Linking Scales & "I am not a modeller"

The biggest challenges in socioecological modelling

Beth Fulton, Fabio Boschetti, Ingrid van Putten

2015

Advances vs Fashions

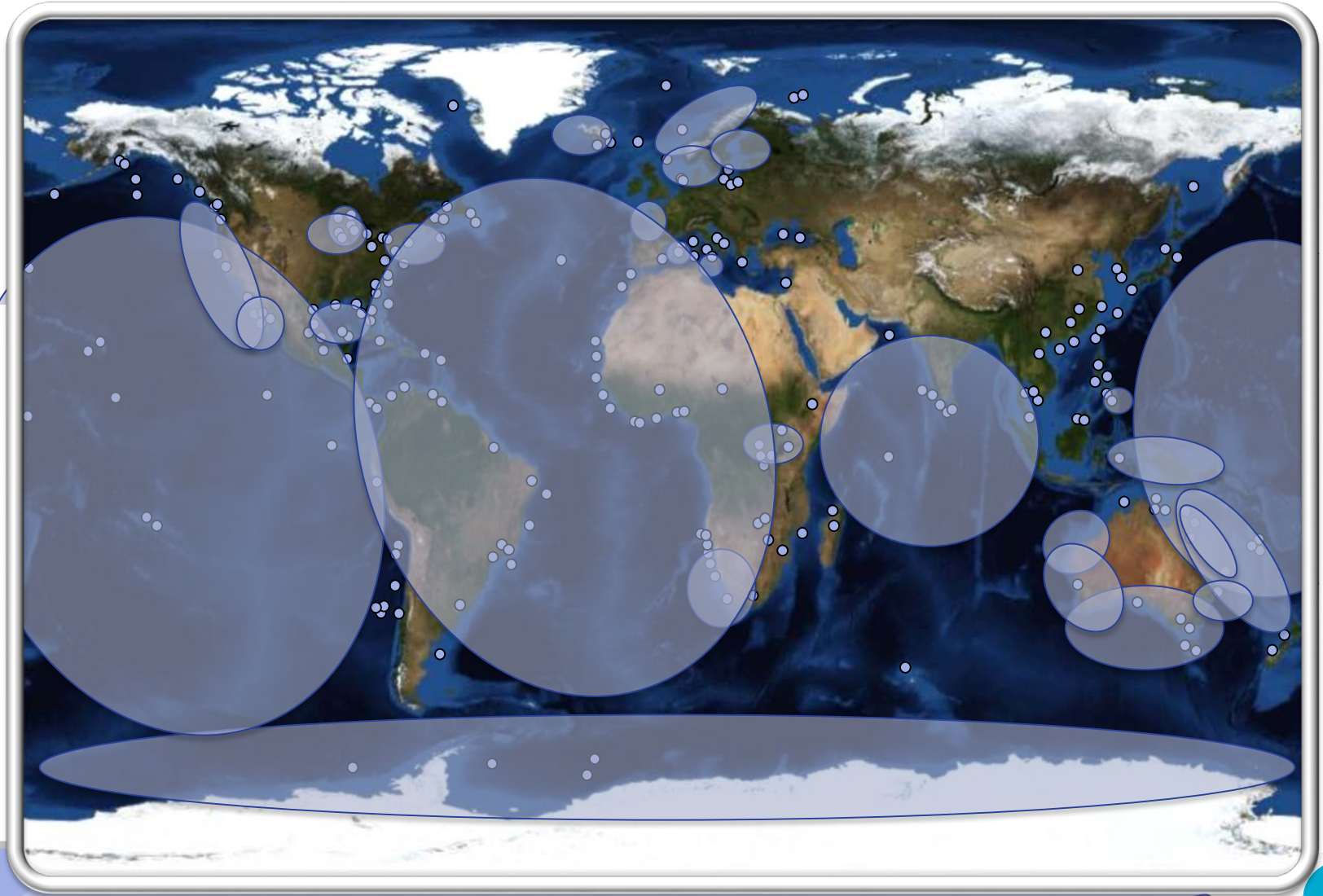| 1970s | 1980s | 1990s | 2000s | 2010s |

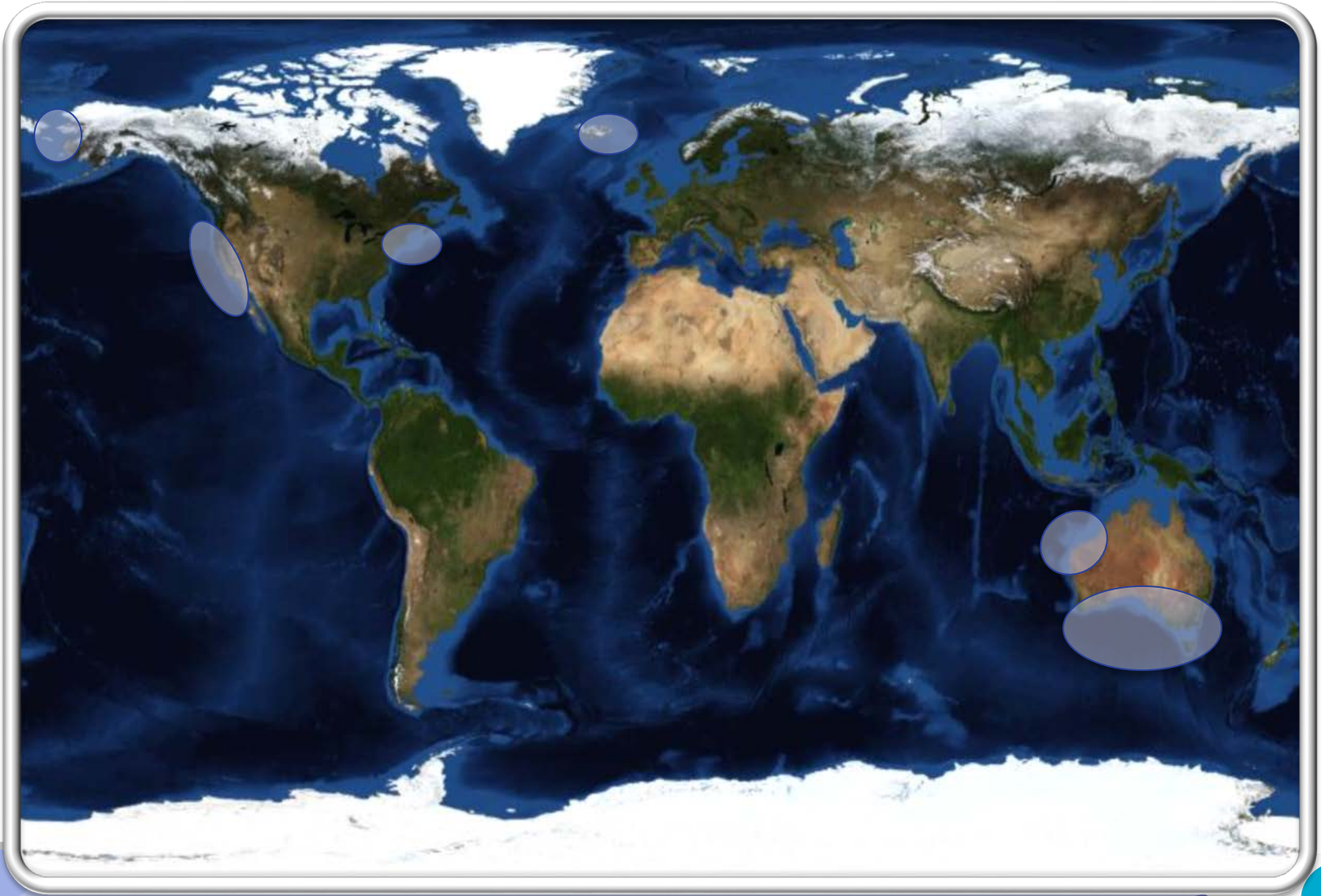**Single species**   **Systems**
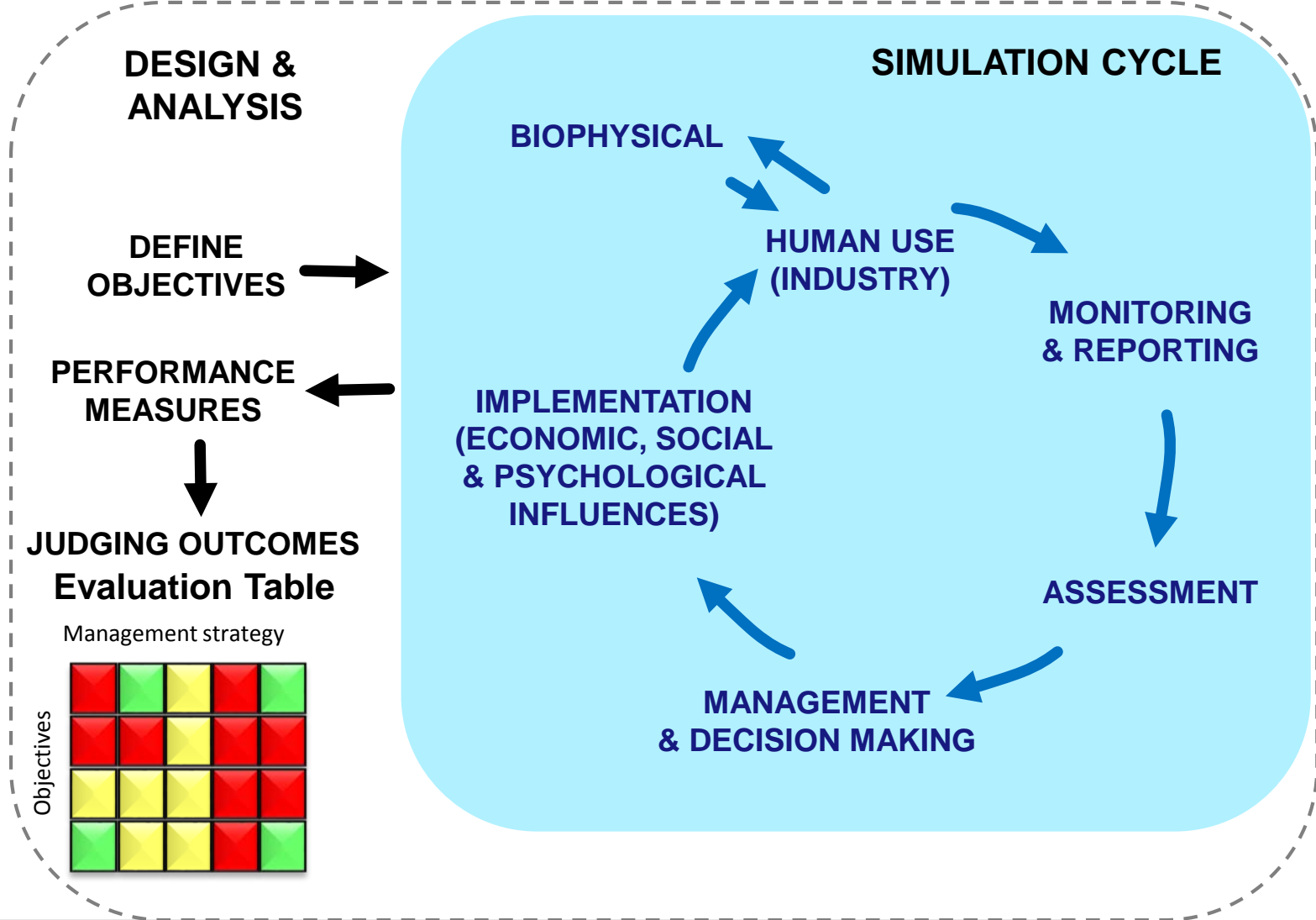
Science: Widely Used

15+ packages

Management: Early Days

Management Strategy Evaluation

Systems perspective + Adaptive Management Cycle

Australian Example: SE Fishery

- Multi-everything fishery
- Highly diverse and variable
- Solutions needed

Australian Fisheries

Future Operating Environment for Commonwealth Fisheries

Australian Government
Australian Fisheries Management Authority

$220m to secure Australia's fishing future

The Minister for Fisheries, Senator Ian Macdonald today announced a $220 million adjustment package to help secure Commonwealth fish stocks and a profitable future for the fishing industry. The *Securing our Fishing Future* package follows concerns about the state of Australia's fish stocks, and the sustainability and profitability of the industry.

Fisheries Minister Ian Macdonald announces the $220m adjustment package earlier today.

The Government will provide a major package of one-off structural adjustment and improved management measures for those fisheries managed by the Australian Government. As part of the measures, AFMA has today released new catch limits for the SESS and effort limits in the ETBF (further information follows).

www.afma.gov.au   Protecting our fishing future

Box 7051, Canberra Business Centre, ACT 2610 Tel (02) 6272 5029 Fax (02) 6272 5175   AFMA Direct 1300 723 621

Australian Government
Department of Agriculture, Fisheries and Forestry

Commonwealth Fisheries Harvest Strategy

Policy and Guidelines

September 2007

DEPARTMENT OF AGRICULTURE, FISHERIES AND FORESTRY

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Disciplinary Focus

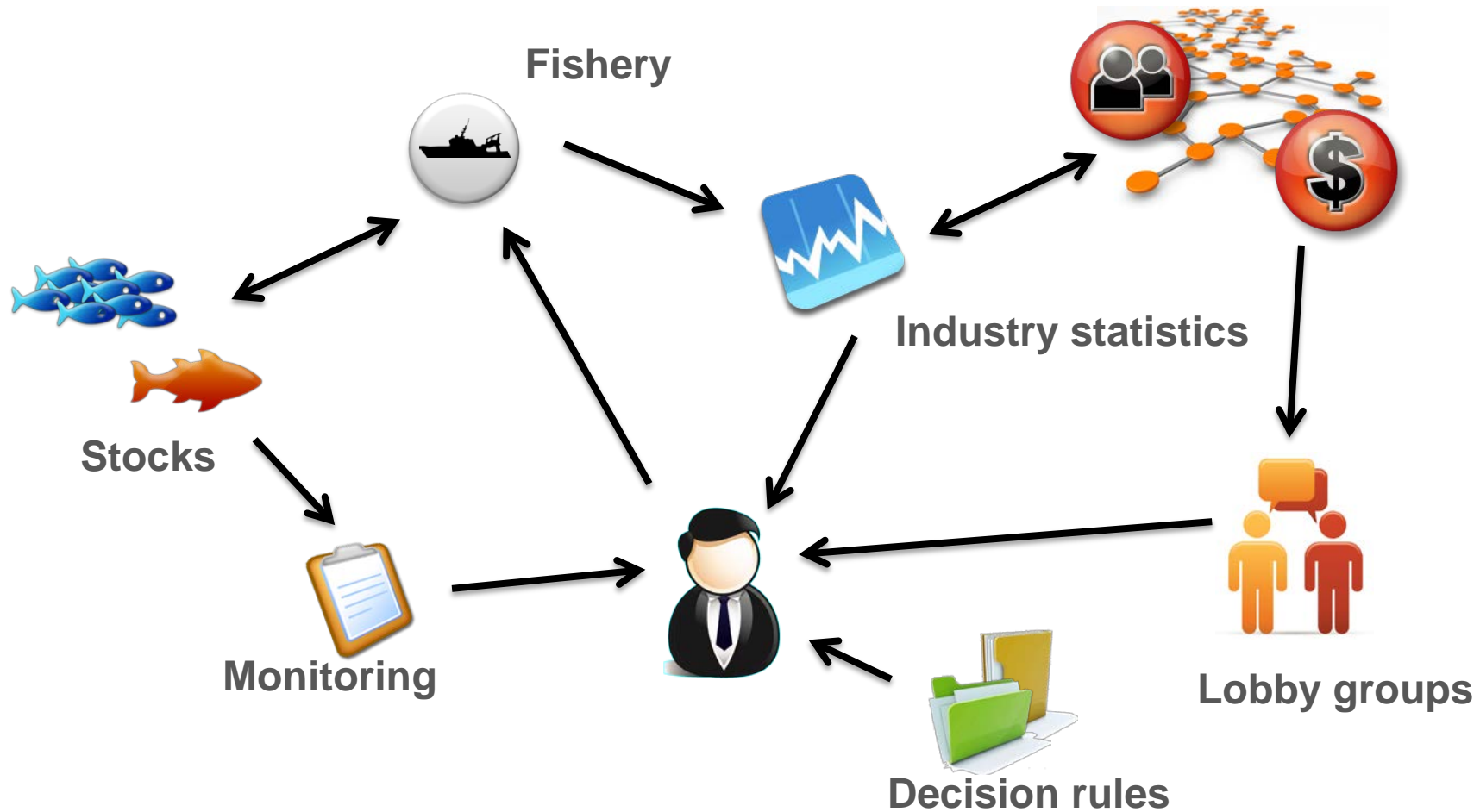
Fishery

Industry statistics

Stocks

Decision rules

- Best management = quotas (mostly)

Cross-disciplinary Links

Fishery

Industry statistics

Stocks
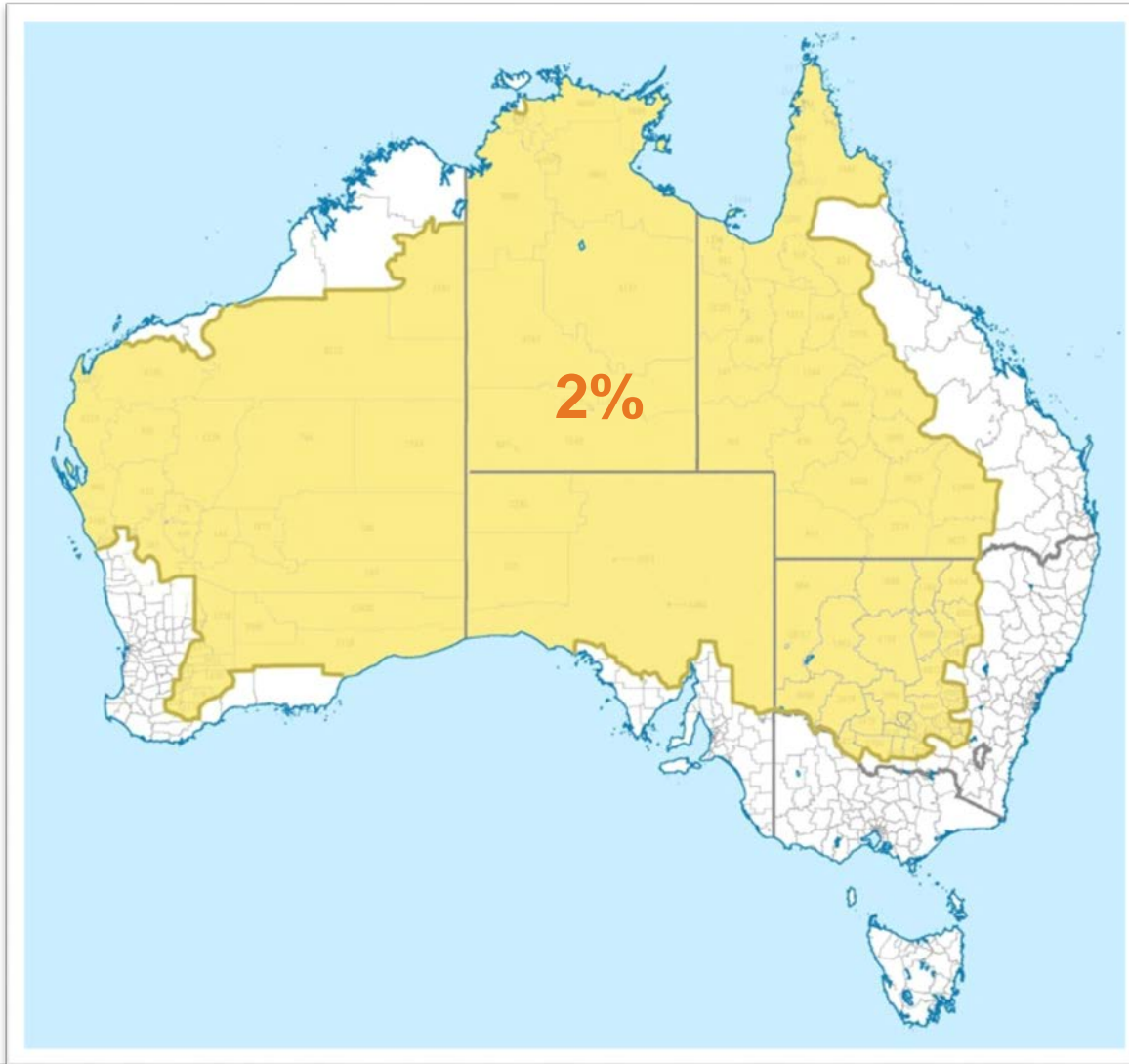
Monitoring

Lobby groups

Decision rules

- Effective management = quotas + spatial + gear restrictions

System's view
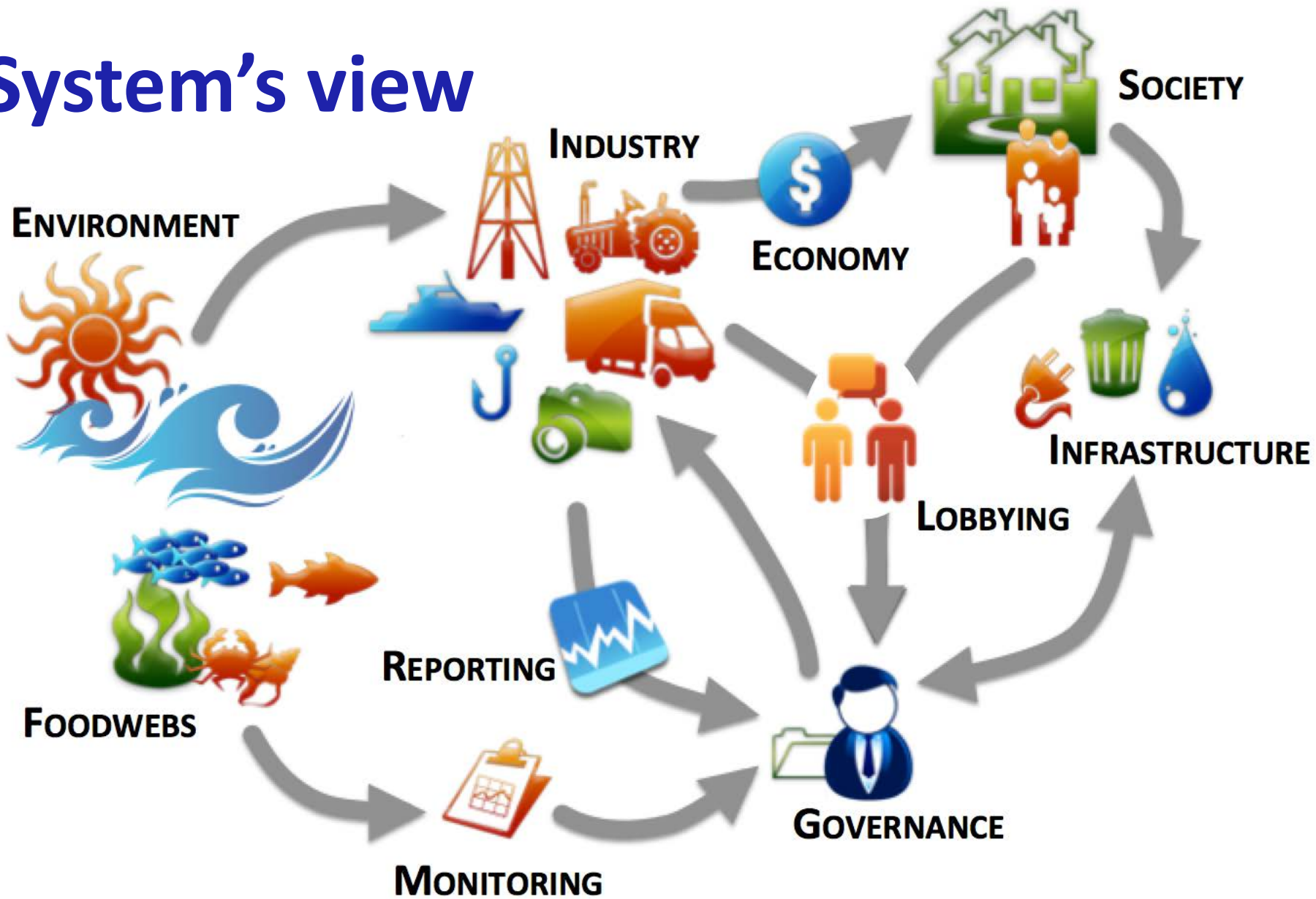
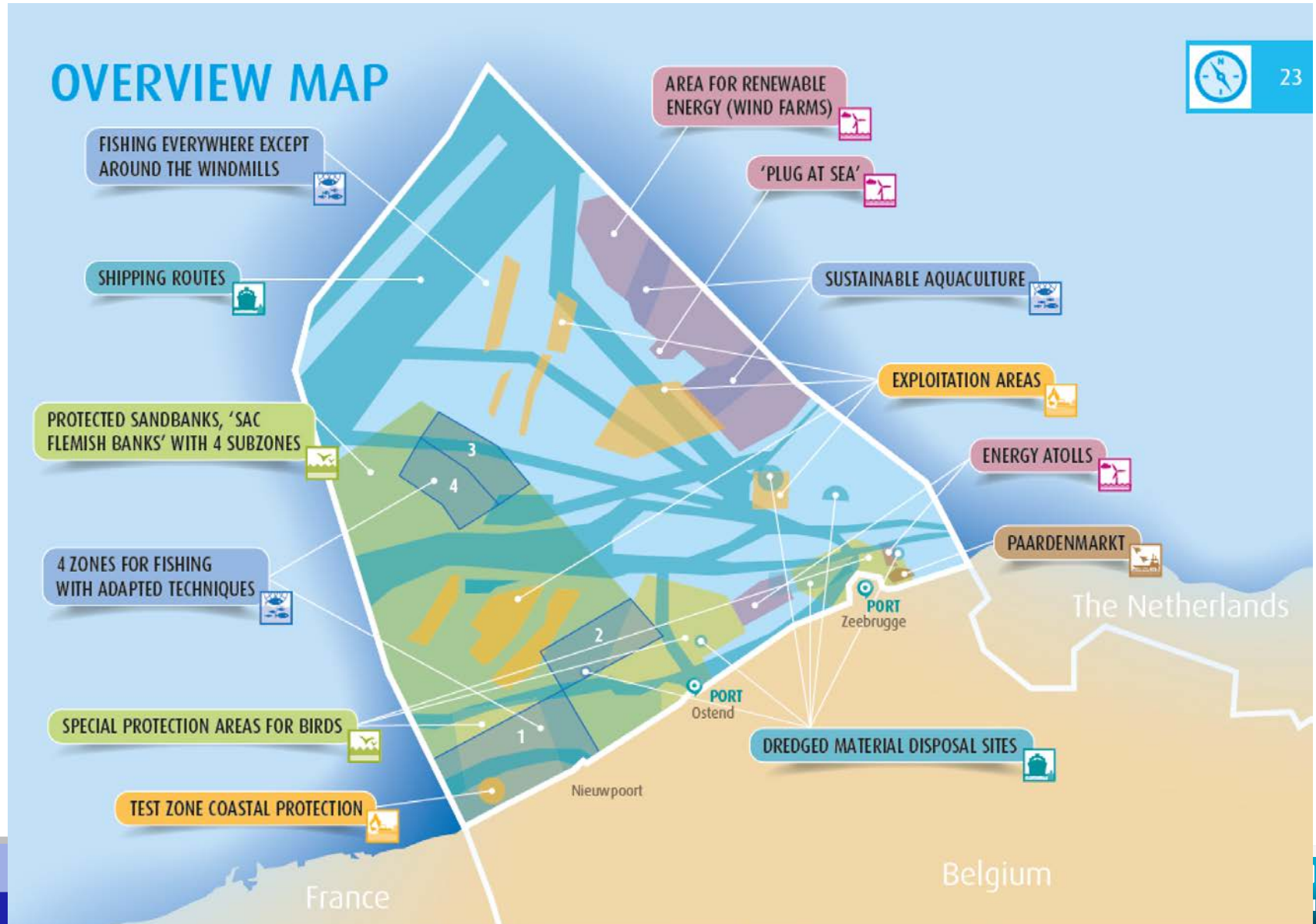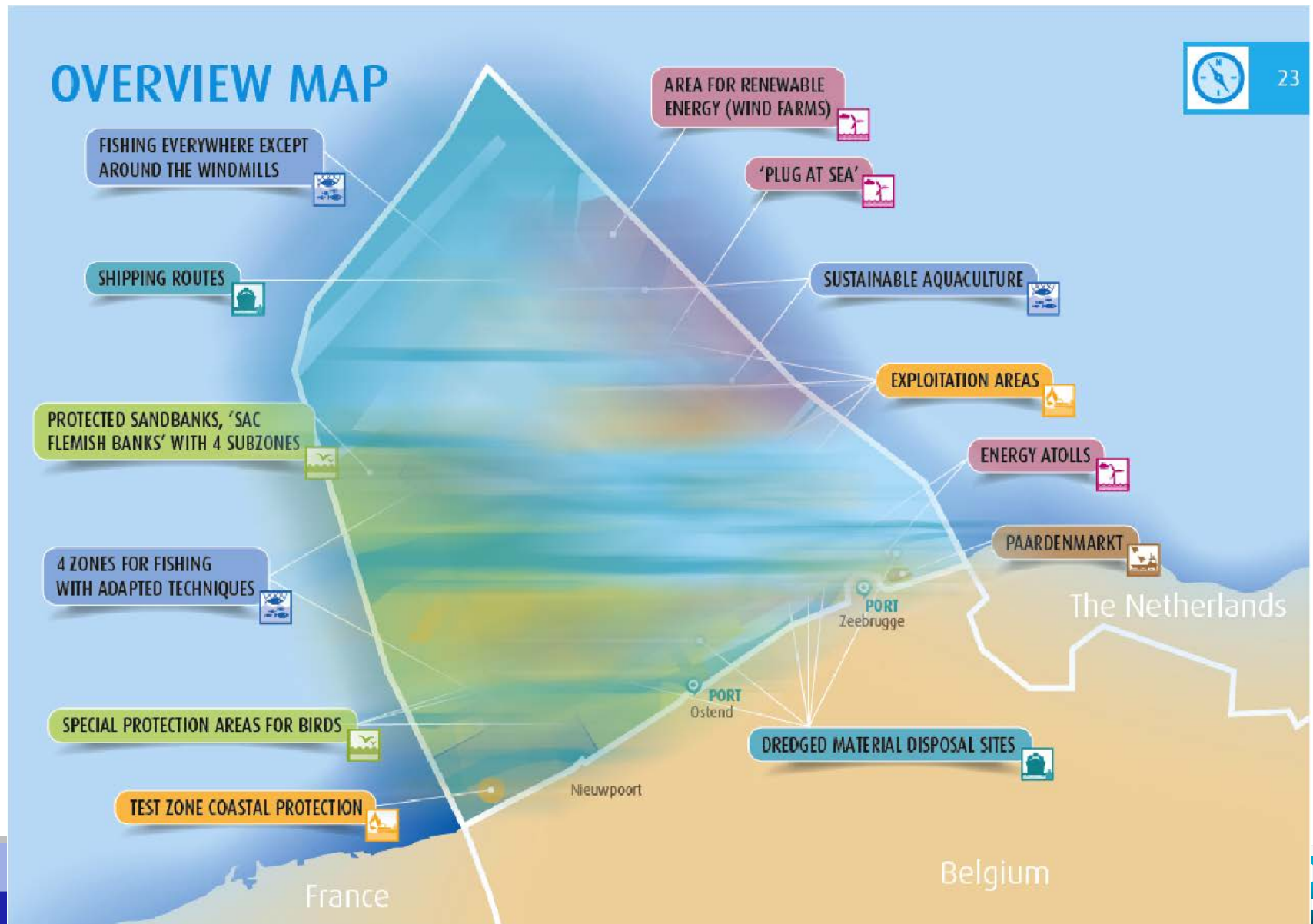# Australians - The Coastal Species

2%

Map: ABS

Aquatic Revolution

Conflicts & Resolution

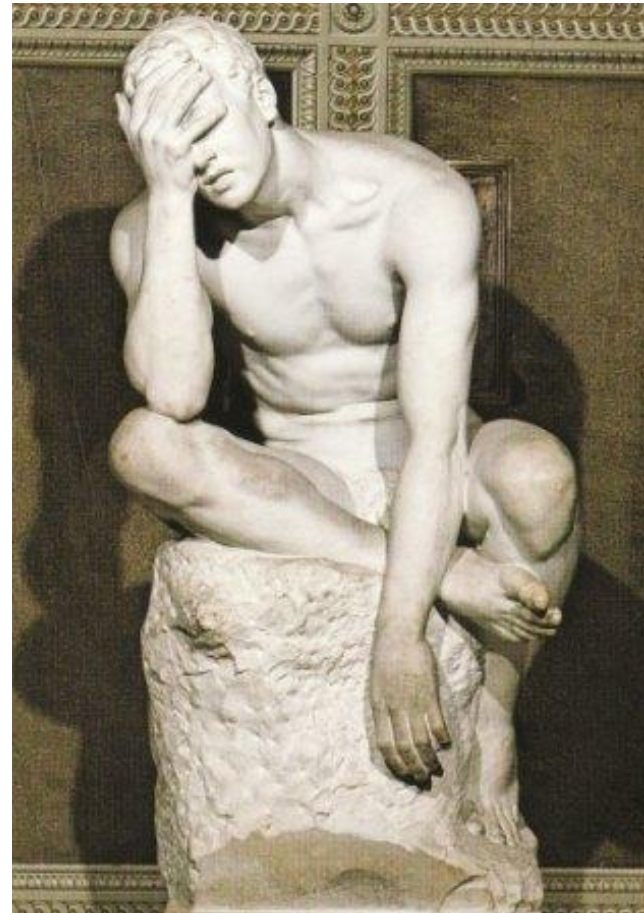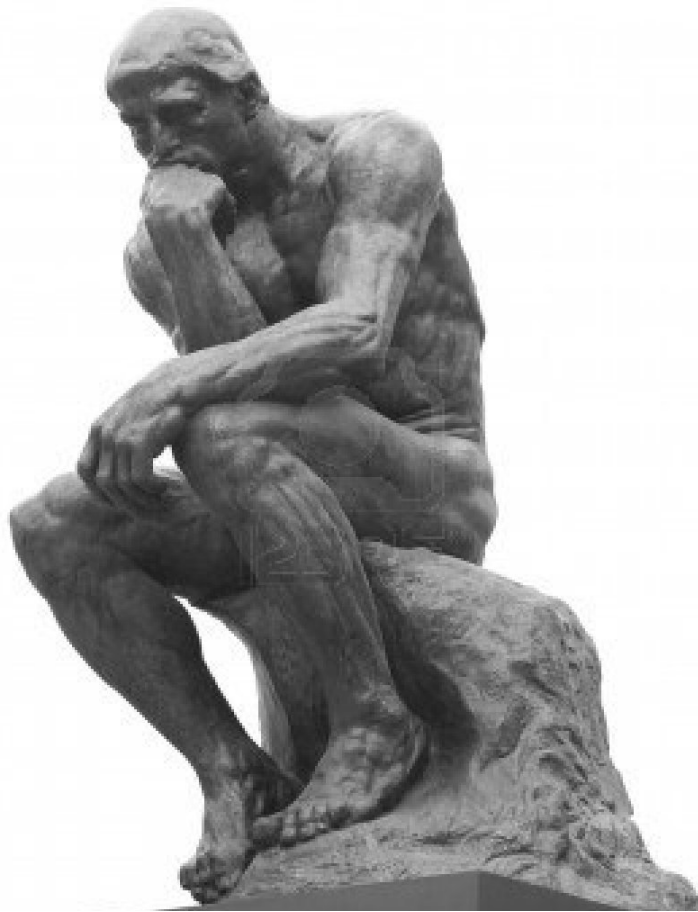# Conflicts & Resolution... Maybe

Engagement of Knowledge Systems

- Expanding appreciation & integration

- Participatory

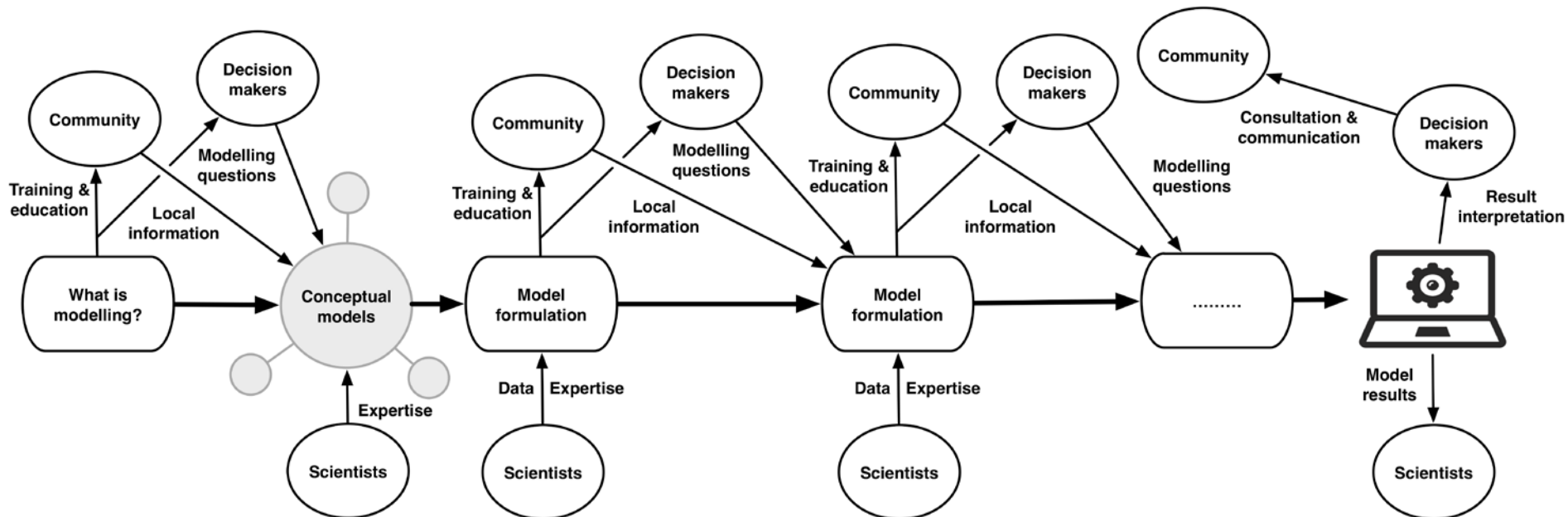# Systems = Consideration of options …unfortunately

Participatory Recipe for Success

Why did it falter?

1. Check the ego

2. Clear communication

3. Take the time to build trust

4. Work with people & iteratively
   (those involved & with different points of view)

The eco bits

- Habitat
- Reproduction
- Waste
- Growth
- Feeding
- Movement & Migration
- Acclimation, Biodiversity & Evolution
- Mortality
- Primary production
- Catchments
- Hypoxia
- Nutrient cycling N, P, C, Si, O, Fe, S
- Environmental forcing
  - Temperature
  - Salinity
  - Alkalinity (pH)
  - Wind
- Currents, eddies, tides & stratification
- Sediment processes
- Bathymetry

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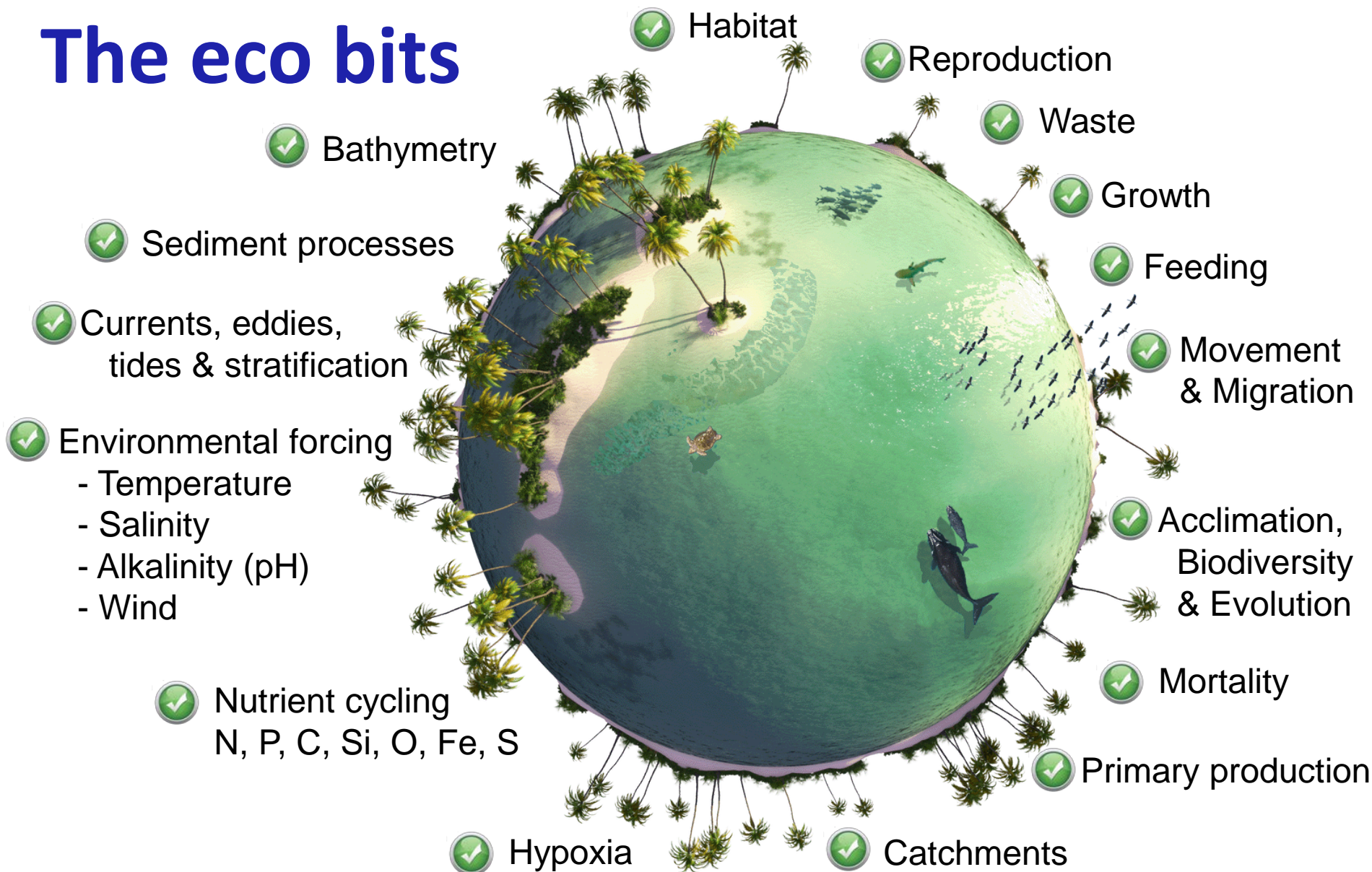
Human bits

Social networks

Attitudes

Behaviour & decisions

Monitoring

Assessments

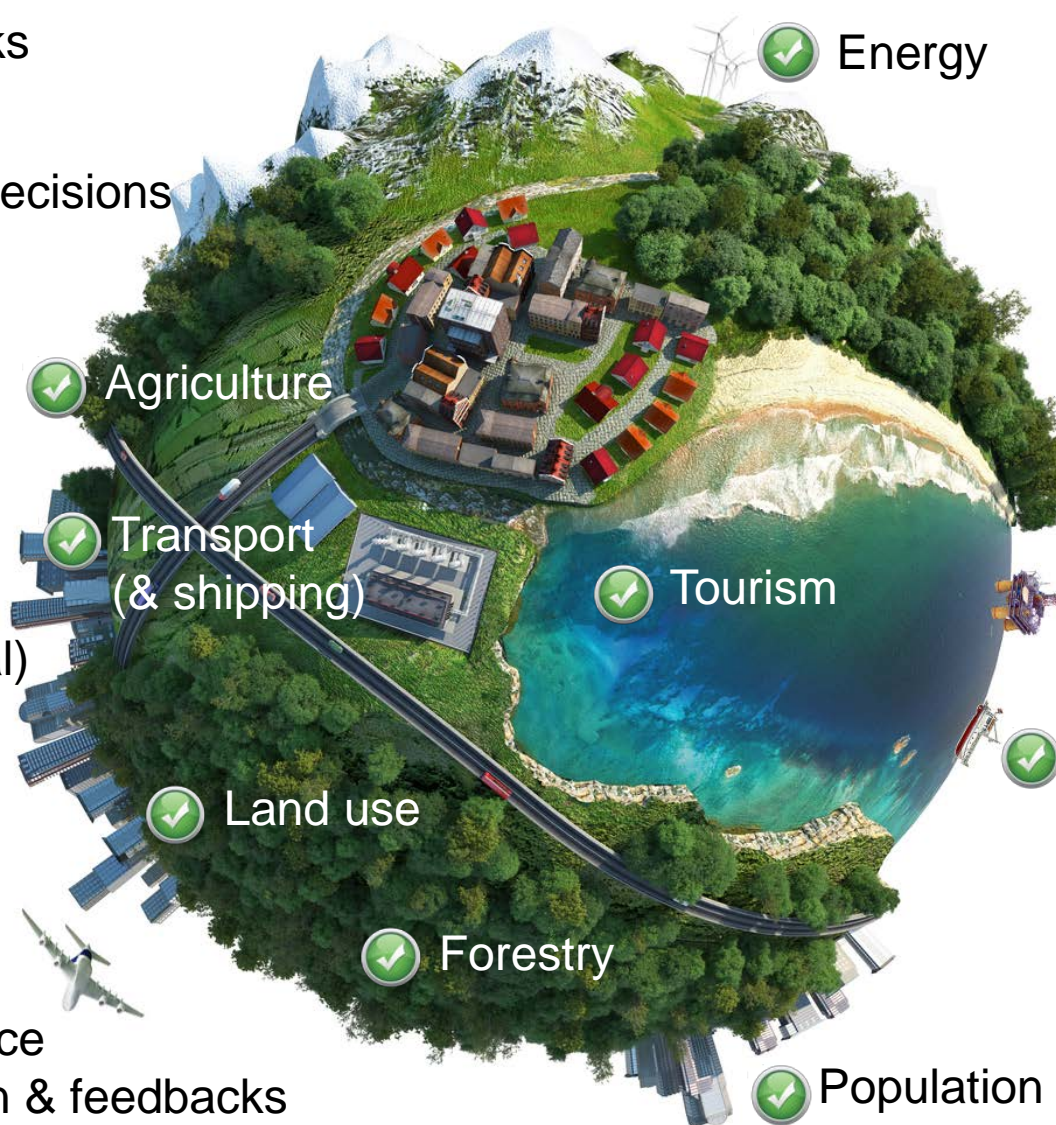Control Rules

Regulation

Urban (& residential) development & infrastructure (including ports)

Limits
Governance
Integration & feedbacks

Energy

Economy

Markets

Trade

Costs

Revenue

Investment

Agriculture

Transport (& shipping)

Tourism

Catchments

Non-renewable Resources (oil, gas, mining)

Land use

Fisheries (commercial & recreational)

Forestry

Population

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Scales

14 orders of magnitude

Handling multiple scales

	Individual	Patch	Local	Regional	Global
Physical					
Ecological					
Economic					
Social/Cultural					
Management (& Institutions)					

- Modelling weakest at intermediate scales & for socially related

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Jurisdictional Complications
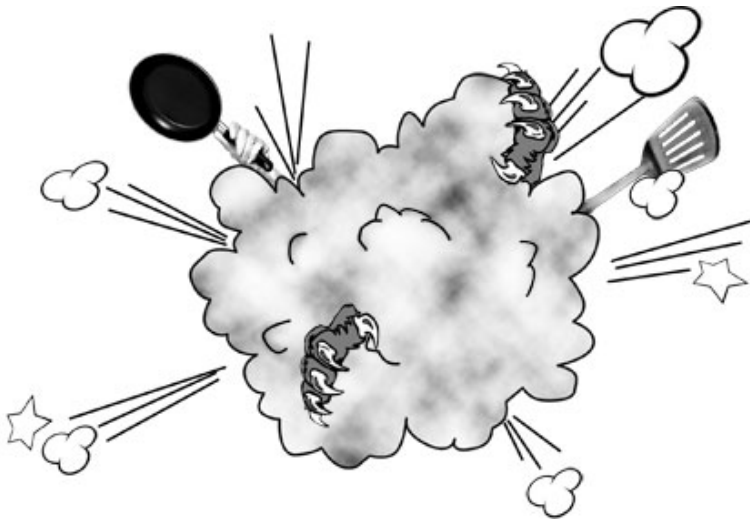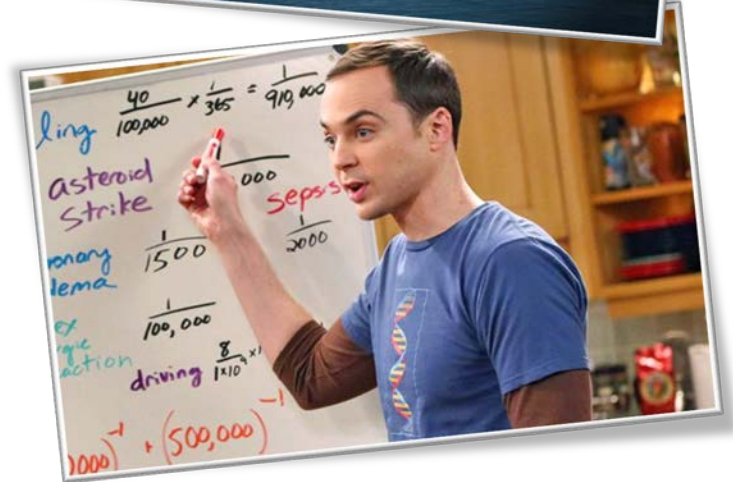

- Theory vs Practice
- Time poor & high staff turn over
- Champions are hard to find…
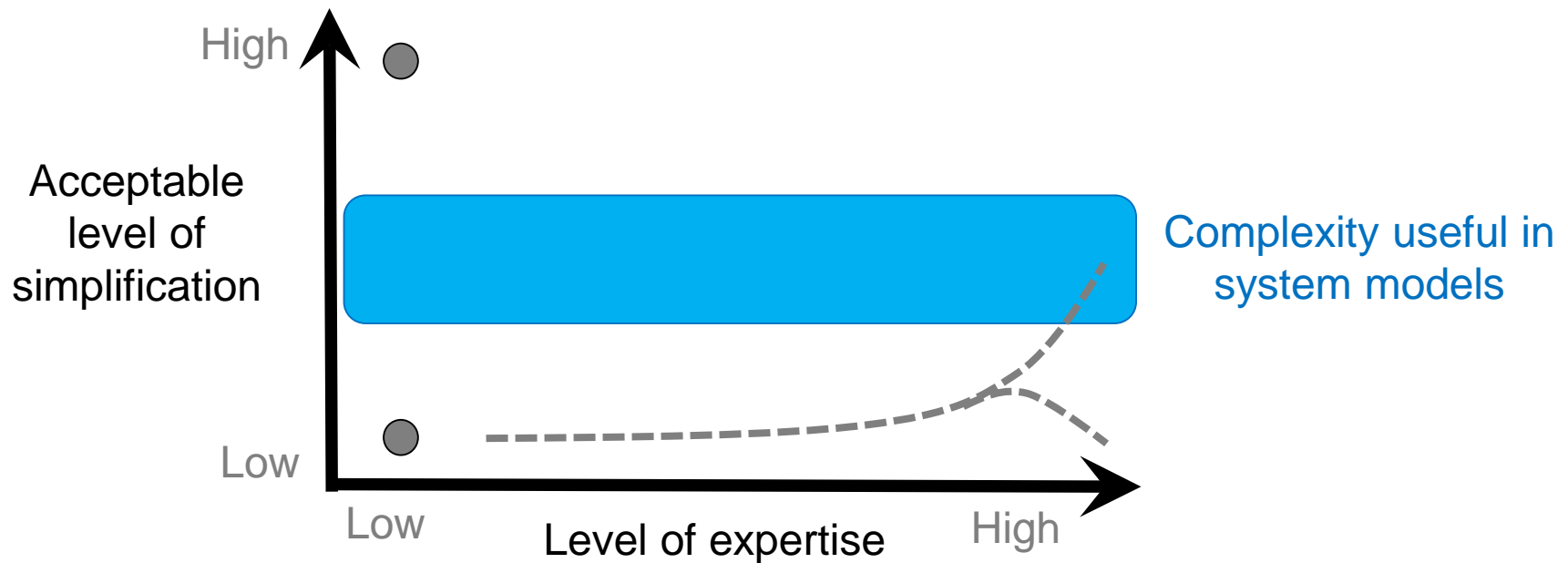
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Distrust of models

- Familiarity & trust (competency, integrity, warmth)

- Easy to blame the modeller (nerds still aren't cool)

- Science = one voice (how much relative trust to place in it?)

- Honest broker and participatory approach misunderstood

    You're in the pocket of…
<insert disliked group of choice>

Knowledge vs Simplification Comfort

- "I'm not a modeller"
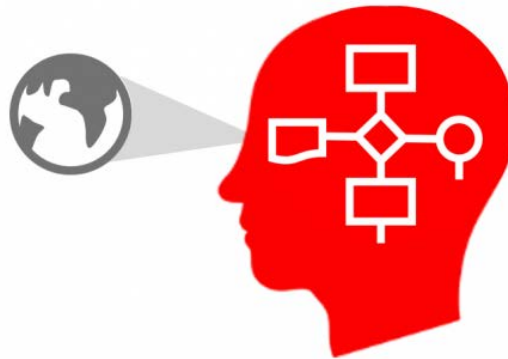 - give up or latch on to detail to "make it real"

- Don't appreciate value of improved thinking
- Assume desire crystal ball & as can't be done write it all off

Trust (own) mental models

"I trust my gut…"

- Mental models = mix of emotions & function

- Multiple (inconsistent) models held simultaneously

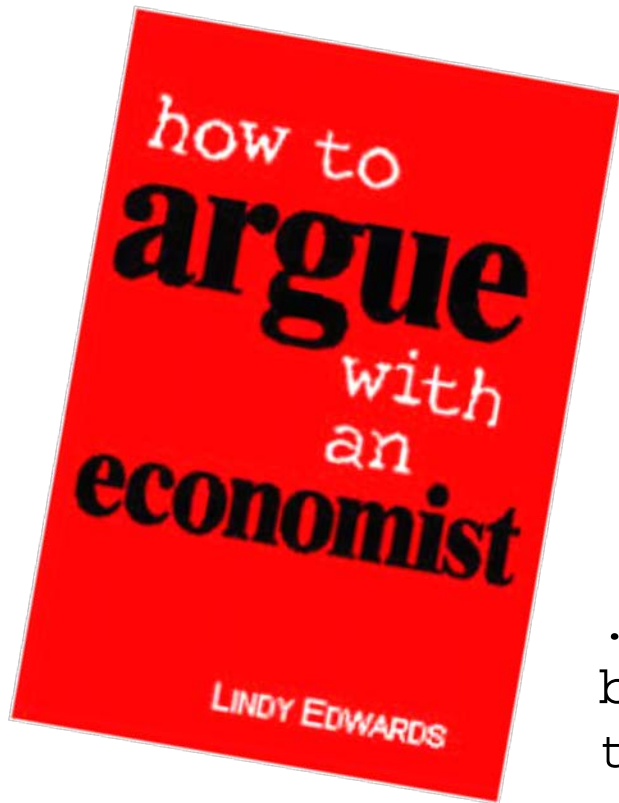- Static past, now, future rather than system dynamic view

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Message related?

- Scientific use colours message received (greenhouse, blanket, bath tub, addiction, disease)

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Distrust of ^{some} models

- "The economic projections say…"
- Different levels of acceptance
- Accident of history?
- Different standards?

how to **argue** with an economist

LINDY EDWARDS

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...reflects on how economics has
become central to our lives, and how
the 'economic rationalist'
perspective has become the lens
through which all matters in
Australian public life are viewed...
```

Message related?

- Messages (vs desires)
  - Trade-offs less palatable than "win-win"

- Simplification of the message vs improved focus
  - Specificity
  - Non-linearity
  - Long timeframes
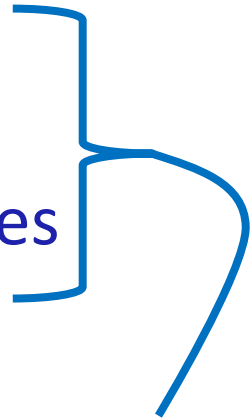
Not things we are naturally good at

How get better uptake

- Understand trust, psychology, attitudes
- More than box ticking (needs true, equal, integration)
  - Tiramisu score

Ways of Thinking

Focused

Broad

Skill Assessment
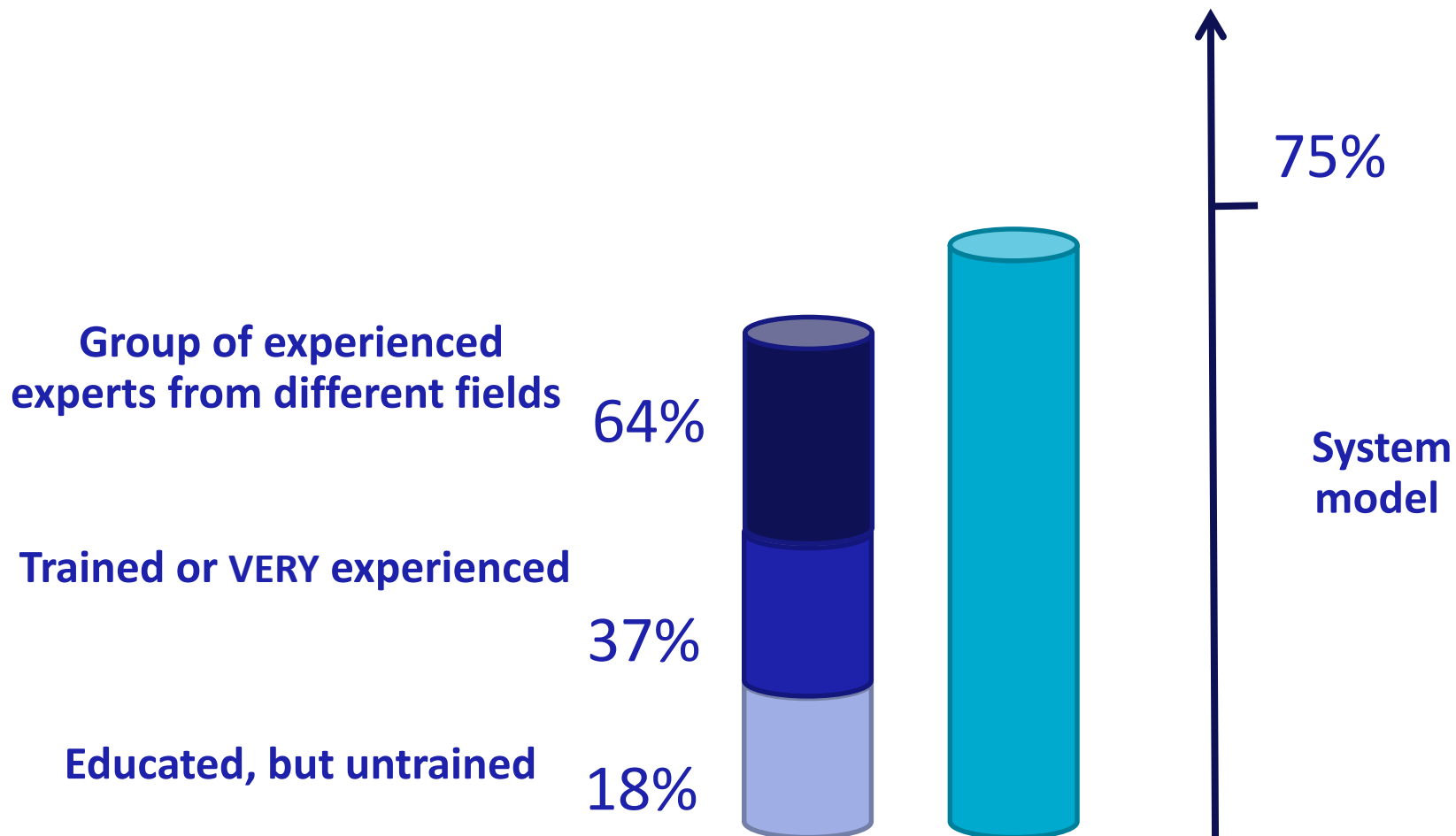
Model not always right, why should I care about them?

75%

Group of experienced experts from different fields

64%

System model

Trained or VERY experienced

37%

Educated, but untrained

18%

Boschetti et al (2011), Fulton et al (2007)

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How get better uptake

- New ways of doing things (share more existing lessons?)

- Time to educate too short, compromise position needed?

- Systems learning added to tools people at ease with?

Summary

- System approaches have had major success

- Hard won lessons are struggling with new challenges

1) Modelling new scales & components

2) Engaging at new scales & battling scepticism

3) Human psychology & trust critical

4) Technology, communication, capacity based solutions?

5) Alternative (e.g. hybrids) required?

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Thank you

CSIRO Oceans & Atmosphere
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