Supplementary Material

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| **Supplementary Table 1.** Morphospecies used in analyses, their physical descriptions, and sites where they were observed. Laser dots in images are 16 cm apart. | | | | |
| **Classification** | **Image** | **Morphospecies** | **Description** | **Location (flank/summit/both)** |
| **STRUCTURAL SPONGES** | | | | |
| Hexactinellid |  | Small Hexactinellida spp. | Small (<10 cm) | Summit |
|  | Hexactinellida spp. | Large, tubular, palmate | Both |
| Demosponge |  | *Geodia parva* (Hansen, 1885) | Masisve, globular | Summit |
|  | *Geodia hentscheli* (Cárdenas, Rapp, Schander & Tendal, 2010) | Massive, globular | Flank |
|  | *Craniella infrequens* | Small, spherical | Both |
|  | *Polymastia thielei* (Koltun, 1964) | Small-medium, papillate,globular | Summit |
|  | *Stylocordyla borealis* (Lovén, 1868) | Small, stipitate | Both |
|  | *Lycopodina* sp. (Lundbeck, 1905) | Small, stipitate | Flank |
|  | *Haliclona* sp. (Grant, 1841) | Medium-large, foliaceous | Both |
|  | *Hemigellius* sp. (Burton, 1932) | Large, tubular, palmate | Summit |
|  | *Stelletta rhaphidiophora* (Hentschel, 1929) | Massive, globular | Summit |
|  | *Lissodendoryx (Lissodendoryx) complicata* (Hansen, 1885) | Branched | summit |
|  | Small demosponge | Globular (<10 cm) | Both |
|  | Medium demosponge | Globular (10-20 cm) | Both |
|  | Large demosponge | Massive, globular (>20 cm) | Both |
|  | Unidentified demosponge 3 | Small, globular, white | Summit |
| **ASSOCIATED FAUNA** | | | | |
| Porifera |  | *Hexadella dedritifera* (Topsent, 1913) | Encrusting, yellow | Summit |
|  | Unidentified demosponge 1 | Encrusting, small patch, white | Summit |
|  | Unidentified demosponge 2 | Encrusting, small patch, yellow/white | Summit |
| Cnidaria |  | *Gersemia rubiformis* (Ehrenberg, 1834) | Branching, purple, pink | Summit |
|  | Actiniaria sp. | Small, pink | Both |
|  | *Umbellula* sp. (Gray, 1870) | Large, branched, brown | Flank |
| Arthropoda |  | *Bythocaris* sp. (G.O. Sars, 1870) | Small, red | Flank |
|  | Scalpellidae indet. | Stalked, white | Flank |
| Echinodermata |  | Feather star | Branched, brown/yellow | Flank |
|  | *Tylaster willei* (Danielssen and Koren, 1881) |  | Summit |
|  | Asteroidea sp. | Small, white | Both |
|  | *Hymenaster* sp. (Wyville Thomson, 1873) | Red/orange, spikey appearance | Summit |
|  | *Solaster* spp. (Forbes, 1839) | Colorful, many arms | Both |
|  | *Strongylocentrotus* sp. (Brandt, 1835) |  | Summit |
|  | Ophiuroid |  | Flank |
| Chordata |  | Ascidiacea sp. 1 | Opaque, brown/gray | Both |
|  | Ascidiacea sp. 2 | Gelatinous appearance | Flank |