

Hudson 2016-019 International Deep Sea Science Expedition Cruise Report

E. Kenchington, L. Beazley, I. Yashayaev

Ocean and Ecosystem Sciences Division
Maritimes Region
Fisheries and Oceans Canada

Bedford Institute of Oceanography
PO Box 1006
Dartmouth, Nova Scotia
Canada B2Y 4A2

2017

Canadian Data Report of Fisheries and Aquatic Sciences 1277



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canada

Canadian Data Report of Fisheries and Aquatic Sciences

Data reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of the series reflects the broad interests and policies of Fisheries and Oceans Canada, namely, fisheries management, technology and development, ocean sciences, and aquatic environments relevant to Canada.

Data reports are not intended for general distribution and the contents must not be referred to in other publications without prior written clearance from the issuing establishment. The correct citation appears above the abstract of each report. Each report is abstracted in the data base *Aquatic Sciences and Fisheries Abstracts*.

Data reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page.

Numbers 1-25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26- 160 were issued as Department of Fisheries and Environment, Fisheries and Marine Service Data Reports. The current series name was changed with report number 161.

Rapport statistique canadien des sciences halieutiques et aquatiques

Les rapports statistiques servent de base à la compilation des données de classement et d'archives pour lesquelles il y a peu ou point d'analyse. Cette compilation aura d'ordinaire été préparée pour appuyer d'autres publications ou rapports. Les sujets des rapports statistiques reflètent la vaste gamme des intérêts et politiques de Pêches et Océans Canada, notamment la gestion des pêches, la technologie et le développement, les sciences océaniques et l'environnement aquatique, au Canada.

Les rapports statistiques ne sont pas préparés pour une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans autorisation écrite préalable de l'établissement auteur. Le titre exact figure au haut du résumé de chaque rapport. Les rapports à l'industrie sont résumés dans la base de données *Résumés des sciences aquatiques et halieutiques*.

Les rapports statistiques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement d'origine dont le nom figure sur la couverture et la page du titre.

Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

Canadian Data Report of Fisheries and
Aquatic Sciences 1277

2017

Hudson 2016-019 International Deep Sea Science Expedition Cruise Report

E. Kenchington, L. Beazley, I. Yashayaev

Fisheries and Oceans Canada
Ocean and Ecosystem Sciences Division
Maritimes Region
Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
B2Y 4A2

© Her Majesty the Queen in Right of Canada, 2017.

Cat. No. Fs97-6/1277E-PDF ISBN 978-0-660-08910-2 ISSN 1488-5395

Correct citation for this publication:

Kenchington, E., Beazley, L., and Yashayaev, I. 2017. Hudson 2016-019 International Deep Sea Science Expedition Cruise Report. Can. Data Rep. Fish. Aquat. Sci. 1277: v + 55p.

Table of Contents

ABSTRACT.....	iv
RÉSUMÉ	v
Cruise Dates, Participants and Shift Schedule	2
General Voyage Track and Major Work Locations	3
List of Science Equipment	4
Equipment Supplied by or through Federal Departments at the Bedford Institute of Oceanography	4
Equipment Supplied through NEKTON	4
Summary of Operations	5
Detailed Summary of Activities in Work Locations.....	6
Work Location 1 – Emerald Basin/Vazella Sponge Grounds.....	6
Sea Pen Significant Benthic Area	7
Work Location 2 – Oceanographic Transect between Nova Scotia and Bermuda	7
The Extended Halifax Line (Atlantic Zone Offshore Monitoring Program -AZOMP)	8
The Ecological Roles of the Cold Walls of Western Boundary Currents: Gulf Stream	15
Work Location 3 – Kelvin Seamount	19
Work Location 4 – Bermuda.....	21
Bowditch Seamount	22
Plantagenet (Argus) and Challenger Banks	25
Work Location 5 – The Gully Marine Protected Area.....	30
Hydrographic Sampling in the Gully MPA	34
Work Location 6 – Logan Canyon.....	37
Acknowledgements.....	38
Appendix 1. Details of Gear Deployments	39
Appendix 2. Collection Permits, Approvals and Authorizations Associated with the Hudson 2016-019 Mission.....	47
Bermuda Government	47
Gully Marine Protected Area Approval	49
Vazella Sponge Closures	51
DFO Fisheries Authorization	52

ABSTRACT

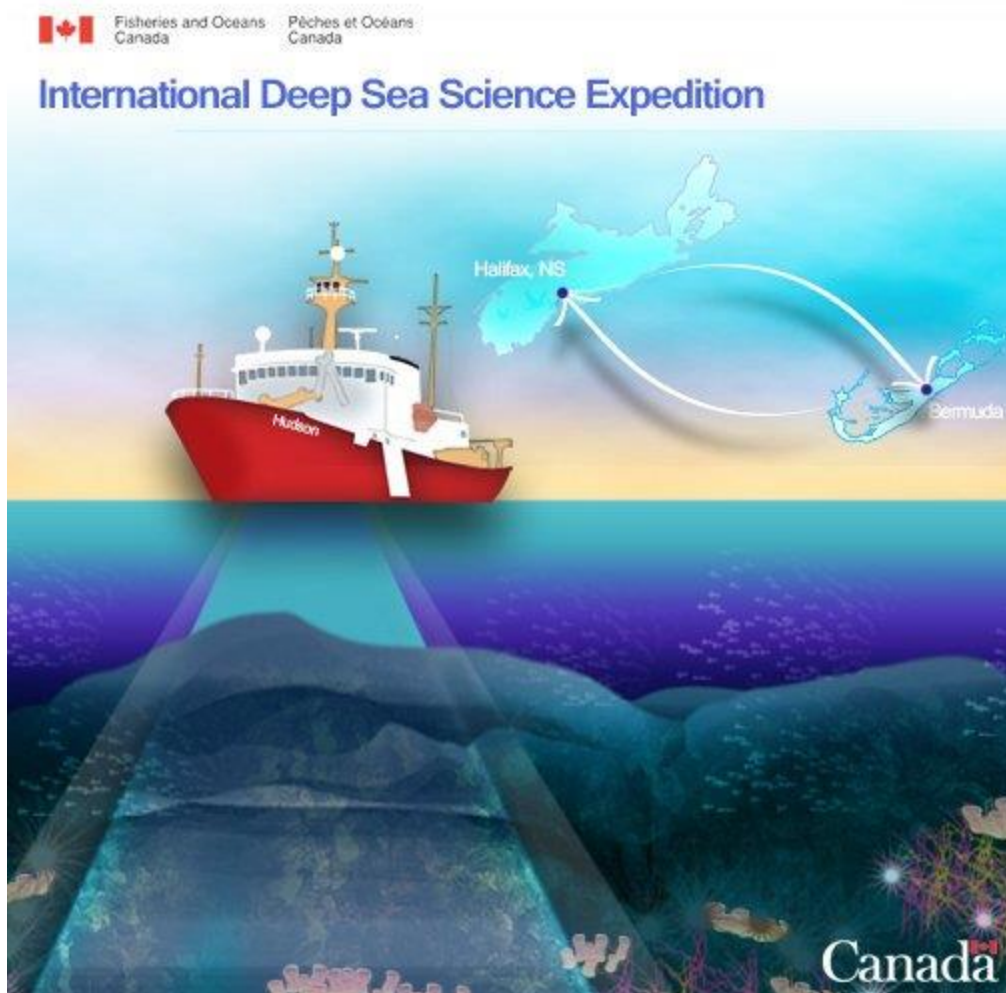
Kenchington, E., Beazley, L., and Yashayaev, I. 2017. Hudson 2016-019 International Deep Sea Science Expedition Cruise Report. Can. Data Rep. Fish. Aquat. Sci. 1277: v + 55p.

Fisheries and Oceans Canada conducted an international deep sea science expedition from July 14 to August 16, 2016. There were 25 scientists and contractors on board drawn from 3 Canadian federal departments, i.e., Fisheries and Oceans Canada (DFO), Defence Research and Development Canada (DRDC), Environment and Climate Change Canada (ECCC) Canadian Wildlife Service (CWS), 3 collaborators, i.e., NEKTON, the EU Horizon 2020 projects ATLAS and SponGES, and ROV and multibeam operators (contracted through NEKTON). In addition Natural Resources Canada – Geological Survey of Canada (Atlantic) (NRCAN), the Canadian Hydrographic Service (CHS), and colleagues within DFO provided the mission with essential scientific gear and expertise. Data on the physical oceanography were collected using ARGO float, CTD, XBT, SXV and Niskin bottles. Data on the biological oceanography was collected with a neuston net, a multinet and a MVP. Benthic data were collected with a drop camera (4Kcamera), ROV, Van Veen grab, box core, and multibeam. The mission deployed 397 operations, 12 of which were gear tests. Of the total number of operations, there was a high success rate (90%), with success being defined as deployment and retrieval with data collected. The quality of the data was not factored into this calculation. The total time of in water operations was 335 hours for gears where such a compilation is meaningful. This report provides the details for each operation, including position and whether it was successful. The positions of most operations were also mapped according to geographic locale.

RÉSUMÉ

Kenchington, E., Beazley, L., and Yashayaev, I. 2017. Hudson 2016-019 International Deep Sea Science Expedition Cruise Report. Can. Data Rep. Fish Aquat. Sci. 1277: v + 55p.

Pêches et Océans Canada a dirigé une expédition scientifique dans les grands fonds du 14 juillet au 16 août 2016. Vingt-cinq scientifiques et entrepreneurs provenant de trois ministères fédéraux canadiens (Pêches et Océans Canada [MPO], Recherche et développement pour la défense Canada [RDDC], Service canadien de la faune [SCF] d'Environnement et Changement climatique Canada [ECCC]) se trouvaient à bord, ainsi que trois collaborateurs (c.-à-d. NEKTON, les projets ATLAS et SponGES du programme Horizon 2020 de l'UE et opérateurs de VTG et multifaisceaux [au moyen d'un contrat conclu avec NEKTON]). En outre, la Commission géologique du Canada (Atlantique) (CGCA) de Ressources naturelles Canada, le Service hydrographique du Canada (SHC) et les collègues au sein du MPO ont fourni à la mission du matériel scientifique et une expertise essentiels. Des données sur l'océanographie physique ont été recueillies à l'aide de flotteurs ARGO, de sondes CTP, de bathythermographes largables (XBT), d'engin SXV et de bouteilles Niskin). Des données sur l'océanographie biologique ont été collectées grâce à un filet à Neuston, un filet multiple et un profileur embarqué sur un navire en déplacement. Des données benthiques ont été récoltées à l'aide d'une caméra sous-marine (caméra 4K), d'un VTG, d'une benne Van Veen, d'un carottier à boîte et d'un multifaisceau. La mission a permis l'exécution de 397 opérations, dont 12 d'entre elles étaient des essais d'engin. Sur le nombre total d'opérations exécutées, on a observé un taux de réussite élevé (90 %), que l'on définit comme étant des activités de déploiement et d'extraction ayant permis la collecte de données. La qualité des données n'a pas été prise en compte dans ce calcul. La durée totale des opérations dans l'eau était de 335 heures pour les engins concernant lesquels une compilation est importante. Ce rapport fournit les détails de chaque opération, y compris la position et le degré de réussite. Les positions de la plupart des opérations ont également été cartographiées selon la géographie locale.



HUDSON 2016-019 International Deep Sea Science Expedition Cruise Report

July 14 - August 16th, 2016

Chief Scientists: E. Kenchington/L. Beazley

Chief Oceanographer: I. Yashayaev

Cruise Dates, Participants and Shift Schedule

The original departure date was July 14, 2017 but this was delayed until July 19, 2017 primarily due to missing parts (fan) and preparation work associated with the contracted ROV and the need for Canadian Coast Guard (CCG) to make repairs to the boom in the CTD room. This meant that one of the seamounts (Gregg Seamount) that we had hoped to visit was dropped and other smaller adjustments were made to make up for the lost time. The ROV continued to delay mission objectives throughout, and was never fully functional. The end date was August 16, 2017 and the vessel departed and returned from the port of Halifax, Nova Scotia, Canada.

There were 25 scientists and contractors on board (Table 1) drawn from 3 Canadian federal departments, i.e., Fisheries and Oceans Canada (DFO), Defence Research and Development Canada (DRDC), Environment and Climate Change Canada (ECCC) Canadian Wildlife Service (CWS), 3 collaborators, i.e., NEKTON, the EU Horizon 2020 projects ATLAS and SponGES, and ROV and multibeam operators (contracted through NEKTON). Natural Resources Canada – Geological Survey of Canada (Atlantic) (NRCAN), the Canadian Hydrographic Service (CHS), and colleagues within DFO provided the mission with essential scientific gear and expertise. The mission operated using two 12-hour shifts. The day shift ran from 0600 to 1800, while the night shift ran from 1800 to 0600. L. Beazley was chief scientist in Bermuda.

Table 1. Cruise participants, affiliation, participation, shift, and roles.

Name	Affiliation	Participation	Shift	Role
Allen, Terry	DSSI	Full	0600-1800	ROV operator
Anstey, Carol	DFO	Full	1800-0600	Water sampler
Beazley, Lindsay*	DFO	Full	0600-1800	Water/benthic
Benjamin, Robert	DFO	Full	0500-1700	Data manager
Bohan, Aileen	NEKTON contract	1 st , 2 nd legs	1800-0600	Multibeam operator
Cormier, Terry	DFO	Full	1800-0600	CTD operator
Fotheringham, Mark	DRDC	Full	1800-0600	MVP operator
Graham, Daniel	DRDC	Full	0600-1800	MVP operator
Hawkes, Nickolas	UiB (SponGES)	Full	0600-1800	Logbook/benthos
Henry, Lea-Anne	Heriot-Watt (ATLAS)	2 nd , 3 rd legs	0600-1800	Logbook/benthos
Kempf, Philipp	NEKTON contract	Full	1800-0600	Multibeam operator
Kenchington, Ellen*	DFO	1 st , 3 rd legs	Flexible	Chief scientist
Lirette, Camille	DFO	Full	1100-2300	Data manager
MacDonald, Barry	DFO	Full	0600-1800	Gear/logistics
Murillo, Javier	DFO	Full	0600-1800	Logbook/benthos
Noftall, Mark	DSSI	Full	0600-1800	ROV operator
Nealova, Lenka	NEKTON	Full	0600-1800	Logbook
Parent, Sonia	DFO	3 rd leg	Flexible	Communications
Roterman, Nicolai	NEKTON	Full	0600-1800	Oceanography
Toms, Brad	CWS (ECCC)	Full	0600-1800	Bird/whale watcher
Sherwood, James	DSSI	Full	0600-1800	ROV operator
van der Grient, Jesse	NEKTON	Full	1800-0600	Logbook
Woodall, Lucy	NEKTON	Full	0600-1800	Sampling
Xavier, Joana	UiB (SponGES)	1 st leg	0600-1800	Benthos (sponges)
Yashayev, Igor	DFO	Full	Flexible	Oceanography

General Voyage Track and Major Work Locations

The general voyage track is shown in Figure 1. The areas of operation were Emerald Basin, Kelvin Seamount, Transect between Halifax and Bermuda including the Gulf Stream front, Bermuda, the Gully MPA, and Logan Canyon.

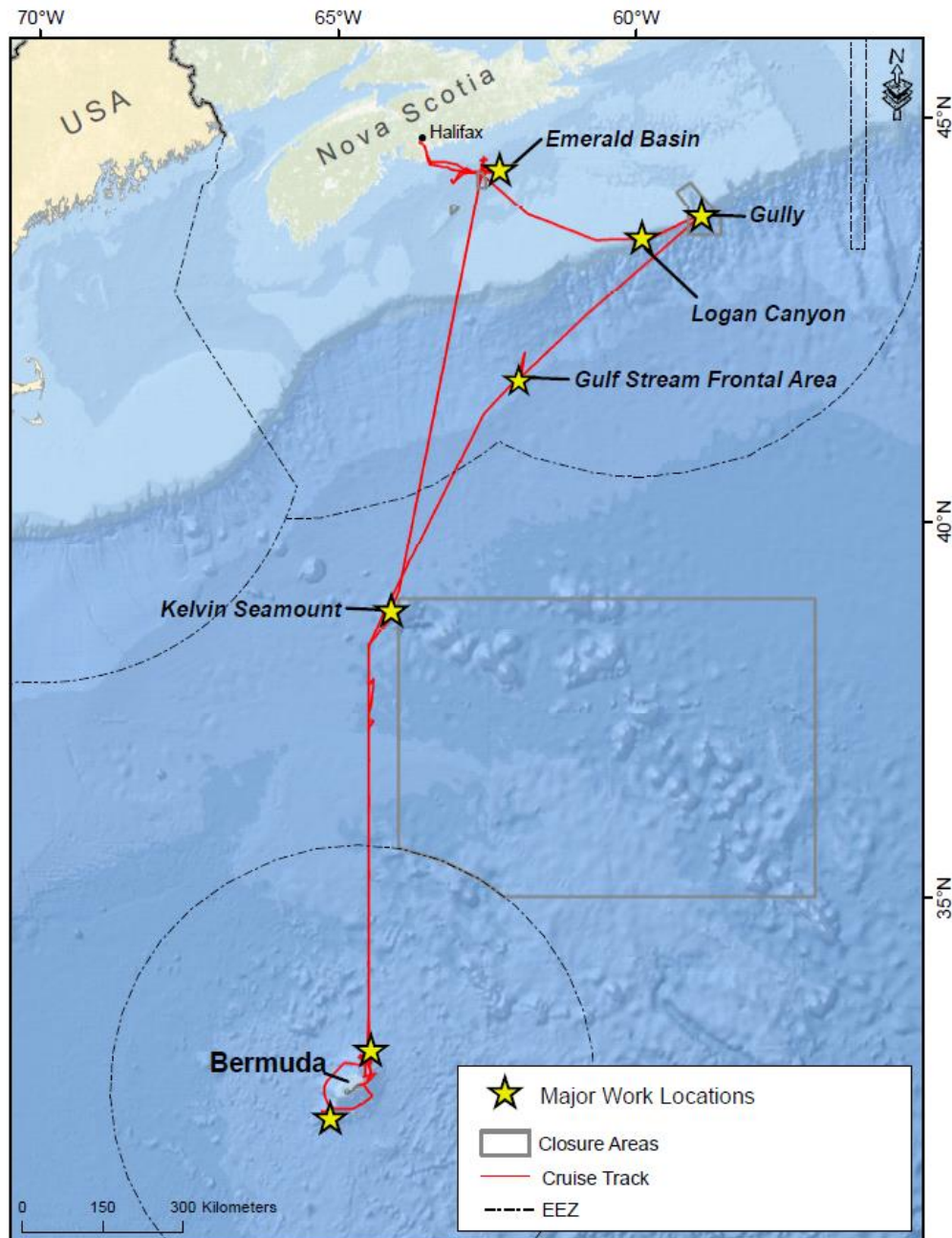


Figure 1. Voyage track (red line) for the Hudson 2016-019 mission. General operations and major work locations are identified by the yellow stars. The NAFO New England Seamount Closure is indicated, along with national exclusive economic zones.

List of Science Equipment

Equipment Supplied by or through Federal Departments at the Bedford Institute of Oceanography

CTD and Rosette (T. Cormier, DFO)
Moving Vessel Profiler (MVP) (D. Graham, DRDC) (Fish and sensors/CHS and DFO)
Mega Box Corer (P. Pledge, NRCan)
4K Camera system (4KCam) (P. Pledge, NRCan)
4K Camera system (4KCam) (G. Standon, Geoforce)
Van Veen grabs (2) (P. Pledge, NRCan)
XBT and SVPs (B. MacDonald, DFO) (Figure 2) (D. Graham, DRDC) (A. Hartling, DFO)
Multinet (M. Ringuette, DFO)
Ringnet (M. Ringuette, DFO)
SBE 25 CTD (E. Kenchington, DFO)
SBE 39 (E. Kenchington, DFO)
Niskin Bottles (E. Horne, DFO)
3 VHF Radios for onboard communications (E. Kenchington, DFO)
Beacons and charger (E. Kenchington, DFO)
Photographic Equipment and Microscopes in the GP Lab (E. Kenchington, DFO)
Regulus navigation system - 4 Regulus computers (P. Pledge, NRCan)
NAVNET (R. Benjamin, DFO)
Video editing/digital conversion system (E. Kenchington, DFO)
Sorting tray, sieve table and trough system (E. Kenchington, DFO)
Steel Cages for Formaldehyde and Sample storage on the stern (E. Kenchington, DFO)
Reefer Container (2) (COOGER, DFO)
Live holding system (B. MacDonald, DFO)
Refrigerator and freezer (E. Kenchington, DFO)
-80 Ultra Cold freezer (E. Kenchington, DFO)
Underway system (A. Hartling, DFO)
Liquid Nitrogen and Dewars (Tim Perry, DFO)
Salometer (G. States, DFO)
Oxygen Titration equipment (S. Punshon, DFO)
Water filtration equipment (B. MacDonald / M. Ringuette, DFO)
Turner Fluorometer (M. Ringuette, DFO)

Equipment Supplied through NEKTON

Remotely Operated Vehicle (ROV) (Deep Sea Systems International (DSSI)- Oceaneering)
Pole-mounted Multibeam system (Contracted; L. Woodall, NEKTON, MacGregor)
USBL- Sonardyne Ranger 2 with two Sonardyne Wideband Mini Transport (WMT) beacons - Applied Acoustics, UK/ROMOR (L. Woodall, NEKTON)
Neuston net (L. Woodall, NEKTON)



Figure 2. Barry MacDonald of Fisheries and Oceans Canada deploying an eXpendable BathyThermograph (XBT). The probe is dropped from the ship and measures the temperature as it falls through the water, transmitting the data back to the ship.

Summary of Operations

The mission deployed 397 operations, 12 of which were gear tests, with 3 of those conducted in the Bedford Basin, Halifax, Nova Scotia (Table 1, Appendix 1). Of the total number of operations, there was a high success rate (90%), with success being defined as deployment and retrieval with data collected. The quality of the data was not factored into this calculation. The total time of in water operations was 335 hours for gears where such a compilation is meaningful. Appendix 1 lists the details for each operation. Each time gear was deployed it was assigned an unique consecutive number referred to as a CON. The CON is linked to a number of data fields some of which are presented in the Appendix. Queries on associated data should refer to the CON and Station Name.

Table 1. Summary of Operations Conducted on Hudson 2016-019.

Operation	Successful	Test	Aborted	Total	Time (Hr)
Physical Oceanography					
ARGO	1	0	0	1	
CTD	50	0	2	52	75
XBT	190	0	9	199	
XSV	4	2	0	6	
Niskin	3	0	1	4	1
Biological Oceanography					
Neuston	22	0	2	24	8
MultiNet	15	0	0	15	13
MVP	28	2	0	30	128
Benthic					
Van Veen	4	0	1	5	5
4K Camera	13	2	4	19	31
ROV	13	3	7	23	29
Multibeam	8	3	0	11	40
Box Core	8	0	0	8	5
Total	359	12	26	397	335

Detailed Summary of Activities in Work Locations

Prior to proceeding to the first work location gear trials were undertaken in Bedford Basin (Station Name BB) primarily for the multibeam sounder. Some of the older XSVs were also tested. Permits, approvals and authorizations associated with the mission are listed in Appendix 2.

Work Location 1 – Emerald Basin/Vazella Sponge Grounds

Overview

Six different sites within Work Location 1 - Emerald Basin/Vazella Sponge Grounds were sampled with various gears (Figure 3). This is a Case Study Area for the EU Horizon 2020 project SponGES (grant agreement No 679849) and all deployments were conducted as part of DFOs contribution to the SponGES project (Appendix 2). In this work area a single 4KCam transect (Station SP 3, CON 397) was conducted opportunistically. Objectives in this area were compromised due to the presence of pelagic longlines which restricted operations to day during the August dates.

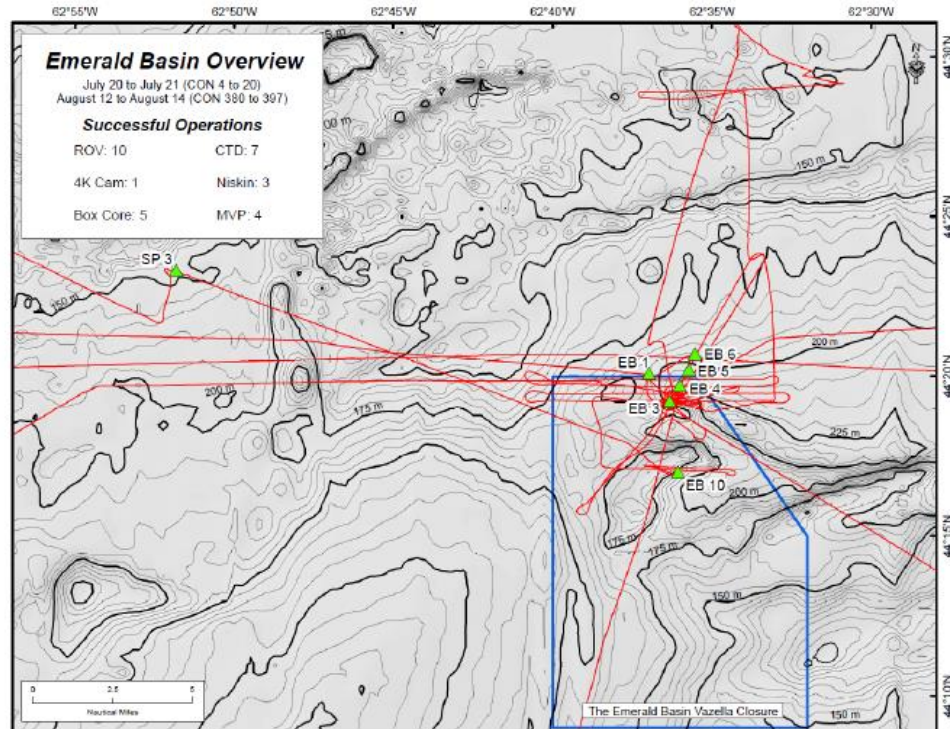


Figure 3. Location of Stations EB -1,3,4,5,6 10 within Work Location 1-Emerald Basin/Vazella Sponge Grounds (green triangles). Red track indicates ship movements; Blue Box represents the Emerald Basin Vazella Sponge Closure.

Summary of Operations:

Day of Year: 202 – 203 (CON 4 to 20)

Day of Year: 225 – 227 (CON 380 to 397)

Sea Pen Significant Benthic Area

A 975 m photographic transect was run using the 4Kcam at approximately 146 m depth. This transect was planned opportunistically to adapt to the decision to remove from the area when the longlines were in the water. Fifty-two good photos were taken in an area identified as a Significant Benthic Area for sea pens. Sea pens were present in all photos and validated the species distribution modelling of Beazley et al. 2016 (*Canadian Technical Report of Fisheries and Aquatic Sciences* 3172: vi+189p.)



Work Location 2 – Oceanographic Transect between Nova Scotia and Bermuda

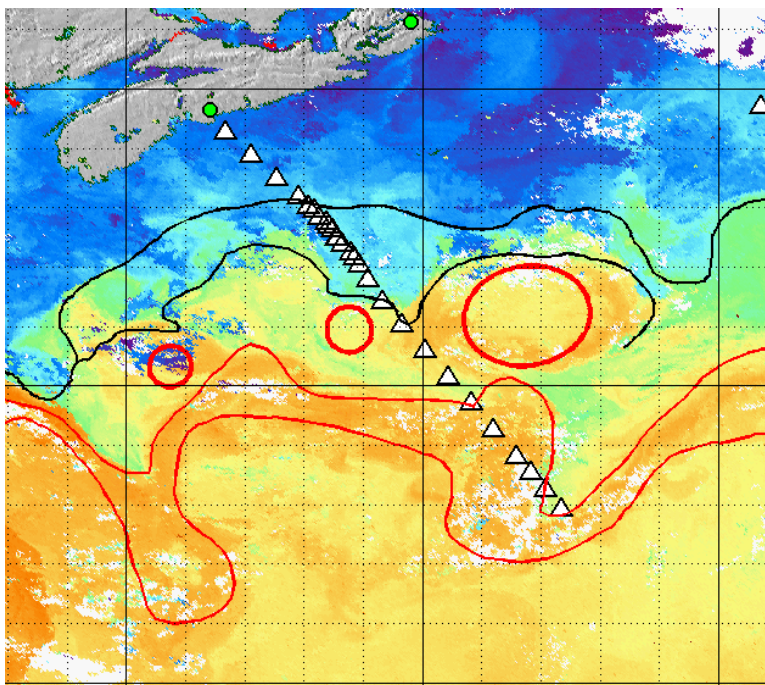
Overview

These projects were presented by DFO and embraced by the EU Horizon 2020 Project ATLAS Work Package 1: Ocean Dynamics Driving Ecosystem Response (grant number 678760) and are considered a DFO contribution to ATLAS. I. Yashayaev, E. Head and E. Kenchington are all associated with ATLAS.

The Extended Halifax Line (Atlantic Zone Offshore Monitoring Program -AZOMP)

Project Lead: Dr. I. Yashayaev, DFO-BIO

The Scotian Slope/Rise Monitoring Program of the Bedford Institute of Oceanography, Department of Fisheries and Oceans (DFO), collects and analyzes physical, chemical and biological observations over the Scotian Slope and Rise at deep-water stations added to the offshore end of AZMP's Halifax Line. The stations are referred to as the eXtended Halifax Line (XHL) and are located over the continental rise and complement the AZMP stations over the continental slope and shelf. In the 1960s and 70s this line ran from Halifax to Bermuda and was known as AOL 4134. Sampling at the XHL stations is usually carried



out during the CCGS Hudson's return trip from the Labrador Sea in late spring. For most variables, the measurement protocol is the same as that in the Labrador Sea Monitoring Program. The variables measured from 2006-2010 are:

- Physical: Potential Temperature (θ), Salinity (S), Potential Density (σ_2 , referenced to 2000m), and Dissolved Oxygen (DO)
- Carbon: Alkalinity (Alk), Total Inorganic Carbon (TIC), Chlorofluorocarbon-12 (CFC-12)
- Nutrients: Nitrate, Phosphate, Silicate
- Biology: Bacteria, Chlorophyll, Picoplankton, Nanoplankton

AZOMP contributes to international ocean observation, climate and carbon programs such as the Global Ocean Observation System (GOOS), the Climate Variability and Prediction project (CLIVAR), the Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP), and the International Ocean Carbon Coordination Project (IOCCP). During 2008-2013 DFO monitoring on the Scotian Slope/Rise is being complemented by a collaborative moored measurement project with the National Oceanography Centre, as part of the UK Rapid Climate Change (RAPID) program.

Sampling of the Halifax to Bermuda Line was undertaken on the transit to and from Bermuda with the intent of reaching the Bermudean and Scotian slopes at either end (Figures 4-9). Physical oceanographic data were collected with CTDs, XBTs, XSVs, MVPs and an ARGO float deployment.

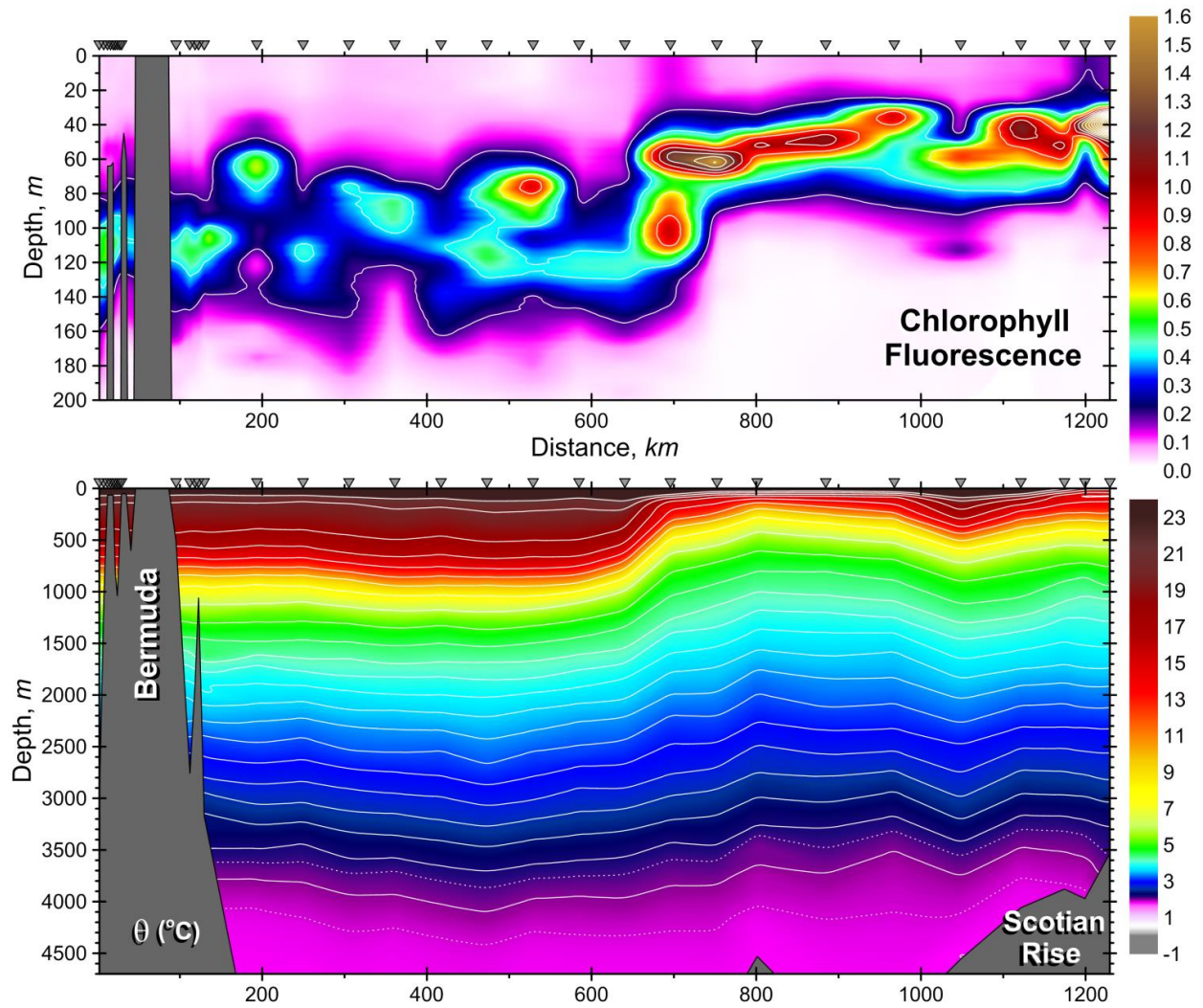


Figure 4. The figure shows an example of the physical oceanographic data collected on the Halifax to Bermuda Line collected at sea with preliminary data. Upper panel: Chlorophyll Fluorescence; Lower panel: Density. Bermuda on the left, Scotian slope on the right (graphics courtesy of Dr. I. Yashayaev).

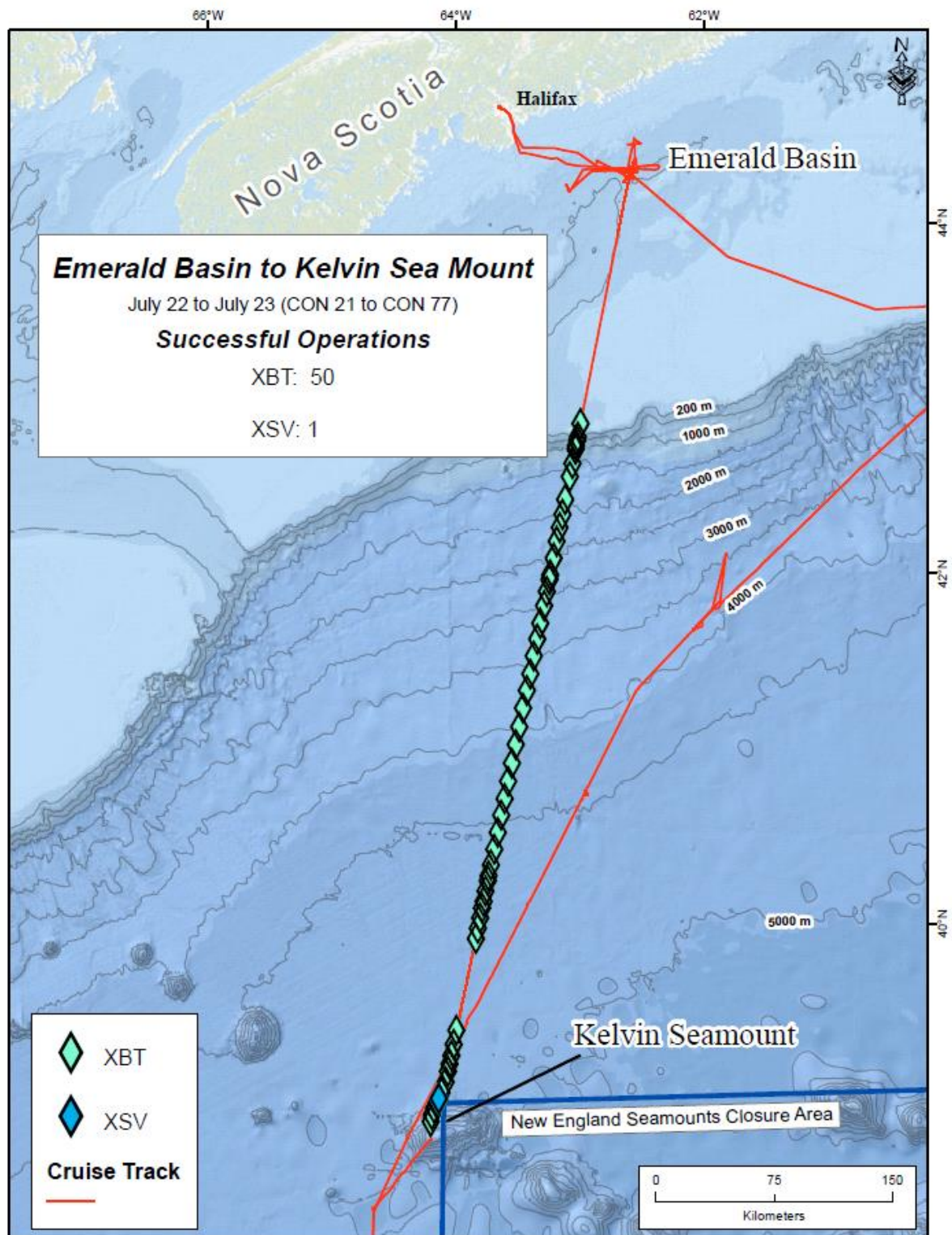


Figure 5. Location of XBT Stations within Work Location 2 -Emerald Basin to Kelvin Seamount (green triangles). Red track indicates ship movements; Blue Box represents the NAFO New England Seamount Closure Area to protect Vulnerable Marine Ecosystems (VMEs). The EEZ of Bermuda is indicated.

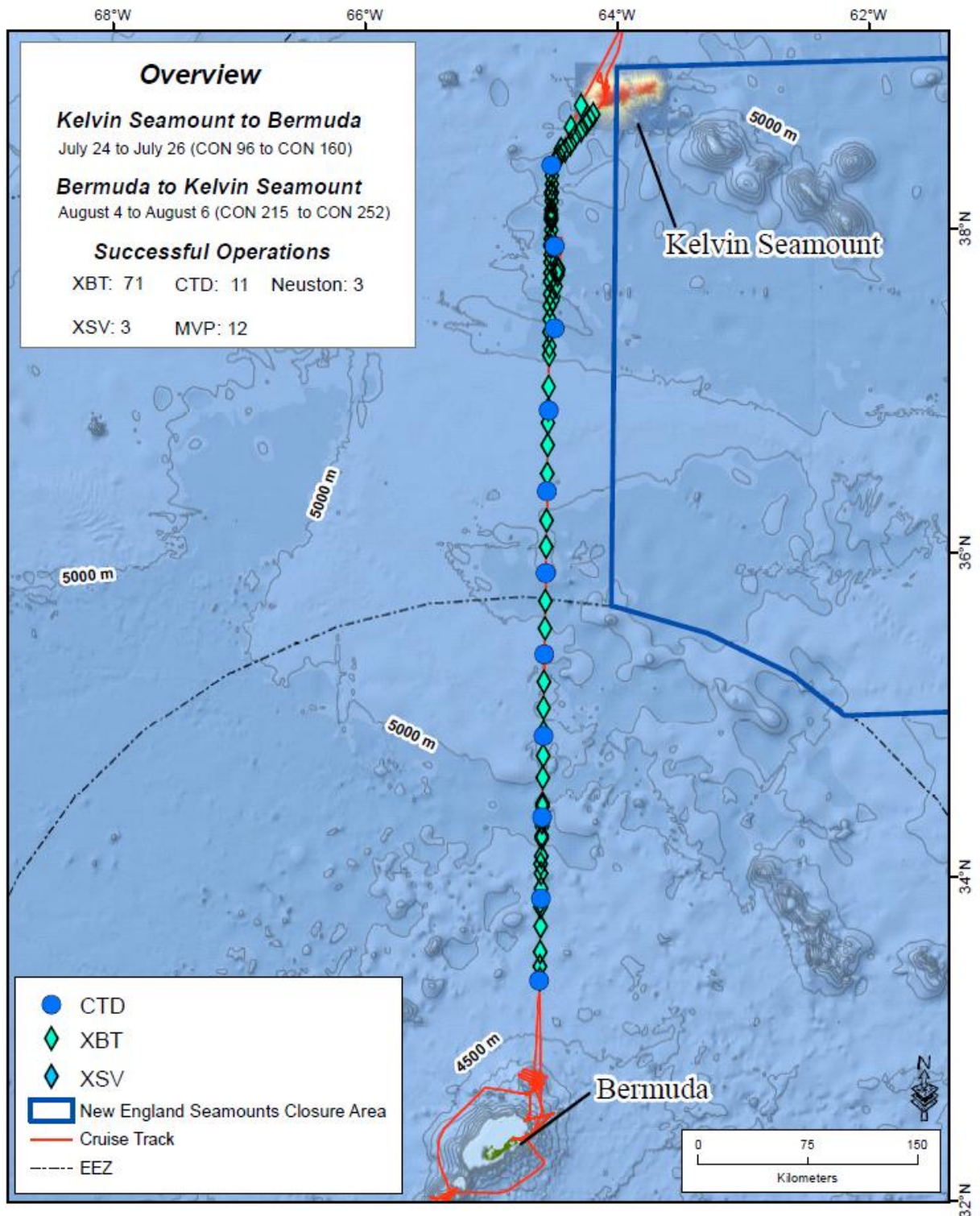


Figure 6. Location of Successful XBT, XSV and CTD Stations within Work Location 2 - Kelvin Seamount to Bermuda. Red track indicates ship movements; Blue Box represents the NAFO New England Seamount Closure Area to protect Vulnerable Marine Ecosystems (VMEs). The EEZ of Bermuda is indicated.

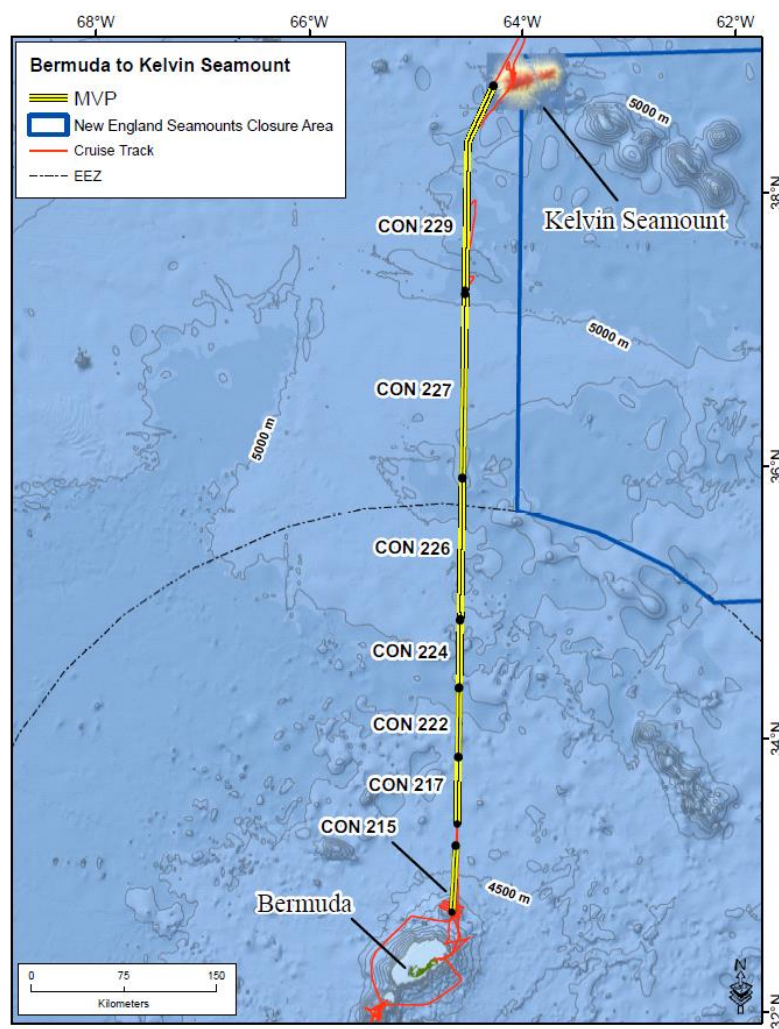
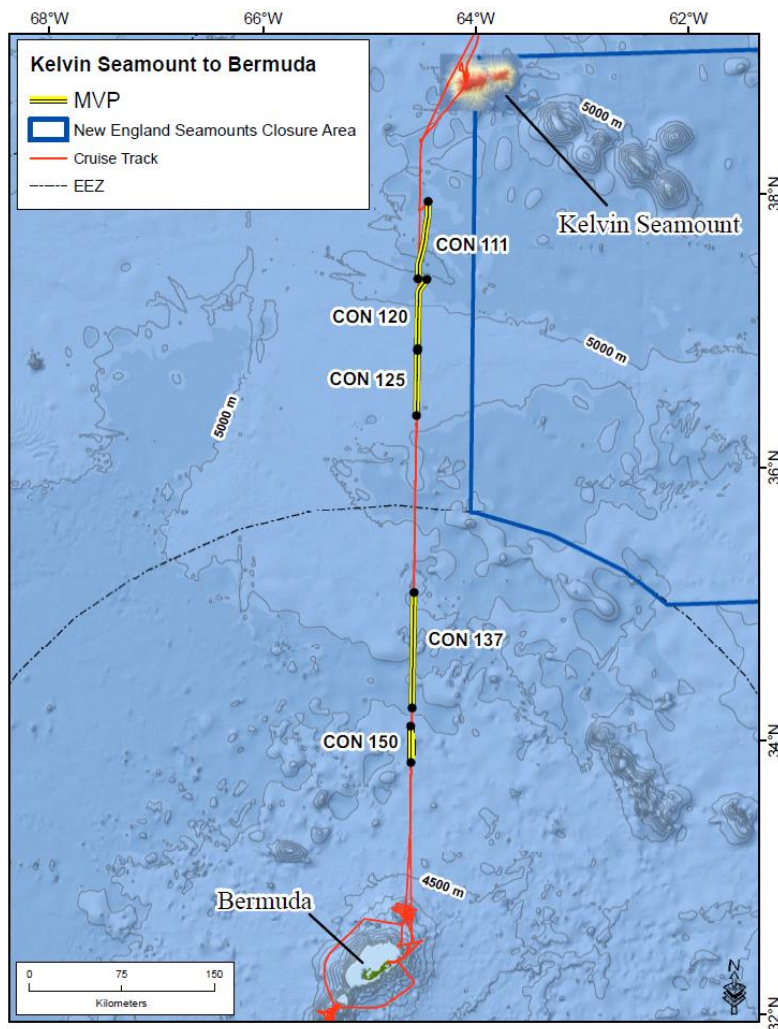


Figure 7. Location of MVP transects along the Halifax to Bermuda Line.

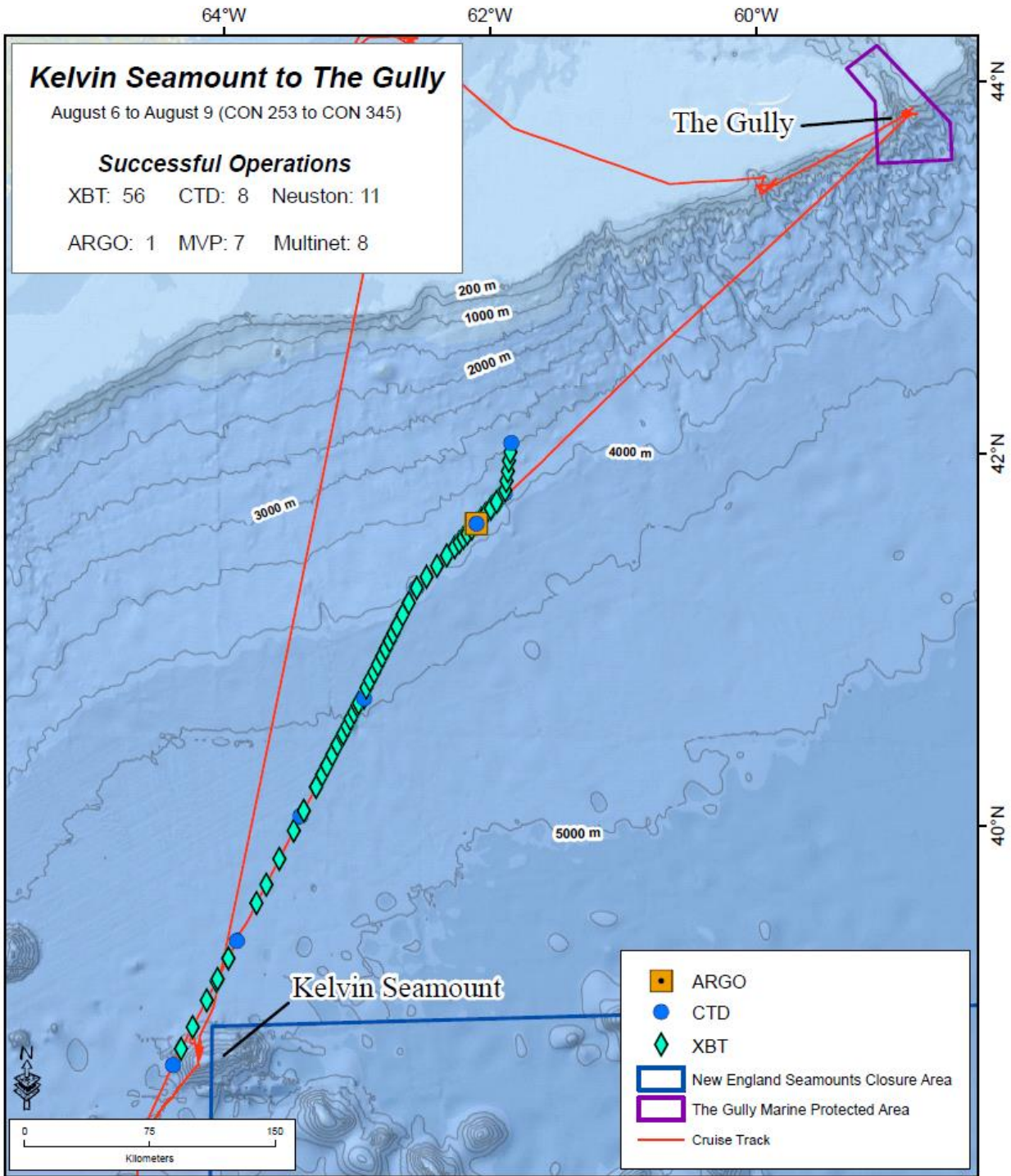


Figure 8. Location of Successful XBT, ARGO and CTD Stations within Work Location 2 - Kelvin Seamount to the Gully. Red track indicates ship movements; Blue Box represents the NAFO New England Seamount Closure Area to protect Vulnerable Marine Ecosystems (VMEs). The Gully MPA is indicated.

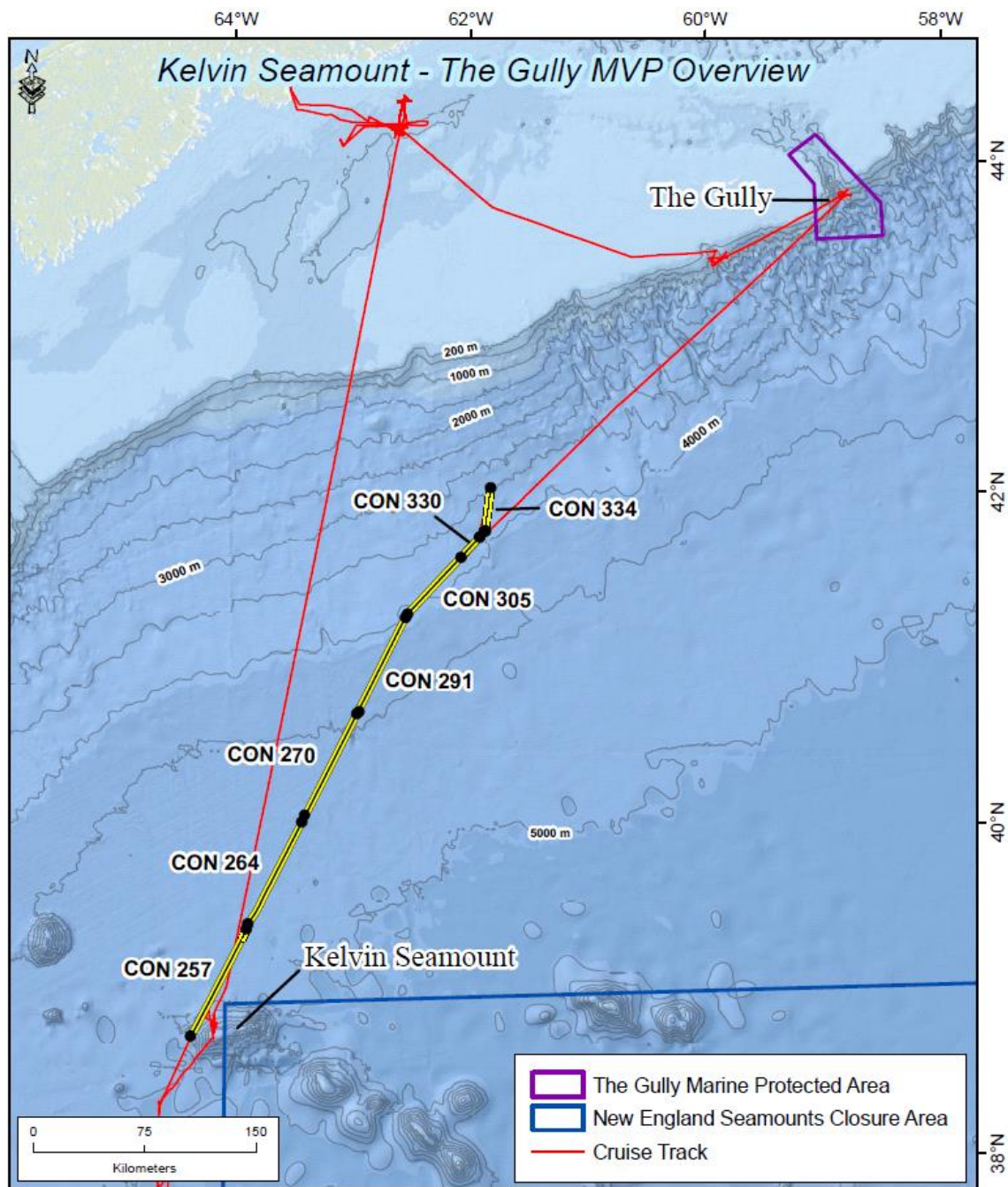


Figure 9. Location of MVP Stations within Work Location 2 - Kelvin Seamount to the Gully. Red track indicates ship movements; Blue Box represents the NAFO New England Seamount Closure Area to protect Vulnerable Marine Ecosystems (VMEs). The Gully MPA is indicated.

Summary of Operations:

Day of Year: 204 – 205 (CON 21-77)

Day of Year: 206 -208 (CON 96 to 160)

Day of Year: 217 – 219 (CON 215 to 252)

Day of Year: 219 – 222 (CON 253 to 345)

The Ecological Roles of the Cold Walls of Western Boundary Currents: Gulf Stream

Project Lead: Dr. E. Kenchington (DFO-BIO)

Dr. I. Yashayaev: Physical oceanography (DFO-BIO); chief scientist for XHL, AZOMP

Dr. E. Head: Zooplankton (DFO-BIO); XHL, AZOMP

Dr. T. Kenchington: Ecology (DFO-BIO)

ATLAS WP 1

Flows in the major western boundary currents are 50-100x the total water discharged by all the world's rivers. Waters in western boundary currents typically move 40-120 km per day and are major oceanic features. These currents also extend much deeper than most other surface currents, down to a depth of 1000 m or more. At the surface these fronts are physically visible and are identified by lines of rips and waves, foam, debris, and marked changes in water colour. The ecology of fronts formed by the western boundary currents have not been systematically studied. However there is ample evidence that they can provide species distribution barriers defining geographic boundaries, mixing and/or concentration zones exploited by large predators, areas of enhanced production, areas of vertical export and/or horizontal transport and are areas of increased variability (Acha et al. 2015 Ecological Processes at Marine Fronts: Oases in the ocean, Springer). We proposed to examine frontal surfaces (at a variety of scales) from ocean chemistry through microbiota to megafauna. We are interested in the behavior of animals and plants as they come into contact with these surfaces and seek to know whether cold walls are such major centres for ecological interactions that they are of ocean-wide significance despite their very limited volume.

The Gulf Stream Frontal Area was successfully sampled during the cruise with XBT, CTD, ARGO, MVP, Multinet and Neuston net (Figures 10,11) with details of each CON presented in Appendix 1. The Argo Float is identified by WMO# 4901827 (SN 333) and as of 14 August 2017 the float was still active. Updates can be found at <http://www.argodatamgt.org/Access-to-data/Description-of-all-floats2> (enter 4901827 for platform number). The float remained off the Scotian Shelf for an extended period of time and is now off the coast of the SE USA (Figure 12). It is collecting T and S data to depths of 2000 m (Figure 13).

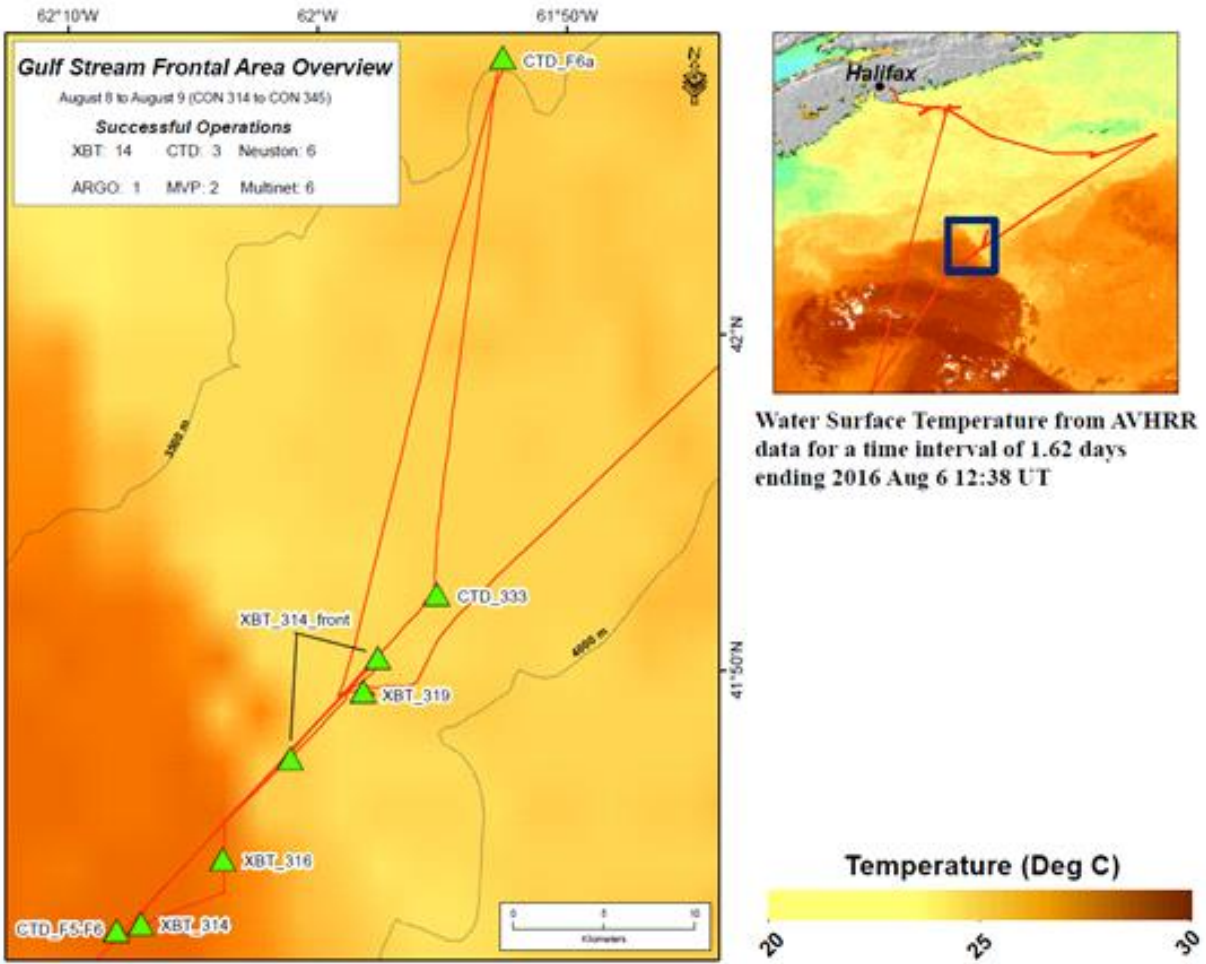


Figure 10. Location of CTD Stations within Work Location 2 – Gulf Stream Frontal Area. Red track indicates ship movements.

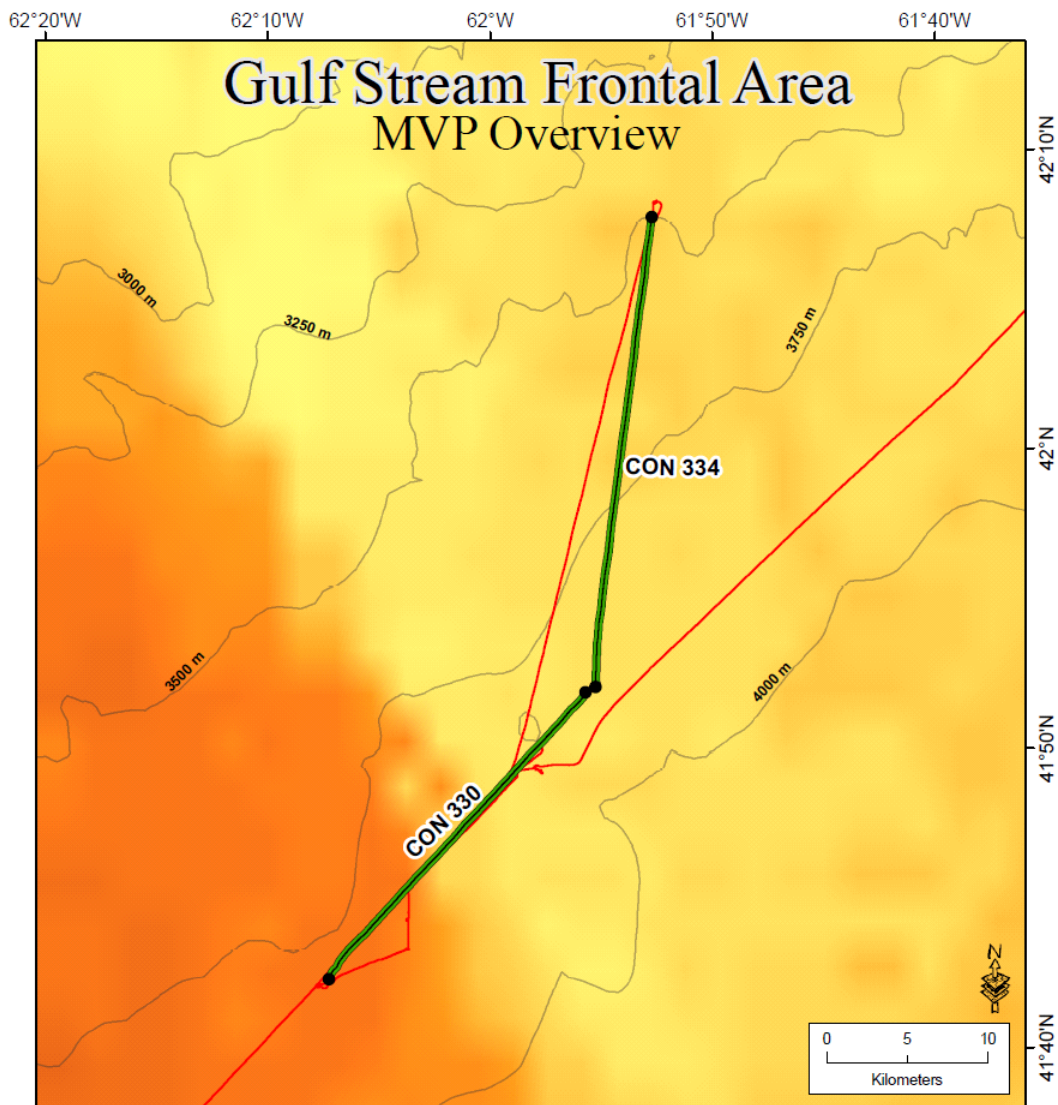


Figure 11. Location of MVP Stations within Work Location 2 – Gulf Stream Frontal Area. Red track indicates ship movements.

Summary of Operations:

Day of Year: 221 – 222 (CON 314 to CON 345)

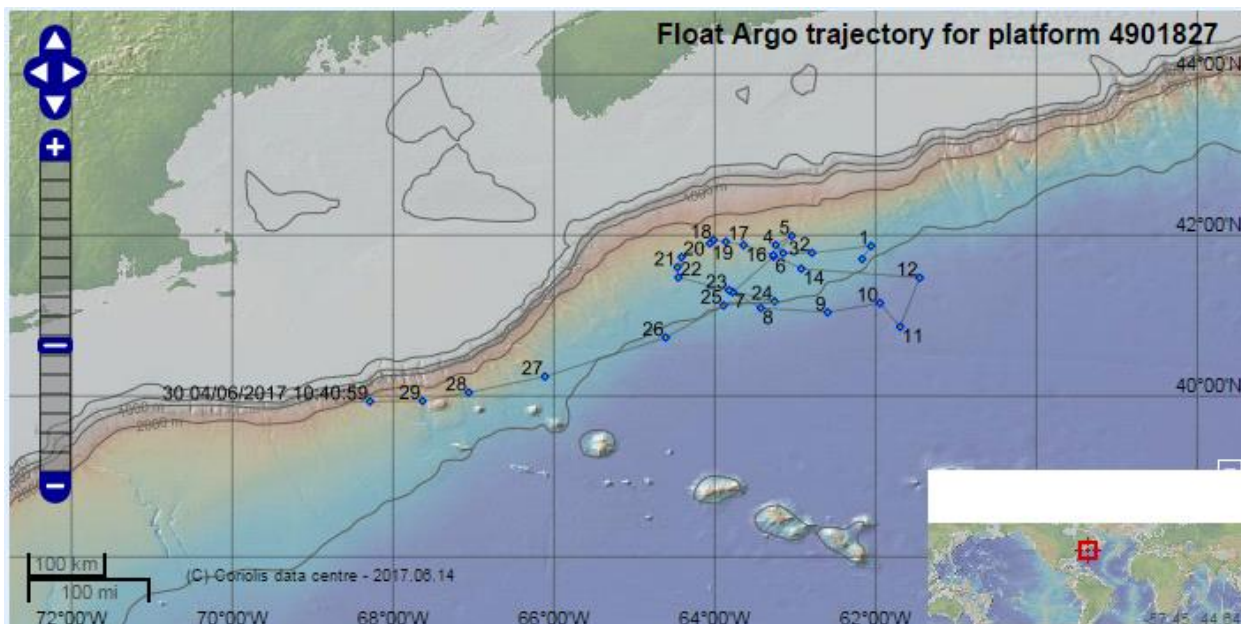


Figure 12. Track of the Argo Float deployed during the Hudson 2016-019 mission from date of release (09/08/2016 08:46:00) to 14/06/2017 10:48:00. Graphic downloaded from Coriolis: <http://www.argodatamgt.org/Access-to-data/Description-of-all-floats2>.

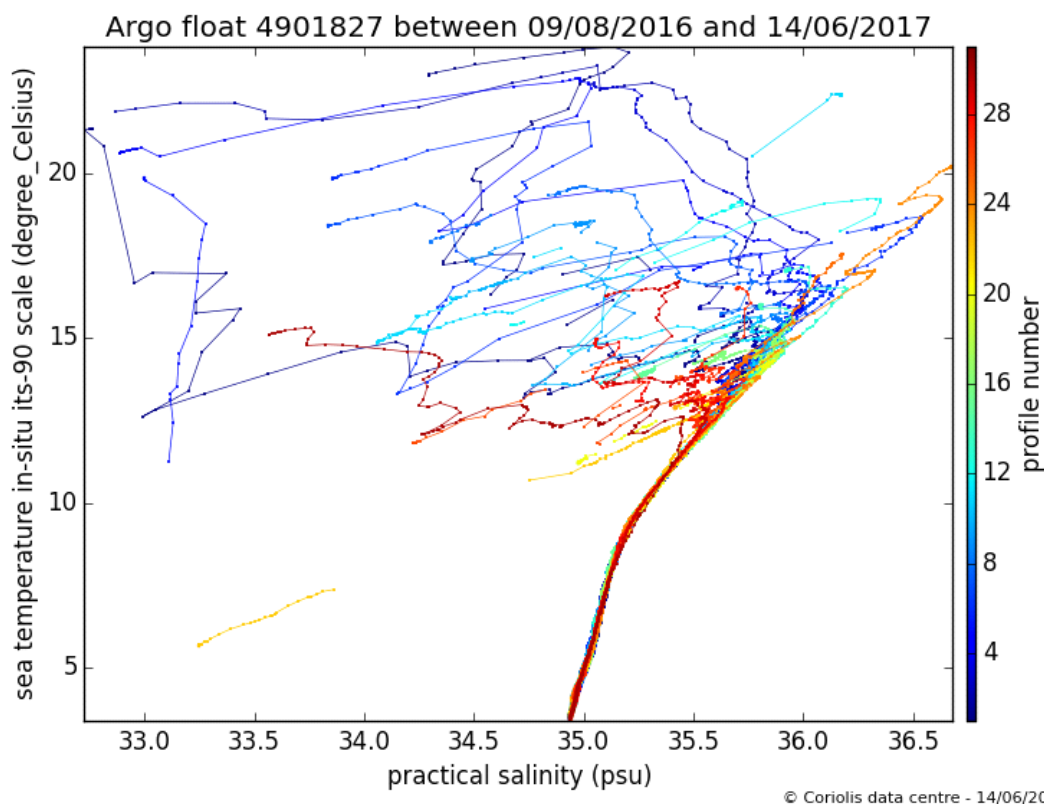


Figure 13. T-S data collected from the Argo Float deployed during the Hudson 2016-019 mission from date of release (09/08/2016 08:46:00) to 14/06/2017 10:48:00. Graphic downloaded from Coriolis: <http://www.argodatamgt.org/Access-to-data/Description-of-all-floats2>.

Work Location 3 – Kelvin Seamount

Overview

Video transects with a remotely operated vehicle (ROV) were designed to survey both outside and inside the NAFO New England Seamount Closure boundary in order to evaluate the boundaries of the closure and its effectiveness in protecting VME on Kelvin Seamount. However, due to strong currents in the area the ROV could not be deployed. Only one photographic transect, outside of the seamount closure was completed, using the 4K Camera ('4KCam') (Figure 15). The transect line covered 1.4485 km, had a start depth of 1850 m and an end depth of 1937 m, and 87 photos of good quality were collected (e.g., Figure 14).

Kelvin Seamount is of particular importance as it lies within the boundary of the Canadian territorial claim to the United Nations Convention on the Law of the Sea (UNCLOS), and may in the future be within Canadian jurisdiction. The seamount is of volcanic origin and basalt rocks were common in all images (Figure 14). Preliminary analysis of the photos taken (E. Kenchington, J. Murillo) revealed at least 65 unique taxa across 8 phyla. Cnidaria was the dominant phylum with 23 taxa, most of them being octocorals with at least 15 species observed (e.g., Figure 14). The gorgonian coral were the dominant group. The second dominant phylum in terms of species richness was Echinodermata, with at least 19 taxa, comprised mainly of brittlestars and crinoids. They were found attached to rocks, sediment and over the gorgonians, in some occasions covering them almost completely. At least 10 species of sponges were observed, some of them of about 20 cm long and wide, indicating that structure forming sponges are present in the area. In addition, more than 70 xenophyophores (Phylum Foraminifera) were recorded, which indicates a high density of this particular taxon. Xenophyophores are VME indicator species. A report on these findings was presented to the November 2016 meeting of the NAFO Working Group on Ecosystem Science Assessment (WGESA) in support of advice on the boundaries of their seamount closures. The report will also be available through the NAFO website at <https://www.nafo.int/Portals/0/PDFs/sc/2016/scs16-21.pdf>

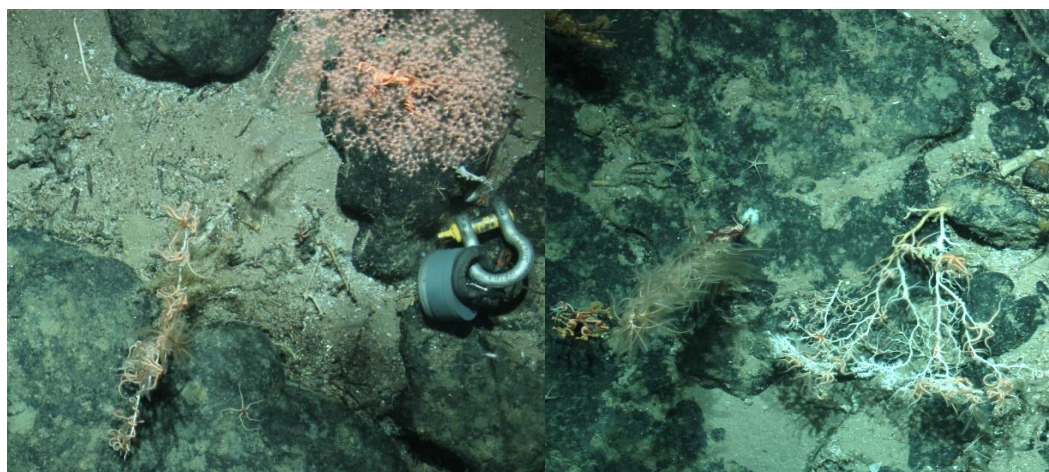


Figure 14. Left panel, the gorgonian coral *Metallogorgia melanotrichos* with the associated brittle star *Ophiocreas oedipus*. Right panel, *Corallium* sp. (white gorgonian) and another gorgonian of the Family Plexauridae covered by crinoids and brittle-stars can be observed.

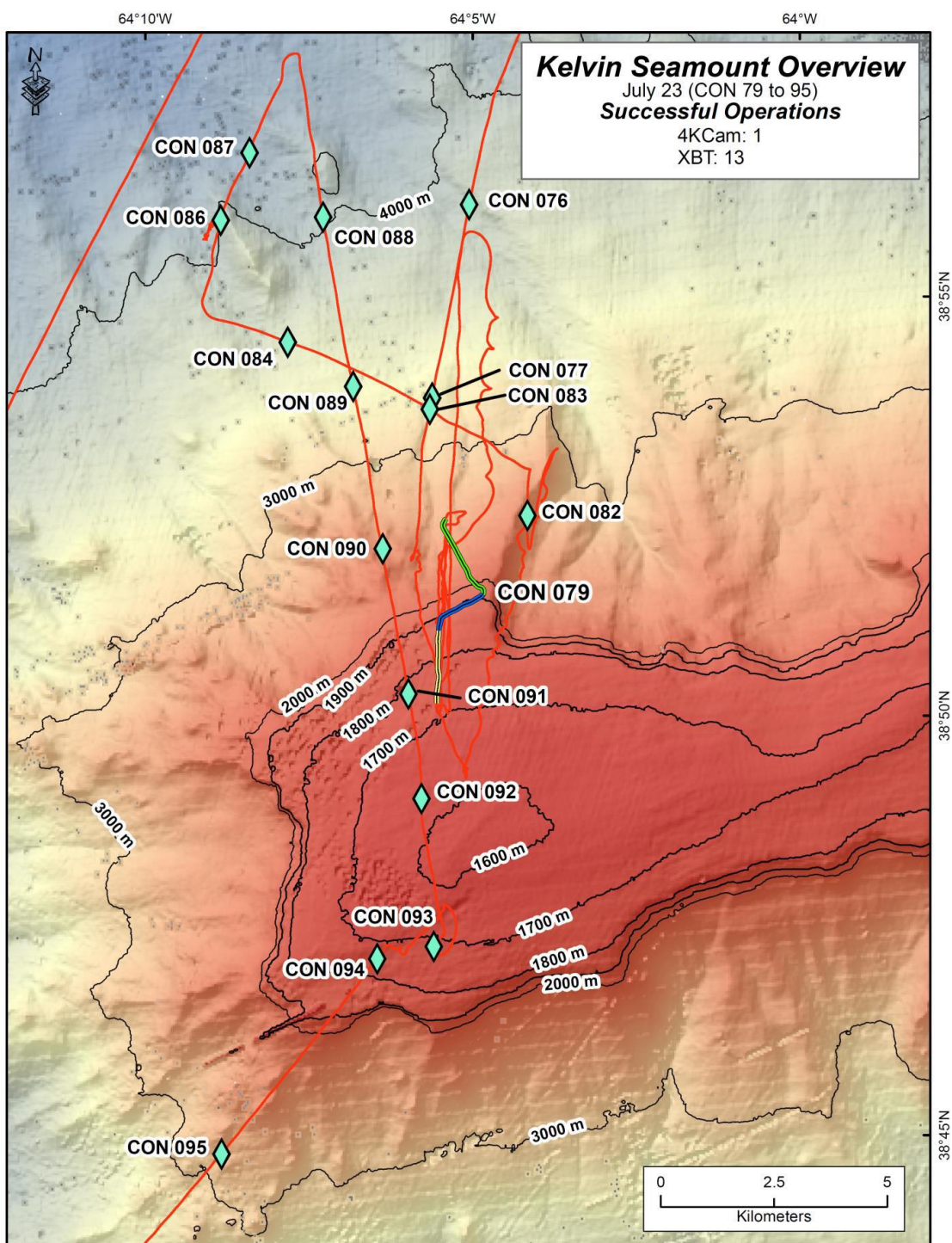


Figure 15. Location of XBT and 4K Cam Stations within Work Location 3 – Kelvin Seamount. Red track indicates ship movements. The blue line indicates the camera transect location.

Summary of Operations:

Day of Year: 205 (CON 79 to CON 95)

Work Location 4 – Bermuda

Overview

A special permit was issued by the Bermuda Government, Department of Environment and Natural Resources in Hamilton, Bermuda (Permit Number 160701; Appendix 2). In accordance with these permits, all samples of living material, rocks, multibeam bathymetry and benthic imagery were provided to the designated authorities on September 20, 2016.

Sampling was undertaken in 3 areas: Plantagenet Bank (commonly known as Argus Bank and referred to as such herein), Challenger Bank and Bowditch Seamount. Sampling locations at Argus and Challenger were determined by the NEKTON project members to complement the shallow water work undertaken there in a concurrent mission.

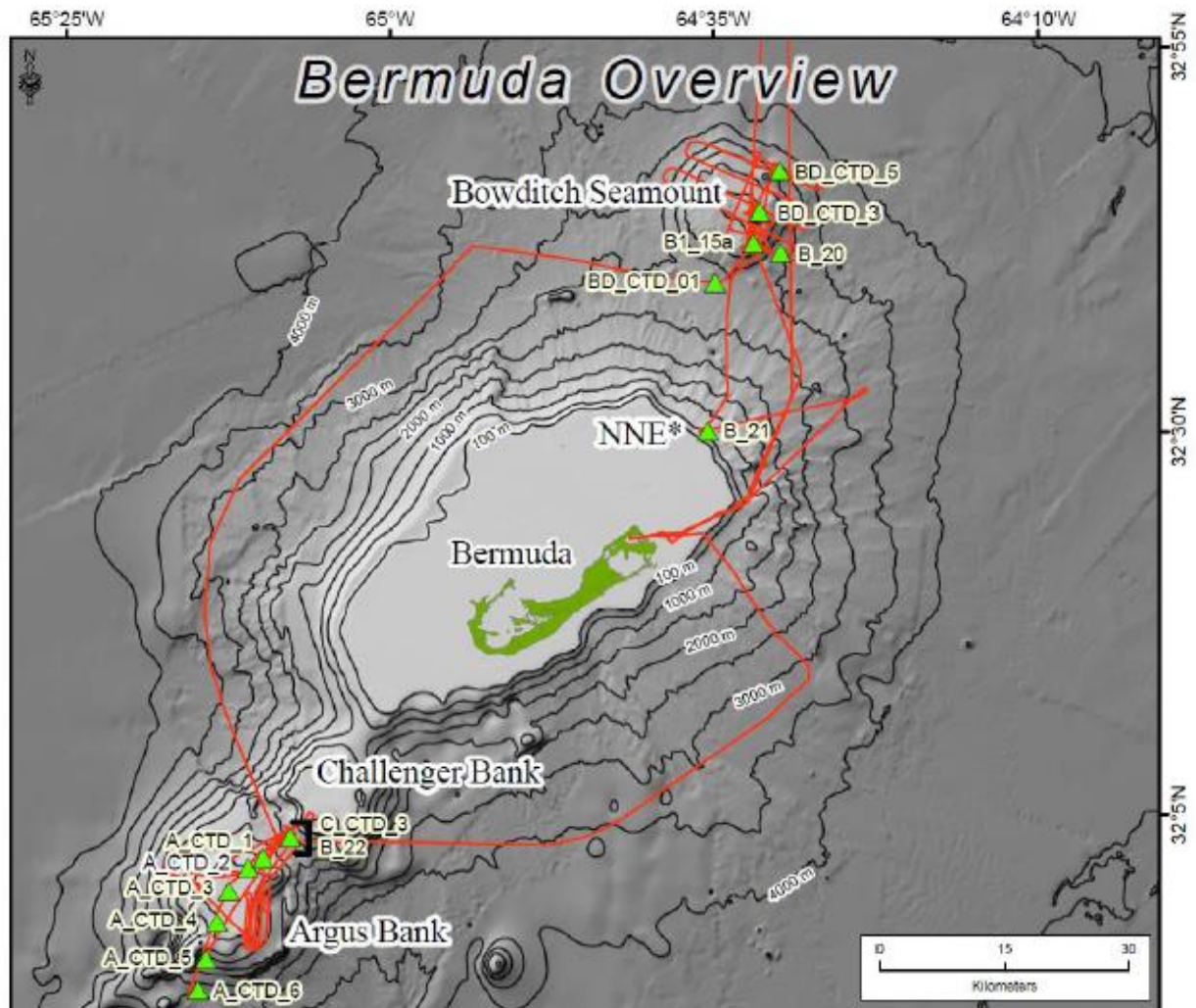


Figure 16. Overview map showing location operations in the 3 major sampling locations in Bermuda.

Bowditch Seamount

Bowditch Seamount was sampled using 7 gear types (Figures 17, 18, 19). The ROV did not work at this location (2 aborted operations) and so benthic imagery was only available from the 4KCam. Unfortunately, only one transect was completed (CON 173) as the camera snagged on its second deployment and the Captain of the CCGS Hudson ordered the cable cut. After completion of the Bermuda work areas permission from the Government of Bermuda was sought and granted to return to Bowditch to collect two Van Veen grab samples at the request of E. Kenchington. This was to collect some dead coral fragments that were of interest to DFO/ATLAS. All live coral from those grabs were included in the specimens returned to Bermuda.

Woods Hole Oceanographic Institute conducted a multibeam survey over roughly half of Bowditch Seamount. A priority for this location during the Hudson 2016-019 mission was to do a multibeam survey of the remaining area of the seamount in support of the NEKTON project and the Government of Bermuda (Figure 18).

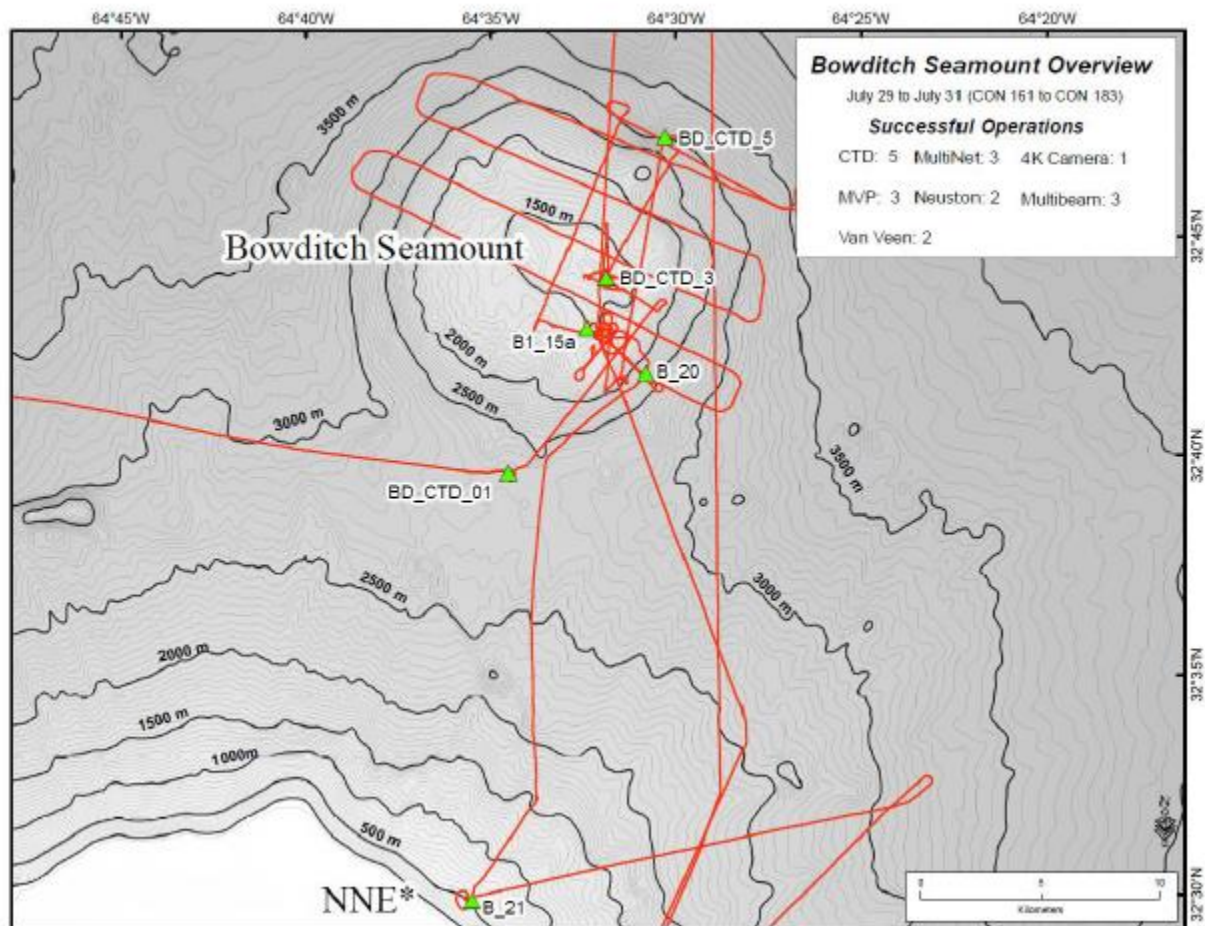


Figure 17. Overview map showing location of operations on Bowditch Seamount, Bermuda. Red line indicates cruise track.

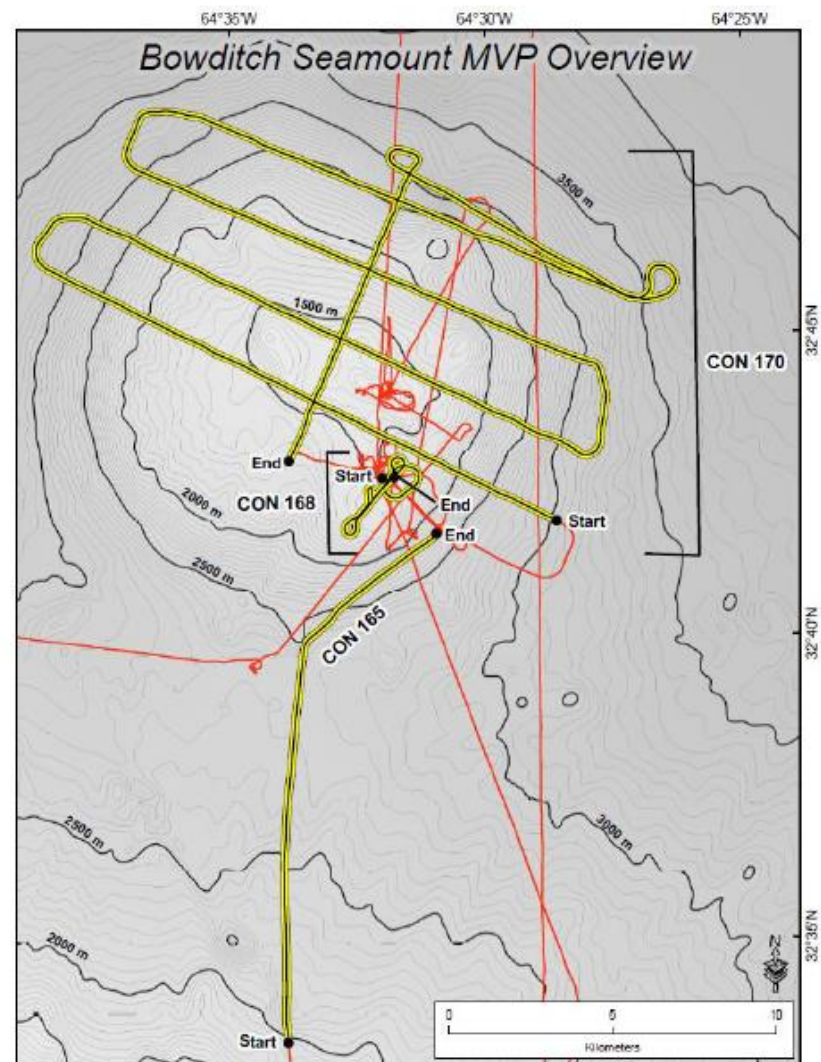
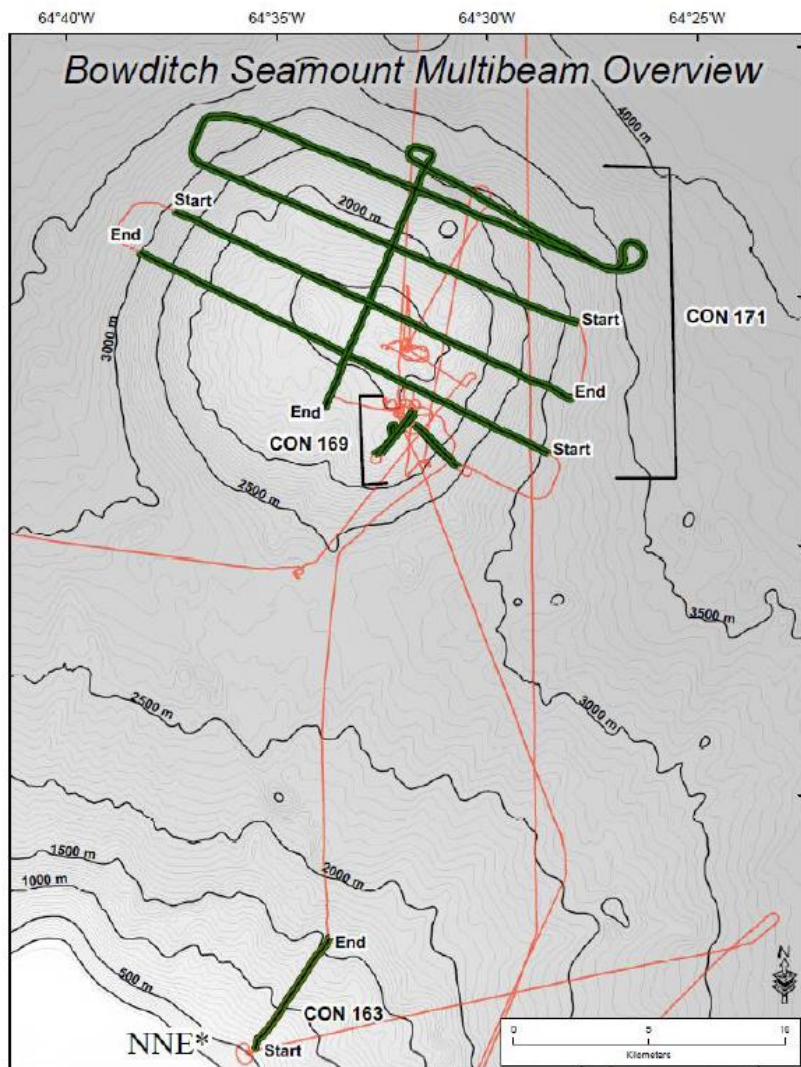


Figure 18. Maps of multibeam (left) and MVP coverage (right) on Bowditch Seamount.

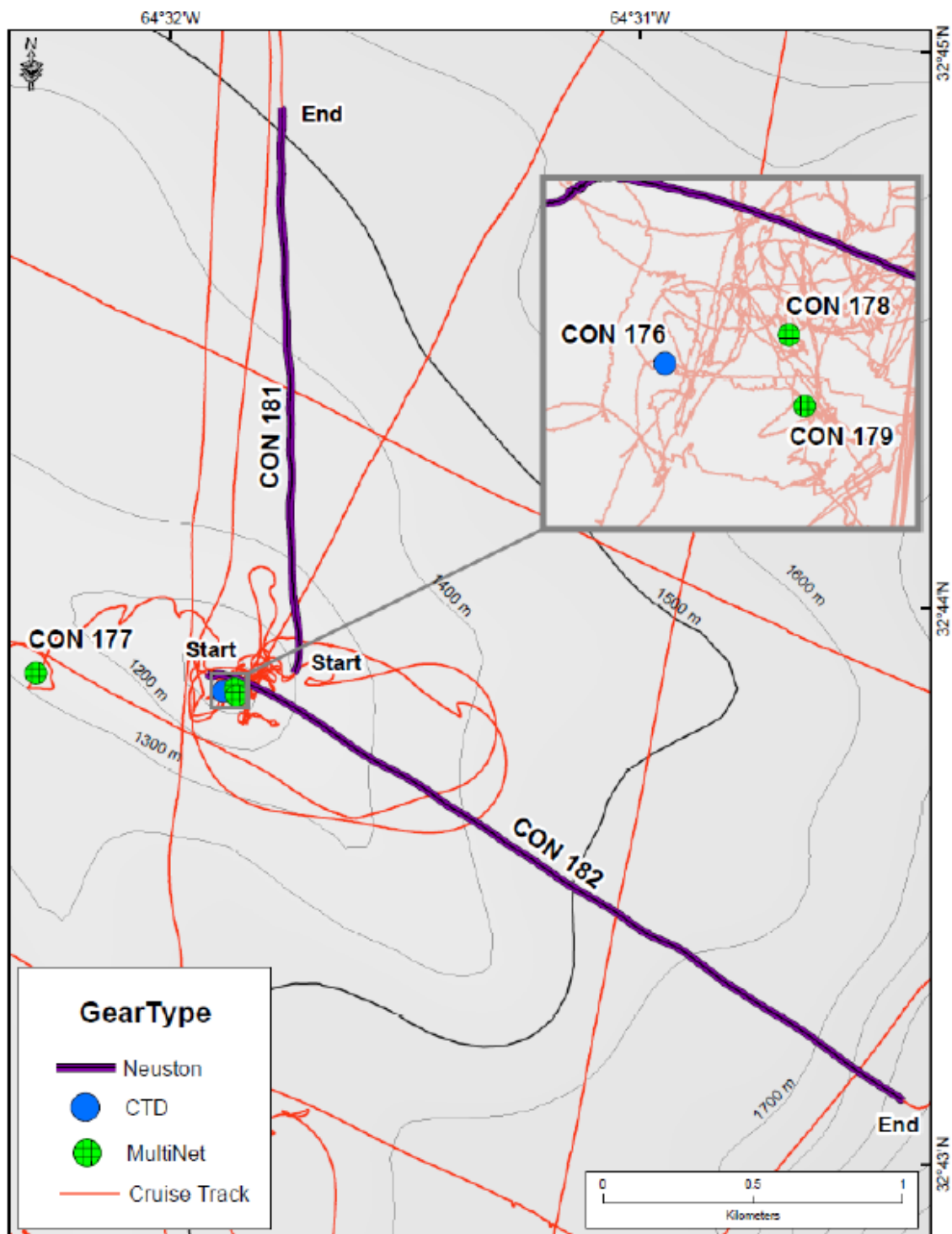


Figure 19. Locations of water column sampling on Bowditch Seamount.

Summary of Operations:

Day of Year: 211 – 213 (CON 161 to CON 183)

Day of Year: 216 (CON 213, CON 214)

Plantagenet (Argus) and Challenger Banks

Eight gear types were successfully deployed in this work area (Figures 20-24), including multibeam work on Argus Bank (Figure 21) and the first successful ROV dive on the saddle between Challenger and Argus Banks (Figure 22). The ROV operated at 1006 (start) to 1007 (end) m depth and covered 1.493 km. Positions of neuston net sampling and a photo transect completed with the 4KCam on the saddle between Challenger and Argus Banks are shown in Figures 23 and 24 respectively. The 4KCam photos were also taken at 1007 to 1008 m depth. This work was done collaboratively with DFO, NEKTON and the Government of Bermuda. As per the permitting agreement (Appendix 2), all samples and images were sent to Bermuda for further processing.

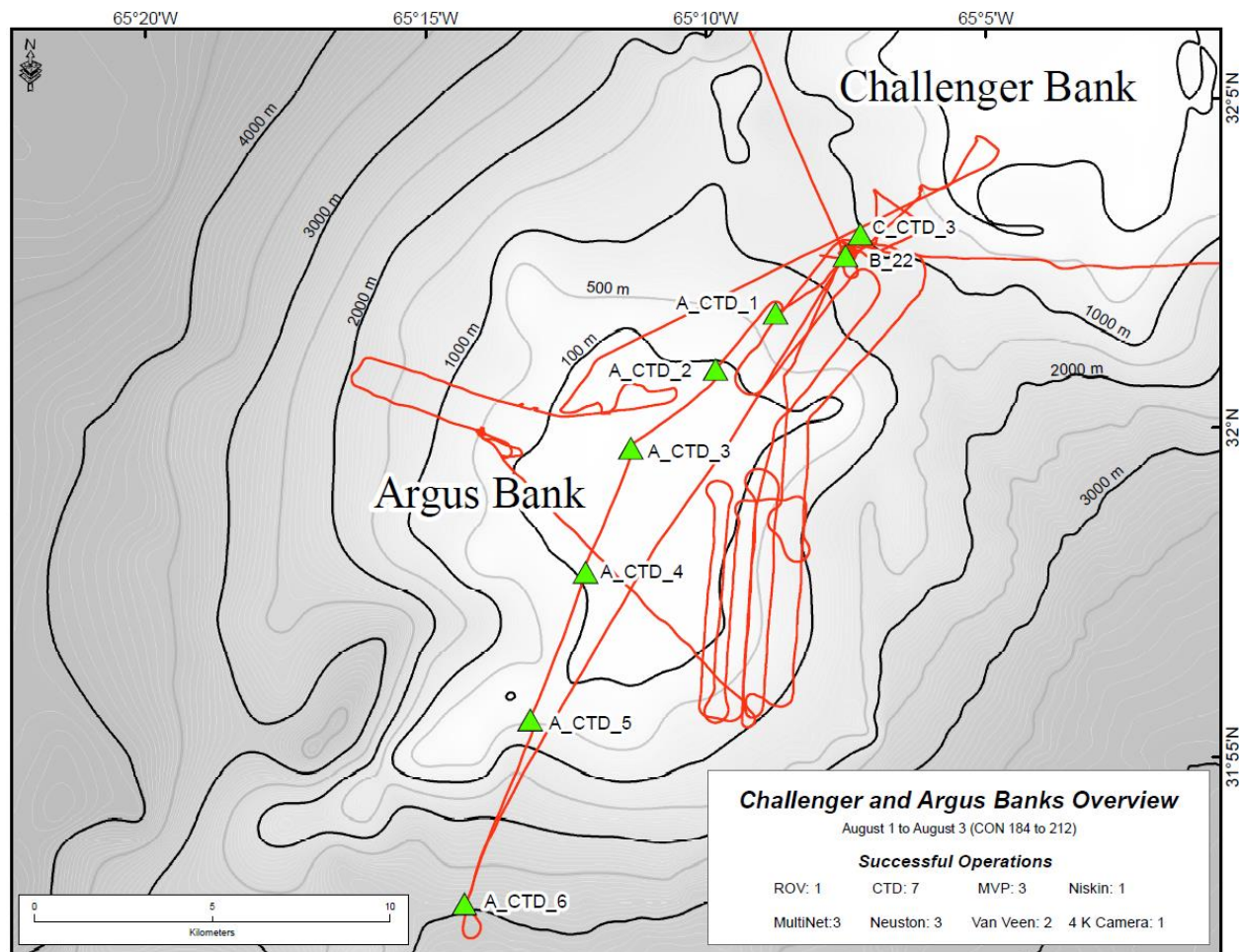


Figure 20. Locations of sampling on Argus and Challenger Banks. Red line indicates cruise track.

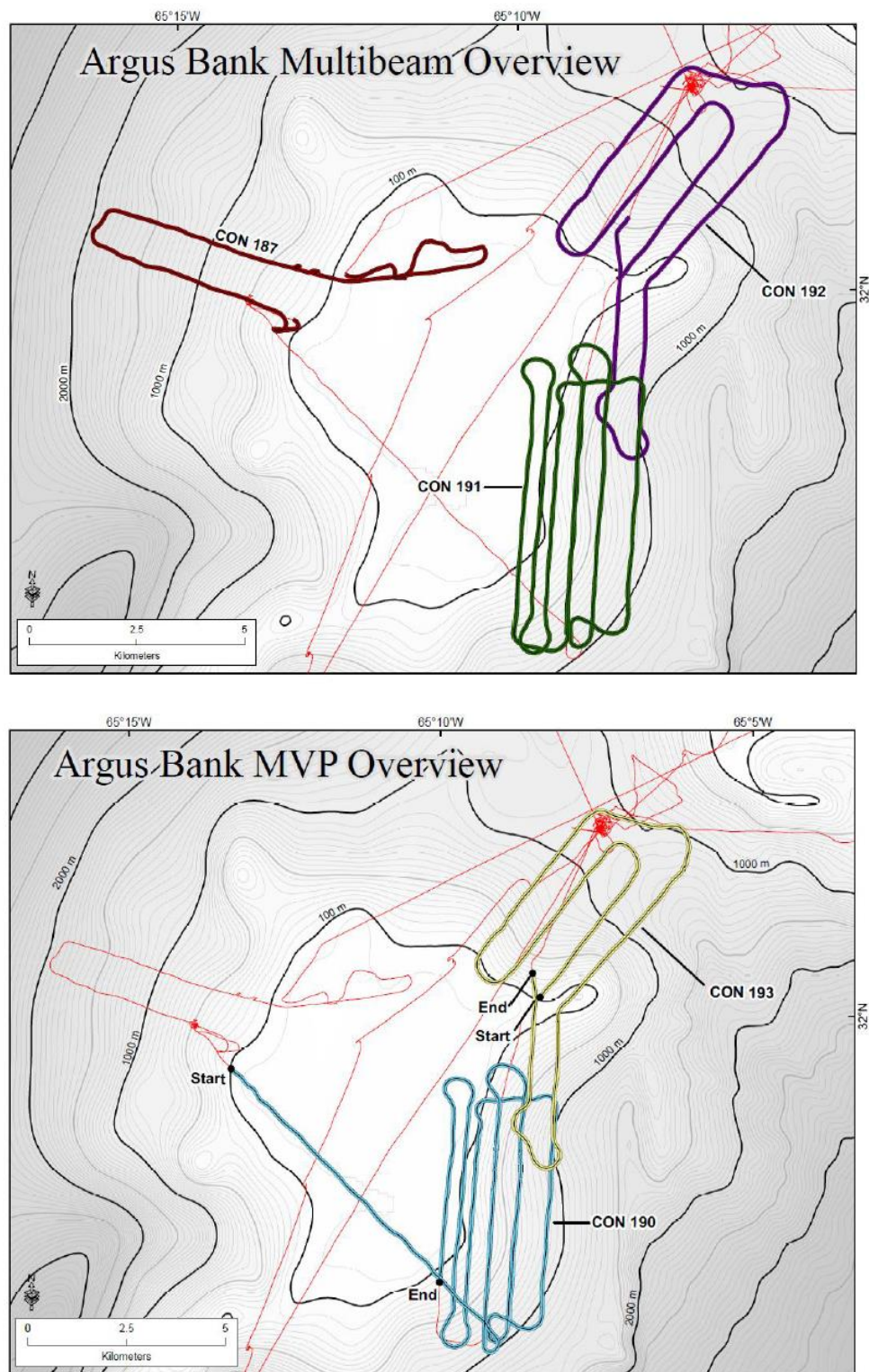


Figure 21. Details of multibeam and MVP operations on Argus Bank. Red line indicates the cruise track.

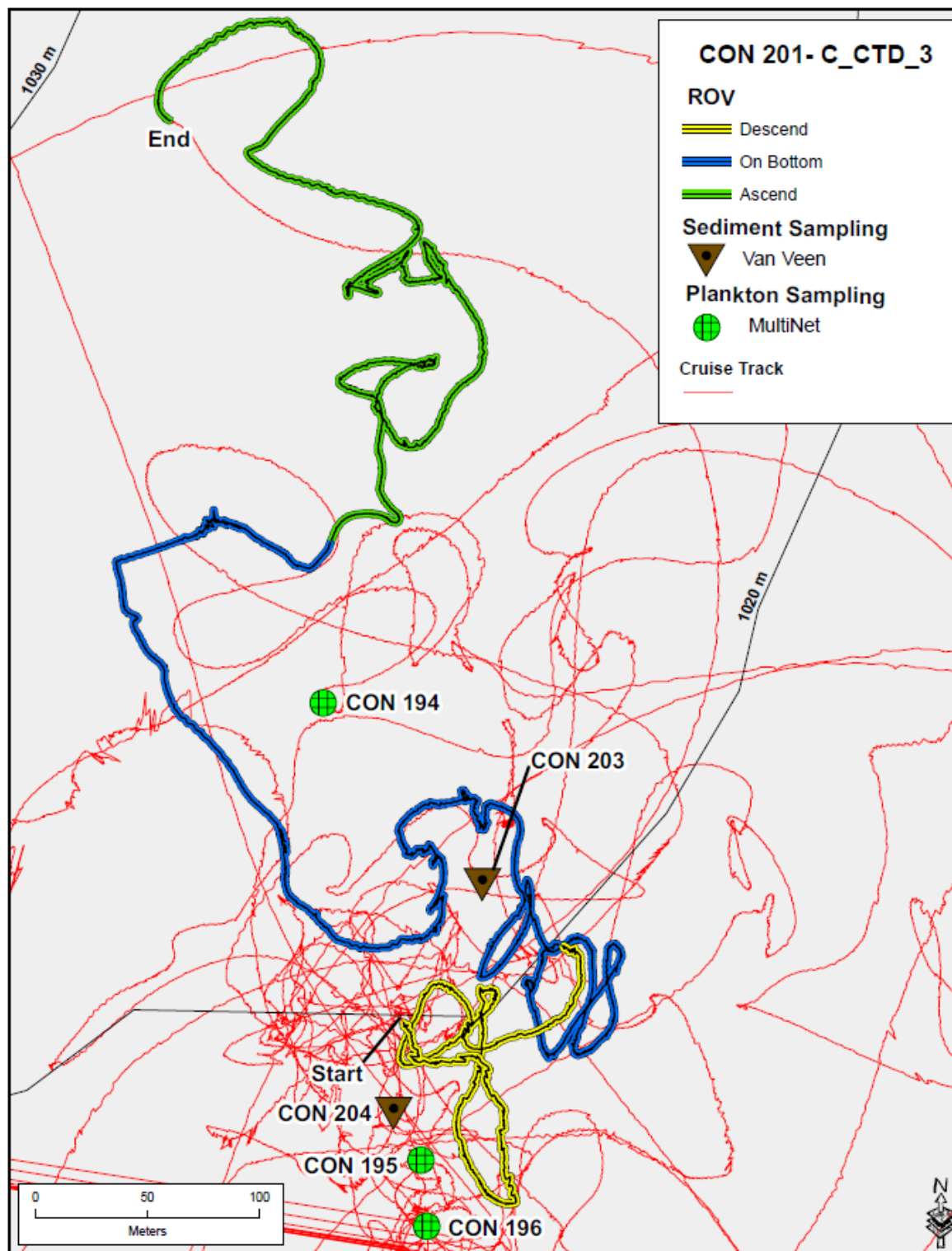


Figure 22. Location of ROV dive on Challenger Bank with positions of grab and multinet sampling indicated. Red lines indicate the cruise track.

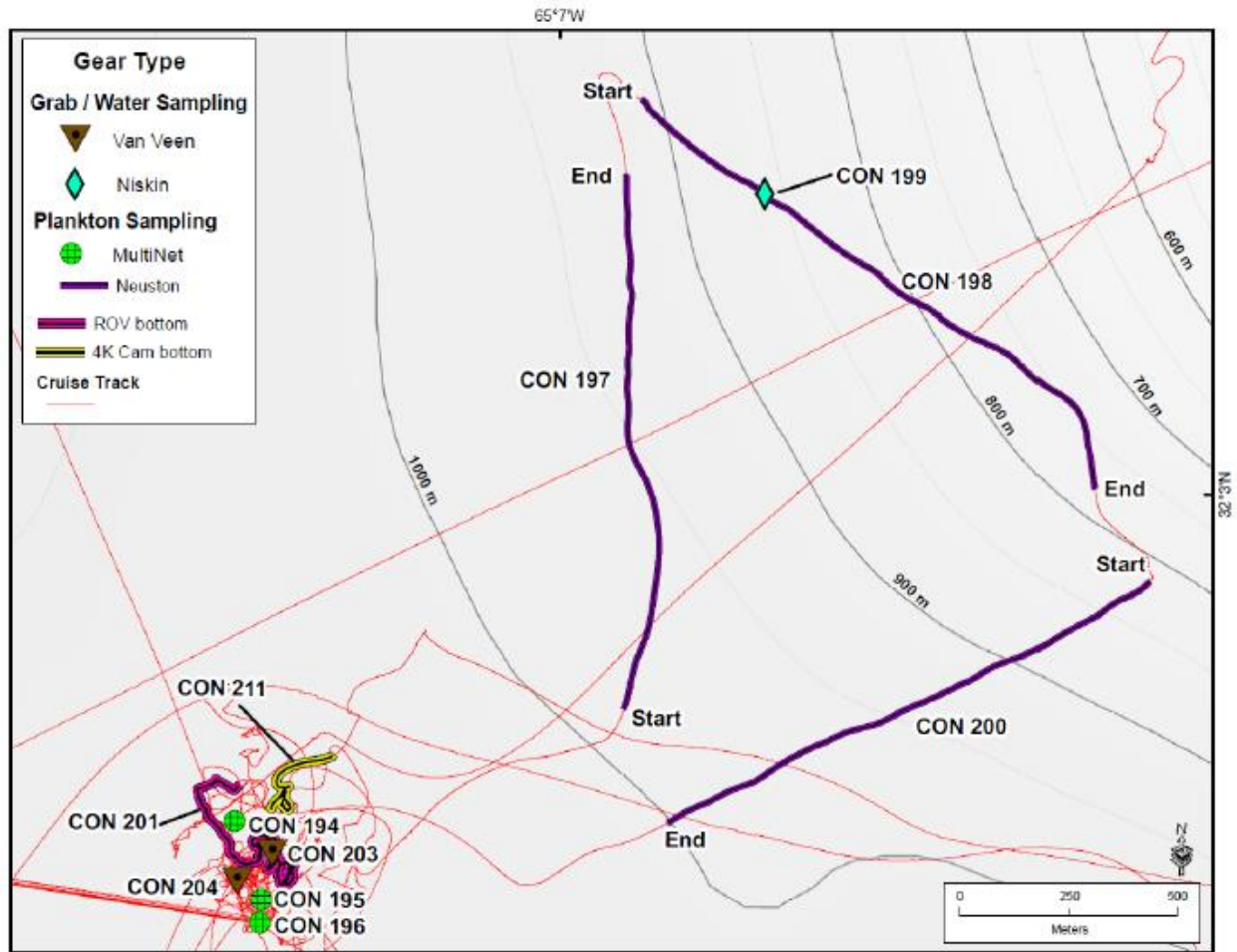


Figure 23. Location of neuston net tows on Challenger Bank relative to positions of grab and multinet sampling. Red lines indicate the cruise track.

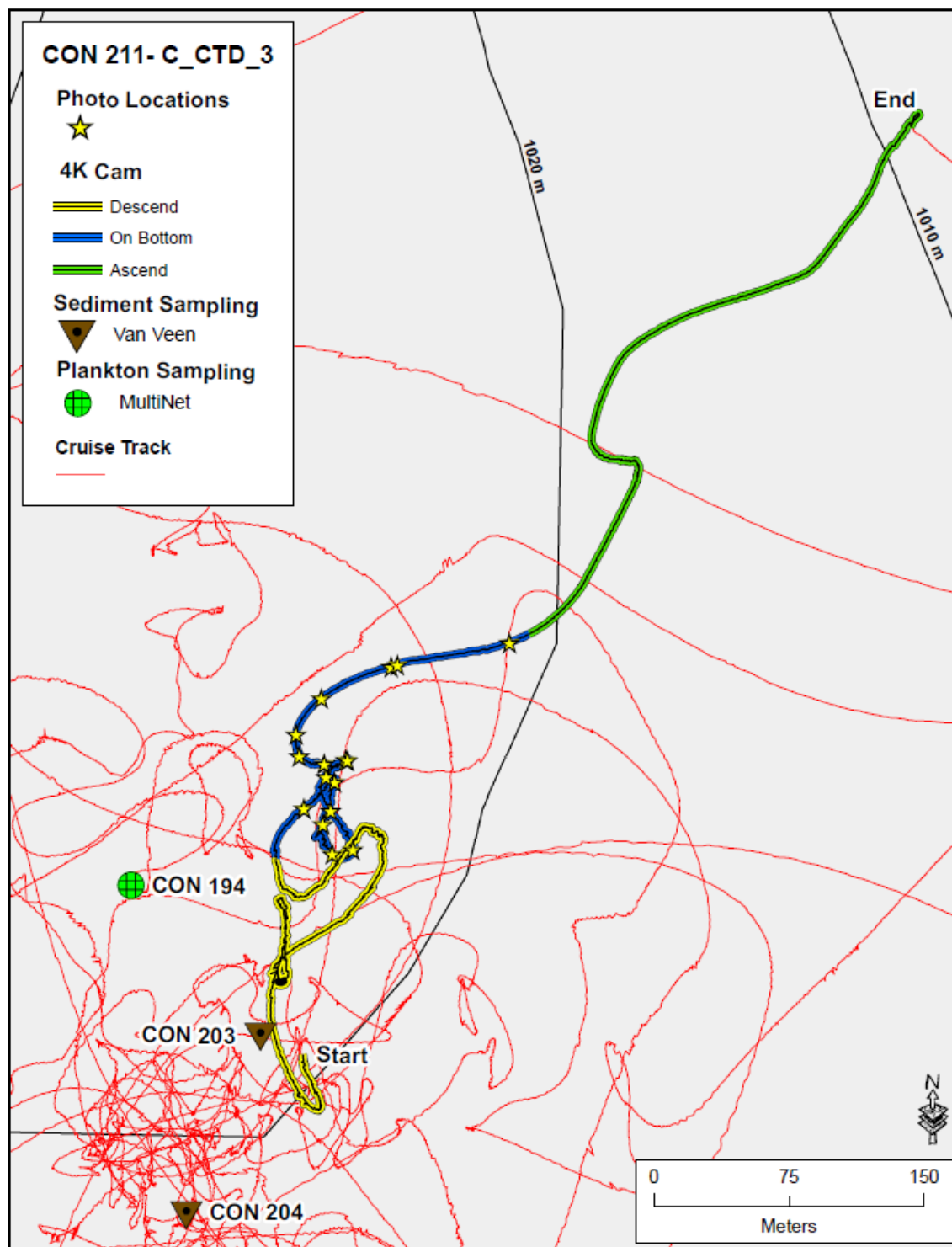


Figure 24. Location of 4KCam photo transect on Challenger Bank relative to positions of grab and multinet sampling. Red lines indicate the cruise track.

Summary of Operations:

Day of Year: 214 – 216 (CON 184 to CON 212)

Work Location 5 – The Gully Marine Protected Area

Overview

Sampling in the Gully MPA (Figures 25, 26) was conducted with the appropriate approval (Appendix 2) to further enhance our knowledge of the functioning of the Gully ecosystem and to determine why the Gully, particularly the area called the ‘Southwest Prong’, experiences enhanced richness and biomass of benthic and pelagic fauna. The vertical and horizontal energy flow into this area of the Gully, and the mechanisms which trap that energy there, were of particular interest. Six gear types were deployed (Figure 26), including two successful ROV dives (Figures 27 and 28) and two 4KCam photo transects (Figures 29 and 30) in addition to CTD (Figure 31) and neuston net sampling (Figure 32). Xenophyophores were present on the soft sediments in photos taken on CON 357 (Figure 30), which confirmed that this habitat described in Kenchington et al. 2014 (Deep Sea Research II 104: 67-82) extends across the canyon. Gorgonian corals were present in Zone 2 which has prompted a re-evaluation of zoning in the MPA to maximize protection of corals.

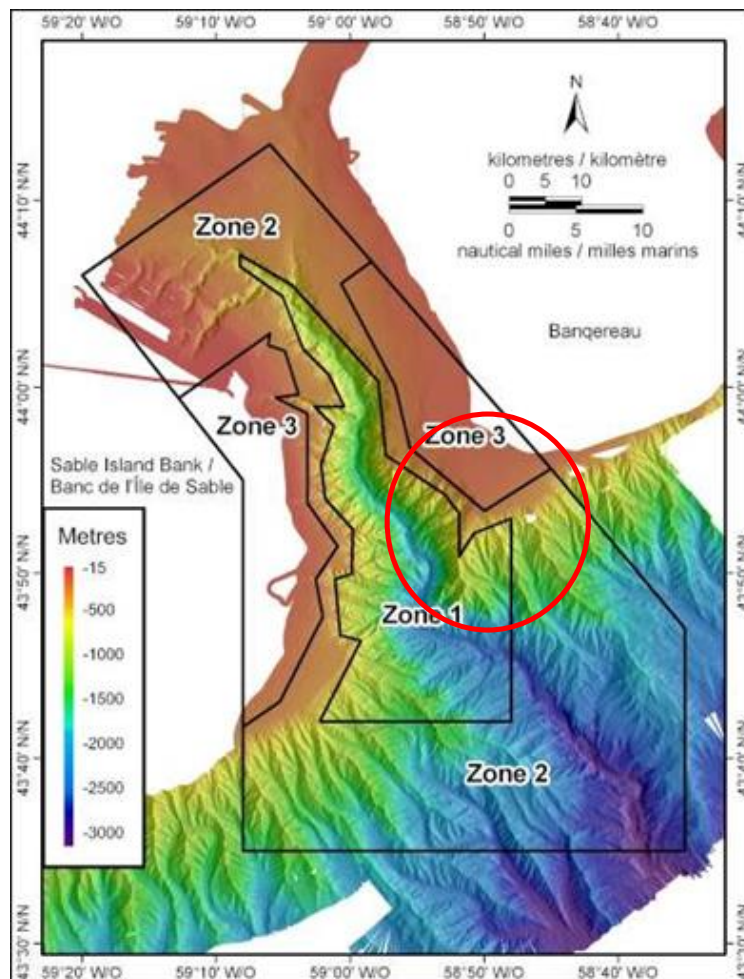


Figure 25. The Gully Marine Protected Area showing the MPA boundary and activity zones. The location of the Southwest Prong is indicated in the red circle on the eastern wall of the canyon.

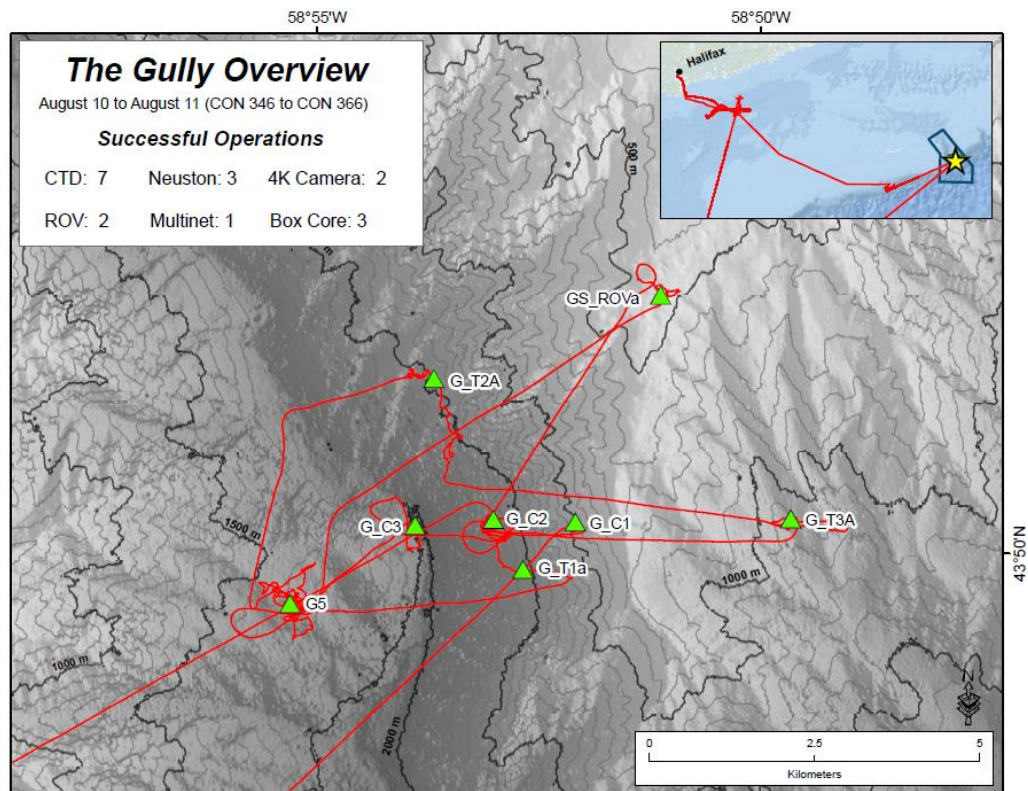


Figure 26. Location of sample collections in the Gully MPA. Red lines indicate the cruise track.

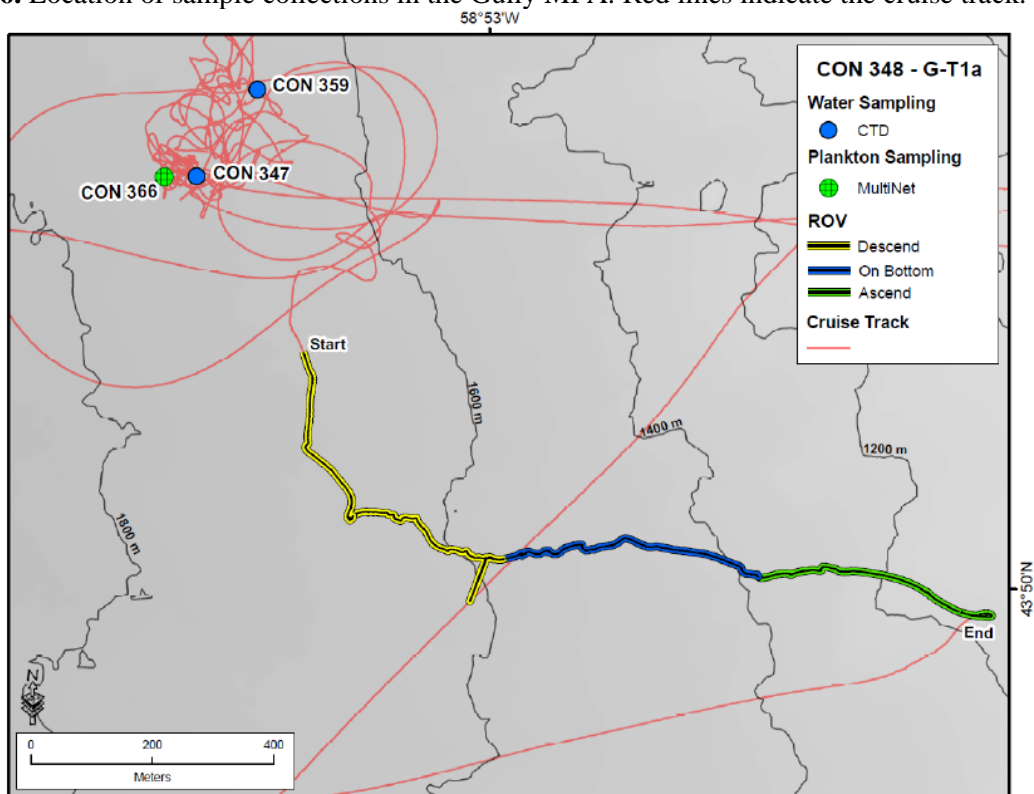


Figure 27. Location of ROV transect CON 348 in the Gully MPA. Start depth was 1533 m and end depth was 1349 m. Red lines indicate the cruise track.

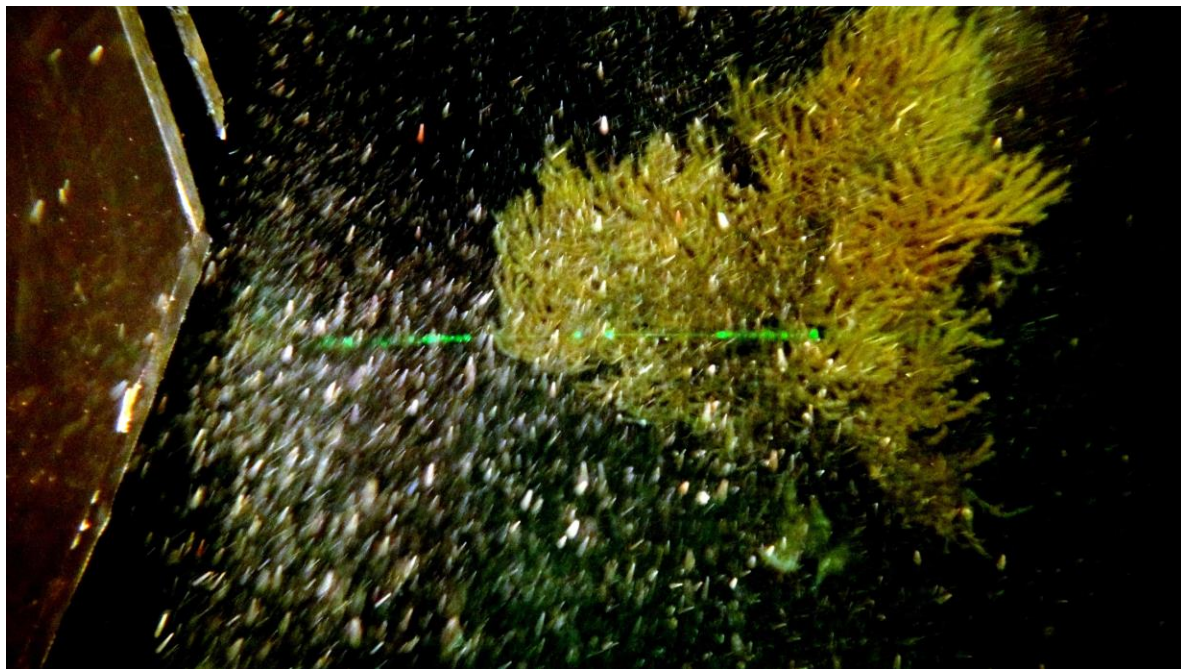
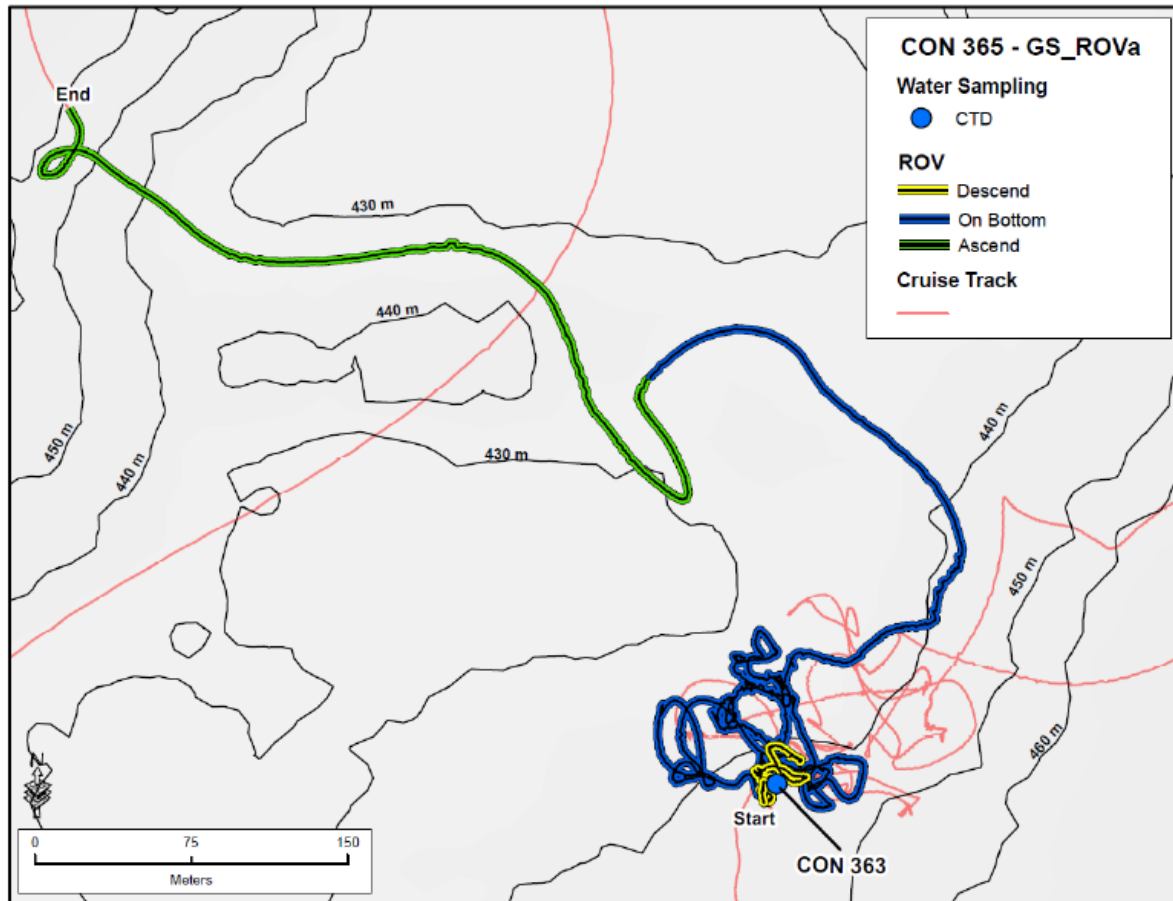


Figure 28. Upper panel: Location of ROV transect CON 365 in the Gully MPA. Start depth was 428.5 m and end depth was 437.3 m. Red lines indicate the cruise track. Lower panel: Large *Primnoa resedaeformis* coral colony visible through the krill as the ROV nears bottom.

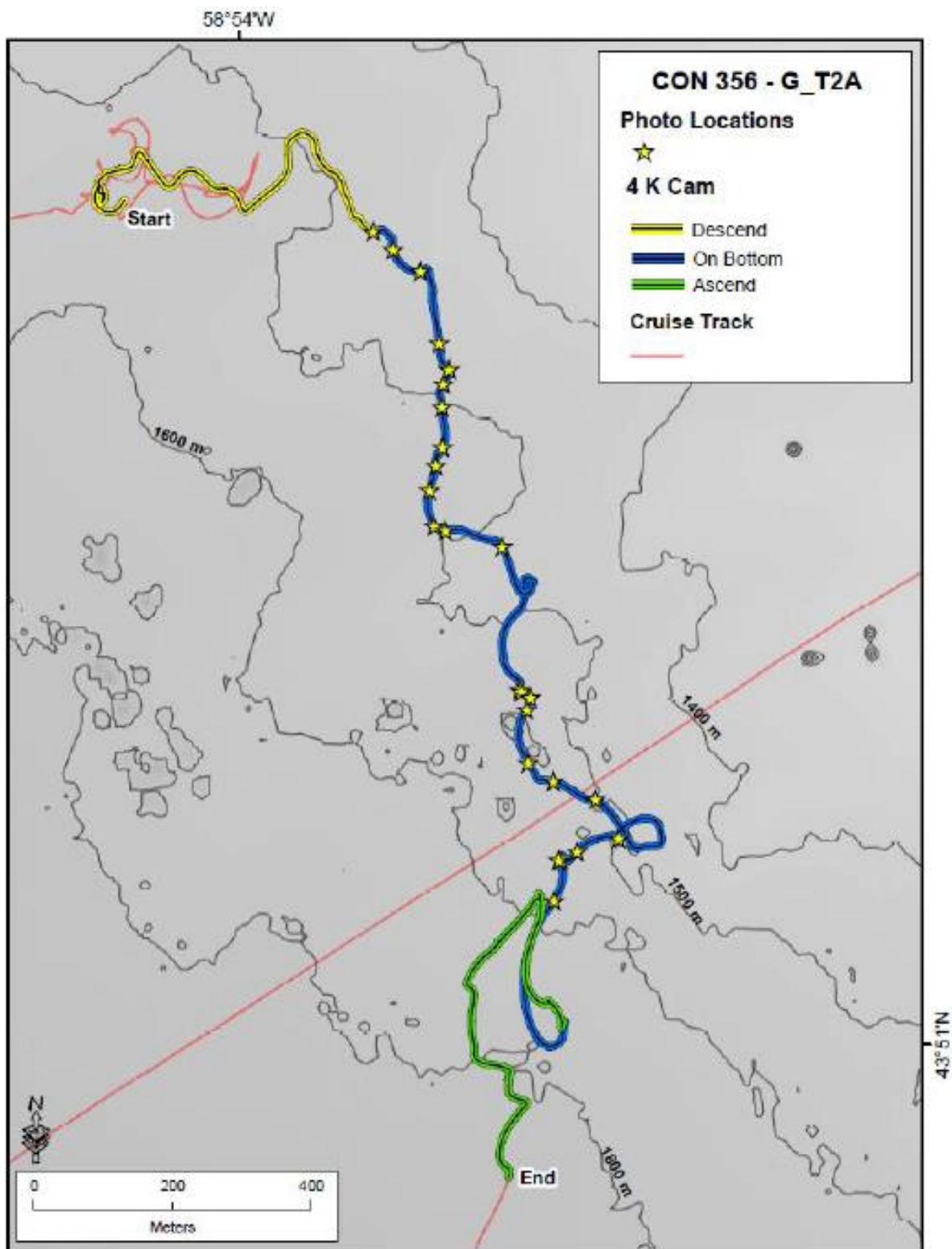


Figure 29. Location of 4KCam photo transect CON 356 in the Gully MPA. The transect length on bottom was 2.085 km and the start depths were 1532 and 1425 m respectively. 25 good photos were taken from this deployment. Red lines indicate the cruise track.

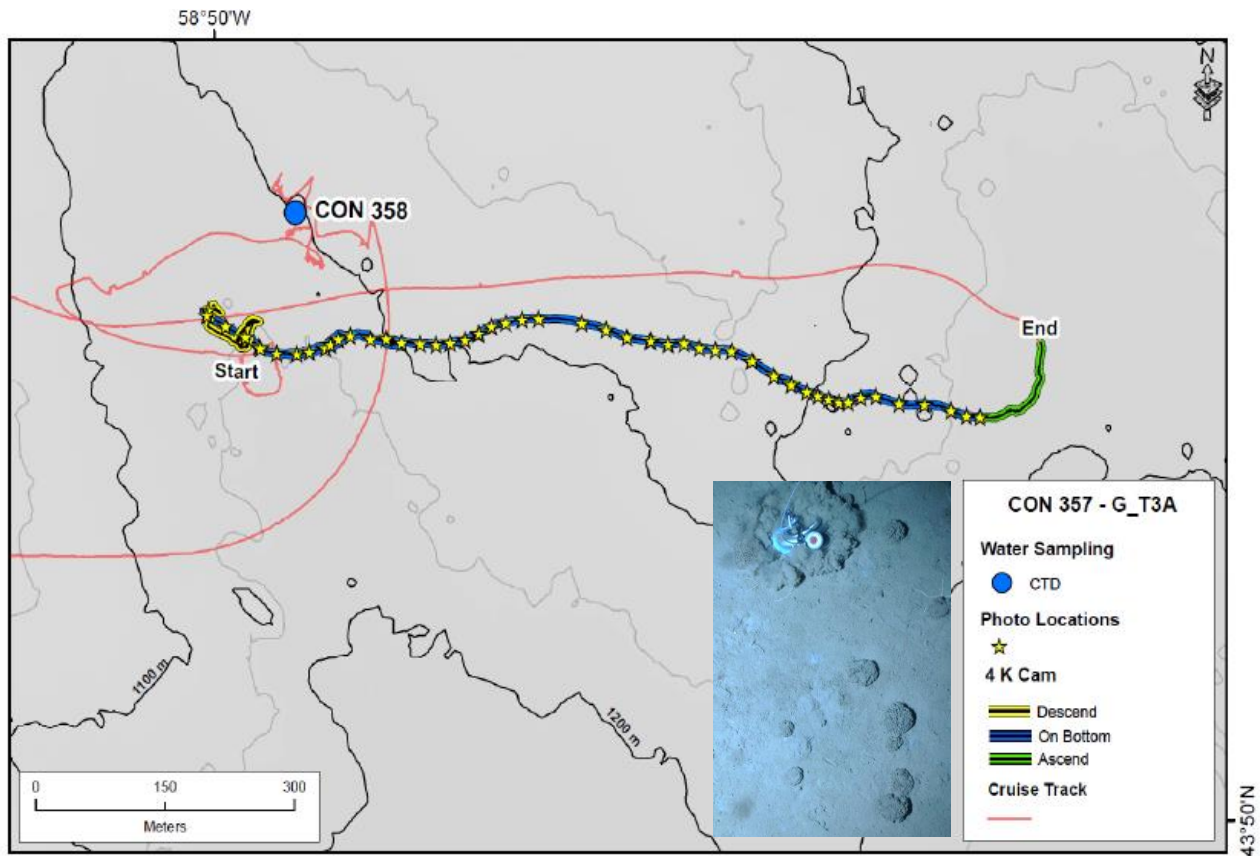


Figure 30. Location of 4KCam photo transect CON 357 in the Gully MPA. The transect length on bottom was 2.056 km and the start depths were 1130 and 1126 m respectively. 50 good photos were taken from this deployment (inset). Red lines indicate the cruise track.

Hydrographic Sampling in the Gully MPA

The distributions of temperature, salinity, and various chemical and biological constituents were measured using a CTD and neuston net (Figures 31, 32) in the vicinity of the Southwest Prong to characterize the hydrography of this biological hotspot. Stations were focused in an area where high concentrations of Northern Bottlenose Whales have been recorded during the month of August. Continuous full-depth profiles of temperature, salinity, oxygen, and velocity to within 10 m of the bottom were made. A rosette with 24, 10-l sampling bottles collected water samples for biological and chemical analyses.

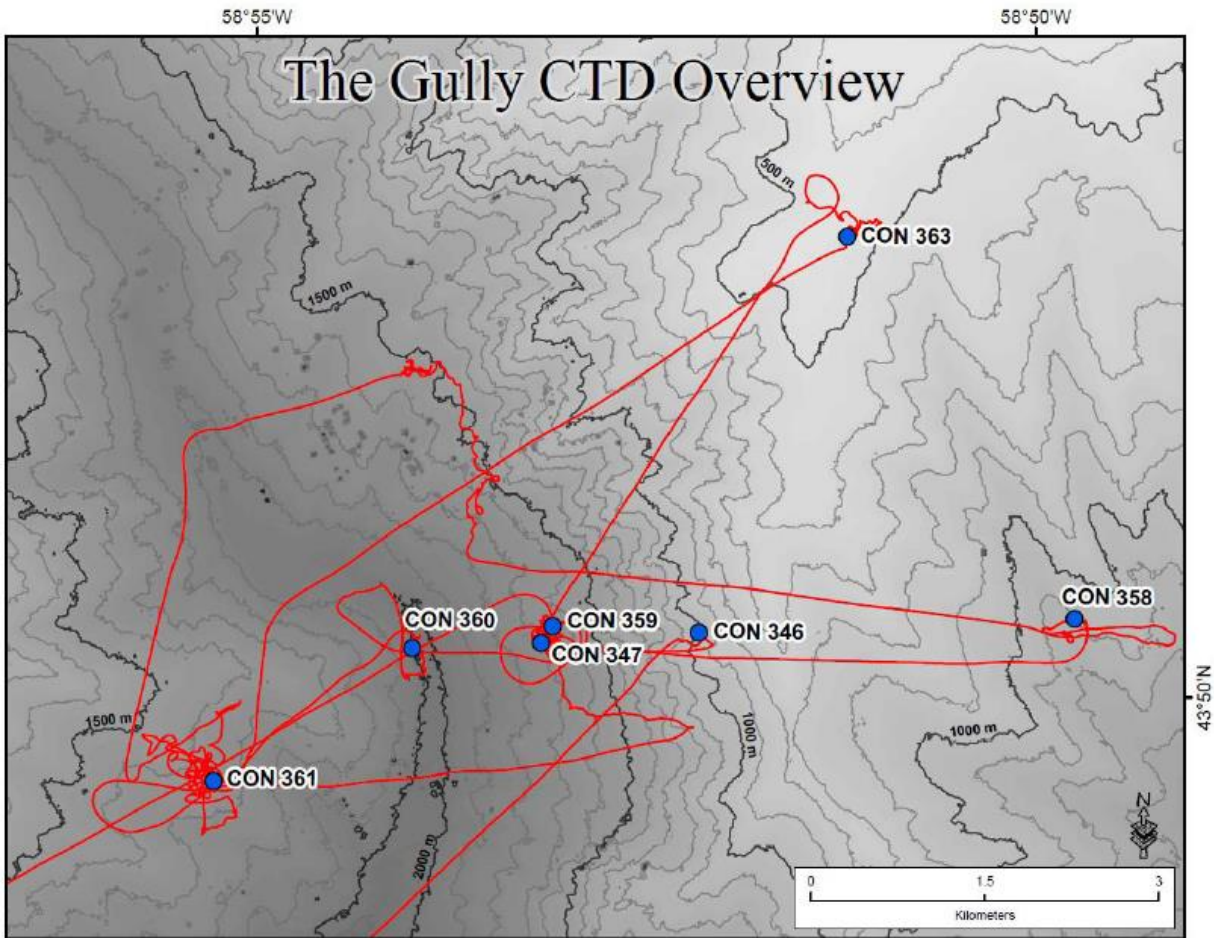


Figure 31. Location of CTD stations in the Gully MPA. Red lines indicate the cruise track.

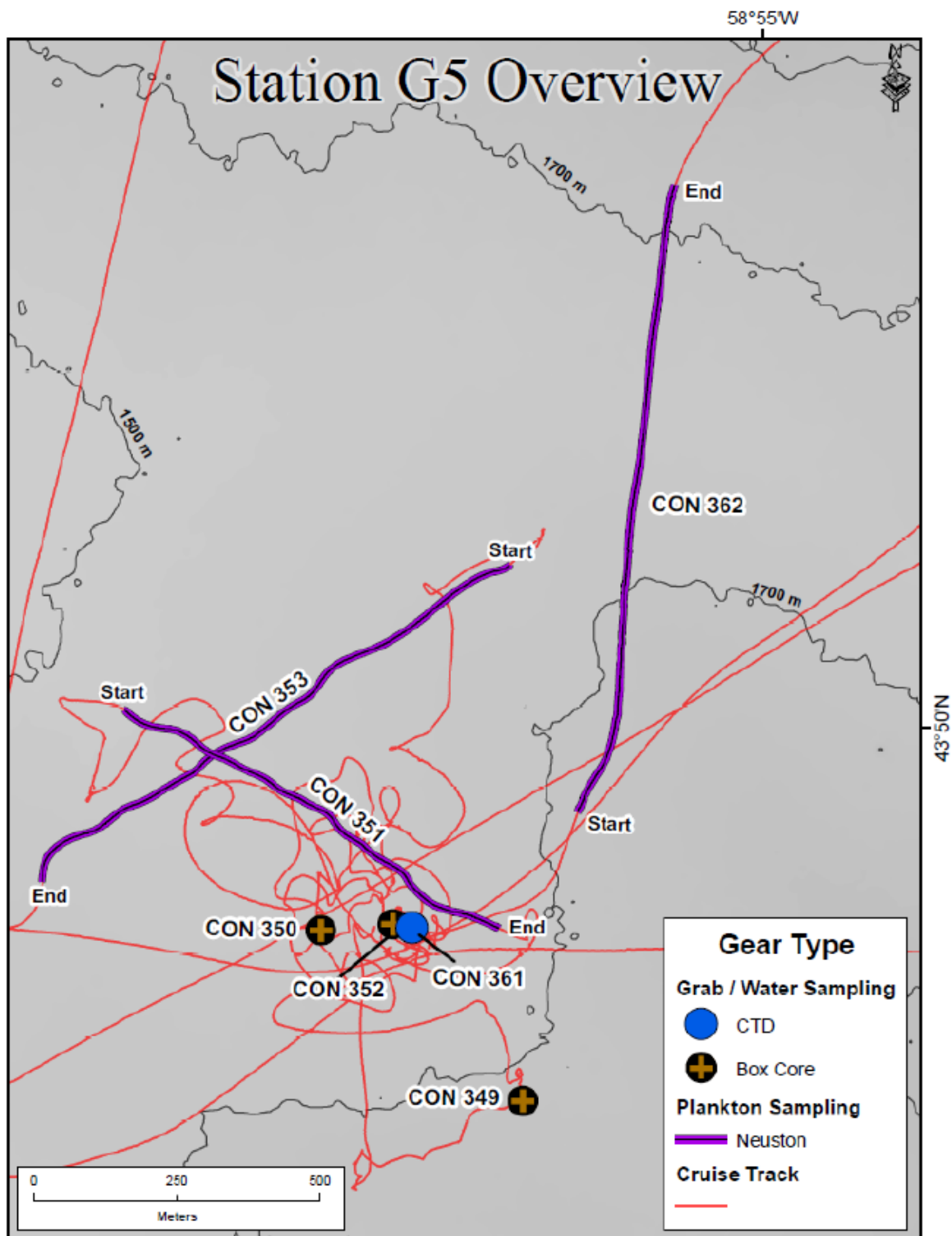


Figure 32. Location of neuston net and box core samples in the Gully MPA. Red lines indicate the cruise track.

Summary of Operations:

Day of Year: 223 – 224 (CON 346 to CON 366)

Work Location 6 – Logan Canyon

Overview

Sampling in Logan Canyon was conducted to further enhance our knowledge of the ecosystems and functioning of deep water canyons of the Scotian Shelf. *In situ* data has not been previously collected in Logan Canyon and the area was suggested by DFO Oceans managers as one of interest. Five CTD casts and 8 4KCam photo-transects were completed (Figure 33, Appendix 1). The canyon was depositional with soft sediment communities at all sampled locations.

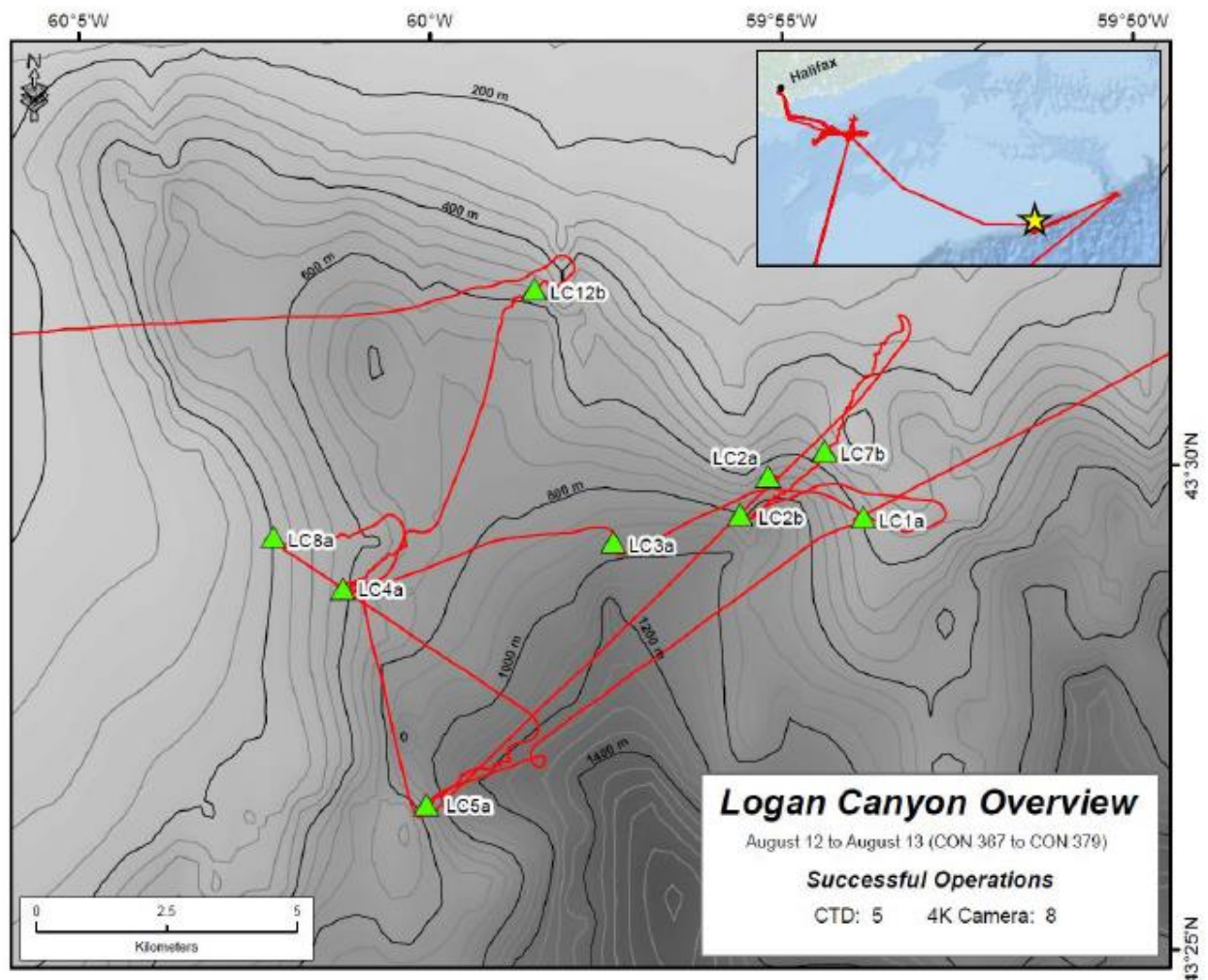


Figure 33. Location of sampling sites in Logan Canyon. Red lines indicate the cruise track.

Summary of Operations:

Day of Year: 225 – 226 (CON 367 to CON 379)

Acknowledgements

We thank Camille Lirette and Javier Guijarro for the production of all of the maps presented in this document. We appreciate the support provided by Dr. Tammy Trott and Dr. Joanna Pitt, Government of Bermuda, in facilitating our sample collections in Bermudan national waters. We are very appreciative of the services provided by Joseph Simas, Vice President, Marine Operations, Meyer Agencies Ltd., Bermuda in facilitating pilots and transfers while in Bermuda. We thank the Captain and crew of the CCGS Hudson and all science personnel for their assistance on this mission. We thank Tracy Jones and Chella Stephens for their help with administrative work associated with this mission and to the DFO senior managers both at BIO and at NHQ for allowing us to undertake this extraordinary expedition.

Appendix 1. Details of Gear Deployments

CON	Station Code	Gear	Deployed Latitude (DD)	Deployed Longitude (DD)	2016 Start Date (DD/MM)	Start Time (GMT)	Success
001	BB_test	XSV	44.69375	-63.639472	19/07	21:08:30	Test
002	BB_test	MultiBeam	44.69003	-63.641927	19/07	21:47:44	Test
003	BB_test	XSV	44.699022	-63.650223	19/07	22:06:10	Test
004	EB_1	CTD	44.333938	-62.616487	20/07	04:48:36	Yes
005	EB_06	CTD	44.344605	-62.592562	20/07	05:24:21	Yes
006	EB_05	CTD	44.335983	-62.595543	20/07	06:58:36	Yes
007	EB_04	CTD	44.328268	-62.600948	20/07	07:25:55	Yes
008	EB_03	CTD	44.319328	-62.604737	20/07	08:54:44	Yes
009	EB_03	ROV	44.318583	-62.599633	20/07	14:14:06	Test
010	EB_03	Box Core	44.319172	-62.604618	20/07	16:23:55	Yes
011	EB_03	ROV	44.320447	-62.605443	20/07	18:57:55	No
012	EB_03	Box Core	44.319282	-62.606032	21/07	09:33:06	Yes
013	EB_03	Box Core	44.319732	-62.605467	21/07	10:37:54	Yes
014	EB_03	Box Core	44.319608	-62.604523	21/07	11:43:44	Yes
015	EB_3\EB_6	MVP	44.266395	-62.647338	21/07	13:22:13	Test
016	EB_3\EB_6	MVP	44.303543	-62.613027	21/07	13:56:48	Yes
017	EB_03	ROV	44.31927	-62.60516	21/07	17:49:03	No
018	EB_03	Niskin	44.319623	-62.604875	21/07	19:57:07	Yes
019	EB_03	Niskin	44.319002	-62.603912	21/07	21:01:01	No
020	EB_03	Niskin	44.319482	-62.604653	21/07	21:24:38	Yes
021	XBT_02	XBT	42.887493	-62.996748	22/07	05:26:15	Yes
022	XBT_03	XBT	42.80942	-63.017917	22/07	05:50:01	Yes
023	XBT_04	XBT	42.787183	-63.024212	22/07	05:56:45	Yes
024	XBT_05	XBT	42.759752	-63.031427	22/07	06:05:02	Yes
025	XBT_06	XBT	42.740257	-63.036722	22/07	06:10:57	Yes
026	XBT_07	XBT	42.659658	-63.058235	22/07	06:35:53	Yes
027	XBT_08	XBT	42.584363	-63.078653	22/07	06:58:33	Yes
028	XBT_09	XBT	42.453435	-63.113787	22/07	07:37:06	Yes
029	XBT_10	XBT	42.368192	-63.136638	22/07	08:03:00	Yes
030	XBT_11	XBT	42.293198	-63.157057	22/07	08:25:55	Yes
031	XBT_12	XBT	42.213608	-63.177952	22/07	08:49:48	Yes
032	XBT_12	XBT	42.118352	-63.203542	22/07	09:18:11	Yes
033	XBT_13	XBT	42.022632	-63.229215	22/07	09:46:55	Yes
034	XBT_13	XBT	41.996085	-63.235938	22/07	09:54:54	Yes
035	XBT_13/XBT_14	XBT	41.926648	-63.25477	22/07	10:16:09	Yes
036	XBT_14/XBT_15	XBT	41.846723	-63.275992	22/07	10:40:20	Yes
037	XBT_16	XBT	41.745497	-63.302565	22/07	11:09:48	Yes
038	XBT_17	XBT	41.656055	-63.326628	22/07	11:36:00	Yes
039	XBT_18	XBT	41.55896	-63.352402	22/07	12:04:38	Yes
040	XBT_19	XBT	41.45737	-63.3791	22/07	12:34:37	Yes
041	XBT_20/XBT_21	XBT	41.362605	-63.404122	22/07	13:03:13	Yes
042	XBT_022	XBT	41.262158	-63.430708	22/07	13:33:17	Yes
043	XBT_23	XBT	41.153257	-63.459522	22/07	14:04:44	Yes
044	XBT_24	XBT	41.053808	-63.485488	22/07	14:33:37	Yes
045	XBT_25/XBT_26	XBT	40.946953	-63.513615	22/07	15:04:33	Yes
046	XBT_027	XBT	40.843197	-63.54058	22/07	15:34:55	Yes
047	XBT_28	XBT	40.745105	-63.566443	22/07	16:04:32	Yes

048	XBT_28/XBT_29	XBT	40.650218	-63.591282	22/07	16:34:54	Yes
049	XBT_29	XBT	40.551447	-63.616733	22/07	17:05:25	Yes
050	XBT_29/XBT_30	XBT	40.455632	-63.64201	22/07	17:35:37	Yes
051	XBT_30/XBT_31	XBT	40.364665	-63.665722	22/07	18:05:25	Yes
052	XBT_31/XBT_32	XBT	40.302778	-63.681852	22/07	18:25:37	Yes
053	XBT_053	XBT	40.274355	-63.689048	22/07	18:35:07	Yes
054	XBT_32/XBT_33	XBT	40.215097	-63.704648	22/07	18:55:25	Yes
055	XBT_33	XBT	40.15741	-63.719633	22/07	19:15:22	Yes
056	XBT_33/XBT_34	XBT	40.134468	-63.725227	22/07	19:23:08	No
057	XBT_34	XBT	40.11977	-63.72908	22/07	19:28:06	Yes
058	XBT_34/XBT_35	XBT	40.061497	-63.744413	22/07	19:47:52	Yes
059	XBT_35	XBT	40.002898	-63.75951	22/07	20:07:48	Yes
060	XBT_36	XBT	39.943905	-63.77476	22/07	20:27:47	Yes
061	XBT_36	XBT	39.856277	-63.797243	22/07	20:58:01	No
062	XBT_37	XBT	39.764957	-63.820702	22/07	21:29:20	No
063	XBT_38	XBT	39.679375	-63.842608	22/07	22:01:34	No
064	XBT_39	XBT	39.604013	-63.862315	22/07	22:31:00	No
065	XBT_40	XBT	39.483675	-63.893322	22/07	23:23:00	No
066	XBT_41	XBT	39.417372	-63.91025	22/07	23:54:19	Yes
067	XBT_42	XBT	39.3545	-63.93076	23/07	00:32:00	Yes
068	XBT_42	XBT	39.271917	-63.94749	23/07	01:02:24	Yes
069	XBT_43	XBT	39.224788	-63.959343	23/07	01:25:07	Yes
070	XBT_44	XBT	39.18282	-63.969975	23/07	01:45:15	Yes
071	XBT_45	XBT	39.12123	-63.98621	23/07	02:15:05	Yes
072	XBT_46	XBT	39.056672	-64.026085	23/07	02:47:35	Yes
073	XSV_01	XSV	39.025682	-64.036117	23/07	03:05:16	Yes
074	XBT_46	XBT	39.007378	-64.047008	23/07	03:15:10	Yes
075	XBT_47	XBT	38.971403	-64.06963	23/07	03:35:05	Yes
076	XBT_48	XBT	38.933923	-64.083657	23/07	03:55:02	Yes
077	XBT_49	XBT	38.89539	-64.092465	23/07	04:15:04	Yes
078	K2a	4K Cam	38.844845	-64.087643	23/07	05:39:40	No
079	K2a	4K Cam	38.834655	-64.090433	23/07	07:08:32	Yes
080	K2a	4K Cam	38.85154	-64.090165	23/07	10:31:42	No
081	K4a	4K Cam	38.821908	-64.083155	23/07	15:14:38	No
082	K2B	XBT	38.87227	-64.067968	23/07	17:54:01	Yes
083	K2B	XBT	38.893165	-64.093027	23/07	18:14:45	Yes
084	exta_Kelvin_XBT1	XBT	38.906115	-64.129317	23/07	18:26:04	Yes
085	Test_Kelvin extra_Kelvin_XBT	MultiBeam	38.930193	-64.145918	23/07	18:53:45	Test
086	3	XBT	38.930203	-64.146875	23/07	18:59:49	Yes
087	exta_Kelvin_XBT4 extra_Kelvin_XBT	XBT	38.943703	-64.139693	23/07	20:12:18	Yes
088	5	XBT	38.931012	-64.120802	23/07	20:45:51	Yes
089	extra_Kelvin_XBT 6	XBT	38.897497	-64.11264	23/07	21:02:39	Yes
090	extra_Kelvin_XBT 7	XBT	38.865285	-64.104672	23/07	21:21:24	Yes
091	extra_Kelvin_XBT8	XBT	38.836538	-64.097625	23/07	21:38:18	Yes
092	extra_Kelvin_XBT 9	XBT	38.8157	-64.093997	23/07	21:50:55	Yes
093	exta_Kelvin_XBT1 0	XBT	38.786387	-64.09042	23/07	22:09:38	Yes
094	exta_Kelvin_XBT1 1	XBT	38.783832	-64.104735	23/07	22:40:30	Yes

095	exta_Kelvin_XBT1 2	XBT	38.744558	-64.143717	23/07	23:09:39	Yes
096	exta_Kelvin_XBT1 3	XBT	38.706765	-64.18268	23/07	23:39:43	Yes
097	exta_Kelvin_XBT1 4	XBT	38.680268	-64.211407	24/07	00:08:09	Yes
098	exta_Kelvin_XBT1 5	XBT	38.649333	-64.238682	24/07	00:39:44	Yes
099	exta_Kelvin_XBT1 6	XBT	38.608067	-64.27818	24/07	01:24:55	Yes
100	extra_Kelvin_XBT 17	XBT	38.568578	-64.325012	24/07	02:08:07	Yes
101	extra_Kelvin_XBT 18	XBT	38.523462	-64.362042	24/07	02:55:02	Yes
102	extra_Kelvin_XBT 19	XBT	38.482213	-64.40228	24/07	03:39:55	Yes
103	exta_Kelvin_XBT2 0	XBT	38.446	-64.445833	23/07	04:24:40	Yes
104	extra_Kelvin_XBT 21	XBT	38.415787	-64.475673	24/07	04:56:00	Yes
105	B_1	CTD	38.388803	-64.505755	24/07	05:53:45	Yes
106	XBT_B1aB2	XBT	38.225378	-64.501785	24/07	11:04:41	Yes
107	XBT_B1bB2	XBT	38.212037	-64.501927	24/07	11:10:40	Yes
108	XBT_B1cB2	XBT	38.06298	-64.500438	24/07	12:11:17	Yes
109	XBT_B1dB2	XBT	37.897567	-64.504873	24/07	13:25:50	Yes
110	B_2	CTD	37.882593	-64.499442	24/07	14:06:52	Yes
111	B2	MVP	37.947138	-64.423032	24/07	17:43:52	Yes
112	B2-3	XBT	37.752002	-64.439988	24/07	19:39:47	Yes
113	B2-3	XBT	37.742193	-64.441987	24/07	19:46:24	Yes
114	B2-3	XSV	37.73079	-64.442538	24/07	19:55:39	Yes
115	B2-3	XBT	37.714782	-64.444083	24/07	20:08:19	Yes
116	B2-3	XBT	37.64396	-64.456	24/07	21:02:34	Yes
117	B2-3	XSV	37.580623	-64.472617	24/07	21:49:10	Yes
118	B2-3	XBT	37.558703	-64.479275	24/07	22:05:30	Yes
119	B_03	CTD	37.384832	-64.496893	25/07	00:23:02	Yes
120	B_03-04	MVP	37.378188	-64.424473	25/07	03:33:49	Yes
121	B_03-04	XBT	37.22028	-64.500127	25/07	04:53:26	Yes
122	B_03-04	XBT	37.023773	-64.500387	25/07	06:14:34	Yes
123	XBT_B4	XBT	36.883492	-64.50034	25/07	07:11:54	Yes
124	CTD_B4	CTD	36.881713	-64.501993	25/07	08:09:27	Yes
125	B_04-05	MVP	36.871585	-64.496745	25/07	11:35:22	Yes
126	B_04-05	XBT	36.80134	-64.50055	25/07	12:05:14	Yes
127	B_04-05	XBT	36.66306	-64.499872	25/07	13:02:14	Yes
128	B_04-05	XBT	36.487407	-64.499895	25/07	14:13:30	Yes
129	B_5	CTD	36.380708	-64.499003	25/07	15:17:36	Yes
130	B_05-06	XBT	36.199788	-64.500105	25/07	19:14:09	Yes
131	B_05-06	XBT	36.035677	-64.500288	25/07	20:11:04	Yes
132	B_06	CTD	35.876883	-64.49998	25/07	21:32:44	Yes
133	B_06-07	XBT	35.702178	-64.500012	26/07	01:26:10	Yes
134	B_06-07	XBT	35.53226	-64.500167	26/07	02:34:16	Yes
135	B_07	CTD	35.37442	-64.500167	26/07	03:43:54	Yes
136	B_07_08	XBT	35.203393	-64.501867	26/07	07:55:37	Yes
137	MVP-B_07-08	MVP	35.085722	-64.498695	26/07	08:45:15	Yes
138	B_07-08	XBT	35.042922	-64.500337	26/07	09:02:55	Yes
139	B_08	XBT	34.891692	-64.499948	26/07	10:04:36	Yes

140	B_08-09	XBT	34.745963	-64.49994	26/07	11:03:51	No
141	B_08-09	XBT	34.61138	-64.500062	26/07	11:58:00	Yes
142	B_09	XBT	34.451813	-64.500343	26/07	12:58:48	Yes
143	B_09	XBT	34.433798	-64.500117	26/07	13:05:36	Yes
144	B_09	XBT	34.336187	-64.500258	26/07	14:01:38	Yes
145	B_09-10	XSV	34.311123	-64.500167	26/07	14:17:09	Yes
146	B_09-10	XBT	34.252757	-64.50031	26/07	14:52:42	Yes
147	B_09-10	XBT	34.23579	-64.49979	26/07	15:04:50	Yes
148	B_09-10	XBT	34.12607	-64.500332	26/07	16:11:40	Yes
149	B_09-10	ROV	34.120262	-64.500413	26/07	16:27:02	Test
150	MVP-B_09-10	MVP	34.108388	-64.509683	26/07	17:37:27	Yes
151	B_09-10	XBT	34.07765	-64.50691	26/07	17:54:46	Yes
152	B_09-10	XBT	34.019288	-64.503062	26/07	18:32:17	Yes
153	B_10	XBT	33.926913	-64.50022	26/07	19:24:17	Yes
154	B_10	XBT	33.840657	-64.50379	26/07	20:12:25	Yes
155	B_10	ROV	33.826607	-64.5039	26/07	20:25:05	Test
156	B_10	XBT	33.8107	-64.502017	26/07	20:59:11	Yes
157	B_10_11	XBT	33.693675	-64.49983	26/07	22:02:13	Yes
158	B_10_11	XBT	33.534023	-64.499873	26/07	23:27:24	Yes
159	B_10_11	XBT	33.444528	-64.499993	27/07	00:16:11	Yes
160	B_11	XBT	33.366275	-64.500012	27/07	00:58:06	Yes
161	NNE1_a	ROV	32.494147	-64.588307	29/07	17:01:34	No
162	B_21	CTD	32.49378	-64.587682	29/07	18:02:16	Yes
163	NNE1_a	MultiBeam	32.495883	-64.585763	29/07	18:57:29	Yes
164	NNE2_c test	MVP	32.53375	-64.557985	29/07	20:09:49	Test
165	NNE2_c	MVP	32.552448	-64.55884	29/07	20:22:23	Yes
166	B_20	CTD	32.694288	-64.512728	29/07	21:44:41	Yes
167	NNE2_c test	MultiBeam	32.709	-64.528947	29/07	23:39:49	Test
168	Roll_01	MVP	32.707593	-64.530987	29/07	23:44:11	Yes
169	Roll_01	MultiBeam	32.705205	-64.526302	30/07	00:07:11	Yes
170	BD_01 to BD_10	MVP	32.696753	-64.507553	30/07	03:19:11	Yes
171	BD_01 to BD_10	MultiBeam	32.740177	-64.462308	30/07	03:18:48	Yes
172	B1_15a	ROV	32.711645	-64.537355	30/07	17:16:37	No
173	B1_15a	4K Cam	32.710145	-64.532315	30/07	20:59:10	Yes
174	B1_19_a	4K Cam	32.687878	-64.528433	31/07	00:10:21	No
175	BD_CTD_5	CTD	32.784395	-64.503495	31/07	04:38:42	Yes
176	BD_CTD_3	CTD	32.73044	-64.53055	31/07	08:28:44	Yes
177	BD_CTD_3	MultiNet	32.732005	-64.531275	31/07	11:46:47	Yes
178	BD_CTD_3	MultiNet	32.73025	-64.530417	31/07	15:52:06	Yes
179	BD_CTD_3	MultiNet	32.73073	-64.530475	31/07	17:35:23	Yes
180	BD_CTD_3	Neuston	32.730732	-64.530253	31/07	18:49:21	No
181	BD_CTD_3	Neuston	32.731145	-64.528542	31/07	19:08:55	Yes
182	BD_CTD_3	Neuston	32.731038	-64.531622	31/07	19:57:00	Yes
183	BD_CTD_01	CTD	32.65455	-64.571928	31/07	21:43:38	Yes
184	C_CTD_3	CTD	32.041008	-65.123577	01/08	07:21:32	Yes
185	C_CTD_2	CTD	32.057242	-65.101857	01/08	08:56:27	No
186	C_CTD_1	CTD	32.071902	-65.085512	01/08	09:45:17	No
187	Arg1_M	MultiBeam	31.99373	-65.226855	01/08	11:41:39	Yes
188	Arg1_5a	ROV	31.994837	-65.230352	01/08	17:03:55	No
189	Arg1_5a	ROV	31.99579	-65.231695	01/08	18:08:07	No
190	ArgMB1_1 to ArgMB1_2	MVP	31.985148	-65.220767	01/08	21:43:07	Yes
191	ArgMB1_2	MultiBeam	31.927847	-65.151352	01/08	22:52:09	Yes
192	ArgMB2_1 to	MultiBeam	31.977913	-65.142145	02/08	05:32:37	Yes

	ArgMB2_2						
	ArgMB2_1 to						
193	ArgMB2_2	MVP	32.002855	-65.138807	02/08	05:34:47	Yes
194	C_CTD_3	MultiNet	32.042277	-65.122585	02/08	10:50:57	Yes
195	C_CTD_3	MultiNet	32.040402	-65.122968	02/08	12:14:53	Yes
196	C_CTD_3	MultiNet	32.04052	-65.122613	02/08	13:33:16	Yes
197	C_CTD_3	Neuston	32.04532	-65.114718	02/08	16:23:31	Yes
198	C_CTD_3	Neuston	32.057973	-65.114565	02/08	16:58:42	Yes
199	C_CTD_3	Niskin	32.056308	-65.111967	02/08	17:03:31	Yes
200	C_CTD_3	Neuston	32.048168	-65.10194	02/08	17:32:29	Yes
201	C_CTD_3	ROV	32.041637	-65.123725	02/08	18:53:46	Yes
202	C_CTD_3	Van Veen	32.041208	-65.124023	02/08	21:58:17	No
203	C_CTD_3	Van Veen	32.041745	-65.123662	02/08	23:08:44	Yes
204	C_CTD_3	Van Veen	32.041795	-65.123505	03/08	00:17:16	Yes
205	A_CTD1	CTD	32.026573	-65.143813	03/08	01:58:06	Yes
206	A_CTD2	CTD	32.011097	-65.16291	03/08	03:01:09	Yes
207	A_CTD3	CTD	31.991785	-65.186388	03/08	03:45:02	Yes
208	A_CTD4	CTD	31.95891	-65.20027	03/08	04:19:59	Yes
209	A_CTD5	CTD	31.921342	-65.2147	03/08	05:02:53	Yes
210	A_CTD6	CTD	31.874098	-65.233295	03/08	06:30:42	Yes
211	C_CTD_3	4K Cam	32.04208	-65.123113	03/08	10:43:33	Test
212	C_CTD_3	MVP	32.040518	-65.06203	03/08	12:27:39	Yes
213	B1_15_a	Van Veen	32.710585	-64.533127	03/08	22:19:47	Yes
214	B1_15_a	Van Veen	32.70997	-64.532312	03/08	23:46:13	Yes
215	BD_CTD_3 to B11	MVP	32.724055	-64.532765	04/08	01:36:08	Yes
216	B_11	CTD	33.360728	-64.50001	04/08	06:37:02	Yes
217	B_11 to B_10	MVP	33.370372	-64.499547	04/08	09:41:52	Yes
218	B_10	Neuston	33.8627	-64.499975	04/08	14:09:16	Yes
219	B_10	Neuston	33.849235	-64.50139	04/08	14:44:27	Yes
220	B_10	Neuston	33.860568	-64.501605	04/08	15:12:58	Yes
221	B_10	CTD	33.865458	-64.500645	04/08	15:55:07	Yes
222	B_10-09	MVP	33.867158	-64.49975	04/08	18:41:12	Yes
223	B_09	CTD	34.368938	-64.500563	04/08	22:25:35	Yes
224	B_08-09	MVP	34.376658	-64.500125	05/08	01:43:27	Yes
225	B_08	CTD	34.872467	-64.499752	05/08	05:51:55	Yes
226	B_08	MVP	34.877847	-64.497365	05/08	08:56:29	Yes
227	B_05-06	MVP	35.900813	-64.500052	05/08	18:10:55	Yes
228	GSXBT_1a	XBT	37.27595	-64.499733	06/08	03:48:09	Yes
229	GSXBT_1a-1b	MVP	37.286642	-64.499768	06/08	03:52:23	Yes
230	GSXBT_1a-1b	XBT	37.361968	-64.499783	06/08	04:21:58	Yes
231	GSXBT_1a-1b	XBT	37.439977	-64.499953	06/08	04:52:09	Yes
232	GSXBT_1a-1b	XBT	37.522172	-64.499883	06/08	05:23:34	Yes
233	GSXBT_1a-1b	XBT	37.596148	-64.499765	06/08	05:53:07	Yes
234	GSXBT_1a-1b	XBT	37.674062	-64.499745	06/08	06:25:06	Yes
235	GSXBT_1a-1b	XBT	37.726443	-64.499793	06/08	06:46:38	Yes
236	GSXBT_1a-1b	XBT	37.793938	-64.499778	06/08	07:14:12	Yes
237	GSXBT_1a-1b	XBT	37.838712	-64.499765	06/08	07:33:27	Yes
238	GSXBT_1a-1b	XBT	37.886843	-64.500075	06/08	07:53:56	Yes
239	GSXBT_1a-1b	XBT	37.936968	-64.499842	06/08	08:14:42	Yes
240	GSXBT_1a-1b	XBT	37.9924	-64.500157	06/08	08:37:14	Yes
241	GSXBT_1a-1b	XBT	38.051213	-64.500115	06/08	09:00:38	Yes
242	GSXBT_1a-1b	XBT	38.073205	-64.499987	06/08	09:09:13	Yes
243	GSXBT_1a-1b	XBT	38.091332	-64.499852	06/08	09:16:25	Yes
244	GSXBT_1a-1b	XBT	38.116257	-64.499868	06/08	09:26:28	Yes
245	GSXBT_1a-1b	XBT	38.169857	-64.499907	06/08	09:47:31	Yes

246	GSXBT_1a-1b	XBT	38.22242	-64.500072	06/08	10:08:24	Yes
247	GSXBT_1a-1b	XBT	38.273047	-64.499852	06/08	10:29:42	Yes
248	GSXBT_1a-1b	XBT	38.325937	-64.499962	06/08	10:50:55	Yes
249	GSXBT_1b	XBT	38.381287	-64.492423	06/08	11:13:21	Yes
250	GSXBT_1b	XBT	38.49007	-64.433985	06/08	12:00:04	Yes
251	GSXBT_1b_2a	XBT	38.626015	-64.357572	06/08	12:58:57	Yes
252	GSXBT_1b_2a	XBT	38.762665	-64.280675	06/08	14:00:13	Yes
253	CTD_F1	CTD	38.788515	-64.266068	06/08	14:38:56	Yes
254	CTD_F1	Neuston	38.789497	-64.265615	06/08	17:33:29	Yes
255	CTD_F1	Neuston	38.80199	-64.264602	06/08	18:03:39	Yes
256	CTD_F1	Neuston	38.797432	-64.252748	06/08	18:35:58	Yes
257	CTD_F1	MVP	38.79859	-64.263588	06/08	19:09:06	Yes
258	CTD_F1	XBT	38.876268	-64.210765	06/08	19:49:29	Yes
259	CTD_F1	XBT	38.994015	-64.133805	06/08	20:45:41	Yes
260	CTD_F1_F2	XBT	39.139748	-64.039447	06/08	21:56:22	Yes
261	CTD_F1_F2	XBT	39.254412	-63.964762	06/08	22:46:53	Yes
262	CTD_F1_F2	XBT	39.366377	-63.892005	06/08	23:46:25	Yes
263	CTD_F2	CTD	39.461095	-63.831122	07/08	00:56:38	Yes
264	CTD_F2_F3	MVP	39.486128	-63.826735	07/08	03:58:09	Yes
265	CTD_F2_F3	XBT	39.665623	-63.698027	07/08	05:14:54	Yes
266	CTD_F2_F3	XBT	39.765942	-63.63104	07/08	05:59:29	Yes
267	CTD_F2_F3	XBT	39.903557	-63.540712	07/08	06:57:40	Yes
268	CTD_F2_F3	XBT	40.055907	-63.440912	07/08	08:01:20	Yes
269	CTD_F3	CTD	40.128968	-63.394888	07/08	08:48:33	Yes
270	CTD_F3_F4	MVP	40.14783	-63.38552	07/08	11:48:29	Yes
271	CTD_F3_F4	XBT	40.163672	-63.370965	07/08	11:58:13	Yes
272	CTD_F3_F4	XBT	40.292092	-63.285567	07/08	12:56:40	Yes
273	CTD_F3_F4	XBT	40.358568	-63.241718	07/08	13:27:10	Yes
274	CTD_F3_F4	XBT	40.419671	-63.193167	07/08	13:51:06	Yes
275	CTD_F3_F4	XBT	40.466128	-63.17058	07/08	14:20:20	Yes
276	CTD_F3_F4	XBT	40.520077	-63.134702	07/08	14:49:16	Yes
277	CTD_F3_F4	XBT	40.568453	-63.103077	07/08	15:16:59	No
278	CTD_F3_F4	XBT	40.578953	-63.095578	07/08	15:23:08	Yes
279	CTD_F3_F4	XBT	40.621008	-63.068077	07/08	15:46:47	Yes
280	CTD_F3_F4	XBT	40.658258	-63.043318	07/08	16:07:22	Yes
281	CTD_F3_F4	XBT	40.694648	-63.01938	07/08	16:26:46	Yes
282	CTD_F3_F4	XBT	40.73151	-62.994562	07/08	16:46:13	No
283	CTD_F3_F4	XBT	40.744742	-62.985877	07/08	16:52:59	Yes
284	CTD_F4	MultiNet	40.786462	-62.964617	07/08	17:34:48	Yes
285	CTD_F4	Neuston	40.77762	-62.959432	07/08	19:05:01	Yes
286	CTD_F4	MultiNet	40.778467	-62.957938	07/08	19:35:21	Yes
287	CTD_F4	Neuston	40.769015	-62.951298	07/08	21:06:23	Yes
288	CTD_F4	XBT	40.773575	-62.948348	07/08	21:34:16	Yes
289	CTD_F4	XBT	40.773015	-62.947668	07/08	21:37:54	Yes
290	F4	CTD	40.770265	-62.94663	07/08	21:50:25	Yes
291	CTD F4 F5	MVP	40.779265	-62.950657	08/08	00:41:32	Yes
292	CTD F4 F5	XBT	40.82695	-62.930653	08/08	01:07:45	Yes
293	CTD F4 F5	XBT	40.867247	-62.90442	08/08	01:27:40	Yes
294	CTD F4 F5	XBT	40.911158	-62.874992	08/08	01:49:15	Yes
295	CTD F4 F5	XBT	40.95023	-62.849108	08/08	02:07:43	Yes
296	CTD F4 F5	XBT	40.996063	-62.818857	08/08	02:29:15	Yes
297	CTD F4 F5	XBT	41.036693	-62.791815	08/08	02:48:04	Yes
298	CTD F4 F5	XBT	41.079547	-62.763187	08/08	03:08:28	Yes
299	CTD F4 F5	XBT	41.117608	-62.73784	08/08	03:27:18	Yes
300	CTD F4 F5	XBT	41.157658	-62.710688	08/08	03:47:11	Yes

301	CTD F4 F5	XBT	41.219572	-62.669212	08/08	04:17:46	Yes
302	CTD F4 F5	XBT	41.28266	-62.627152	08/08	04:48:37	Yes
303	CTD_F5	CTD	41.362443	-62.571143	08/08	05:58:44	Yes
304	CTD_F5	XBT	41.363637	-62.569553	08/08	08:37:29	Yes
305	CTD_F5-F6	MVP	41.370027	-62.560643	08/08	08:48:03	Yes
306	CTD_F5-F6	XBT	41.422727	-62.497807	08/08	09:17:28	Yes
307	CTD_F5-F6	XBT	41.481833	-62.422517	08/08	09:50:04	Yes
308	CTD_F5-F6	XBT	41.538145	-62.35135	08/08	10:21:42	Yes
309	CTD_F5-F6	XBT	41.58229	-62.295308	08/08	10:47:07	Yes
310	CTD_F5-F6	XBT	41.609523	-62.26069	08/08	11:02:42	Yes
311	CTD_F5-F6	XBT	41.632532	-62.231405	08/08	11:16:24	Yes
312	CTD_F5-F6	XBT	41.655515	-62.20224	08/08	11:29:29	Yes
313	CTD_F5-F6	XBT	41.679847	-62.171228	08/08	11:42:41	Yes
314	CTD_F5-F6	XBT	41.70716	-62.136432	08/08	11:57:18	Yes
315	CTD_F5-F6	XBT	41.734322	-62.101807	08/08	12:11:48	Yes
316	CTD_F5-F6	XBT	41.759837	-62.069305	08/08	12:26:46	Yes
317	CTD_F5-F6	XBT	41.789698	-62.03102	08/08	12:43:37	Yes
318	CTD_F5-F6	XBT	41.800728	-62.017095	08/08	12:49:42	Yes
319	CTD_F5-F6	XBT	41.822677	-61.989015	08/08	13:01:42	Yes
320	XBT_319	MultiNet	41.82388	-61.98724	08/08	13:58:56	Yes
321	XBT_319	Neuston	41.821282	-61.986465	08/08	15:01:25	Yes
322	XBT_316	MultiNet	41.760325	-62.068943	08/08	16:11:04	Yes
323	XBT_316	Neuston	41.758793	-62.068218	08/08	17:11:00	Yes
324	XBT316_S1	MultiNet	41.74262	-62.069133	08/08	17:49:15	Yes
325	XBT316_S1	Neuston	41.740968	-62.068398	08/08	18:45:01	Yes
326	XBT316_S2	MultiNet	41.726208	-62.06928	08/08	19:19:28	Yes
327	XBT316_S2	Neuston	41.725227	-62.072752	08/08	20:16:49	Yes
328	XBT_314	ARGO	41.70652	-62.134893	08/08	21:30:35	Yes
329	XBT_314	CTD	41.706618	-62.136668	08/08	21:54:18	Yes
330	XBT_314	MVP	41.709897	-62.127845	09/08	00:26:43	Yes
331	XBT_314-front	XBT	41.788155	-62.033633	09/08	01:13:58	Yes
332	XBT_314-front	XBT	41.836978	-61.9723	09/08	01:41:59	Yes
333	CTD_333	CTD	41.86962	-61.930508	09/08	02:25:25	Yes
334	CTD_333-F6a	MVP	41.870802	-61.926793	09/08	04:58:22	Yes
335	CTD_333-F6a	XBT	41.883803	-61.926157	09/08	05:05:58	Yes
336	CTD_333-F6a	XBT	41.935278	-61.918602	09/08	05:26:41	Yes
337	CTD_333-F6a	XBT	41.988252	-61.908298	09/08	05:47:23	Yes
338	CTD_333-F6a	XBT	42.044188	-61.897297	09/08	06:08:40	Yes
339	CTD_333-F6a	XBT	42.091298	-61.888262	09/08	06:26:44	Yes
340	CTD_F6a	CTD	42.140192	-61.877023	09/08	06:59:07	Yes
341	XBT_319	MultiNet	41.822278	-61.99018	09/08	11:23:17	Yes
342	XBT_319	XBT	41.822428	-61.990035	09/08	11:56:47	Yes
343	XBT_319	Neuston	41.824525	-61.990108	09/08	12:20:42	Yes
344	XBT_319-E1	MultiNet	41.824165	-61.968	09/08	13:05:31	Yes
345	XBT_319-E1	Neuston	41.827055	-61.96671	09/08	14:04:01	Yes
346	G_C1	CTD	43.839293	-58.873467	10/08	06:35:08	Yes
347	G_C2	CTD	43.840715	-58.887652	10/08	07:48:32	Yes
348	G_T1a	ROV	43.837343	-58.887608	10/08	09:53:03	Yes
349	G5	Box Core	43.82866	-58.923452	10/08	13:34:08	Yes
350	G5	Box Core	43.832192	-58.926248	10/08	16:19:15	Yes
351	G5	Neuston	43.83423	-58.93136	10/08	17:51:11	Yes
352	G5	Box Core	43.832025	-58.926463	10/08	18:54:14	Yes
353	G5	Neuston	43.836198	-58.92286	10/08	20:30:48	Yes
354	G5	Neuston	43.833203	-58.934343	10/08	20:58:46	No
355	G_T2A	4K Cam	43.862292	-58.902472	10/08	22:07:28	Test

356	G_T2A	4K Cam	43.861362	-58.90233	10/08	22:39:00	Yes
357	G_T3A	4K Cam	43.838498	-58.833245	11/08	01:50:21	Yes
358	G_T3A	CTD	43.839538	-58.832972	11/08	04:31:52	Yes
359	G_C2	CTD	43.840865	-58.889293	11/08	06:01:29	Yes
360	G_C3	CTD	43.838243	-58.902228	11/08	08:20:45	Yes
361	G5	CTD	43.830037	-58.925303	11/08	10:22:57	Yes
362	G5	Neuston	43.832292	-58.921648	11/08	11:40:49	Yes
363	GS_ROVa	CTD	43.870148	-58.854862	11/08	12:43:38	Yes
364	GS_ROVa	ROV	43.87115	-58.851238	11/08	13:42:22	No
365	GS_ROVa	ROV	43.87012	-58.854772	11/08	15:24:28	Yes
366	G_C2	MultiNet	43.840125	-58.890043	11/08	18:42:56	Yes
367	LC1a	CTD	43.492463	-59.903207	12/08	02:07:00	Yes
368	LC2a	CTD	43.4995	-59.922758	12/08	02:55:28	Yes
369	LC3a	CTD	43.489517	-59.960397	12/08	04:05:41	Yes
370	LC4a	CTD	43.483777	-60.026178	12/08	05:49:00	Yes
371	LC5a	CTD	43.445517	-60.008067	12/08	06:58:14	Yes
372	LC1a	4K Cam	43.493372	-59.902017	12/08	09:25:06	Yes
373	LC2b	4K Cam	43.493297	-59.928977	12/08	11:37:20	Yes
374	LC7b	4K Cam	43.503428	-59.910463	12/08	13:37:25	Yes
375	LC7b	4K Cam	43.50738	-59.906723	12/08	14:04:50	Yes
376	LC5a	4K Cam	43.445382	-60.007853	12/08	17:11:30	Yes
377	LC8a	4K Cam	43.492525	-60.039618	12/08	20:13:14	Yes
378	LC4a	4K Cam	43.483438	-60.026228	12/08	22:29:04	Yes
379	LC12b	4K Cam	43.532357	-59.982677	13/08	00:55:19	Yes
380	EB_03	ROV	44.31926	-62.605077	13/08	15:34:49	Yes
381	EB_03	ROV	44.319093	-62.605137	13/08	16:54:51	Yes
382	EB_03	ROV	44.319093	-62.605007	13/08	18:31:34	Yes
383	EB_03	ROV	44.319325	-62.605087	13/08	19:38:56	Yes
384	1A to 14 B	MVP	44.334965	-62.675162	13/08	21:35:21	Yes
385	1A to 1B	MultiBeam	44.328363	-62.558122	13/08	21:41:53	Yes
386	EB_03	ROV	44.320577	-62.605702	14/08	13:40:21	Yes
387	EB_03	Box Core	44.319607	-62.605972	14/08	16:15:03	Yes
388	EB_03	ROV	44.31948	-62.604697	14/08	17:23:00	Yes
389	1A to 14 B	MultiBeam	44.320692	-62.665913	14/08	19:48:47	Yes
390	1A to 14 B	MVP	44.318855	-62.563028	14/08	20:05:29	Yes
391	EB_03	ROV	44.319203	-62.606445	15/08	12:18:07	Yes
392	EB_03	CTD	44.317978	-62.606152	15/08	15:30:06	Yes
393	EB_10	ROV	44.283032	-62.60004	15/08	17:49:24	Yes
394	EB_10	ROV	44.282075	-62.601453	15/08	19:03:31	Yes
395	EB_10	ROV	44.281995	-62.601433	15/08	21:30:04	Yes
396	EB_End	CTD	44.28197	-62.601483	15/08	23:18:15	Yes
397	SP_3	4K Cam	44.38629	-62.857938	16/08	01:03:50	Yes

Appendix 2. Collection Permits, Approvals and Authorizations Associated with the Hudson 2016-019 Mission

Bermuda Government

PERMIT NO: 160701



BERMUDA GOVERNMENT
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
P.O. Box HM 834, Hamilton, Bermuda HM CX

SPECIAL PERMIT
issued under the Fisheries Act, 1972

APPLICANT NAME: Dr. Ellen. Kenchington and Dr. Lindsay Beazley
ADDRESS: Fisheries and Oceans Canada, Bedford Institute of Oceanography, P.O. Box 1006, 1 Challenger Drive, Dartmouth, N.S., Canada

DATE: 8 July 2016

PERMIT

This Special Permit authorizes the above named to:

Conduct benthic and pelagic sampling from the CCGS Hudson on Challenger Bank, Plantagenet (Argus) Bank, and Bowditch Seamount and at 4 locations on the Bermuda Pedestal (i.e. Tiger Reef, North Rock, North East and one South Shore site - possibly Spittal or XL).

Permission is granted to sample at three depth levels (i.e. 500m, 1000m and 1500m) on Challenger Bank, Plantagenet Bank, and the 4 locations on the Bermuda Pedestal.

Permission is also granted to sample at three depth levels (i.e. 1500m, 1700m and 1900m) on Bowditch Seamount.

The applicants can:

- Collect up to 10 benthic megafauna specimens by ROV at each depth at each location.
- Collect up to 10 push-core (box corer) sediment samples at each depth at each location.
- Collect seawater throughout the water column at each location using a CTD/Niskin rosette sampler, and extract eDNA from the water samples.
- Collect zooplankton samples at each location using open/closing nets throughout the water column.
- Collect marine organisms on the sea surface at each location using a neuston net.
- Collect up to 20 rock samples at each depth level on Bowditch Seamount.

In addition, permission is granted to map the slopes of the Bermuda Pedestal, Challenger Bank, Plantagenet Bank and the Bowditch Seamount using multi-beam sonar.

Permit SP160701

The above permissions are subject to the following Terms and Conditions:

- a) Permit is valid from 29th July until 3rd August 2016.
- b) The permit holders are responsible for the actions of any person designated to undertake research or collect specimens/samples on their behalf.
- c) Sampling locations are subject to change, on approval of the Dept. of Environment and Natural Resources, based on prevailing weather conditions. (Bermuda Radio will advise local mariners of any planned activity of the Hudson on any particular day, based on information provided by the Captain of the Hudson).
- d) Sampling may be constrained by the activity of local fishing vessels.
- e) No more than two replicate benthic megafauna specimens per species should be collected at each depth at each sampling location. A separate licence will be issued for the collection of coral and any other protected species.
- f) Rare taxa must not be collected i.e. a single colony or specimen at a specific depth within a location.
- g) Benthic sampling areas should be inspected before collection begins. This restriction is waived if a particular taxon is immediately observed to be common or abundant, i.e. more than 10 colonies or individuals are apparent when the bottom is first encountered. It is preferred that only a piece of a colonial organism be collected.
- h) If any *Sargassum* spp. is collected by neuston tows, any captured Sargassumfish (*Histrio histrio*) or Syngnathidae should be returned to the ocean as soon as possible accompanied by some *Sargassum*. The remaining collected *Sargassum* should be archived in 75% alcohol, along with any other associated fauna, and deposited with the Curator of the Bermuda Natural History Museum (Dr. Struan R. Smith).
- i) Specimens for research purposes only. No commercial value.
- j) The Bermuda Government considers these resources to be the property of the people of Bermuda, such that collected materials, or their derivatives (e.g. DNA), may not be used for any commercial interest without the explicit sanction of the Government of Bermuda's Department of Environment and Natural Resources and the Minister responsible.
- k) The Department of Environment and Natural Resources would appreciate receiving the multi-beam sonar data files when available so that they can be integrated into the Department's GIS system.
- l) A list of specimens collected must be submitted to the Department of Environment and Natural Resources prior to departure from Bermuda.
- m) An export permit from the Department of Environment and Natural Resources is required for any marine specimens leaving Bermuda.
- n) A progress report must be submitted to the Department of Environment and Natural Resources before any request for an extension of this permit will be granted.
- o) Upon completion of the study or within three years of the collection, whichever is less, a report detailing the results of this work must be deposited with the Department of Environment and Natural Resources.
- p) Electronic copies of any publications resulting from the studies must be sent to the Department of Environment and Natural Resources for inclusion in the Natural History Museum Library.

If you agree to the terms and conditions listed above, please sign and date this form and send it to the Department of Environment and Natural Resources for the authorizing countersignature.

I agree to the above terms and conditions

Date

14 July 2016
14 July 2016
14/7/2016

Andrew Pettit
Director

Date

Department of Environment and Natural Resources

Gully Marine Protected Area Approval



Fisheries and Oceans Pêches et Océans
Canada Canada

PO Box 1006
Dartmouth, NS
B2Y 4A2

File / Référence
GMPA-2016-03

JUL 25 2016

Lindsay Beazley
Bedford Institute of Oceanography
1 Challenger Dr
Dartmouth, NS
B2Y 4A2

Dear Lindsay:

RE: Gully Marine Protected Area (MPA) Activity Approval
Multidisciplinary Oceanographic Research Mission (Hudson 2016-019)

I am pleased to inform you that your request to conduct a variety of research and monitoring activities in the Gully MPA between 9 and 13 August 2016 has been approved under Section 6(1) of the *Gully MPA Regulations*. Information provided in the application submitted on 22 June 2016 (attached) demonstrates compliance with the regulatory conditions that must be met for issuance of Ministerial Approval. Any changes to the approved activities that have not been described in the submitted and approved plan must be discussed with the Oceans and Coastal Management Division (OCMD).

While in the MPA, you will be expected to comply with all applicable federal legislation. In particular, we'd like to emphasize that holding a Ministerial Approval issued pursuant to the *Gully MPA Regulations* does not satisfy any requirements of the *Species at Risk Act* or the *Fisheries Act*. Neither does the MPA Approval given here substitute for any permits or licences required under those statutes. It is your responsibility to ensure any necessary authorizations are acquired prior to undertaking the approved MPA activities. Further, you are expected to comply fully with any conditions stipulated therein.

To support conservation and protection of the MPA ecosystem, you are asked to adhere to the following requests while undertaking the approved research:

1. Decrease vessel speed to 10 knots or less when operating in the MPA as per the General Guidelines for MPAs published by the Canadian Coast Guard in Section 5A of the Annual Edition Notices to Mariners (<https://www.notmar.gc.ca>).
2. Maintain a watch during daylight hours for turtles, marine mammals and marine debris (e.g., abandoned fishing gear, plastics, other garbage or pollutants) as described in the submitted Activity Plan. Provide any sightings information to Oceans and Coastal Management Division (OCMD).
3. Report environmental emergencies or other incidents, including unintentional discharges and mammal collisions, to the Canadian Coast Guard within two hours of the occurrence. Notify OCMD as soon as possible and file an MPA incident report.

4. Minimize echosounder power levels as much as possible and limit the use of echosounders to the minimum necessary for safely accomplishing the mission goals and objectives.

5. Provide a cruise report to OCMD that details MPA arrival and departure dates & times, and outlines operations undertaken within the MPA.

We have enclosed a set of templates and instructions to assist with the documentation being sought in the requests attached to this Approval. The activity report, sightings data, and incident notifications should be submitted to Paul Macnab in OCMD at:

Paul Macnab
Fisheries and Oceans Canada
Bedford Institute of Oceanography
1 Challenger Dr., B500
Dartmouth, NS
B2Y 2V9

Phone: (902) 426-6391
E-mail: Paul.Macnab@dfo-mpo.gc.ca

Please feel free to follow-up with Paul should you have any questions or need further clarification. Thank you for your continued interest in the Gully MPA. Your research program contributes to the MPA knowledge base and is linked to the site's long-term monitoring needs; OCMD is grateful for this scientific support.

Yours sincerely,



Glen Herbert
Regional Manager
Oceans and Coastal Management Division
Ecosystem Management Branch
Maritimes Region

Attachments: Approved Activity Plan
Activity and Incident Report Template

Vazella Sponge Closures



Fisheries and Oceans
Canada

Pêches et Océans
Canada

1 Challenger Drive
P.O. Box 1006
Dartmouth, NS B2Y 4A2

June 30, 2016

Dr. Ellen Kenchington
Ecosystem Research Division
Science Branch, Fisheries and Oceans Canada
Bedford Institute of Oceanography

Dear Dr. Kenchington:

RE: Application to Conduct Benthic Survey in Vazella Sponge Closures

The Oceans and Coastal Management Division received your application for an activity in the Sponge Conservation Areas in early June 2016. We understand the purpose of this research is to collect data and information on the *Vazella pourtalesi* sponge grounds of Emerald Basin, Scotian Shelf in support of the EU-funded SponGES project on "Deep-sea Sponge Grounds Ecosystems of the North Atlantic: an integrated approach towards their preservation and sustainable exploitation" - Grant Agreement no. 679849. Your proposal to conduct an ROV survey and other sampling has been reviewed to determine whether these activities are consistent with the goals and objectives of the conservation area and broader sponge conservation requirements in the region. I am pleased to inform you that your request has been approved.

We request that any significant changes to the program, such as alterations in the amount sampling station locations, be sent to the Oceans and Coastal Management Division prior to sailing.

Thank you for your support of sponge research and advancing our understanding and management of these closures. If you have any questions, please do not hesitate to contact Derek Fenton, Oceans Biologist at DFO Regional Headquarters in Dartmouth (902-403-2548 or derek.fenton@dfo-mpo.gc.ca).

Yours sincerely,

Rhea King
Regional Director
Ecosystem Management Branch
Fisheries and Oceans Canada

cc: Carl MacDonald

Canada

DFO Fisheries Authorization



Fisheries and Oceans / Pêches et Océans
Canada / Canada

7A0001F000

Document No: 11393261

Page 1 of 4

REGISTRATION(S) AND/OR FISHING LICENCE(S)

This document authorizes the registration card holder and/or licence holder to engage in fishing and related activities on the Atlantic coast of Canada subject to the provisions of the Fisheries Act and Regulations made thereunder.

This licence and/or registration is issued under the authority of the Minister of Fisheries and Oceans Canada.

FIN 7-000153-26

CALENDAR YEAR 2014

ISSUANCE DATE: MAY 26, 2014

FISHERIES AND OCEANS CANADA
REGIONAL DIRECTOR SCIENCE
1 CHALLENGER DRIVE, BIO
DARTMOUTH, NS, NS
B2Y 4A2

HOMEPORT

11804 DARTMOUTH

Licence(s) - 2014

Licence #	Species	Areas	Licence Type	Gear Permitted	Amt	VRN	LOA
323354	ITEMS UNSPECIFIED			UNKNOWN	600		

TO BE OPERATED BY ANY SCIENCE STAFF OFFICER (PROJECT OFFICER) AUTHORIZED BY THE REGIONAL DIRECTOR SCIENCE BRANCH, MARITIMES REGION TO CONDUCT RESEARCH AS DEFINED ON A SIGNED FISHERIES RESEARCH NOTICE.

DESIGNATED OPERATOR STATUS

SCIENTIFIC/EDUCATIONAL AND LIVE FISH TRANSFER LICENCE

PURSUANT TO SECTIONS 52 AND 56 OF THE FISHERY (GENERAL) REGULATIONS, THIS LICENCE AUTHORIZES THE REGIONAL DIRECTOR, SCIENCE BRANCH, MARITIMES REGION, FISHERIES AND OCEANS CANADA (DFO), BIO, 1 CHALLENGER DRIVE, DARTMOUTH, NS, B2Y 4A2, PHONE: 426-3489, AND PERSONS WORKING UNDER HIS SUPERVISION, TO COLLECT, HOLD, AND/OR OBSERVE FINFISH, SHELLFISH, MARINE MAMMALS AND MARINE PLANTS FOR RESEARCH AND EDUCATIONAL PURPOSES, AND TRANSPORT LIVE FISH AND SHELLFISH TO DFO FACILITIES SUBJECT TO THE FOLLOWING CONDITIONS:

1. THAT THE AREA OF OPERATION BE LIMITED TO THOSE AREAS WHERE THE MARITIMES REGION HAS A RESEARCH MANDATE;
2. THAT AQUATIC ORGANISMS BE COLLECTED OR OBSERVED BY ANY MEANS NORMALLY USED IN THE COURSE OF SCIENTIFIC RESEARCH ON AQUATIC LIFE;
3. THAT THIS LICENCE DOES NOT AUTHORIZE COLLECTIONS OF MOLLUSCAN SHELLFISH OR ANY OTHER SPECIES OF FISH WHERE FISHING IS PROHIBITED DUE TO CONTAMINATED AREAS THAT HAVE BEEN CLOSED BY PROHIBITION ORDER;
4. THAT SAMPLING OR OBSERVATIONS BE CONDUCTED FROM ANY PLATFORM, SUCH AS FISHING VESSELS PARTICIPATING IN RESEARCH PROJECTS, AIRPLANES, HELICOPTERS, GOVERNMENT RESEARCH AND PATROL VESSELS OR SUBMERSIBLES, REQUIRED FOR THE PURPOSE OF THE RESEARCH PROGRAM;
5. THAT ANY UNATTENDED GEAR MUST HAVE CLEAR MARKINGS ON IT IDENTIFYING THE LICENCE NUMBER, FISHERIES RESEARCH NUMBER AND CONTACT PERSON WITH AN EMERGENCY CONTACT NUMBER AND ANY LOBSTER/CRAV TRAPS MUST HAVE A DFO SCI/EXP TAG ATTACHED;
6. THAT THE DIRECTOR, CONSERVATION & PROTECTION, DARTMOUTH, NS, LICENSING, DARTMOUTH, N.S., AND THE AREA CHIEF, CONSERVATION & PROTECTION, IN THE AREA OF WHICH A GIVEN RESEARCH PROJECT IS TO TAKE PLACE, BE ADVISED IN ADVANCE OF THE FISHING, SAMPLE COLLECTION, AND/OR TRANSFER ACTIVITY, BY MEANS OF A "MARITIMES REGION FISHERIES RESEARCH NOTICE" AUTHORIZED BY THE REGIONAL DIRECTOR, SCIENCE BRANCH, MARITIMES REGION OR HIS REPRESENTATIVE;
7. THAT A COPY OF THIS LICENCE AND THE SIGNED FISHERIES RESEARCH NOTICE (FRN) MUST BE CARRIED ABOARD ANY PLATFORM INCLUDING RESEARCH VESSELS, FISHING VESSELS PARTICIPATING IN RESEARCH PROJECTS, AND AIRCRAFT USED TO PERFORM SCIENTIFIC RESEARCH, AND BY PERSONNEL WORKING UNDER THE DIRECTION OF THE SCIENCE BRANCH, DFO, MARITIMES REGION, WHILE PERFORMING FISHERIES RESEARCH ACTIVITIES IN THE FIELD;
8. THAT THE TRANSFER OF SALMONIDS MUST MEET THE REGIONAL FISH HEALTH POLICY GUIDELINES (RFHPG) AS WELL AS TEST NEGATIVE FOR ANY PATHOGENS LISTED UNDER THE FISH HEALTH PROTECTION REGULATIONS (FHPR) INCLUDING THE INFECTIOUS SALMON ANAEMIA VIRUS (ISAV) EXCEPT THOSE GOING INTO AN APPROVED QUARANTINE FACILITY;
9. THAT ANIMALS, AND ANY WASTE PRODUCTS IN CONTACT WITH THE ANIMALS, PLACED INTO QUARANTINE

It is a condition of this licence that the registration holder/licencee sign all pages of this document.



23/6/2016

DATE



REGISTRATION(S) AND/OR FISHING LICENCE(S)

This document authorizes the registration card holder and/or licence holder to engage in fishing and related activities on the Atlantic coast of Canada subject to the provisions of the Fisheries Act and Regulations made thereunder.

This licence and/or registration is issued under the authority of the Minister of Fisheries and Oceans Canada.

FIN 7-000153-26

CALENDAR YEAR 2014
ISSUANCE DATE: MAY 26, 2014

FISHERIES AND OCEANS CANADA
REGIONAL DIRECTOR SCIENCE
1 CHALLENGER DRIVE, BIO
DARTMOUTH, NS, NS
B2Y 4A2

HOMEPORT
11804 DARTMOUTH

Licence #	Species	Areas	Licence Type	Gear Permitted	Amt	VRN	LOA
-----------	---------	-------	--------------	----------------	-----	-----	-----

SHALL BE DISPOSED OF IN A STERILE MANNER ON COMPLETION OF THE RESEARCH PROJECT, EXCEPT WHERE LIVE RELEASE IS AUTHORIZED UNDER AN INDIVIDUAL SECTION 56 F(G)R TRANSFER LICENCE ISSUED PURSUANT TO RISK ASSESSMENT BY THE INTRODUCTIONS AND TRANSFERS COMMITTEE FOR THE RECEIVING WATERS.

10. THAT THIS LICENCE DOES NOT AUTHORIZE:

- TRANSFERS FROM OUTSIDE OF CANADA,
- TRANSFERS OF SHELLFISH INTO THE WATERS OF CAPE BRETON OR EEL LAKE, YARMOUTH COUNTY,
- TRANSFERS OF FINFISH FROM SHELBURNE HARBOUR OR SEAL ISLAND CAPE BRETON,
- TRANSFERS OF FISH TO, OR FROM, AREAS THAT TEST POSITIVE OR HAVE TESTED POSITIVE FOR AEREMONAS SALMONICIDA, THE CAUSATIVE AGENT FOR FURUNCULOSIS, OR FOR THE INFECTIOUS SALMON ANAEMIA (ISA) VIRUS, FOR THE DURATION OF THIS LICENCE OR DURING THE PAST TWO YEARS,
- TRANSFERS OF SHELLFISH FROM THE MARIE-JOSEPH MUSSEL GROWING AREA, ARICAT, WHITEHEAD OR JEDDORE;
- TRANSFERS OF OYSTERS (CRASSOSTREA VIRGINICA) FROM CAPE BRETON WATERS, FROM ASPY BAY TO THE CANO CAUSEWAY, INCLUSIVE OF BRAS D'OR LAKE AND ST. PATRICK'S CHANNEL, EXCEPT INTO APPROVED QUARANTINE FACILITIES.

11. THE LICENCE HOLDER IS REQUIRED TO MAINTAIN HARD COPY OR ELECTRONIC COPY RECORDS OF TRANSFER ACTIVITIES. RECORDS SHALL INCLUDE THE NUMBER OF LIVE FISH TRANSFERRED, THE SPECIES OF LIVE FISH TRANSFERRED, THE DATE(S) IN WHICH EACH TRANSFER OCCURRED, THE OCCURRENCE OF MORTALITIES (PRE-TRANSFER, DURING THE TRANSFER AND POST TRANSFER) AND THE SOURCE LOCATION. RECORDS ARE TO BE UPDATED IMMEDIATELY UPON COMPLETION OF TRANSFERS AND SHALL BE SUBMITTED TO THE CHAIR OF THE NOVA SCOTIA INTRODUCTIONS AND TRANSFERS COMMITTEE BY DECEMBER 15, 2014.

12. THAT THIS LICENCE IS VALID FROM THE DATE OF ISSUE TO DECEMBER 31, 2019.

NOTE:

NOTHING IN THIS LICENCE SHALL BE CONSTRUED AS AUTHORITY UNDER THE SPECIES AT RISK ACT (SARA) TO KILL, HARM, HARASS, CAPTURE OR TAKE AN INDIVIDUAL OF A WILDLIFE SPECIES THAT IS LISTED AS "EXTIRPATED", "ENDANGERED" OR "THREATENED" AS IDENTIFIED IN SCHEDULE 1 OF SARA. IF THE ACTIVITY AUTHORIZED IN THIS LICENCE IS EXPECTED TO INTERACT WITH AN "EXTIRPATED", "ENDANGERED" OR "THREATENED" SPECIES, AN APPLICATION FOR A SECTION 73 SARA PERMIT CAN BE FOUND AT WWW.SARAREGISTRY.GC.CA AND SUBMITTED TO THE DFO SPECIES AT RISK MANAGEMENT DIVISION AT XMARSARA@DFO-MPO.GC.CA. FOR MORE INFORMATION ON SARA, INCLUDING A LIST OF PROTECTED SPECIES, PHONE 1-866-891-0771, VISIT WWW.SARAREGISTRY.GC.CA, OR CONTACT DFO SPECIES AT RISK MANAGEMENT DIVISION AT XMARSARA@DFO-MPO.GC.CA OR 902-426-4164.

SCIENTIFIC/EDUCATIONAL AND LIVE FISH TRANSFER LICENCE

PURSUANT TO SECTIONS 52 AND 56 OF THE FISHERY (GENERAL) REGULATIONS, THIS LICENCE AUTHORIZES THE REGIONAL DIRECTOR, SCIENCE BRANCH, MARITIMES REGION, FISHERIES AND OCEANS CANADA (DFO), BIO, 1 CHALLENGER DRIVE, DARTMOUTH, NS, B2Y 4A2, PHONE: 426-3489, AND PERSONS WORKING UNDER HIS SUPERVISION, TO COLLECT, HOLD, AND/OR OBSERVE PINFISH, SHELLFISH, MARINE MAMMALS AND MARINE PLANTS FOR RESEARCH AND EDUCATIONAL PURPOSES, AND TRANSPORT LIVE FISH AND SHELLFISH TO DFO FACILITIES SUBJECT TO THE FOLLOWING CONDITIONS:

1. THAT THE AREA OF OPERATION BE LIMITED TO THOSE AREAS WHERE THE MARITIMES REGION HAS A RESEARCH MANDATE;
2. THAT AQUATIC ORGANISMS BE COLLECTED OR OBSERVED BY ANY MEANS NORMALLY USED IN THE COURSE OF SCIENTIFIC RESEARCH ON AQUATIC LIFE;
3. THAT THIS LICENCE DOES NOT AUTHORIZE COLLECTIONS OF MOLLUSCAN SHELLFISH OR ANY OTHER SPECIES OF FISH WHERE FISHING IS PROHIBITED DUE TO CONTAMINATED AREAS THAT HAVE BEEN CLOSED BY PROHIBITION ORDER;
4. THAT SAMPLING OR OBSERVATIONS BE CONDUCTED FROM ANY PLATFORM, SUCH AS FISHING VESSELS PARTICIPATING IN RESEARCH PROJECTS, AIRPLANES, HELICOPTERS, GOVERNMENT RESEARCH AND PATROL VESSELS OR SUBMERSIBLES, REQUIRED FOR THE PURPOSE OF THE RESEARCH PROGRAM;

It is a condition of this licence that the registration holder/licencee sign all pages of this document.

23 / 6 / 2016

DATE

Canada



REGISTRATION(S) AND/OR FISHING LICENCE(S)

This document authorizes the registration card holder and/or licence holder to engage in fishing and related activities on the Atlantic coast of Canada subject to the provisions of the Fisheries Act and Regulations made thereunder.

This licence and/or registration is issued under the authority of the Minister of Fisheries and Oceans Canada.

FIN 7-000153-26

CALENDAR YEAR 2014
ISSUANCE DATE: MAY 26, 2014

FISHERIES AND OCEANS CANADA
REGIONAL DIRECTOR SCIENCE
1 CHALLENGER DRIVE, BIO
DARTMOUTH, NS, NS
B2Y 4A2

HOMEPORT
11804 DARTMOUTH

Licence #	Species	Areas	Licence Type	Gear Permitted	Amt	VRN	LOA
-----------	---------	-------	--------------	----------------	-----	-----	-----

5. THAT ANY UNATTENDED GEAR MUST HAVE CLEAR MARKINGS ON IT IDENTIFYING THE LICENCE NUMBER, FISHERIES RESEARCH NUMBER AND CONTACT PERSON WITH AN EMERGENCY CONTACT NUMBER AND ANY LOBSTER/CRAB TRAPS MUST HAVE A DFO SCI/EXP TAG ATTACHED;
6. THAT THE DIRECTOR, CONSERVATION & PROTECTION, DARTMOUTH, NS, LICENSING, DARTMOUTH, N.S., AND THE AREA CHIEF, CONSERVATION & PROTECTION, IN THE AREA OF WHICH A GIVEN RESEARCH PROJECT IS TO TAKE PLACE, BE ADVISED IN ADVANCE OF THE FISHING, SAMPLE COLLECTION, AND/OR TRANSFER ACTIVITY, BY MEANS OF A "MARITIMES REGION FISHERIES RESEARCH NOTICE" AUTHORIZED BY THE REGIONAL DIRECTOR, SCIENCE BRANCH, MARITIMES REGION OR HIS REPRESENTATIVE;
7. THAT A COPY OF THIS LICENCE AND THE SIGNED FISHERIES RESEARCH NOTICE (FRN) MUST BE CARRIED ABOARD ANY PLATFORM INCLUDING RESEARCH VESSELS, FISHING VESSELS PARTICIPATING IN RESEARCH PROJECTS, AND AIRCRAFT USED TO PERFORM SCIENTIFIC RESEARCH, AND BY PERSONNEL WORKING UNDER THE DIRECTION OF THE SCIENCE BRANCH, DFO, MARITIMES REGION, WHILE PERFORMING FISHERIES RESEARCH ACTIVITIES IN THE FIELD;
8. THAT THE TRANSFER OF SALMONIDS MUST MEET THE REGIONAL FISH HEALTH POLICY GUIDELINES (RPHPG) AS WELL AS TEST NEGATIVE FOR ANY PATHOGENS LISTED UNDER THE FISH HEALTH PROTECTION REGULATIONS (FHRP) INCLUDING THE INFECTIOUS SALMON ANAEMIA VIRUS (ISAV) EXCEPT THOSE GOING INTO AN APPROVED QUARANTINE FACILITY;
9. THAT ANIMALS, AND ANY WASTE PRODUCTS IN CONTACT WITH THE ANIMALS, PLACED INTO QUARANTINE SHALL BE DISPOSED OF IN A STERILE MANNER ON COMPLETION OF THE RESEARCH PROJECT, EXCEPT WHERE LIVE RELEASE IS AUTHORISED UNDER AN INDIVIDUAL SECTION 56 F(6)R TRANSFER LICENCE ISSUED PURSUANT TO RISK ASSESSMENT BY THE INTRODUCTIONS AND TRANSFERS COMMITTEE FOR THE RECEIVING WATERS.
10. THAT THIS LICENCE DOES NOT AUTHORIZE:
 - TRANSFERS FROM OUTSIDE OF CANADA,
 - TRANSFERS OF SHELLFISH INTO THE WATERS OF CAPE BRETON OR EEL LAKE, YARMOUTH COUNTY,
 - TRANSFERS OF FINFISH FROM SHELBOURNE HARBOUR OR SEAL ISLAND CAPE BRETON,
 - TRANSFERS OF FISH TO, OR FROM, AREAS THAT TEST POSITIVE OR HAVE TESTED POSITIVE FOR AEREMONAS SALMONICIDA, THE CAUSATIVE AGENT FOR FURUNCULOSIS, OR FOR THE INFECTIOUS SALMON ANAEMIA (ISA) VIRUS, FOR THE DURATION OF THIS LICENCE OR DURING THE PAST TWO YEARS,
 - TRANSFERS OF SHELLFISH FROM THE MARIE-JOSEPH MUSSEL GROWING AREA, ARICHAT, WHITEHEAD OR JEDDORE;
 - TRANSFERS OF OYSTERS (CRASSOSTREA VIRGINICA) FROM CAPE BRETON WATERS, FROM ASPY BAY TO THE CANO CAUSEWAY, INCLUSIVE OF BRAS D'OR LAKE AND ST. PATRICK'S CHANNEL, EXCEPT INTO APPROVED QUARANTINE FACILITIES.
11. THE LICENCE HOLDER IS REQUIRED TO MAINTAIN HARD COPY OR ELECTRONIC COPY RECORDS OF TRANSFER ACTIVITIES. RECORDS SHALL INCLUDE THE NUMBER OF LIVE FISH TRANSFERRED, THE SPECIES OF LIVE FISH TRANSFERRED, THE DATE(S) IN WHICH EACH TRANSFER OCCURRED, THE OCCURRENCE OF MORTALITIES (PRE-TRANSFER, DURING THE TRANSFER AND POST TRANSFER) AND THE SOURCE LOCATION. RECORDS ARE TO BE UPDATED IMMEDIATELY UPON COMPLETION OF TRANSFERS AND SHALL BE SUBMITTED TO THE CHAIR OF THE NOVA SCOTIA INTRODUCTIONS AND TRANSFERS COMMITTEE BY DECEMBER 15, 2014.
12. THAT THIS LICENCE IS VALID FROM THE DATE OF ISSUE TO DECEMBER 31, 2019.

NOTE:
NOTHING IN THIS LICENCE SHALL BE CONSTRUED AS AUTHORITY UNDER THE SPECIES AT RISK ACT (SARA) TO KILL, HARM, HARASS, CAPTURE OR TAKE AN INDIVIDUAL OF A WILDLIFE SPECIES THAT IS LISTED AS "EXTIRPATED", "ENDANGERED" OR "THREATENED" AS IDENTIFIED IN SCHEDULE 1 OF SARA. IF THE ACTIVITY AUTHORIZED IN THIS LICENCE IS EXPECTED TO INTERACT WITH AN "EXTIRPATED", "ENDANGERED" OR "THREATENED" SPECIES, AN APPLICATION FOR A SECTION 73 SARA PERMIT CAN BE FOUND AT WWW.SARAREGISTRY.GC.CA AND SUBMITTED TO THE DFO SPECIES AT RISK MANAGEMENT DIVISION AT XMARSARA@DFO-MPO.GC.CA. FOR MORE INFORMATION ON SARA, INCLUDING A LIST OF PROTECTED SPECIES, PHONE 1-866-891-0771, VISIT WWW.SARAREGISTRY.GC.CA, OR CONTACT DFO SPECIES AT RISK MANAGEMENT DIVISION AT XMARSARA@DFO-MPO.GC.CA OR 902-426-4164.

It is a condition of this licence that the registration holder/licencee sign all pages of this document.

23/6/2016
DATE

Canada



REGISTRATION(S) AND/OR FISHING LICENCE(S)

This document authorizes the registration card holder and/or licence holder to engage in fishing and related activities on the Atlantic coast of Canada subject to the provisions of the Fisheries Act and Regulations made thereunder.

This licence and/or registration is issued under the authority of the Minister of Fisheries and Oceans Canada.

FIN

7-000153-26

CALENDAR YEAR 2014

ISSUANCE DATE: MAY 26, 2014

FISHERIES AND OCEANS CANADA
REGIONAL DIRECTOR SCIENCE
1 CHALLENGER DRIVE, BIO
DARTMOUTH, NS, NS
B2Y 4A2

HOMEPORT

11804 DARTMOUTH

The use of ALL of these licence(s) is subject to any conditions which are issued by D.F.O. The licence holder must ensure that they have received the licence conditions, and may NOT conduct any fishing activity with any of these licence(s) unless in receipt of the licence conditions.