



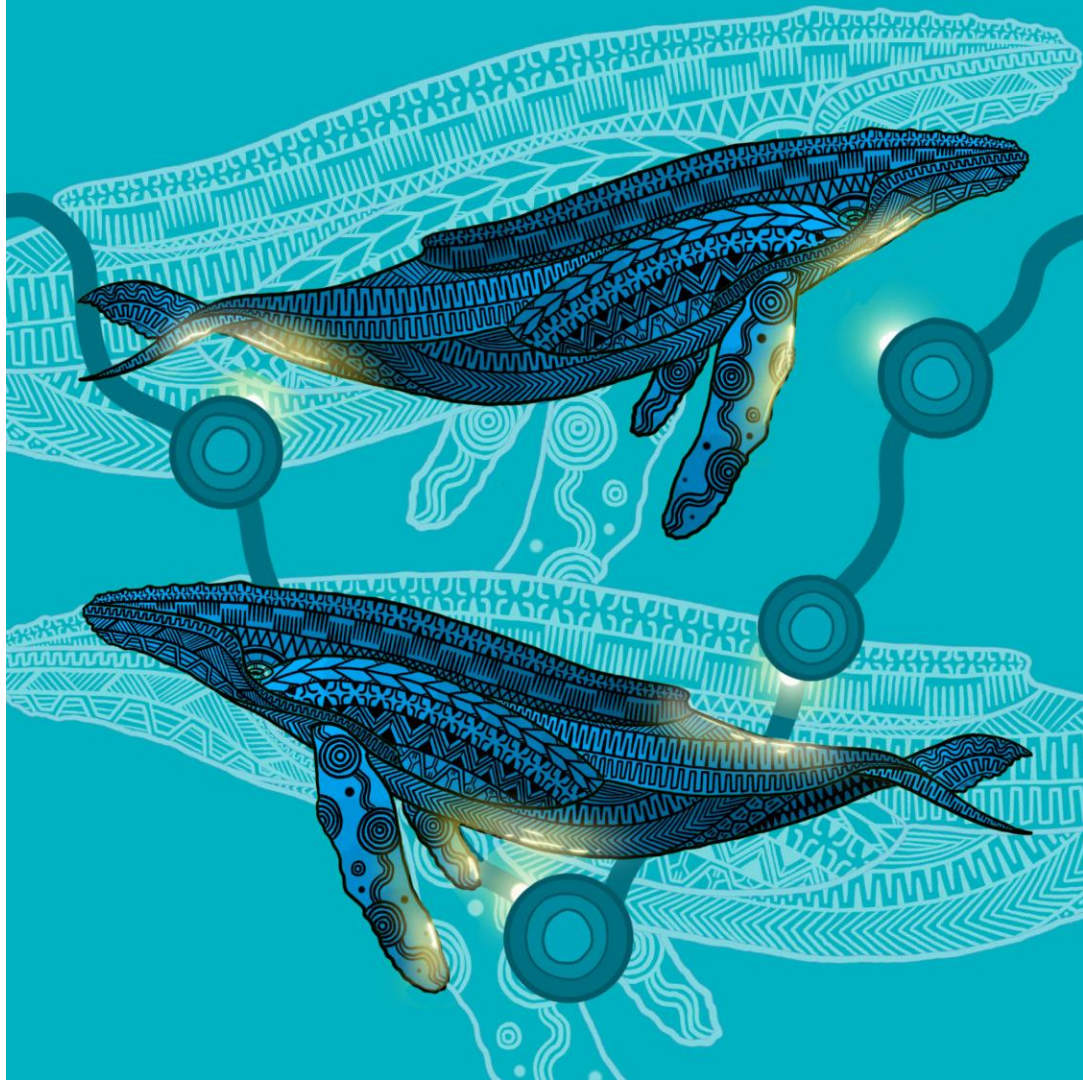
My risk \neq Your risk

Collaborative approaches to
navigating different risk
perspectives in decision making for
marine social-ecological systems

Jess Melbourne-Thomas & Debbi Pedreschi

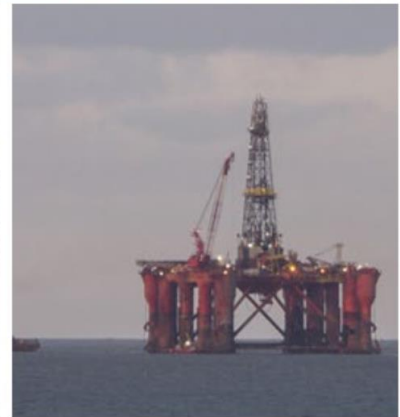
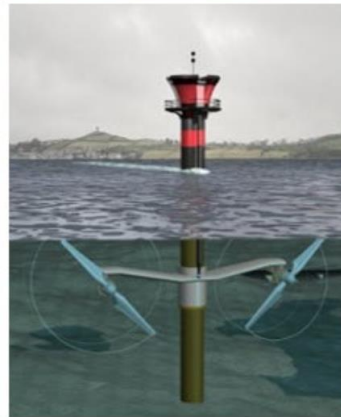
MSEAS 2024







A new risk landscape for marine spaces



'Astounding' ocean temperatures in 2023 intensified extreme weather, data shows

Record levels of heat were absorbed last year by Earth's seas, which have been warming year-on-year for the past decade

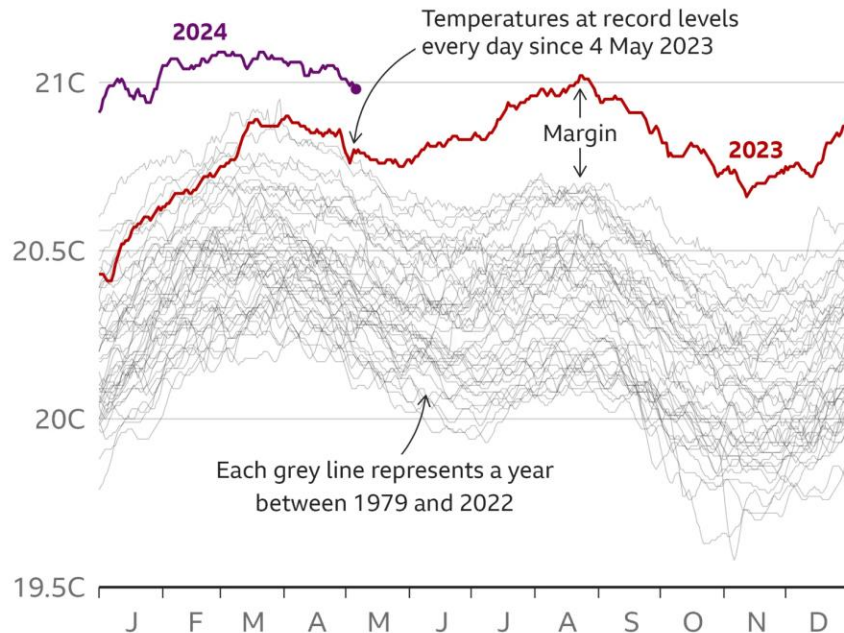


📹 Cyclone Freddy, the longest-lived cyclone ever recorded, battering Blantyre in Malawi last year. Photograph: Thoko Chikondi/AP

“Astounding” ocean temperatures in 2023 supercharged “freak” weather around the world as the climate crisis continued to intensify, new data has revealed.

A year of record-breaking ocean temperatures

Daily average sea surface temperature, 1979-2024



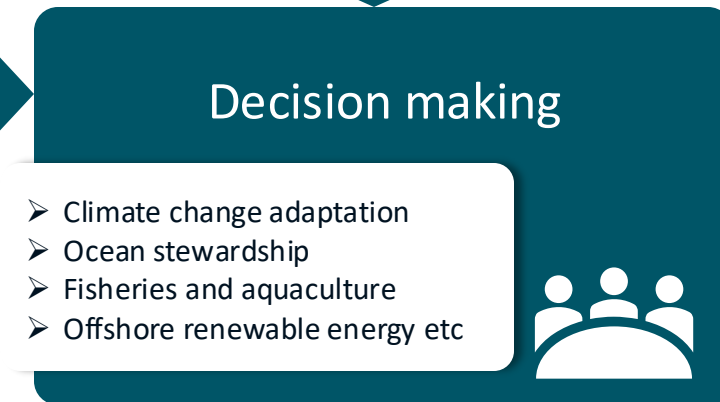
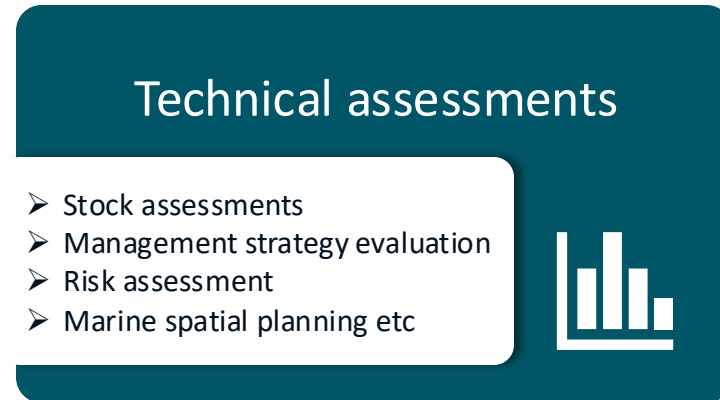
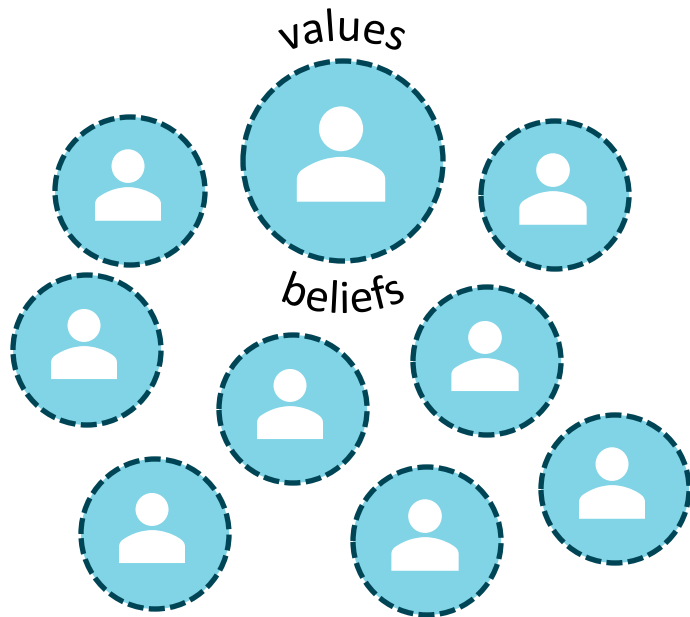
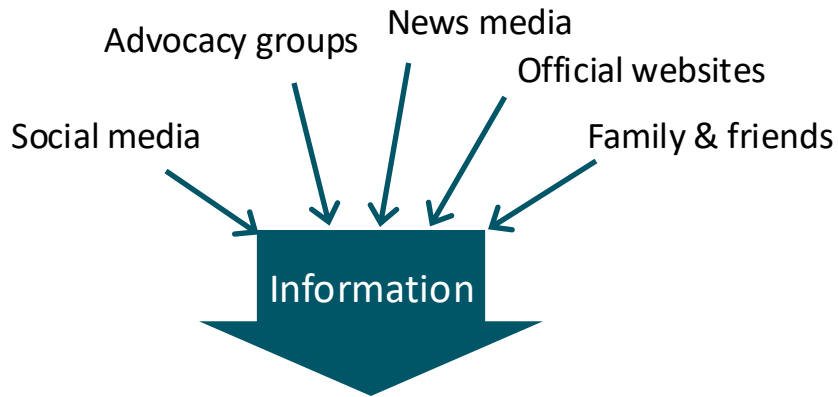
Temperatures measured between latitudes 60° North and 60° South

Source: ERA5, C3S/ECMWF



Diverse connections, values, needs, knowledge



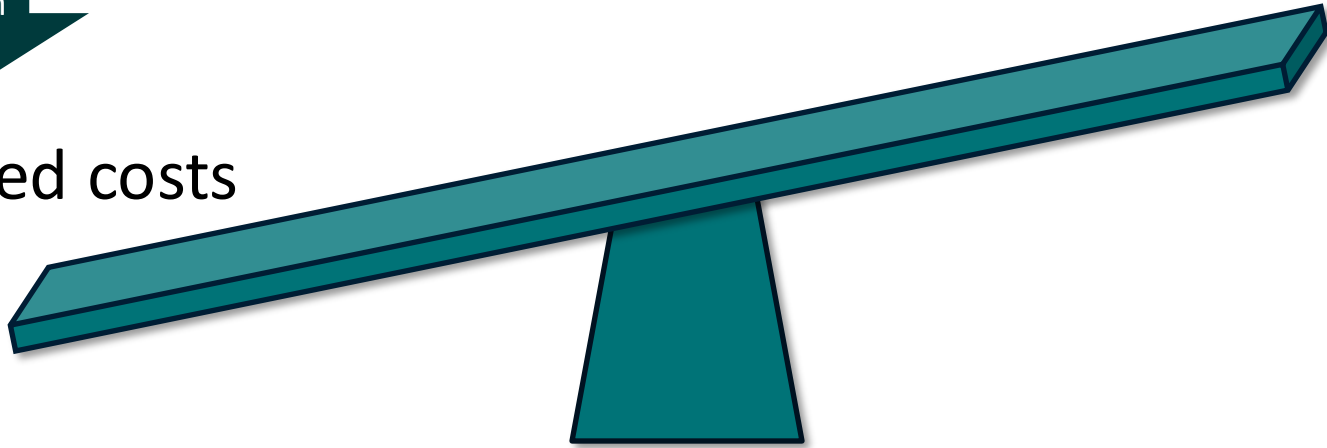




Tipping the balance for risk perception?

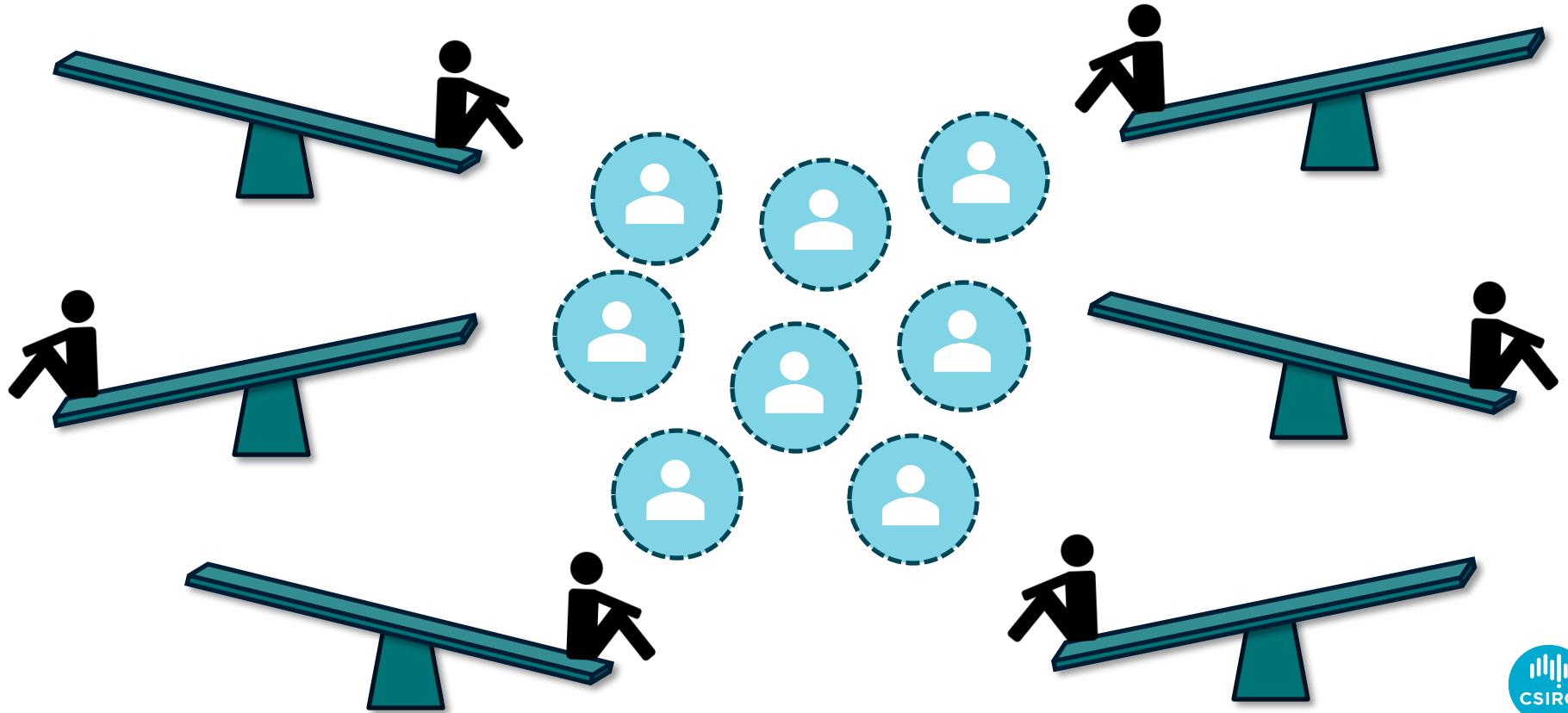


Perceived costs



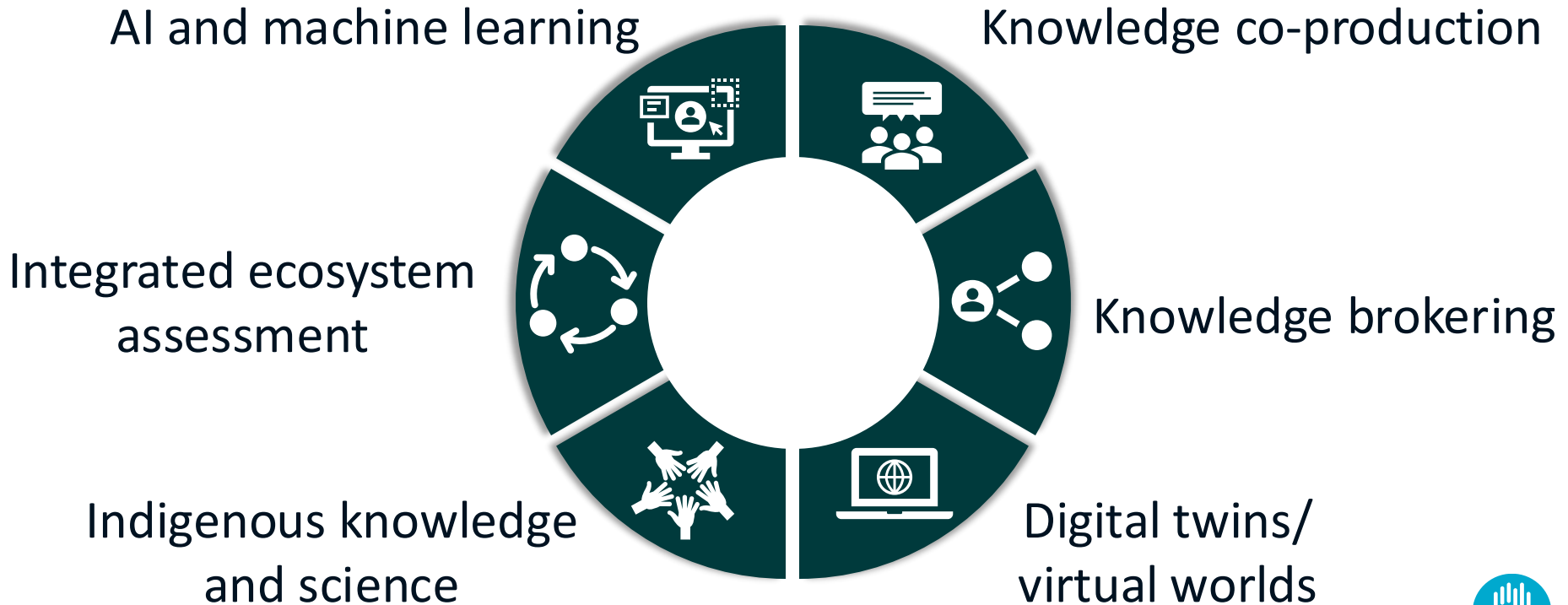
Potential benefits

There are lots of seesaws to balance...





An evolving toolkit to meet the challenges



Knowledge co-production

Co-developing decision support tools



Knowledge brokering



Digital twins/
virtual worlds



Indigenous knowledge
and science



Integrated ecosystem
assessment



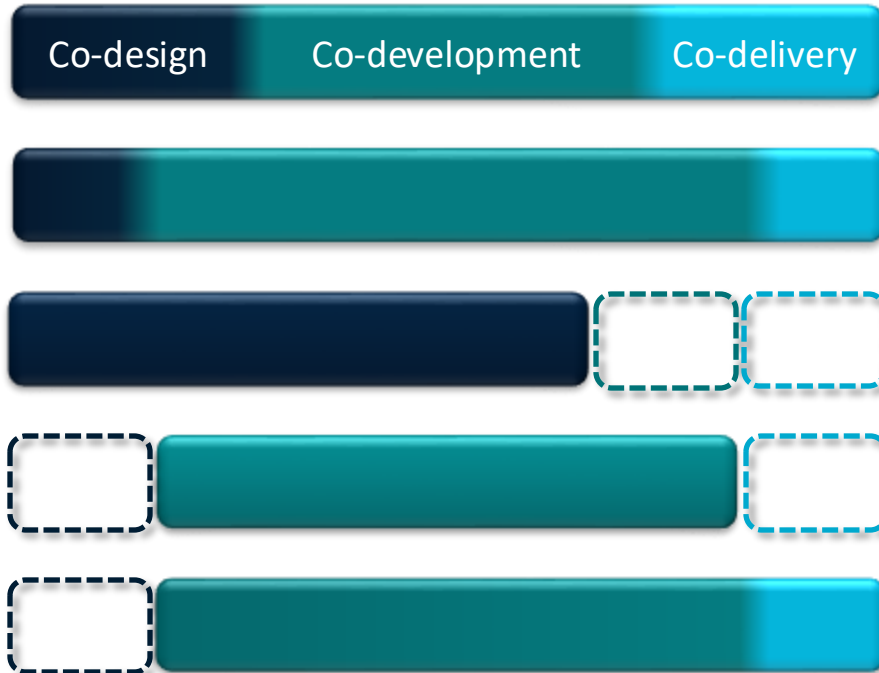
AI and machine learning

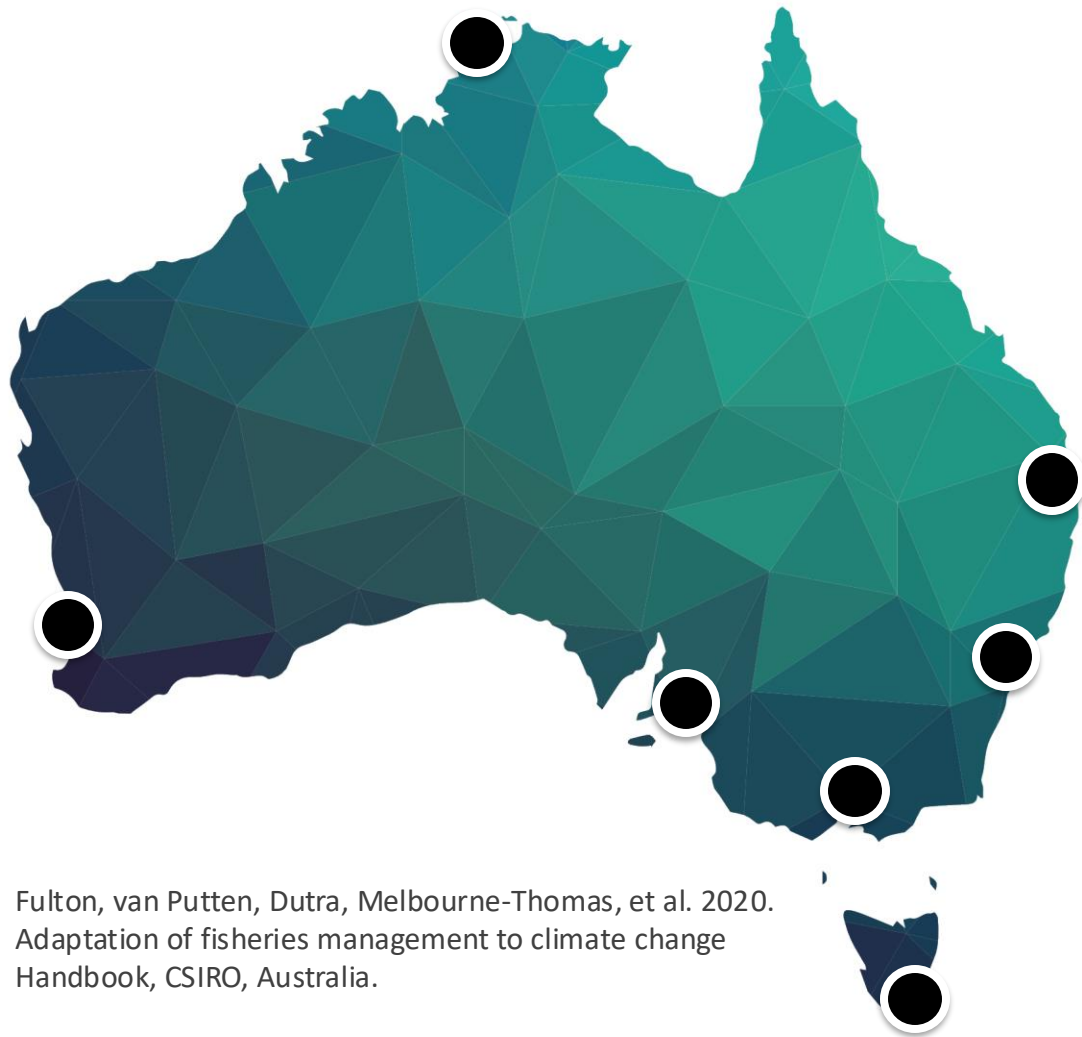


Co-Design
Setting joint research agendas, research questions and planning implementation

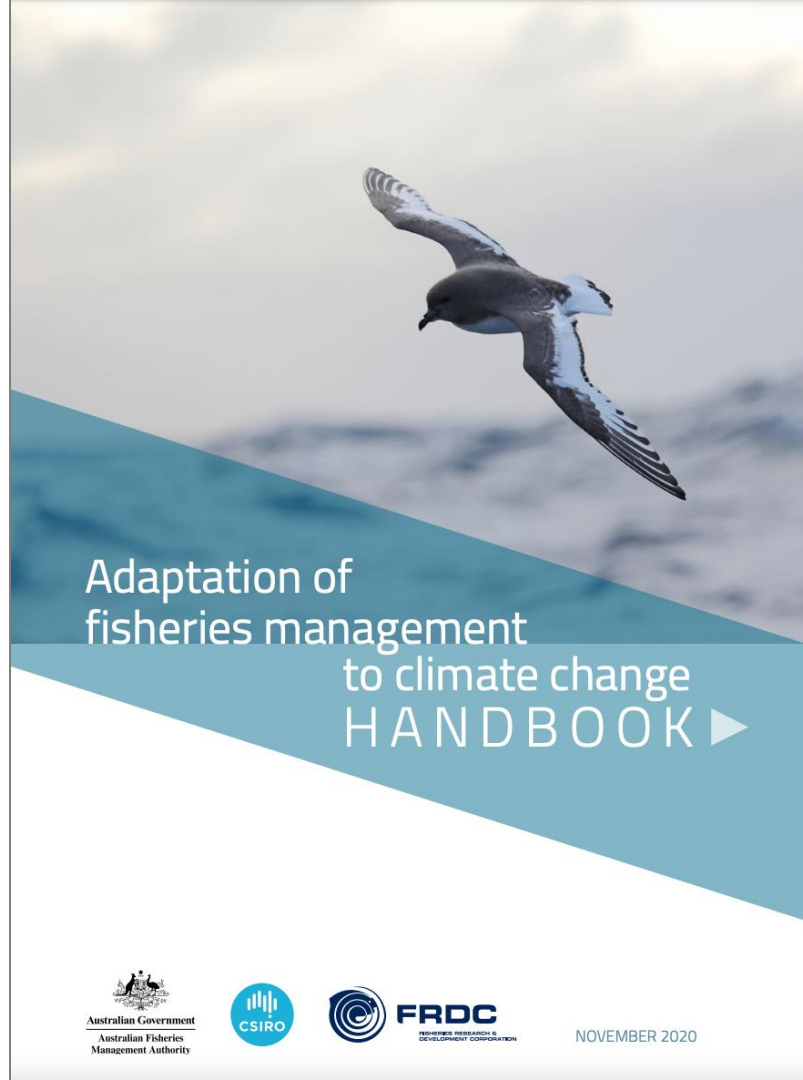
Co-Development
Working alongside clients, stakeholders and collaborators to produce new knowledge to solve a particular problem

Co-Delivery
Participating with clients, stakeholders and collaborators to apply and maintain aspects of the completed project in industry or community





Fulton, van Putten, Dutra, Melbourne-Thomas, et al. 2020.
Adaptation of fisheries management to climate change
Handbook, CSIRO, Australia.

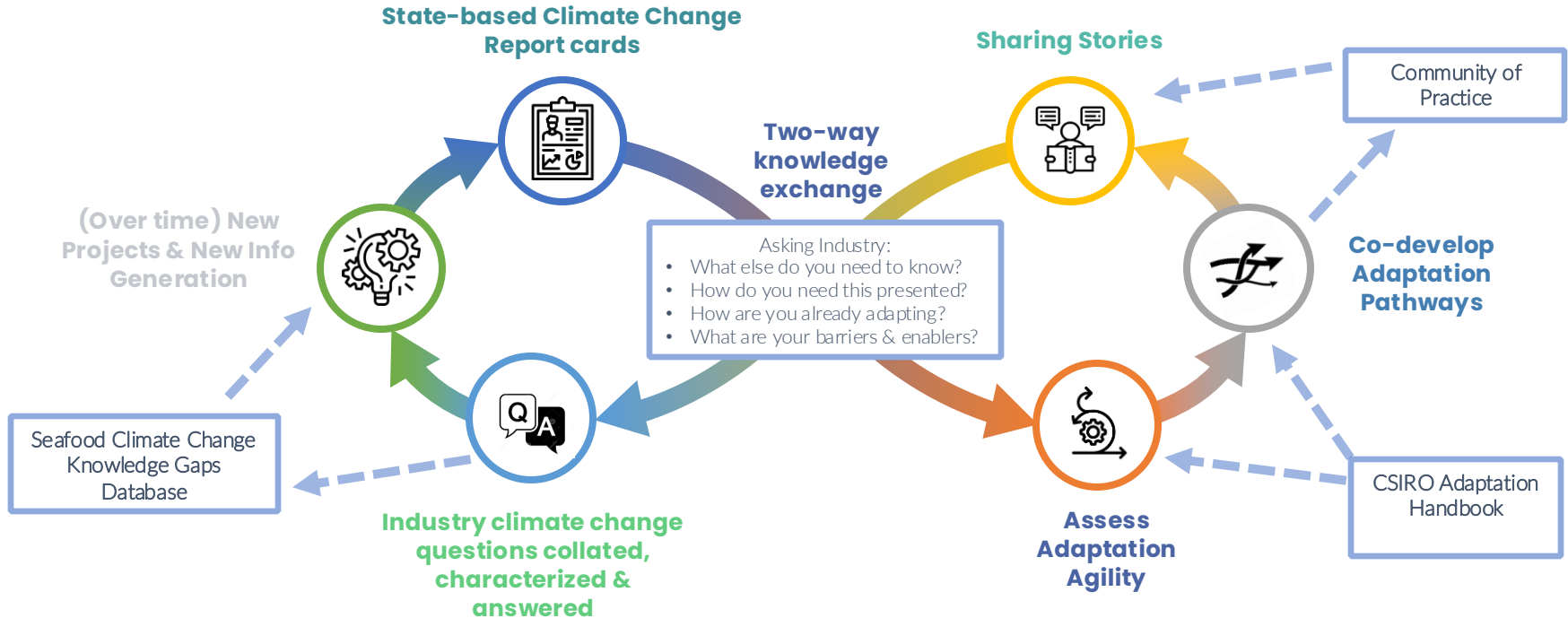


Adaptation of fisheries management to climate change HANDBOOK ▶



Sea Change

Co-developing pathways to mitigate and adapt to a changing climate for fisheries and aquaculture in Australia



AI and machine learning



Knowledge co-production



Integrated ecosystem
assessment



Knowledge brokering



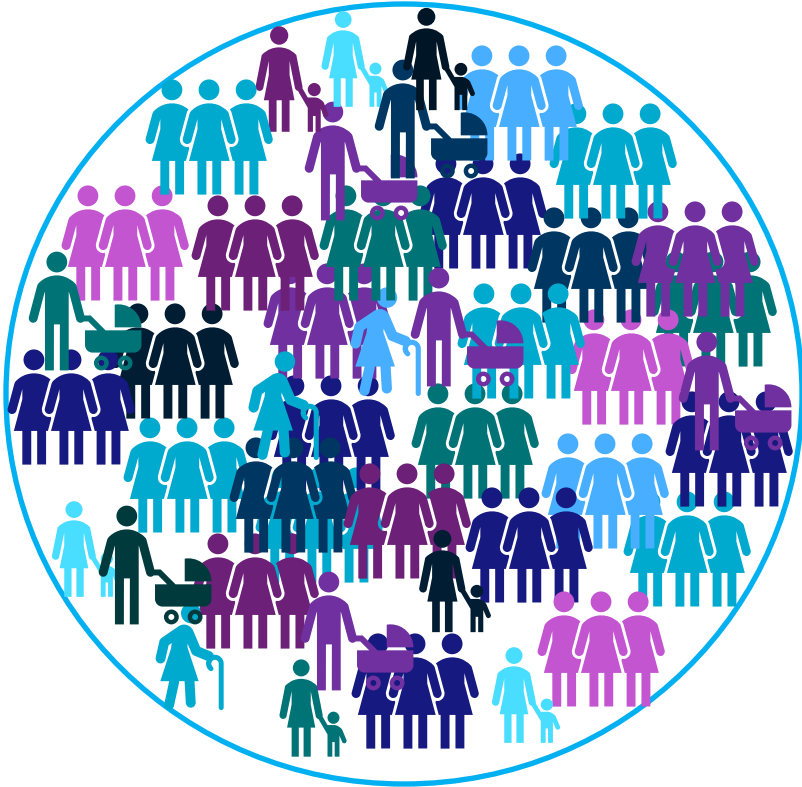
Indigenous knowledge
and science



**Digital twins/
virtual worlds**

Social influence
modelling

What is a social influence model?



Real world



Representation to guide decision making



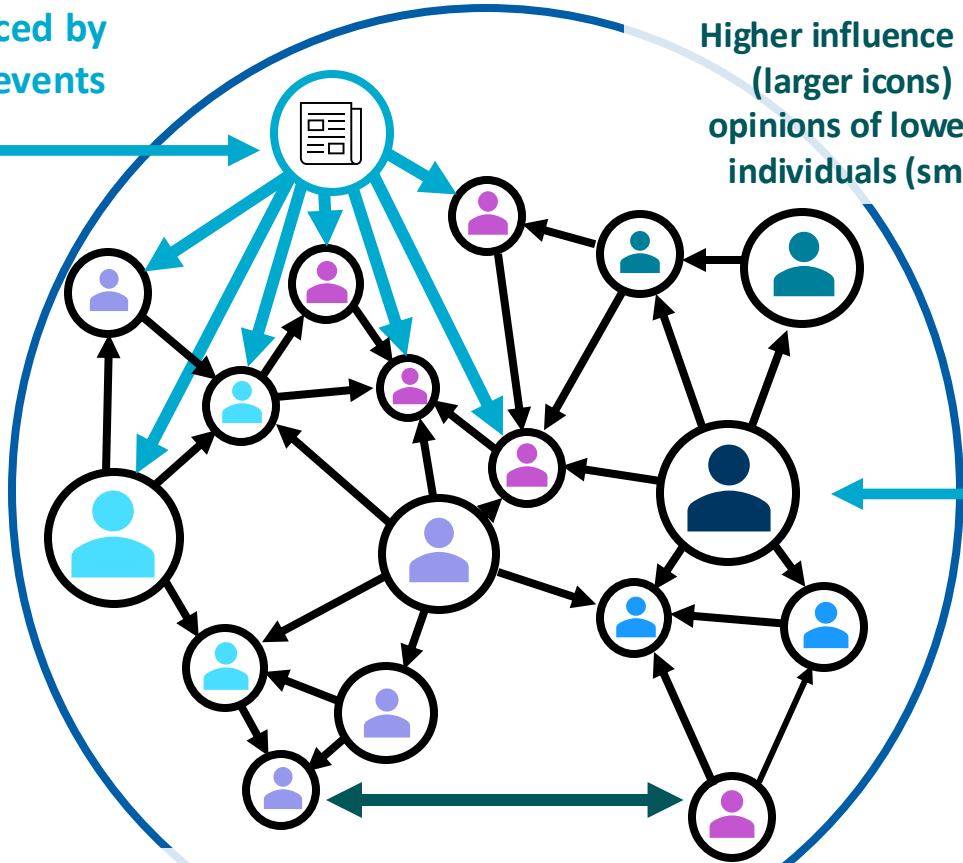
Virtual world



Agent-based bounded-confidence network model developed in netlogo

Influenced by external events

Higher influence individuals (larger icons) modify the opinions of lower influence individuals (smaller icons)



No influence where opinion separation exceeds the confidence threshold

AI and machine learning

Knowledge co-production

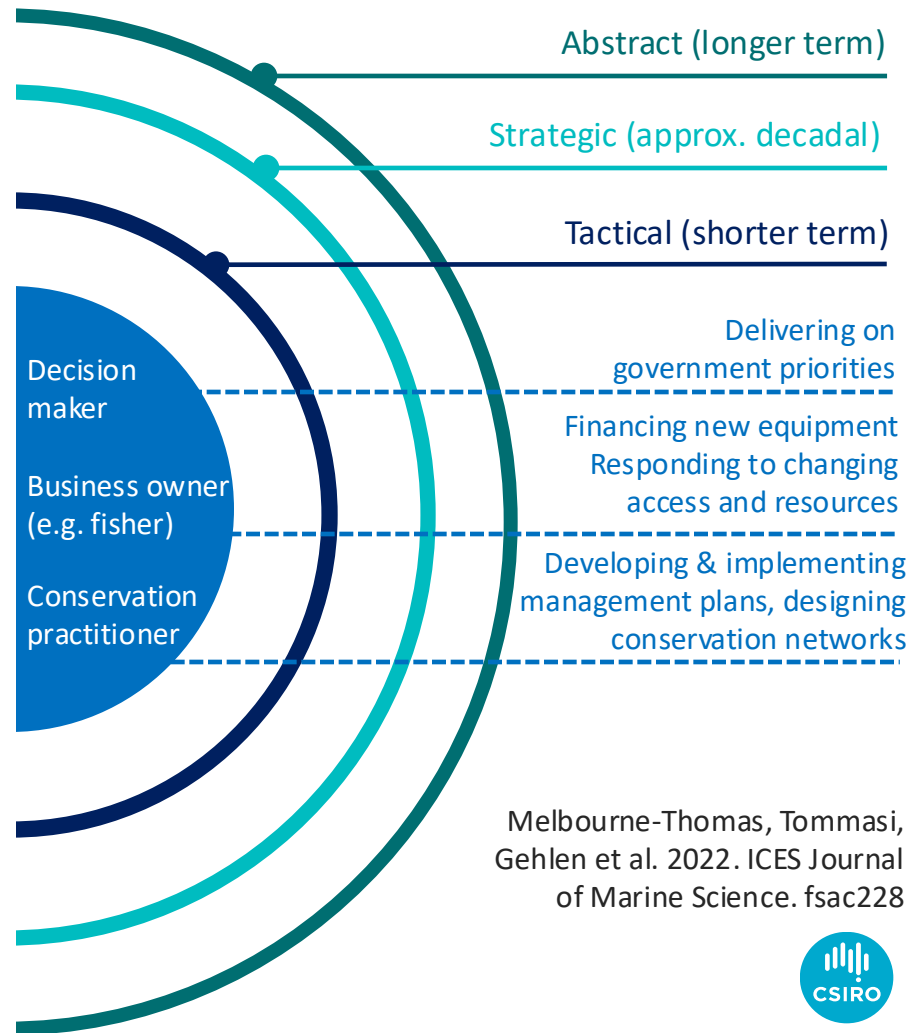
Integrated ecosystem
assessment

Knowledge brokering

Indigenous knowledge
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Digital twins/
virtual worlds





Close (somewhat important
– feels more 'distant' in time)

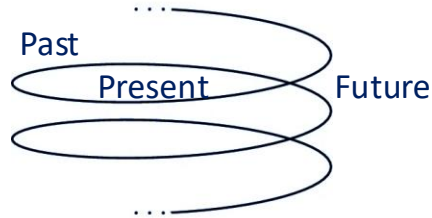
e.g. meeting a researcher,

Closer (culturally important
– more immediate in time)

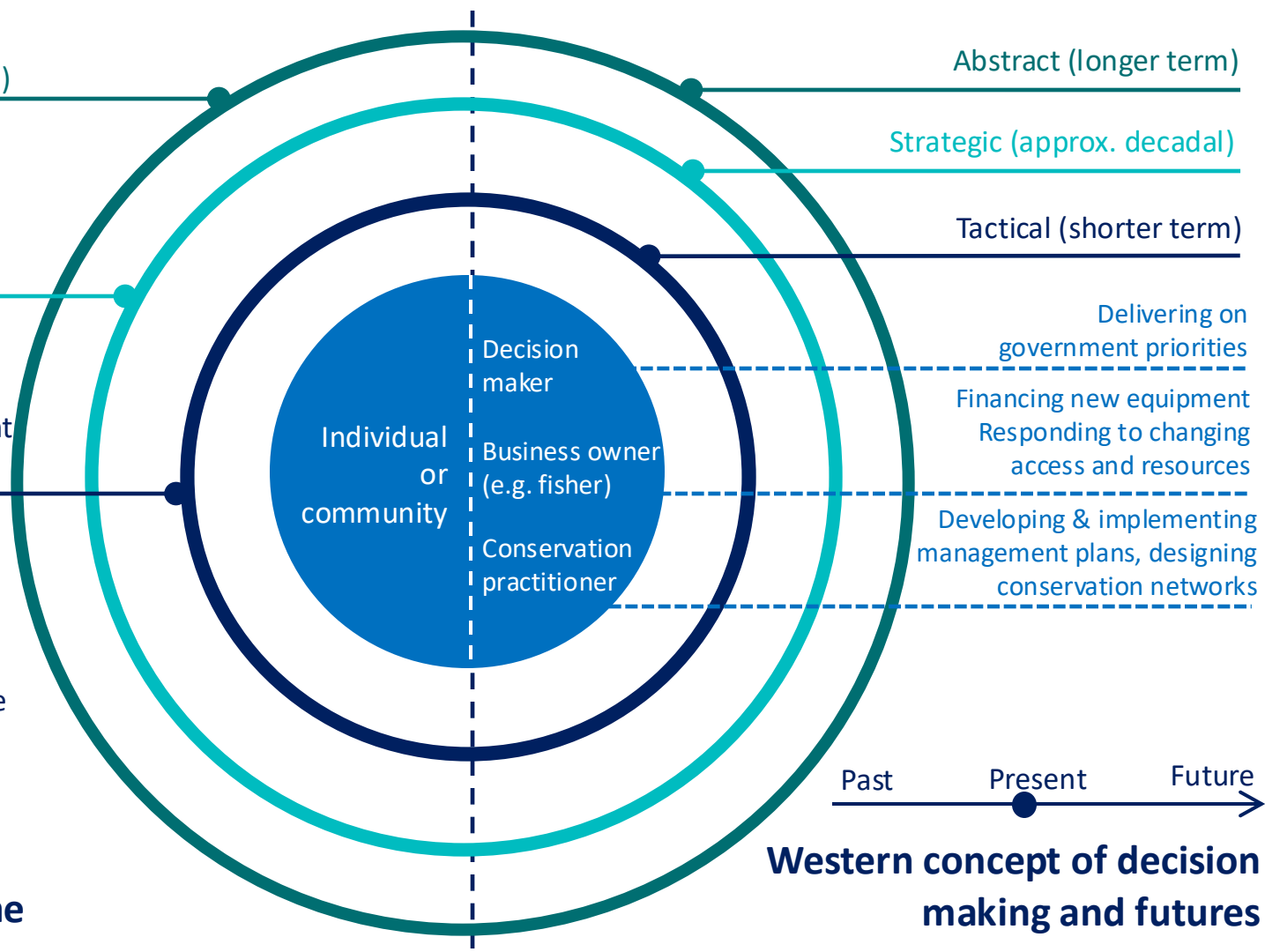
e.g. seasonal indicator,
customary harvest

Closest (personally important
– always feels recent)

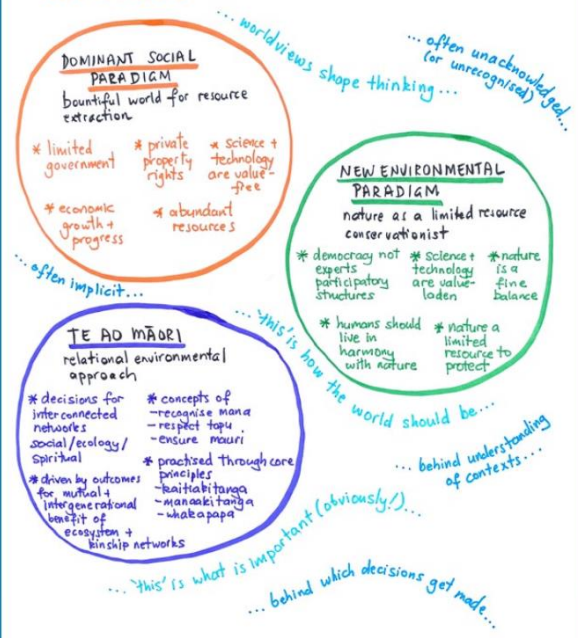
e.g. death of a loved one,
colonisation



**Example Indigenous
concept – cyclical time**



RISK and UNCERTAINTY are perceived relative to worldviews



WORLDVIEWS

Ask: What worldviews do I identify with?

Then: What risks make sense in my worldview?

What risks make sense for other worldviews?

Risk perception depends on where you stand



situated knowledge of experience in place

POSITIONALITY

Ask: What positionalities do I occupy now and at other times?

Then: How does where I stand affect my perception or risk?

What might other people think is risky because of their situation?

How have you been taught to understand risk?

Law. Has it been done before?



what is case law?

Economy.

How much will it cost to fix?



Ecology.

what might happen to the ecosystem?



Disciplinary training shapes perceptions of risk + questions asked

DISCIPLINES

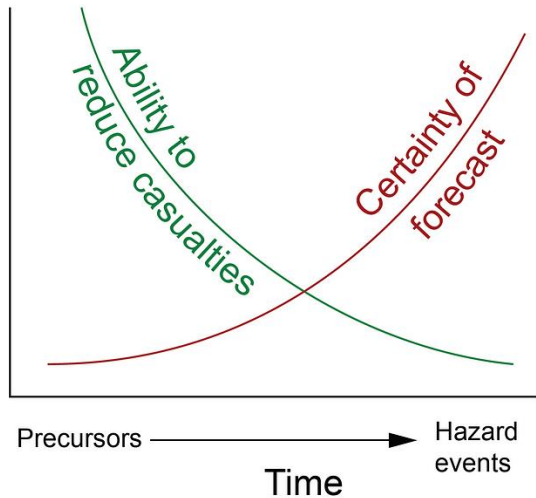
Ask: How have I been taught to understand risk through my education and training?

Then: How does this affect the way I think about what is risky?

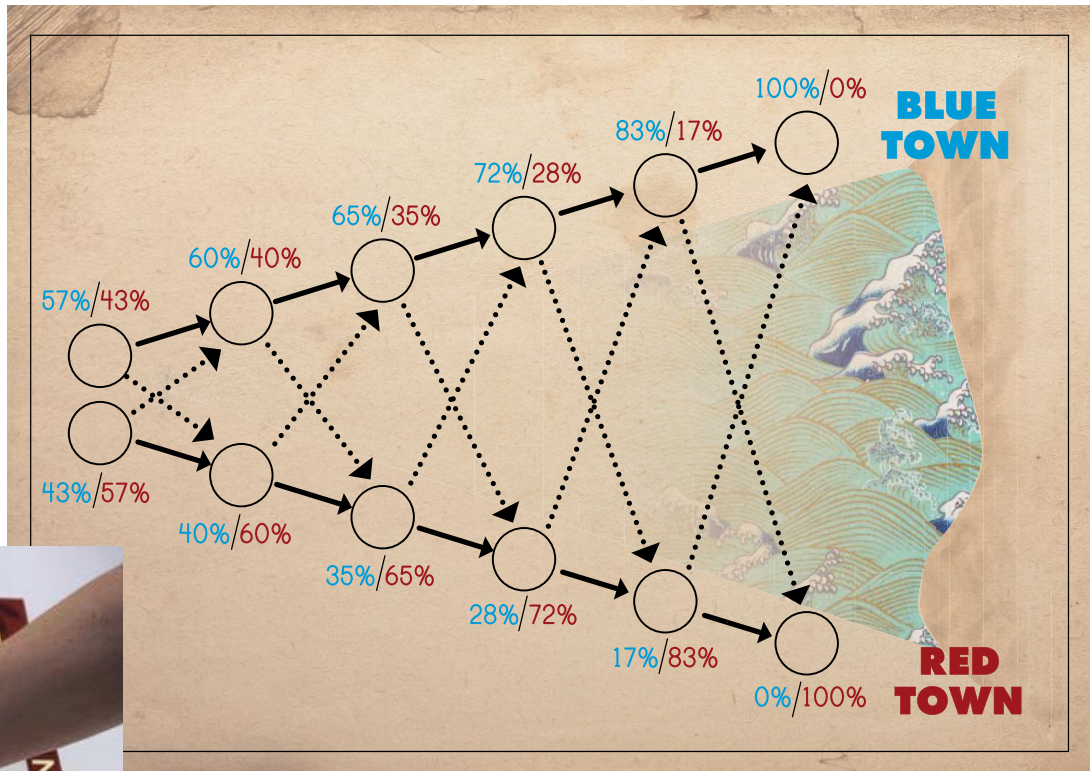
What might people who have been trained in different disciplines think is risky?



Brigette Wright



Jamie McCaughey



Boho Interactive & Earth Observatory Singapore



Thank you

Acknowledgements

Corrine Condie, Emily Ogier, Nathan Harrison

