UPTAKE AND PATHWAYS OF COASTAL ADAPTATION PROCESSES IN AUSTRALIA

COASTAL COLLABORATION CLUSTER: MEETING COASTAL CHALLENGES

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AUSTRALIAN COASTAL CITIES

Sydney

85% of Australians live under 50km from the coast

Population ~ 21 million
coast ~ 6.5 million

New South Wales ~ 80% - ≤ 3km

GROWING **NEEDS**

INCREASING EXPECTATION

Infrastructure and services

- Water supply
- Electricity supply
- Telecommunications
- Sanitation
- Food delivery
- Road and railway systems

Governance and planning

- Complexity - policy levels from federal to local, governments, decision-makers and citizens

GROWING **CHALLENGES**

ENHANCED BY ENVIRONMENTAL CHANGES

Erosion

Flooding

GROWING **CHALLENGES**

	Within 200m of the coastline
Regional infrastructure	120 ports
	5 power stations/substations
	3 water treatment plants
	170 unidentified industrial zones
	1,800 bridges
Community services and facilities	258 police, fire and ambulance stations
	75 hospitals and health services
	46 government administration facilities
	360 universities, colleges and schools
	102 retirement/nursing homes
	11 emergency services facilities
	41 waste disposal facilities

Hospital, Cairns (QLD)

Airport, Sydney (NSW)

Sewage plant (NSW)

(Source: Geoscience Australia 2009 *in* Developing a national coastal adaptation agenda 2010)

GROWING **CHALLENGES**

EXAMPLE: RAIL AND TRAMWAYS

Estimated length of existing rail and tramway infrastructure at risk from the combined impact of inundation and shoreline recession for sea level rise.

Nationally: 1,200 - 1,500 km of rail lines and tramways potentially at risk from inundation and shoreline recession from a sea level rise of 1.1 metres

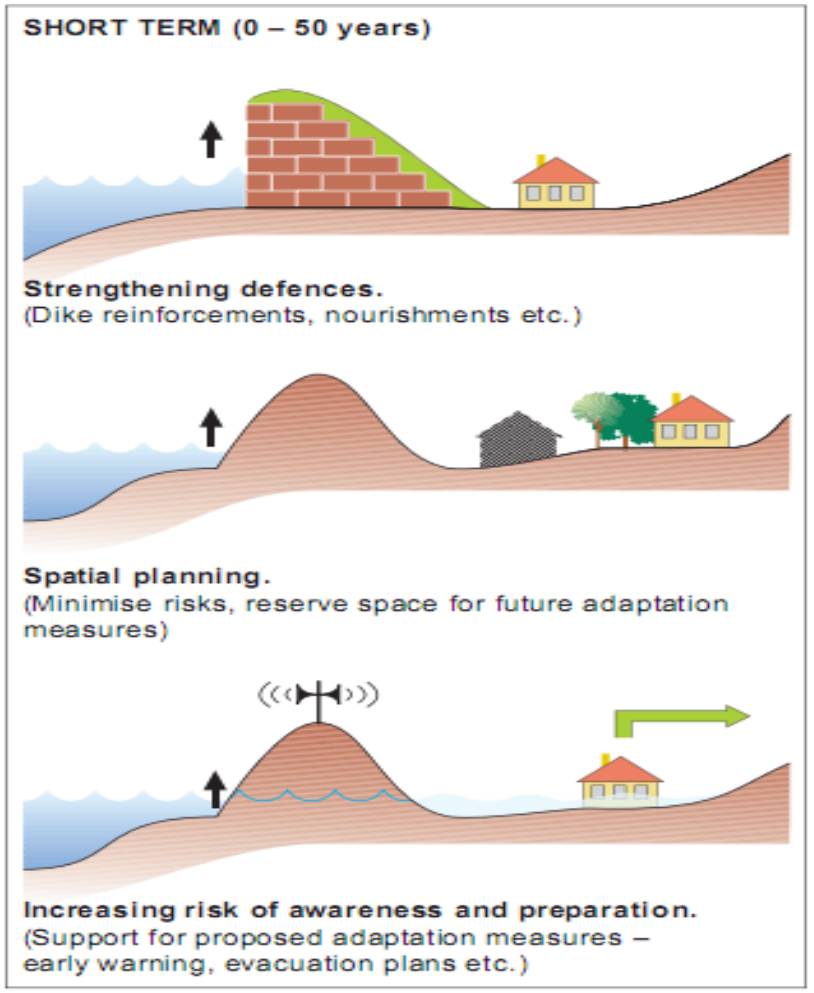
MANAGEMENT ISSUES

- Adaptation coastal zone plans to sea level rise scenarios – zones (current, 2050, 2100)

0.4m **1.1m**

- Management Options
  - Protection (seawalls, sandbags, rising house floors)
  - 'Planned' Retreat (hazard lines)
  - No action

ADAPTATION focus



Source: *Climate Change Risks to Australia's Coast* 2009:146.

POLITICAL RESPONSES

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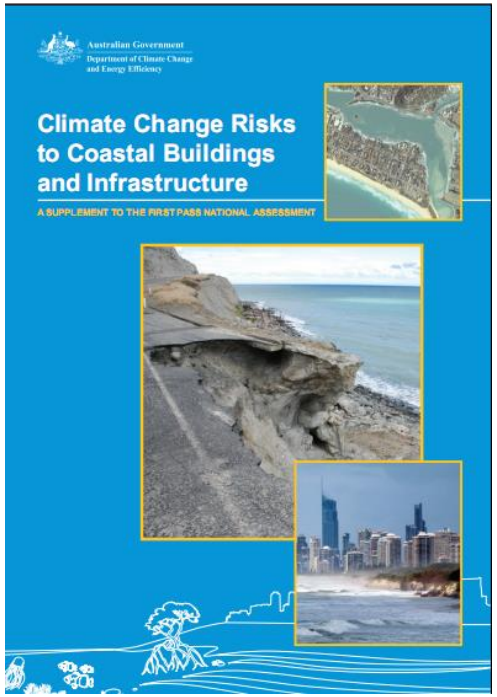
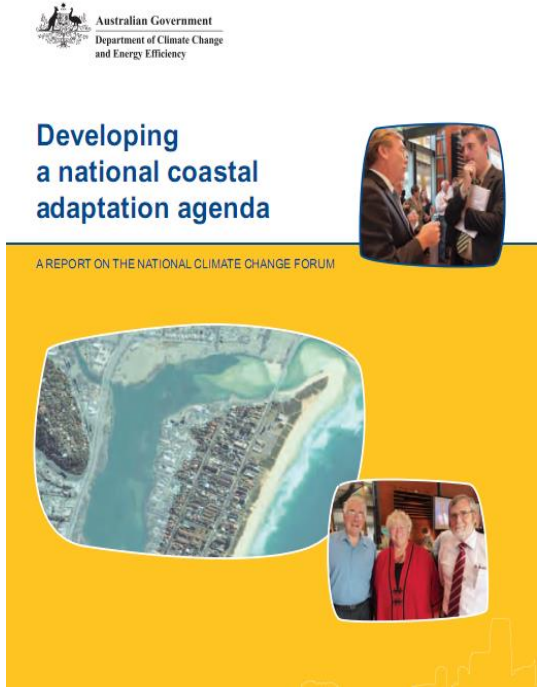
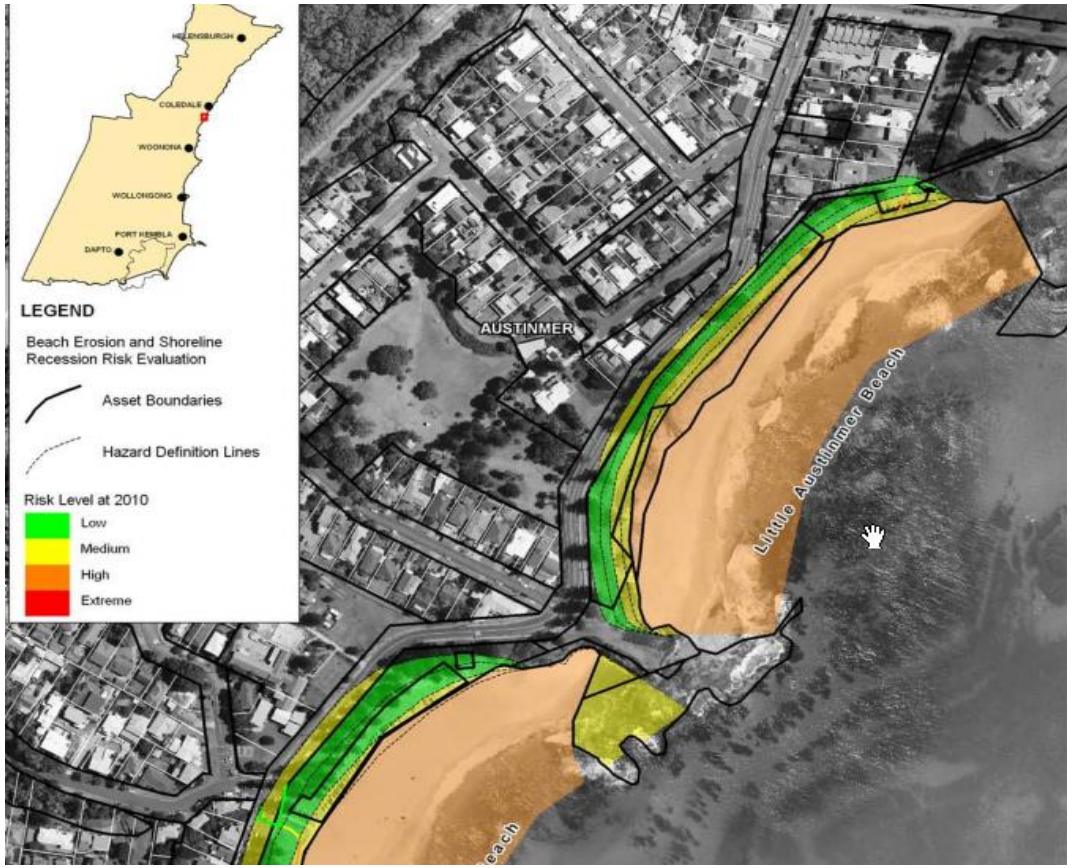
2011



2010



UPDATE OF COUNCILS COASTAL MANAGEMENT PLANS



SCIENTIFICALLY

Perceptions of Science

Remote, external, presuming superior knowledge, using strange language,

Little real life experience, dismissive of community knowledge, reluctant to engage with citizen science

Nice work if you can get it

Coastal Collaboration Cluster

Commonwealth Science and Industrial Research Organisation

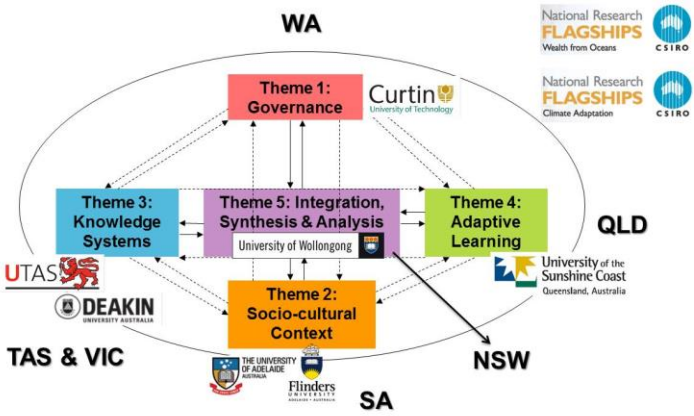
THE COASTAL COLLABORATION CLUSTER

The **C**oastal **C**ollaboration **C**luster aimed to develop approaches to better **connect** science with the **needs** of governments, communities and industries to meet coastal challenges

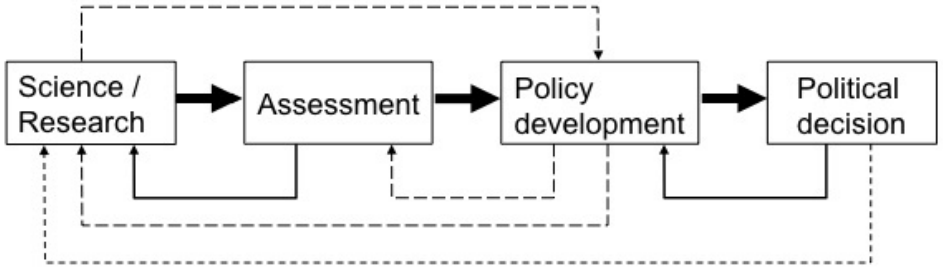
A CSIRO FLAGSHIP SOCIAL RESEARCH PROJECT

- identify the key social and institutional **barriers** that inhibit the uptake of science in the coastal zone
- ways to introduce and apply the best **knowledge** available to coastal policy-making and planning

KNOWLEDGE **PATHWAYS**



Current paths to science impact



Information flow

- Strong / normative
- Weak / normative
- Weak
- Very weak / absent

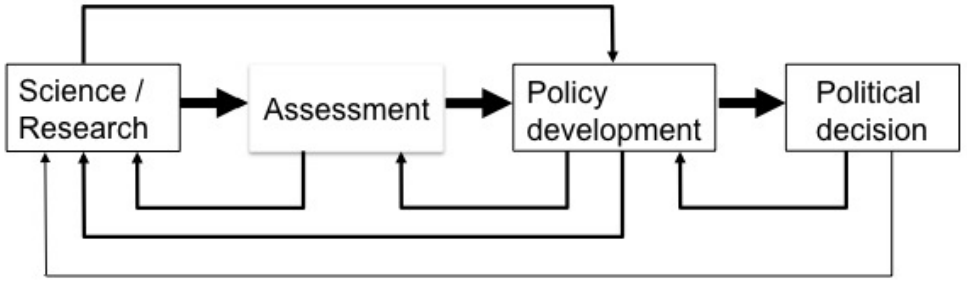
Notes

Science information is normally on a one way trip as shown, with both feedback links and longer, indirect links being weak

The cumulative effects of transmission from science to policy is to weaken science impact

What are the institutional and socio-cultural processes that lead to this information flow structure?

More effective paths to science impact



Information flow

- Strong / normative
- Normative
- Useability

Notes

Science information is developed with stronger feedback from the policy and political domains in terms of defining information needs and policy impact

Stronger forward links such as research on properties of policy options

Feedback from Political domain on useability of science advice, but weak enough to inhibit political preferences from influencing science outcomes

What are the institutional and socio-cultural processes that would create and/ or strengthen these linkages?

(De La Mare 2010)

GOVERNANCE AND COASTAL ADAPTATION **UPTAKE**

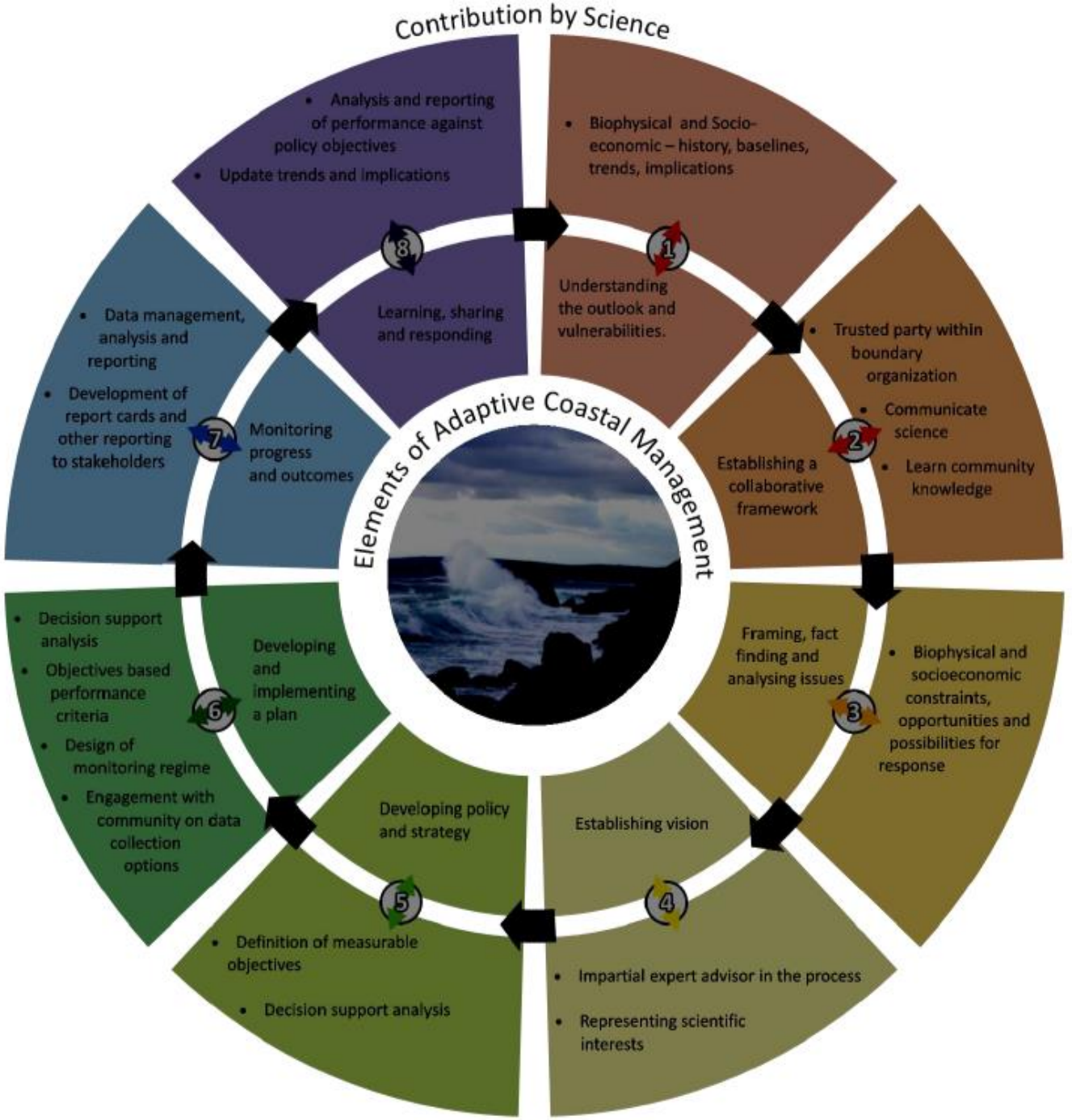
CONTEXT – INCREASING CONTESTATION OF SCIENCE

Barriers	Key issues to be addressed
1. Clarity about data needed *(needs of users)*	▪ Limited in-house capacity ▪ Inadequate engagement researchers / information users
2. Spatial-temporal scales *(local relevance)*	▪ Periodic access or closure for particular uses ▪ Underlying processes of biophysical and socio-economic change in coastal areas are medium to long term in relation to most financial or political/electoral decision cycles
3. Information sharing *(availability)*	▪ Available, but not understandable
4. Understanding the applicability of science *(multiple purposes)*	▪ Biophysical science need to interact with cultural, social and economic values, attitudes and traditional knowledge
5. Uncertainty, risk and standards of proof *(application)*	▪ Concepts of statistical confidence, addressing uncertainty in research design, and degrees of risk

OPPORTUNITIES FOR SCIENCE ENGAGEMENT

The roles of sciences in the management and decision cycle

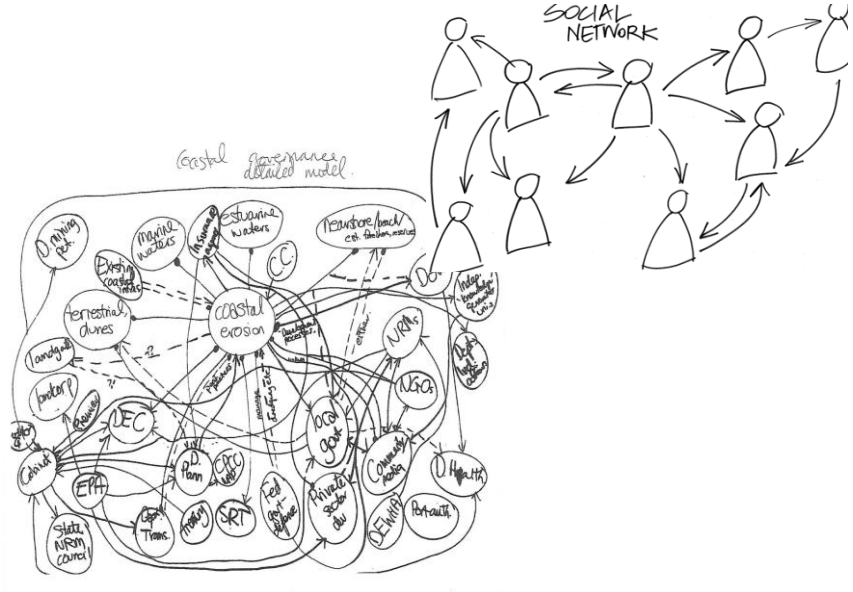
- Trusted, professionally independent advisor
- Contract provider of research services (e.g. peer review, scenario modelling, design/conducting of research)
- Sectoral stakeholder representing scientific interests and analysis



PATHWAYS OF COASTAL ADAPTATION

CHALLENGES OF INFORMING COMPLEX DECISIONS

1. BOUNDARY PROCESSES & ORGANISATIONS
2. SOCIAL NETWORKS
3. COASTAL CHAMPIONS



Socio-ecological system

BOUNDARY PROCESS AND ORGANIZATIONS

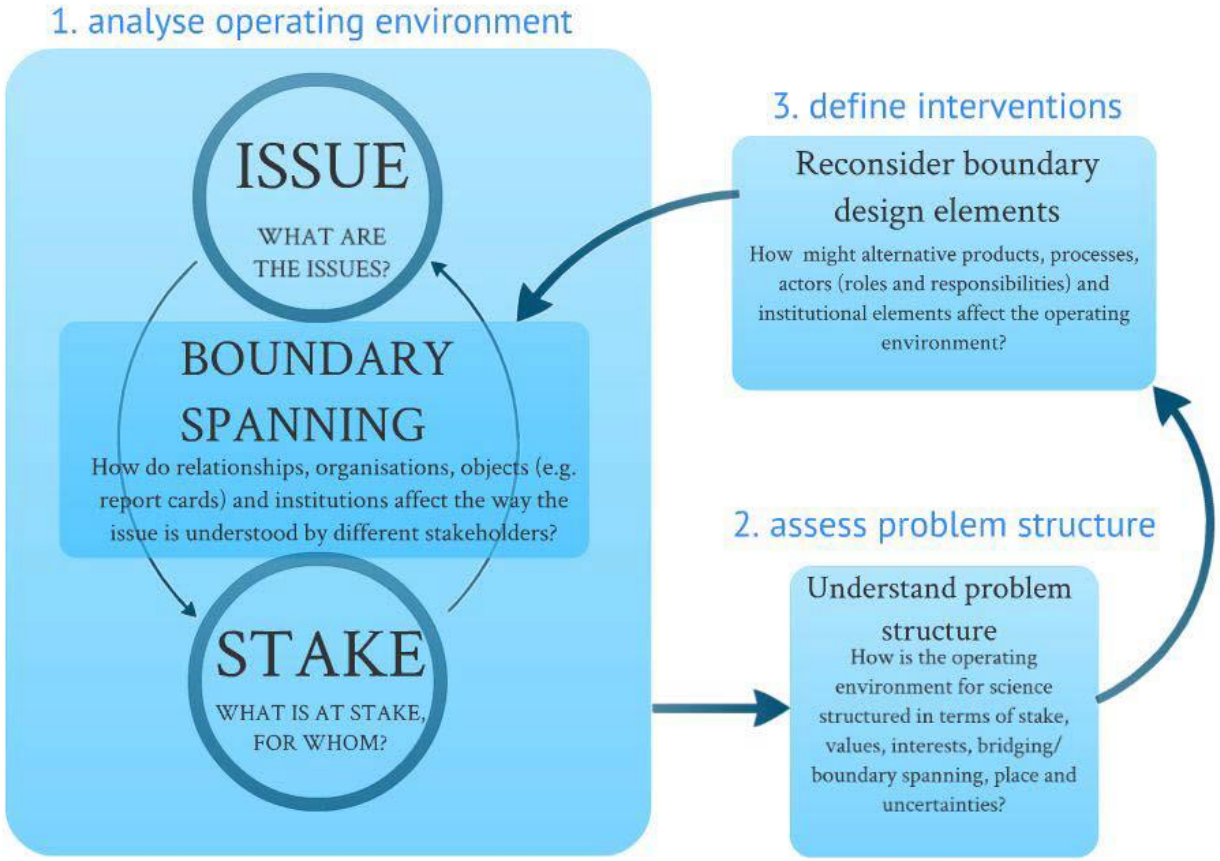
TACTICAL PROBLEM SOLVING APPROACH

Conceptual model for improving the uptake of science

Forums for such engagement in knowledge sharing, development and application

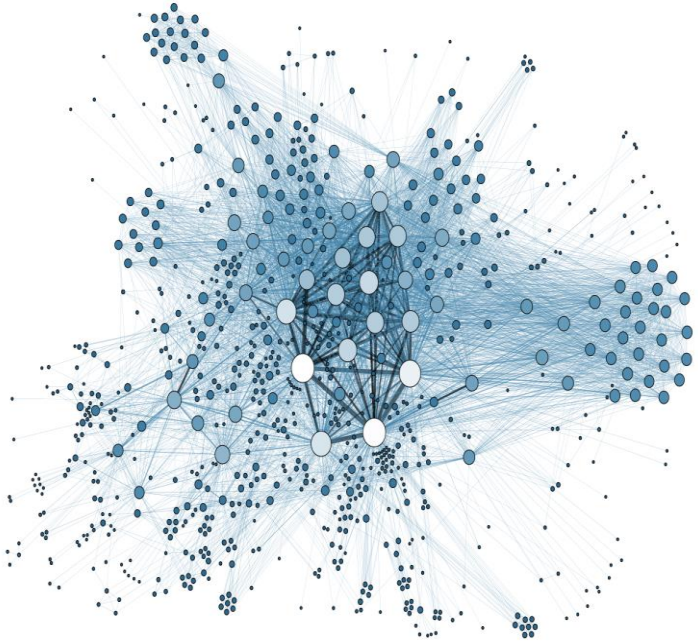
Natural Resource Management (NRM) boards (FORMAL)
Community groups (INFORMAL)

(Coffey and O'Toole 2012; O'Toole et al. 2013)



SOCIAL **NETWORKS**

SNA seeks to explain how social interaction is conditioned by the patterns of connection between people (actors).



1. high betweenness centrality → gatekeepers / brokers
2. mapping coastal networks and then connecting with central actors → facilitate the distribution of information
3. Identifying actors for inclusion in 'boundary spanning' projects

(Clarke et al. 2013; Scott 2014)

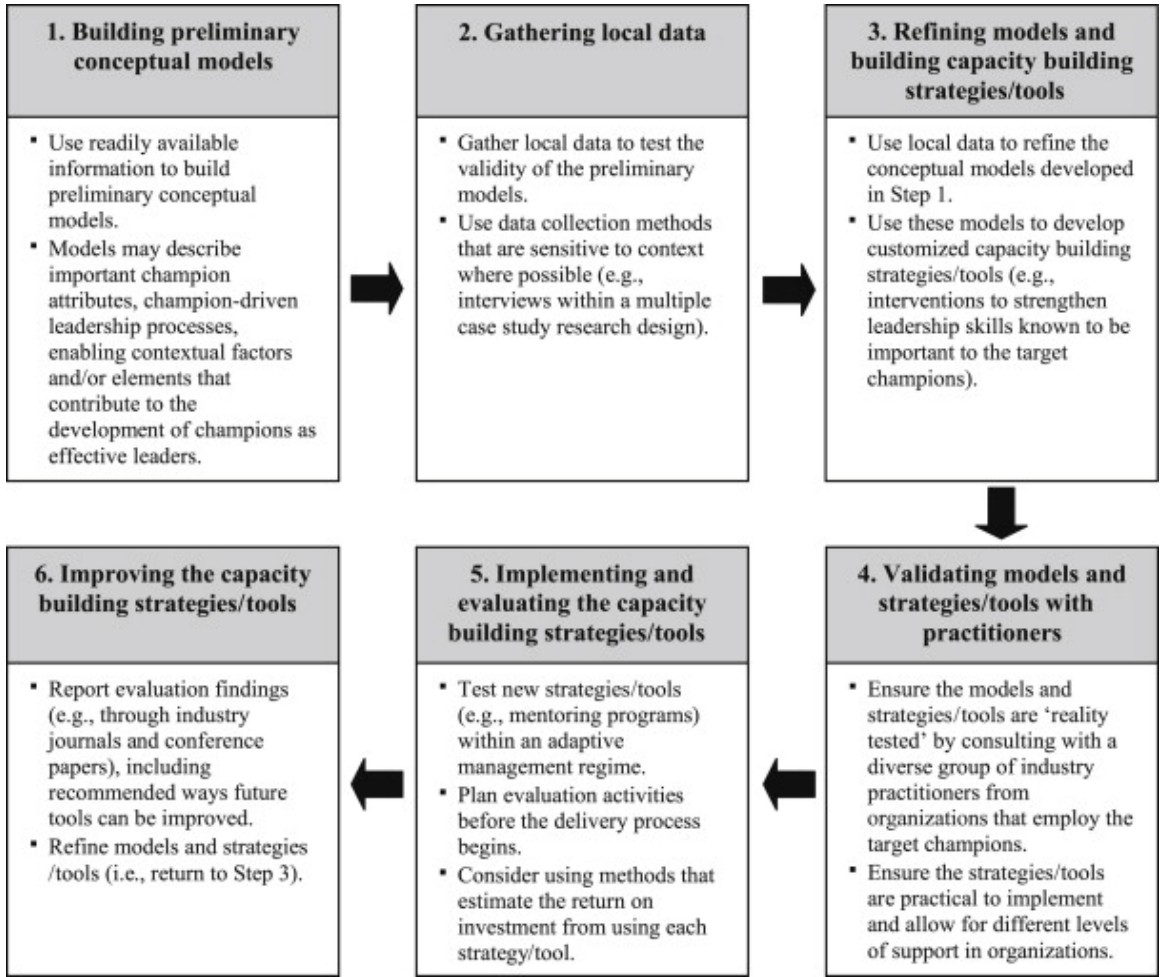
COASTAL **CHAMPIONS**

Key characteristics of coastal champions

1. Effective communicator
2. Extensive knowledge
3. Effective Networker
4. Passionate
5. Persistent
6. Credible
7. Longevity
8. Friendly
9. Committed
10. Enthusiastic
11. Hard Working
12. Selfless
13. Innovative
14. Determined

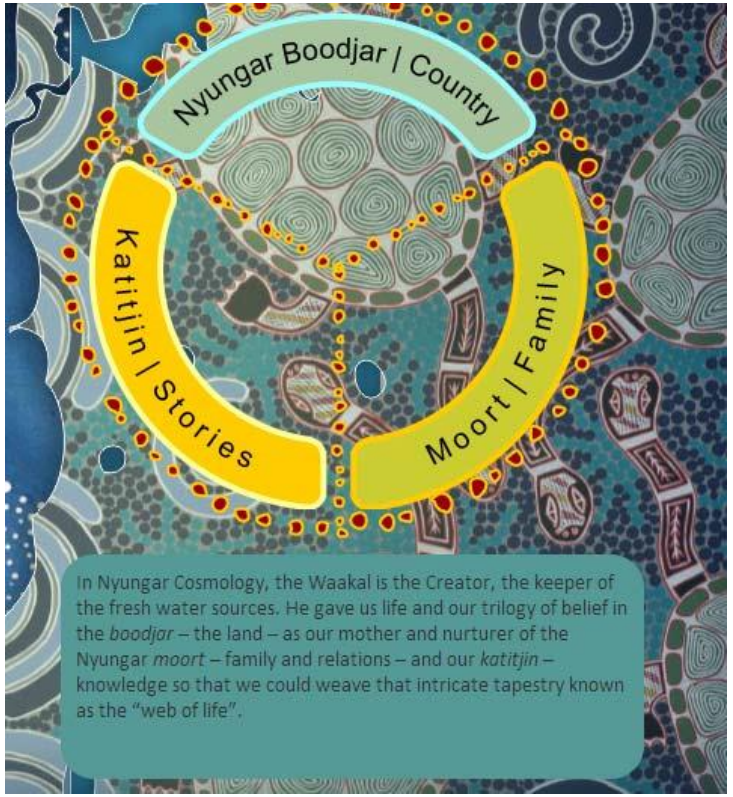
(Mumford's 2012; Taylor et al 2012)

FOSTERING COASTAL CHAMPIONS



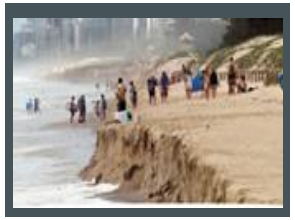
COASTAL **CHAMPIONS - NETWORKS**

Major strategies of science uptake into Australian coastal policy



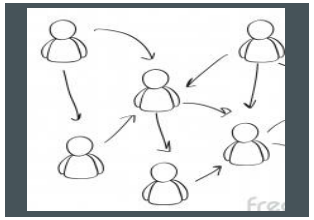
http://coastalcluster.org.au/node/271

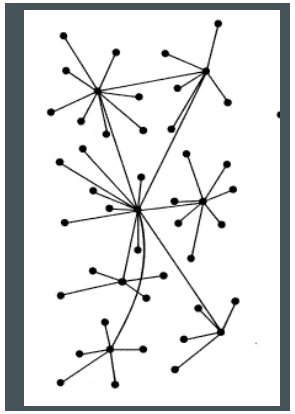
SUCCESSFUL INFLUENCERS OF SCIENCE UPTAKE



- Maintain integrity and credibility
- Be persistent
- Understand different motivations and views

- Build and maintain relationships
- Disseminate information
- Communicate effectively





- Identify and attend forums for developing relationships
- Communicate indirectly - through the media
- Communicate widely - publish in journals with wide readerships, multi-disciplinary conferences

IN CONCLUSION

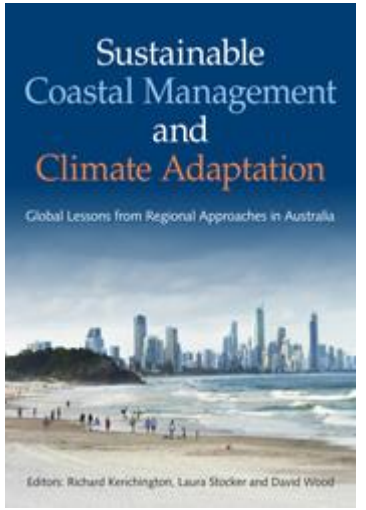
- **Conventional systems** of government have not been very successful in resolving coastal management problems.
  - lack of progress is partially attributable to inadequate representation in governance processes of the variety of knowledges present on the coast.
- Current approaches to **coastal adaptation planning** are likely to be beset by:
  - complex processes and uncertain understandings;
  - diverse forms of legitimate knowledge / multiple sources of fragmented information;
  - constrained /conflicting and planning horizons and timeframes;
  - sensitivities regarding the release of information;
  - the sense that coastal adaptation is political.

IN CONCLUSION

- **Scientific knowledge** is central to good governance, providing key information about environmental changes and adaptation, increasing stakeholder awareness of the impacts of climate change and building effective action.

- **Knowledge** - consisting primarily of scientific knowledge, but also of managerial, lay and Indigenous knowledge

- It has to be **adaptive** and deal with temporal scale challenges:
  - Biophysical – change medium to long term _ generational
  - Socioeconomic – change short to long term_decadal
  - Political – short term – fig leaf? 1-4yrs
  - Catastrophic – instantaneous



THANK YOU! OBRIGADO!

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Photos removed.