Wetland risk assessment Great Barrier Reef catchments

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Thanks to Mike Ronan from the Queensland Wetlands Program

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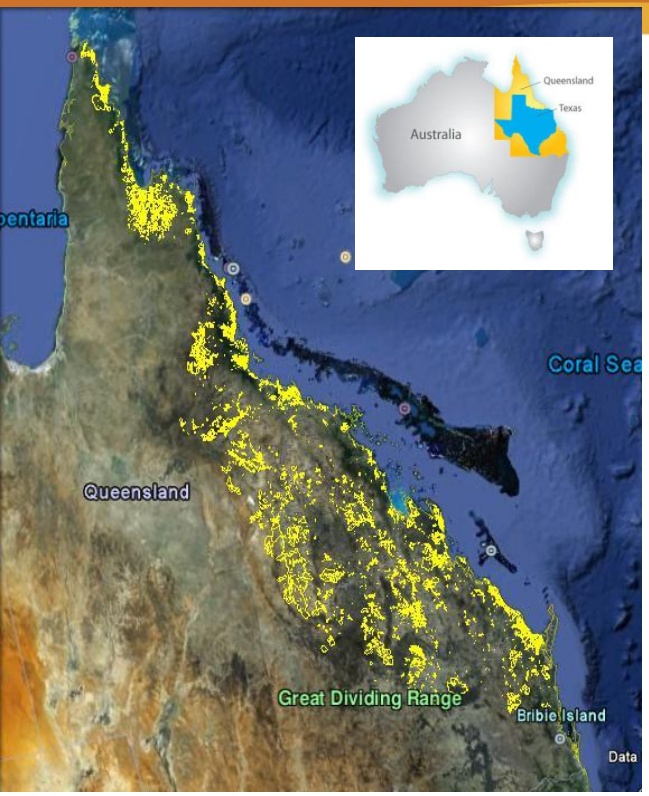
Wetland risk assessment
Great Barrier Reef catchments



- ~2000 km coral reef and coastline
- GBR catchments 424 000 km^2 (163,706 m^2)
- ~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

16 DEC 2009

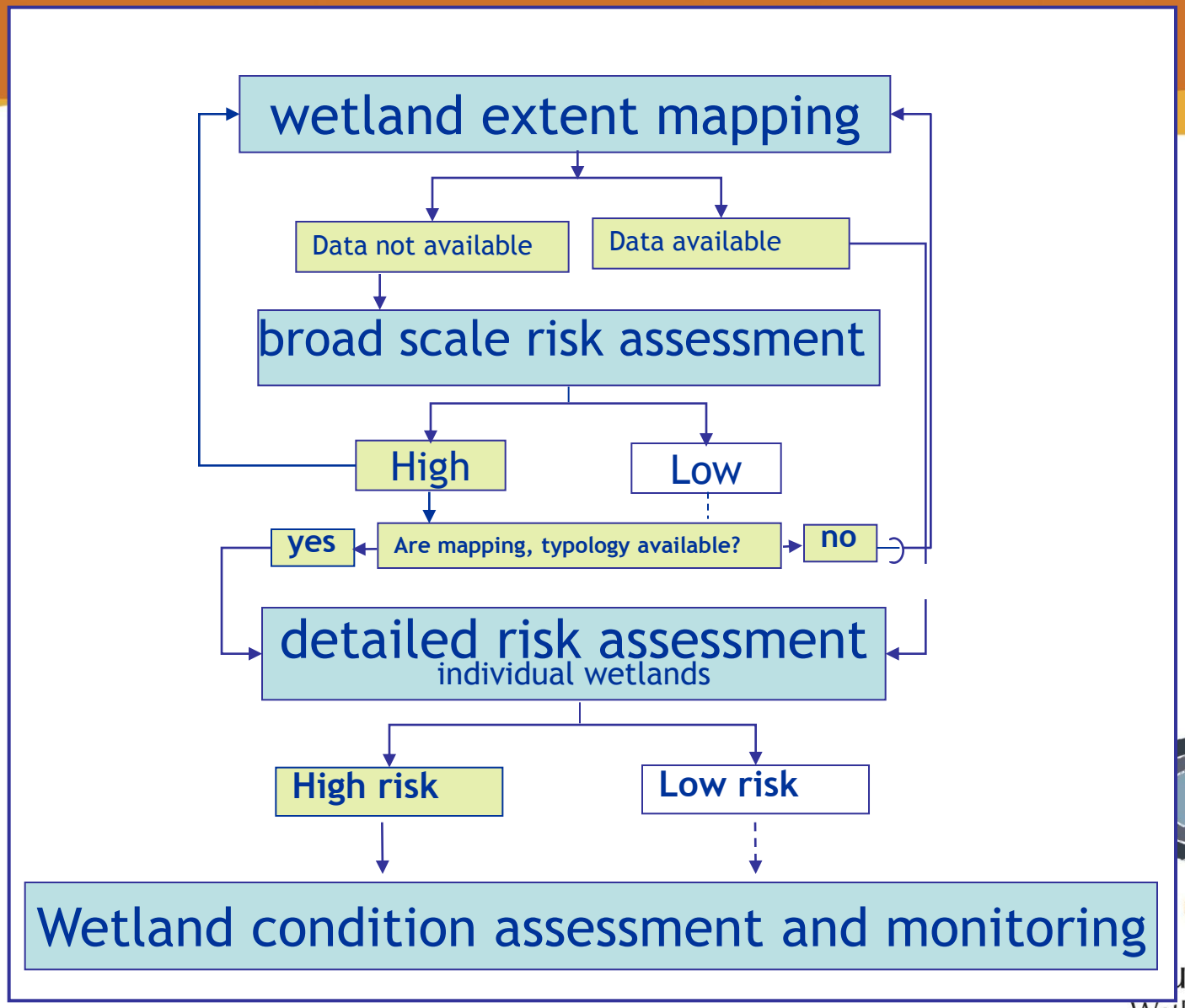
dry phase

dry phase

wet phase
15 MAY 2010
67°ENE mag
E:149°06'12.14"
S:027°04'49.11"

wet phase
12 MAY 2010
188°S mag
E:150°09'56.46"
S:028°20'48.91"

Towards a Queensland wetland monitoring program



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Foundational tools and resources

Wetland mapping

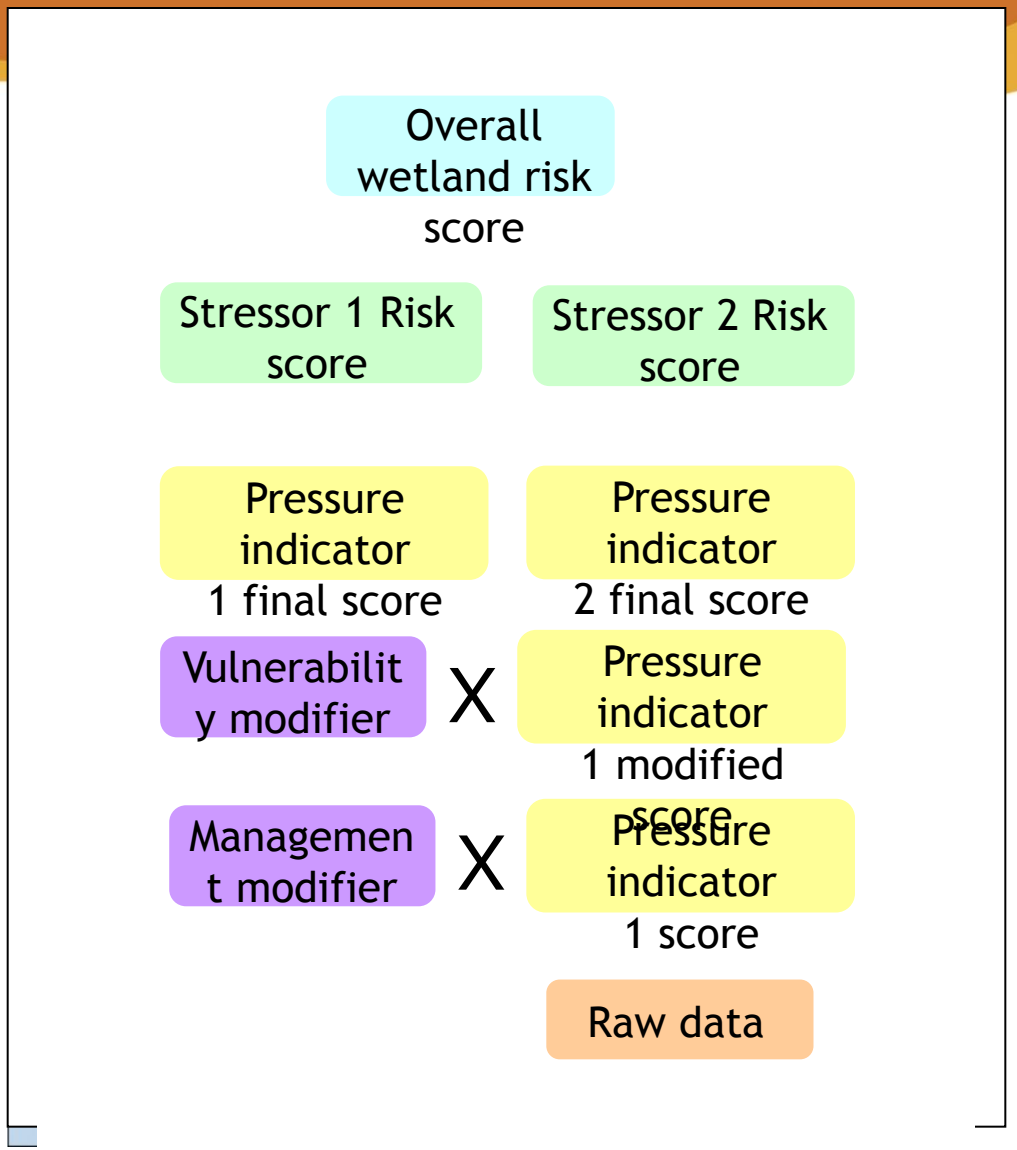
Risk / condition framework

Stressor models

Pressure indicators

GIS/ spatial methods

Assessment software



The GBR wetland risk assessment

Risk assessment based on:

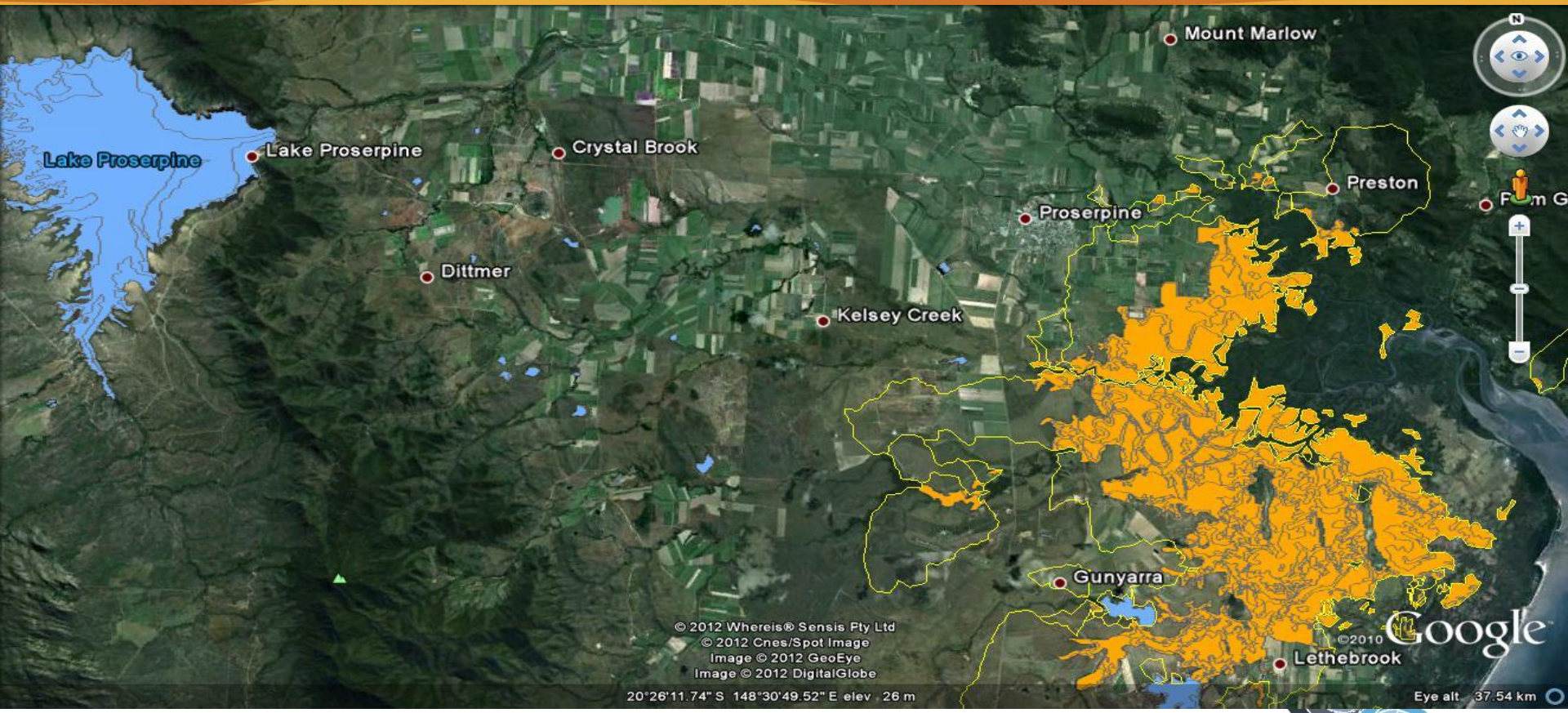
- **individual wetlands at the local level**
- **application of data for 17 broad pressure indicators/measures**

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**

Brick wall!
Adaptive management…..

Capturing pressures from local to landscape



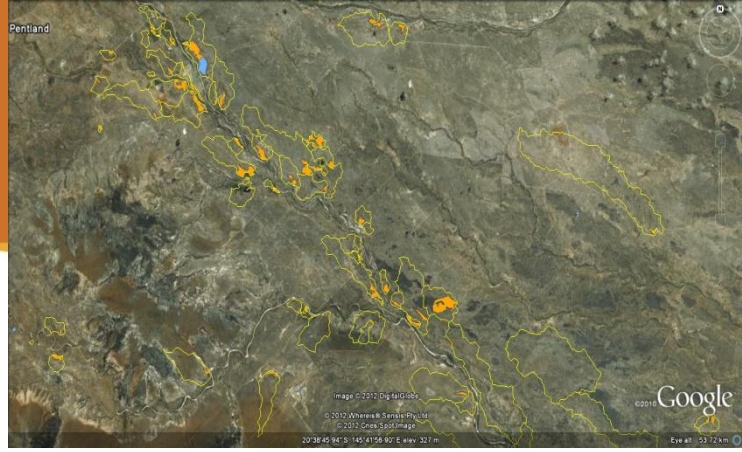
Practical and conceptual challenges

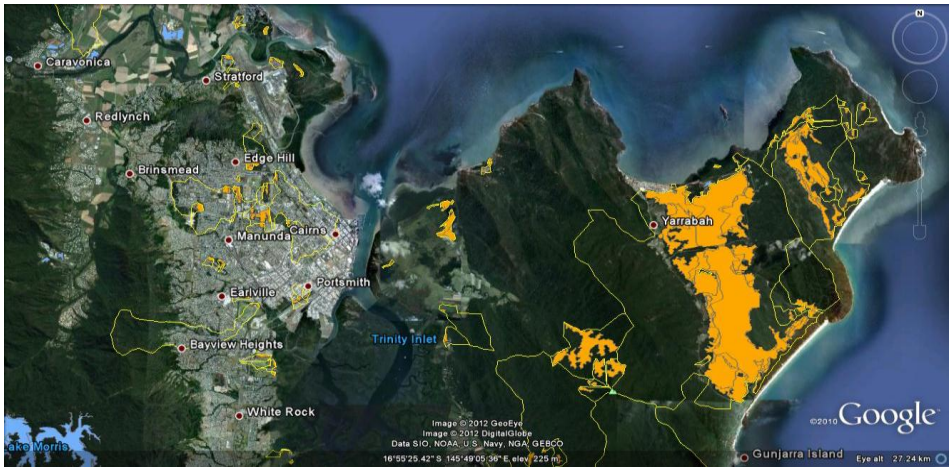
Watershed delineation challenges

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

Stakeholders

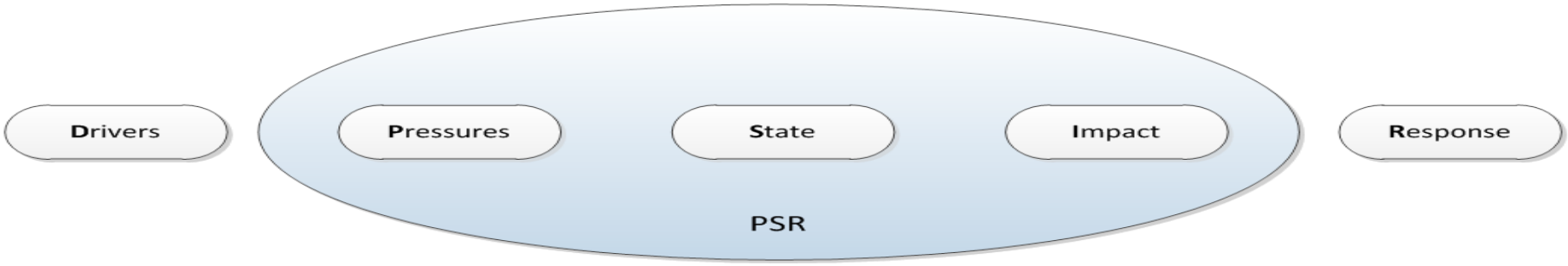
- broad strategic v local
- watersheds for dry season





PSR framework and indicator review
Pressure, stressor, response (impact)

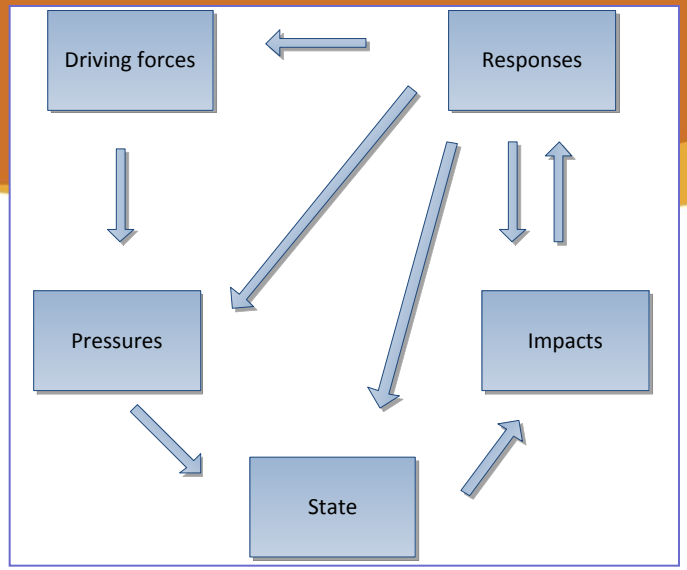
- A PSR model is useful when investigating ecological causal relationships. Each stressor and web of relationships is individually considered.
- Stressors are often confused with pressures and challenging to wetland managers.
- PSR does not consider underlying socio-economic factors or such as drivers or management responses.
- PSR does not provide logical starting and ending points or feedback loops to determine relevant pressures and management response.

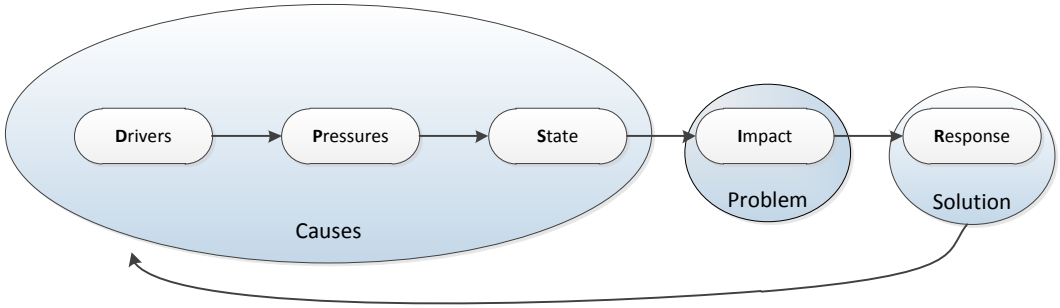


DPSIR

European Environment Agency / adopted by the Millennium Assessment

DPSIR describes the interactions between society and the environment

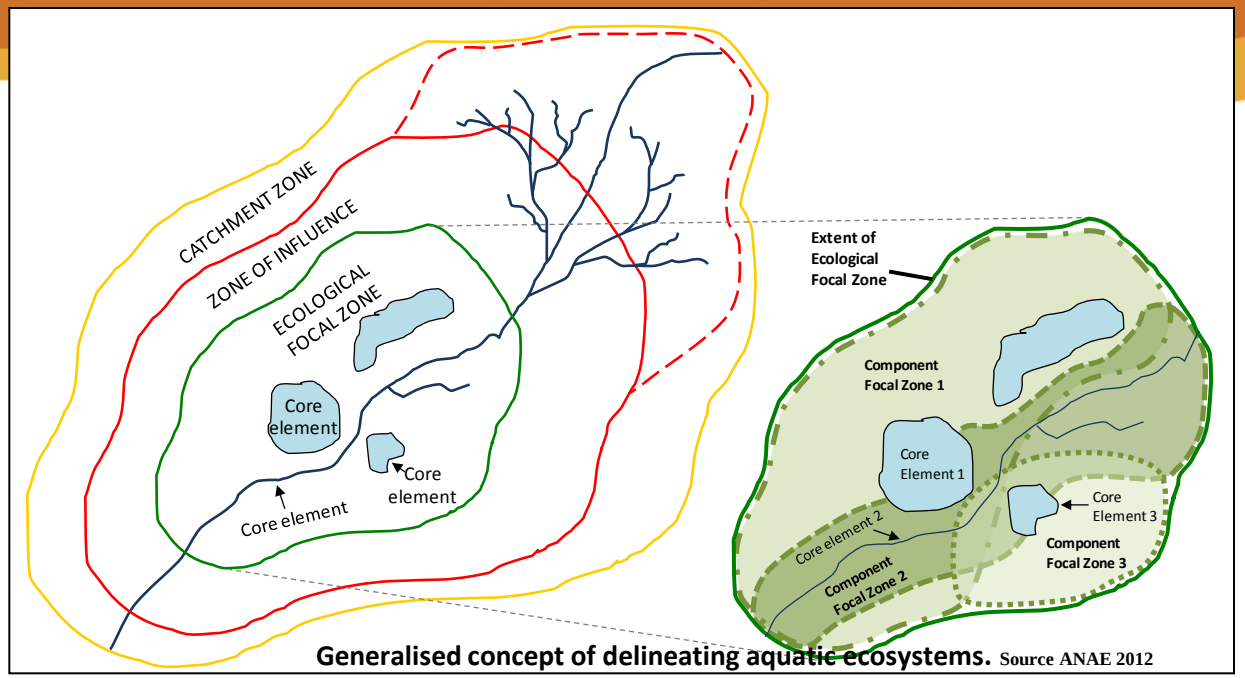




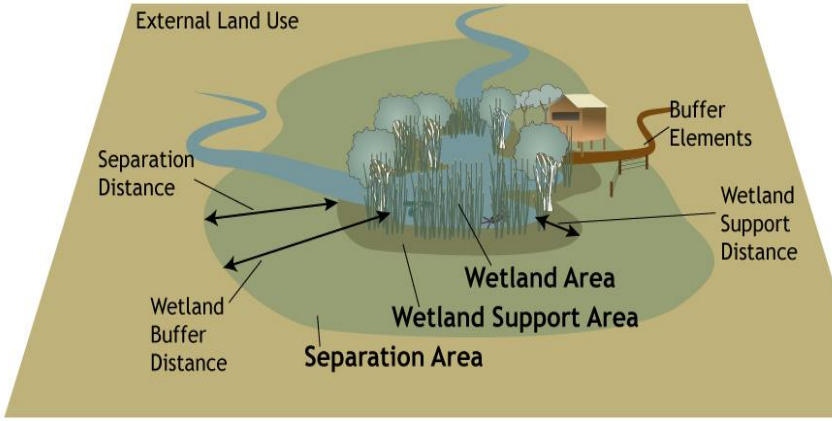
- Provides for assessment of ecological and socio-economic responses
- Logical sequential loops
- Used for targeted management of most relevant socio-economic factors.
- Limited wetland specific examples in literature
- Inconsistent applications and definitions, challenged by scale
- Land use drivers

Delineations and buffer areas for scale specific indicators

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



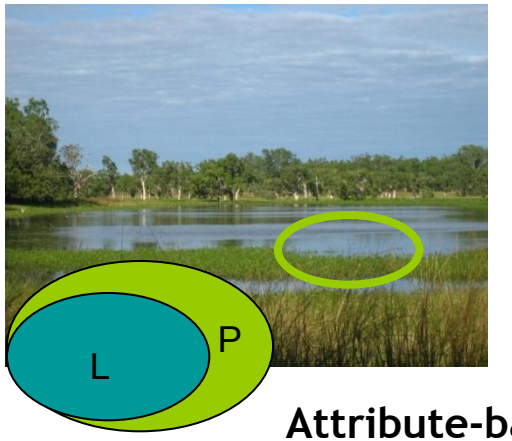
Generalised concept of delineating aquatic ecosystems. Source ANAE 2012

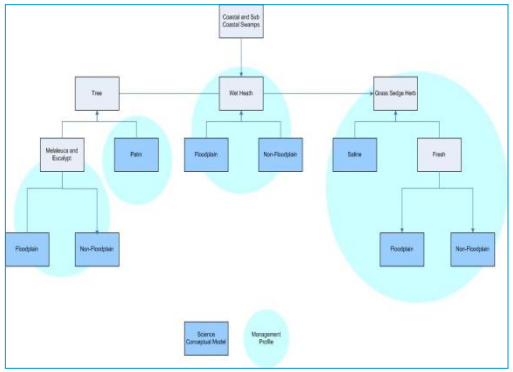


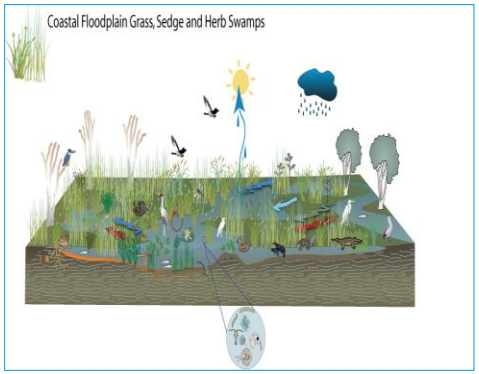
Queensland buffer planning guidelines Source: QWP 2011

Wetland types respond differently

- Focus on habitat types
- Adapt DPSIR to consider wetland components & processes
- Develop a regionalisation -future
- Benchmarking types - future





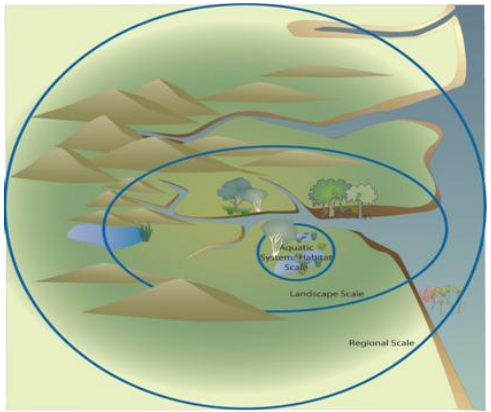


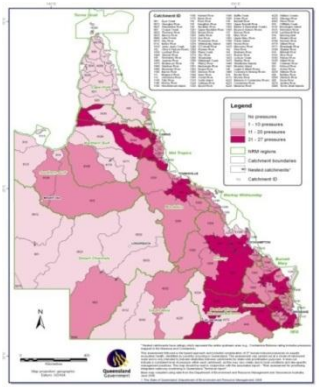
Wetland system
Climate regions
Water type
Water regime
Substrate
Topography
Vegetation

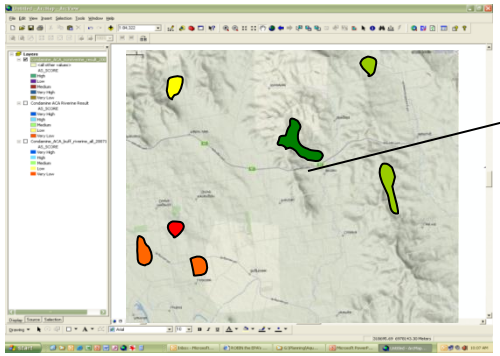
Attribute-based wetland Qld habitat typology

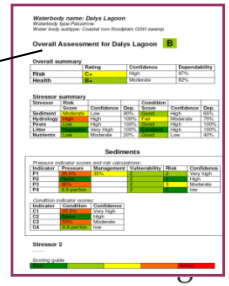
Lessons and conclusions

- 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 to incorporated into risk assessments
- Consideration of wetland types is essential to assess risk
- Be prepared to adaptively manage









Questions & suggestions

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