ENVIRONMENTAL IMPACTS OF SEABED MINERAL EXTRACTION – TOWARDS A COMPREHENSIVE RISK ASSESSMENT

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Image: Stefanus Martanto

RISING DEMAND FOR NATURAL RESOURCES

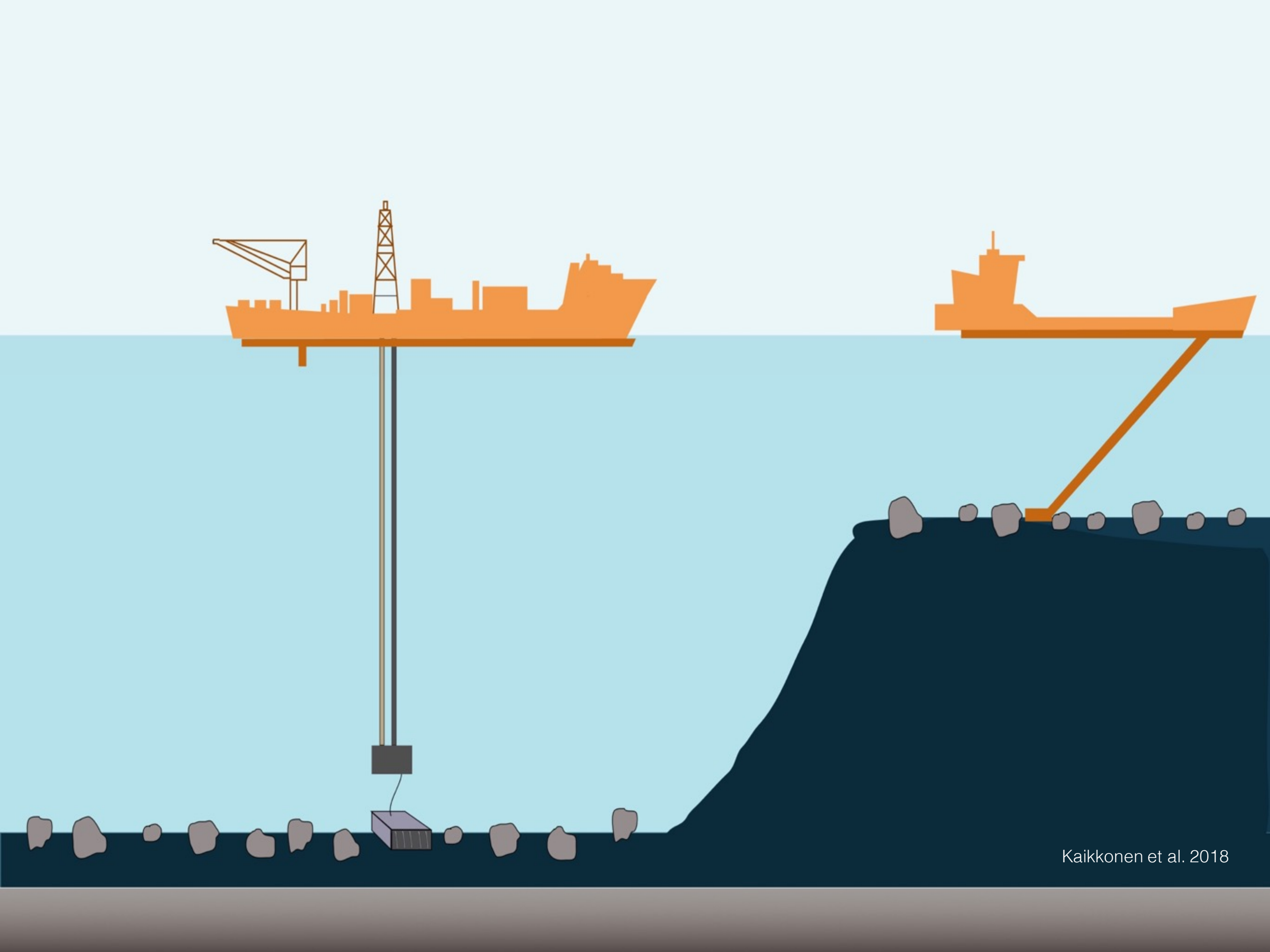
Population growth and infrastructure development increase the need for raw materials and metals for new technologies

Image: NASA

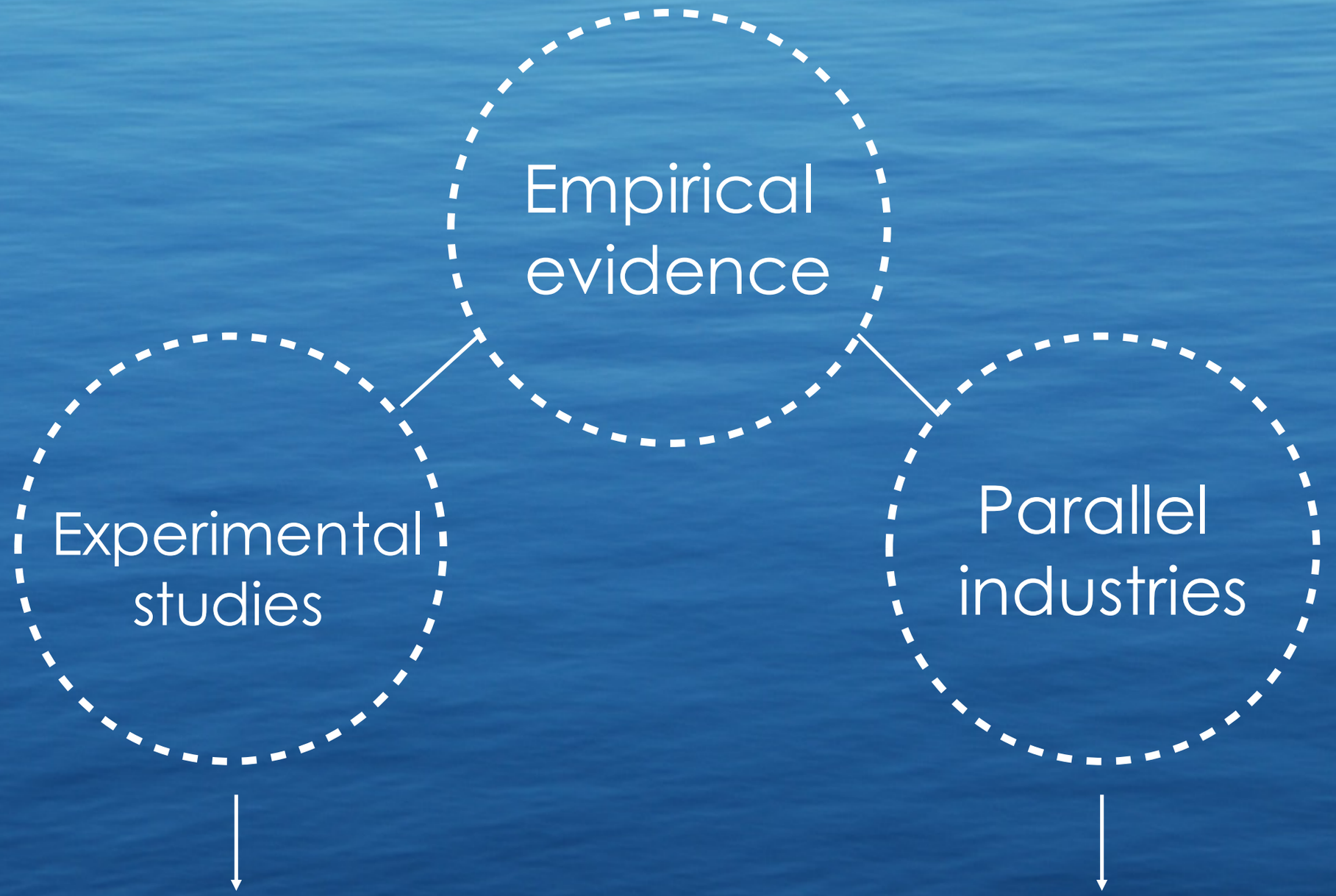
FERROMANGANESE CONCRETIONS

HOW TO ESTIMATE IMPACTS PRIOR TO EXPLOITATION?

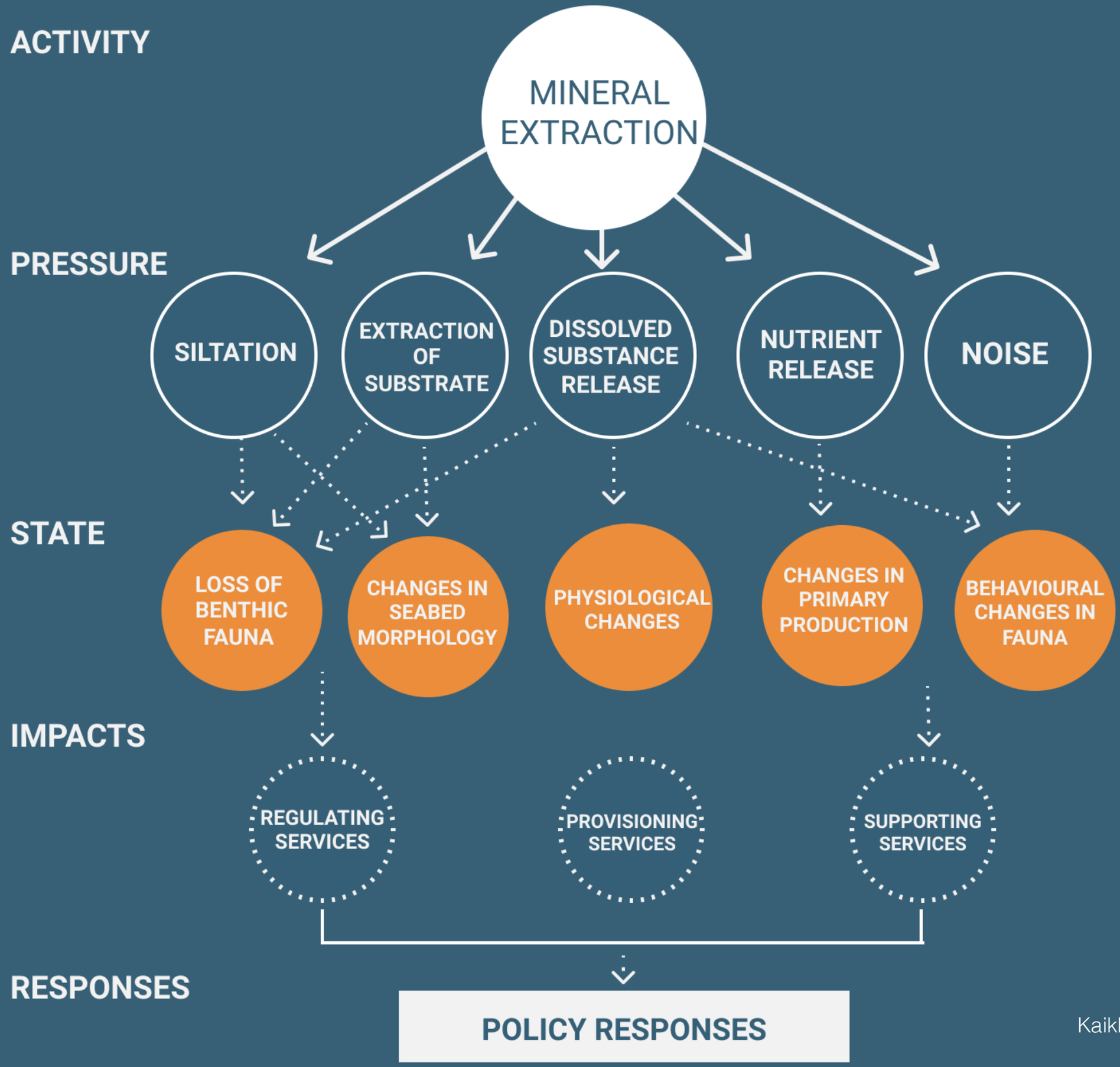
Image: Will Swann


Kaikkonen et al. 2018

HOW ARE IMPACTS ADDRESSED?



Review of the used methods and documented impacts



Kaikkonen et al. 2018

PRESSURE ⇢ STATE CHANGE

By using causal chains, further analyses on the associated **risks** may be implemented

ENVIRONMENTAL RISK ASSESSMENT

Take into consideration all **possible outcomes** and their **probabilities**

Image: Jeremy Bishop

KNOWLEDGE GAPS

Implications for environmental risk assessments

Image: Jeremy Bishop

ROLE AS HABITAT

Image: GEOMAR

CONCRETION
DISTRIBUTION

SPATIAL
REPRESENTATIVITY

ASSOCIATED
ORGANISMS

CONCRETION
DISTRIBUTION

SPATIAL
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ROLE AS
HABITAT

CONCRETION
DISTRIBUTION

SPATIAL
REPRESENTATIVITY

ASSOCIATED
ORGANISMS

ROLE AS
HABITAT

ECOLOGICAL
FUNCTIONS

INTEGRATING ECOSYSTEM SERVICES INTO THE IMPACT ASSESSMENT

Habitat characteristics

Ecosystem services

Valuation & Management

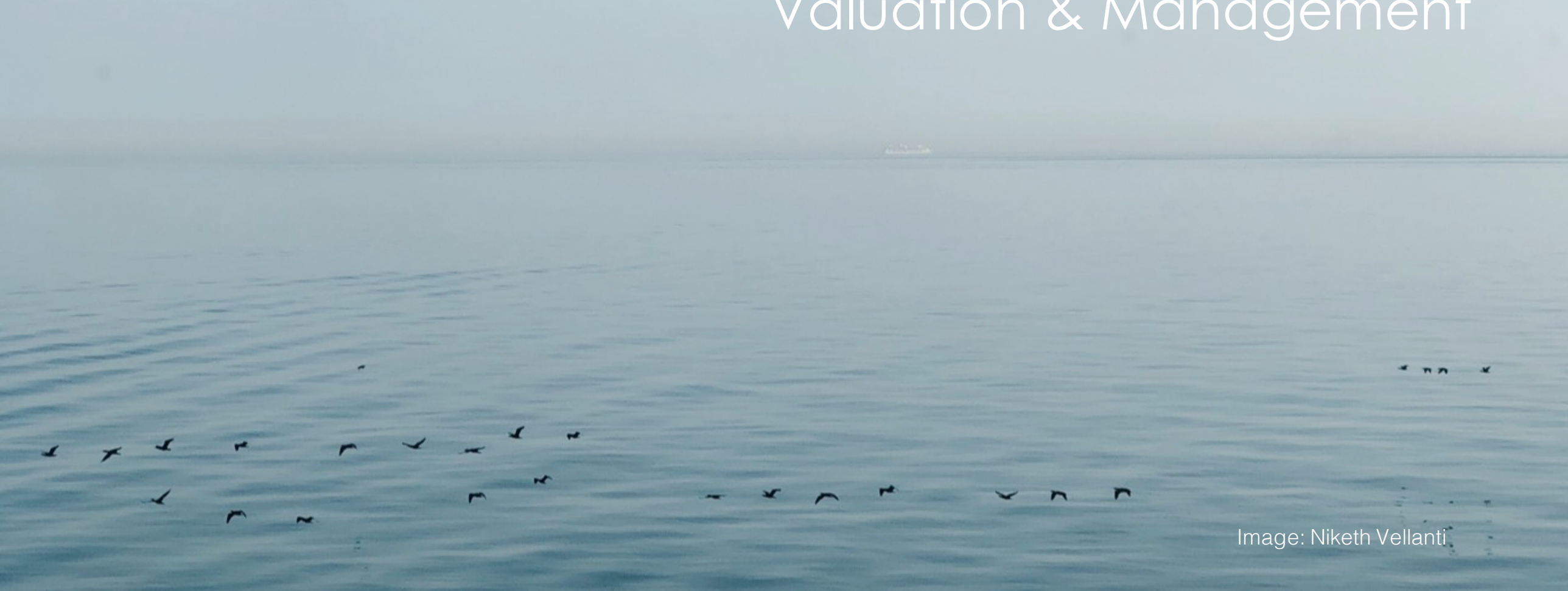

Image: Niketh Vellanti

RISK ASSESSMENT TO SUPPORT STRATEGIC DECISION MAKING IN MARINE GOVERNANCE

Image: Matt Hardy

TOWARDS A COMPREHENSIVE IMPACT ASSESSMENT

Exploitation of seabed minerals may proceed
quicker than scientific knowledge on the environmental impacts.

We use a problem-structuring framework to review
causal relationships between pressures caused by mineral extraction
and the associated changes in marine ecosystems.

This work examines the missing links for comprehensive impact assessments
including the habitat role of the mineral deposits and the long-term impacts.

Kaikkonen, L., Venesjärvi, R., Nygård, H., & Kuikka, S. (2018).
Assessing the impacts of seabed mineral extraction in the deep sea
and coastal marine environments: Current methods and
recommendations for environmental risk assessment. *Marine pollution
bulletin*, *135*, 1183-1197.

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