

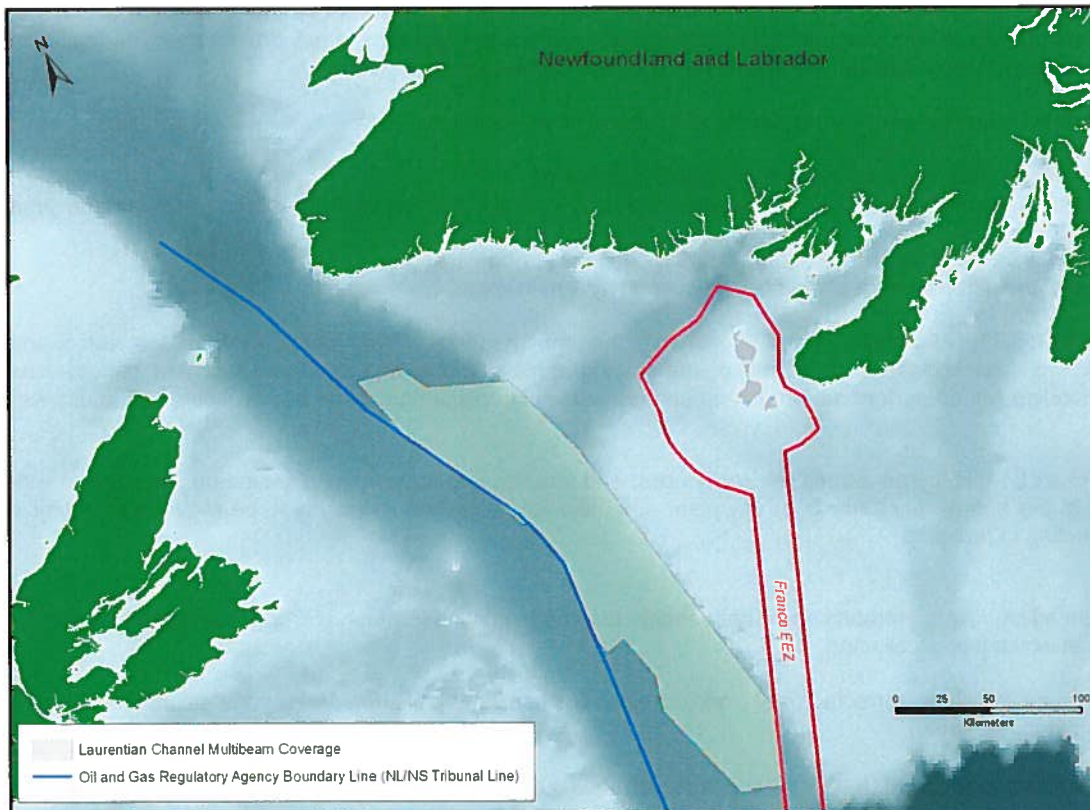
## F5211-130193 Laurentian Channel Ground-truthing Project

The Oceans Division is working towards the creation of a benthic habitat map for the Laurentian Channel Area of Interest (AOI), to describe the biophysical and ecological characteristics of the area. In support of this goal, multibeam echo sounder (MBES) survey data has been gathered for priority areas.

For this contract the processed MBES data layers (to be provided by Oceans Division NL region) must be classified using multispectral and/or conventional interpretation methods to generate a segmented map of the survey area (Figure 1). This output will be used to develop a sample site plan which will be the basis for the second part of this contract, the ground-truthing field survey. This survey will involve the collection and processing of underwater video and seabed photographs, as well as the collection of sediment/infaunal grab samples (to be processed at a later date).

The resulting data collected as part of this contract will be a major component in the future creation of benthic habitat mapping products including a final 'Benthoscape' for the Laurentian Channel.

**Figure 1 Laurentian Channel Multibeam Coverage (Approx 13,000 km<sup>2</sup>)**



### Requirements:

**Part 1 Development of segmented survey map and design of a sample site plan for collecting data (photographic/video, grain size and infauna).**

#### Work Task 1. Segmented Survey Area Map

The processed MBES data layers must be classified using multispectral analysis methods and/or conventional interpretation methods (depending on data quality) to generate a segmented map of the survey area. This analysis will produce an optimal number of acoustic classes as the basis for the sample site plan.

**Deliverable:** A segmented map of the survey area based on existing processed MBES data layers giving an optimal number of benthic acoustic classes in ArcGIS 10.0 compatible Shapefile format.

#### Work Task 2. Design of a sample site plan for data collection

Develop a sample site plan based on the acoustic segmentation of previously collected MBES derived layers derived in

Task 1. This component must define a minimum number of ground-truthing stations. Additional stations may be required in the case of complex topography.

**Deliverables:**

Ground-truth sample site design, including ArcGIS 10.0 compatible Shapefile. The ground-truthing density must be appropriate for the topography of the study area based on data obtained from previous DFO MBES surveys

Comprehensive metadata for spatial data products

**Part 2 Field Surveys**

**Work Task 3. Collection and processing of underwater video and seabed photographs**

Collection of photographic and video ground-truthing data through the deployment of a towed camera system. Short, underwater camera and video surveys must be conducted at sampling stations spaced at an appropriate density for the topography within the study area, with additional sample stations strategically placed to investigate features of particular interest. Each transect must collect approximately 15 minutes of data at speeds of approximately 1 nm/hr. Transects must cover a distance of approximately 200-500 m of seafloor at an altitude of 1-2 m above the seabed. In addition to video footage, approximately 40-60 accurately geo-referenced seafloor photographs must be collected during each transect. The camera system must include, but is not limited to, the following specifications:

- system must be rated for use in water depths up to approximately 500 m;
- altimeter, and pitch and roll sensors;
- the survey vehicle must have appropriate light field illumination;
- lasers (set at a known spacing) in the downward facing camera are required for scaling and surface area calculations;
- minimum resolution of photographs should be 10 mega pixels; and
- Image view of the video camera should be approximately 1 m in width.

The proponent must identify the make of the camera(s), the configuration of the towed system, the video and photographic recording medium/system to be used, the photographic camera lens configuration, and specify how camera position encoding will be performed. If back-up camera systems/replacement parts are available, this must also be specified.

Sampling stations must be distributed across the study area, and locations must be refined based on discussions with DFO and a review of the preliminary sample survey plan. On-the-water adjustments may also be required to optimize the sample site selection in real-time.

**Deliverables:**

Georeferenced digital photographs and video footage provided in native format (i.e., \*.jpg, \*.avi) and at the resolution at which it was collected.

Photographs must include corrected (real world) camera positions in the file headers (and/or include this information in a data table).

Video must include corrected (real world) camera positions audio encoded on the right channel in the form of a GPGGA NMEA string or a pre-described equivalent.

Video camera CCD dimensions and camera attitude data, including altitude, pitch and roll must also be provided.

Navigational and station keeping data (all ship and real world positions, station number, geographic location, date, time, start and end time/location of transect line, etc.) must be processed into an organized file structure or MS Access 2010 database.

**Work Task 4. Collection of sediment/infaunal grab samples (to be processed at a later date)**

Collection of grab samples from a subset of the sampling stations (i.e., where time and substrate types permit) for benthic infaunal analysis, using sampling gear specially designed for the collection of samples from a mix of substrata (i.e. gravel, pebble, mixed sediments, coarse sand etc.).

Expected sample size is approximately 60 stations for benthic infaunal analysis plus replicate sampling of approximately 10 stations (for a total of approximately 70 stations). A digital surface photograph will be taken of all samples collected, and the volume of sediment for each grab sample will be recorded. Samples will be sieved and prepared for storage for future analysis. Storage of seabed samples will be discussed with the contractor (samples may be delivered to DFO for long term storage, or temporarily stored at the contractor's facility, depending on space availability).

**Deliverables:**

Seabed samples collected for benthic infaunal analysis at 60 of the stations within the study area.

A detailed report on the methods used in the various analyses.

**Proposal:**

A technical and cost proposal is required from the Contractor. Proposals must address the requirements of the Statement of Work and the Evaluation criteria. The contractors' proposal must demonstrate that they have the ability and technical resources to conduct the proposed work, including:

- Suitable vessels for offshore fall/winter surveys
- Suitable underwater camera system
- Suitable seabed sampling equipment
- Qualified and experienced project leader and support team

**Contract period:**

Date of award to 31 March 2014

DFO Oceans must receive a copy of all the processed data, backscatter mosaics, map layers and reports by March 31, 2014.

**Tender Packages:**

To receive complete tender package, please contact Kimberly Walker at [kimberly.walker@dfo-mpo.gc.ca](mailto:kimberly.walker@dfo-mpo.gc.ca)

Inquiries: Direct all bidding and contract questions to Kimberly Walker at [kimberly.walker@dfo-mpo.gc.ca](mailto:kimberly.walker@dfo-mpo.gc.ca)

