

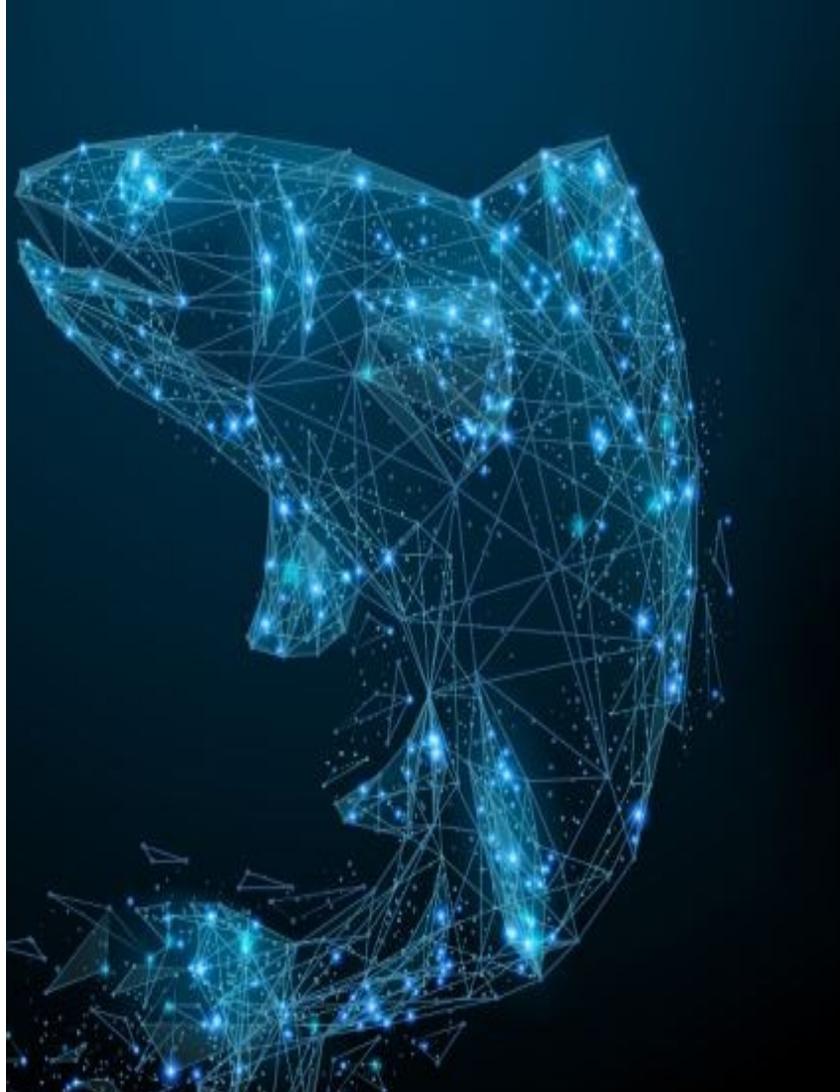


RISK & MCS

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Who we are

Australia's national science agency



One of the world's largest multidisciplinary science and technology organisations



5,600+ dedicated people working across 53 sites globally



State-of-the-art research infrastructure



550 international collaborators in 69 countries

Solving the greatest challenges through innovative science and technology



Research and capability relevant to food systems



Agriculture and food



Environment



Manufacturing



Oceans and fisheries



Energy



Digital and data solutions



Biosecurity



Transport logistics



Human health & nutrition



Definition	Reference
The objectified uncertainty regarding the occurrence of an undesirable event	Willett (1901)
Measurable uncertainty	Knight (1921)
A measure of the probability and severity of adverse effects	Lowrance (1976)
The probability that a consequence will occur	Rasmussen (1981)
The probability of harm	Wachbroit (1991)
The magnitude of an adverse event multiplied by the likelihood of its occurrence	Mullin and Bertrand (1998)
The combination of the magnitude of an adverse event and the probability of its occurrence	Environmental Risk Management Authority (1999)
The probability of future loss	Byrd and Cothorn (2000)
The combination of the probability of an event and its consequences	ISO/IEC (2002)
The probability of occurrence of an undesired event	van Straalen (2002)
The chance, within a time frame, of an adverse event with specific consequences	Burgman (2005)
The probability of an unwanted outcome or consequence occurring	Wooldridge (2008)
The effect of uncertainty on objectives	ISO (2009)
An objective measure of the product of the likelihood and consequences of	World Health Organisation

RISK = The Probability of Loss



Some uses ...

“The Index does not estimate the volume of IUU catch but provides the basis for assessing IUU fishing risk across 152 individual coastal States, based on a suite of 40 indicators that are periodically re-sampled ..”

“If we, the traditional fishermen, violate the MOU Box borders, the risk is that our boats would be caught and burned in the middle of the sea. That’s the risk ..”

“Results suggest that a country’s risk of illegal fishing is positively related to the number of commercially significant species found within its territorial waters and its proximity to known ports of convenience. ..”

“That is ‘in seeking to benefit themselves, offenders do not always succeed in making the best decision because of the risk and uncertainty involved’ ..”



Why MCS and Risk ?

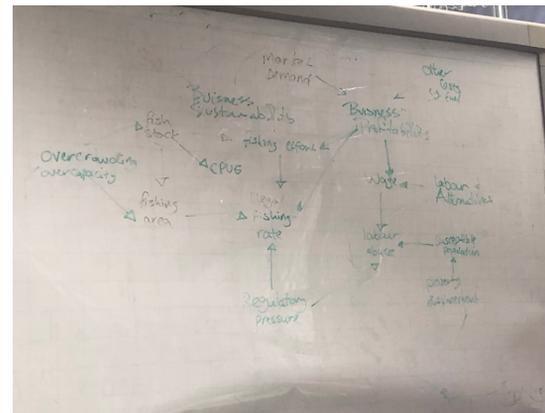




Problem formulation



- Know your problem, know your context
- What is the problem?
- What possible adverse outcomes should be investigated?
- What are the pathways by which they might occur?
- Opportunity to seek opinions of (diverse) stakeholders

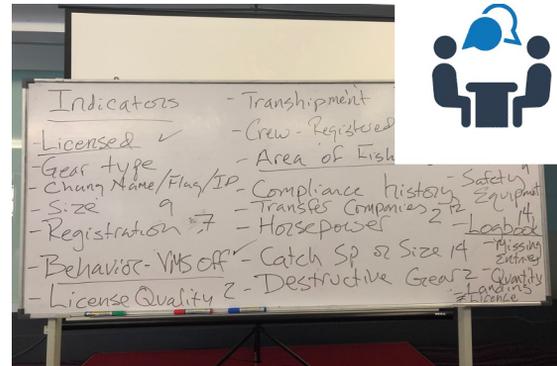




What do we mean by Indicators



- Help identify what is important
- Aids communicating what is important
- What is measurable?
- What data is missing based on measurable indicators?
- What is important?
- How to communicate and convey convincingly to decision makers.





Key considerations for a risk assessment



- Underlying conceptual model
- Measurable & identifiable endpoints
- Repeatable
- Assumptions and uncertainty acknowledged
- Decision criteria
- Relevant

Usually **Predictive** – performed BEFORE the expected issue

But can also be **Retrospective** – subsequent to the issue to identify the pathway

A few important considerations to keep in mind



Know your data – know your context

Where does Uncertainty creep in?

- Collecting data
- Analysing data
- Interpreting/applying outcomes

Forms of uncertainty

- Human behavior
- Sampling error
- Mis-reporting
- Variation – Environment, ecological, demographic

We can't measure **TRUTH**
There is always **NOISE**
This is where we get **UNCERTAINTY**



How many fish are on the screen ?





Risk Assessments

Consequences	Negligible	Low	Medium	High
Likelihood				
Negligible	Negligible	Negligible	Low	Medium
Low	Negligible	Low	Medium	Medium
Medium	Low	Medium	Medium	High
High	Medium	Medium	High	High

Qualitative

Risk predictions on an “ordinal” scale – “high”, “medium”, “low” / “negligible”

Typically presented in a risk matrix, easy to perform and communicate
Predictions cannot be compared to outcomes

Semi-quantitative

Risk predictions on an “interval” scale – 1,2,3,... or 10,20,30...

Typically by scoring risk criteria, easy to perform and communicate
Difficult to compare predictions with outcomes (scale is arbitrary)

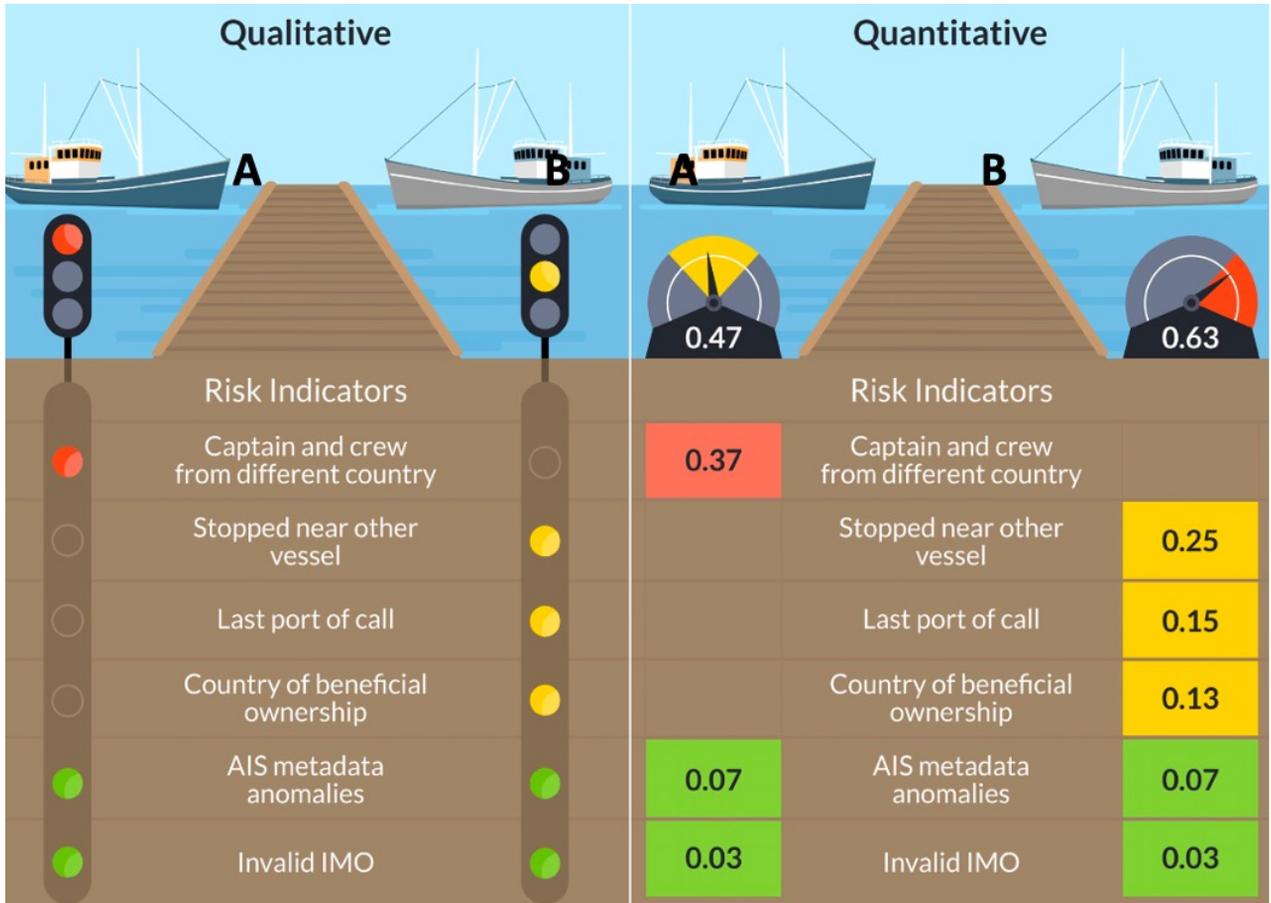
Quantitative

Risk Predictions on a “ratio” scale – e.g. expected loss

Typically involves modelling and expert elicitation
Predictions can be compared to outcomes



Qualitative versus Quantitative





Managing Risks

Monitor your assessment

Review your models and indicators

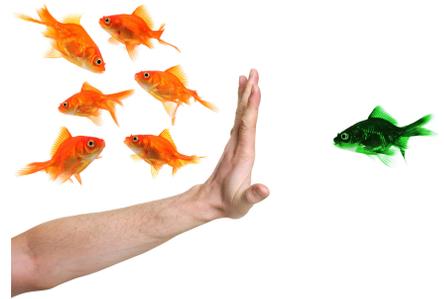
Update as needed

Fully understand the problem, and identify priorities

Informed decision-making tool

Identify cost-effective resource relevant management options

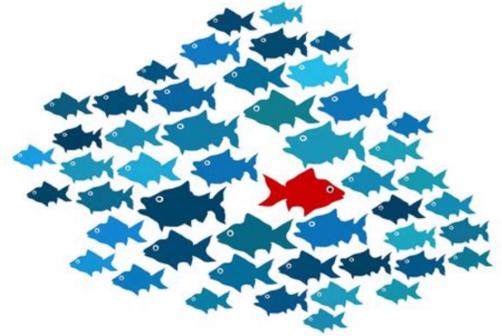
Many different roles are constantly making many decisions





Summary

Start simple, build from there



- Get experts together
- Know your problem
- Understand the pathways
- Have clear and measurable endpoints – know your data
- Understand scope and uncertainty
- Use rigorous techniques
- Make predictions that can be tested



Thank you

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