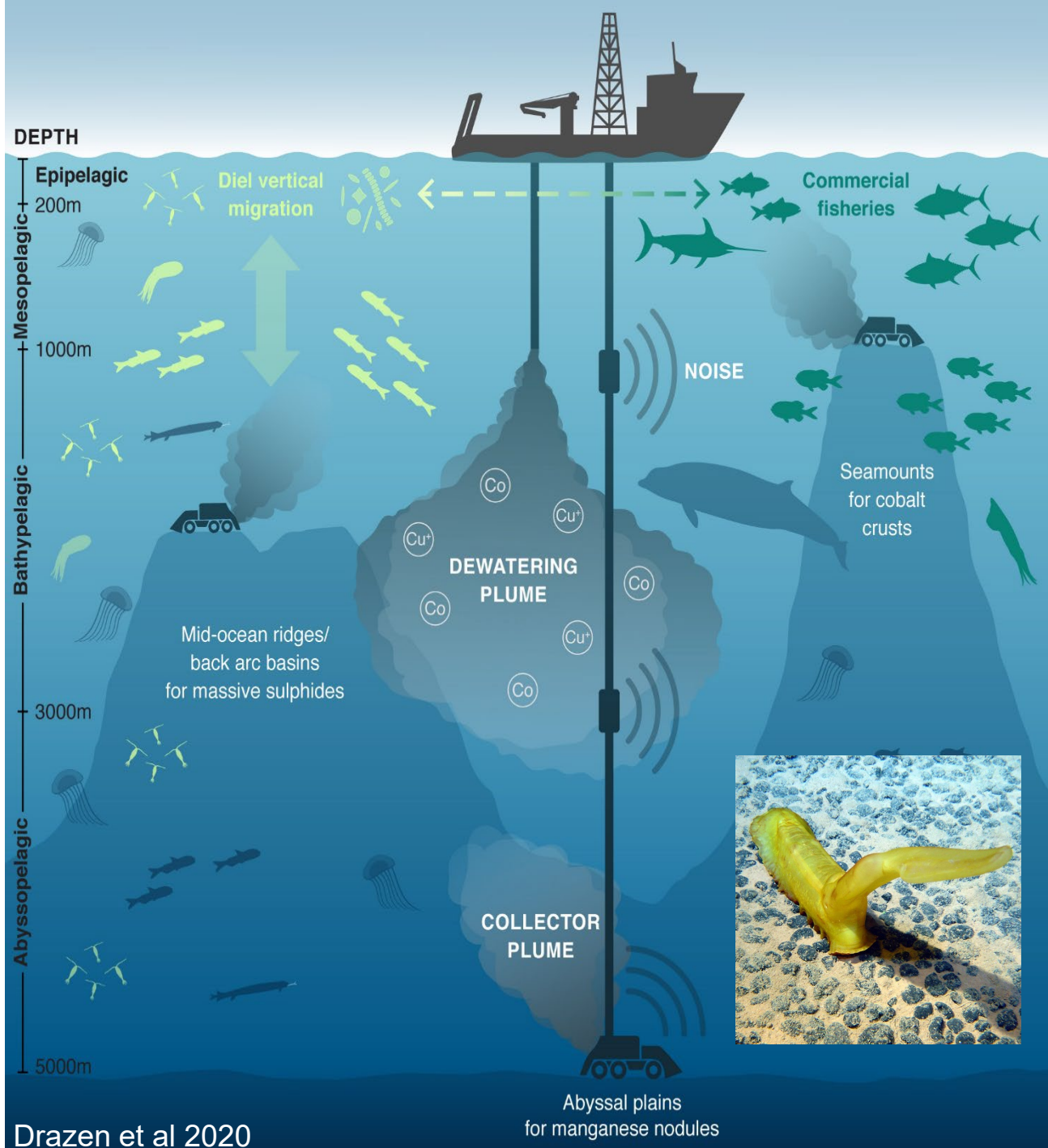


Potential pathways for interactions between deep-sea mining and tuna fisheries

Dr Jesse van der Grient

Royal Netherlands Institute for Sea Research (NIOZ), Netherlands

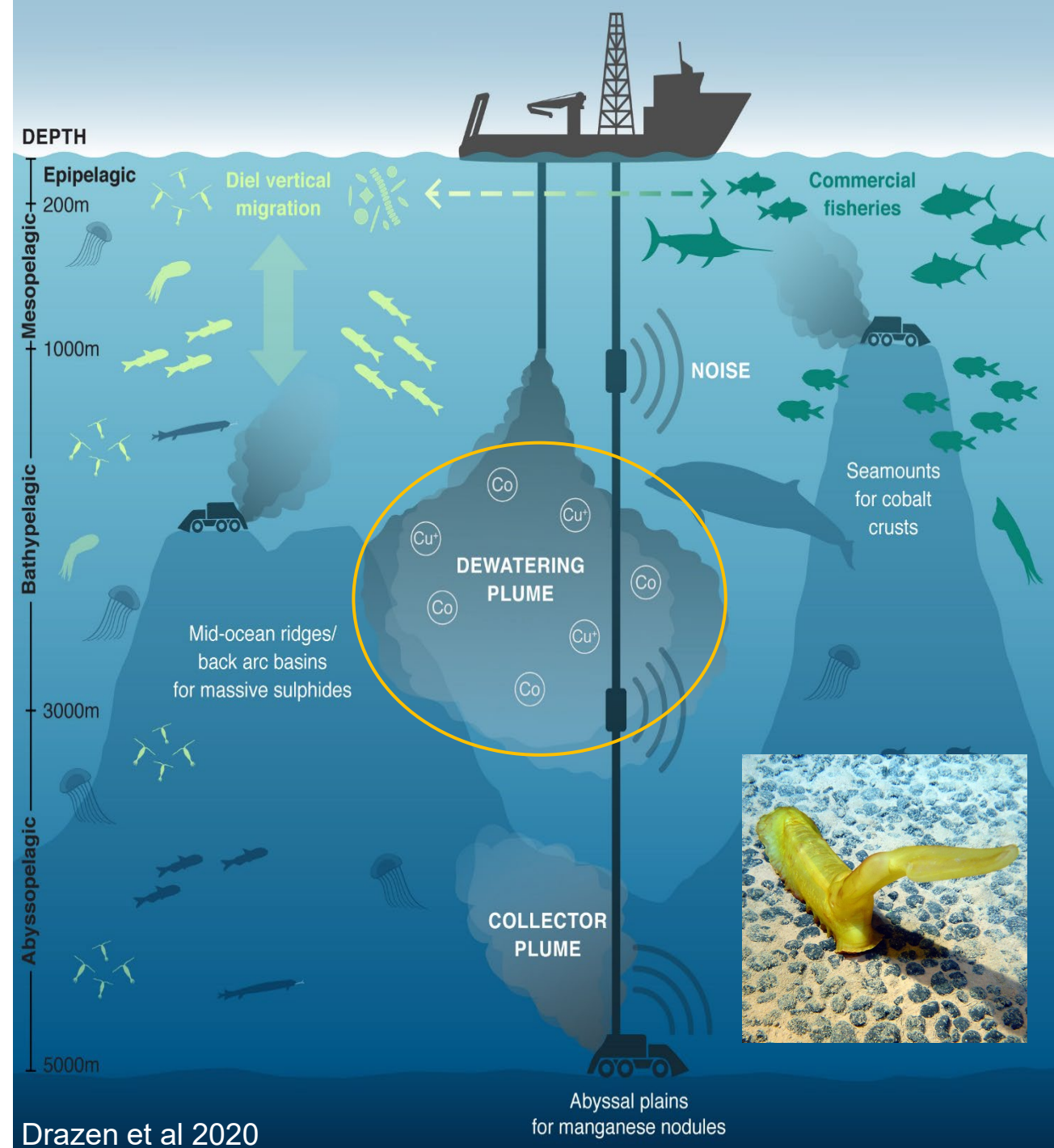
What is deep-sea mining?



Deep-sea mining could have pelagic impacts

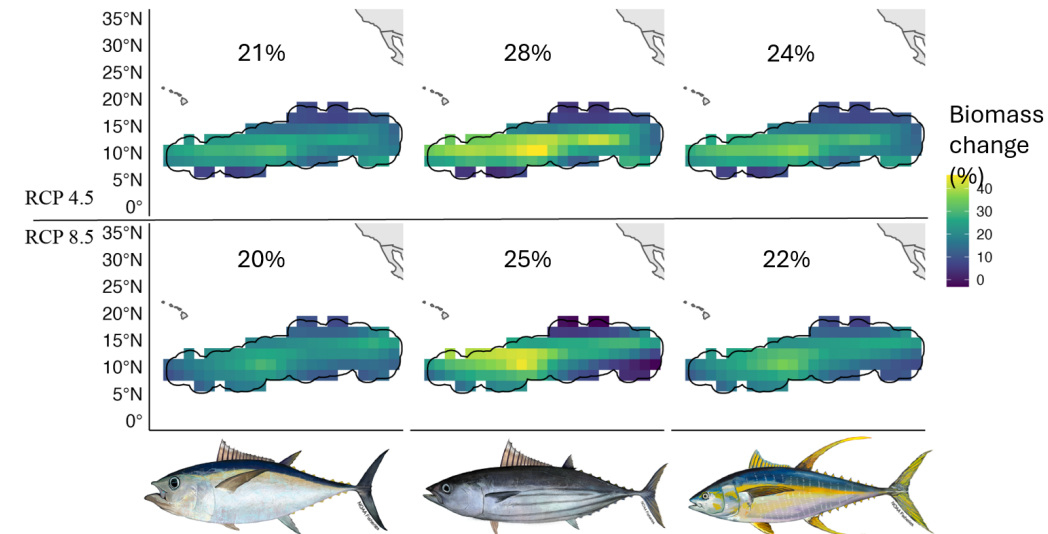
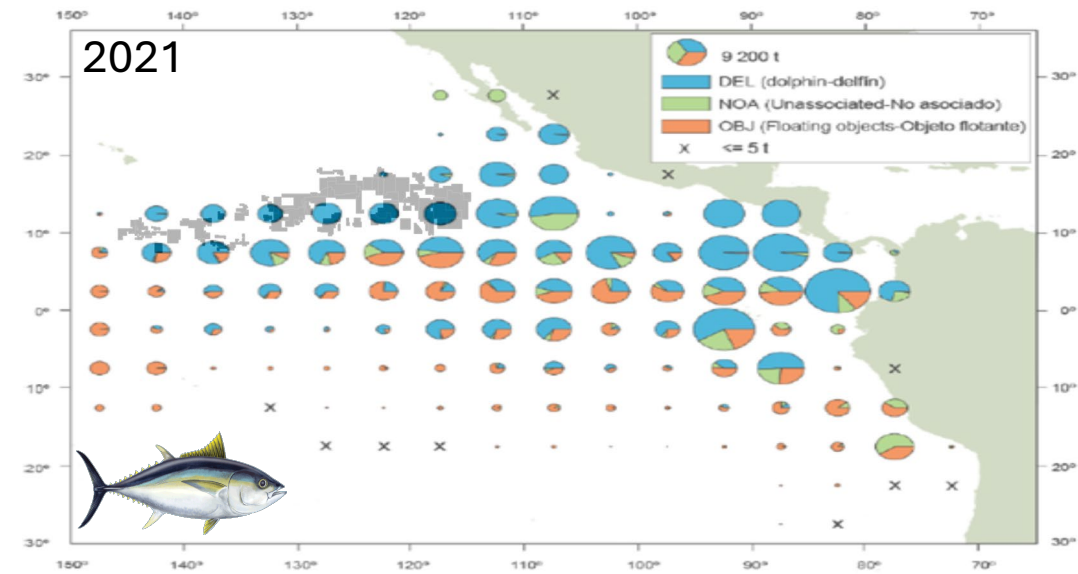
Impacts are poorly understood

- Impact pathways: sediments and metals
- Impact of midwater plume is poorly understood
 - Spatial and temporal extent much debated
 - Based on models and/or small-scale tests
 - Very little data on biological responses



Deep-sea mining areas overlap with the IATTC

- Clarion Clipperton Zone expected to be mined
- Overlap varies by Nation (van der Grient & Drazen 2021)
- Overlap may increase in the future because of climate change (Amon et al., 2023)
- Key is the discharge depth for impact pathways

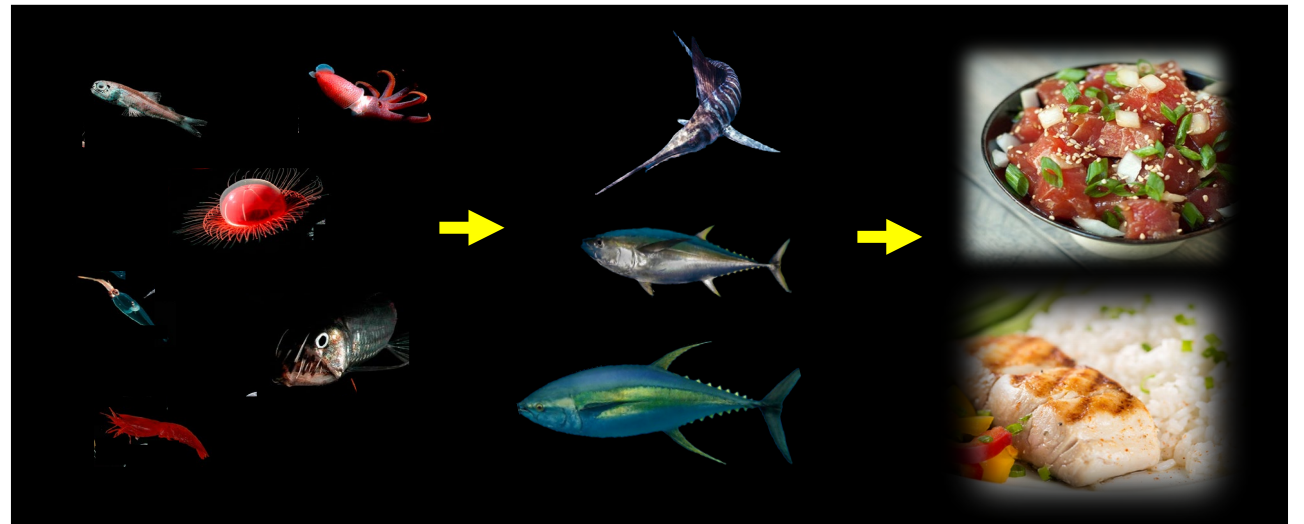


Impact pathways can be influenced via the food web

Deep pelagic fishes and squid are important prey for tunas

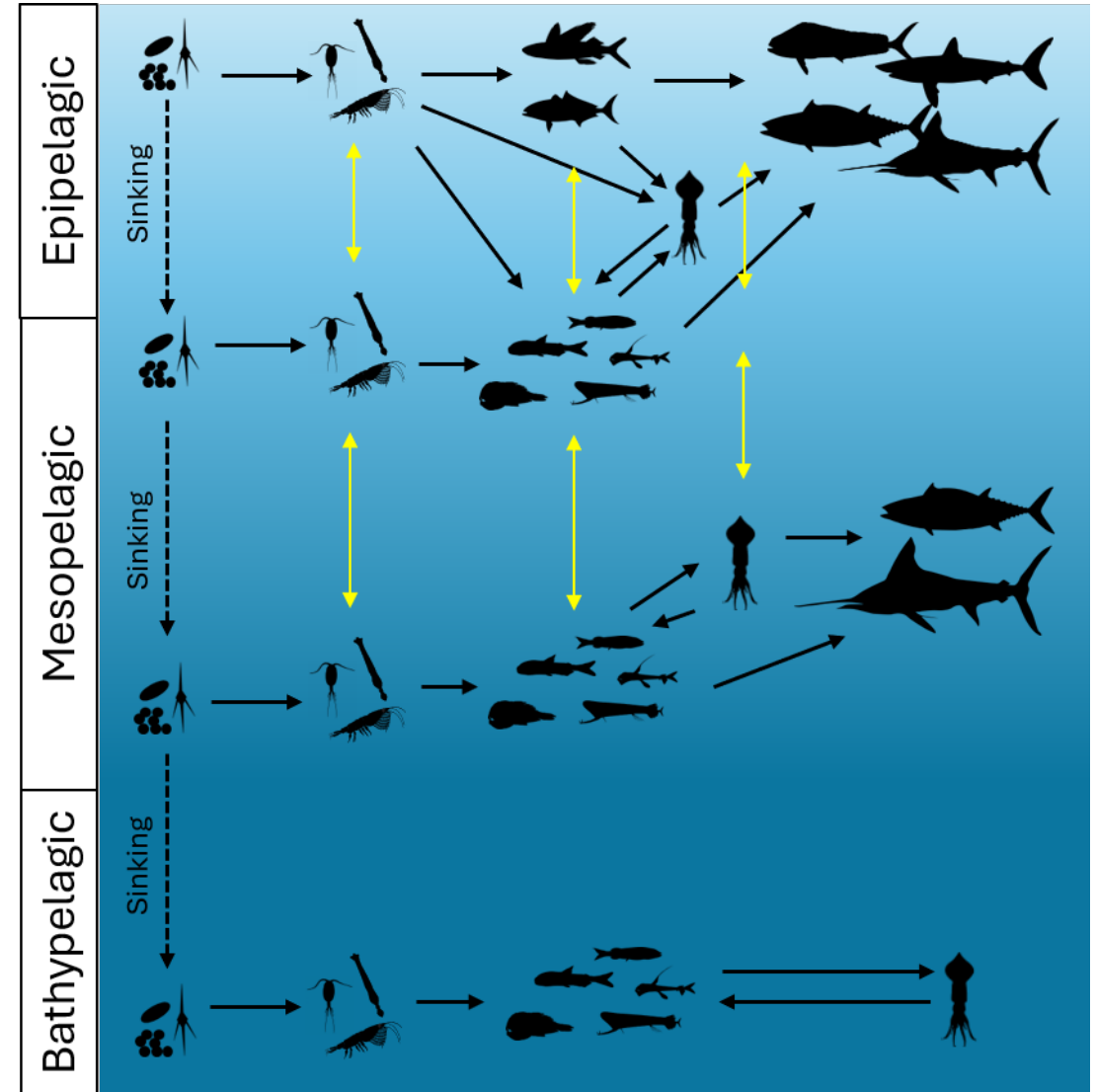
If these animals are harmed by mining, effects on fisheries include:

- Avoidance of area
- Reduced forage
- Seafood contamination via prey
 - Can potentially lead to overreaction in consumer behaviour



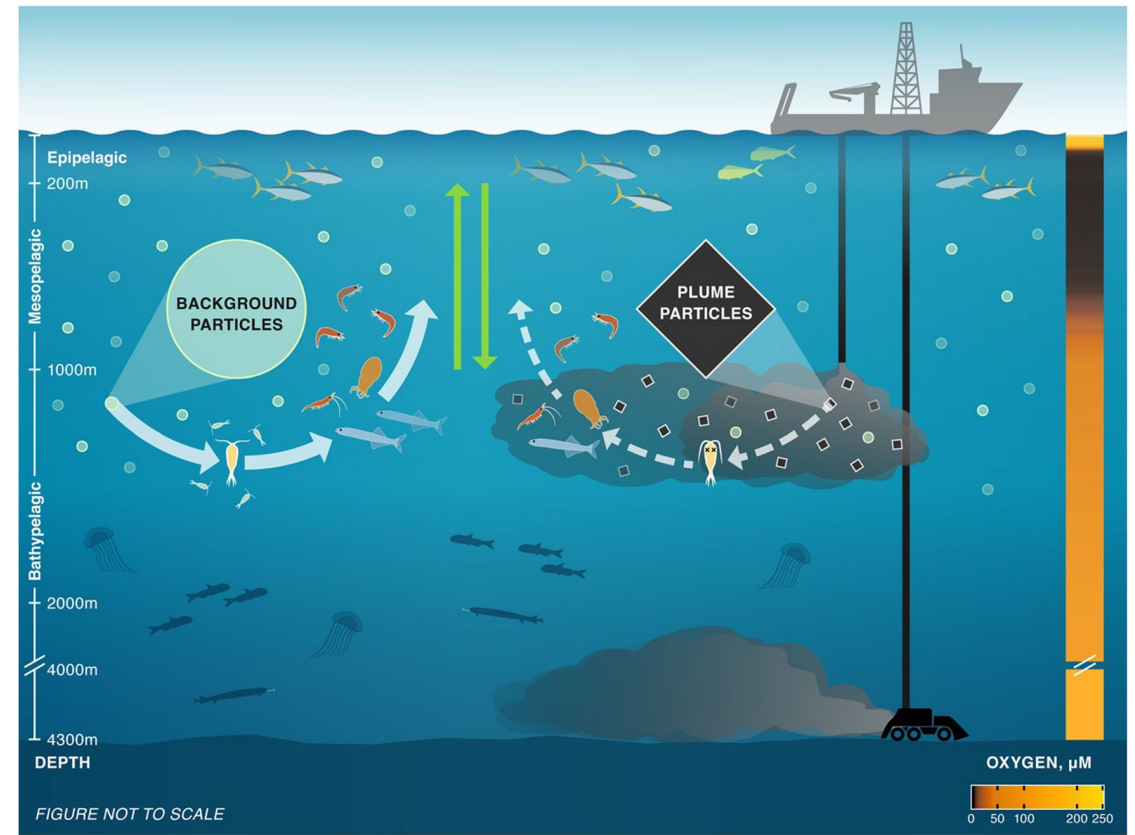
Impact pathways can be influenced via the food web

- Diurnal vertical migration vertically connects the food web
- Oceanographic dynamics influence regional variability in migration
 - Oxygen Minimum Zone (Perelman et al., 2021, Assad et al., *in press*)
 - Eddies and surface productivity (Perelman et al., 2023)



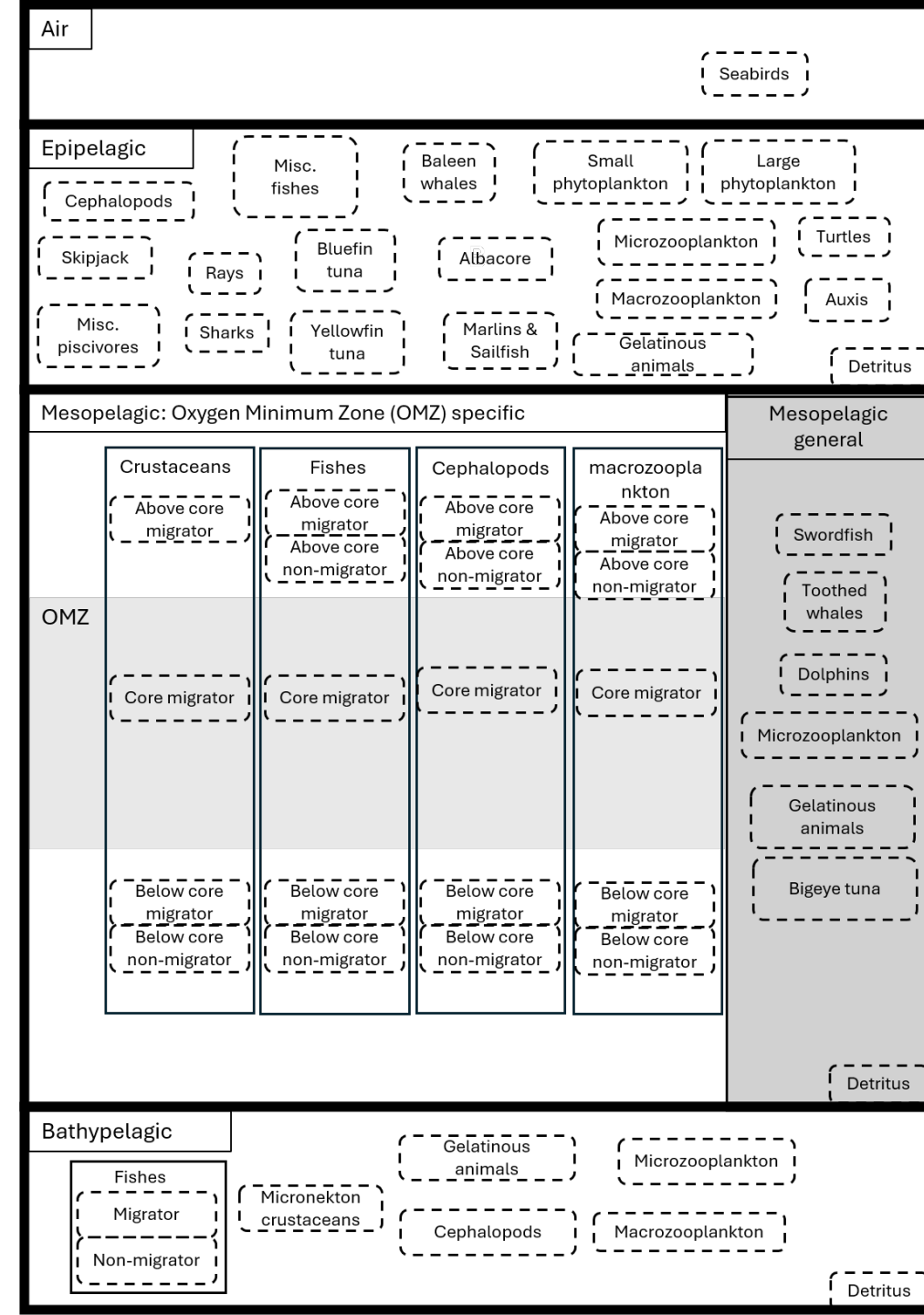
Impact pathways can be influenced via the food web

- Mining particles similar in size as natural particles (Dowd et al., 2025)
- Possible effects of natural particle dilutions (Dowd et al., 2025)
 - >50% of zooplankton feeds on particles
 - 60% of micronekton feed on zooplankton



Upcoming work

- Pelagic food-web model combining newly available CCZ data on deep pelagic and mining
- Investigates:
 - Plume effects (sediment, metal bioaccumulation)
 - Climate change
- Special interest indirect effects on tuna biomass



Recommendations for involvement

- Develop mechanisms for information exchange
 - ISA technical study only considered benthic fisheries in the CCZ, not the larger tuna fisheries
 - Deep pelagic effects need to be discussed
- IATTC staff could attend ISA meetings and engage as observers
- Encourage ISA to consider ecosystem-based management

Acknowledgements



References

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<https://doi.org/10.3389/fmars.2021.632764>
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- van der Grient & Drazen (2021) Potential spatial intersection between high-seas fisheries and deep-sea mining in international waters. *Marine Policy*, 129: 104564
<https://doi.org/10.1016/j.marpol.2021.104564>

Deep Seabed Mining Policy Update

IATTC: EBWG

Bobbi-Jo Dobush

Salt Horizon, LLC

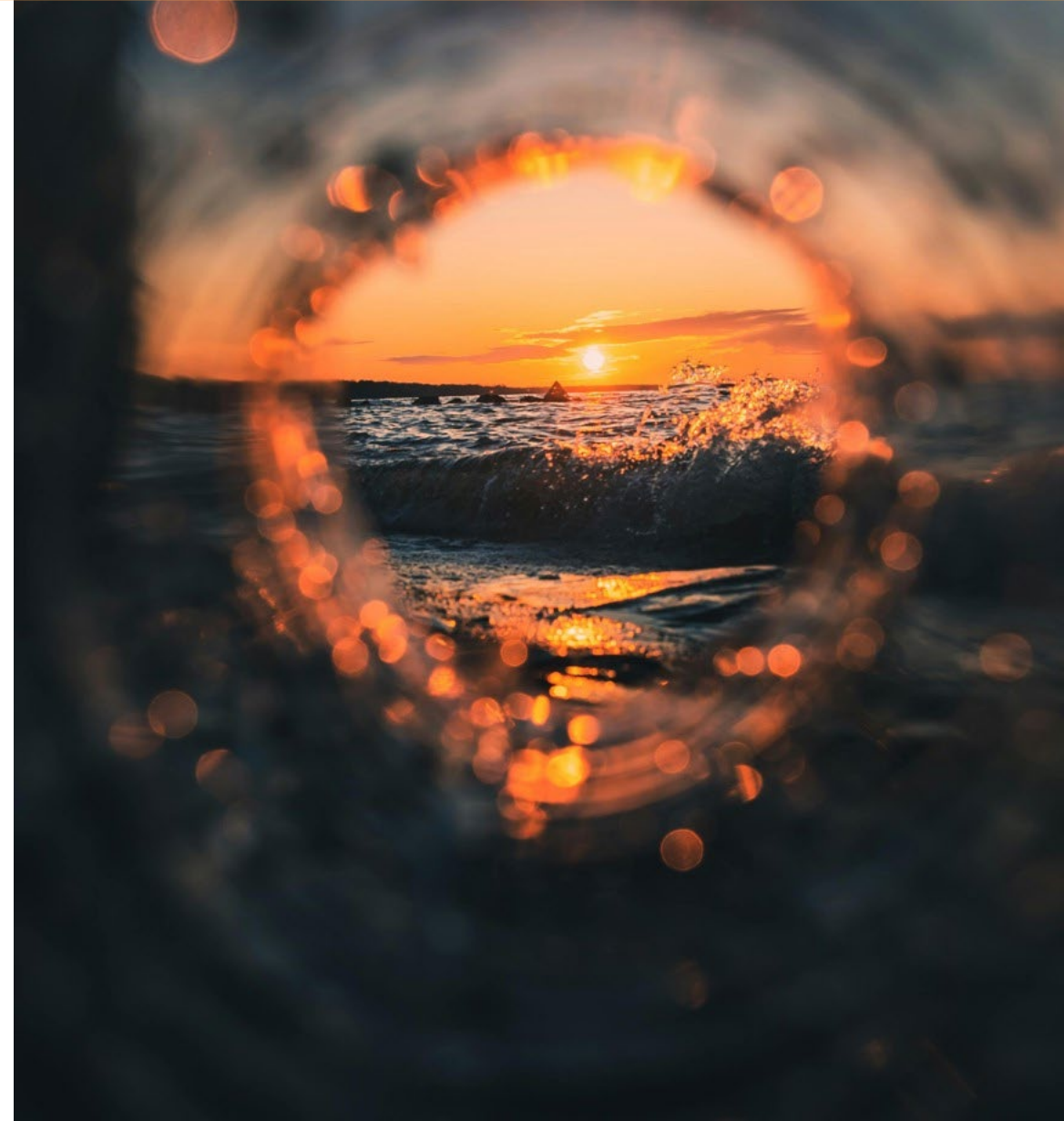
June 1, 2026



Major DSM Policy Updates 2026



- International Seabed Authority (ISA)
- US Deep Sea Hard Minerals Resources Act (DSHMRA)



Disclaimer: Neither this deck nor the presentation given are legal or financial advice; instead they provide a set of questions and considerations. Information provided may contain errors and should be confirmed.

DSM Governance: International & National Waters



- International Seabed Authority (ISA) set up in 1994 in Kingston, Jamaica
- Exploration permitted beginning in 2001
- Exploitation regulations / Mining Code currently under negotiation
- “effective protection of marine environment”
- Common heritage of humankind
- Equal opportunity/ non-discrimination

- ISA contracts running for 15+ years
- No full-scale seabed mining yet
- Currently 30+ exploration contracts issued in international waters by International Seabed Authority
- Contractors range from States, to research institutions, to private sector



Countries Evaluating DSM In National Waters Include

- Norway
- Cook Islands
- Japan
- Papua New Guinea
- Tonga
- India
- United States

ISA Update 2026



Unfinished Elements



*little discussion of fisheries impacts (driven by scientists) and no industry or RFMO presence)



The US Executive Order Re: DSM



April 24, 2025 “Unleashing America’s Offshore Critical Minerals and Resources”

NOAA to expedite process for reviewing and issues DSM exploration and commercial exploitation leases in ABNJ

- 10+ companies have applied or are applying
- The Metals Company, Inc. received a notice of “full compliance” on their exploration/exploitation application (May 2026)

NOAA Consolidated Exploration and Exploitation Permit Applications

- The Metals Company, SeaX, American Metals Resources (comment period closed February and May)
- New application from American Deep Sea Minerals, Inc. (to be posted soon)
- ***Anyone can comment on these applications***



- **Deep Seabed Hard Mineral Resources Act**
- NOAA has exclusive authority under U.S. law for deep seabed mining activities for polymetallic nodules by US Companies in **Areas Beyond National Jurisdiction (ABNJ)**

Overlap of DSHMRA areas and ISA contract areas – topic of major discussion at ISA.

Questions?

