Department of **Environment, Climate Change and Water** NSW

Estuary Health – Technical and Policy Integration: A State Government Perspective

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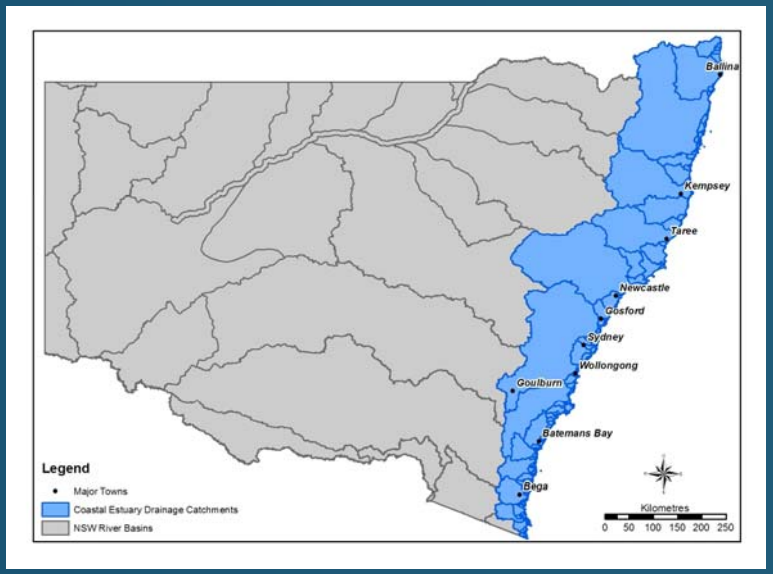
Outline of talk

- Estuary health monitoring
- Current policy and management
- Integration

Estuaries and their catchments

- 184 estuaries, 111 close / open
- 127,000 km^2 of estuary catchment or 15.8% of NSW
- 5,370,000 people or 82% of NSW (and rising) and 26% of Australia
- 64 LGAs, up to 10 LGAs per estuary and 29 estuaries per LGA
- Pristine to rural to fully urbanised



Multiple pressures (human activity)

- Coastal land clearing
- Land use intensification
- Fertilisers, pesticides
- Riparian degradation
- Foreshore development
- Fishing and aquaculture
- Effluent disposal, septics
- Acid sulfate soil drainage
- Training walls, artificial entrance opening, dredging

Multiple stressors (from environment)

- Increased nutrient inputs
- Sediment load increase
- Organic material
- Altered catchment flows
- Increased tidal flows
- Changed salinity regime
- Invasive species
- Climate change – sea level rise, rainfall, temp.

Caulerpa taxifolia – Little Manly Cove

Scope of the estuary management issue

- Estuary / catchment diversity:
  - Biophysical
  - Pressures / stressors
  - Ecological response
  - Societal values / needs
  - Jurisdictions
  - Tenure
- Policy, management, planning, investment, ecological, temporal scales
- Data diversity – coverage, standards, databases, spreadsheets, GIS, custodians
- Need to turn complex data into information useful for decision-makers

Historical NSW policy response

- Estuary Management Policy (1992), estuary specific plans
- Statement of Intent for coastal lakes (2003)
  - based on vulnerability / sensitivity
  - required sustainability assessments and management strategies
- Natural Resources Commission targets (2005)
- NSW Natural Resources MER Strategy (2006)
- Reporting in SoC (2008), SoE – local, state, national
- NSW State Plan (2006 and 2009)

State Plan (NRC) estuaries target

- ‘By 2015 there is an improvement in the condition of estuaries and coastal lake ecosystems’
- 1 of 13 NRM maintain or improve targets

MER Strategy 2006 (under review)

- New coordinated system of NR MER in NSW
- Periodic formal reports evaluating data
- Inform policy, investment and BMP decisions
- Assess progress towards targets
- Access to underlying knowledge base
- Initial objective to assess condition

Policy / management questions

- How big is the problem?
- Is it getting better or worse?
- What's causing it?
- What can be done to fix the problem?
- Is management making a difference?
- How can the above be communicated?

Translated into scientific questions

- Condition
- Diagnosis
- Management

Estuary health monitoring program

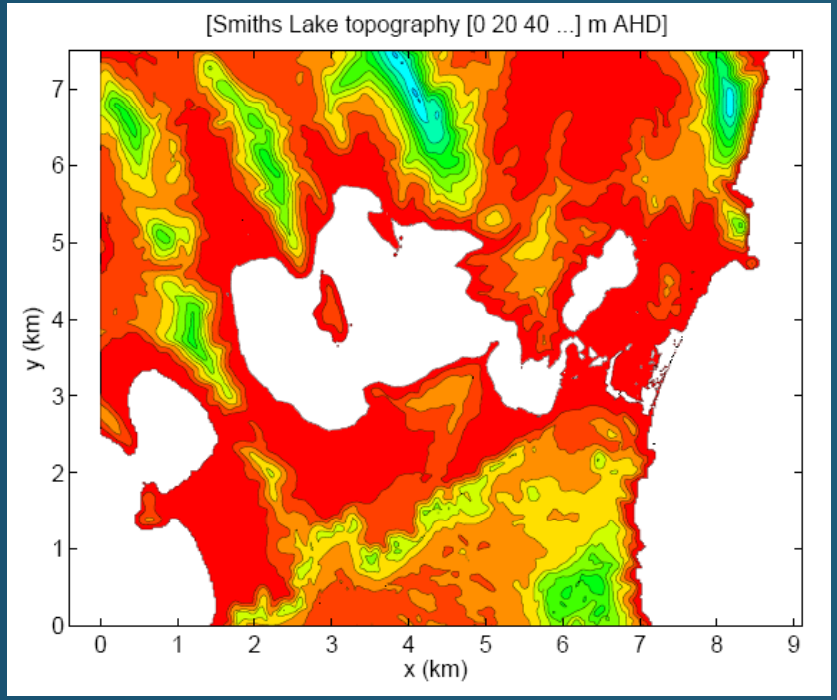
- Indicators are ecological endpoints that integrate effects of multiple sources of degradation:
  - Chlorophyll a and macroalgae
  - Water clarity (turbidity)
  - Seagrass, mangrove, saltmarsh extent
  - Fish assemblages
- Scoring system for each indicator
- Predictive models for diagnosis and future forecasting

Pressures / stressors

- Population (ABS)
- Land use (API mapping)
- Hydrology change (2CSalt)
- Sediment loads (export rates and point sources)
- Nutrient loads (export rates and point sources)
- Water extraction (licences)
- Foreshore structures and aquaculture (licences)
- Training walls and artificial opening (Councils)
- Fishing (commercial catch records)

Physical / environmental context data

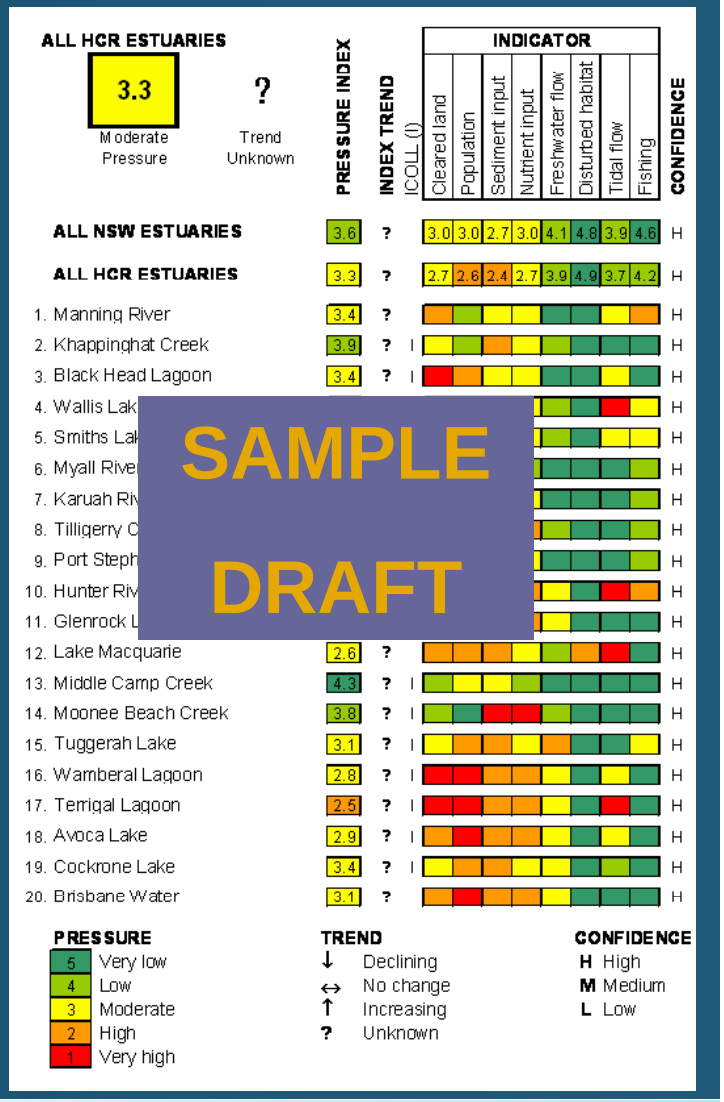
- Identifiers and location
- Geomorphological type, entrance condition
- Estuary and catchment boundaries
- Topography
- Bathymetry and volumes
- Tidal and mangrove limits
- Tidal flows, prism, planes
- Rainfall / evaporation
- Dilution ratios
- Tidal and freshwater flushing



Estuary report cards by CMA region

Condition report card

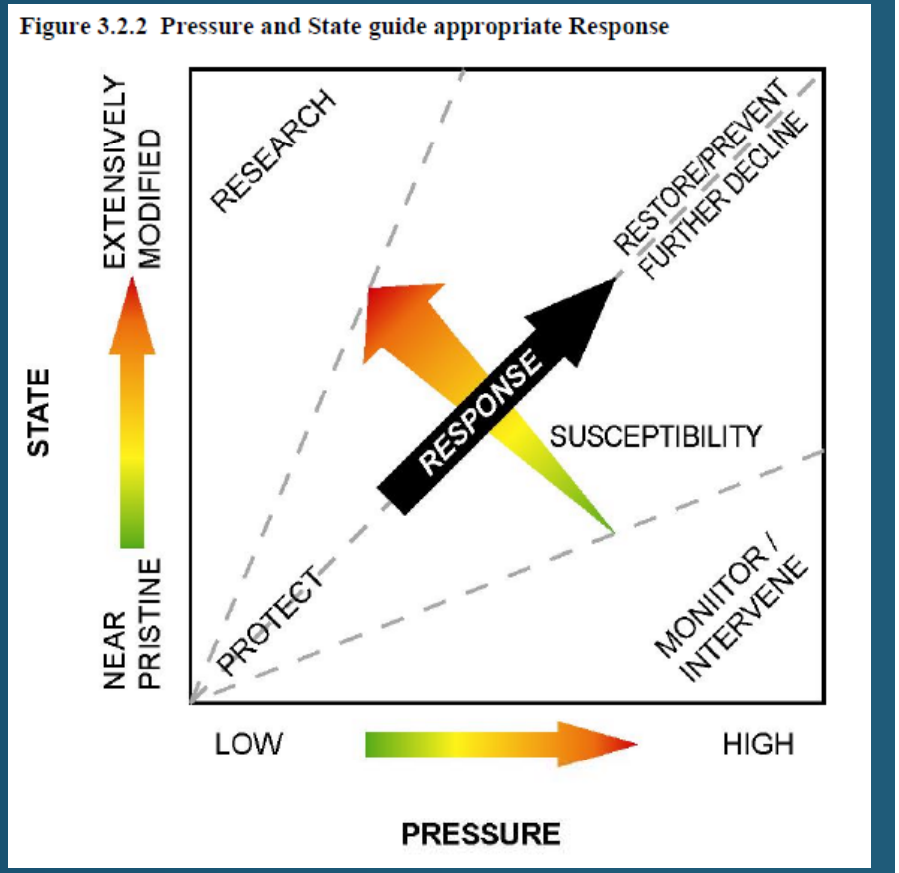
Pressure report card



Pressure report card

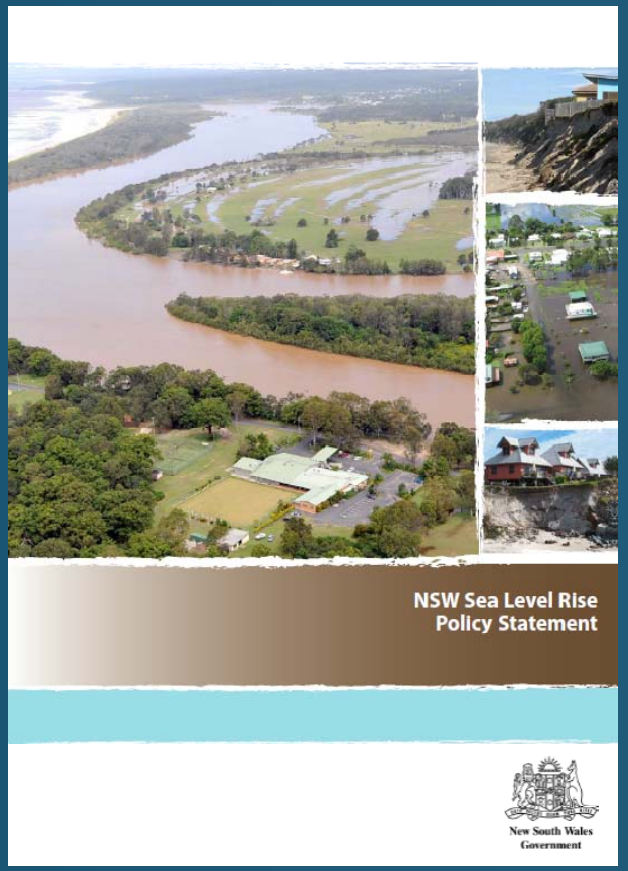
Potential management framework

- **Scientific priorities:**
  - **NPS/LP: protect good condition**
  - **NPS/HP: reduce pressures, monitor**
  - **EMS/LP: research why**
  - **EMS/HP: targeted repair**
- **Assess high conservation value**
- **Overlay benefit/cost, impacts, stakeholder interest / capacity, investor preferences, etc**



Other NSW policy and planning

- Catchment Action Plans, Investment Strategies
- Regional Strategies
- NSW Biodiversity Strategy
- NSW Sea Level Rise Policy
- Climate Change Action Plan



Council policy and planning

- Land use planning
- Development controls
- Management and business plans
- Environmental sustainability action plans
- State of the Environment reports
- Estuary Management Plans

Examples of integration

- Report cards and data on estuary health
  - screening level tool for Statewide priorities for conservation, protection, restoration, research
  - prioritisation of effort in CMA CAPs
- CERAT and DEFIRE ecological response models: impact of catchment land use scenarios on eutrophication
- CLAM tool: ecological / socio-economic tradeoffs
- Estuary Processes Studies and Management Plans
- HCVAE assessments with Aust Govt
- Common Assessment and Reporting Framework

Challenges for scientists, managers and policy makers

DATA MANAGEMENT

- Standards, corporate storage
- Metadata, directories, access

UNCERTAINTY

- Multiple drivers, pressures and stressors
- Evolving knowledge of ecosystem response
- Data starved environment
- Tools that match data and accommodate uncertainty

RESOURCING

- Under-valuation of environmental services
- Investment in monitoring and assessment

Challenges for scientists, managers and policy makers

SCALES

- Spatial
  - Matching ecological with management scales
  - Statewide vs more local management response
- Temporal
  - Matching science with policy and management ‘real time’ needs
  - Shorten feedout of science to management
  - Need for short term results / reports to justify investment
  - Lag between action and response

COMMUNICATION

- Government, industry, community, research, education
- Appropriate information products (maps, report cards), processes, Web