Glass Sponge Reefs: a new opportunity for conservation research

What’s happening with glass sponge reefs?

In 2015, Fisheries and Oceans Canada (DFO) closed bottom contact fishing (i.e., all commercial and recreational bottom contact fishing activities for prawn, shrimp, crab and groundfish, including halibut, were prohibited) at nine glass sponge reefs in the Strait of Georgia, including reefs surrounding Passage Island at the entrance to Howe Sound, and at Defence Islands northeast of Anvil Island. During the process leading to those closures, citizen scientists Glen Dennison and Lena Clayton were actively using a new method of drop-camera drift transects to identify locations of glass sponge reefs in Howe Sound (Figure 1). These newly identified Howe Sound sponge reefs were not considered during that earlier federal process, so they remain unprotected, with the exception of the Passage Island sponge reefs.
Therefore, citizen scientist divers, dive industry representatives (guides, instructors) and the Vancouver Aquarium’s Howe Sound divers met in May 2015 to discuss approaches to protecting these Howe Sound sponge reefs. In an about-face on previous secrecy about reef locations in order to protect sponges from accidental anchor damage, it was decided to go public and invite citizen science divers on the reefs to gain public awareness. With a grant from Mountain Equipment Co-op (MEC), the Vancouver Aquarium Marine Science Centre developed a web page showing citizen science divers how to locate and photograph or videotape various bar-coded stakes around the periphery of the inshore Defence Island bioherm, then submit images of the sponges together with these location identifier stakes, in order to allow monitoring of sponge growth and health over time at this site.

In late May, the annual prawn fishing season took place, with many observations of fishing on Howe Sound glass sponge reefs noted by conservationists. The fishery closed earlier than planned in 2016 owing to low catch rates. The greatest human conflict with glass sponge reefs relates to fishing gear damage to the reefs, whether from downrigger contact, bottom trawling or prawn trap contact, and has been the basis for almost all the negotiated closures with fishing sectors for the sake of sponge reef protection.

Is there a particular importance or connection to First Nations?

The Defence Islands are sacred to the Squamish Nation, and the Squamish Nation has indicated interest in seeing conservation of the glass sponge reefs off the eastern Defence Island.
Figure 1. Pink dots indicate glass sponge reef locations in Howe Sound determined by drifting drop-camera method of Glen Dennison and Lena Clayton (personal communication). The four southern-most reefs are located inside a DFO closure implemented in 2015. The green shading represents the approximate area of Squamish River and Fraser River outflows in Howe Sound.
Why is it important?

Glass sponge reefs (also called bioherms) were thought to have gone extinct thousands of years ago when they were discovered off the Canadian continental shelf in the mid-1980s. Howe Sound is the only known location where these glass sponge reefs are shallow enough to be studied by scuba divers using compressed air, making them uniquely accessible to the diving community. Cloud sponge is a common name for *Aphrocallistes vastus*, the main reef-forming glass sponge species in Howe Sound. The cloud name comes from its appearance.

These glass sponge reefs provide refuge for rockfish broodstock, and in Howe Sound the redstripe rockfish is a species almost exclusively associated with these reefs. Spot prawns aggregate around the sponge reefs, and for that reason the conflict with prawn trapping activity arises.

What is the current state?

“Local knowledge” about cloud sponges differs depending on who you talk to. Fishermen have long said of cloud sponges, “oh, yeah, that’s sea cabbage, and it grows back the next winter.” In contrast, divers had the lore that cloud sponges are hundreds of years old and never grow back if damaged. The truth is that there appears to be a tendency for individual sponges to grow at varying rates during different climate cycles. Deterioration has been observed during the buildup of El Niños (warm coastal winters) and rapid episodic growth was observed in some sponges during La Niña cycles (cooler winters). In 2015, the first proof of fragment healing and reattachment in cloud sponges was published; notably, healing took place during La Niña weather.

Mechanical damage to sponge reefs in Howe Sound has been documented in the video transects of Glen Denison. The prawn fishery has focused on fishing near these reefs because of the high densities of prawns that accumulate around the periphery of the reefs. Whereas the Pacific cod trawl fishery in the Strait of Georgia eliminated large areas of glass sponge reef on Halibut and McCall Banks, the prawn trap fishery has caused more localized damage, which may experience healing and recovery during favourable climate cycles.

Monitoring is needed to determine the extent to which sponge reefs can heal damage caused by climate cycles or mechanical damage by humans. The dive volunteers posting on the Aquarium website for the bar code marked areas at the inshore Defence Island location have already documented that necrosis of a head of cloud sponge can occur within several months.
What’s being done?

In October 2016, seven organizations\(^{11}\) submitted a proposal to Fisheries and Oceans Canada asking for protection of the glass sponge reefs in Howe Sound. The Regional Director General for the Pacific Region responded suggesting that the detailed information provided on the Howe Sound Sponge Reefs would feed directly into the marine conservation target strategy of establishing new effective area-based conservation measures, such as closing fisheries in waters that are home to sensitive sponges and corals.

Diving representatives approached BC Parks to discuss possible expansion of Halkett Bay Marine Provincial Park on Gambier Island, to include the Halkett pinnacle sponge reef. On May 26, 2016, the B.C. Minister of Environment, Mary Polak, announced the expansion of Halkett Bay Marine Park to include the sponge reef. Future plans are for funding a safe, permanent boat moorage for divers’ access to that sponge reef. Citizen science will be enhanced owing to the accessibility of this reef at Halkett Point to commercial dive charters out of Horseshoe Bay.

On March 23, 2016, Canadian Parks and Wilderness Society (CPAWS) hosted an evening at Science World on glass sponge reefs, which included discussion of the Strait of Georgia and Howe Sound reefs. At the Salish Sea Ecosystem Conference in Vancouver in April 2016, there were four presentations on the glass sponge reefs of Howe Sound, covering various aspects of the biology, ecology and conservation of these reefs. Between these March and April meetings and the May announcement of inclusion of the sponge reef near Halkett Point inside the new boundaries of Halkett Marine Park, there has been favourable publicity of these reefs. On May 31, the David Suzuki Foundation and Vancouver Aquarium hosted a public meeting at Kay Meek Centre featuring Howe Sound videos, including a sponge reef video by Roy Mulder.

A new federal process for protection of Howe Sound glass sponge reefs under the federal Pacific Region Cold-Water Coral and Sponge Conservation Strategy,\(^{12}\) which was released in 2011, is being urged for Howe Sound. Requests are now being promulgated.

Divers need to exercise caution to avoid breaking sponges by contact with fins or hands, so a new Professional Association of Diving Instructors (PADI) course has been developed to teach safe diving practice around sponge reefs.
What can you do?

Individual and Organization Actions:

- Contribute to citizen science projects in order to monitor glass sponge growth at the inshore Defence Island sponge reef.
- Report illegal fishing and trapping to DFO within sponge closure areas.
- Take the PADI course developed to teach safe diving practice around sponge reefs before diving around sponge reefs.
- Familiarize yourself and others with locations of sponge reefs throughout Howe Sound, specifically if bottom contact fishing or mooring your vessel.

Government Actions and Policy:

- Encourage local education and awareness of the importance of sponge reefs, and the risks they face.
- Advertise the uniqueness of the opportunity to dive a sponge reef using compressed air in Howe Sound.
- Support local citizen science projects, and formal studies aimed at understanding and monitoring glass sponge reefs.
- Install a safe and permanent moorage for dive boats at glass sponge reef sites.
- Implement full protection of glass sponge reefs throughout all of Howe Sound.
- Restrict bottom contact fishing throughout all glass sponge reefs in Howe Sound.
Resources

Drop camera and other videos of sponge reefs in Howe Sound
mlssbc.com/2013/04/27/mlss-collaborates-with-experts-from-vancouver-aquarium/

Footnotes

2 http://www.vanaqua.org/act/research/howe-sound-group/sponges