

Deep Sea Mining Impacts on Microbial Ecosystem Services: **A workshop to identify priority questions and develop a white paper**

Dates April 18-19, 2018
Location Graham Shimmield Residence Hall, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine, USA – bigelow.org
Host Beth Orcutt, borcutt@bigelow.org
Sponsor Center for Dark Energy Biosphere Investigations (C-DEBI)

Executive summary

The effluent of hydrothermal circulation through subsurface oceanic crust is the root cause of hydrothermal mineral deposits on and below the seafloor. These effluents and deposits support unique microbial and macrofaunal communities at the seafloor, serving as windows into deep seafloor processes and analogs for the study of extraterrestrial life. These sites are increasingly targeted for commercial exploitation for mineral extraction¹. Commercial ventures to exploit these resources have accelerated substantially, despite international oversight and understanding of the impacts of this exploitation lagging behind. The C-DEBI scientific community, in particular, represents a broad swath of experts in seafloor hydrothermal circulation, mineral alteration and formation, and hydrothermal vent microbial and macrofaunal ecology. The time is ripe to bring together representatives from this community to focus on the opportunities and threats raised by deep-sea mining to the study of the subsurface (and vice versa), to develop strategies to prioritize research questions of relevance to this applied topic, and to develop a framework to provide guidance and leadership in advising the International Seabed Authority on this topic. This workshop – to be held in April 2018 at the Bigelow Laboratory for Ocean Sciences in Maine – will bring together representatives of the C-DEBI community with additional experts in hydrothermal environments with consultants and advisors to the ISA and related agencies to discuss these issues and develop a white paper with recommendations.

Objective & Deliverables

The primary objective of this workshop is to develop a white paper that provides observations and recommendations that are of value to shaping policy related to deep-sea mining. It will also be used as a basis for scoping and launching new research and funding initiatives that could advance our understanding of mining impacts on the deep biosphere, and vice versa. Participants will be involved in preparing the following deliverables:

- 1) A brief workshop report within one month of the workshop close that provides an executive summary of the workshop outcomes, for publication to the C-DEBI research community.
- 2) A white paper completed within six months of the end of the workshop, aimed at publication in a relevant policy and/or trade magazine (such as *Marine Technology Reporter* or *Oceanography*) and addressed to industry, policy makers, non-profit foundation program managers, the C-DEBI community, and the scientifically literate public.
- 3) Pitches for non-profit foundations and science programs interested in the impacts of deep-sea mining, to support targeted applied science research that addresses policy & industry needs.

¹ <https://eos.org/articles/deep-seabed-mining-may-come-soon-says-head-of-governing-group>

Draft workshop agenda

April 17: Travel day to workshop venue – *Please plan to arrive by 6PM*
Evening ice breaker at Graham Shimmield Residence Hall with catered dinner

April 18:

07:30-08:30 *Catered breakfast*
08:30-10:00 Welcome, overview, and workshop charge
10:00-10:30 *Coffee break*
10:30-12:00 Session on current deep-sea mining activities and policy
12:00-13:00 *Catered lunch break*
13:00-15:00 Session on vent macrofauna and microbial ecology and resilience
15:00-15:30 *Coffee Break*
15:30-17:00 White paper working group charge, brainstorming
18:00-20:00 *Catered dinner*

April 19:

07:30-08:30 *Catered breakfast*
08:30-09:00 Summary of prior day and reminder of workshop charge
09:00-10:30 Continued working group brainstorming/writing
10:30-11:00 *Coffee break*
11:00-12:00 Open discussion of next steps
12:00-13:00 *Catered lunch break*
13:00-14:00 Tour of Bigelow Laboratory
14:00-15:00 Final working group efforts
15:00-15:30 *Coffee Break*
15:30-17:00 Wrap up and final outcomes
18:00-20:00 *Offsite dinner in Boothbay Harbor, Maine*
20:00- *meeting adjourned, return travel can begin*

April 20:

Return travel day
07:30-08:30 *Catered breakfast for any remaining guests*
09:00-17:00 Continued working opportunities for any remaining guests



Travel logistics:

Venue: Graham Shimmield Residence Hall (GSRH), Bigelow Laboratory for Ocean Sciences, 60 Bigelow Drive, East Boothbay, ME, 04544.

The closest airport to Bigelow Laboratory is the Portland International Jetport (PWM), which is roughly a 90-minute car ride. Bus coach service to Portland from Boston Logan Airport is also available via the Concoard Coach, and the bus terminal is also served by the Amtrak Downeast line. From Portland, participants should use Lyft, Uber or other ride sharing programs to be delivered to Bigelow Laboratory; return rides to the airport or bus terminal will be arranged. Participants should arrange their own economy-class airfare or coach using a US-flagged carrier. Travel costs will be reimbursed directly by the C-DEBI program following the workshop.



Lodging will be provided as single-occupancy dorm rooms with private baths (shared between two rooms) in the brand new, energy efficient GSRH on the rocky shore of the Damariscotta River. A fitness room is available, and wireless internet is available throughout the GSRH. Meals will be provided (please notify host of any dietary restrictions). Meetings will take place in the Alford conference room within the GSRH.

