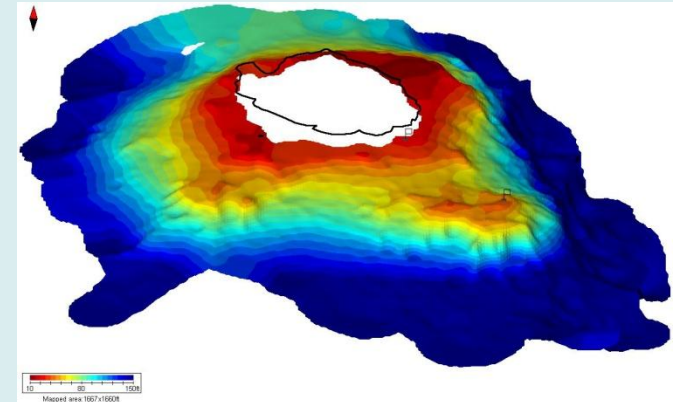
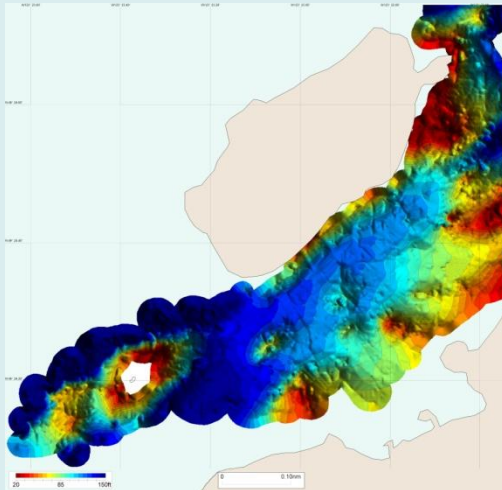




Marine Life Sanctuaries Society

Presents

***Glass Sponges
Bioherms in Howe
Sound
“Unique in the World”***



Glass Sponge Reefs in Howe Sound

- Group effort – MLSS, UCBC, Vancouver Aquarium
- Family History
- Context and jurisdiction



Basic Information

- Stationary, filter feeding organisms
- Animal
- Long-lived, slow growing (est. 2-10cm/yr)
- Primary structure is a matrix of silica-based spicules
- Reef forming abilities
- Unique habitat for deep marine life



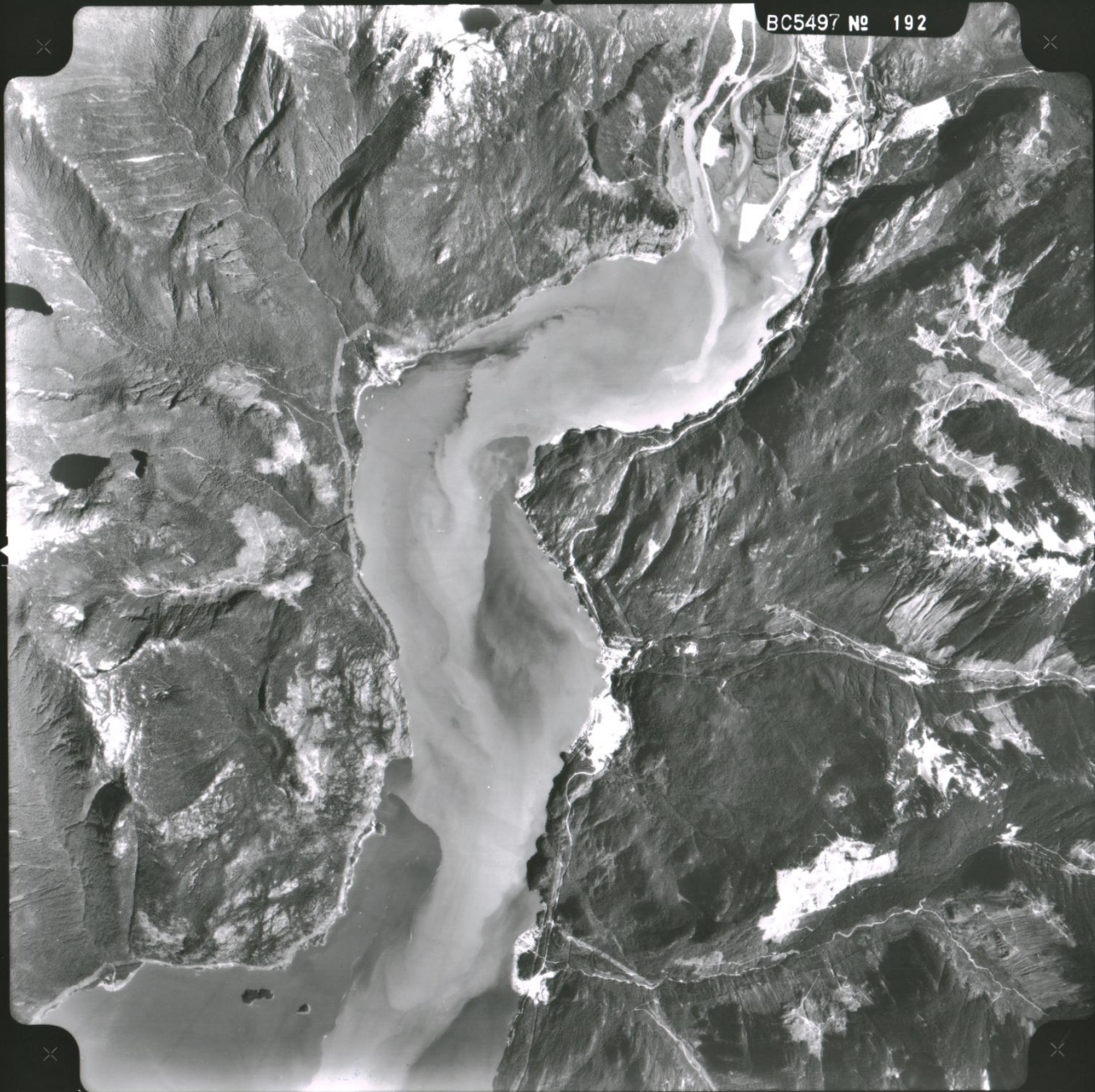
Filter Feeding

- Rely on currents to transport food towards them
- Can filter 900x their body volume/hr
- Consume microscopic plankton, bacteria, detritus and sediment
- Based on recent study estimated 230 tons per day of bacteria consumed by Sponge Reefs off BC Coast
- Larger particles, vibrations & impact will cause irritation and arrest filter feeding
- Communicate to other cells through electrical signalling

Habitat

- High Si
- 9-10°C
- Low sedimentation
- High suspended sediment load (turbid water)
- Higher velocity deep currents; leeward side of ridges/sea mounts

BC5497 No 192



Sponge: How Far Back in Time Do They Go?

A Brief History of Life on Earth

MYA*	Eon	Era	Period	Epoch	Events	
0.045	Phanerozoic	Cenozoic	Quaternary	Recent	Modern humans worldwide distribution; sixth mass extinction event	
1.8				Pleistocene	First hominines appear	
5			Tertiary	Cretaceous	Pliocene	Origin of human family
24					Miocene	Many grazing mammals; primate radiation
37					Oligocene	First anthropoid primates; abundant birds
58					Eocene	Modern mammals and angiosperms
65					Paleocene	Placental mammals diversify
144					Early mammals; first modern birds; first modern fishes; angiosperms appear and become dominant; climax of dinosaurs followed by their extinction at end of period; fifth mass extinction event	
213			Jurassic	First mammals; first birds; dinosaurs dominant; therapsids extinct; abundant bony fishes; gymnosperm forests		
248			Mesozoic	Triassic	Reptiles diversify; first dinosaurs; many insect types; bony fishes diversify; abundant cycads and conifers; fourth mass extinction event	
286	Paleozoic	Carboniferous	Permian	Insects diversify; reptiles diversify; first therapsids; cycads and conifers expand; third mass extinction event		
320				Pennsylvanian	First reptiles appear; amphibians diversify; first conifers; abundant seed ferns; major coal deposits	
360			Mississippian			
408			Devonian	First amphibians appear; terrestrial life diversifies; fishes diversify; first true bony fishes; first sharks; second mass extinction event		
438			Silurian	Jawless fishes diversify; first jawed fishes appear; first terrestrial plants and animals		
505	Ordovician	All lifeforms still aquatic only; armored ostracoderm fishes diversify; invertebrates diverse and dominant; first mass extinction event				
543	Cambrian	Aquatic life only; all modern animal phyla present; first vertebrates appear; trilobites common				
2500	Proterozoic	The Proterozoic and Archean Eons are sometimes referred to collectively as the Precambrian.			Oldest eukaryotic fossils (algae)	
3800	Archaean				Marked by the beginning of geological history; first lifeforms evolved; oldest prokaryotic fossils	
~4500	Hadean				Solar System forms; molten Earth forms and begins to cool; no geological history during Hadeon (because there was no solid rock); when solid rock formed, geological history began and the Hadean ended	

* Millions of Years Ago. The dates shown next to each time unit (eon, era, period, epoch) marks the beginning of that time unit. The end date of the time unit is marked by the next cell above the time unit of interest. For example, the Mesozoic dates from 248 MYA to 65 MYA.

Refs:

1. Avers CJ. 1989. Process and Pattern in Evolution. Oxford: Oxford University Press. 590p.
2. Gee H. 1999. In Search of Deep Time. New York: The Free Press. 267p.

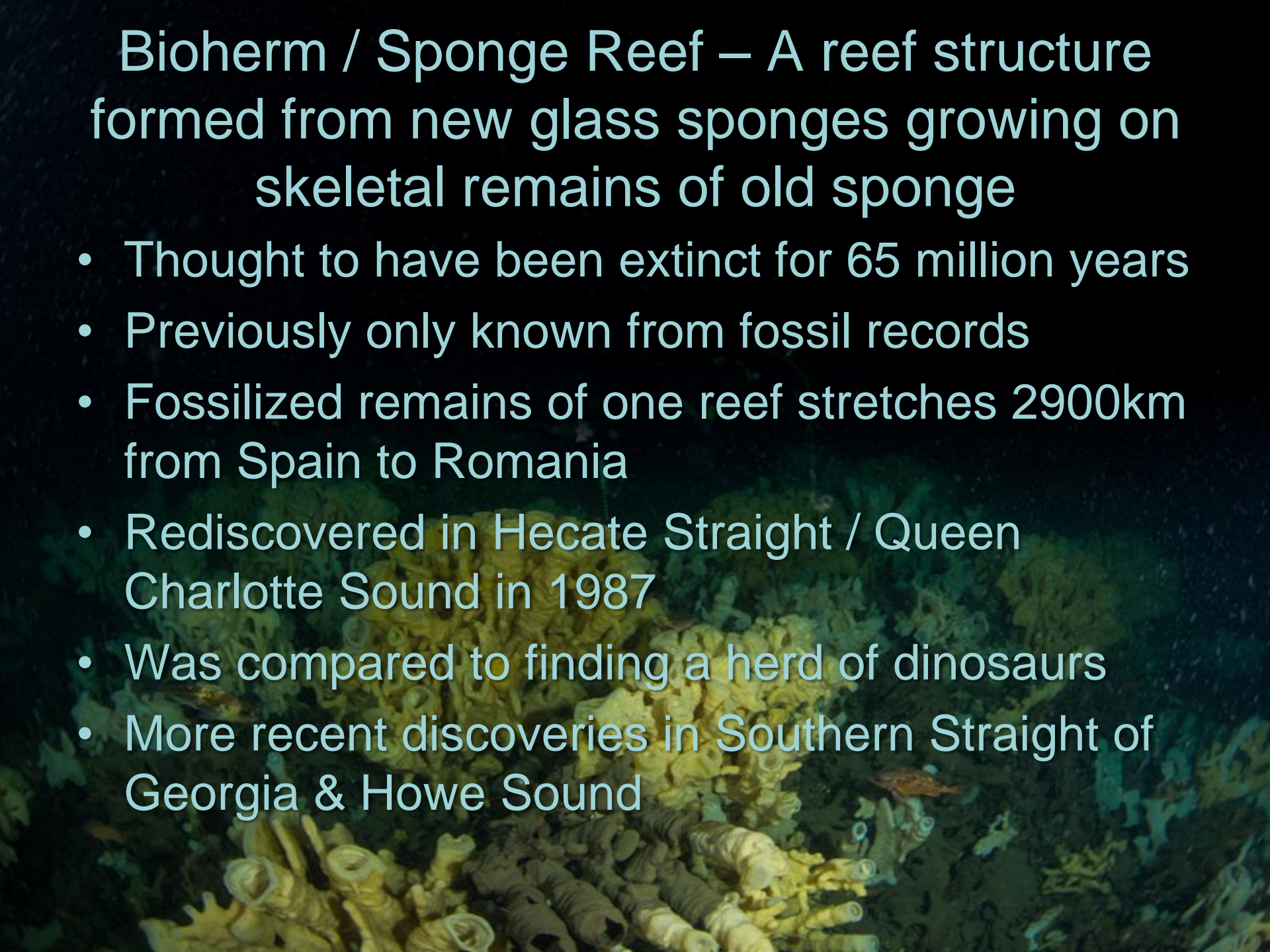
This timeline was downloaded from the About.com Animals/Wildlife website at www.animals.about.com.

Sponge Garden

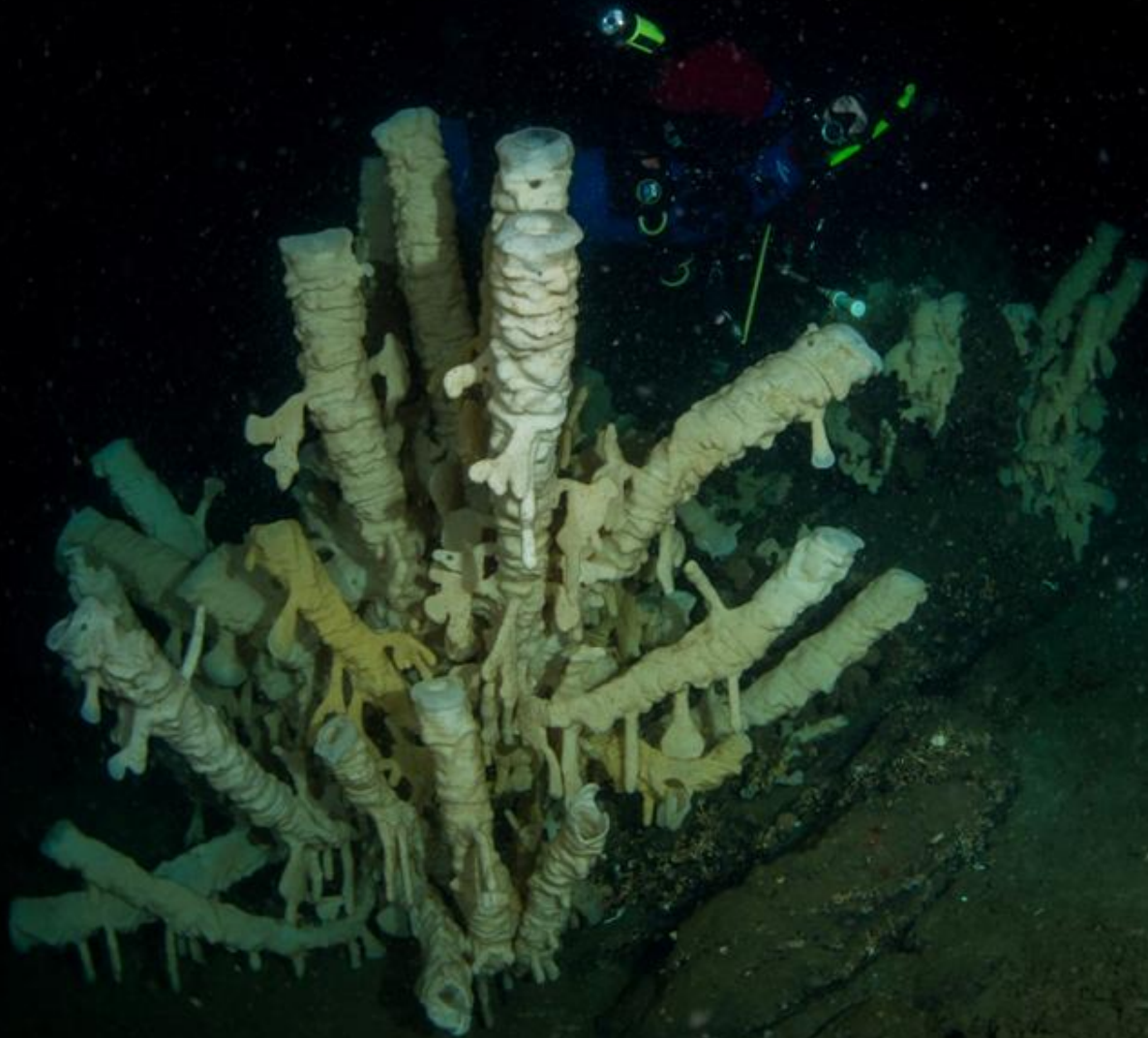


Bioherm / Sponge Reef – A reef structure formed from new glass sponges growing on skeletal remains of old sponge

- Thought to have been extinct for 65 million years
- Previously only known from fossil records
- Fossilized remains of one reef stretches 2900km from Spain to Romania
- Rediscovered in Hecate Strait / Queen Charlotte Sound in 1987
- Was compared to finding a herd of dinosaurs
- More recent discoveries in Southern Strait of Georgia & Howe Sound



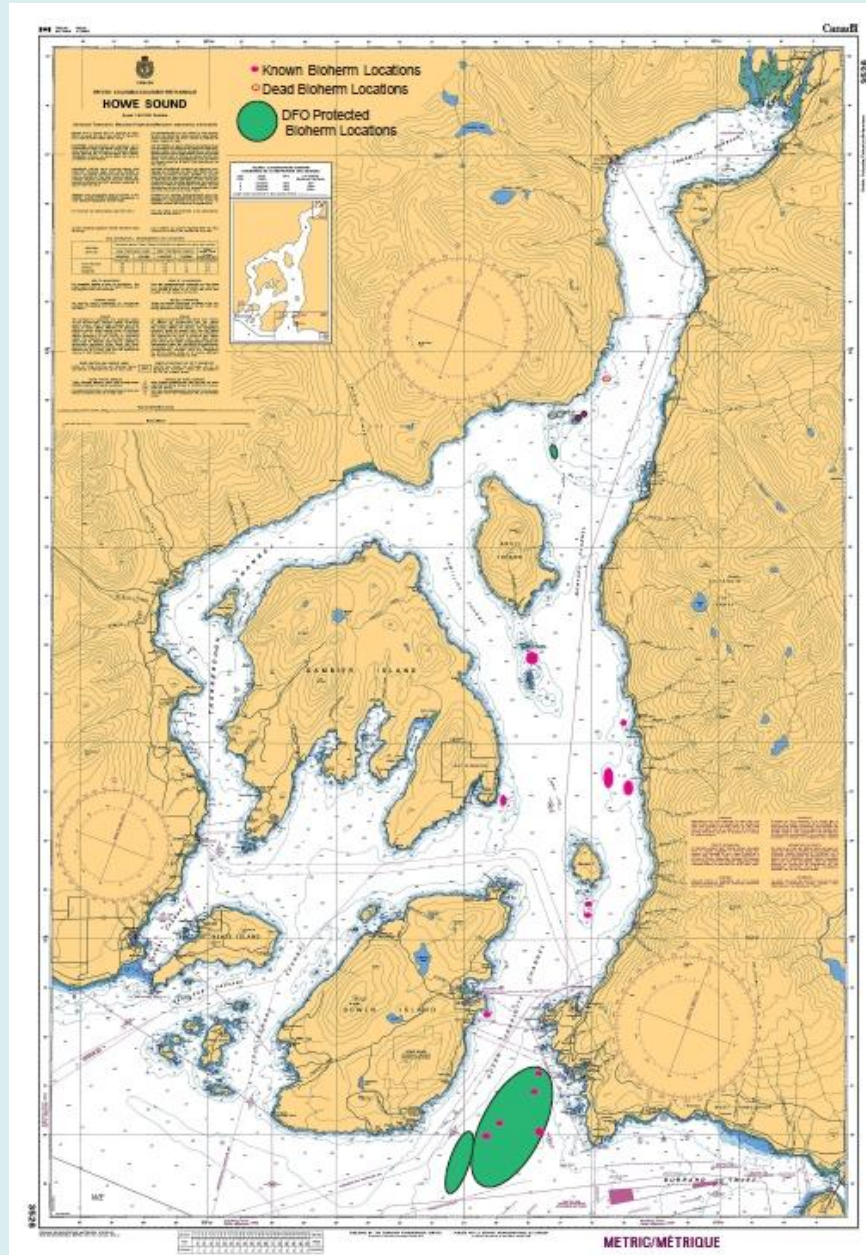
Estimated to grow 2-10cm/yr



Estimated to grow 2-10cm/yr



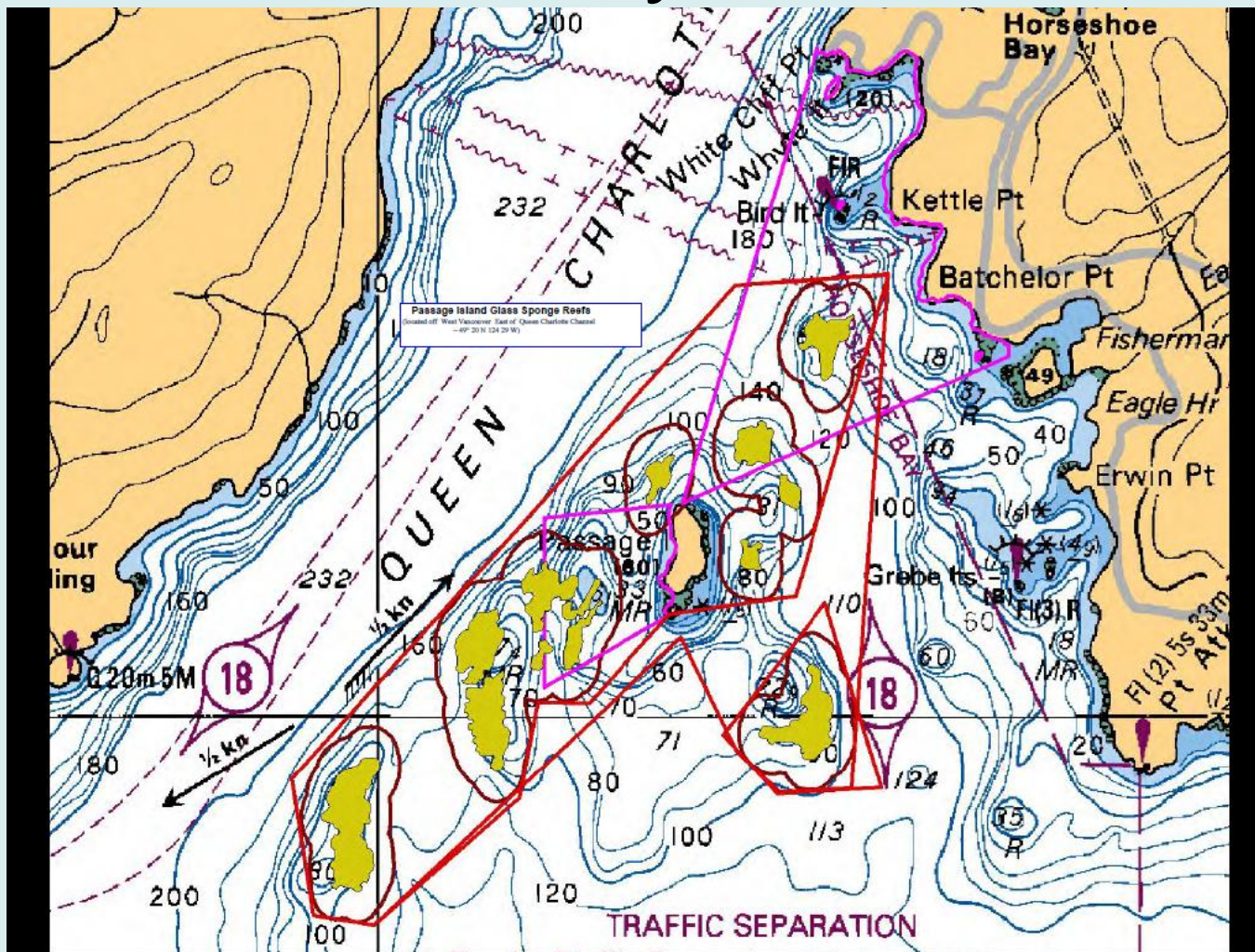
Sponge Reefs discovered to date



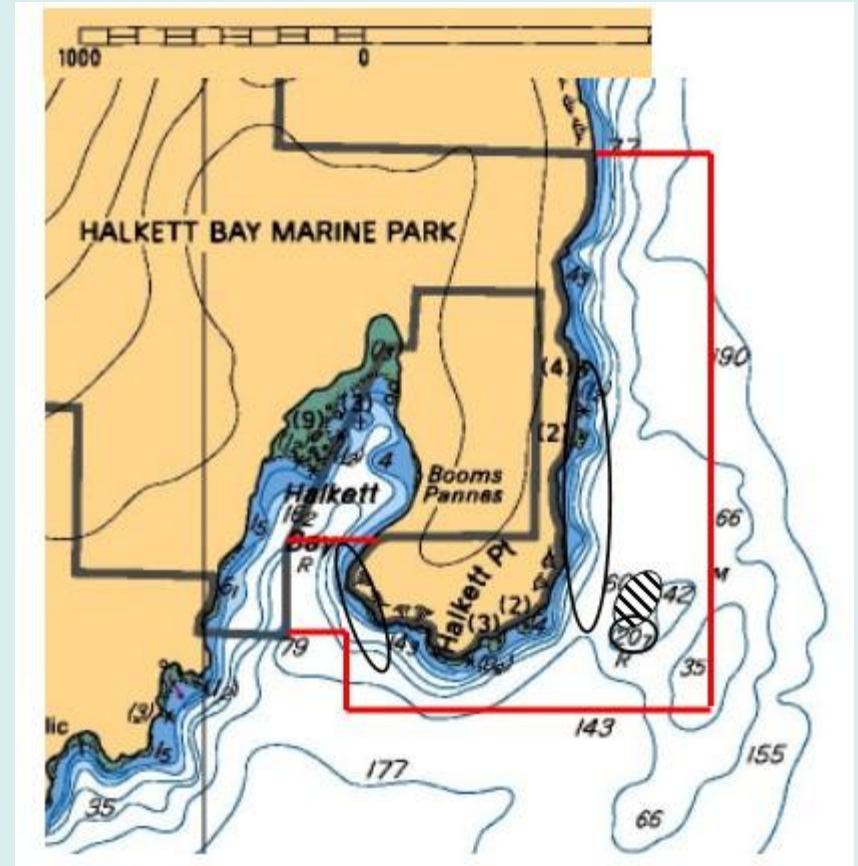
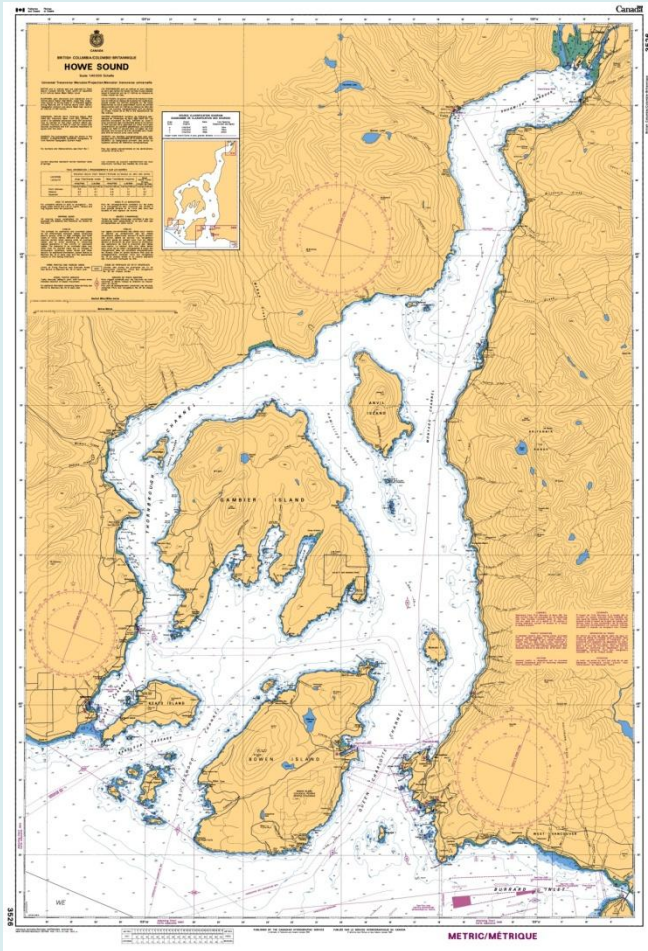
Howe Sound

Queen Charlotte Channel Sponge

Identified by the DFO



Halkett Provincial Park proposal

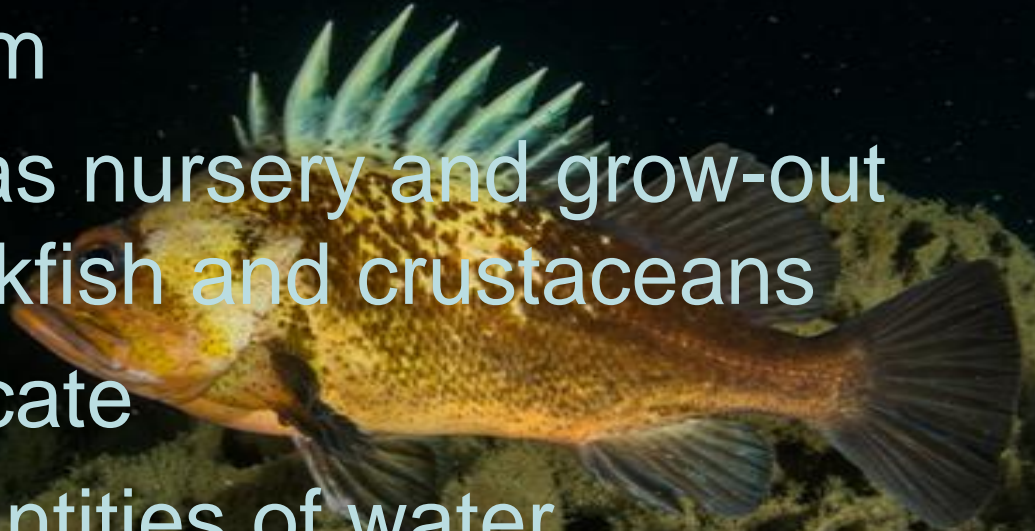


Halkett Provincial Park Proposal

- Joint effort by Marine Life Sanctuary Society, Underwater Council and Vancouver Aquarium
- Great support from MLA Jordan Sturdy
- Expand existing park boundaries to include Sponge Garden & Sponge Reef Habitat
- Ministry currently reviewing proposal
- Letters of Support from Squamish Nation, Islands Trust and others.
- More letters would be helpful

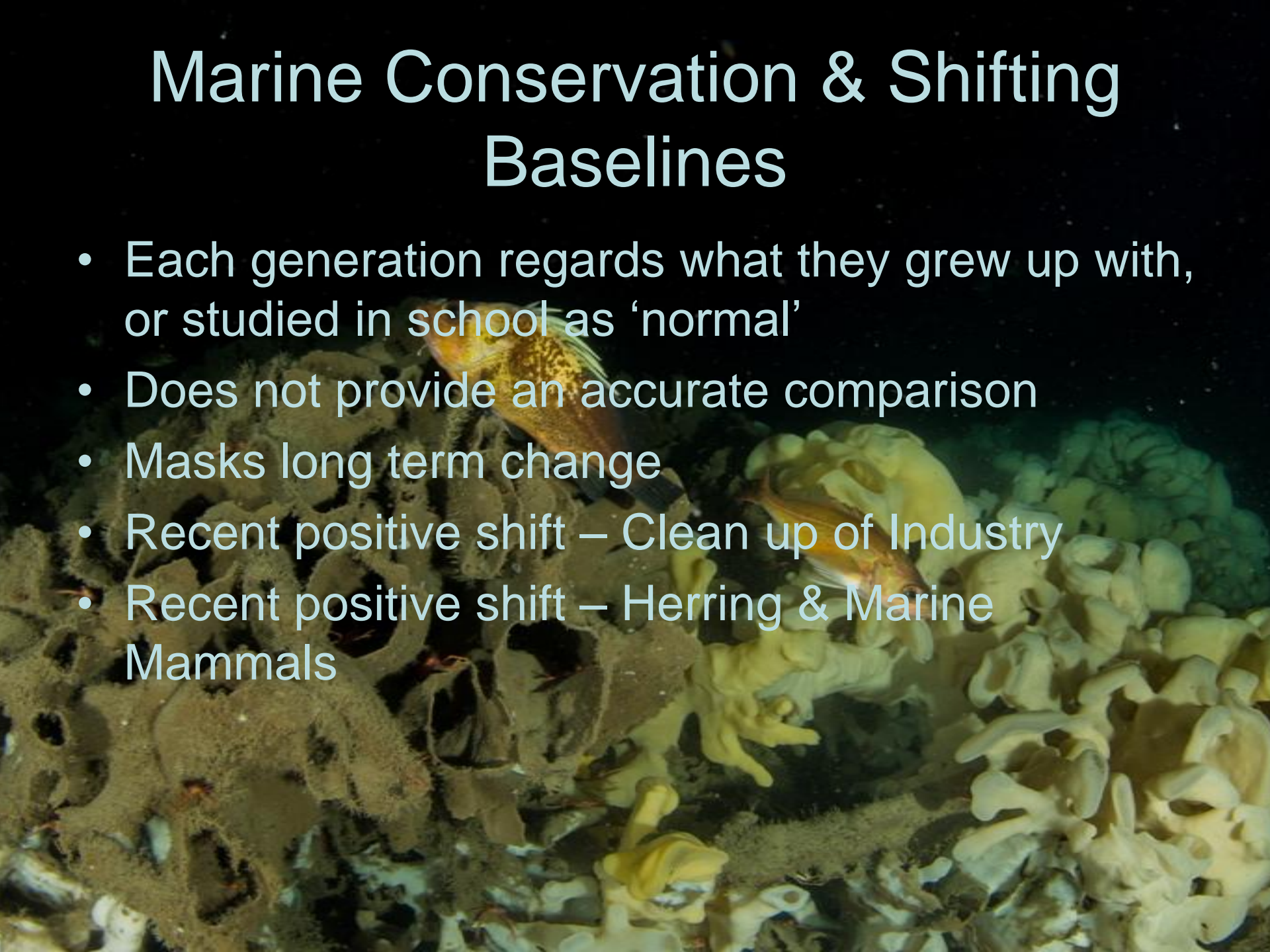
Why should we care?

- Ancient life form
- Appear to act as nursery and grow-out habitat for Rockfish and crustaceans
- Extremely delicate
- Filter huge quantities of water
- Susceptible to temperature shifts, valuable indicator of climate change
- Occur in shallow water, unique in the world



Marine Conservation & Shifting Baselines

- Each generation regards what they grew up with, or studied in school as 'normal'
- Does not provide an accurate comparison
- Masks long term change
- Recent positive shift – Clean up of Industry
- Recent positive shift – Herring & Marine Mammals



'Fishing Stories'



- Late 1800's homestead family
- 1940's massive Rockfish caught in large numbers
- 1950's/60's Spear-fishing
- 1970's / 80's recreational fishing
- 1990's decline / collapse of recreational fishing
- 2000's Howe Sound clean-up and recovery?
- Moving forward...

Compare to present day

- Stocks severely depleted
- Rockfish and Lingcod closed to all fishing in Howe Sound
- 2 species of Rockfish considered extirpated (locally extinct)
- 2 Species listed as Threatened by COSEWIC
- Little to no enforcement

How does this relate to glass sponges?

- Sponge reefs are ideal rockfish habitat
- Appear to act as nursery areas
- Rockfish are slow to mature and some species live beyond 100
- Studying and protecting the sponge reefs may help rockfish stocks recover

Bioherms as grow-out habitat for Rockfish?



Howe Sound is unique

- Local sponge reefs are shallow enough to visit & study using traditional Scuba methods
- Only known location in the world!
- No expensive equipment and support ships required

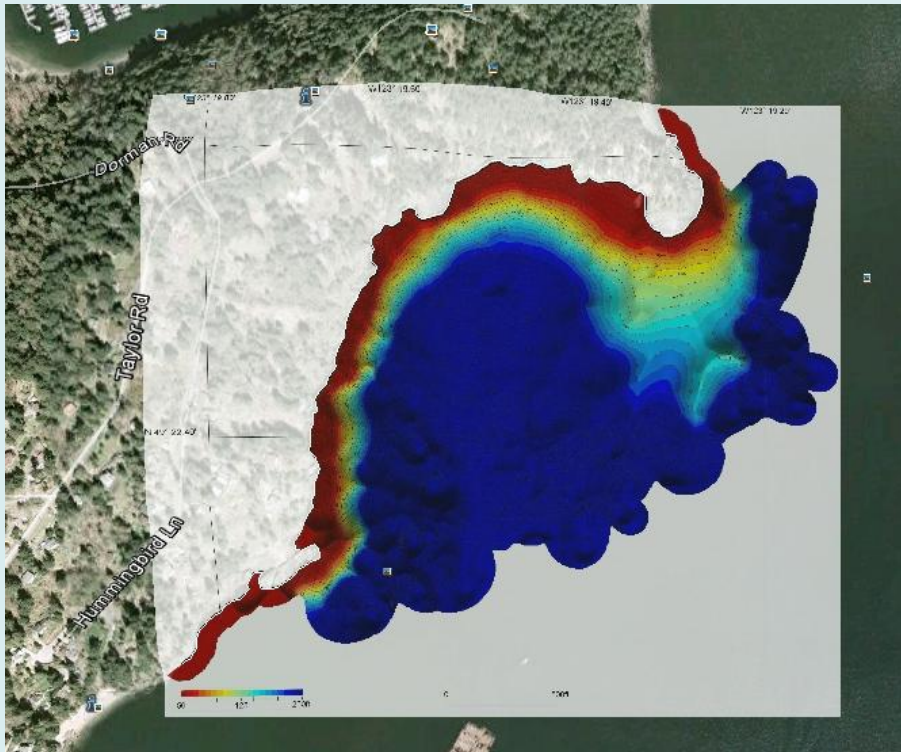


Citizen Science

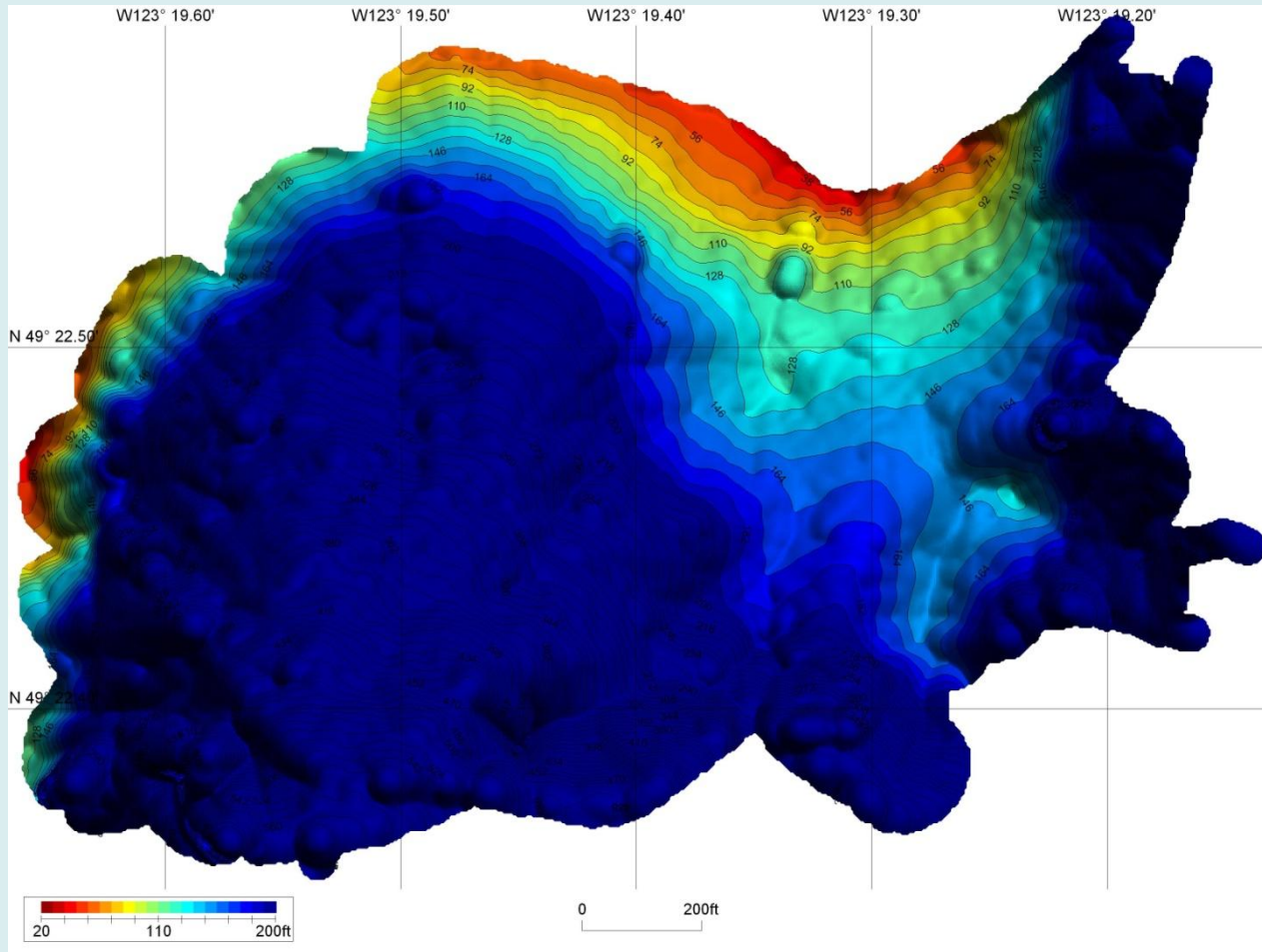
- *Mapping*
- *Dive surveys, photos and video*
- *Technical Dives*
- *Drop Camera*
- *Temperature Monitors*
- *UBC Engineering Student Projects*
- *Collaboration with other groups*



Dorman Bay



Dorman Point 3D View showing the deep canyon adjacent to the reef




Letter of support to MLSS

- If on land protection would likely already be in place
- Out of sight out of mind
- *“Our organization is pleased to support the addition of the foreshore to Halkett Bay Provincial Park in order to protect the sponge reefs.”*
- First step – we plan on expanding efforts to all reefs in Howe Sound



© Adam Taylor 2015

A photograph showing a dense colony of tubular polychaete worms. The worms are yellowish-brown and form a complex, interconnected network of tubes. Each tube has a distinct circular opening at the top, which is the worm's head. The colony is set against a dark, almost black background, which makes the lighter-colored tubes stand out. The overall appearance is that of a thick, textured mat of living organisms.

© Adam Taylor 2015