

Monitoring & managing marine biodiversity in the Sydney region

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Sydney Coastal Councils
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Traditional Management Roles

- DPI Fisheries – harvest fisheries, marine pests, marine threatened species, marine habitats
- OEH – pollution, oceanography, coastal erosion, oil spill response
- Marine Parks Authority – marine conservation
- NSW Maritime – boating, moorings, port functions
- Coastal CMAs – various support activities
- Coastal councils – foreshore structures

Harvest Fisheries in NSW

- Commercial Fisheries
 - Small scale (1000 fishers, \$90 M), multi-species, multi-sector, very complex management arrangements (FMA), challenging compliance
- Recreational Fisheries
 - Large and diverse (1 million fishers, \$500 M), fishing fee, simpler mgt








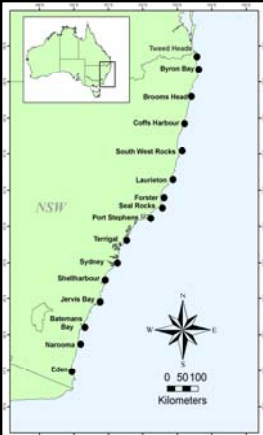
MARINE PARK FISHING BANS

NO science NO sense NO support

Check out the lack of evidence for fishing bans @ www.southcoastcofishers.com


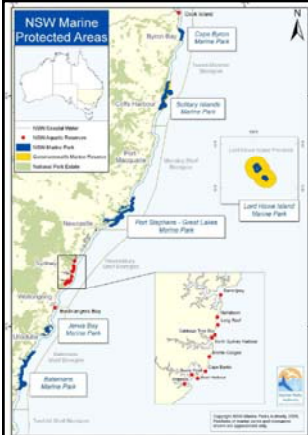
MARINE PARKS FISHING FAMILIES CONVICTED WITHOUT EVIDENCE

There is no evidence to justify recreational fishing bans www.southcoastcofishers.com


The NSW Marine Estate

- 1300 km of coastline
- extends 5.6 km offshore
- tiny part of Aust's ocean jurisdiction (13.5 million sq km)
- 184 estuaries; various types
- 6 large Marine Parks
- 12 small Aquatic Reserves

NSW MPAs

- CBMP = 22,740 ha
- SIMP = 71,100 ha
- PS-GLMP = 97,700 ha
- LHIMP = 48,000 ha
- JBMP = 21,450 ha
- BMP = 86,000 ha



Knowledge exercises 2002-10

- Broadscale biodiversity assessments
 - 2002–2005; options for new Marine Parks in NSW
- Marine Biodiversity Decline report
 - 2008; initiative of former MACC
- Review of Marine Park Science in NSW
 - 2009; lead to revised MP research framework (2010-15)
- Marine Knowledge reviews
 - NR-CMA in 2007; HCR-CMA in 2010
- Fisheries Resource Assessments
 - 2006–2007, 2009-10; status & trend in fish catch
- Seabed Mapping reports
 - Estuaries 2009; Marine 2010
- MER Technical reports
 - Marine 2010; Estuaries 2011

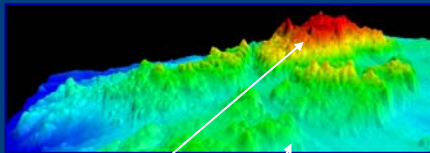


Mapping aquatic habitats & species

- indicator for MER Estuaries (eg extent of seagrass)
- indicator for MER Marine (eg extent of kelp beds)
- indicator for MER Invasive Species (extent of *Caulerpa*)
- is an ongoing activity for OEH & DPI
- joint Seabed Mapping project in 2008/09
- mapping provides opportunity to integrate knowledge



Offshore habitat mapping; swath acoustics + ground-truthing
(DECCW component of Seabed Mapping project 2008-09)



Patchy *Eklonia* dominated reef

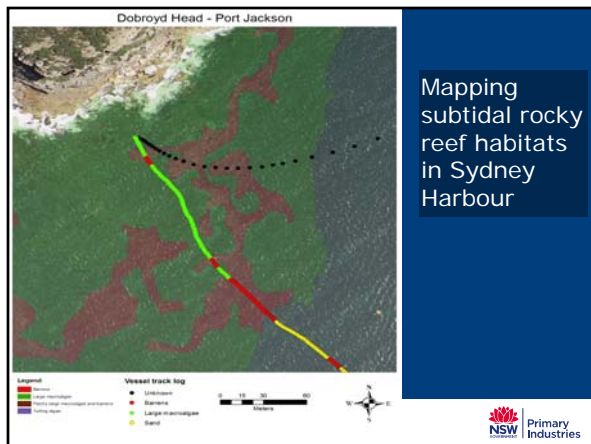
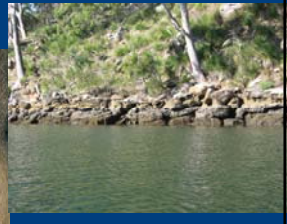
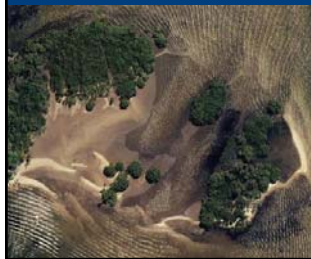


Sponge reef >45 m depth

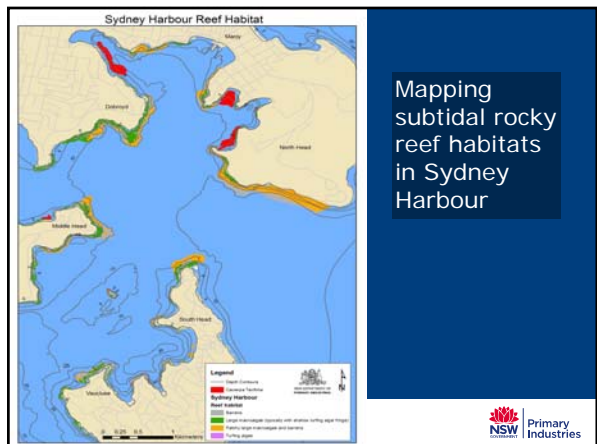


What are key estuarine habitats?

1. Natural physical features
 - Deep holes
 - Sand bars or mud banks
 - Rocky reefs



Mapping subtidal rocky reef habitats in Sydney Harbour



Mapping subtidal rocky reef habitats in Sydney Harbour



What are key estuarine habitats?

2. Man-made physical features (non deliberate)
- Jetties or pontoons
 - Breakwalls
 - Oyster racks



What are key estuarine habitats?

3. Man-made physical features (deliberate)
- Artificial reef balls in Lake Macquarie



ry tries

What are key estuarine habitats?

4. Biological features
- Mangrove forests
 - Seagrass beds
 - Saltmarsh
 - Algae



Life in the Seagrass

1. Harvested Fish



3. Protected fish



2. Epizootic animals



4. Introduced Caulerpa



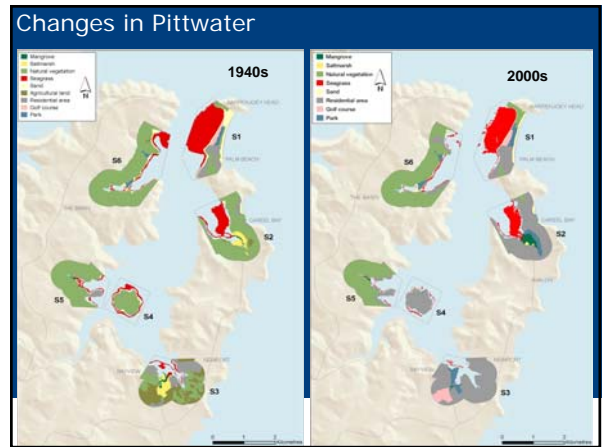
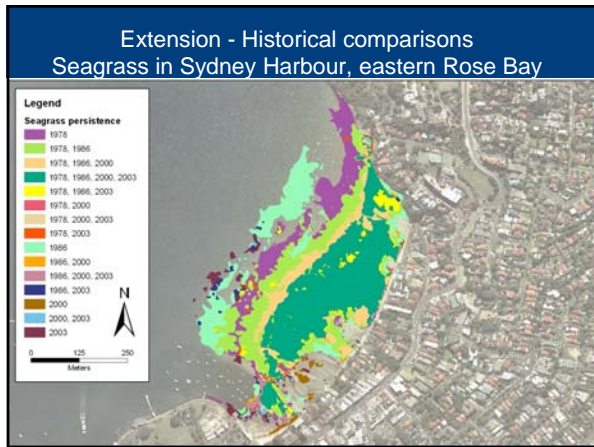
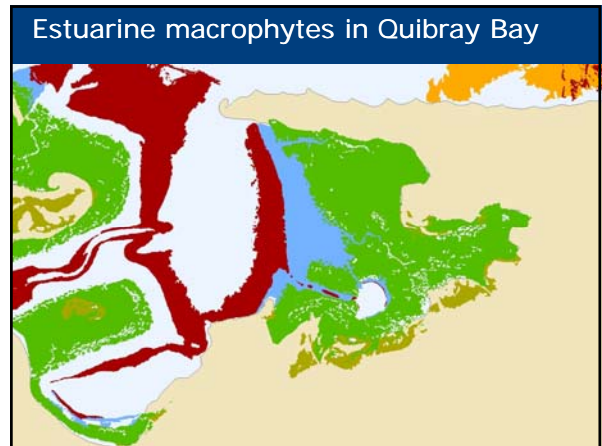
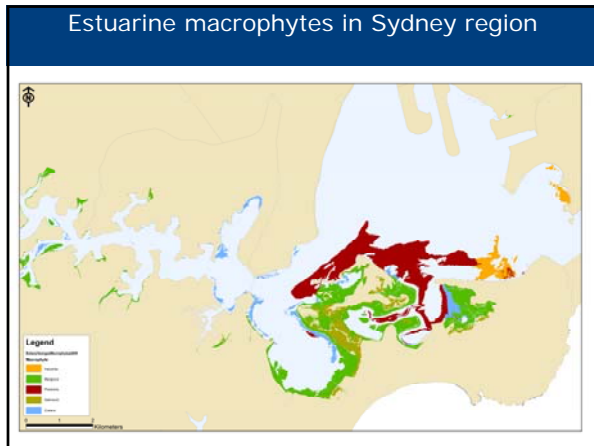
C. taxifolia in Sydney area

- Port Hacking 2000
- Sydney Harbour 2001
- Botany Bay 2001
- Pittwater 2000



C. taxifolia in Sydney Harbour; still present but very patchy

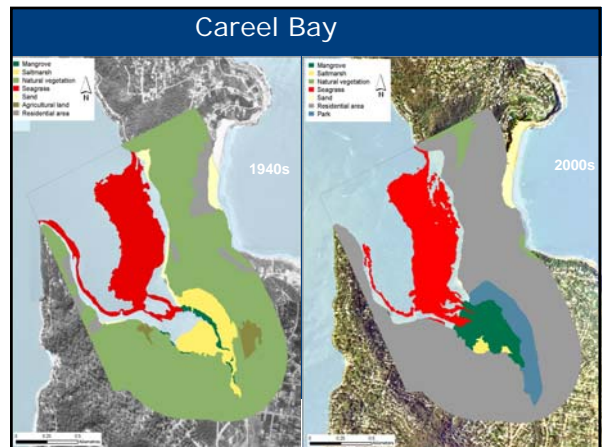


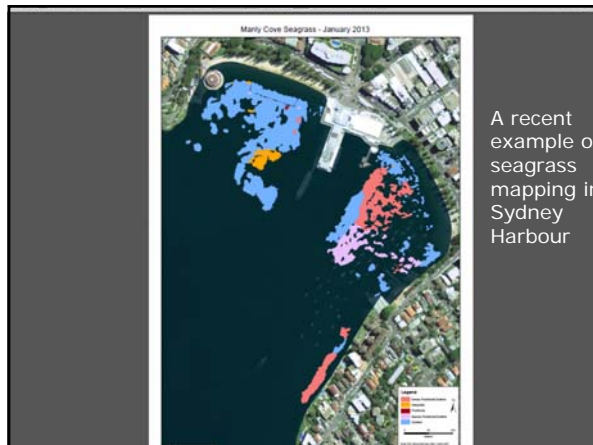
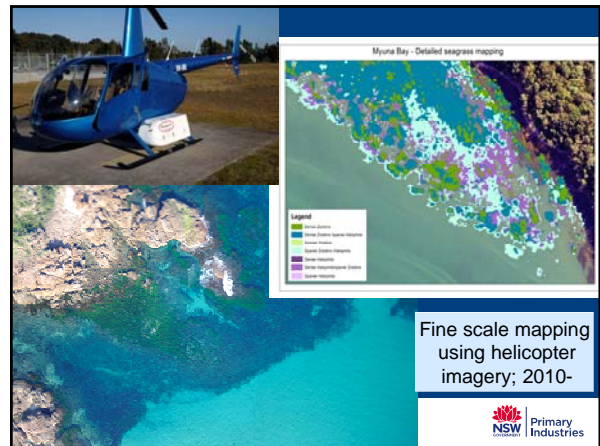
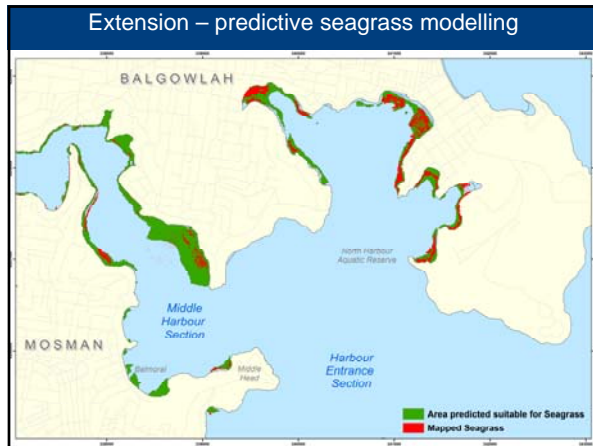


Total changes across the 6 sites in Pittwater

	1940s (ha)	2000s (ha)	%Change 1940s-2000s	
			Increase	Decrease
Natural vegetation	711.44	403.22		- 43.32
Agricultural land	93.89	0.00		- 100.00
Residential area	113.20	506.37	347.32	
Recreational area	20.22	77.30	282.30	
Saltmarsh	36.03	1.45		- 95.98
Mangrove	7.40	16.32	120.54	
Seagrass	220.16	157.85		- 28.30

NSW Primary Industries





Report of the Independent Scientific Audit of Marine Parks in New South Wales

To Minister for Primary Industries, the Hon Katrina Hodgkinson MP and Minister for the Environment, the Hon Robyn Parker MP

- Delivered February 2012
- 16 recommendations; 2 principal ones
- Further submissions closed 30 June 2012
- NSW Govt response to be released March 2013 (today?)
- Heralds 'different approach'

By the NSW Marine Parks Independent Scientific Audit Panel
 Assoc Prof R.G. Quattri (Chair)

NSW Primary Industries

Scientific Audit recommendations (egs)

- Coastal management under a new Authority
- All NSW marine science overseen by new independent body
- More consideration of social & economic issues
- Further use of analytical tools in MP zoning
- More emphasis on threat & risk assessment
- Further extension of MER system

NSW Primary Industries

Key philosophies

- CAR system is no longer the main guiding principle
- Management responses should relate to identified threats – ‘insurance argument’ not sufficient
- Community values are as important as biological considerations
- The entire ‘Marine Estate’ should be managed holistically, not as discrete spatial units

Threat	Activities
Resource use	Fishing (Commercial, recreational, indigenous, plus illegal, unreported and unregulated)
	Aquaculture
	Dredging and spoil dumping
	Mineral, oil, gas exploration and extraction
	Shipping
	Tourism
Land based impacts	Diffuse and point-source pollution
Marine biosecurity	Pests and disease
Marine pollution	Oil spills, marine debris
Climate change	Sea level rise, acidification, increased temperature, storm events



Human Pressures	Soft-sediment												Rocky reef		
	Vegetated			Unvegetated						Intertidal			Subtidal		
	Salt-marsh	Mangrove	Seagrass	Intertidal	Shallow (<25m)	Intertid (25-50m)	Deep (>50m)	Intertidal	Shallow (<25m)	Intertid (25-50m)	Deep (>50m)	Intertidal	Shallow (<25m)	Deep (>50m)	
Resource use	Recreational fishing	Stone and boat based													
	Commercial fishing	Ocean Head													
		Ocean Trawl													
		Ocean Trap and Line													
		Lowline													
	Recreation and tourism	Mooring													
		Driftnet													
Land based impacts	Foreshore developments														
	Storage facilities														
	Stormwater catchment non-leaf														
	Estuary Freshwater														
Marine biosecurity	Shipping and marine incidents														
	Comms. vessels														
Climate change															

Ecological Risk Assessment - Marine Biodiversity in NSW

Aims

1. Identify all sources of risk from human perturbations to marine biodiversity
2. Assess level of risk to marine biodiversity from the identified human perturbations; based on literature as much as possible
3. Identify and prioritise issues to be addressed to reduce level of risk
4. Recommend management action / further research to enhance ecological resilience to human perturbations to maintain / improve protection of MBD

Based on approach of Astles et al 2009, Astles 2011



Threat & Risk Assessment - Marine Biodiversity in Sydney Harbour

- The new approach to managing the NSW marine estate being announced today can, and should, be applied to the Sydney region as much as to other bioregions where MPs already exist.
- A current SIMS initiative provides an excellent platform on which to progress thinking and data collection around this approach as a “case study” for the Hawkesbury Bioregion.

Future mapping, monitoring and other assessments in the Sydney region, 2013 -

- Finalise report on temporal changes to estuarine macrophytes.
- Develop framework for characterising seagrass condition
- Continue mapping other habitat features – rocky reefs, bathymetry, sediments
- Extend biodiversity assessments
- Link with offshore habitats
- Extend models for predicting occurrence
- Assess ecological, social & economic values associated with Sydney Harbour (part of SIMS SHRP)