Interpretation of a Sublittoral Benthic Survey Along the Shoreline of Whites Point, Digby Neck, Nova Scotia

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1.0 Introduction

During 28 and 29 June 2002, as part of a geophysical survey, Canadian Seabed Research collected grab samples and carried out a video survey to determine the nature of the benthic biological community present within the sublittoral zone offshore of Whites Point Cove, Digby Neck, Nova Scotia. This report presents an interpretation of the grab samples and video survey.

2.0 Methodology

The grab samples and video survey were carried out aboard the cape islander *Katabatic Winds* in water depths ranging between 9.5 and 41.5 metres. Weather conditions at the time of the survey ranged between foggy and sunny and the sea surface was characterized by constantly rolling waves.

Benthic samples were collected with a Van Veen Grab sampler deployed and retrieved using a hydraulic hauler. Once retrieved, the samples were drained while still in the sampler, and then transferred into clean plastic containers where they were visually analyzed for general characteristics. The samples were then placed into clean plastic bags and later frozen until a more detailed laboratory analysis could be carried out. The laboratory analysis was carried out on 21 February 2004.

The video survey was carried out along two transects; one longer, mostly northerly, transect of about 525 meters, and one shorter, mostly westerly, transect of about 30 metres.

The locations of the grab samples and video transects are shown in Figures 1 and 2.

3.0 Results

3.1 Benthic Grab Samples

A total of 12 benthic grab samples were attempted, but only five were successful in obtaining a benthic sample. At two of the sampling sites (G3 and G4), two attempts failed to produce a sample, and at one site (G9) a sample was collected on the second attempt. One site (G7) failed to produce a sample on the first attempt, and a second attempt was not made.

The field and laboratory observations made for the benthic grab samples are listed in Table 1.

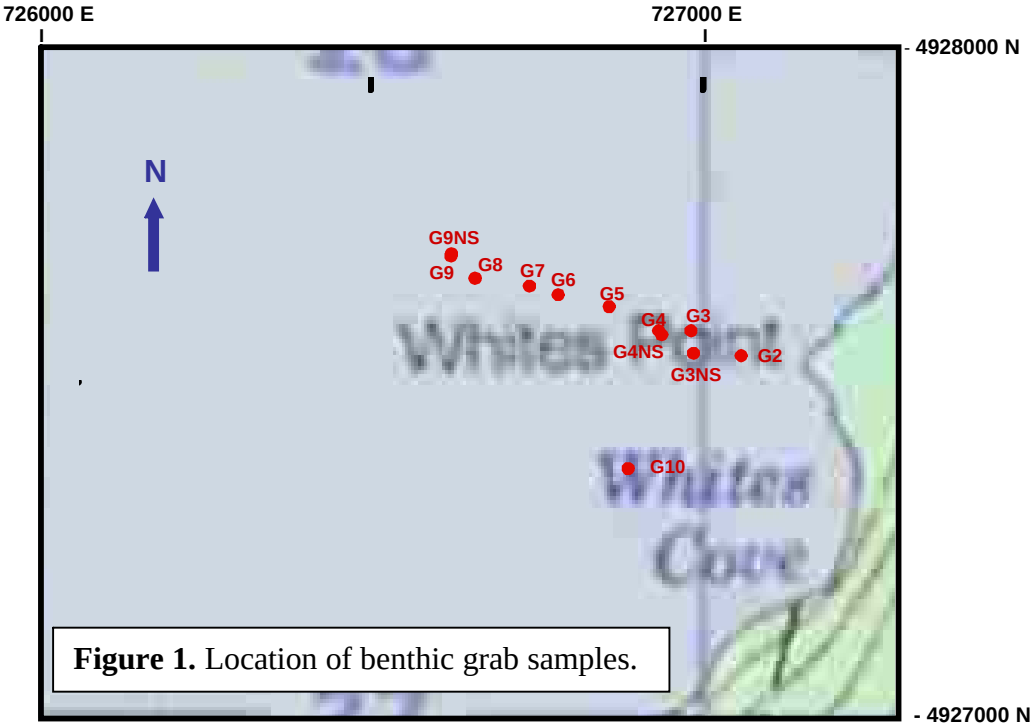

Figure 1. Location of benthic grab samples.

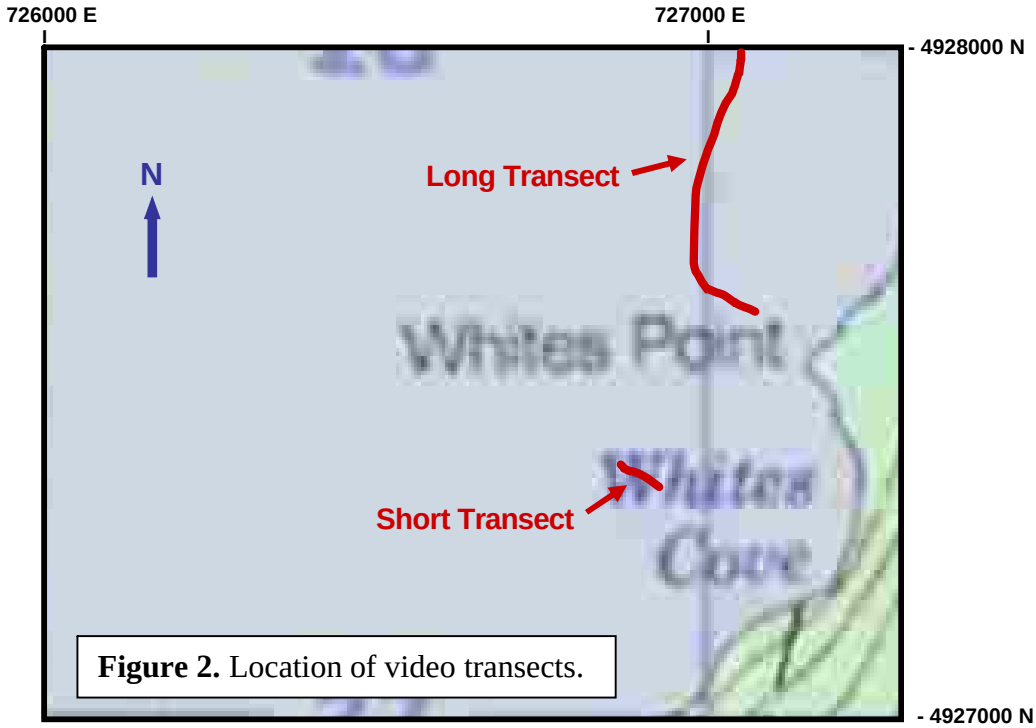

Figure 2. Location of video transects.

Table 1. Description of benthic grab samples (all samples were collected on 28 June 2002, except sample G10 which was collected on 29 June 2002).

Sample Number	Location*		Time (Local)	Water Depth (metres)	Field Description	Laboratory Description
	Northing	Easting				
G2	4927539.29	727057.95	16:37	9.5	ca 250 gms; kelp; various seaweeds	One partial specimen of kelp (*Laminaria sp.*) and one specimen of irish moss (*Chrondrys crispus*)
G3	4927576.93	726982.19	16:43	22.5	No sample; muddy water	--
G3NS	4927692.47	726622.00	17:01	-	No sample	--
G4	4927576.93	726933.73	16:48	28.0	No sample	--
G4NS	4927570.96	726938.25	17:30	--	No sample	--
G5	4927613.17	726859.22	17:20	33.5	ca 2000 gms; 80% shell fragments; 20% sand/fines; small percentage of biomass - worms	Mostly fine sands and shell fragments; no 'worms' present in sample
G6	4927631.11	726782.66	17:14	37.0	ca 500 gms; shell fragments; single cobble ca 5 cm	Mostly small (0.3-0.5 mm) gravel and mollusc (horse mussel, clam, and limpet) shell fragments; one large (6 dia. cm) rock covered with hydroid polyps and a tubiculous polychaete (*Spirorbis spirillum*)
G7	4927643.91	726739.37	17:10	38.5	No sample	--
G8	4927631.11	726782.66	17:14	37.0	Biological insignificant; nothing saved	--
G9	4927689.47	726620.98	16:55	41.5	ca 500 gms; sea cucumber, brown, ca 15 x 10 cm; 80% shell fragments and 20% dark colored sand mixture	Mostly coarse (1 mm to 3 cm) sediments; some of larger cobbles covered with encrusting calcareous algae (probably *Phymatolithion sp.*); many mollusc shell fragments; sea cucumber not present in sample
G9NS	4927692.47	726622.00	17:01	--	No sample	--
G10	4927369.62	726887.79	11:37	24.0	ca 2000 gms; 30% shell fragments; 65% coarse sand; 5% subrounded pebbles; no odour	Mostly fine (0.5 – 2.0 mm) gravel and shell fragments of mussels and sea urchin spines

*NAD83 UTM Zone 19

3.2 Video Transects

The information obtained by the video transects is quite limited. For much of the video, either the camera was moved too quickly or was not in focus making it difficult to discern the nature of the benthic community. However, some portions of the video do provide information on the type of biological community present in the area of the transects. The following is a general description of what can be seen on the video.

The longer transect covered a distance of about 525 metres and is captured between the 04:27 and 21:46 time markers on the video tape. The following describes what can be seen along this transect.

- 04:27 to 05:33 - the camera is moving too quickly and/or is out of focus most of the time, but this portion of the video shows some fairly well developed kelp beds and some smaller boulders that appear to be covered with irish moss
- 05:33 to 06:37 - camera is out of focus
- 06:37 to 07:09 - dense algal beds, which appear to be mostly irish moss, attached to small boulders
- 07:09 to 07:19 - camera is out of focus
- 07:19 to 07:30 - sponges and irish moss attached to small boulders
- 07:30 to 10:53 - this section of the video is very poor as the camera is either out of focus or moving too quickly; what can be seen appears to be beds of irish moss interspersed with areas of gravel and shell fragments.
- 10:53 to 13:30 - the substrate consists of gravel and shell fragments interspersed with small boulders; most of the boulders contain attached macrophytes (probably irish moss), and some are colonized by coralline red algae; there is a starfish at 12:39
- 13:30 to 15:40 – camera is moving too quickly but can see many starfish and some sponges; bottom appears to be more sandier than at other sites
- 15:40 to 16:23 - camera is moving too quickly
- 16:23 to 17:06 - sandy bottom containing many starfish and crabs
- 17:06 to 17:56 - camera is out of focus
- 17:56 to 19:25 - gavel substrate strewn with small boulders; starfish at 18:21

The shorter transect covered a distance of only about 30 metres and is captured between the 21:38 and 30:23 time markers on the video tape. The video record was generally much better than that from the longer transect. The following describes what was recorded.

- 21:38 to 22:05 – the bottom appears to be covered with small boulders that are colonized with dense algal growth that appears to be mainly irish moss; there is a basket star (probably *Gorgonocephalus articus*) attached to a boulder at 21:53

- 22:05 to 22:29 – camera is out of focus

- 22:09 to 30:23 – the initial portion of this record shows a dense irish moss bed; most of the video, however, shows a relatively barren substrate of coarse gravel and shell fragments, with little evidence of a well developed biological community except at the very end where a sea anemone (27:20), crabs (27:30), a boulder with attached mussels (28:53) and a sponge (29:04) can be seen..

4.0 Conclusions

Based on the benthic grab samples and video record, the subtidal substrate offshore of Whites Point is composed largely of coarse sands, gravels and mollusc shell fragments overlain in many areas by small to medium size boulders heavily colonized by various types of flora and fauna. Most of the community appears to consist of epiflora and epifauna (plants and animals that live above the sediment surface). The major types of epiflora present are attached macroscopic alga of which kelps and irish moss appear to be most prominent. In some case, small boulders are colonized by encrusting coralline red algae. The epifauna appears to consist mainly of sessile attached anthozoans, hydroid polyps and sponges, and motile starfish and crabs.

There appears to be little or no infauna (animals that burrow into the sediments) present as a result of the instability of the sediment surface and the presence of strong erosional processes. This is common in high energy environments where waves and water currents are strong enough to create an unstable bottom substrate and which prevent the deposition and accumulation of fine sediments.