Department of Environment & Climate Change NSW

Monitoring Estuary Health for State of the Catchment Reports

NSW COASTAL CONFERENCE

Monitoring, Evaluation and Reporting Coordination Section
Tony Roper 6 Nov. 2008

Outline

- MER Strategy
- Data
- Reporting
- Lessons learned
- Decision-making

NSW MER STRATEGY

Wentworth Group

Reform package in February 2003 included:

- Setting environmental standards
- Restructuring institutions to:
  - Improve scientific input into policy setting
  - Get better information systems
- State Government to:
  - Collect better information
  - Monitor, evaluate and report

NRC Targets 2005

Maintain, improve, increase or no decline in:

- BIODIVERSITY: Native vegetation, fauna, threatened species, invasive species
- WATER: Riverine ecosystems, groundwater, marine waters, wetlands, estuaries
- LAND: Soil condition, land capability
- SOCIO-ECONOMIC: Economic sustainability and well-being, NRM capacity

NSW Natural Resources MER Strategy 2006

- Response to NRC targets
- Refocus agency resources
- Inform decision-making on:
  - policy settings
  - investment programs
  - best practice management
- Includes Govt, Councils, CMAs, all land managers

Objectives of MER System

- Integrate disparate monitoring programs
- Measure progress on resource condition targets
- Inform NSW and Local Govt SoE reports
- Supply NSW data to Aust. Govt
- Provide open access to data
- Periodic reports evaluating data

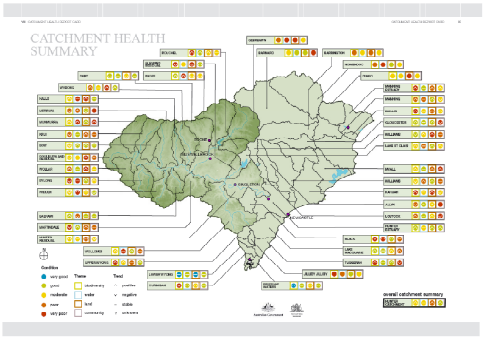
State of the Catchment Report

- Preliminary assessment of condition
- Inform investment decisions
  - within CMAs
  - between CMAs
- Inform other nr managers' investment decisions
- Assess progress towards Catchment Targets

Strategy Implementation

- Two pilots – estuaries and native vegetation by June 2007
- Concurrent bid to NAP/NHT2 for $5.799M to:
  - collect baseline data
  - prove up indicators and methods
- $659,000 for estuaries plus in-kind
- Set up inter-agency Estuaries Theme Team, SRCMA

State of the Catchment report



DATA

NRC Condition Indicators

- Chlorophyll a
- Macroalgae incl. epiphytes
- Seagrass, mangrove, saltmarsh
- Fish assemblages
- + we
  - added turbidity and other water quality parameters
  - deleted stress biomarkers

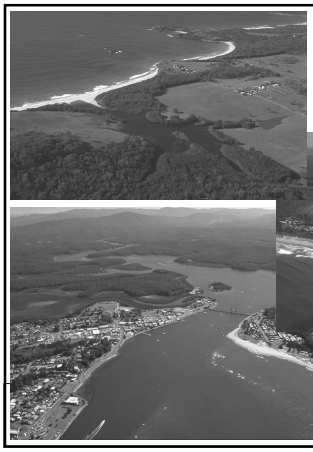
Data Trawl

- Agencies
- Councils
- Water authorities
- Universities
- PhDs, Masters etc

Data Quality Scoring System

Water quality:

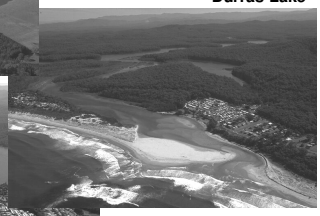
- Lab accreditation
- Field methods
- Sample replication
- Spatial coverage
- Temporal coverage
- Age of data
- Number of sampling programs



How can we assess condition of estuaries?

Meringo Creek

Durras Lake



Clyde River

How Can We Assess Condition?

- All estuaries are different
- Classify into common groups
- Define a reference condition
- Are there thresholds for biological effects?
- Levels of acceptable change from reference
- What does poor condition look like?

Classification

Water quality:

- Chl-a and turbidity
  - dilution
  - flushing
- Depends on:
  - catchment runoff, 2CSalt models
  - estuary volume
  - entrance condition
  - tidal prism
  - entrance exchange efficiency

Fish: bioregions by latitude

Data Types - Estuaries

Condition	Chlorophyll a and turbidity Macroalgae incl. epiphytes Seagrass, mangrove, saltmarsh Fish assemblages
Physical features	Bathymetry, depth, area, volume Tidal prism, planes, flows, limits Catchment area, rainfall, runoff Geomorphology, entrance exchange

Pressure Data

- Condition indicators must respond to disturbance
- Need disturbance gradients to stratify sampling program
- Best pressure gradients may be combinations
- Helps establish causes and management responses

Criteria for Pressure Data

- Data availability
- Time required to collate
- Gap-fill with correlations
- If no data, ability to model pressure
- Strength of link to condition
- Readily determined reference condition

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Pressures	Catchment land use, population, sewerage
	Riparian vegetation, water extraction
	Foreshore structures, aquaculture
	Waterway invasive species, commercial harvesting, entrance opening, training walls
	Sea level rise, temp./rainfall change

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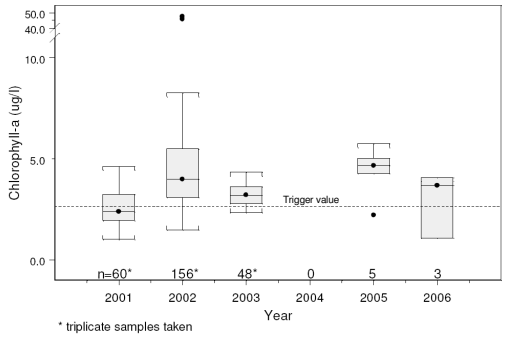
Stressors	Change in hydrology
	Change in nutrient and sediment loads

REPORTING

Scoring Condition and Pressure

- Degree of deviation from reference
- ANZECC has concept of trigger values

Burrill Lake Chlorophyll a



* triplicate samples taken

Scoring Condition and Pressure

- Degree of deviation from reference
- ANZECC has concept of trigger values
- Biological or ecological effects

Biological/Ecological Effects

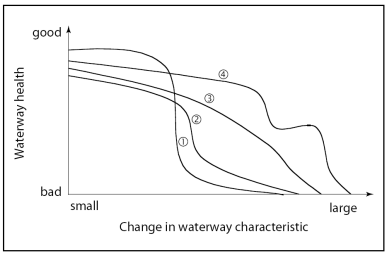
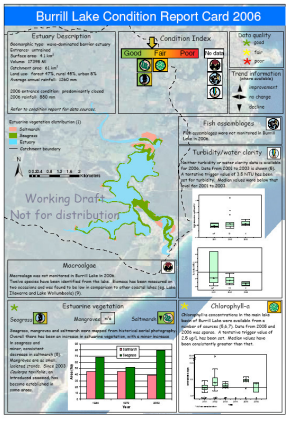


Figure 14. Different trajectories for changes in ecosystem health/value.

Source: Guidelines for Protecting Australian Waterways, January 2002

Scoring Condition and Pressure

- Degree of deviation from reference
- ANZECC has concept of trigger values
- Biological or ecological effects
- Ranking into equal intervals/percentiles
- Multiple of reference value
- Expert/professional judgement

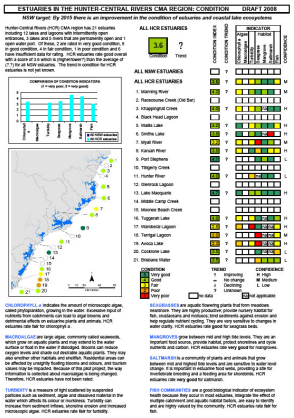


Lessons Learned

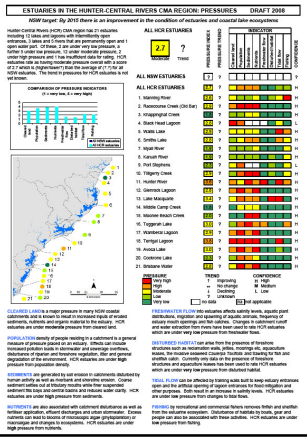
- Data collation worthwhile, time consuming
- Data not listed in a directory
- Very little metadata
- Limited corporately stored data
- Licensing requirements vary
- Widely varying storage formats
- Conceptual models valuable
- Physical data key for classification and to assess condition
- Pressure data essential to design
- Easier to gather pressure data State-wide
- Power of analysis depends on good datasets

State of the Catchment Reports

- 13 theme teams to design and implement monitoring programs
- Two pilots in HCR and CW CMAs by June 2008
- Other 11 CMAs by December 2008
- To include management responses
- 21 estuaries in HCR
- SoC Online application
- Corporate data management



Estuary Condition



Estuary Pressures

SoC Report Hierarchy

- Levels of information:
  - Overall catchment summary
  - Overview report
  - 13 report cards on condition, pressure, response
  - Supporting technical documents
  - Data summaries
  - Data
- User decides their own entry level
- Publicly available online

DECISION-MAKING

Broad Management Questions

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

Role for risk assessment in tradeoffs between:

- Condition, pressure, vulnerability, values, costs/benefits
- Catchment Action NSW project

Benefits of MER System for Managers

- Comprehensive compilation of all existing data
- One geo-database accessible by everyone
- Common data collection protocols
- Standard designs consistent with best practice
- New data collection on ecosystem health/pressures
- Refined classification schemes
- Definition of reference condition recognising type
- Ranking of system condition – HCV to degraded

Benefits of MER System for Managers

- Definition of trigger values for a management response
- Knowledge of which ecosystems are vulnerable
- Risk assessment approach leading to policy, investment and management priorities
- State of the Catchment reports:
  - sound scientific basis
  - embedded in decision-making frameworks
  - data and information products Internet accessible
  - usable by many for reporting purposes
  - wide audience interested in estuaries

THANK YOU