The processes and concepts indicated in this presentation are subject to change.

Development of environmental thresholds

Progress report

IEG co-chairs

8 July 2025

The processes and concepts indicated in this presentation are subject to change.

Presentation outline

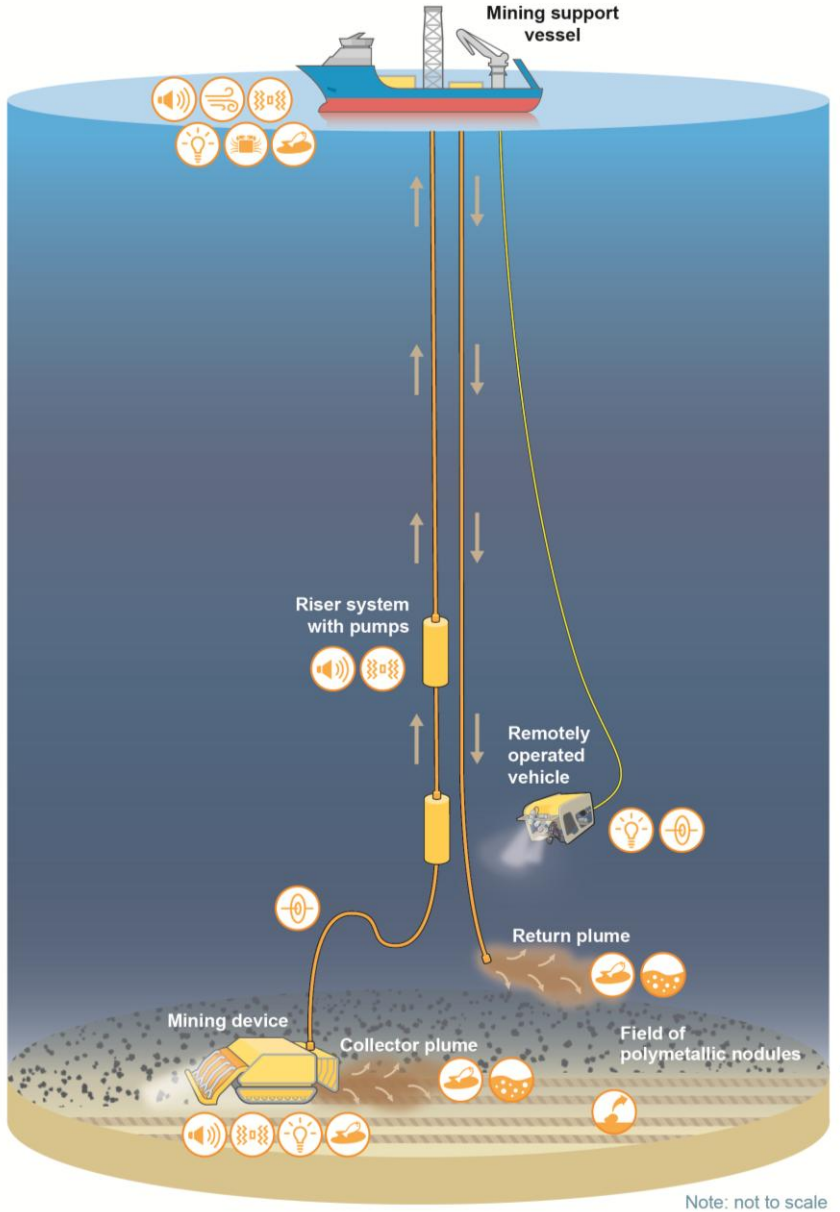
1. Background
2. Proposed approach
3. Intersessional expert group work
4. Concluding remarks

The processes and concepts indicated in this presentation are subject to change.

Development of environmental thresholds

- Council decision **ISBA/27/C/42** requested threshold values for these main pressures:
  i. Toxicity
  ii. Turbidity and settling of resuspended sediments
  iii. Underwater noise and light pollution

- Requested "*binding environmental threshold values, including early warning thresholds .... including the maximum level of harm that can be considered acceptable*"



The processes and concepts indicated in this presentation are subject to change.

Intersessional Expert Group (IEG) – ISBA/28/C/5

- Objectives:
  - To synthesize and review **existing information** on thresholds;
  - To identify **appropriate indicators** to define threshold metrics;
  - To define **threshold levels**, including early warning thresholds and levels of uncertainty and confidence;
  - To evaluate **critical gaps in knowledge** related to threshold determination and recommend future required work.

- Three subgroups composed of:
  - 2 LTC co-chairs and 1 alternate
  - 10 experts each (5 nominated by regional groups of the Council + 5 nominated by other stakeholders); 3 additional experts for Light pollution (no nominations received)
  - *ad hoc* consultations with other experts or initiatives, as required, for example, to fill expertise gaps and accessing data and information

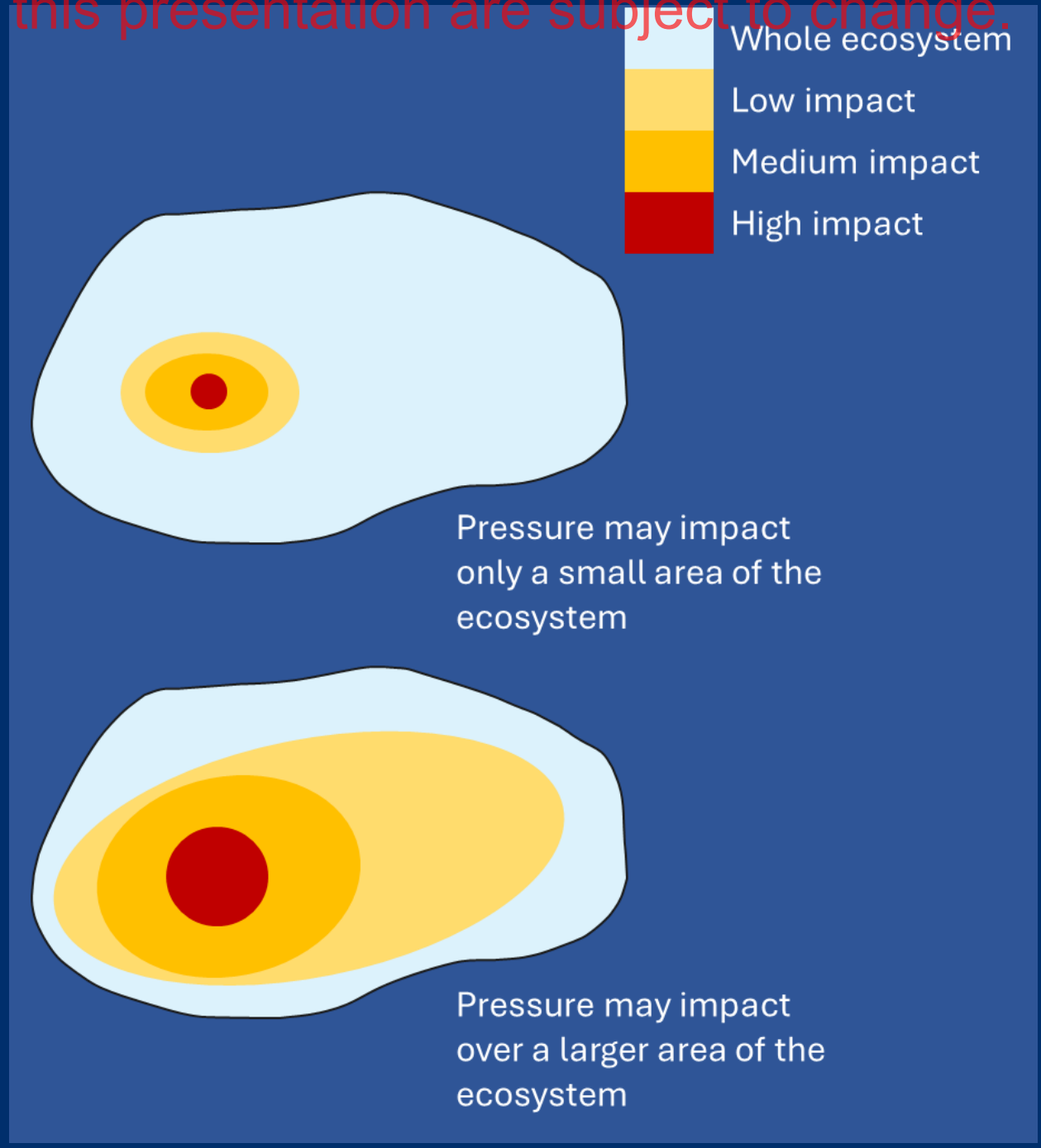
The processes and concepts indicated in this presentation are subject to change.

Proposed approach

The processes and concepts indicated in this presentation are subject to change.

Pressures and Impacts

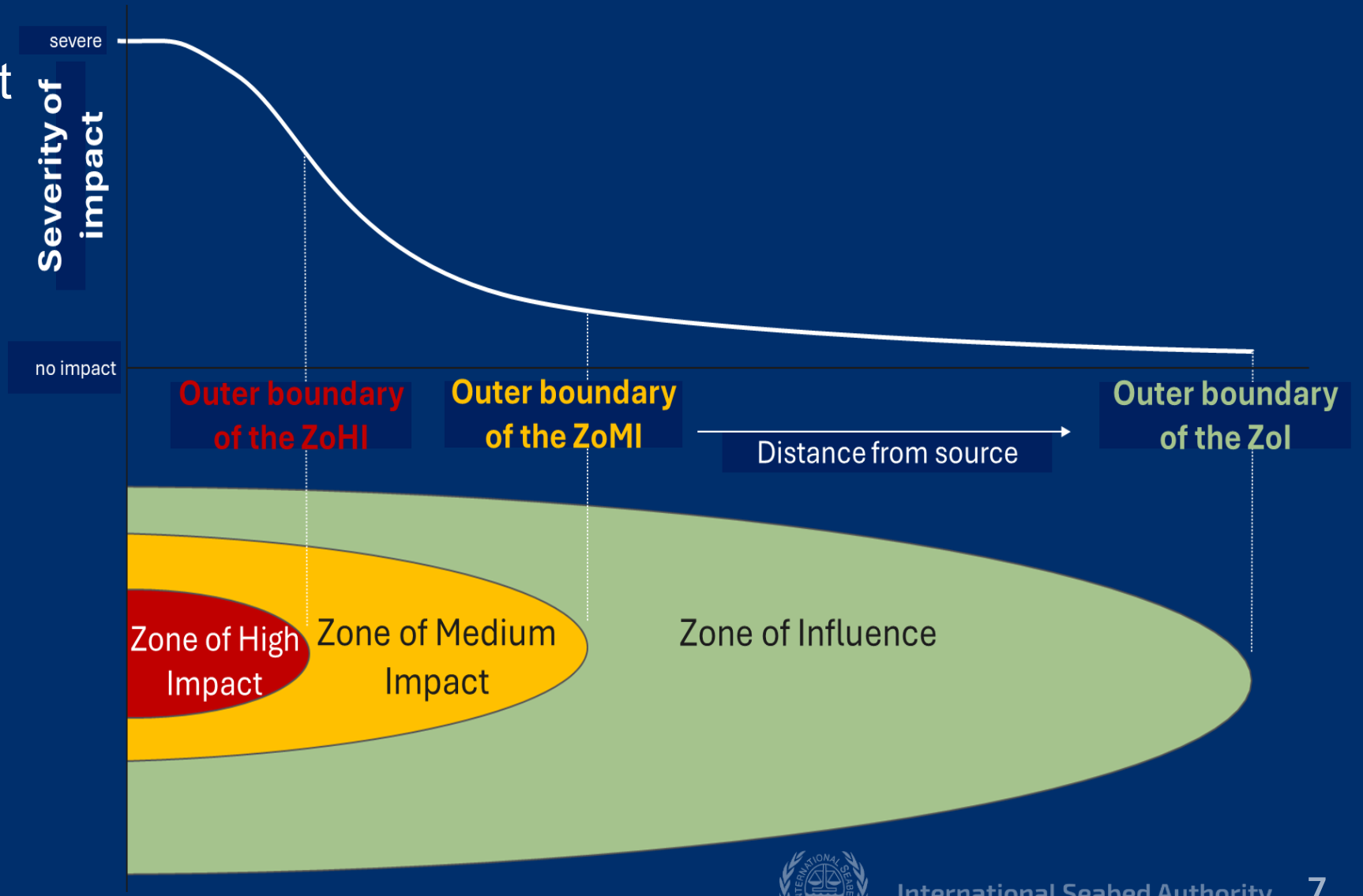
- Pressures are the forces or influences exerted by mining that affect the survival, health or behaviour of organisms within an ecosystem
- How these pressures will impact an ecosystem depends on the particular situation, taking into account the local environment, the type of disturbance, over how large an area, for how long etc.
- Effective management needs to understand both pressures and impacts



Zone-of-impact/influence (ZOI) approach

- ZoI is a common concept in environmental management

- It refers to spatially defined areas around a source of disturbance, each characterized by varying degrees of environmental change along a gradient.



Zone-of-impact/influence (ZOI) approach

ZONES	IMPACT category	EFFECT level	PRESSURE (Suspended sediment concentration)
Zone of Influence	Negligible impact	Natural levels + (X%)	Background
	Slight impact	Natural levels + (Y%)	Background + (α mg/l)
Zone of Medium Impact	Minor impact	Causes levels of stress	X mg/l
	Moderate impact	Causes levels of mortality	Y mg/l
Zone of High Impact (equivalent to area of operations)	Major impact	May cause total mortality	Z mg/l

Ecological reference points (ERPs)

- The areas of different impact identified in the ZoI approach are then defined and delimited by **ecological reference points**
- These are metrics or measures to indicate the status or health of the ecosystem (e.g., % original population, % animals affected)
- When assessed for a particular mineral resource environment and operation, they can then help determine ecological thresholds and development of management actions
- But the science alone cannot define the actions taken at these reference points and hence turn them into thresholds
  - **Economic, societal, and political considerations are necessary**

The processes and concepts indicated in this presentation are subject to change.

IEG Subgroups

The processes and concepts indicated in this presentation are subject to change.

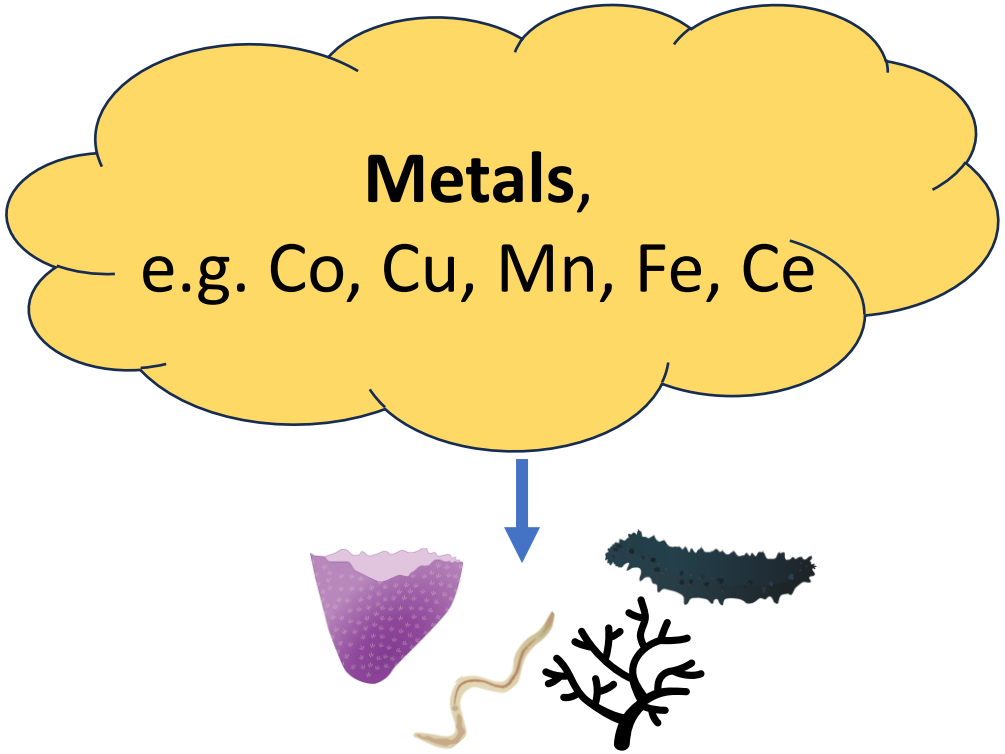
Intersessional Expert Group (IEG) – ISBA/28/C/5

Objectives:

- To synthesize and review **existing information** on thresholds.
- To evaluate **critical gaps in knowledge** related to threshold determination and recommend future required work.

- To identify appropriate indicators to define threshold metrics.
- To define threshold levels, including early warning thresholds and levels of uncertainty and confidence.

Toxicity



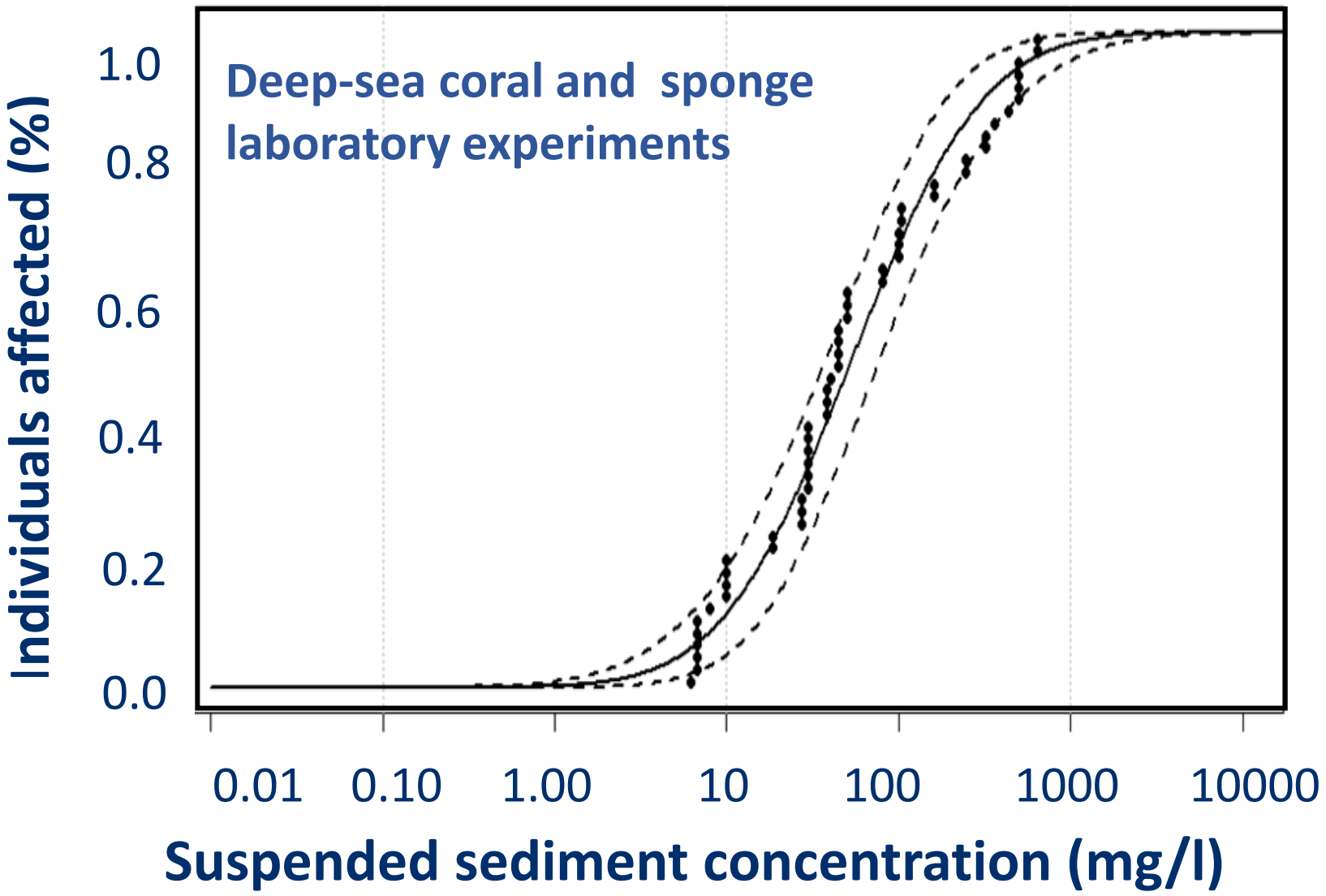
Different biological responses

- Metals naturally occur in the environment
- Plumes from sediment disturbance and return water discharge will contain these metals
- Only subset of metals mobilize in the sediment plume
- Difficult to disentangle the effects of metal toxicity from the effects of sedimentation / turbidity

The processes and concepts indicated in this presentation are subject to change.

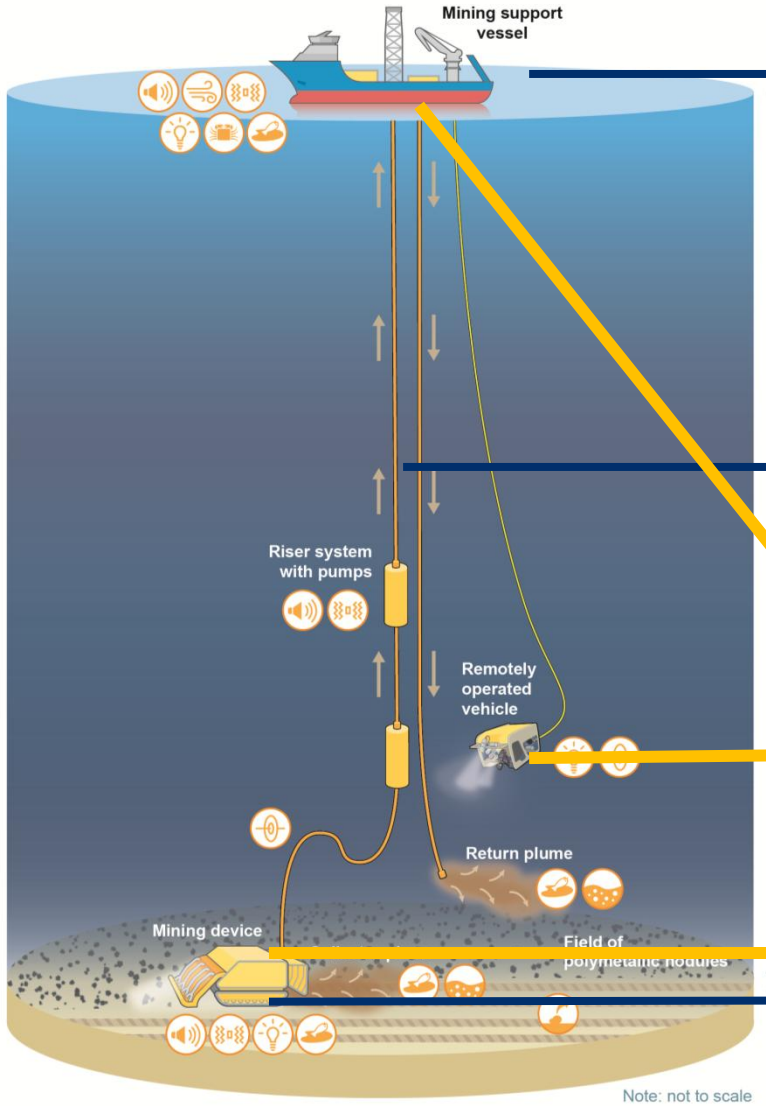
Turbidity

- A dose-response approach analyses levels of the pressure against the proportion of animals affected (feeding, behaviour, breathing etc)
- The level of individuals affected (HC) is an example of an indicator for reference point
  - H /l
  - H ng/l
  - H mg/l



The processes and concepts indicated in this presentation are subject to change.

Noise and light



- Guidance on surface impacts from vessels to marine mammals, e.g. NOAA (2024)
- Initial understanding for other taxa

- Riser with currently unknown noise levels; linear source through the water column
- SOFAR layer

- Understanding of physics of light attenuation
- Uncertainty related to light impacts

- Initial understanding of collector noise
- Uncertainty as to impacts

Concluding remarks: common issues

- Limited information
  - Detailed configuration of many parts of a mining system
  - Few deep-sea studies and experiments, especially related to the water column
- High uncertainty
  - The nature and extent of pressures
  - The impacts of pressures on deep-sea biology and ecology
- Limited existing guidance
  - Few relevant regulatory, policy, other industry guidelines for deep-sea or midwater

Concluding remarks: the way forward

The IEG proposes a **standardized ZoI and Ecological Reference Points approach** as a framework that best supports a science-based path to address the Council's decision.

This approach **integrates** the impact on the environment with the level of pressures. More work is required by the IEG and LTC to finalize this approach.

Going beyond this approach to **create thresholds** will require cooperation with contractors to increase data, and data confidence, from **EIA processes**, as well as political and societal input.

The processes and concepts indicated in this presentation are subject to change.

Questions

The processes and concepts indicated in this presentation are subject to change.

International Seabed Authority

14 - 20 Port Royal Street Kingston, Jamaica

Phone: +1 (876) 922-9105

Fax: +1 (876) 922-0195

www.isa.org.jm