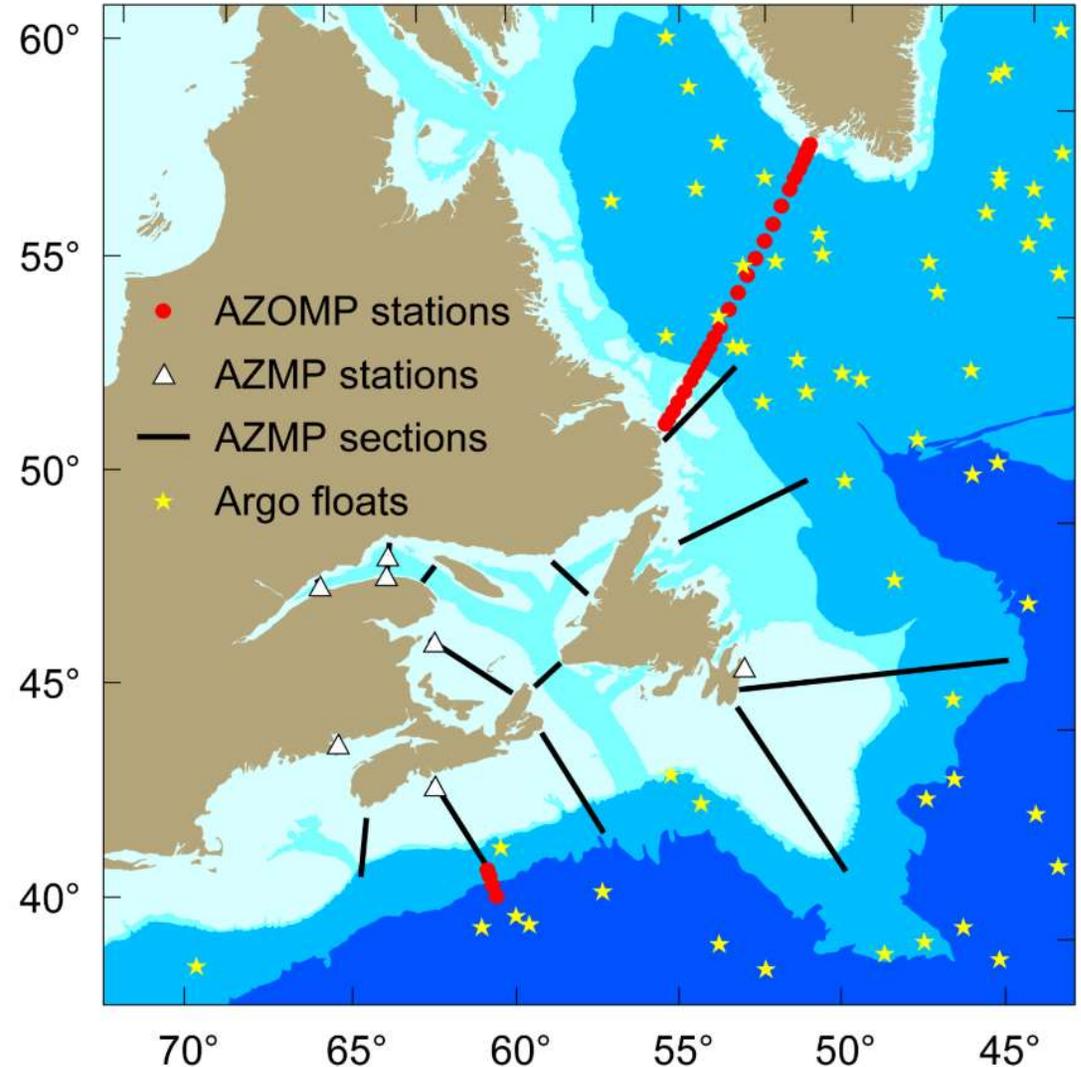
**AC2**

Include dates for other regions.

Andrew Cogswell, 3/25/2019

# Atlantic Zone Off-Shelf Monitoring Program

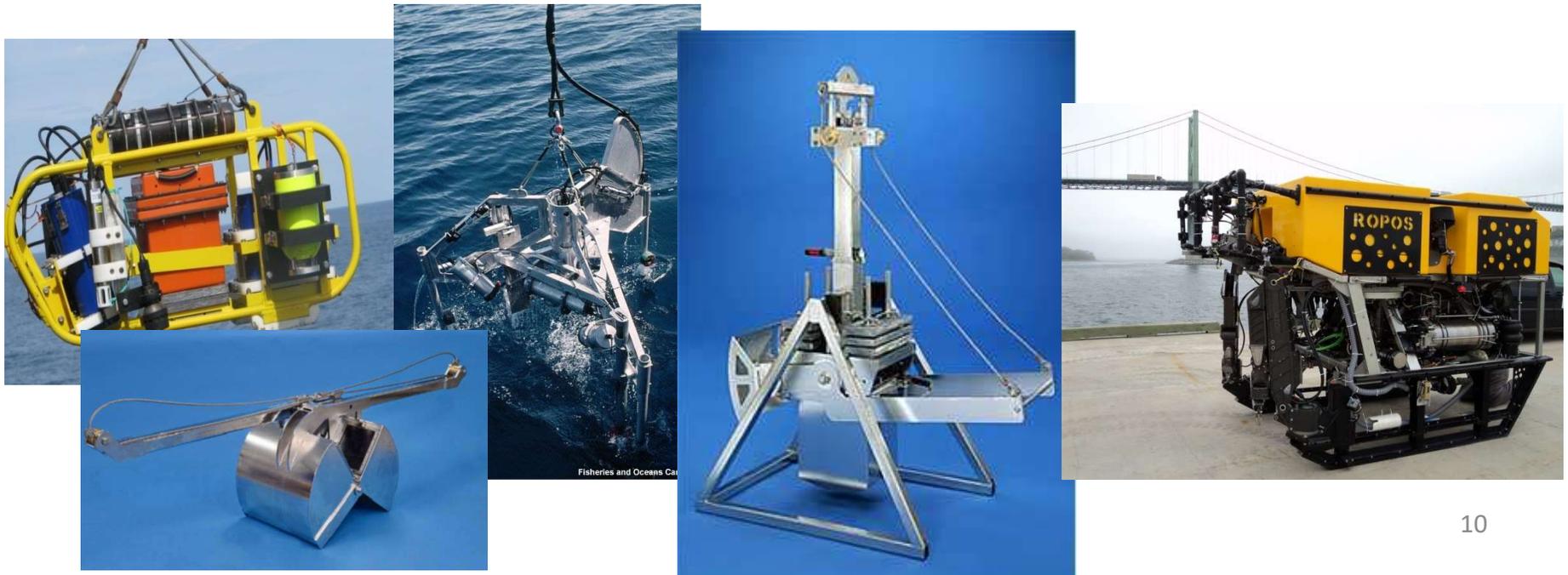
- Lab Sea Monitoring
- Scotian Slope/Rise Monitoring
- Argo float program
- Moorings
- Typically in May  
(~24 days + 4 days for mob/demob)





# Mission Specific Program Objectives/Equipment

- The benthic program involves visualizing, recording and collecting ocean bottom fauna and geological samples with an array of benthic imaging and sample collection methods:



# Benthic Program Operational Requirements (partial list)

- Timing:
  - Usually summer (Jun – Sep) but not exclusively
    - 3-4 weeks in duration
    - 3 days mob and 2 days demob
- Operational area (Mission dependent)
- Personnel
  - 24 to 26
  - 24 hour operations
  - Crew and deckhands for winches and cranes and mob/demob
  - Ship's Technician available 24 hours



# North Atlantic Right Whale Survey

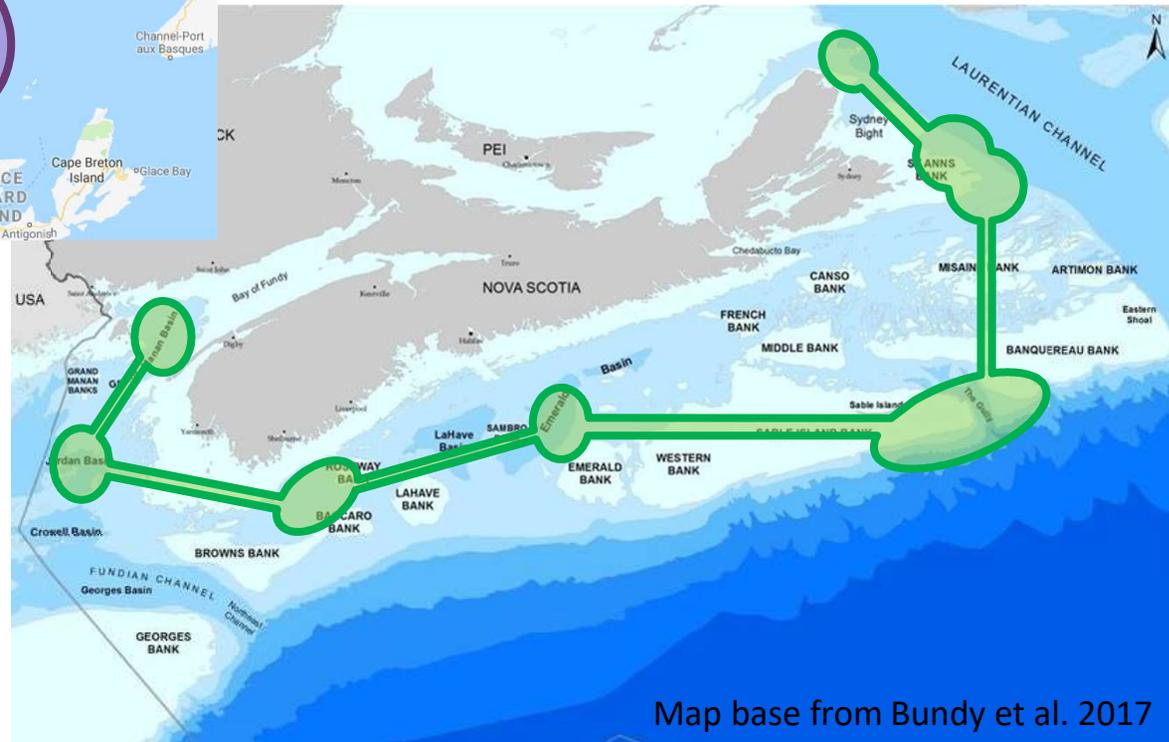
## Mission Objectives:

- Document NARW in the Gulf of St. Lawrence and Scotian Shelf/Bay of Fundy
- Describe distribution of prey and processes driving this distribution
- Understand effects of a ship-based oil spill on the NARW habitat
- Microplastics characterization

# Area of Interest



Opportunistic drone work (Oct)



Likely similar coverage in 2020 and beyond, although activities and effort may change.

# Mission Timing (Gulf of St. Lawrence)

- 28 days when the NARW are present:
  - August is preferred
  - July and September also possible
- Demobilization at BIO in Dartmouth
- Drone work in October where/when possible

# Questions



# Annex AZMP

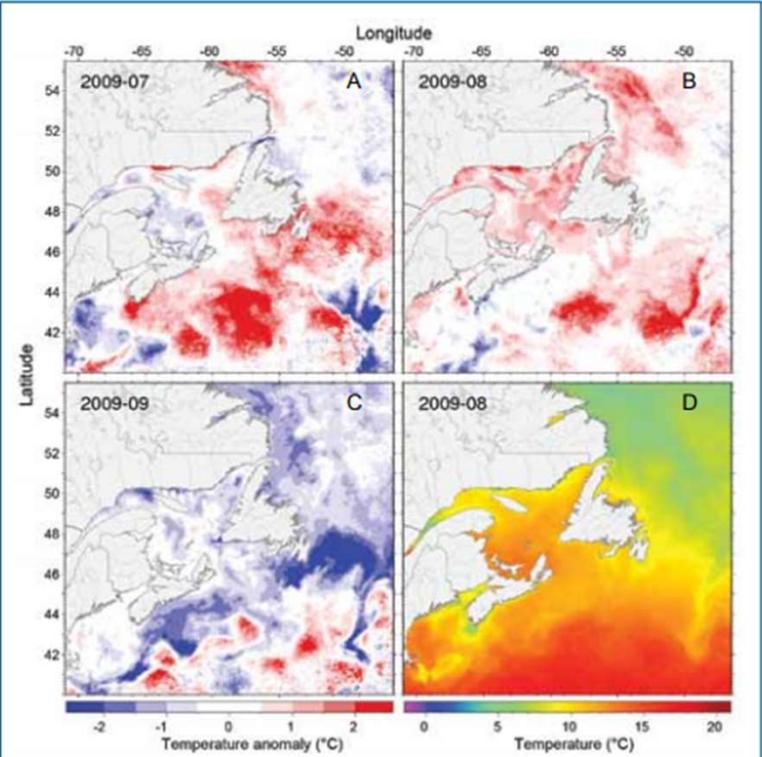
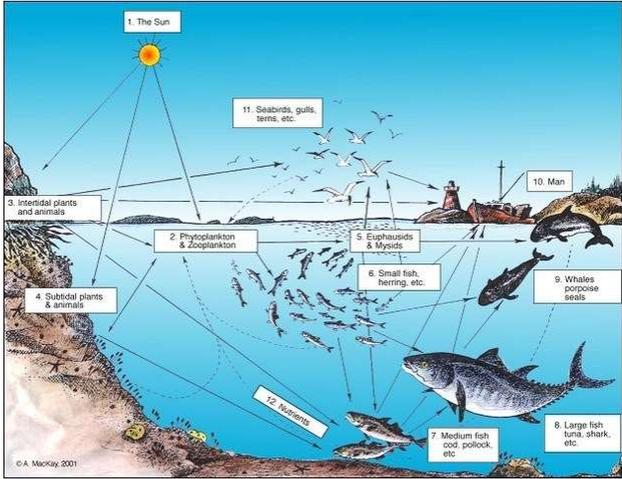


Fig. 1 Sea-surface temperature anomalies (A, B, C; July, August, and September 2009) and sea-surface temperature (D; August 2009) in the AZMP region. Temperature anomalies are based on a 1985–2009 climatology.

*Anomalies de température de la surface de la mer (A, B, C; juillet, août et septembre 2009) et température de la surface de la mer (D; août 2009) dans la région du PMZA. Les anomalies de température sont basées sur la climatologie de 1985 à 2009.*



# Monitoring Program Operations

- Hundreds of separate operations, including:
  - Seabird 911plus CTD and 24 bottle Rosette (10-12 L Niskin bottles) from surface to 5-10 m above bottom with electromechanical sea-cable for real-time display of data
  - Heated CTD sampling/storage for NL and AZOMP
  - Space equipped for water sampling
  - 200 – 5000 m maximum water depth (regionally dependent)



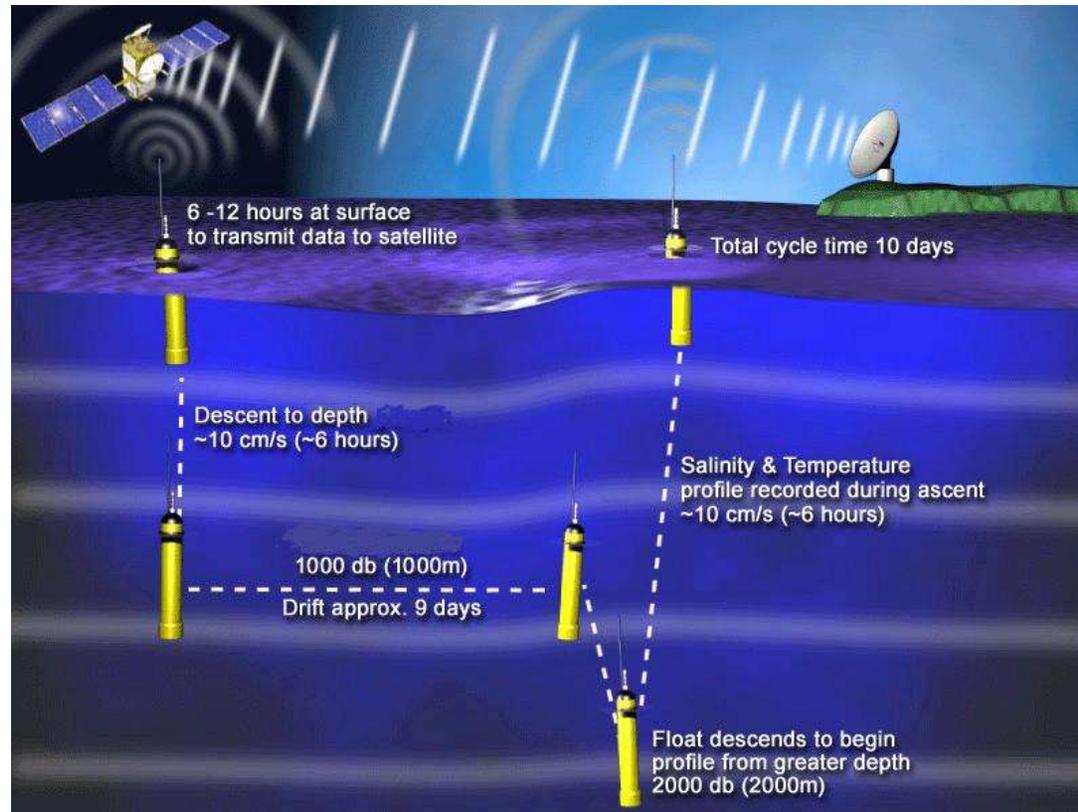
# Monitoring Program Operations

- Vertical Ring Nets from bottom or 1000 m (which is shallower) to surface
- Requires hydrographic winch with 2000 m wire minimum
- Shallow (50 m) towed oblique nets (Québec)
- Seawater is required nearby to wash down nets



# Monitoring Program Operations

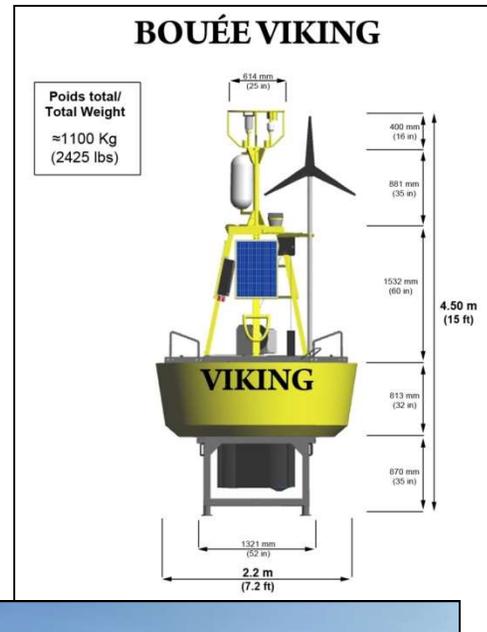
## – ARGO floats deployments



# Monitoring Program Operations

– Mooring/buoy recoveries and deployments

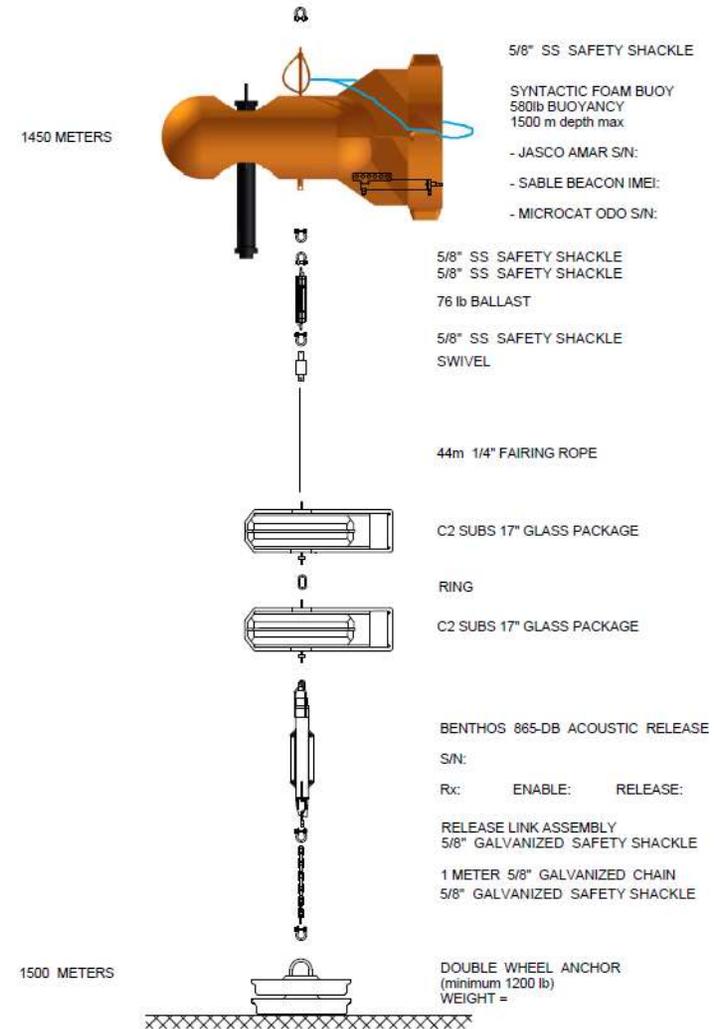
Surface mooring



Subsurface mooring

MOORING # 2025  
 Cetacean Mooring - The Gully  
 Dr. H. Moors-Murphy Oct 2017

Rev A2:  
 Model 1948b1  
 2017 July 13  
 J. Barthelotte



# Monitoring Program Operations

- Other potentially required systems:
  - Underway seawater sampling
  - ADCP and data acquisition system
  - High frequency acoustics system
  - Knudsen system

# Monitoring Program Operational Requirements (partial list)

- 24 hour operations
- >3000 nm travelled/mission and up to 300 nm offshore at 100+ stations
- Minimum 14 berths and 4/cabin max (24 for AZOMP)
- Ample lab, bench, freezer, deck science equipment and chemical storage space
  - Regionally and mission dependent
- Program specific cranes, winches and A-frames
- Access to clean sea water in labs and on deck
- Ice capability (Gulf, NL and AZOMP)
- Room for Observers on the bridge
- High speed rescue craft for crew transfers and operations
- Deck hands to assist with deck operations and mob/demob
- Ship's Technician available 24 hours
- NAV data in all work spaces
- Access to ship's network for logging data
- Internet service

# Annex Benthic Mission

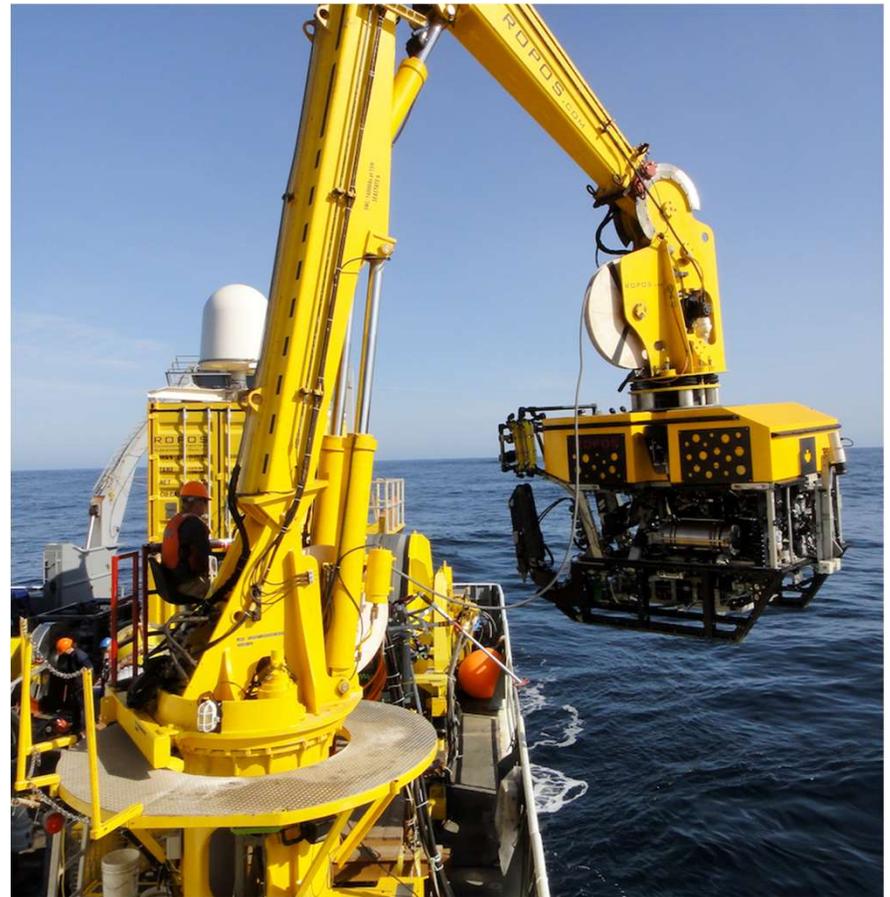


# ROV Operations

- Vessel must be capable of offshore operation of ROV to 3000 m
  - In sea state 5 conditions (speed 22-27 knots; wave height 2.4-4 m)
- Accurately keep station for long periods (over 24 hours) in watch circle around ROV
- Maintain complementary track to ROV in 'transect mode'

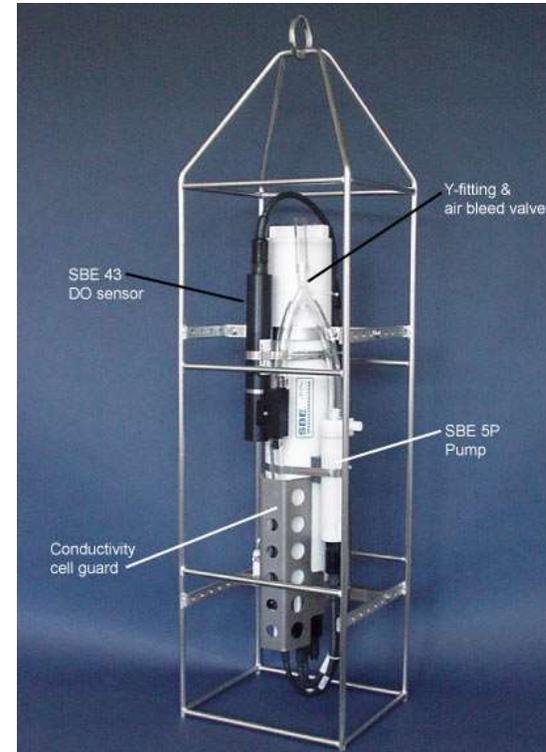
# Example ROV: ROPOS

- 40 HP Science/Work Class ROV
- Own Launch and Recovery System (LARS)
- Navigation and positioning system which uses boom-mounted transducer



# Other Gear

- Water sampling system
  - SBE 25 CTD plus Niskin bottles
  - Requires metred block, winch, and wire capable to 3000 m
  - Dedicated work space on deck for launch and recovery of gear



# Benthic Program Operational Requirements (partial list)

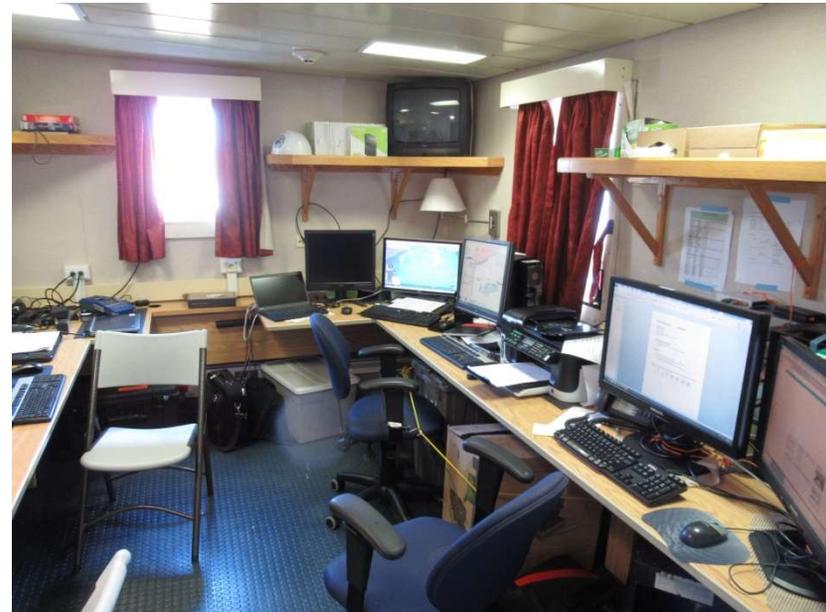
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# Benthic Program Operational Requirements

- Navigation/Network:
  - NAV data available in all work spaces
  - Access to ship's network and data storage
  - Internet service to all science personnel

# Benthic Program Operational Requirements

- Data Acquisition:
  - Space for ROV operators and science staff
  - Ample room for monitors, controls and computer equipment



# Benthic Program Operational Requirements

- Space:
  - Ample deck, lab, bench, chemical and science equipment storage space to meet mission specific requirements



# Annex Whale Mission

