



Marine Estate
Management Authority

Draft Statewide Threat and Risk Assessment (TARA)



Agenda

Time	Session	Lead
10.00 10.05	Welcome and housekeeping	Program Leader
10.05 10.20	Introduction and context	Senior Officer
10.20 11.10	TARA process and outputs	Facilitator
11.10 11.30	Using a risk matrix	Facilitator
11.30 12.00	Community engagement and making a submission	Program Leader
12.00 12.30	LUNCH	
12.30 12.50	TARA findings	Facilitator
12.50 14.20	Workshop TARA risk matrices	Facilitator
14.20 14.30	Where to from here	Program Leader

Session 1 – Introduction and Context



Introductory Video

Chair of the Marine Estate Management Authority



Our Marine Estate

- 1300km of coast extending 5.6km offshore
- 184 estuaries
- Subtropical - temperate influences
- 85% of NSW population live within 50km of the coast
- 11 coastal Aboriginal nations
- 6 marine parks, 12 aquatic reserves





7.5 million
people live along the NSW coastine

1,250 km
coastline



755
beaches

184
estuaries



1.8 million
people go boating each year

800,000
recreational fishers



\$80 million
NSW wild fisheries annual catch

\$6.5 billion
ports contribution to the NSW economy annually



6
marine parks

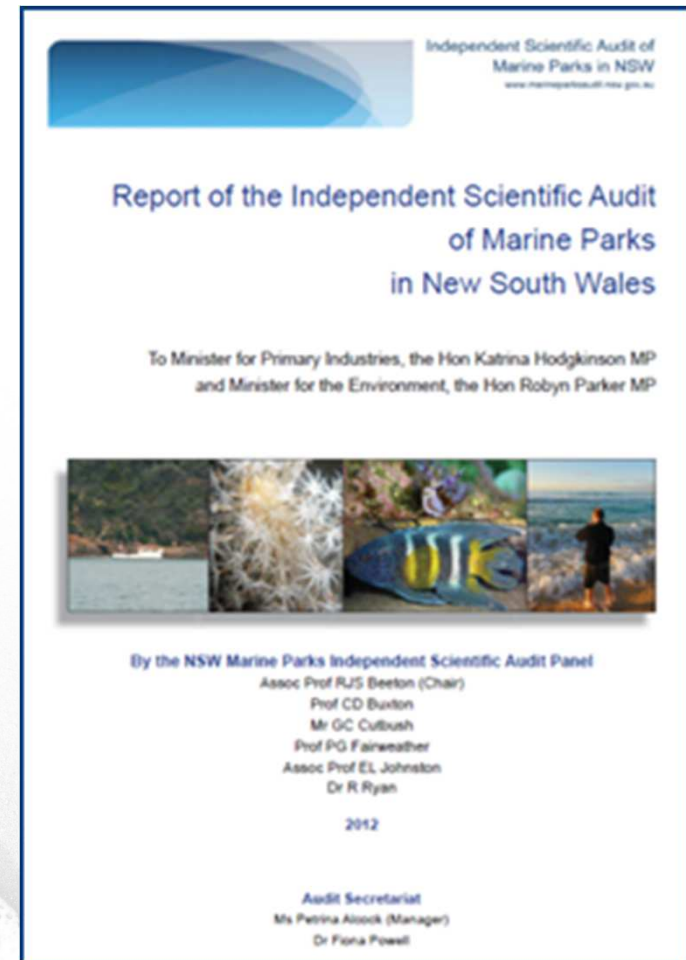
12
aquatic reserves



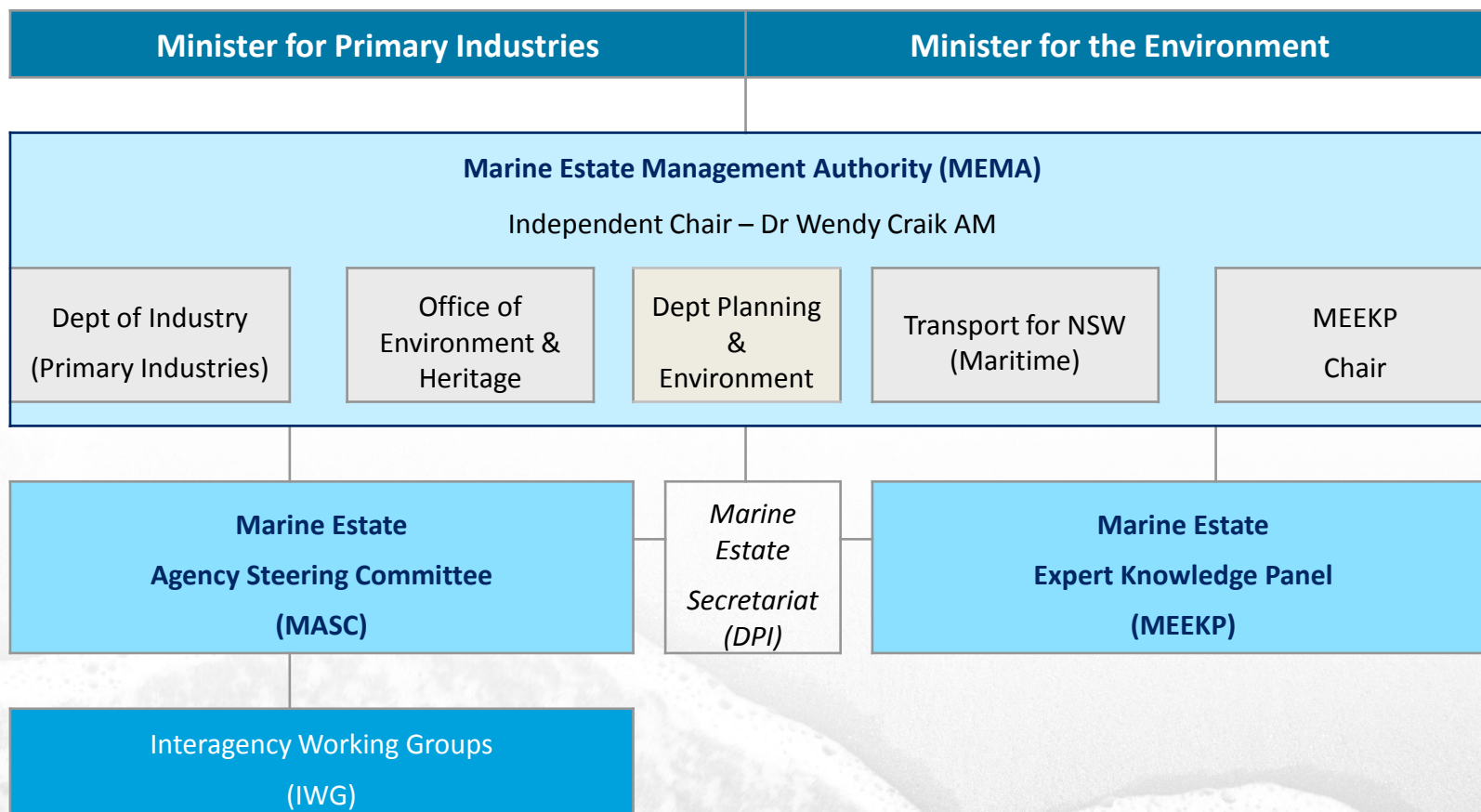
www.marine.nsw.gov.au

Context

- In June 2011 the Independent scientific audit of marine parks in NSW was commissioned to inform future Government policy.
- Two overarching recommendations:
 - The governance of the NSW Marine Estate be reorganised by bringing the entire estate under one legislative and administrative structure - **MEMA was established.**
 - Science for the NSW Marine Estate be reorganised under an Independent Scientific Committee - **MEEKP established.**



MEMA Agencies & Reporting



Legislation

- *Marine Estate Management Act 2014*
- *Marine Estate Management Regulation 2009*
- *Marine Estate Management (Management Rules) Regulation 1999*

The objects of the Act:

(a) to provide for the management of the marine estate of NSW consistent with the principles of ecologically sustainable development in a manner that:

(i) promotes a biologically diverse, healthy and productive marine estate, and

(ii) facilitates:

- economic opportunities for the people of NSW, including opportunities for regional communities, and
- the cultural, social and recreational use of the marine estate, and
- the maintenance of ecosystem integrity, and
- the use of the marine estate for scientific research and education,

(b) to promote the co-ordination of the exercise, by public authorities, of functions in relation to the marine estate,

(c) to provide for the declaration and management of a comprehensive system of marine parks and aquatic reserves.

MEMA Vision

*Healthy coast and sea,
managed for the greatest well-being of the
community, now and into the future*

Healthy coast and sea,



- clean and safe waters
- biologically diverse and resilient ecosystems

managed for the greatest well-being of
the community,



- accessible to the community
- maximum economic, social and environmental benefits

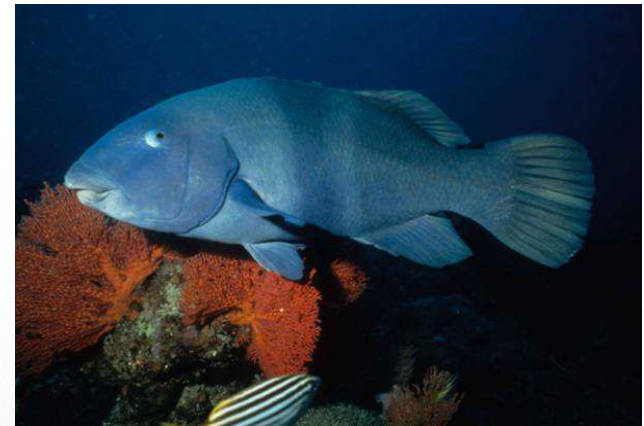
now and into the future



- key community benefits maintained and enhanced for current and future generations

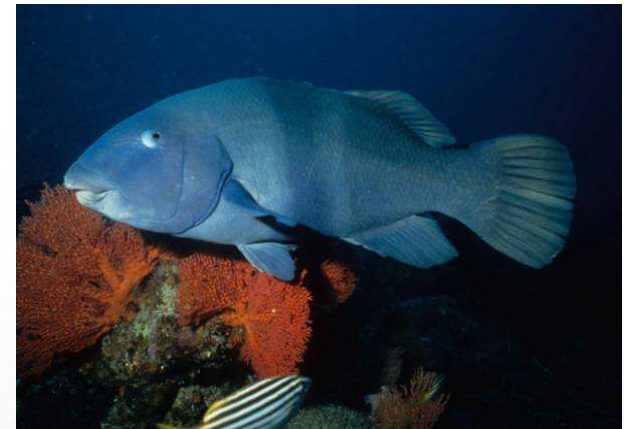
MEMA Projects

- Marine Estate Management Act & Regulations
- Marine estate community survey (2014)
- Threat & risk assessment framework (TARA)
- Hawkesbury Shelf Marine Bioregion assessment
- Marine estate threat & risk assessment
- Marine Estate Management Strategy
- Marine Park Pilots
- Social, Economic & Environmental Monitoring Program



Draft Statewide TARA

- The statewide TARA is:
 - a key commitment of the NSW Government
 - requirement under the MEM Act (every 10 yrs)
- Key input to the NSW Marine Estate Management Strategy
- It's development and implementation is a multi-agency approach
- It is based on evidence (over 600 scientific reports) and informed by community, industry and stakeholders through various mechanisms
- Guided by MEMA and Expert Knowledge Panel





Marine Estate
Management Authority

Five step decision making process



Other Government reforms

There are several coastal and marine reforms underway in NSW at present. An integrated approach is facilitated through various mechanisms including MEMA agency partnerships

- Coastal reforms
- Commercial fishing reforms
- Biodiversity legislation review
- Boating and infrastructure in NSW
- Regional ports strategy development

Purpose of Workshops

- Engage with stakeholders on the draft Statewide TARA report
- Provide the community and stakeholders with:
 - an understanding of the TARA; and
 - the opportunity to :
 - i. identify omissions or inaccuracies within the draft
 - ii. review the evidence base used
 - iii. give additional evidence to inform the finalisation of the TARA
 - iv. provide local & regional examples where available
- Provide the community and stakeholders with an understanding of how to provide a submission and how their feedback will be used
- Outline timeframes for engagement

Session 2 – The TARA Process and Outputs



Introductory Video

TARA Risk Assessment Facilitator – Greg Fisk



What is a Threat and Risk Assessment?

Key Messages

- Process designed to identify, assess and **prioritise** threats and their associated risks to community benefits
- The output of the TARA is a **risk register** (threat vs benefits) that will be used to inform future management

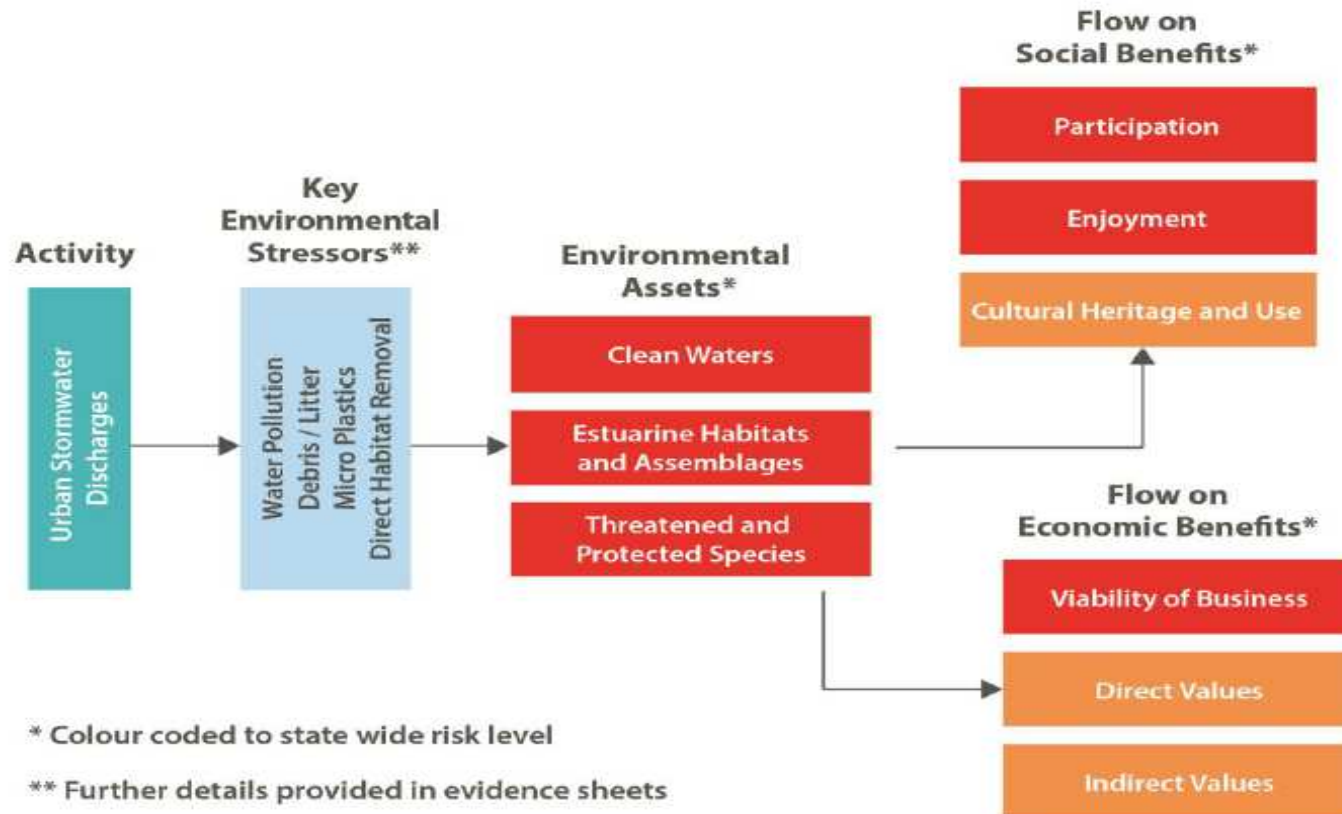
Why has the TARA been done?

- Step 2 of the 5 Step Process - required by the *Marine Estate Management Act (2014)*
- Needed a tool for determining management priorities for the marine estate in a strategic and transparent way
- Evidence based approach highlights where knowledge is lacking and further information is needed
- Evidence can relate to both natural and social science
- Risk processes are useful for identifying and dealing with uncertainty – a significant issue for the marine estate

What is the difference between a 'Threat' and a 'Risk'?

- A **threat** is an activity, event or process that poses a potential level of risk to an environmental asset or social or economic benefit.
- A **stressor** is a consequence of a threat activity that causes an adverse effect on an asset or benefit.
- A **risk** is the chance of something happening that will have an impact on achieving environmental, social or economic objectives.

Example of the Relationship between Threat Activities, Stressors, Assets and Benefits in the TARA



An activity (in this case urban stormwater discharge), impacts environmental assets through applying stressors, this has flow on effects for dependent social and economic benefits.

How was the TARA developed?

- MEMA developed the TARA Framework document to formalise the process
- Drew on models from elsewhere – including the Great Barrier Reef Marine Park Outlook Report
- TARA places a stronger emphasis on social and economic benefits
- Underpinned by ISO 31000 – international standard for risk assessment
- The Framework was run as a pilot in the Hawkesbury Shelf marine bioregion
- It has now been applied across the State (the draft Statewide assessment)



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Threat and Risk Assessment Framework for the NSW Marine Estate



Benefit Categories

Environmental Assets

Environmental Assets separated between:

- Estuaries
- Open Coasts and Marine Waters

Assets include:

- Clean Water
- Habitats (corals, seagrass, beaches, etc.)
- Protected species and communities (including protected fish species, bird species, turtles and marine mammals)

Benefit Categories

Social Benefits

- Participation
 - Safety, health and wellbeing including relaxation
 - Socialising and sense of community
- Enjoyment
 - Enjoying the biodiversity and beauty of the marine estate
 - Consumptive use (catching a fish)
- Cultural Heritage
 - Tangible
 - Intangible

Benefit Categories

Economic Benefits

- Indirect economic benefits (intrinsic and bequest values)
- Affects business viability (employment and value of production)
- Direct economic benefits (individual enjoyment value – consumer surplus)

Threats that affect the flow of benefits

- Resource use (fishing, dredging, tourism activities, etc.)
- Environmental stressors such as land-based water pollution
- Conflicts between or among users
- Climate change
- Access
- Public safety
- Effects of Regulation

Risk Assessment Process in TARA

1. A threat to a benefit 'actually being realised'
2. The risk assessment was completed based on a perception of the effectiveness of the current regulations

Table 1: Risk assessment matrix

LIKELIHOOD	LEVEL OF RISK				
ALMOST CERTAIN	MINIMAL	LOW	MODERATE	HIGH	HIGH
LIKELY	MINIMAL	LOW	MODERATE	HIGH	HIGH
POSSIBLE	MINIMAL	MINIMAL	LOW	MODERATE	HIGH
UNLIKELY	MINIMAL	MINIMAL	MINIMAL	LOW	MODERATE
RARE	MINIMAL	MINIMAL	MINIMAL	MINIMAL	LOW
CONSEQUENCE LEVEL	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC

How were the risks determined?

- A series of workshops with experts
- At the workshops the MEMA and independent experts:
 - reviewed and agreed on categories of threats and benefits (across environment, social and economic)
 - formally assessed the consequence and likelihood for each threat to each benefit
 - assigned a risk level to that threat (minimal, low, moderate, high)
- Risks had to be justified by reviewing the evidence base contained in the background reports and from expert opinion

Evidence-Based Approach

- Over 600 scientific references reviewed
- Outputs of the Marine Estate Community Survey (2014)
- Environmental TARA Background Report (2016)
- Social and economic background information report on the NSW marine estate (Vanderkooi Consulting, 2015)
- Sea countries of New South Wales: a benefits and threats analysis of Aboriginal people's connections with the marine estate (Feary, 2015)
- Subject matter expert opinion from independent experts that participated in the assessment

Example of the Output – Environmental TARA Risk Matrix

		Clean waters											
		Estuarine waters			Saltmarsh			Mangrove			Seagrass		
Region		North	Central	South	North	Central	South	North	Central	South	North	Central	South
Shipping	Large commercial vessels and associated port activities and industries (trade ships, cruise ships, etc.)	Low	Moderate	Low	Minimal	Moderate	Minimal	Minimal	Moderate	Minimal	Minimal	Moderate	Low
	Small commercial vessels (ferries, charter boats, whale watching vessels, fishing vessels, etc.)	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	Low
Commercial fishing	Estuary General	Minimal	Minimal	Minimal	Low	Minimal	Minimal	Low	Minimal	Minimal	Low	Low	Low
	Estuary Prawn Trawl	Low	Minimal	N/A	Minimal	Minimal	N/A	Minimal	Minimal	N/A	Low	Low	N/A
Charter fishing	Line fishing	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Low	Low	Low

Evidence Table – Environmental TARA

Seagrass in Estuaries

Seagrass

<u>Resource use</u>	<u>Activity</u>	<u>Region</u>	<u>Risk level</u>	<u>Conseq</u>	<u>Likelihood</u>	<u>Key stressors</u>	<u>Confidence</u> A: adequate L: limited I: inferred	<u>Spatial extent</u> L: local R: regional
Shipping	Large commercial vessels and associated port activities and industries (trade ships, cruise ships)	Central	moderate	major	possible	Water pollution, physical disturbance - major impacts were considered possible due to potential oil spills and physical disturbance, the moderate resilience of the habitat, and the level of this activity in the identified ports. See section 6.1.1 for further details.	L	L: Main ports only, but particularly Botany Bay and Sydney Harbour
		South	low	major	unlikely	Water pollution, physical disturbance - major impacts were considered unlikely due to low risk of oil spill and physical disturbance reflecting the level of this activity in several local areas. See section 6.1.1 for further details.	L	L: Jervis Bay, Twofold Bay
	Small commercial vessels (ferries, charter boats)	All	low	moderate	possible	Water pollution, physical disturbance - moderate impacts were considered possible due to physical disturbance and oil spills from vessel traffic. See section 6.1.1 for further details.	L	L: Several large estuaries, particularly Botany Bay, Sydney Harbour, Hawkesbury
Commercial fishing	Estuary General	All	low	minor	likely	Physical disturbance –minor impacts were considered likely to occur from this activity at a local scale under current management arrangements. See section 6.1.2 for further details.	L	L: estuaries where commercial fishing allowed only
	Estuary Prawn Trawl	North Central	low	minor	likely	Physical disturbance, water pollution –minor impacts from physical disturbance and sediment res-suspension were considered likely to occur from this activity at a local scale under current management arrangements, and only at	L	L: Hawkesbury only

Example of the Output – TARA Risk Matrix for Social Benefits

		Safety, health & wellbeing (including relaxation)			Socialising & sense of community		
Social and Economic Threats		North	Central	South	North	Central	South
Tier 1 threats	Stressors						
Resource use conflict	Conflict over resource access and use	Low	Low	Low	Low	Low	Low
	Anti-social behavior and unsafe practices	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Overcrowding / congestion	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Loss or decline of marine industries	Moderate	Low	Moderate	Low	Minimal	Low
	Excessive or illegal extraction	Low	Low	Low	Minimal	Minimal	Minimal

Evidence Table – Social and Economic TARA

‘Conflicts over resource access’ on the social benefit of ‘Safety, health & wellbeing (including relaxation)’

Cell no.	Consequence (C)	Likelihood (L)	Overall risk rating (C x L)	Justification narrative/evidence	Confidence A, L, I (?)	Spatial extent Local (site) Regional Statewide	Temporal 1-2 years 10 years 20 years	Trend Decreasing Stable Increasing
1	Moderate	Possible	Low	<p>Conflict between sectors relating to resource access and use is common across the state. While highly localised and sectoral (rather than community wide) these issues were considered to be of a moderate consequence because they occur with sufficient frequency and regularity to justify consideration at a state wide spatial scale. Specific examples including the <i>possible</i> impacts to safety, health and wellbeing include:</p> <ul style="list-style-type: none"> • Safety: anecdotal reports of physical threats assaults and intimidations between competing sectors or between individuals within a sector and links between high value resources (esp. abalone) and organised crime (expert opinion). Danger from competing activities such as powered vessels and passive uses (swimmers) [1] • The Marine Estate Community Survey results identified danger to swimmers from watercraft as the third priority social threat for the NSW general population (31%) and the South East (36%) region. Intercept survey participants in Hawkesbury / Pittwater shared this third priority (23%). Impacts of fishing on snorkeling and Scuba diving were identified as a lower priority threat [1]. • Health: implications for mental and physical health associated with above mentioned conflict and dispute, especially within the commercial fishing sector. FRDC study by King <i>et al.</i> highlighted the impact of conflict between recreational and commercial fishers on the mental health of fishers. In addition lack of bonding social capital within the industry is having a detrimental impact on fisher health and ability to engage with the community and policy makers [2, 3] • Wellbeing (including relaxation): the relaxation benefits associated with use of the coast can be threatened by competing use of coastal land (e.g. development of the coastal zone) and restriction of public access (e.g. through area closures, physical barriers, changes to access arrangements such as roads etc.). An upcoming report into recreational fishing motivations highlights the importance of relaxation and escape as a key motivation of the vast majority of recreational fishers throughout the state. Barriers identified through this study included concerns associated with conflict with commercial fishing and loss of access through MPAs [4]. 	L	Local but common across the state in localised settings	1-2 years	Stable

Limitations of the draft Statewide TARA

- Lack of basic information and evidence – knowledge gaps about baseline extent and conditions, about how the estate is being used and enjoyed
- Lack of applied knowledge about the effect of threats on benefits including for example the carrying capacity or resilience of systems to change
- Subjective in terms of the issues, what people value about the marine estate and the effectiveness of management controls
- Is a starting point to be improved over time as it continues and more knowledge and expertise is developed (10 yearly assessment legislated)

Additional Information Collected About Risks

1. Assessed if the identified risks were occurring -
 - Now - currently or in the short term (1-2 years)
 - In the longer term future (e.g. in 20 years)
 - For climate change - considered risks at 50 years from the current time (2066)
2. Trend in the risk – Was it Increasing, Decreasing or Stable?
3. The geographic extent of the risk of the threat being realised –
 - Highly localised
 - **Local**
 - **Regional**
 - Region specific
 - Statewide

Spatial Extent of Risks

Term	Definition	Example
Highly Localised Risk	Occurring at a site/premises scale or otherwise only occurring at a very small number of defined locations along the coast	<ul style="list-style-type: none">• Impacts of thermal discharges from an industrial facility
Localised Risk	Occurring within or across regions but at a localised scale (e.g. effecting parts of an estuary) or otherwise at a limited number of locations (operating in a small number of estuaries)	<ul style="list-style-type: none">• Impacts on the marine environment from port and shipping operations• Impacts from 4WD on beaches
Regional Risk	Generally occurring across the whole or large parts of a region but does not constitute a Statewide risk	<ul style="list-style-type: none">• The majority of impacts will be in this category
Statewide Risk	A regional risk that is occurring in a widespread manner at a similar scale and intensity across all three regions	<ul style="list-style-type: none">• Water pollution associated with urban stormwater runoff

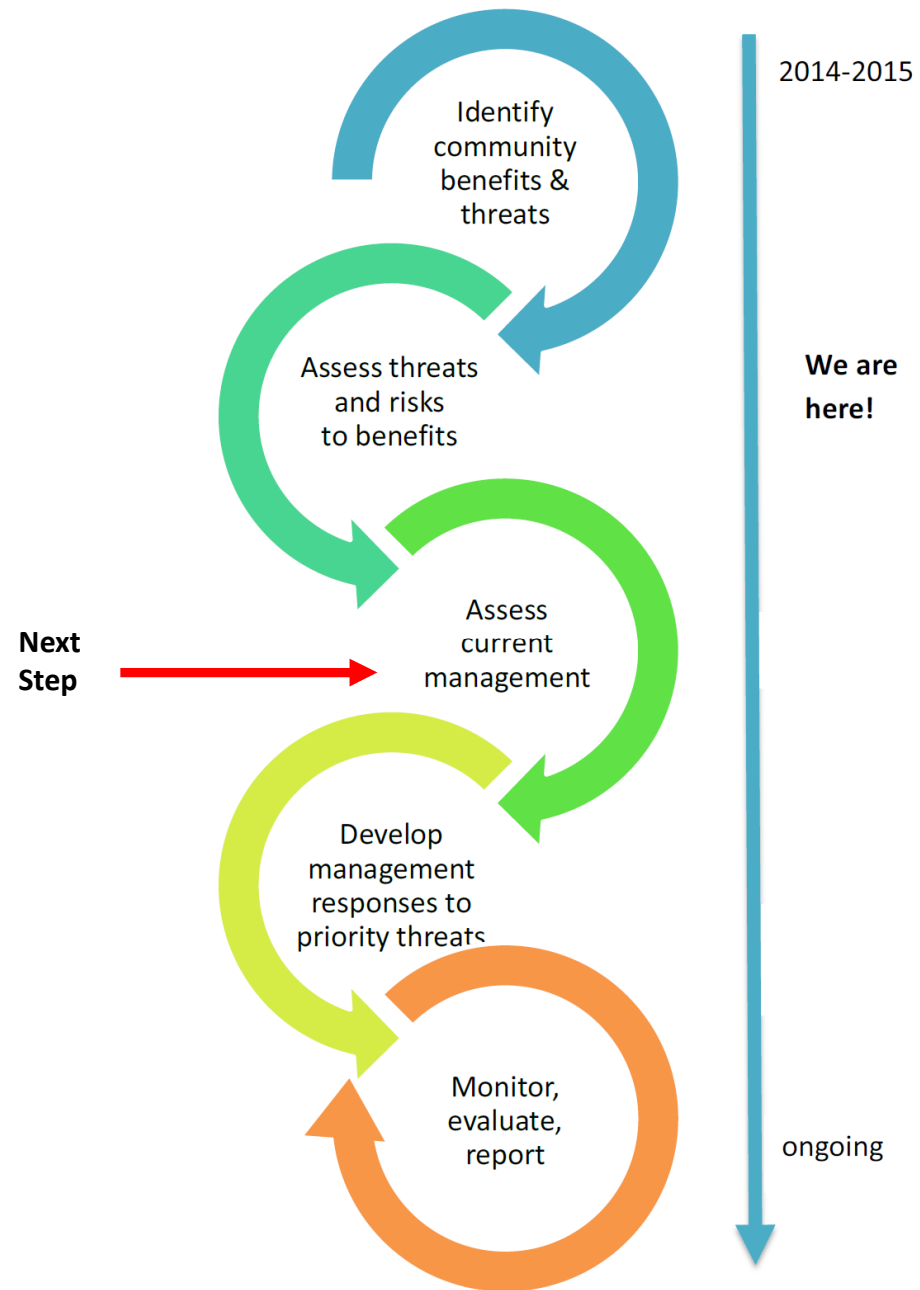
What is our level of confidence in the risk rating based on the evidence?

- Adequate – there is adequate, high quality evidence in the region (A)
- Limited – there is limited evidence, for example, there may be limited evidence for the region but evidence for other parts of the state (L)
- Inferred – there is very limited evidence, for example, there may be limited evidence for the state, but evidence from elsewhere (I)
- MEMA has identified ‘inferred risk ratings’ as key knowledge gaps

So what comes next?

Step 2 – Draft TARA provided for public comment and collection of additional evidence

Step 3 – MEMA agencies 'Assess current management' prior to developing management responses



Risk Tolerance

Risk Levels	Description	Likely Management Action
Minimal	Risk currently acceptable but trend in the risk to be tracked over time	Existing control measures (if any) are suitable Monitoring of risk likelihood and consequence over time to identify if risk is increasing, decreasing or staying the same
Low	Risk likely to be acceptable but trend in the risk to be tracked over time	Existing control measures are suitable at the current time Monitoring of risk likelihood and consequence over time to identify if risk is increasing, decreasing or staying the same
Moderate	Risk may be acceptable with suitable risk control measures in place	Review of existing management controls or activities for the risk Increased or different management controls or activities may be needed
High	Risk less likely to be acceptable; additional risk control measures may be needed to be considered	Review of existing management controls or activities for the risk Increased or different management controls or activities likely to be needed

Issues to be looked at in *Step 3 – Current Management*

- Reason for high risk rating may be lack of implementation rather than a need for new regulation (new regulation not the only solution)
- Future management will seek to prioritise cost-effective initiatives that have a tangible risk reduction i.e. from 'High' to 'Moderate', or 'Moderate' to 'Low'.
- Government cannot manage all threats to a 'Low' or 'Minimal' risk; accept that some will need to be managed at 'Moderate' Level but with the aim to monitor risk and trend over time
- It may also be possible that MEMA agencies may not be able to manage some risks – need a new approach or multi-agency approach (to prevent falling through the cracks) or referral to another agency or regulator
- Recognise need to link with other initiatives where practicable (Coastal Reforms and other Government initiatives)

Session 3 – Using a Risk Matrix



Scenario Activity – Doing a Risk Assessment

Using a framework similar to the TARA

STEP 1: INFORMATION and CONTEXT

What are the hazards or issues you are assessing?

STEP 2: CONSEQUENCES

Use the information to assess the most probable/common consequences of the hazard. This could include -

- Fatality
- Major injuries (significant long term effects)
- Minor injuries (usually requiring several days off work)
- Negligible injuries (maybe first aid)

STEP 3: LIKELIHOOD

- Think about how people are likely to be exposed to each hazard and for how long

STEP 4: RATING THE RISK

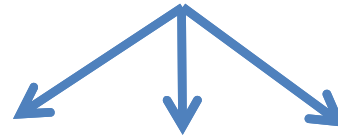
- Use the risk table to work out the risk associated with each hazard

RISK RATING TABLE (adapted from Australian/New Zealand Standard 4360:1995 – Risk Management)

**LIKELIHOOD
of Injury or
Harm to
health**



CONSEQUENCE of any injuries or harm to health



	Insignificant e.g. no injuries	Minor e.g. first aid onsite only	Moderate e.g. medical treatment	Major e.g. extensive injuries	Catastrophic e.g. fatalities
Very likely	MODERATE	MODERATE	HIGH	HIGH	HIGH
Likely	LOW	MODERATE	MODERATE	HIGH	HIGH
Possible	MINIMAL	LOW	MODERATE	HIGH	HIGH
Unlikely	MINIMAL	MINIMAL	LOW	MODERATE	HIGH
Highly unlikely (rare)	MINIMAL	MINIMAL	LOW	MODERATE	MODERATE

Scenario Context

Assess the risks of injury from two common recreational activities on the coast -

1. **walking on a public beach** along an estuary and stepping on something sharp
2. **fishing on a rocky foreshore** on the open coast and falling into the surf

Activity Steps (work with a partner in the audience) -

- A. Assess the most probable/common level of **consequence** from the activity/hazard?
- B. Assess how **likely** it is that the level of consequence would be reached?
- C. Combine the consequence and the likelihood using the matrix to assign a **risk score**
- D. What are some **factors** not provided in the context that could affect the risk scores?

Answers

Walking on a public beach:

- Consequence – stepping on something sharp on the beach – ‘Minor’ consequence (first aid needed)
- Likelihood of a stepping on sharp object on the beach and needing first aid – ‘Unlikely’ likelihood
- Minor x Unlikely = **Minimal** risk rating

Answers

Fishing on a rocky foreshore with waves breaking below:

- Consequence – Falling off the rocks – ‘Moderate’ consequence (requiring medical treatment)
- Likelihood of a fall – ‘Unlikely’
- Moderate x Unlikely = **Low** risk rating

Answers

Other factors that could affect the risk score could include, for example:

- External to the person (weather conditions, distraction by catching a fish, lots of rubbish or other sharp objects at the location such as oysters/coral)
- Internal to the person (have a high experience level with the activity, know the area well, wearing appropriate footwear, wearing a lifejacket)

Example of a Consequence Table from the Draft Statewide TARA

Consequence level	Consequence of impacts on clean waters
Insignificant	No measurable negative impacts on water quality are or will be possible against natural variations.
Minor	Barely measurable negative impacts on water quality outside of natural variation are or will be evident, and any impacts identified have not or will not substantially affect environmental processes.
Moderate	Measurable and on-going negative impacts on water quality are or will be evident in one or more locations. Nevertheless, the level, duration and/or the proportion of area affected have not or will not influence the overall recovery capacity, and the environmental processes in most of the affected location(s) are or will be maintained.
Major	Substantial measurable and on-going negative impacts on water quality are or will be evident in one or more locations, and the level, duration and/or the proportion of area is such that environmental processes are or will be adversely affected.
Catastrophic	Substantial measurable on-going negative impacts on water in one or more locations are or will be evident that are or will endanger environmental processes and their underlying ecological assets in the long-term.

Example Likelihood Table from the Draft Statewide TARA

Likelihood level	Likelihood of impacts
Rare	Never reported in this situation, but still plausible within the timeframe (< 5%)
Unlikely	Uncommon, but has been known to occur elsewhere. Expected to occur in the bioregion only in specific circumstances within the timeframe (5-30%)
Possible	Some clear evidence exists to suggest this is possible in this situation within the timeframe (30-50%)
Likely	Expected to occur in this situation within the timeframe (50-90%)
Almost certain	A very large certainty that this will occur in this situation within the timeframe (>90%)

Risk Matrix used in the Draft Statewide TARA

Table 1: Risk assessment matrix

LIKELIHOOD	LEVEL OF RISK				
ALMOST CERTAIN	MINIMAL	LOW	MODERATE	HIGH	HIGH
LIKELY	MINIMAL	LOW	MODERATE	HIGH	HIGH
POSSIBLE	MINIMAL	MINIMAL	LOW	MODERATE	HIGH
UNLIKELY	MINIMAL	MINIMAL	MINIMAL	LOW	MODERATE
RARE	MINIMAL	MINIMAL	MINIMAL	MINIMAL	LOW
CONSEQUENCE LEVEL	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC

Session 4 – Engagement and How to Make a Submission



Engagement

- Public exhibition 18 January – 31 March
- Six general workshops - February
 - Newcastle, Coffs Harbour, Ballina
 - Kiama, Narooma, Sydney
- Aboriginal focus group workshops – March
 - Byron Bay, Coffs Harbour, Port Macquarie, Newcastle
 - Bega, Ulladulla, Nowra, Wollongong, Sydney
- Mail out to stakeholders / media release / articles
- NSW marine estate website – www.marine.nsw.gov.au
- Online interactive tool to interrogate data and provide a submission

Supporting information

- Draft statewide TARA Report
- Environmental TARA Background Information Report
- Social and Economic Background Information Report
- Social and Economic TARA reference list
- Sea countries of NSW: a benefits and threats analysis of Aboriginal people's connections with the marine environment
- Frequently Asked Questions
- Fact Sheet
- Glossary

We need your feedback

Key things to provide feedback on:

- Do you agree with the risk levels assigned to threats?
 - If no, provide additional evidence to assist us to reconsider the risk rating
- Are there any gaps in information or threats not identified?
- Are there additional studies or research you are aware of to assist us to finalise the TARA?
- Are there local examples of threats to either the environmental assets or to the social and economic benefits you derive from the marine estate?

What is evidence?

Evidence provided in submissions should be:

- Scientific research or reports
- Unpublished data/research
- Supporting background reports

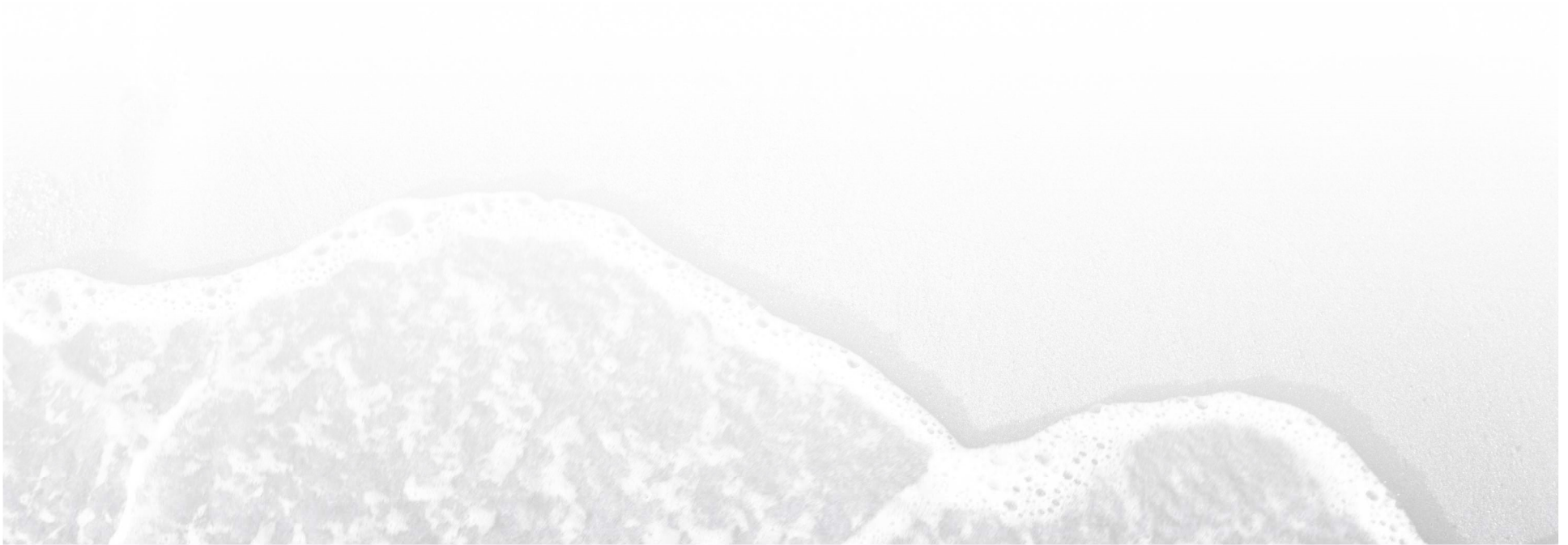
Public opinion is not considered evidence

All feedback will be considered, however the provision of evidence is most likely to influence changes to risk levels

How will your feedback be used?

- Workshop feedback, online submissions and additional evidence provided will be analysed by MEMA agency staff
- A submission report will be completed that includes a summary of submissions and a summary of workshop outcomes
- An interagency working group will review disputed risk levels and/or additional evidence to determine if a risk level should change (e.g. from a moderate risk to a high risk, or vice versa)
- Proposed changes to risk levels following this process will be reviewed by the independent Marine Estate Expert Knowledge Panel and recommendations provided to MEMA for further consideration
- The Statewide TARA will be finalised and inform the development of the Marine Estate Management Strategy and marine park pilots

TARA online interactive tool video demonstration



Session 5 – Findings of the Draft Statewide TARA



Draft Statewide TARA Report



"Where will our knowledge take you?"



**New South Wales Marine Estate
Threat and Risk Assessment Report**
Draft Report

November 2016



Marine Estate
Management Authority

- Introduction
- Methodology
- Key Findings of Environmental TARA
- Key Findings of the Social and Economic TARA
- Evaluation by the Marine Estate Expert Knowledge Panel
- Priority threats for consideration in future steps

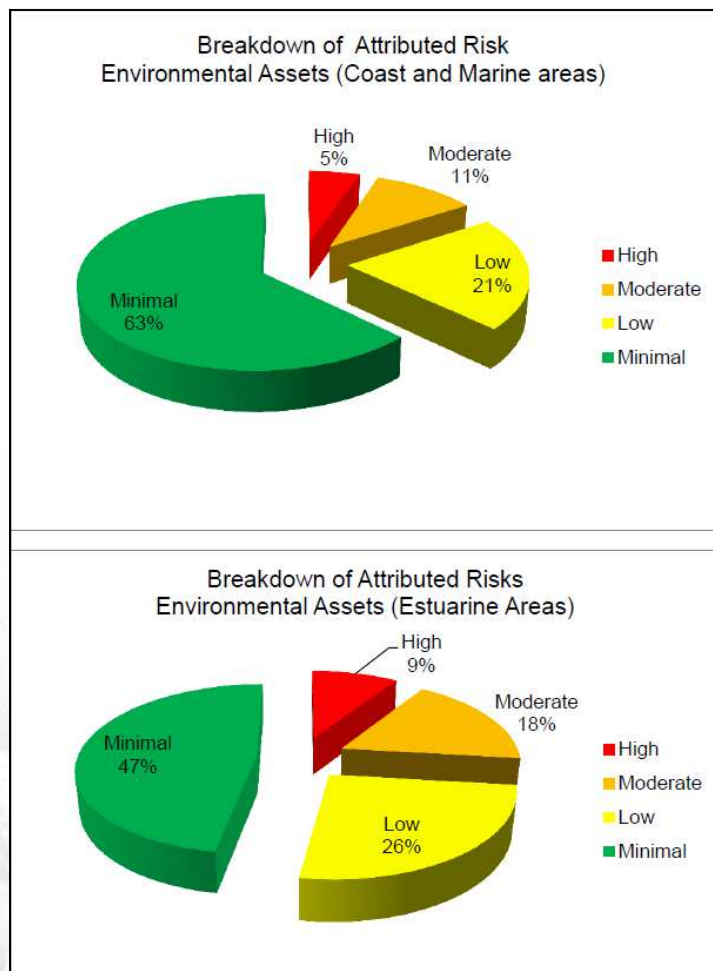
Regions

- Northern Region (Tweed Heads to southern Stockton Bight)
- Central Region (Stockton to Shellharbour - Hawkesbury Shelf marine bioregion)
- Southern Region (Shellharbour to the Victorian border)

Beaches			Shallow soft sediments			Deep soft sediments		
North	Central	South	North	Central	South	North	Central	South
	Minimal			Minimal			High	



Environment Findings



- Higher and greater risks in the estuaries
- Greater influence of land based activities
- Distribution of risks similar across geographic regions but notably:
 - Greater and higher risks in **Central region** estuaries
 - Slightly greater and higher risks in **Southern region** open coasts and marine areas

Statewide Priority Threats – With ‘High’ and ‘Moderate’ Risks to Environmental Assets

Priority Threats to Estuaries

- Estuary entrance modifications
- Urban stormwater discharge
- Agricultural diffuse source runoff
- Clearing riparian and adjacent habitat including wetland drainage
- Recreation and tourism -Boating and boating infrastructure
- Climate Change (20yrs)
- Navigation & entrance management and modification, harbour maintenance, etc.
- Sewage effluent and septic runoff
- Stock grazing of riparian and marine vegetation
- Modified Freshwater flows
- Foreshore development
- Recreation and tourism – Four wheel driving
- Commercial Fishing- Estuary General
- Oyster Aquaculture
- Recreational Fishing – Shore-based line and trap fishing
- Recreational Fishing – Boat-based line and trap fishing
- Beach nourishment and grooming

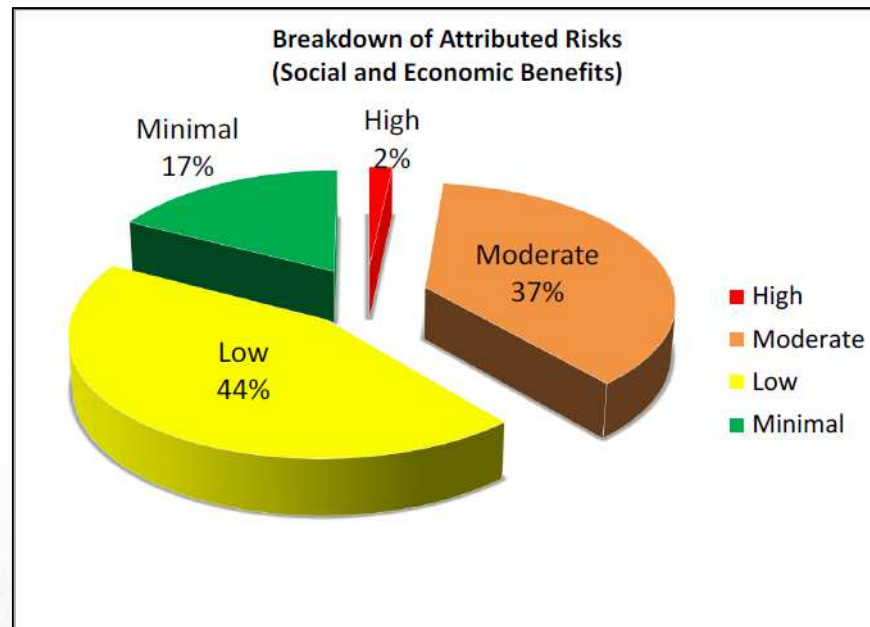
Priority Threats to Open Coasts and Marine Areas

- Climate Change (20yrs)
- Commercial Fishing – Ocean Trawl
- Commercial Fishing – Ocean Trap and Line
- Recreational Fishing – Boat-based line and trap fishing
- Foreshore development
- Urban stormwater discharge
- Commercial Fishing – Ocean Haul
- Recreational Fishing – Shore-based line and trap fishing
- Estuary entrance modification and breakwaters
- Beach nourishment and grooming
- Recreational Fishing – Hand gathering
- Charter activities – whale and dolphin watching
- Shipping – Small commercial vessels

Regional Variation of Priority Threats - Environmental

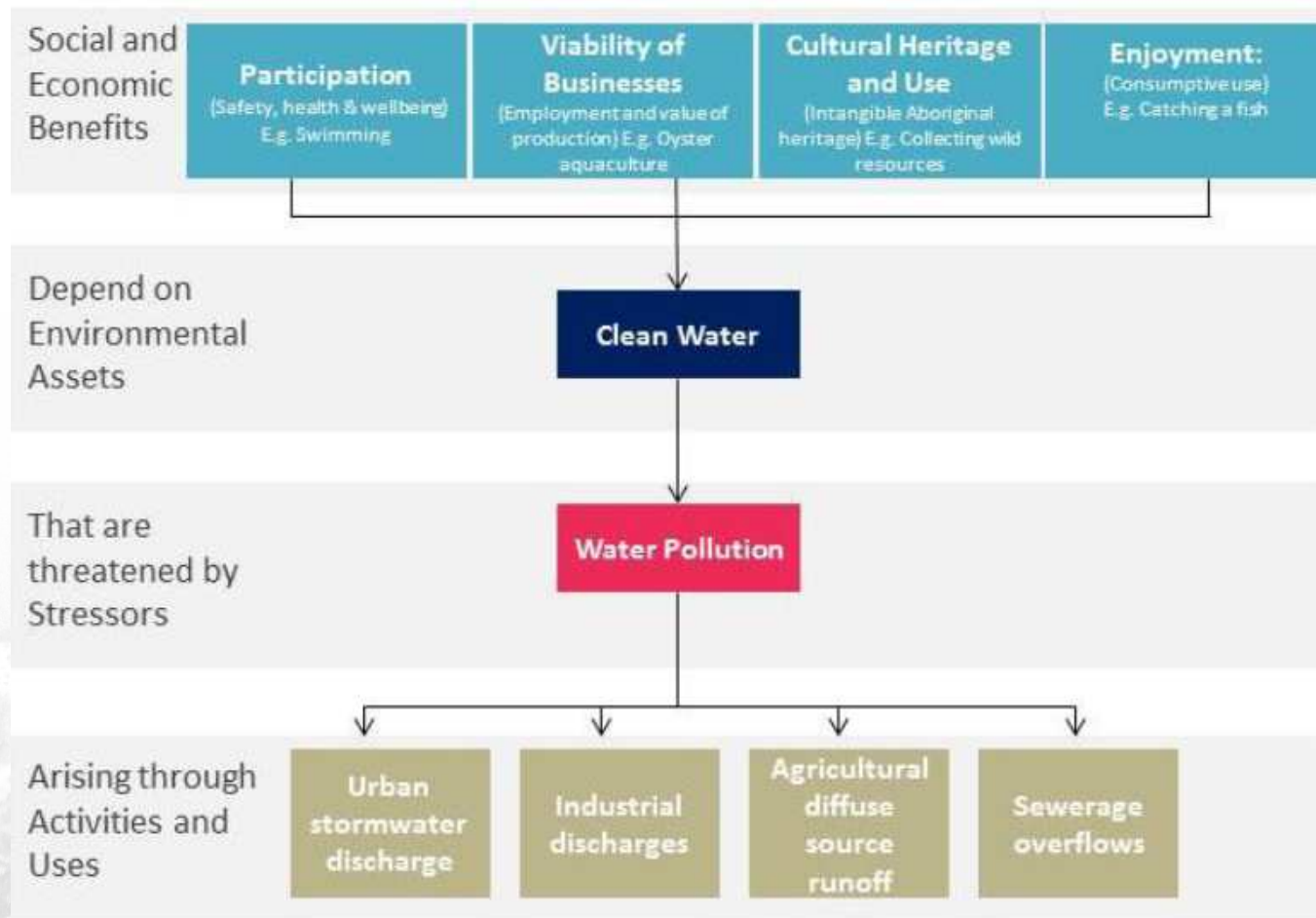
Threats to environmental assets for the North region	Threats to environmental assets for the Central Region	Threats to environmental assets for the South Region
<ul style="list-style-type: none"> • Agricultural diffuse source runoff (in estuaries) • Estuary entrance modifications (in estuaries) • Clearing riparian and adjacent habitat including wetland drainage (in estuaries) • Climate Change (20yrs) • Urban stormwater discharge (in estuaries) • Recreation and tourism -Boating and boating infrastructure (in estuaries) • Navigation & entrance management and modification, harbour maintenance, etc. (in estuaries) • Modified Freshwater flows (in estuaries) 	<ul style="list-style-type: none"> • Urban stormwater discharge • Estuary entrance modifications (in estuaries) • Recreational Boating - Boating and boating infrastructure (in estuaries) • Foreshore development • Agricultural diffuse source runoff (in estuaries) • Clearing riparian and adjacent habitat including wetland drainage (in estuaries) • Shipping - Large commercial vessels and associated port activities and industries (trade ships, cruise ships, etc.) • Climate Change (20yrs) • Sewage effluent and septic runoff 	<ul style="list-style-type: none"> • Estuary entrance modifications • Agricultural diffuse source runoff (in estuaries) • Climate Change (20yrs) • Urban stormwater discharge • Clearing riparian and adjacent habitat including wetland drainage (in estuaries) • Recreation and tourism -Boating and boating infrastructure (in estuaries) • Navigation & entrance management and modification, harbour maintenance, dredging etc. (in estuaries) • Stock grazing of riparian and marine vegetation (in estuaries) • Sewage effluent and septic runoff (in estuaries)

Social and Economic Findings



- Higher proportion of 'moderate' and 'low' risks
- Results indicative of knowledge gaps and uncertainty
- Distribution of risks:
 - Greater and higher risks in **Central region** (> population base)
 - Similar between **Northern region** and **Southern region**

Dependencies between environmental assets and social and economic benefits



Statewide Priority Threats –

With ‘High’ and ‘Moderate’ Risks to Social and Economic Benefits

- Climate change (20 years)
- Inadequate social and economic information
- Urban stormwater discharge
- Agricultural diffuse source runoff
- Anti-social behaviour and unsafe practices
- Limited or lack of access infrastructure to the marine estate
- Reductions in abundances of top and lower order trophic levels from commercial, recreational and charter fishing
- Litter, solid waste, marine debris and microplastics
- Lack of compliance with regulations (by users) or lack of compliance effort (by agencies)
- Inadequate, inefficient regulation, over-regulation (agencies)
- Loss of public access (either by private development or Government area closures)

Regional Variation of Priority Threats - Social and Economic

Threats to Social and Economic Benefits for the North region	Threats to Social and Economic Benefits for the Central Region	Threats to Social and Economic Benefits for the South Region
<ul style="list-style-type: none">• Climate change (20 years)• Agricultural diffuse source runoff• Inadequate social and economic information• Urban stormwater discharge• Reductions in abundances of top and lower order trophic levels from commercial, recreational and charter fishing• Anti-social behaviour and unsafe practices	<ul style="list-style-type: none">• Climate change (20 years)• Urban stormwater discharge• Litter, solid waste, marine debris and microplastics• Inadequate social and economic information• Anti-social behaviour and unsafe practices• Sediment contamination (toxicants in sediment; dioxins in Sydney Harbour, Cooks River)	<ul style="list-style-type: none">• Climate change (20 years)• Agricultural diffuse source runoff• Inadequate social and economic information• Urban stormwater discharge• Reductions in abundances of top and lower order trophic levels from commercial, recreational and charter fishing• Anti-social behaviour and unsafe practices

MEEKP Evaluation –

Cumulative Impact Issues and Key Knowledge Gaps

- Need better understanding of how reduction in fish assemblages (from all types of fishing) affect marine food webs and ecosystems - not just individual stock assessments
- Water quality in estuaries – multiple sources of impact in a finite waterbody
- Climate change can affect the marine estate as a whole – how do we start to build resilience?

Relationship with the Hawkesbury Shelf Marine Bioregion Assessment



HAWKESBURY SHELF **MARINE BIOREGION** ASSESSMENT Suggested management initiatives



- A TARA process was also used to inform the Hawkesbury Shelf Marine Bioregion Assessment
- These outputs used to inform the Draft Statewide TARA – ‘Central Region’ results
- A small number of risk ratings re-assessed and changed when comparing to use levels in other regions

Session 6 – Breakout Sessions on Risk Matrices



Objectives of the Activity

- Look at the outputs of the Draft Statewide TARA in detail
- Improve people's understanding of linkages between risk ratings and evidence
- Opportunity to give MEMA agencies direct feedback about where evidence is supported/not supported
- Opportunity to provide information and identify additional evidence and studies that may inform a re-evaluation of consequence and/or likelihood
- Identify local examples of where risks are occurring
- Assist people to make a submission and maximise its usefulness

Set Up – Two 45 minute Sessions

Table Colour Code	Session 1 Environmental TARA	Session 2 Social and Economic TARA
Blue Table	Resource uses that affect the environmental assets of Estuaries	Resource uses that affect the Social and Economic benefits derived from the marine estate
Yellow Table	Resource uses that affect the environmental assets of Coasts and Marine Waters	Governance of the marine estate including public safety and access availability that affect the Social and Economic benefits derived from the marine estate
Red Table	Land based impacts (including climate change) that affect the environmental assets of Estuaries	Environmental threats (including climate change) that affect the Social and Economic benefits derived from the marine estate
Black Table	Land based impacts (including climate change) that affect the environmental assets Coasts and Marine Waters	Environmental threats (including climate change) that affect the Social and Economic benefits derived from the marine estate

Participant Instructions

Materials –

- At your table you will each get a handout with a section of the TARA matrix from the draft Statewide TARA Report and accompanying evidence table

Instructions -

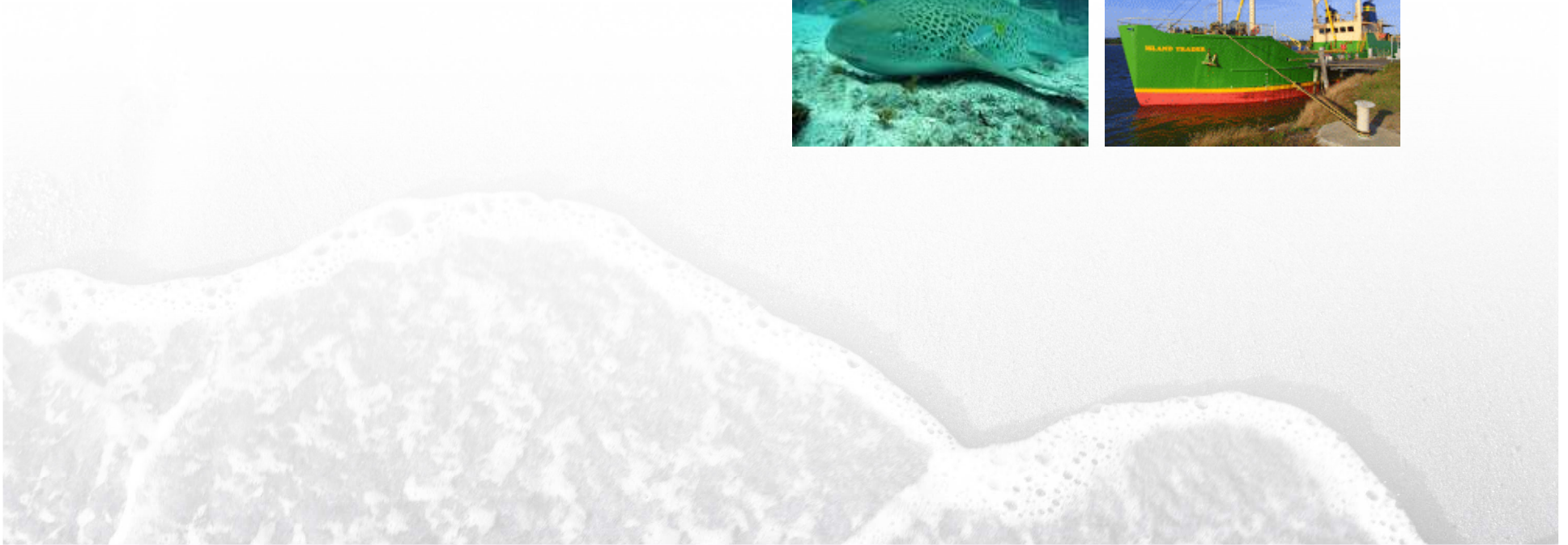
- Familiarise yourself with the risk ratings and the evidence (15 minutes)
- Following your review, consider three questions -
 1. Are there any particular risk ratings in the matrix you would question or change? (e.g. not high enough/too high?)
 2. Is the evidence supplied for that risk deficient or insufficient? Are there other studies or evidence that can be provided to the MEMA agencies about the issue that would affect the risk score?
 3. Can you provide any local examples in your region about where the risk is being demonstrated for the MEMA agencies to follow up?
- MEMA staff facilitator will engage across the table group to capture this information on a template (20 minutes)
- The table will report back to the broader group in a debrief at the end (2 minutes each)

Risk Matrix used in the Draft Statewide TARA

Table 1: Risk assessment matrix

LIKELIHOOD	LEVEL OF RISK				
ALMOST CERTAIN	MINIMAL	LOW	MODERATE	HIGH	HIGH
LIKELY	MINIMAL	LOW	MODERATE	HIGH	HIGH
POSSIBLE	MINIMAL	MINIMAL	LOW	MODERATE	HIGH
UNLIKELY	MINIMAL	MINIMAL	MINIMAL	LOW	MODERATE
RARE	MINIMAL	MINIMAL	MINIMAL	MINIMAL	LOW
CONSEQUENCE LEVEL	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC

Session 7 – Summary



- Important project - please review the draft statewide TARA
- Visit www.marine.nsw.gov.au for more information & view videos
- Submission can be provided via the online interactive tool at the above web address (threat specific or general comment).
- Types of evidence preferred:
 - Scientific research or reports
 - Unpublished data/research
 - Supporting background reports
- Online tool demonstrations are available after the session
- Consultation closes 31 March 2017
- Feedback form completed