Wetland risk assessment
Great Barrier Reef catchments

Maria Vandergragt
Cheree Fenton
Adam Forknall

Aquatic Ecosystem Health Sciences
Department of Science, Information Technology, Innovation and the Arts

Thanks to Mike Ronan from the Queensland Wetlands Program
Wetland risk assessment
Great Barrier Reef catchments

- ~2000 km coral reef and coastline
- GBR catchments 424 000 km² (163,706 m²)
- ~274,435 ha natural wetlands >1 ha
- Human impacts
- Reef Plan wetland target - 2013
- Wetland loss 25%, 850 ha 2001-05

The first comprehensive & systematic spatial assessment of risk to wetlands in Queensland to prioritise:
- management: to target management resources
- monitoring: to target monitoring resources
Towards a Queensland wetland monitoring program

- wetland extent mapping
  - Data not available
  - Data available
    - broad scale risk assessment
      - High
      - Low
        - Are mapping, typology available?
          - yes
          - no
            - detailed risk assessment
              - individual wetlands
                - High risk
                - Low risk

Wetland condition assessment and monitoring
Foundational tools and resources

Wetland mapping

Risk / condition framework

Stressor models

Pressure indicators

GIS/ spatial methods

Assessment software

Overall wetland risk score

Stressor 1 Risk score

Stressor 2 Risk score

Pressure indicator 1 final score

Pressure indicator 2 final score

Vulnerability modifier X

Pressure indicator 1 modified score

Management modifier X

Pressure indicator 1 score

Raw data
The GBR wetland risk assessment

Risk assessment based on:
- individual wetlands at the local level
- application of data for 17 broad pressure indicators/measures

Steps:
1. Local watershed delineation based on mapping & DEM models
2. Spatial application and review of pressure indicators
3. Review stressor framework and models for national alignment
4. Consultation and engagement at each stage
Towards a risk assessment

Adaptive management.....
Capturing pressures from local to landscape
Practical and conceptual challenges

Watershed delineation challenges
- Hydrological focus
- Coastal complexity
- Hydro-geo-physical relations
- Connectivity processes
- Best for isolated depressional wetlands

Stakeholders
- broad strategic v local
- watersheds for dry season
A PSR model is useful when investigating ecological causal relationships. Each stressor and web of relationships is individually considered.

Stressors are often confused with pressures and challenging to wetland managers.

PSR does not consider underlying socio-economic factors or such as drivers or management responses.

PSR does not provide logical starting and ending points or feedback loops to determine relevant pressures and management response.
DPSIR describes the interactions between society and the environment

- Provides for assessment of ecological and socio-economic responses
- Logical sequential loops
- Used for targeted management of most relevant socio-economic factors.
- Limited wetland specific examples in literature
- Inconsistent applications and definitions, challenged by scale
- Land use drivers
Delineations and buffer areas for scale specific indicators

- nested zones
- connections
- local embedded in broader scale
- pressure indicators at scale
- weighted for risk assessment

Generalised concept of delineating aquatic ecosystems. Source ANAE 2012

Queensland buffer planning guidelines. Source: QWP 2011
Wetland types respond differently

• Focus on habitat types

• Adapt DPSIR to consider wetland components & processes

• Develop a regionalisation - future

• Benchmarking types - future

Attribute-based wetland QLD habitat typology
Lessons and conclusions

- DPSIR model is a more comprehensive framework than PSR
- Using land use drivers will provide feedback loops
- Nested delineations are useful for dealing with scale and should be incorporated into risk assessments
- Consideration of wetland types is essential to assess risk
- Be prepared to adaptively manage
Questions & suggestions

Maria Vandergragt
Cheree Fenton
Adam Forknall

Aquatic Ecosystem Health Sciences
Department of Science, Information Technology, Innovation and the Arts

Thanks to Mike Ronan from the Queensland Wetlands Program