



GESAMP

Joint Group of Experts on the
Scientific Aspects of Marine
Environmental Protection

GESAMP 45/4/6

24 July 2018

ENGLISH ONLY

45th session
Agenda item 4

PLANNING OF GESAMP ACTIVITIES:

**IMPACTS OF WASTES AND OTHER MATTER IN THE MARINE ENVIRONMENT FROM
MINING OPERATIONS, INCLUDING MARINE MINERAL MINING**

Report of the Chair of Working Group 42

- 1 The Chair of the working group, Tracy Shimmield attended GESAMP 44 held in Geneva, September 2017, hosted by the World Meteorological Organisation (WMO).
- 2 The International Seabed Authority (ISA) agreed in November 2017 that they would support the GESAMP Working Group 42 (WG42), which was welcomed by the group.
- 3 The first formal meeting and main workshop of WG42 took place 20 - 22 September 2017 and was hosted by IMO at their London Headquarters. Six members of the group attended (Bronwen Currie, Cindy Van Dover, Gi Hoon Hong, Tracy Shimmield, Stuart Simpson and Andrew Sweetman, with two members being unable to attend (Dr James Hein and Dr Cindy Lee Van Dover). At this meeting, the group discussed and finalised the report structure, actions and dates for draft and final report delivery.
- 4 Fredrik Haag the Head Officer, Office of the LC/LP and Ocean Affairs welcomed the group, introduced Dr Andy Birchenough the new Technical Officer, Office of the LC/LP and Ocean Affairs, who will be the Technical Secretary of the group and also Chrysanthe Kolia, the GESAMP Office Coordinator who supported the group during the first meeting by providing information on work processes Mr. Haag also gave a brief overview of GESAMP and reminded members that they were acting as independent scientists and not as representatives of their respective organisations. The Chair gave an overview of the discussions surrounding WG 42 at the GESAMP annual meeting in Geneva. The group discussed the terms of reference and concluded that everyone understood the requirements of the group.
- 5 There was discussion on the name of WG 42 as there was some concern that offshore diamond mining would not be included as this is normally considered mining of gemstones. The group agreed that diamond mining should be included in the review and revised the name of WG42 to "Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining".
- 6 The group agreed the format of the report and discussed what should be included (see Appendix 1).
- 7 In November, Michael Huber was invited to join the working group as a correspondence member and has agreed to review the draft report. In addition, James Hein who is a member of the group has not been able to contribute due to research cruise participation, will also review the draft report.

8 The group identified that there was a lack of physical oceanography skills. The Chair approached Dr Andreas Thurnherr, a Physical Oceanographer based at Columbia University during November 2017. Dr Thurnherr agreed to become a member of the working group and will add to the knowledge and expertise of the group. Another member, Lisa Levin, had to withdraw from the working group due to other commitments. Please see Appendix 2 for current membership of WG 42.

9 Progress has been made with the majority of the members having completed the tasks assigned to them. The Chair, Tracy Shimmield, has some further case studies for Papua New Guinea to complete, she will then draw the information together to produce a draft report. This will be sent to group members to edit areas assigned to specific experts.

10 The initial time line set by the group was to have a draft report by January for comment and review, this has now been re-programmed and the draft will now be produced for initial review by group members in August 2018 with a draft report available for review by the Technical Officer during September 2018. This is later than originally expected and is a result of the formation of the new group and chair, all of who have not been involved in GESAMP before. The Chair now has a process in place to ensure engagement and input from the members of the group.

11 The Chair attended a “Workshop on the draft regulations for the exploitation of mineral resources in the Area: policy, legal and institutional considerations”, February 2018 organised by the UK Foreign and Commonwealth Office and the ISA, held at The Royal Society, London. At the meeting it was proposed that the GESAMP WG 42 could be the ideal group where all scientific information related to deep sea mining is routed through to ensure that all bodies were receiving all available scientific information related to deep sea mining. This needs to be discussed and if considered a positive suggestion, then the Chair will discuss with the Technical Officer on how to follow up with the relevant bodies.

12 In addition, the Chair has been invited to join the UK Department for Business, Energy and Industrial Strategy (BEIS) working group “Deep Sea Mining Working Group” which is looking at aspects of deep sea mining from a UK perspective. The first meeting considered the environmental sustainability of deep sea mining.

13 GEOTRACES (<http://www.geotraces.org/about-us/about-geotraces/mission>) who’s mission “*is to identify processes and quantify fluxes that control the distributions of key trace elements and isotopes in the ocean, and to establish the sensitivity of these distributions to changing environmental conditions*” is keen to interact with WG42 and would bring valuable geochemical expertise to the group. A discussion is taking place between the Chair of WG42 and the Co-Chair of the Scientific Steering Committee of GEOTRACES.

Action requested of GESAMP

14 GESAMP is invited to consider the information provided and take action as appropriate.

Appendix 1

Report Structure

Please note the suggestions that are detailed under the main headings are not exhaustive and were the initial suggestions for inclusion in the report by WG42 members. These will be added to as the report is written and finalised.

1. Introduction:

What is the report for..... GESAMP

2. Overview:

Definition of shallow and deep for sea bed mining: shallow mining 0- 200m, deep mining below 200m

Definition of shallow and deep for tailings placement: tailings deposition at shallow depths 0-200m, intermediate depths 200-1000m depths, deep below 1000m depth where most discharges occur at 100 - 200 m)

Overburden/other matter from sea bed mining, definition of impact zones where the discharge occurs: surface 0-10m, shallow 10-200m, 200-1000m intermediate, greater than 1000m deep

Connection of shallow to deep explain

Near and far field definition (regional)

Short and long term effects

Quality and Transparency of data

2.1 Tailings

Definitions of tailings placement,

Define types of DSTP, processed non-processed, deep placement, shallow placement, ore types

Types, technology

2.2 Mineral mining

Complete process, ships etc

Types, technology

Draw scale of map of world, show DSTP where and impact, mines, size, rate and intensity

Scale of mining compared to other subsea industries

Explain similarity and differences, scale of DSTP and deep sea mining

3. Marine Ecosystem Characteristics

Description of shallow, mid, deep: key points

Services,

Fisheries,

Connectivity function,

4. Potential Impacts:

List with short paragraph in each split benthic/pelagic

Include short and long term effects,

Near and far field

4.1 Physical

Destruction or alteration of habitat and complexity,

Mix of sediment column to depth

Particle size change of habitat,

Granularity benthos and water column

Smothering,

Plume dispersal

Suspended solids: turbidity, light

Enhances transport of material (marine snow), dilution of available food/organic matter

Sediment compression,

Alterations of water flow

Noise

Light

4.2 Chemical

Altered (Increased/decreased) organic from operations

Waste process chemicals

Chemical contaminants, (heavy metals etc)

Increase/decrease trace metals, bioavailability associated with tailings/waste material, stock piles?

Deoxygenation: biogeochemical cycling (increase/decrease trace metals, bioavailability)

Co discharges, sewage/waste waters

Acidification, impacts on bioavailability

Multiple stressors

Organic sediment turnover, stripping of metals for the water column.

4.3 Ecotox

Pelagic

Benthic

Dissolved and dietary exposure

Acute chronic (exposure duration/recovery)

Species relevance (deep vs shallow)

Ecologically relevant

Sub lethal effects

(don't have the right tools, enough data to predict impact accurately)

4.4 Ecology/Biological (Pelagic/Benthic):

Bioaccumulation of metals

Possible benthic pelagic coupling resulting in increased heavy metal concentrations

Biogeochemical cycling (irrigation, bioturbation, carbon and nitrogen, P)

Ecosystem functioning and services (eg. Food chain, fisheries)

Loss of species

Community structure

Abundance

Loss of source population (localised extinction)

(Translocation and connectivity)

5. Cumulative Impacts:

Including synergistic impacts

Fisheries

Climate change, overall impacts, MPA's and placement

Overlay data where climate is changing and mining may occur, cumulative effects.... Map

Local vs regional vs global

Sub lethal effects influencing success of organisms (growth rate/ reproduction)

Multiple mine sites

Cumulative use by industries /management

Recovery

6. Defining Serious harm

7. Case Studies

*Papua New Guinea
Ba*

8. Knowledge Gaps

Baselines

Quality and Transparency of data

Recovery and Resilience

MPA's connectivity

Large scale mining tests?

Further data.....

9. Discussion

Restoration

10. Conclusions

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Appendix 2

Membership of WG42

Name	Affiliation	Country
Bronwen Currie	Ministry of Fisheries and Marine Resources, Swakopmund	Namibia
Raymond Nepstad	SINTEF	Norway
Cindy Van Dover	Duke University NC	USA
James Hein	USGS (US Geological Survey)	USA
Stuart Simpson	CSIRO (Commonwealth Scientific and Industrial Research Organization)	Australia
Andrew Sweetman	Heriot Watt University	UK
Gi Hoon Hong	Korea Institute for Ocean Science and Technology	Republic of Korea
Andreas Thurner	Columbia university	Canada
Tracy Shimmiel	Chair of WG 42	UK
Sandor Mulsow	ISA (Observer)	Jamaica