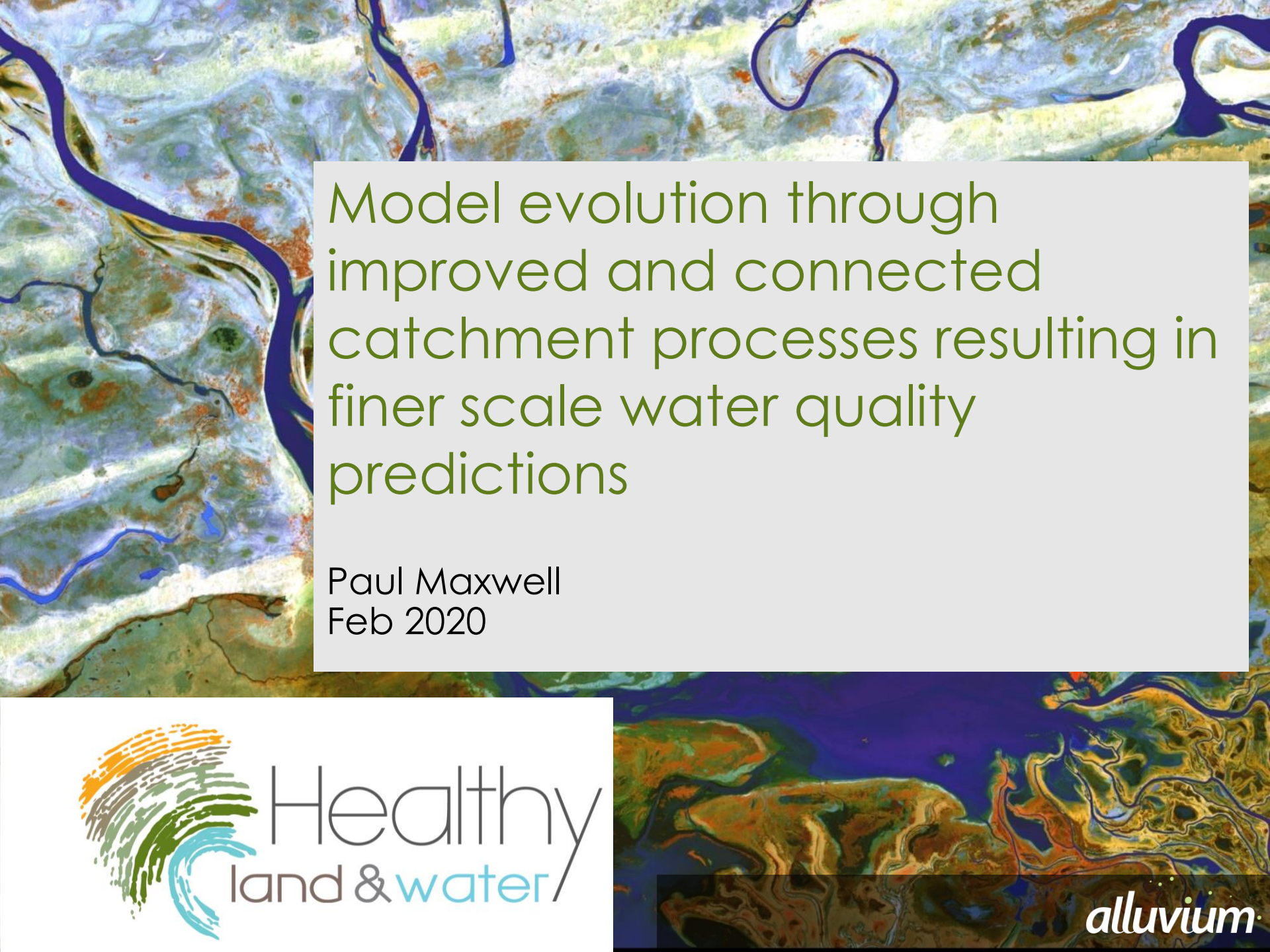


Model evolution through improved and connected catchment processes resulting in finer scale water quality predictions

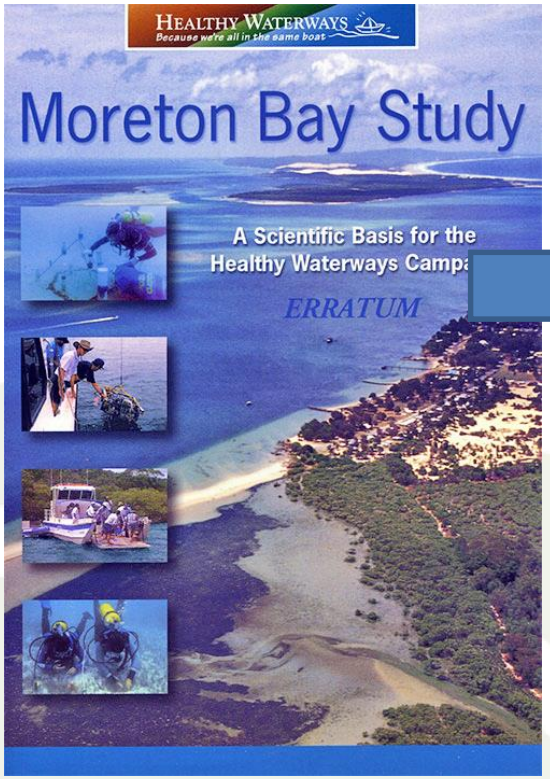
Paul Maxwell
Feb 2020

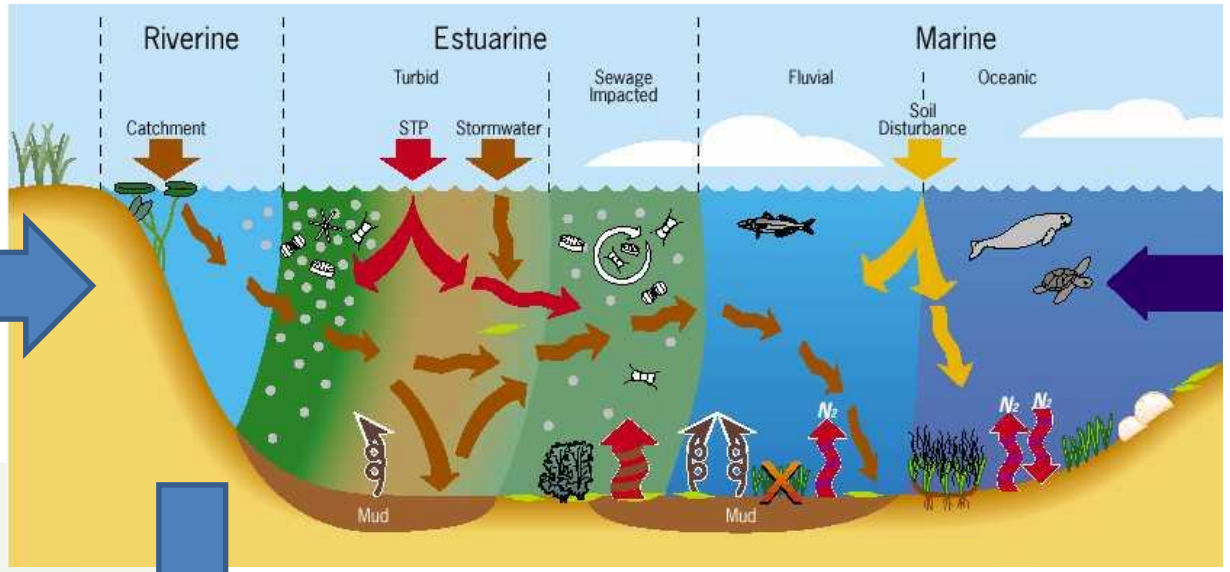
Healthy land & water

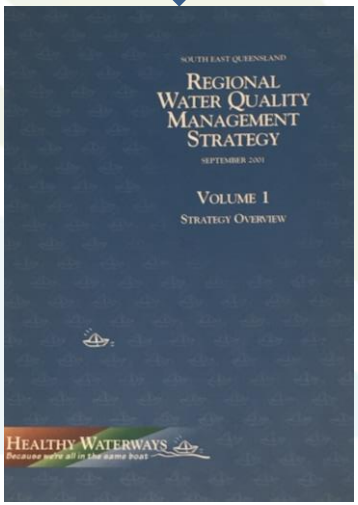
alluvium

SEQ Context

Regional strategy for investment – point sources







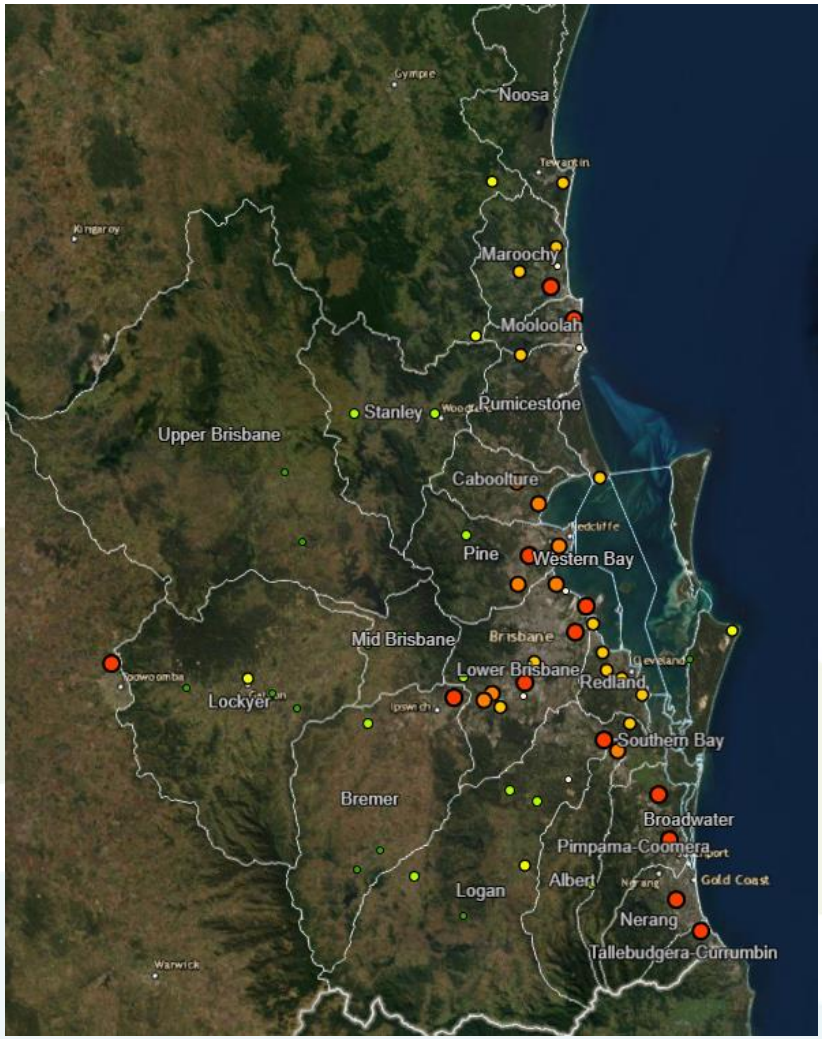
~$1 Billion spent on upgrades

Problem - increasing diffuse pressure

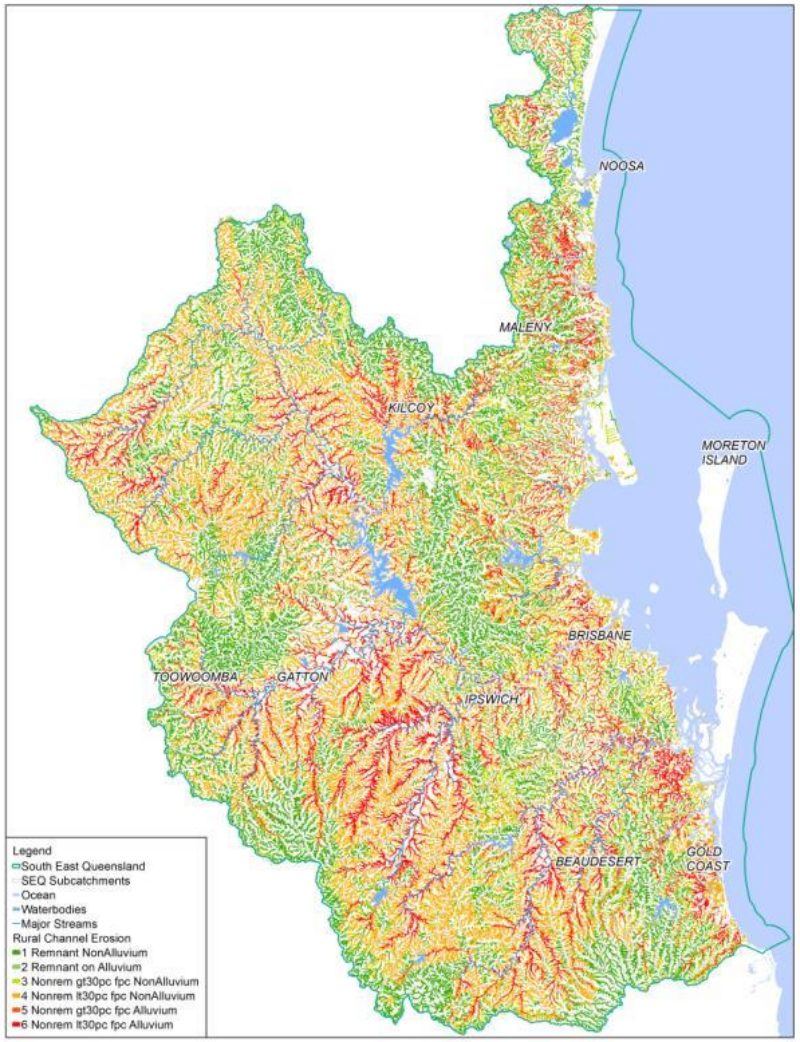
Urban areas

Rural areas

Regional strategy for investment – diffuse sources

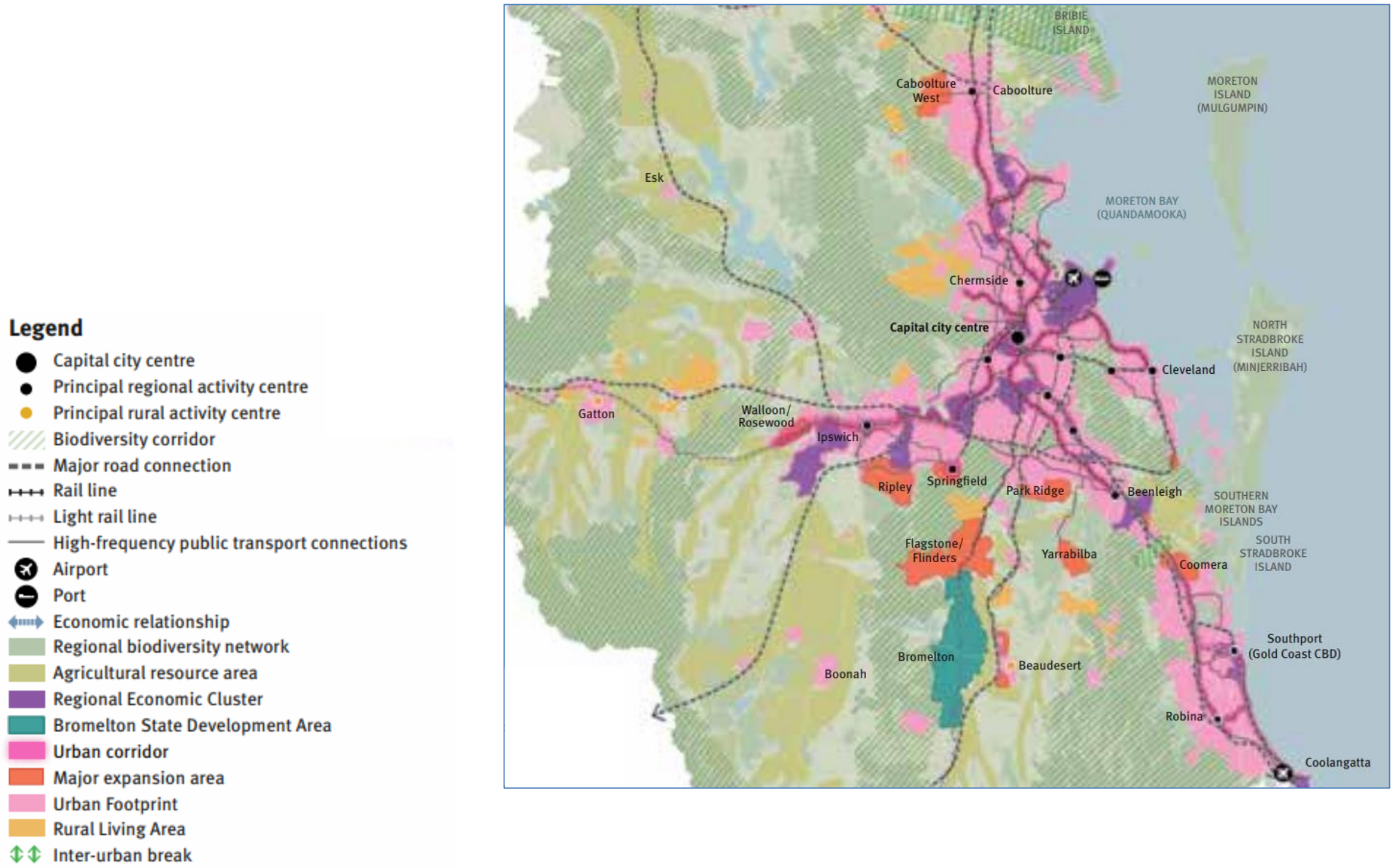


Point sources – 57 odd



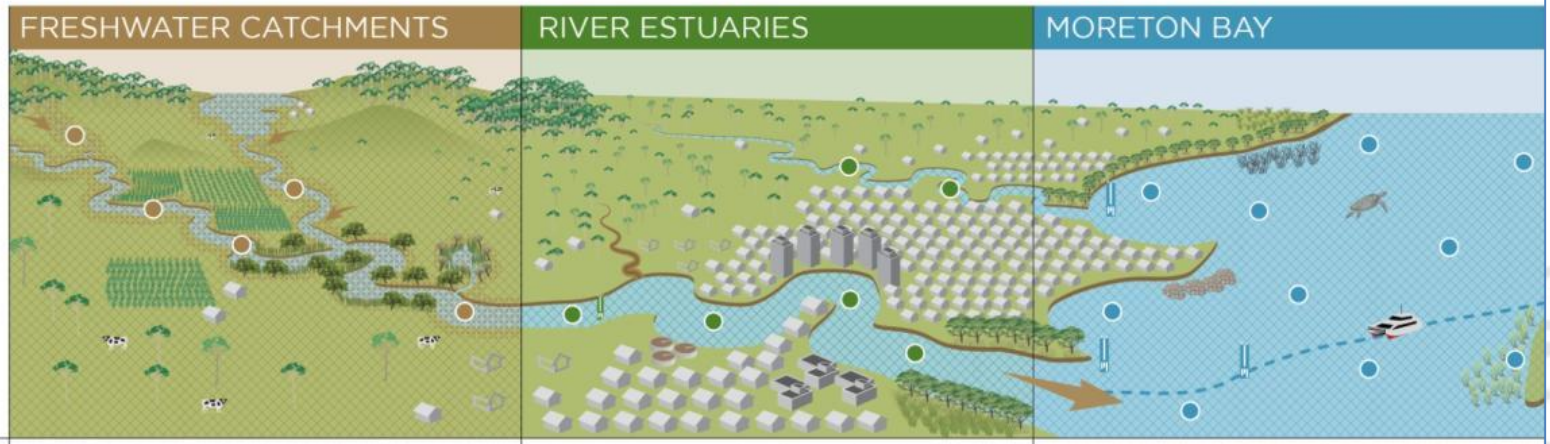
Channel erosion – 48,000km stream, lots of it degraded

Urban hipsters are so annoying



Integrated monitoring and modelling

Healthy Waterways Monitoring Progam - Environmental Component



	FRESHWATER CATCHMENTS	RIVER ESTUARIES	MORETON BAY
Key pressures and management measures Used for model inputs to track progress towards targets	Riparian, wetland & gully extent Land use (eg agricultural land management)	Point source discharge loads Diffuse loads	Estuarine water quality discharged
Models To predict waterway condition	Source model (catchment) Stream health model (waterway condition)	Receiving water quality model	Receiving water quality model
Monitoring Used to validate waterway condition	Aquatic invertebrates Fish Rates of primary productivity & respiration Water quality Load-based monitoring of sediments and nutrients	Riparian, wetland & mangrove extent Chlorophyll a Toxicants Water quality Field monitoring (Physical/chemical, nutrients, chlorophyll a) Continuous sensors	Seagrass & wetland extent & condition Coral Nuisance algae Fauna Mud content of sediment Water quality Field monitoring (Physical/chemical, nutrients, chlorophyll a) Underway sampling from vessels Continuous sensors

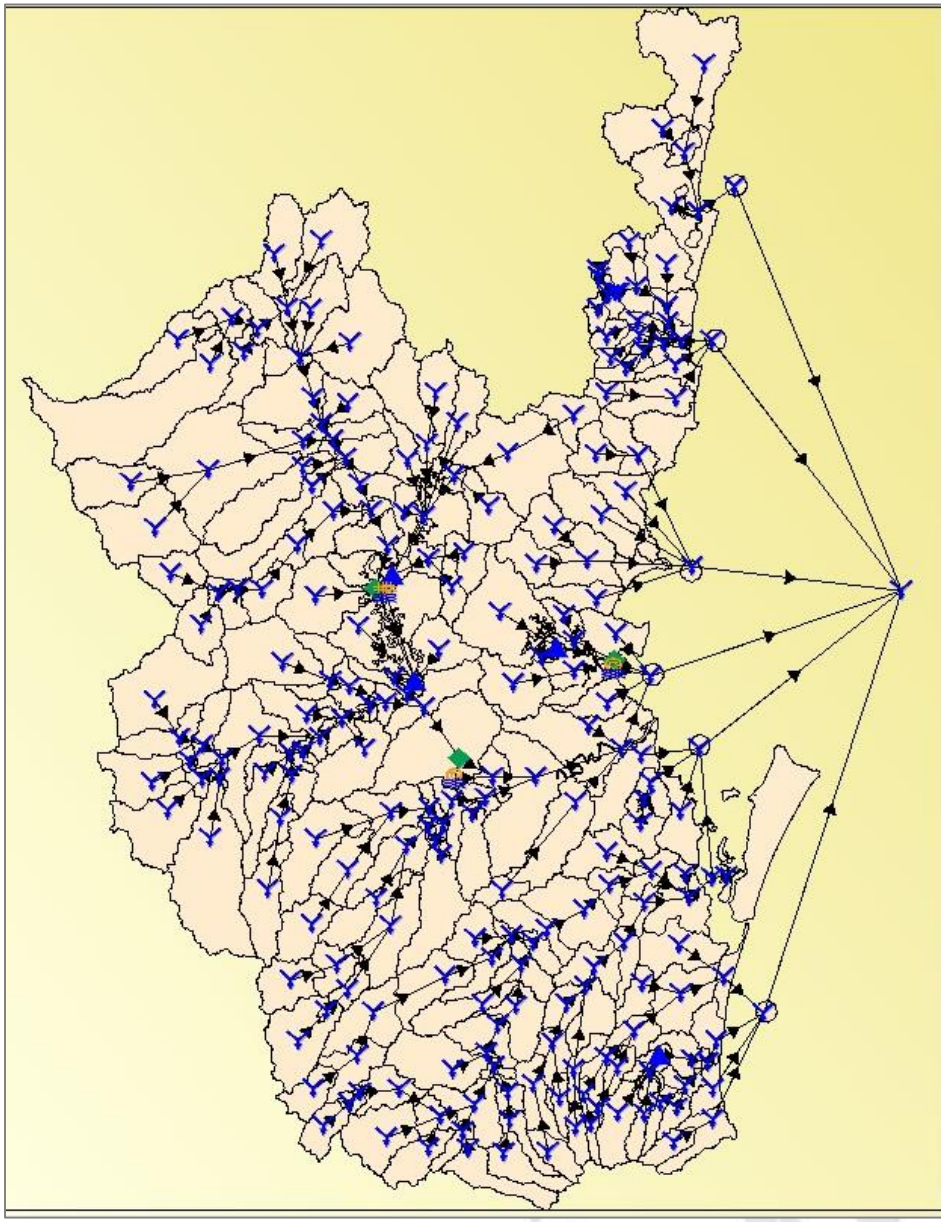
1. Catchment pollutant modelling - Source

What it does do

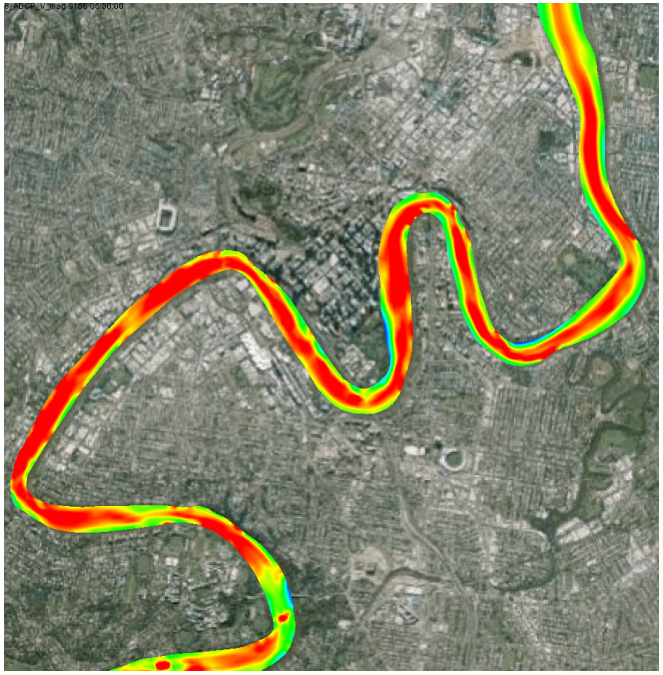
- Flow
- Nutrients, TN, TP, TSS
- Daily time step
- Landuse based runoff
- Fine spatial scale models developed for specific applications (e.g. Redlands, Mid-Brisbane/Lockyer, Upper Brisbane

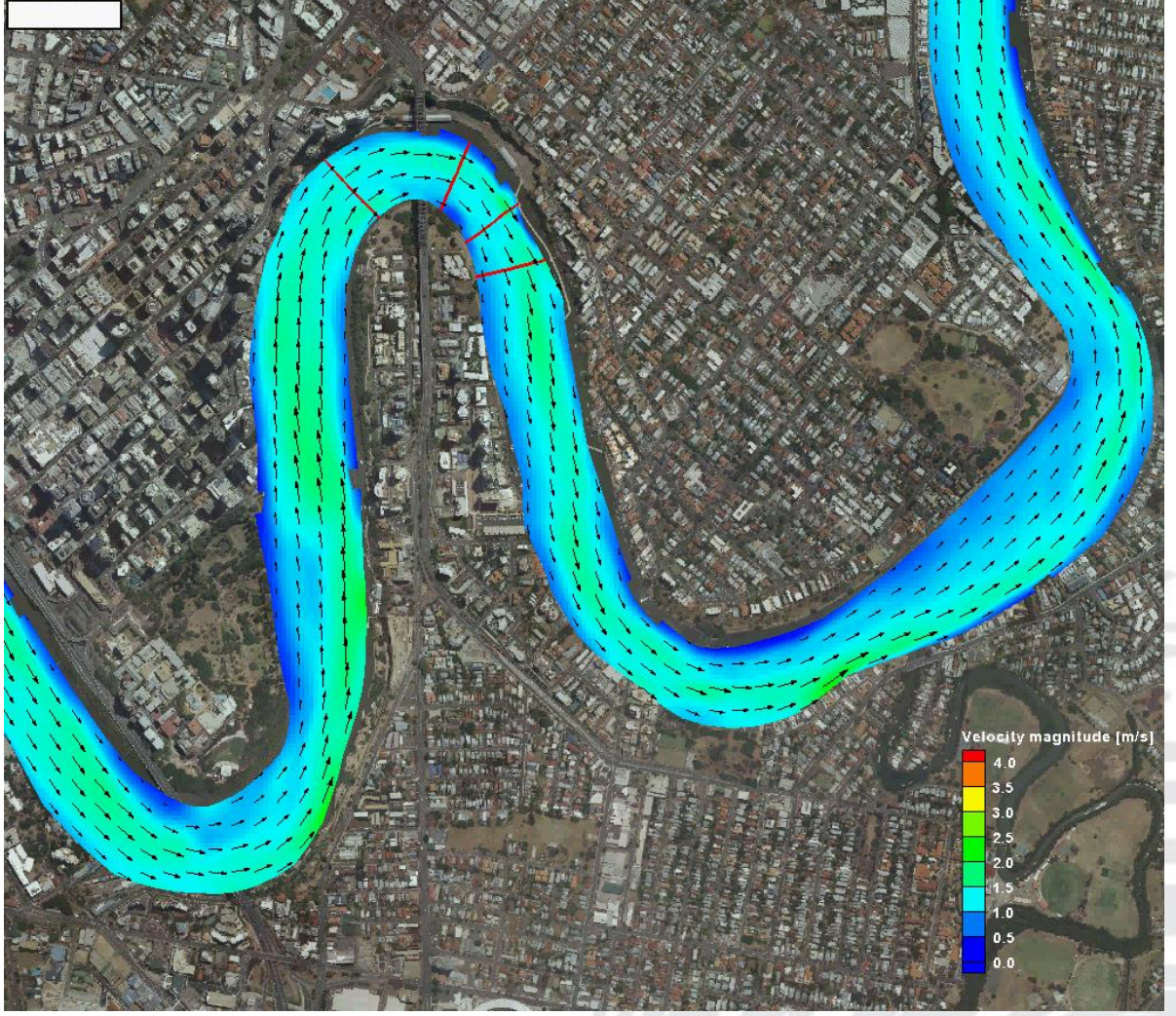
What it doesn't do - yet

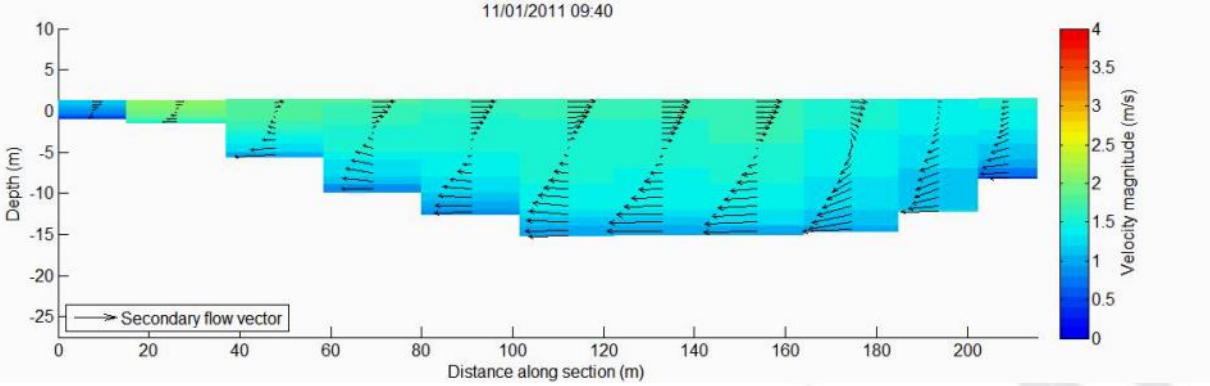
- Channel erosion
- Gully erosion
- Sediment deposition
- Channel hydrology



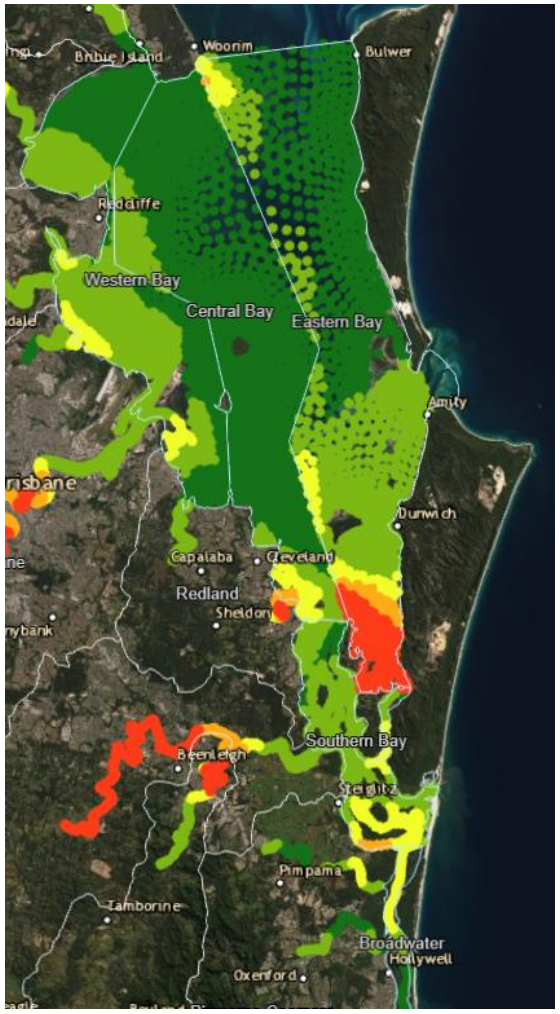
2. Estuarine and bay modelling







Problem - models for Report Carding



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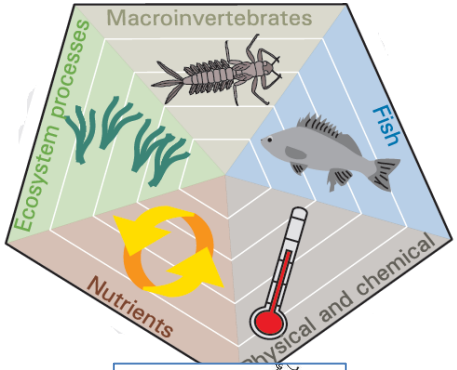

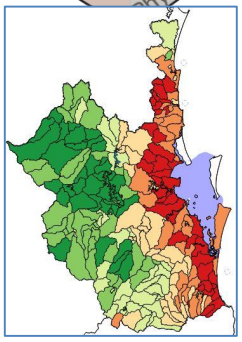

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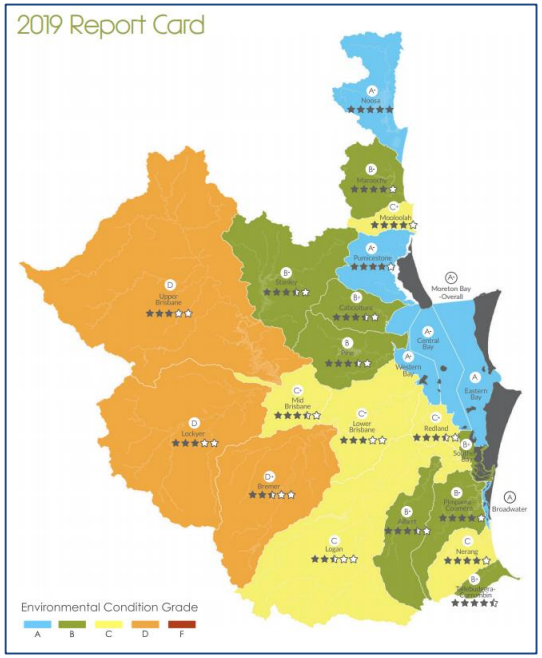
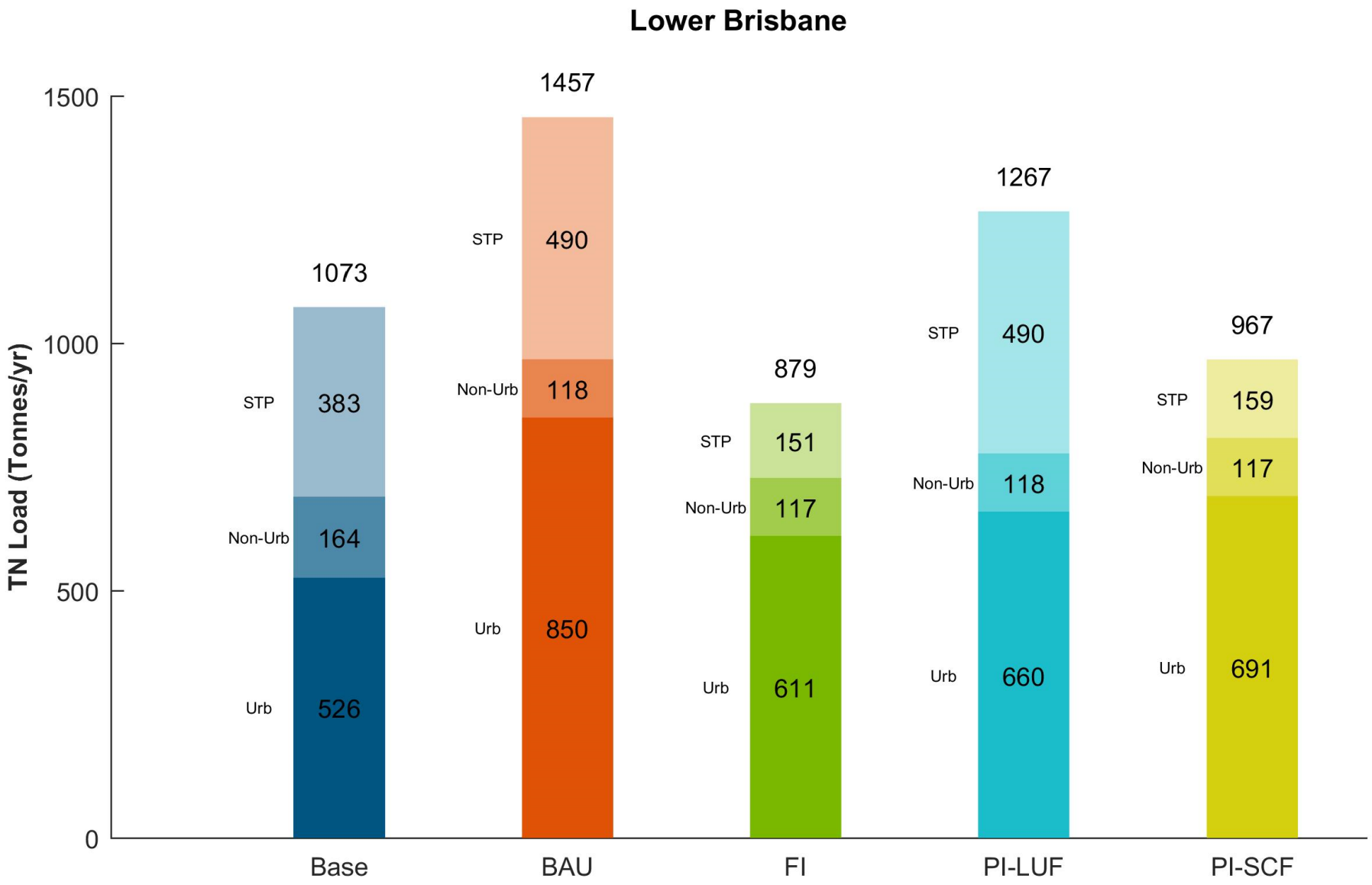
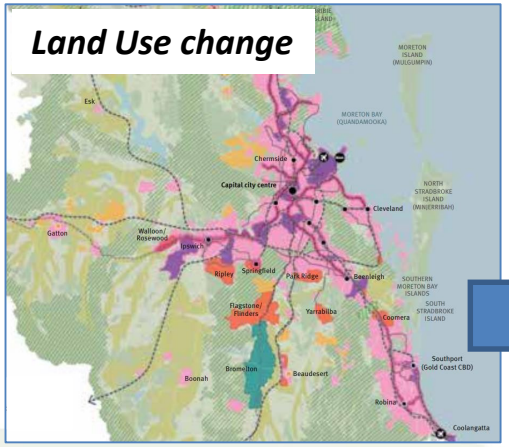
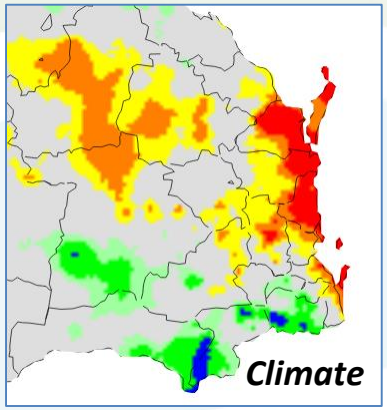


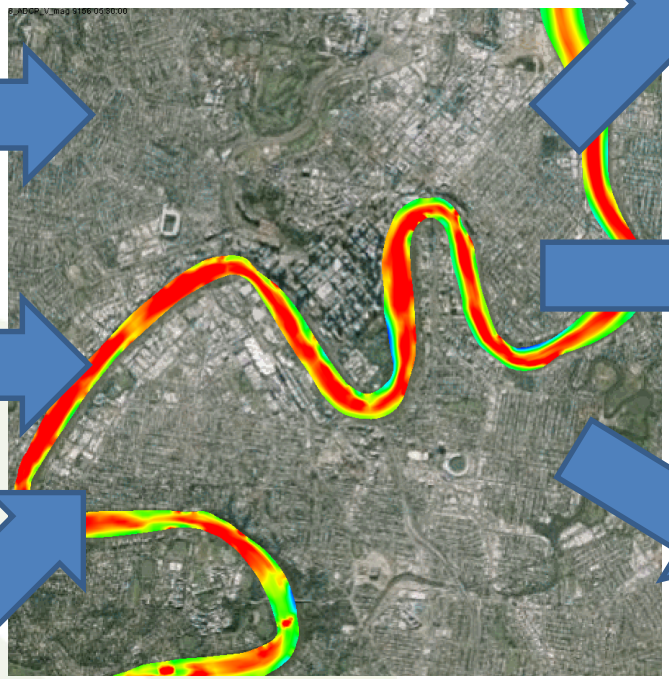
Problem - Catchment target setting

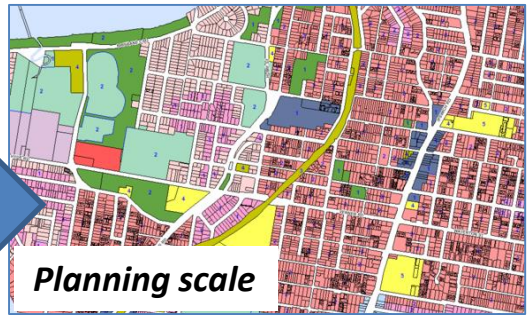


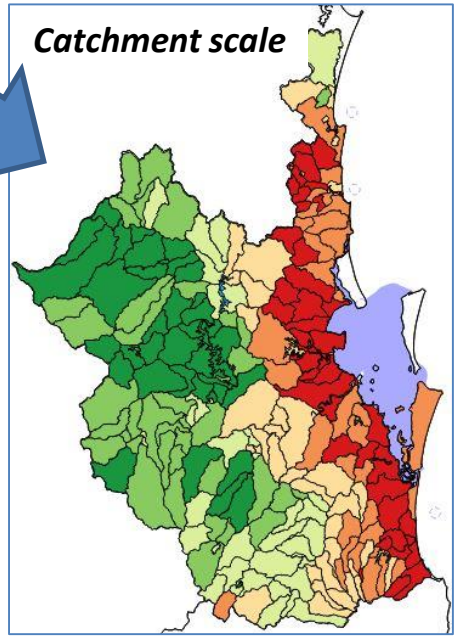
Our plan for SEQ models



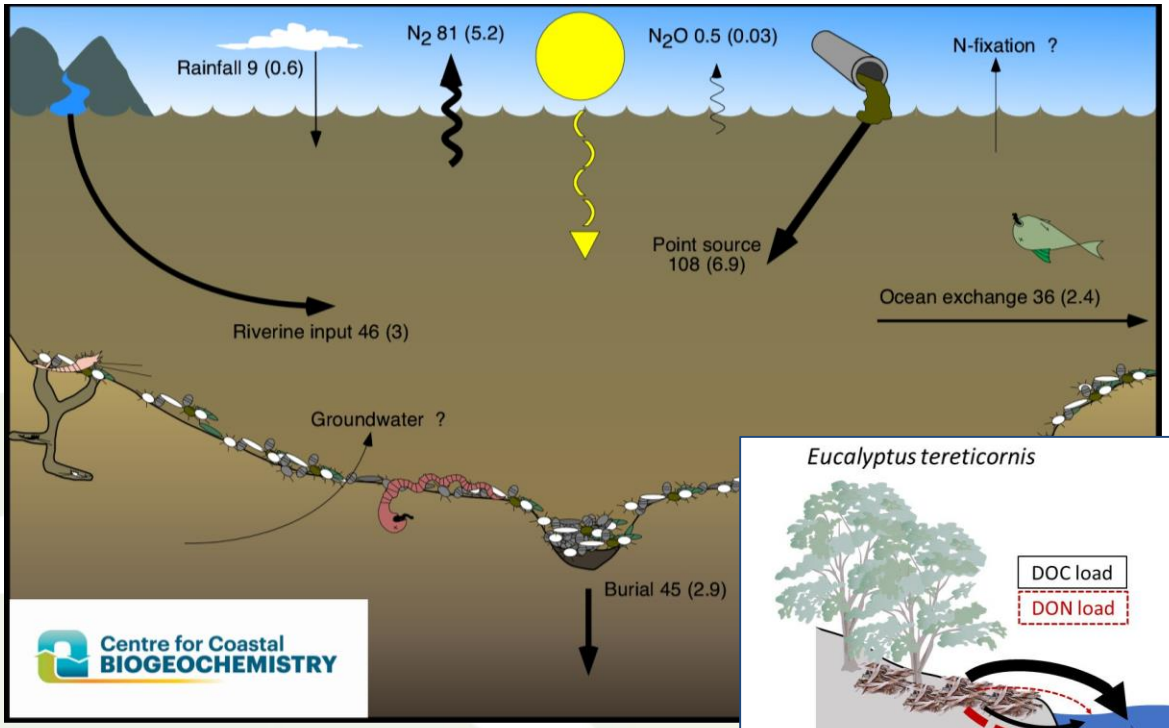




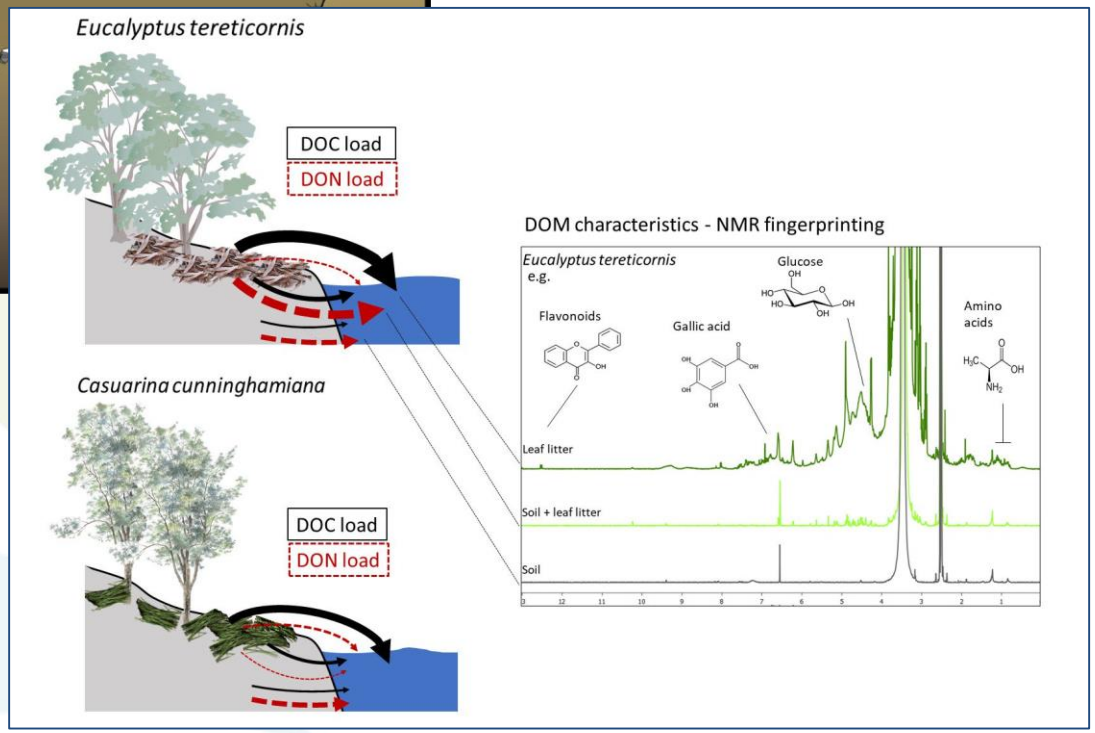




Research and models – ARC linkages

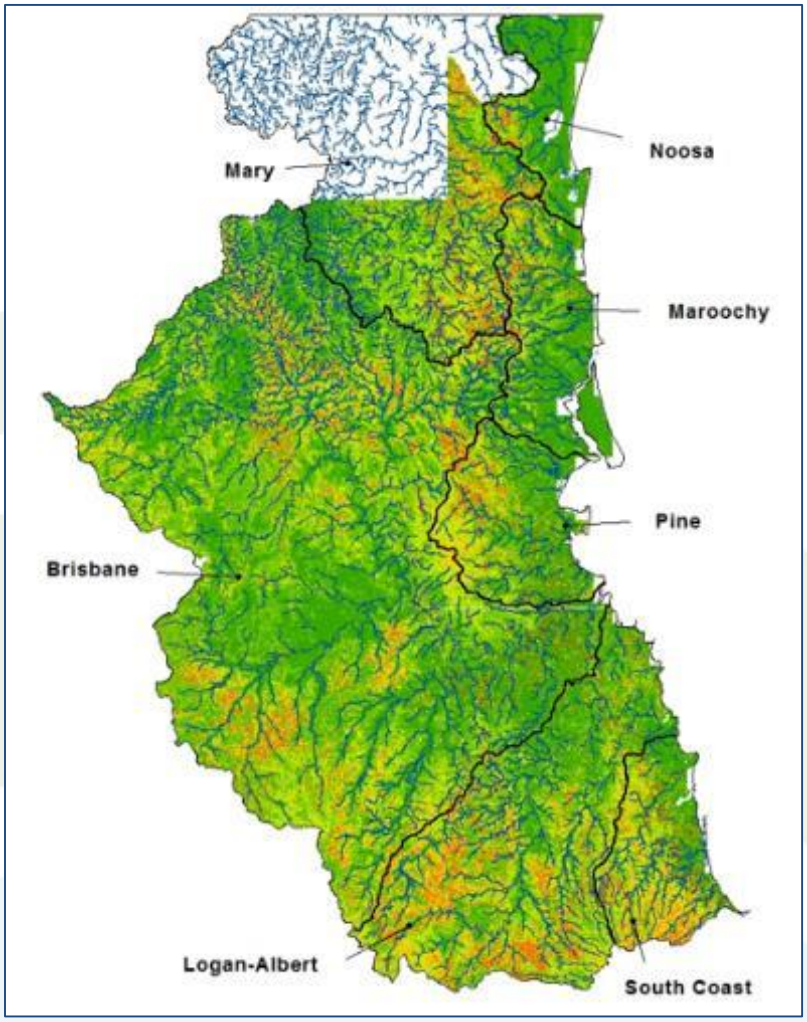


ARC – University Southern Cross/Uni

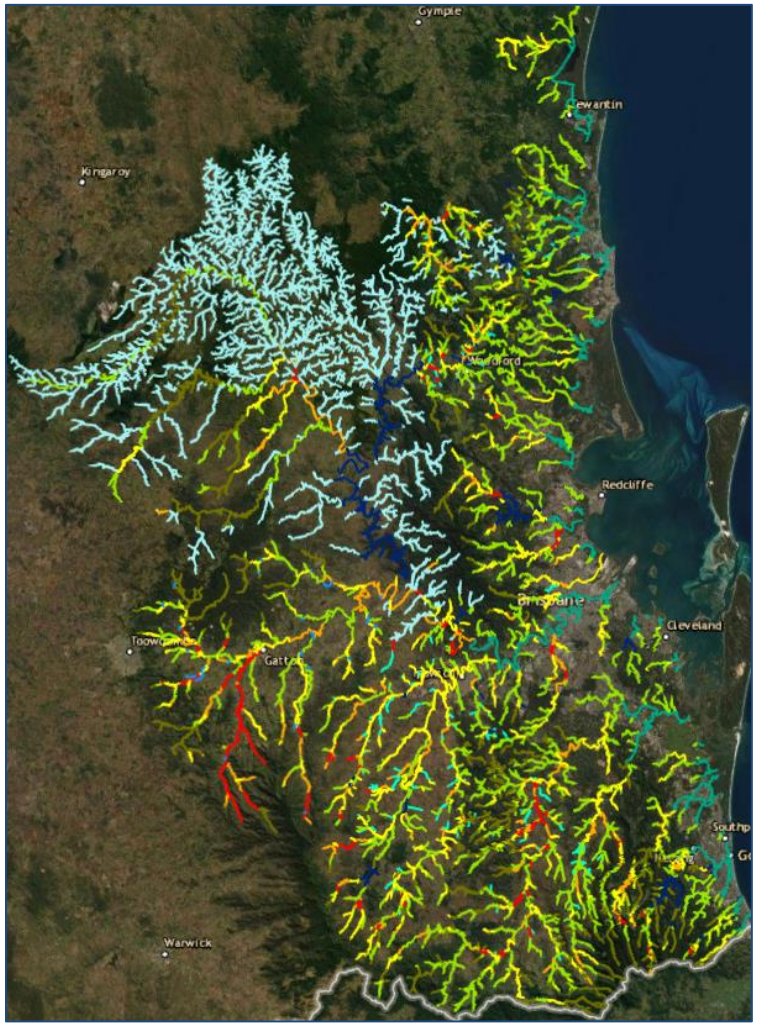


ARC – Griffith Uni/Seqwater

Research and models – sediment erosion



RUSLE – Hillslope erosion



Channel erosion

Conclusion

Scie
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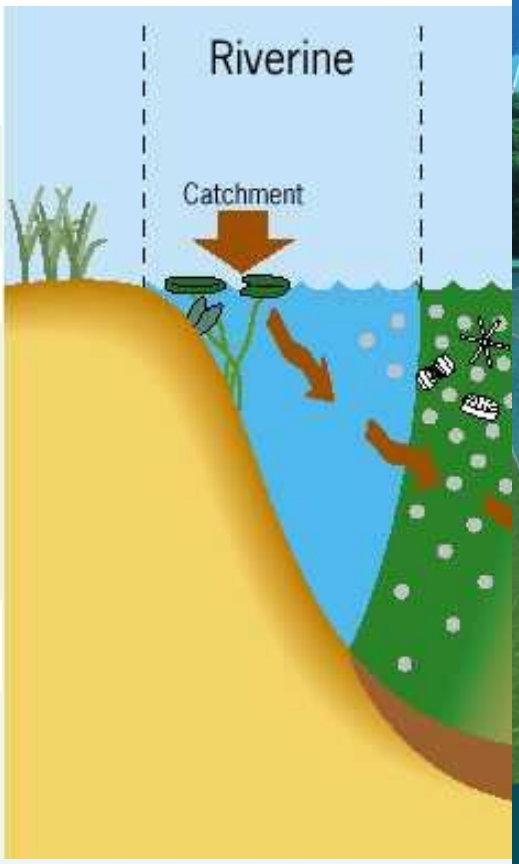
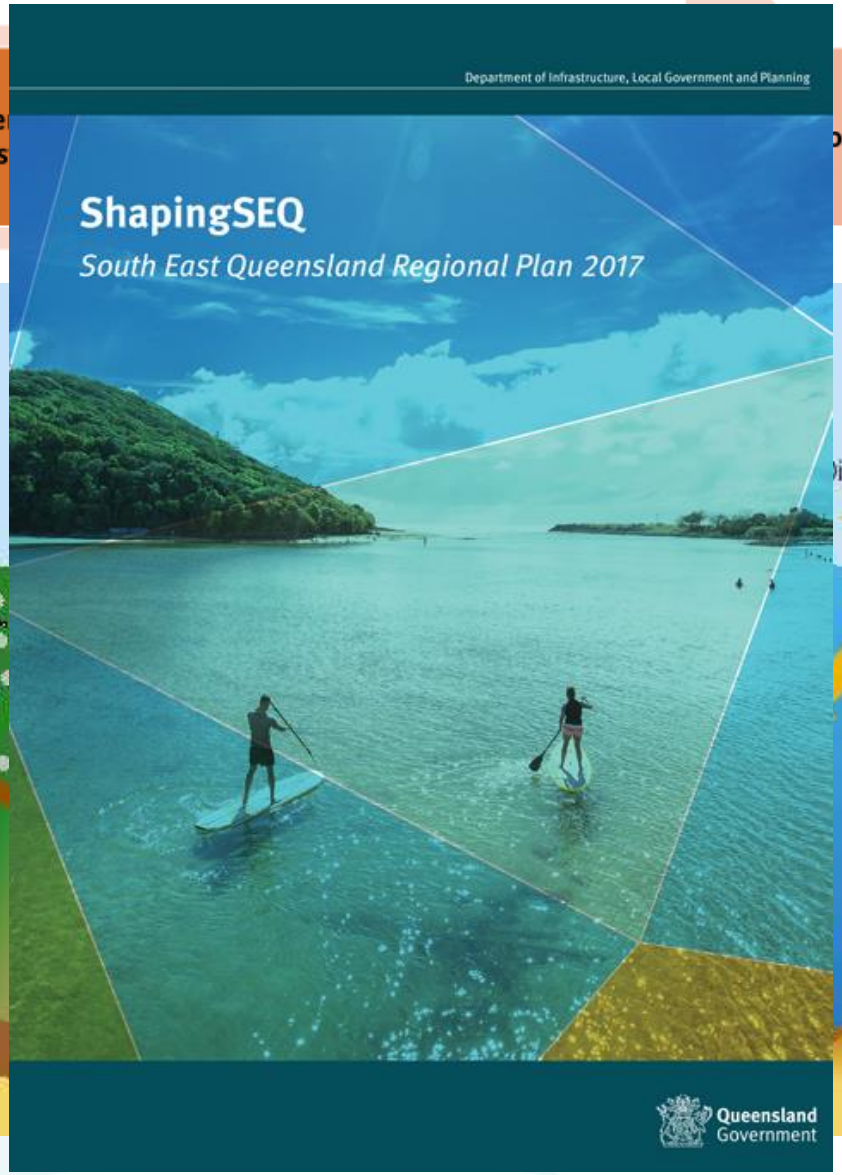
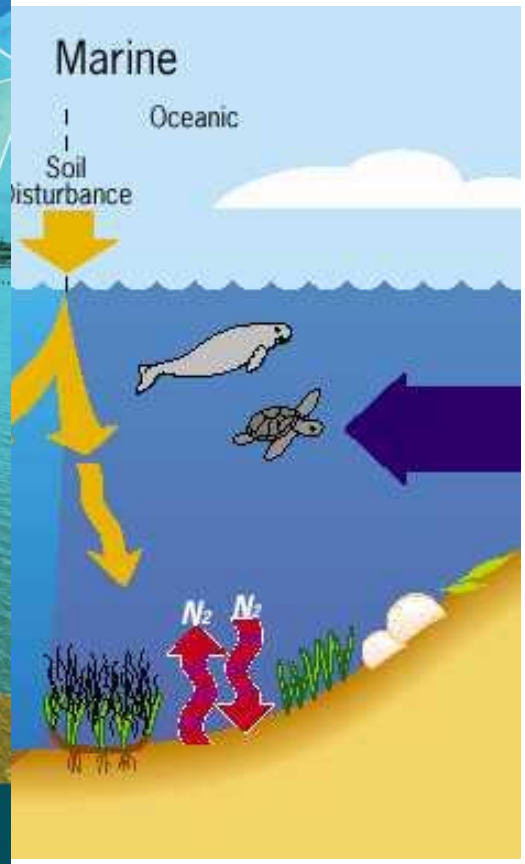
on Making



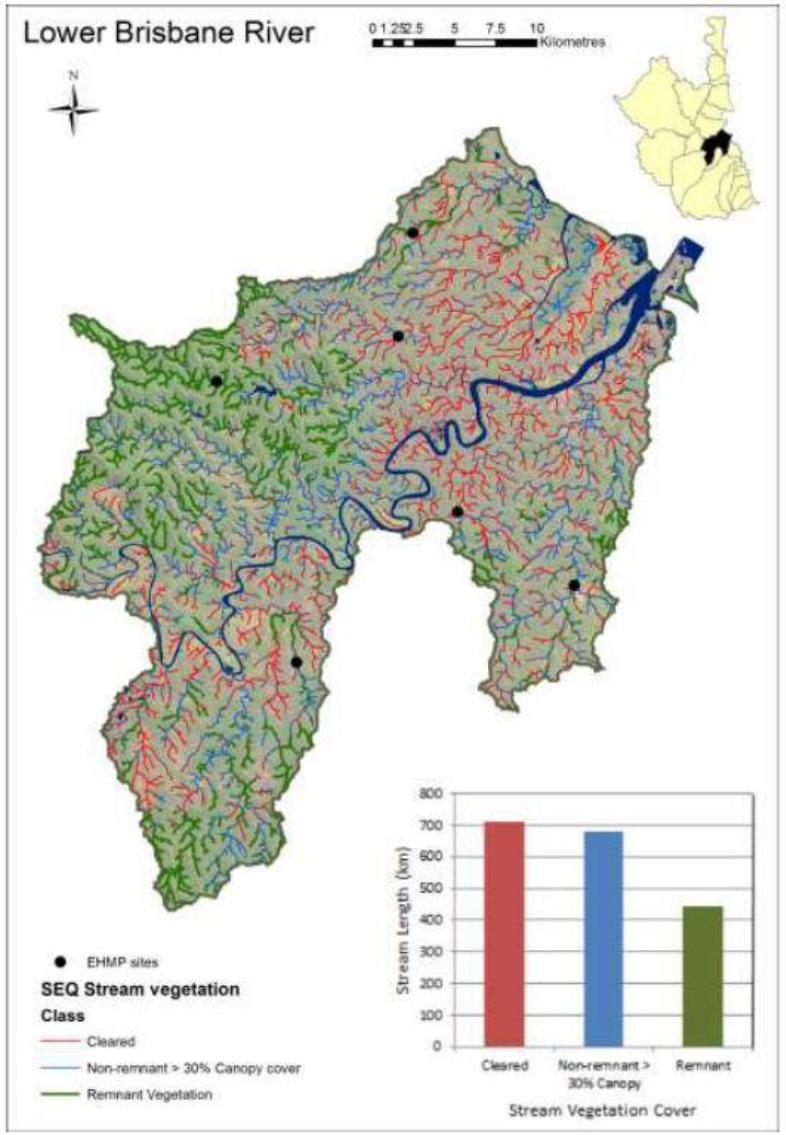




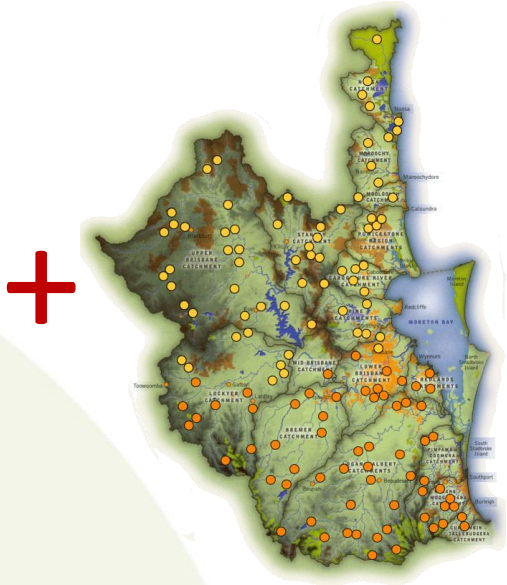
Thank you

3. Stream health modelling

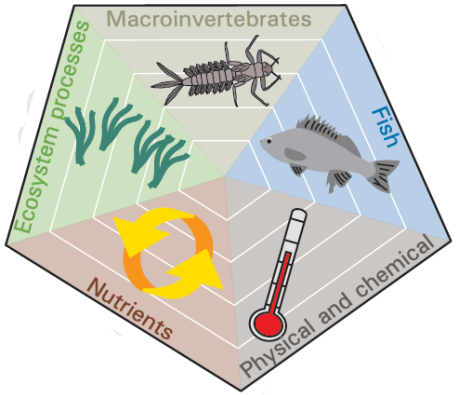
Riparian extent



Field monitoring



Stream Health Scores



HLW Adaptive Management Strategy

2. Plan
- Prioritise actions
- Influence policy
- Regional planning
- Writing guidelines
- Defining actions

3. Implement
- In prioritised areas
- Support community and stakeholders

1. Figure out the problem
- Consultation with community
- Bring together science

4. Monitor
- Track actions
- EHMP
- NRM Regional Plan

5. Evaluate
- Reassess condition of values