The Marine Life Sanctuaries Society and Conservation of Howe Sound Rockfishes and Glass Sponge Reefs

by Sheila Byers

The MLSS Mission — "to establish No-Take marine sanctuaries that will protect all marine life in their natural environment, in perpetuity."

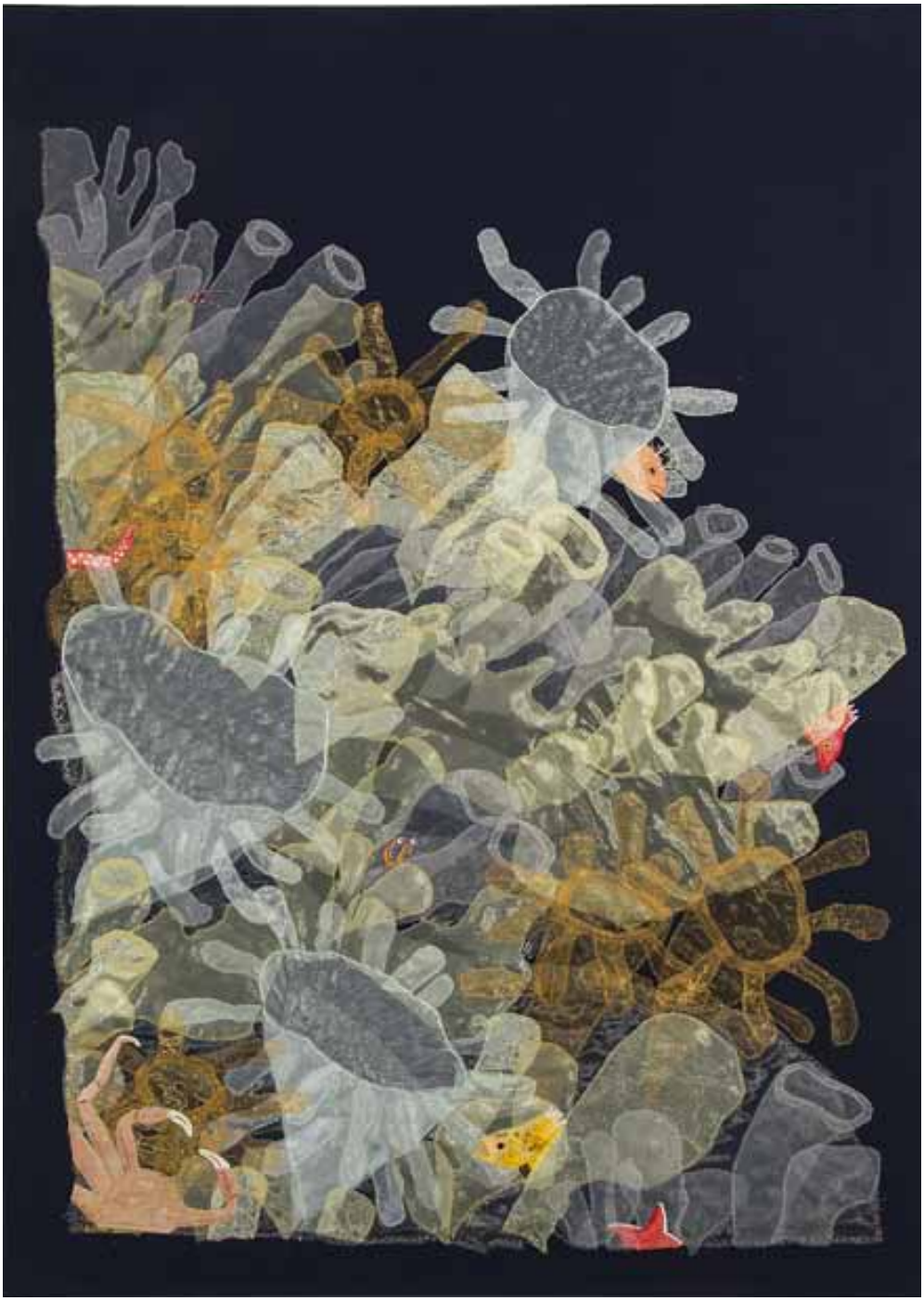
Canada has the longest coastline of any nation in the world. Despite this distinction it has taken decades for Fisheries and Oceans Canada (DFO) to protect a mere 7.75% of the nation's total ocean territory through formally delineated Marine Protected Areas (MPA), conservation areas and marine refuges. None of these designated areas provide full protection. Since its initiation, the Marine Life Sanctuaries Society of British Columbia (MLSS) has been working to achieve greater protection of our coastal marine ecosystems through the creation of no-take sanctuaries where absolutely NO extraction of life or minerals is permitted within these protected areas.

MLSS and Rockfishes — History

The Pacific Marine Life Sanctuaries Society was formed in 1990 as a Canadian registered charitable organization and renamed as the Marine Life Sanctuaries Society in 1993. Since 1985 the idea of forming a society had been buoyed around by experienced dive partners, Andy Lamb and Bernard Hanby, authors of the popular encyclopedic book *Marine Life of the Pacific Northwest* (2005). Throughout thousands of dives over a period of 25 years, they observed a significant decline in populations of formerly abundant inshore rockfish species. Coincidently, they noticed a major increase in the targeting of rockfish species by commercial interests and sport-fishing pressure. They decided it was time to take action to protect rockfishes by calling for the establishment of marine sanctuaries.

Marine sanctuaries ensure regrowth of depleted populations in areas where commercial or recreational species have been over-harvested. Often within a rockfish ecosystem it is the largest and most productive individuals that are targeted and this selective harvest removes the most genetically valuable age groups of fish populations. In 1977, Dr. Bill Ballantine, the "father of marine conservation in New Zealand," successfully demonstrated the value of marine reserves to all New Zealanders — including the commercial and sport fishers. Since then other nations have recognized the benefits of establishing large marine reserves to protect the sustainable harvesting of marine species. Canada has been slow to follow but is making progress.

It is no surprise that collaboration with other like-minded people and Environmental Non-Government Organizations (ENGOs) is critical to accomplish important environmental



City of Glass: Bettina Matzkuhn explores history, geography, and personal stories through embroidery and fabric collage. She holds a BFA in Visual Arts and an MA in Liberal Studies from Simon Fraser University. She exhibits internationally, writes on the arts, lectures, teaches, and volunteers. *City of Glass* was made in collaboration with marine biologist Sheila Byers for an exhibit at the Craft Council of B.C. that paired textile artists with members of Nature Vancouver. Photo by B. Matzkuhn. www.bettinamatzkuhn.ca

Glen Dennison diving on Halkett glass sponge reef. Photo by Adam Taylor.

objectives. One such goal was to stop the fishing of rockfishes off Whytecliff Park. MLSS teamed up with researchers at the Vancouver Aquarium, divers from the Underwater Council of British Columbia (UCBC), board members from Canadian Parks and Wilderness Society (CPAWS) and several concerned professional citizens. In 1993 the consortium successfully achieved MPA status for Whytecliff Marine Park in West Vancouver. This no-take MPA was one of the first in Canada to safeguard all marine life from consumptive use. The legal status of this protection has fallen through the political cracks, however, and Whytecliff Marine Park remains an unofficial MPA (with a fisheries closure by Variation orders) since it was established prior to the adoption of Canada's Ocean Act of 1997. It has not yet been re-designated an MPA under this newer legislation.

MLSS continues to strive for protection of the declining populations of rockfish species in Howe Sound. DFO established Rockfish Conservation Areas (RCA) along the BC coast in 2002; however, evidence suggests that not only is there a prevalence of low compliance and a general lack of awareness of existing fishing regulations, poaching is rampant with very limited Federal enforcement available! Similarly, glass sponge reefs located within RCAs and Marine Provincial Parks receive little to no protection from the spatially managed RCAs as many types of commercial and recreational fishing activities are permitted.

With the discovery of glass sponge reefs in Hecate Strait and Queen

Decorated warbonnet, *Chirolophis decoratus*, peering out of glass sponge osculum. Photo by Adam Taylor.

Charlotte Sound in 1987–1988 and subsequently in the Strait of Georgia (SOG) and Howe Sound, the importance of glass sponge reef ecosystems to the survival of rockfish species soon became evident.

During the discovery of glass sponge reefs in the Strait of Georgia (2002–2010), two reef areas were identified at the north and south ends of Howe Sound, but no other reefs were located. MLSS SCUBA divers, however, first became aware of glass sponges in Howe Sound at Passage Island in 1984; later recognizing these as sponge reefs off Halkett Point in 1996. Between 1984 and 2015, MLSS diver and explorer, Glen Dennison, discovered 12 new reefs within Howe Sound sparking many dive explorations on the reefs. Five reefs in Howe Sound are safely air-gas, SCUBA-diver accessible (24–31 m) — the only known sites in BC that provide unique opportunities for researchers, citizen science and experienced recreational divers. Sponge communities accessible by divers are one of four places in the world: Antarctica, fjords of Southern New Zealand, Mediterranean submarine caves, and the fjords and continental shelf off the Pacific Coast of North America.

Photographic documentation by MLSS divers of rockfishes using the reefs for foraging, protection and nursery grounds, confirms a strong preference by rockfishes for sponge reef habitat. Following the DFO ecosystem management approach, MLSS refocused its efforts on the

glass sponge reef ecosystems to protect not only the rockfishes, but all marine life seeking refuge therein. Rockfish are the predominant species in these ecosystems; yet there is much to learn about the rockfish/sponge relationship.

Since the Whytecliff Park success, the diver–based relationships and collaborations have grown amongst MLSS, the Vancouver Aquarium, UCBC and Canadian Marine Environment Protection Society (CMEPS). The common goal is to provide policy decision-makers and managers with the best science-based information to protect these fragile ecosystems.

Conservation Efforts by MLSS and Partners

In 1998, UCBC divers began installing mooring buoys at strategic reef locations in Howe Sound, helping to minimize damage to bottom-dwelling marine life from boat anchorage and weighted fishing gear (e.g., downriggers). Installation of mooring buoys under the Federal Navigation Protection Act stimulated the creation of Rockfish Conservation Areas ultimately designed, but failing, to alleviate further rockfish population declines.

Since 2011, Glen Dennison has mapped the newly discovered glass sponge reefs using inexpensive methods and equipment to identify and document the reefs: single-beam sonar bathymetric mapping, a custom-designed drop-camera, and SCUBA surveys. In 2017, MLSS submitted a formal report to DFO describing the biological features and spatial locations of the 12 currently unprotected reefs.

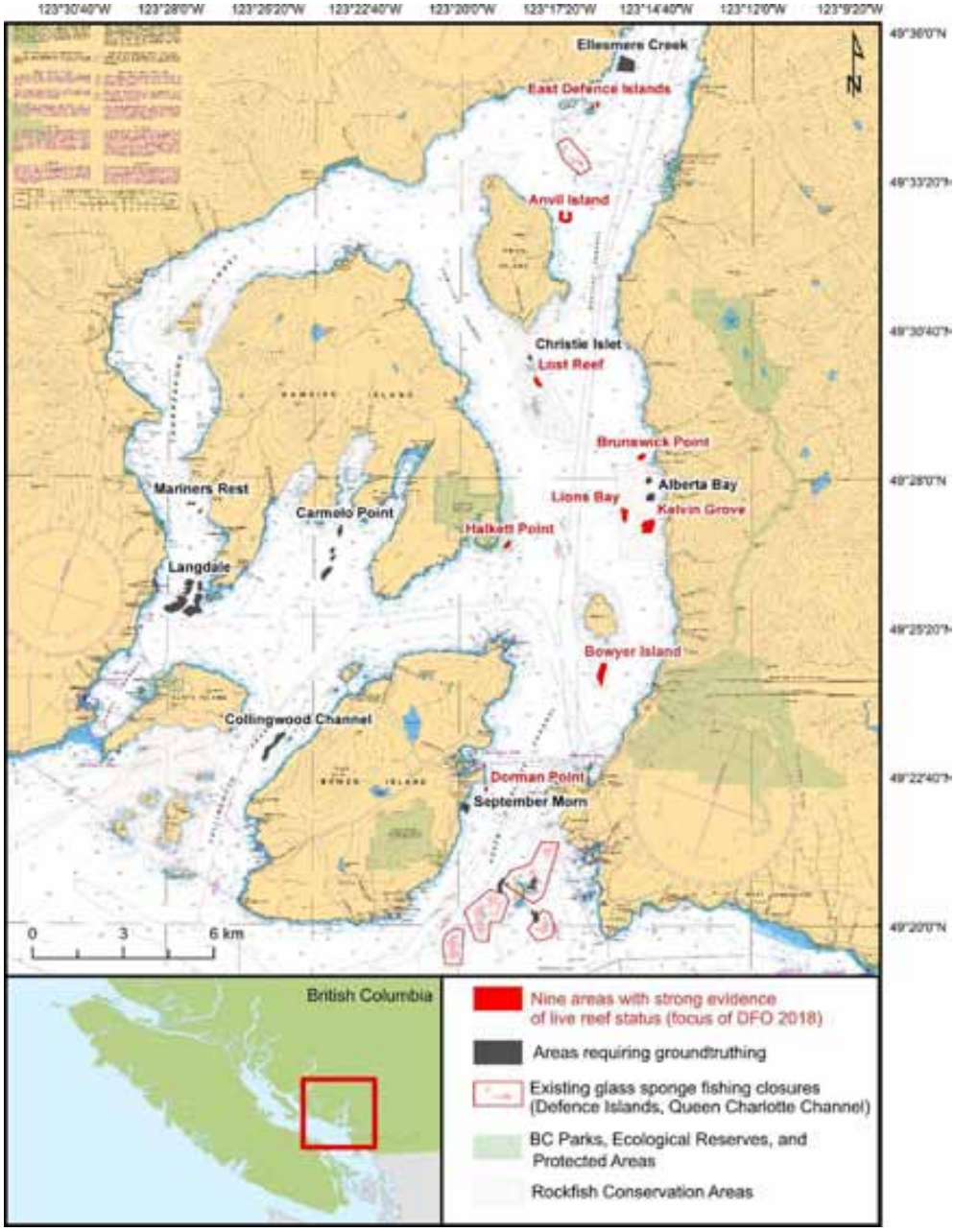
In 2014, MLSS spearheaded an initiative with BC Parks to increase Halkett Bay Provincial Park to include the glass sponges discovered southeast of Gambier Island. Supported by UCBC, the Vancouver Aquarium, Future of Howe Sound Society, David Suzuki Foundation, CMEPS, BC Parks, municipal governments, First Nations and Islands Trust, the marine park was expanded by 136 ha to include a rare glass sponge reef and sponge garden combination. At less than 31 m depth, the new Halkett Bay Provincial Marine Park is one of the five safely diveable reef sites. Then BC Environment Minister Mary Polak and West Vancouver Sea-to-Sky MLA Jordan Sturdy ensured the protection of these sensitive benthic ecosystems through their press announcement on May 26, 2017. In July 2018, a subsurface mooring buoy was installed on a rocky pinnacle adjacent to the Halkett glass sponge reef. MLSS cooperation with the BC Provincial Government assured due diligence to protect the reef from further mechanical damage due to weighted site-marker lines and anchorage. A surface float will be installed in early 2019.

To further the knowledge of sponge recruitment, MLSS conducted a field-based experiment with DFO scientists to study the settlement of larval glass sponges and other sessile biota within the reef ecosystem in Halkett Bay Provincial Marine Park. In 2017, artificial 'larval settlement trees' that emulated the glass sponge structure were installed

within the reef by MLSS divers who regularly photographed evidence of attached biota. Over the one-year experiment, 31 unique taxa settled on the artificial tree. Unfortunately, none were baby glass sponges but our work continues on this project.

Understanding sponge recruitment is crucial for estimating sponge reef recovery potential and may influence important conservation strategies.

Ecosystems in the deep sea like glass sponge reefs are challenging to study. MLSS partnered with



Overview of known glass sponge aggregations in Howe Sound, DFO 2018. DFO Map by permission of Anya Durham.

Aquatica Submarines and Subsea Technologies in 2016 to secure certifications for hull pressure dives and passenger transport on the *Stingray* submersible in Howe Sound. Subsequently, MLSS biologists and dive photographers joined Aquatica in the *Stingray* to dive the glass sponge reefs on Kelvin Grove seamounts (75 m depth). This was a first-ever dive for MLSS in the *Stingray* and for human eyes upon this reef. The *Stingray* provides an affordable platform from which to conduct research at depth such as biota surveys, live versus dead sponge patches within the reefs, etc., and to monitor reefs for anthropogenic impacts. The *Stingray* dives to the *City of Glass* were a once-in-a-lifetime experience for most of the MLSS volunteers.

The MLSS discoveries and research of the glass sponge reefs provide a valuable marine component to the Howe Sound Biosphere Region Initiative (BRI) that was launched in 2016 to obtain a UNESCO (United Nations Educational, Scientific and Cultural Organization) Man and Biosphere Program designation for the Howe Sound Biosphere Region. MLSS' efforts to obtain DFO protection for the glass sponge reef ecosystems that support economically and culturally important marine life substantiate the value of the proposed biosphere reserve. MLSS has a strong working relationship with Ruth Simons, Lead of the Howe Sound BRI and appreciates the opportunity to support efforts to protect the reef ecosystems with the long term goal of sustainable fisheries.

MLSS Education and Outreach

MLSS conducts Beach Interpretation Programs (BIPs) to promote public awareness of local marine life, species interactions and the intricate and complex food webs upon which we depend. Humans are intimately involved and responsible for the sustainability of marine life and the ecosystems that support it, including the fragile glass sponge reefs. BIPs are conducted on the beaches where visitors gain access to subtidal marine life collected by divers and maintained in tanks with through-flowing cold seawater; before returning them to their ocean habitats. Experienced interpreters share their knowledge of natural history and species interactions for the diver-captured animals. BIPs engage the tactile senses with a close-up and hands-on experience, promoting interest, knowledge and a sense of responsibility that prompt a broader stewardship by the public.

Legal Protection for BC Glass Sponge Reefs

The many biological and ecological functions and services provided by glass sponge reefs reinforce their status as sensitive benthic habitats and the need for Federal protection. DFO abides by international commitments for responsible fisheries (to the United Nations and Food and Agriculture Organization) under the Convention of Biological Diversity; as well as several national policies and strategies (e.g., Sensitive Benthic Areas Policy, Ecological Risk Assessment Framework (ERAF), Pacific Region Cold-Water Coral and Sponge Conservation Strategy). DFO fell short

of its conservation commitment to the International Aichi Biodiversity Target 11 to protect 5% of Canada's marine coastline by 2017. Nonetheless, DFO has made substantial progress and MLSS is optimistic that DFO's conservation target to attain 10% protected marine and coastal areas by 2020 will include protection of the combined SOG and Howe Sound reef ecosystems as MPAs.

On February 16, 2017, DFO established an Oceans Act MPA for the Hecate Strait and Queen Charlotte Sound glass sponge reefs: a combined 2,410 sq km area of three individual reef structures and associated biodiversity. The MPA is protected from all bottom-contact fishing activities occurring within a 200 m buffer zone around the protected reef footprints, including stringent measures for mid-water trawl fisheries in the water column and beyond the reef footprints.

MLSS participated in the DFO stakeholder consultations for the protection of the nine SOG and Howe Sound reefs on June 12, 2015 and for the newly discovered Howe Sound reefs on July 26, 2018. The SOG reefs are protected under a formal fishing closure Variation Order No 2015-293: all commercial, recreational and Food, Social and Ceremonial bottom-contact fishing for prawn, shrimp, crab (by trap), and groundfish (including halibut) is prohibited within a 150 m buffer zone around the protected reef footprint.

The public were asked to voluntarily avoid fishing in the newly discovered Howe Sound reefs in September 2017 by DFO Aleria Ladwig, Ecosystems Approach Officer, Resource Management: including bottom-contact fishing gear for crab and prawn trap, trawl, and hook and line fisheries. The 2018 stakeholder consultations were productive and encouraging with DFO assuring fishing closures for the yet unprotected, newly discovered Howe Sound sponge reefs in

Pacific lingcod in Halkett glass sponge reef. Photo by Adam Taylor.

2019. Further work is necessary to achieve long-term MPA designation for all known SOG and Howe Sound reefs rather than existing short-term fisheries closures.

The MLSS team and our collaborative partners look forward to future projects to assist DFO with the science-based information necessary to protect these unique glass sponge reefs. Although MPAs provide some protection to ecosystems, they do not provide full protection for marine life (as noted with the MPA and fisheries closures above) compared to sanctuaries where no extraction would be permitted. Nonetheless, MPAs are an important step forward in the protection of fragile benthic ecosystems in pursuit of sustainable fisheries and marine life.

Thank you to the amazing MLSS team of citizen science researchers, educators and divers.

Sheila Byers, a Registered Professional Biologist and marine biologist, is the Past President and a current Director of the MLSS since 2007. She has been a member of Nature Vancouver, and has sat on the Marine Biology Section Planning Committee, since 2002. Sheila is a Museum Interpreter at the Beaty Biodiversity Museum, UBC.

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