

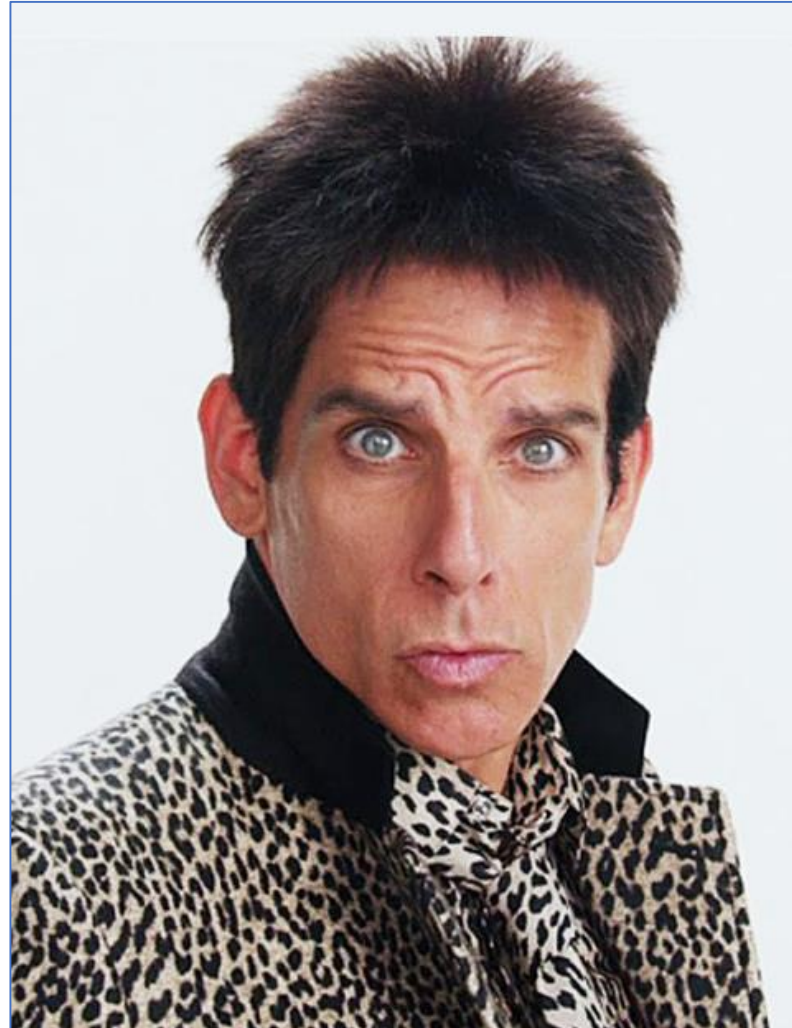


Modelling tools

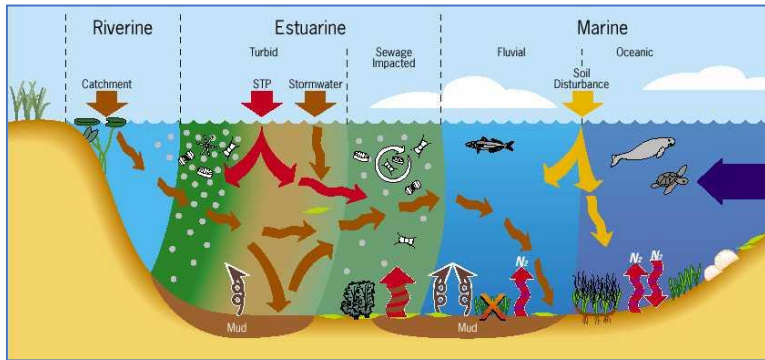
Paul Maxwell



What's a model?



What's a model?



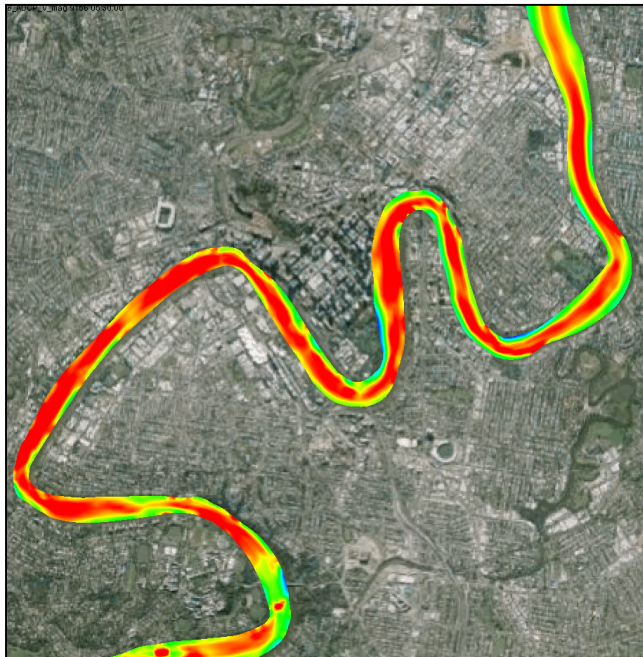
$$\frac{dB}{dt} = (g - d)B \quad (1)$$

$$g = g_{\max} \times \left(\frac{1 - B}{K} \right) \times f(L) \times f(T) \times f(S) \times f(N) \quad (2)$$

$$d = (M + h) \quad (3)$$

$$: d_E = (M + h) \times \text{turnover} \quad (4)$$

$$\frac{dB_D}{dt} = (g - d)B_D + (I - E) \quad (5)$$



All essential ways to explain relationships between entities in a system

Why models?

2. Plan

- Prioritise actions
- Influence policy
- Regional planning
- Writing guidelines
- Defining actions

3. Implement

- In prioritised areas
- Support community and stakeholders

1. Identifying the problem

- Consultation
- Understanding
- Identify pressures

DO



EVALUATE



MONITOR

4. Monitor

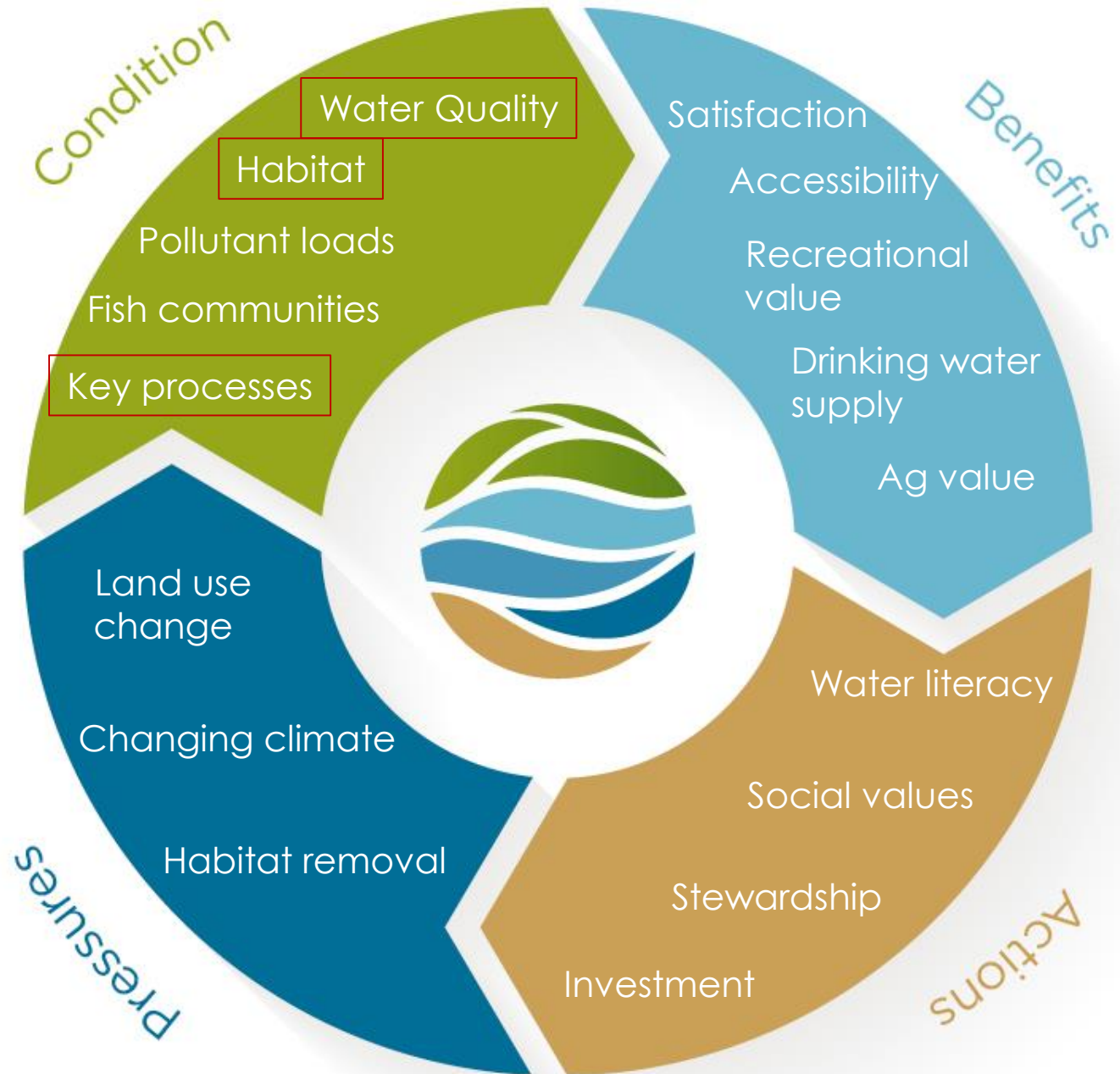
- Track actions
- EHMP
- NRM Regional Plan

5. Evaluate

- Reassess condition of values

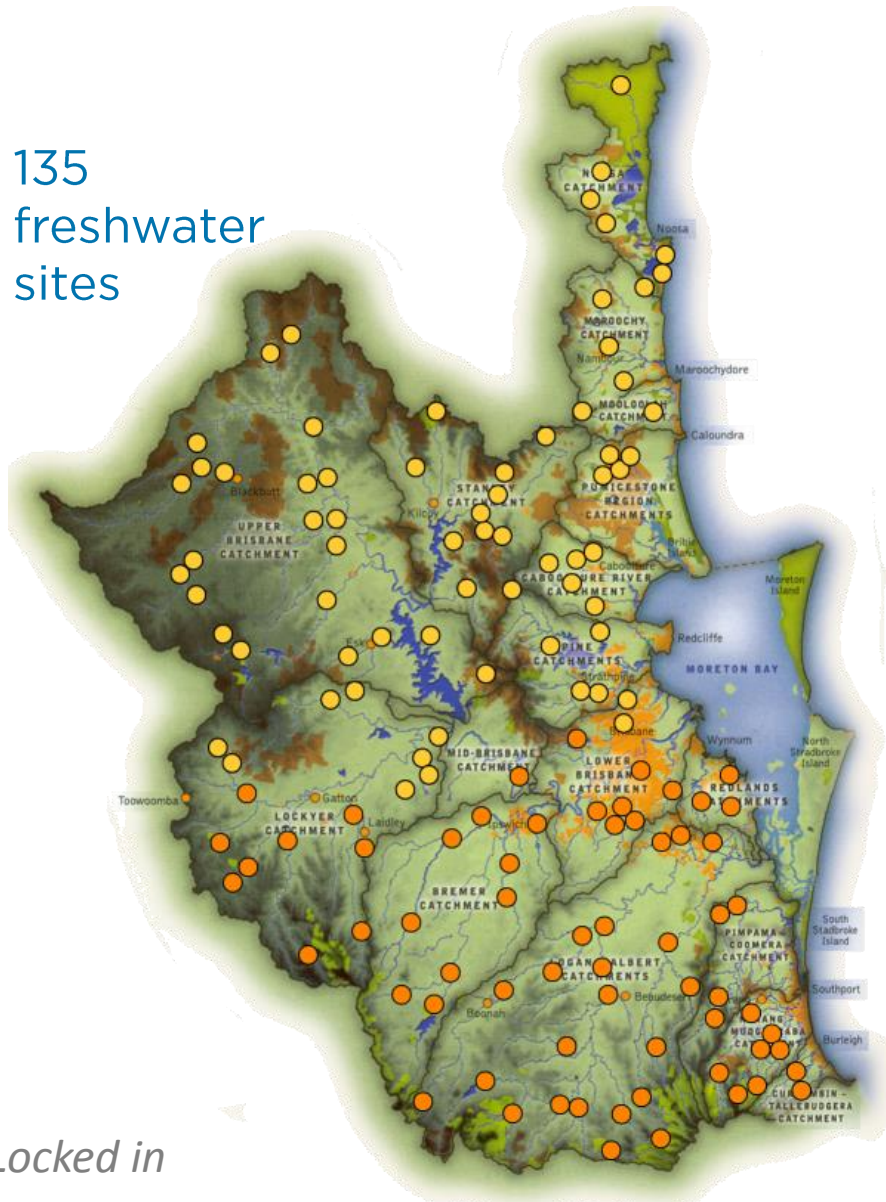


New focus, new monitoring program

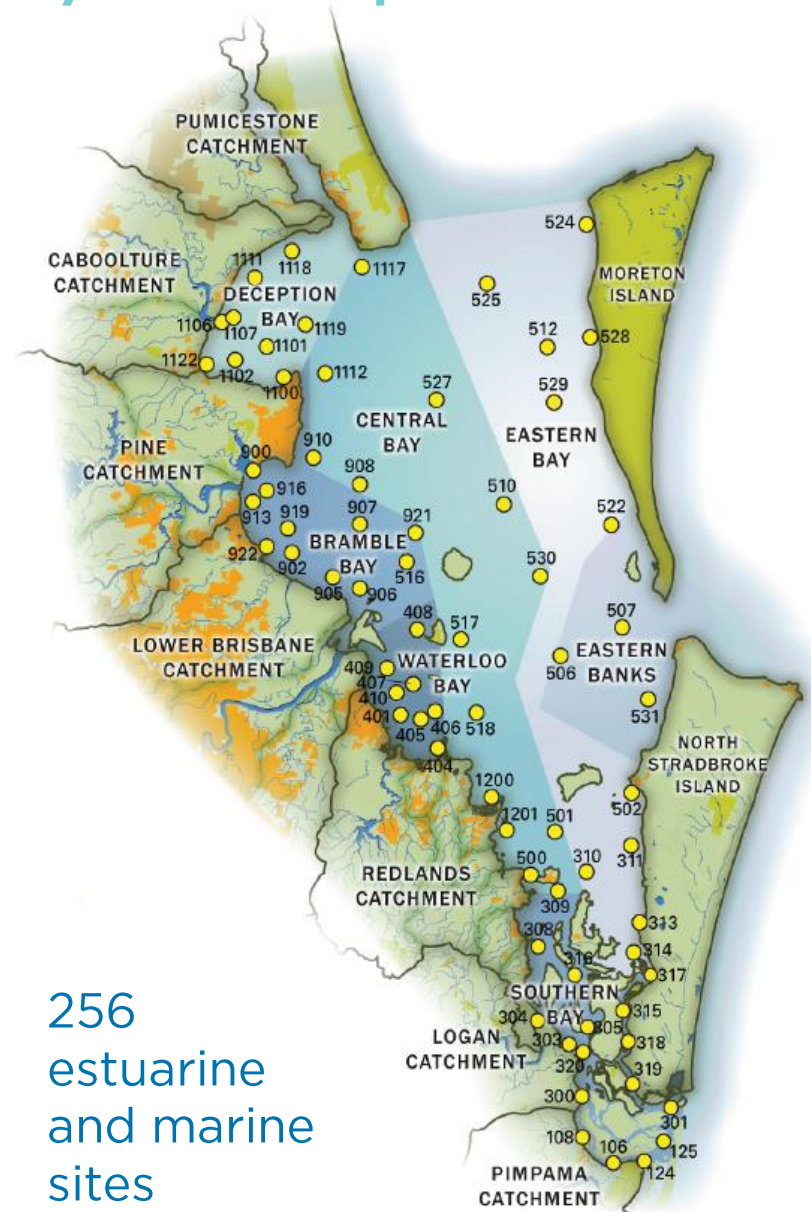


Had to find a way to optimise

135
freshwater
sites

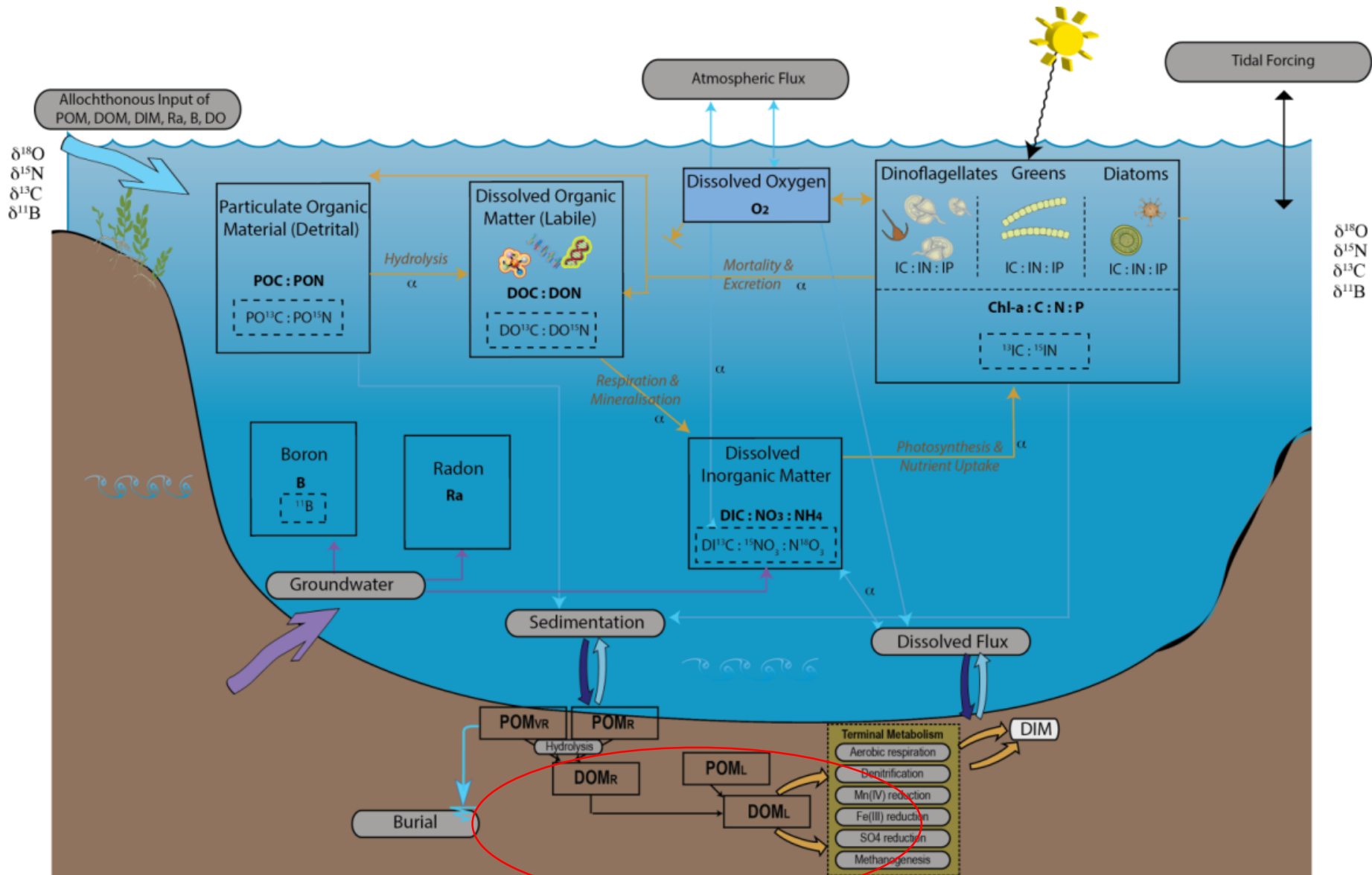


Locked in



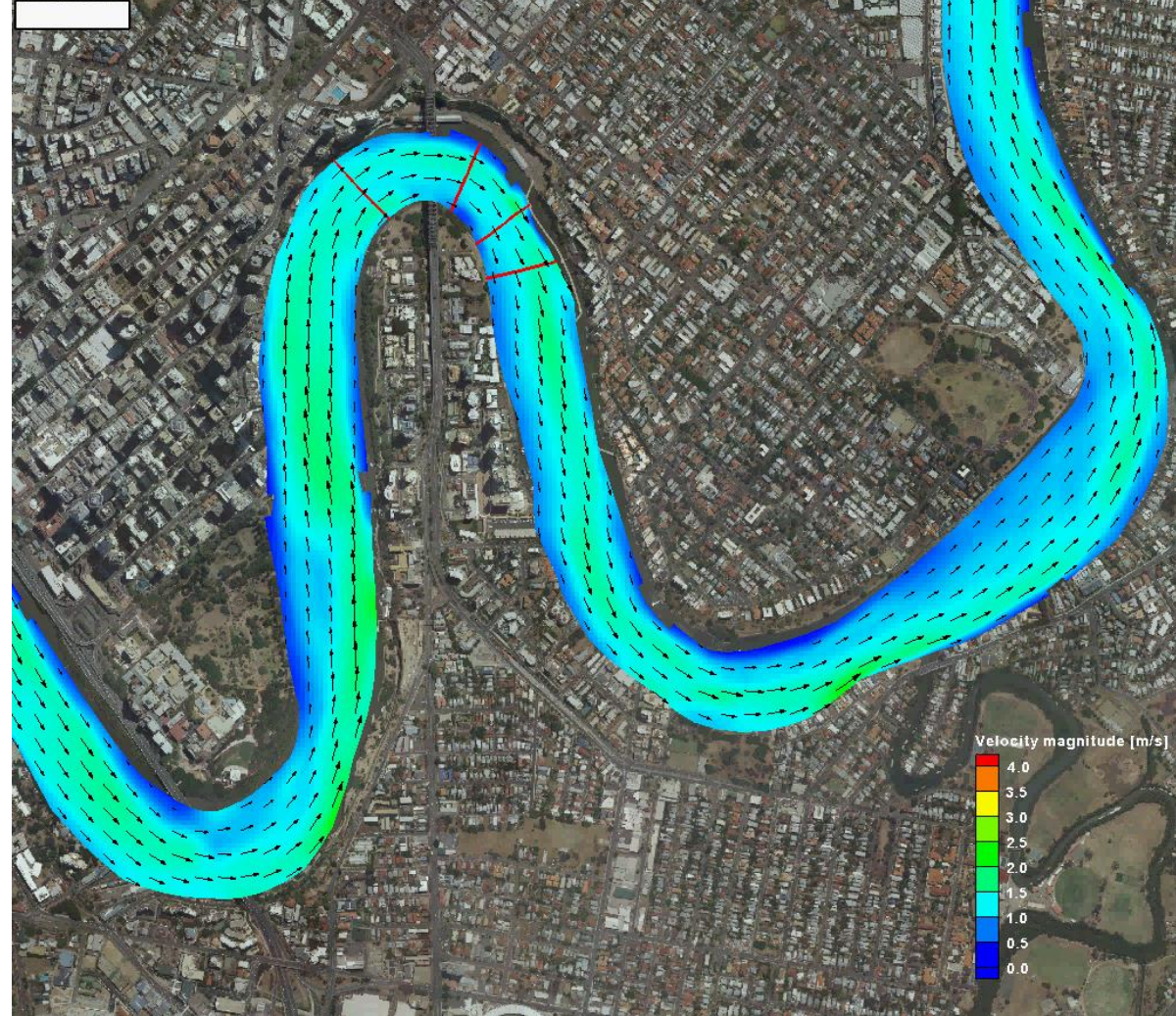
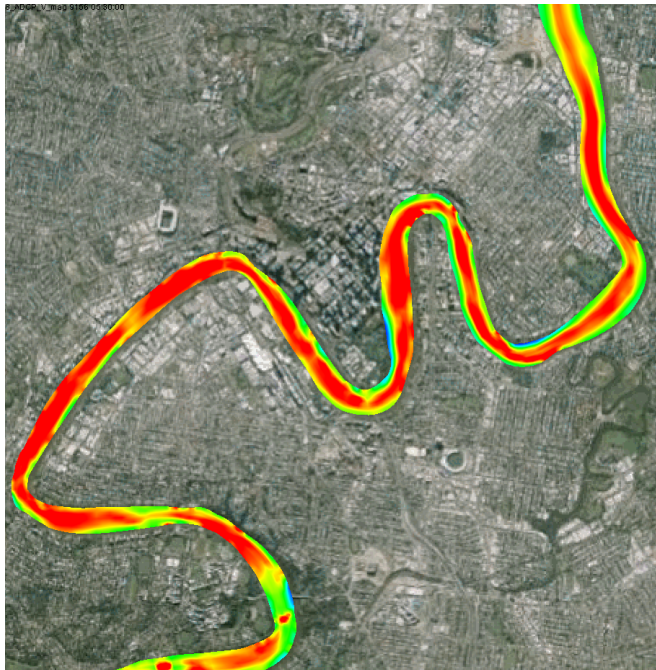
256
estuarine
and marine
sites

1. Estuarine and bay

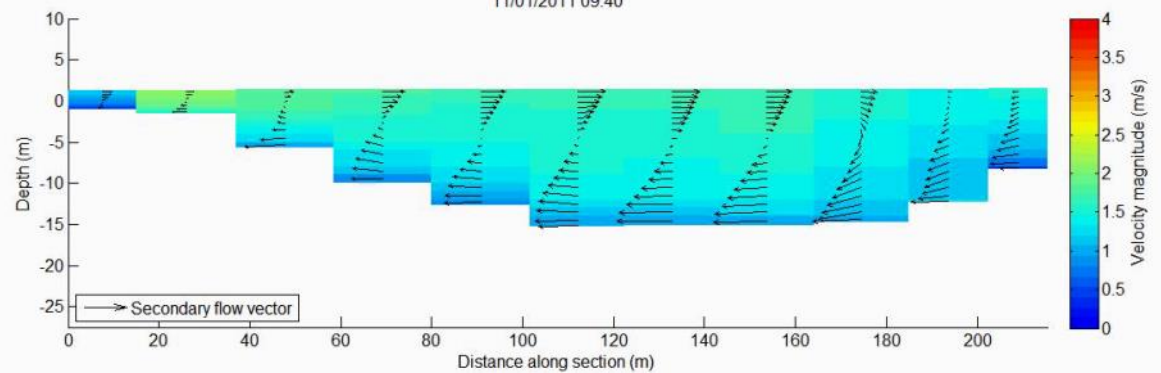


Isotope-enabled carbon & nutrient ecosystem model

Estuarine and bay modelling



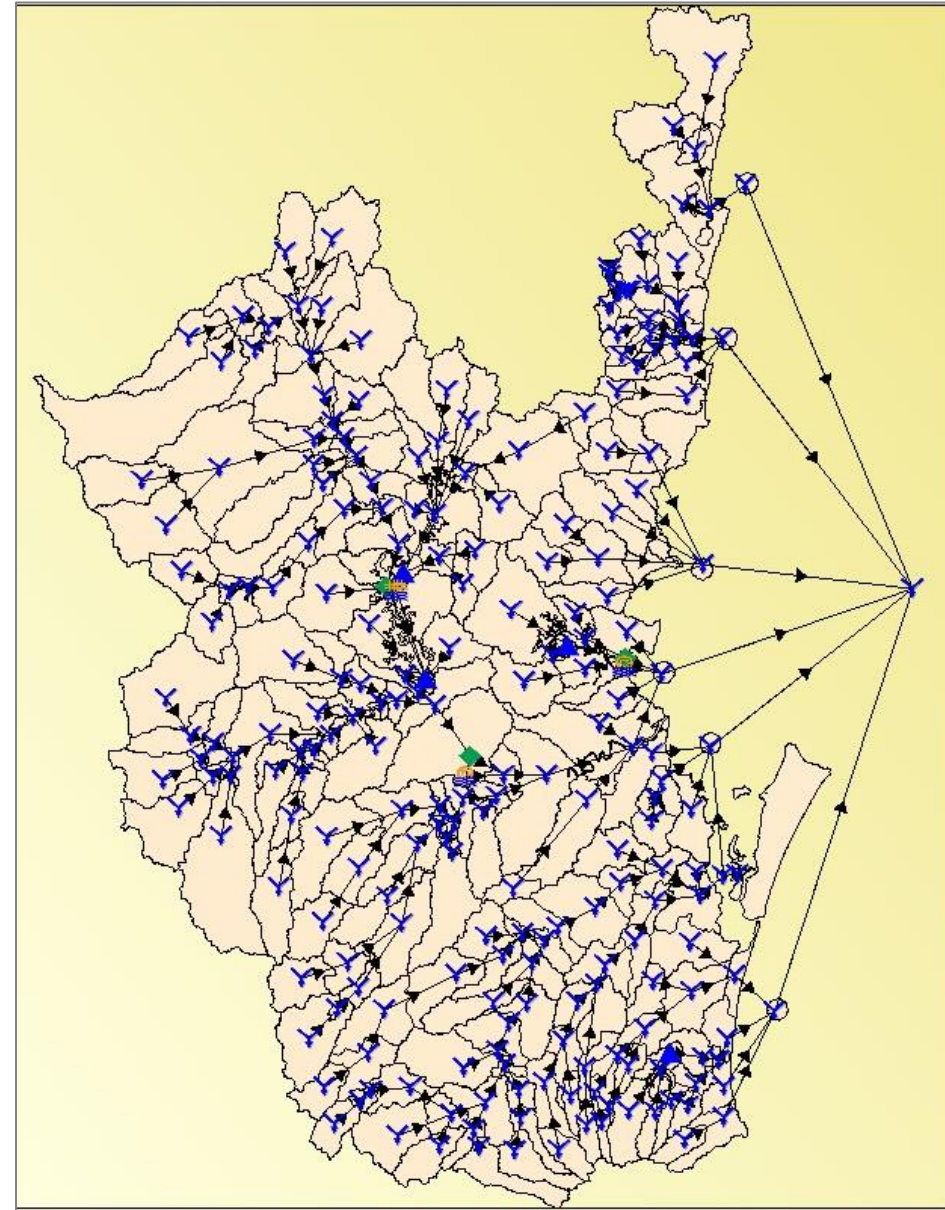
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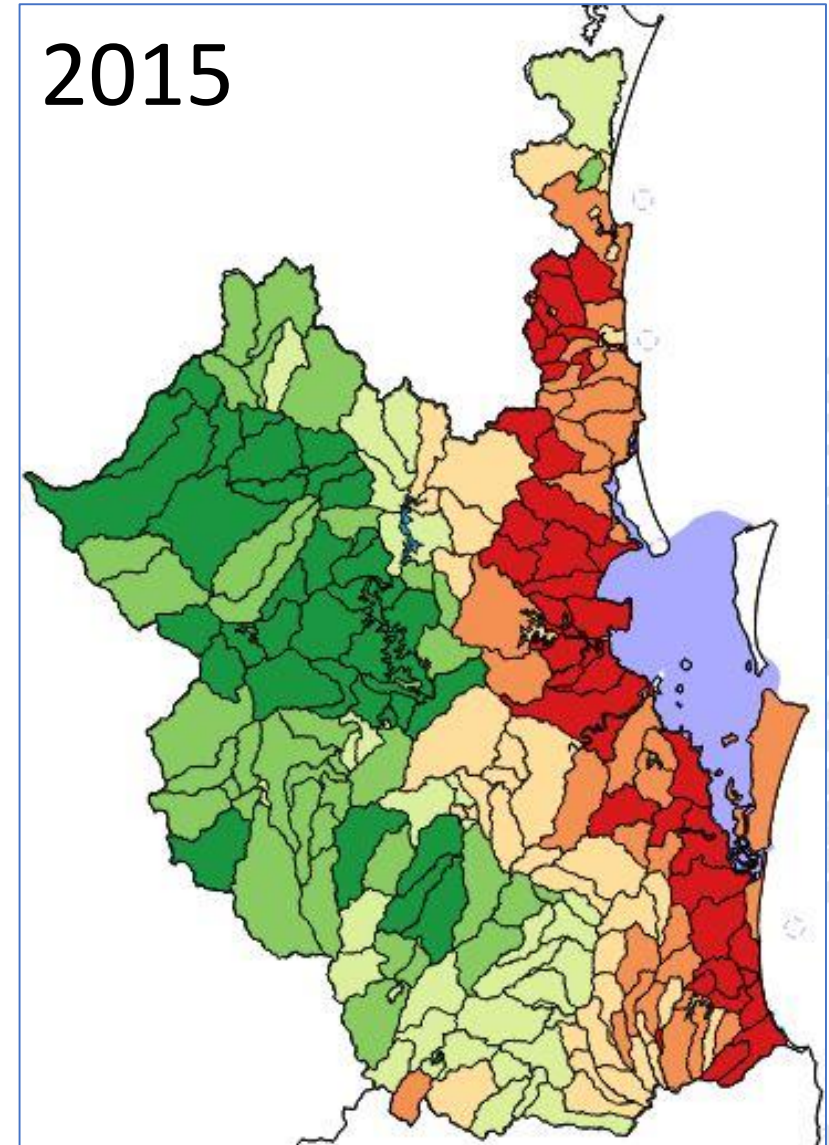
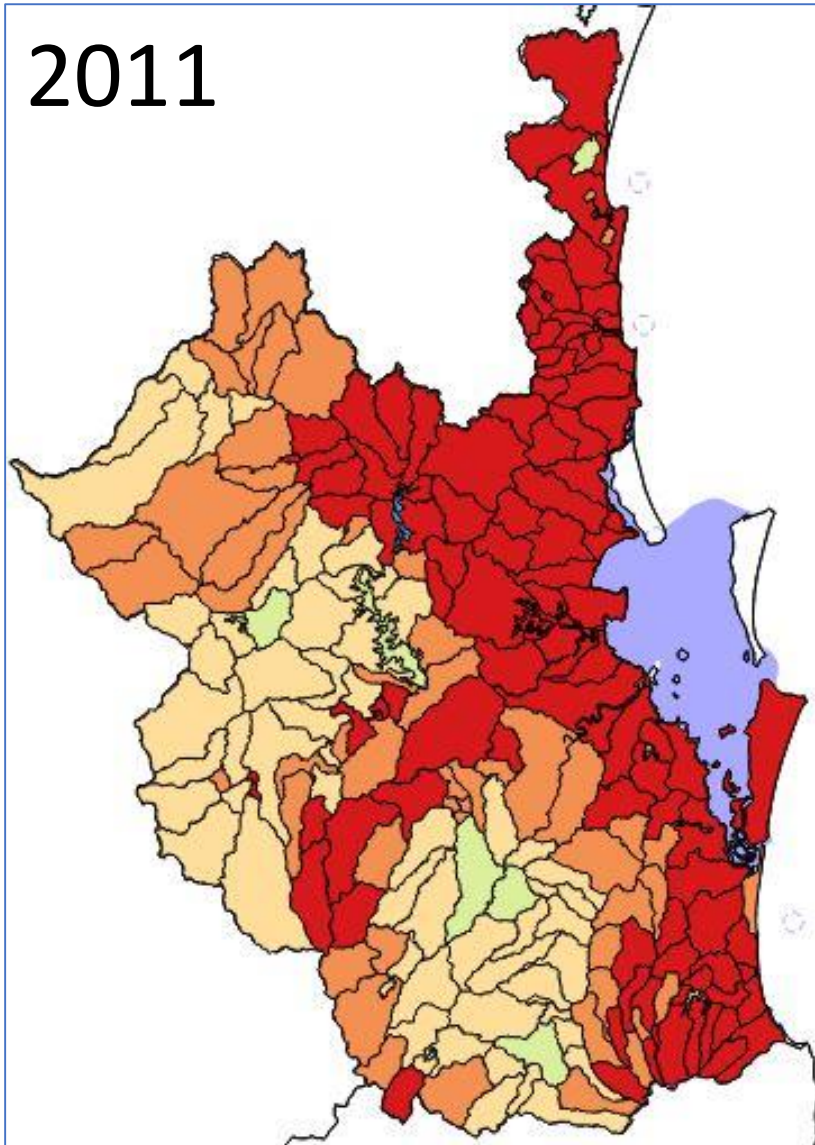
2. Catchment pollutant modelling

SOURCE modelling capability

- At nodes across SEQ, will predict
 - 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)



2. Catchment pollutant modelling

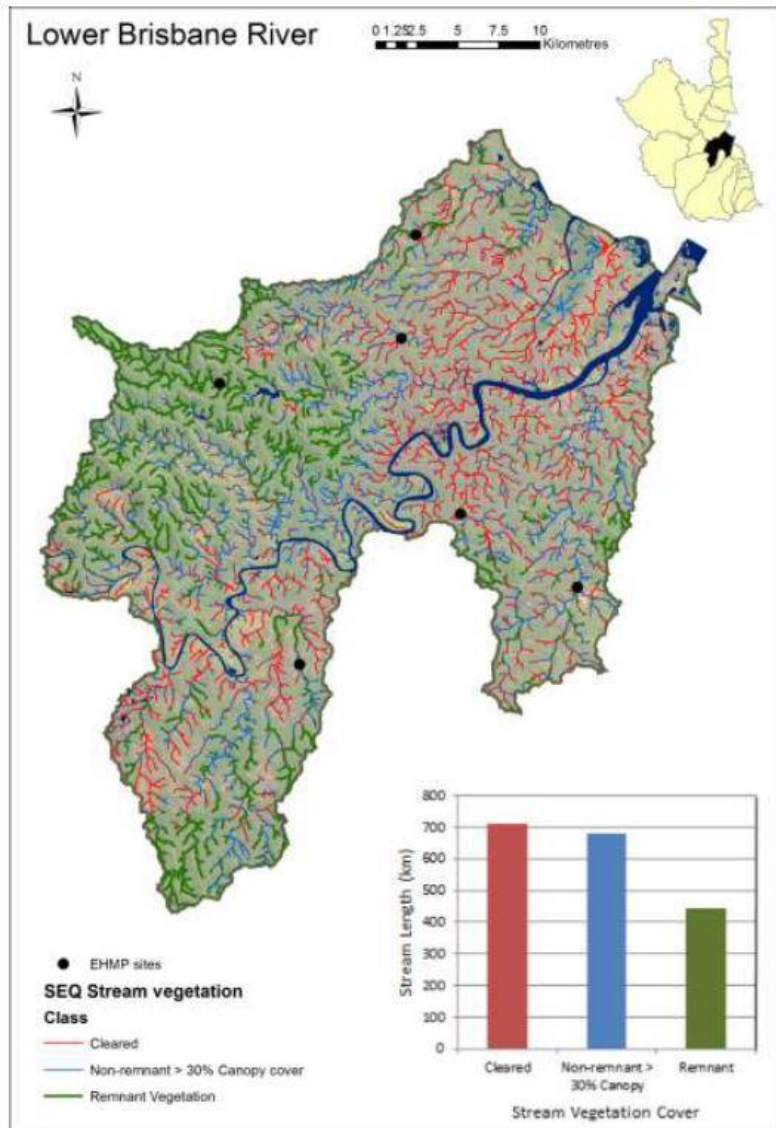


Measuring height and turbidity

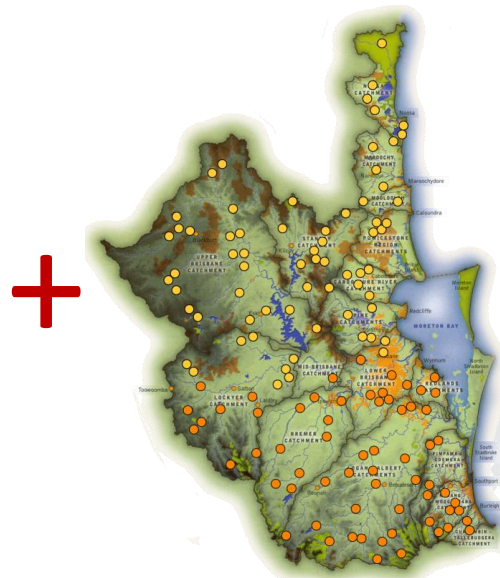


3. Stream health modelling

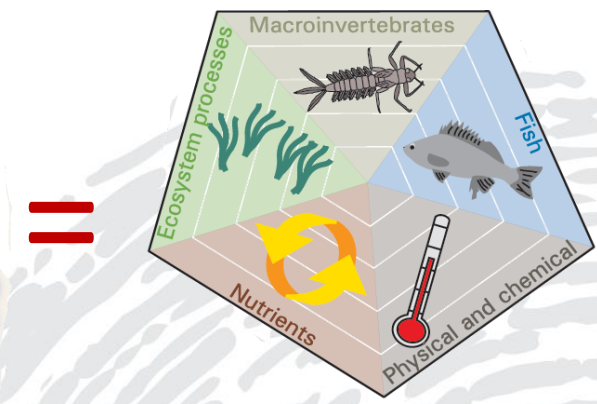
Riparian extent



Field monitoring

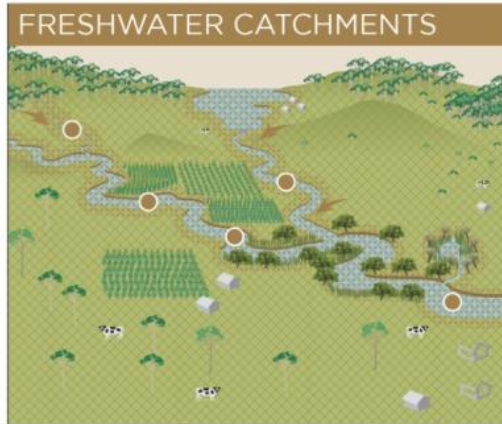






Stream Health Scores



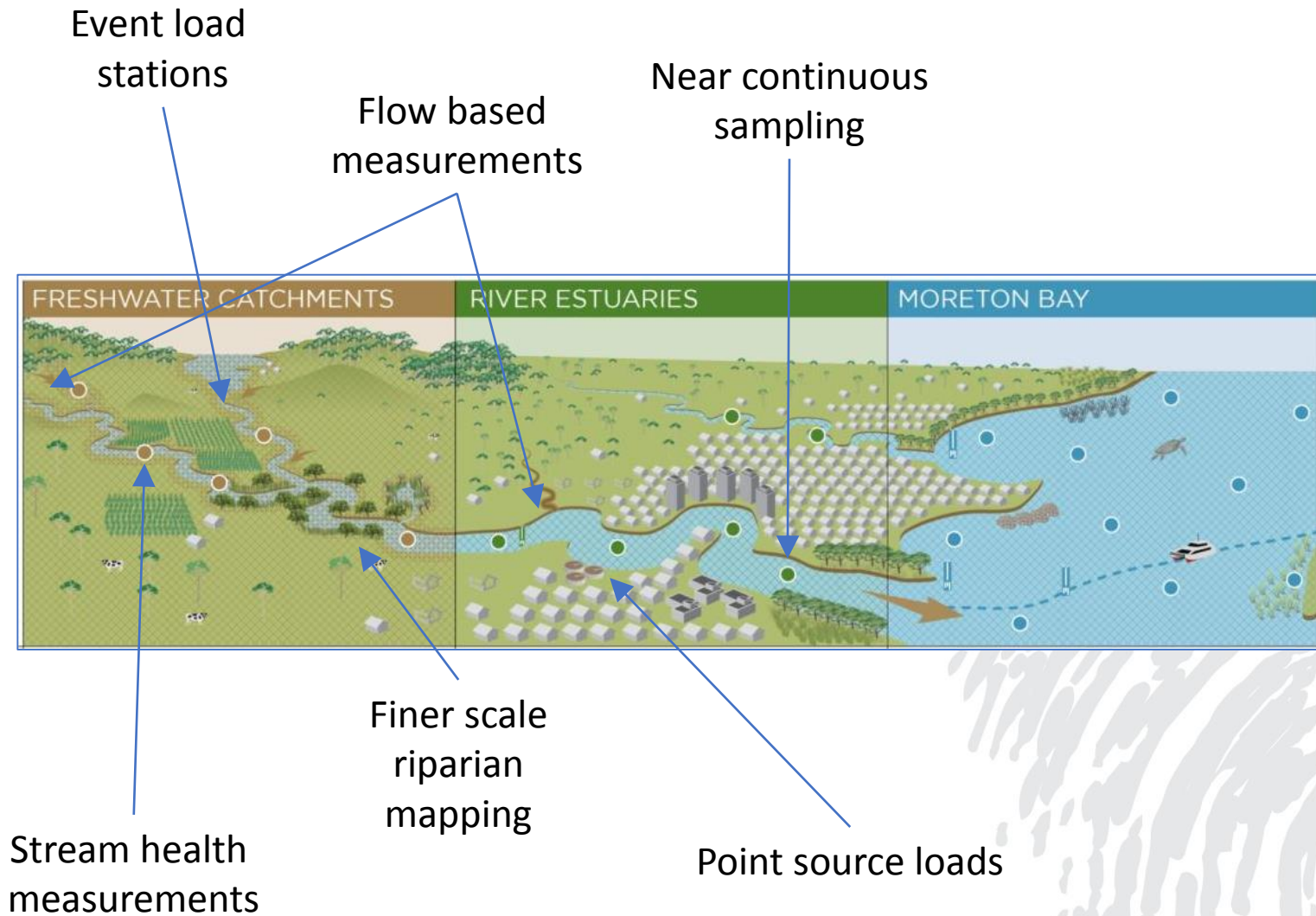
Linking our monitoring with modelling

Healthy Waterways Monitoring Program - Environmental Component

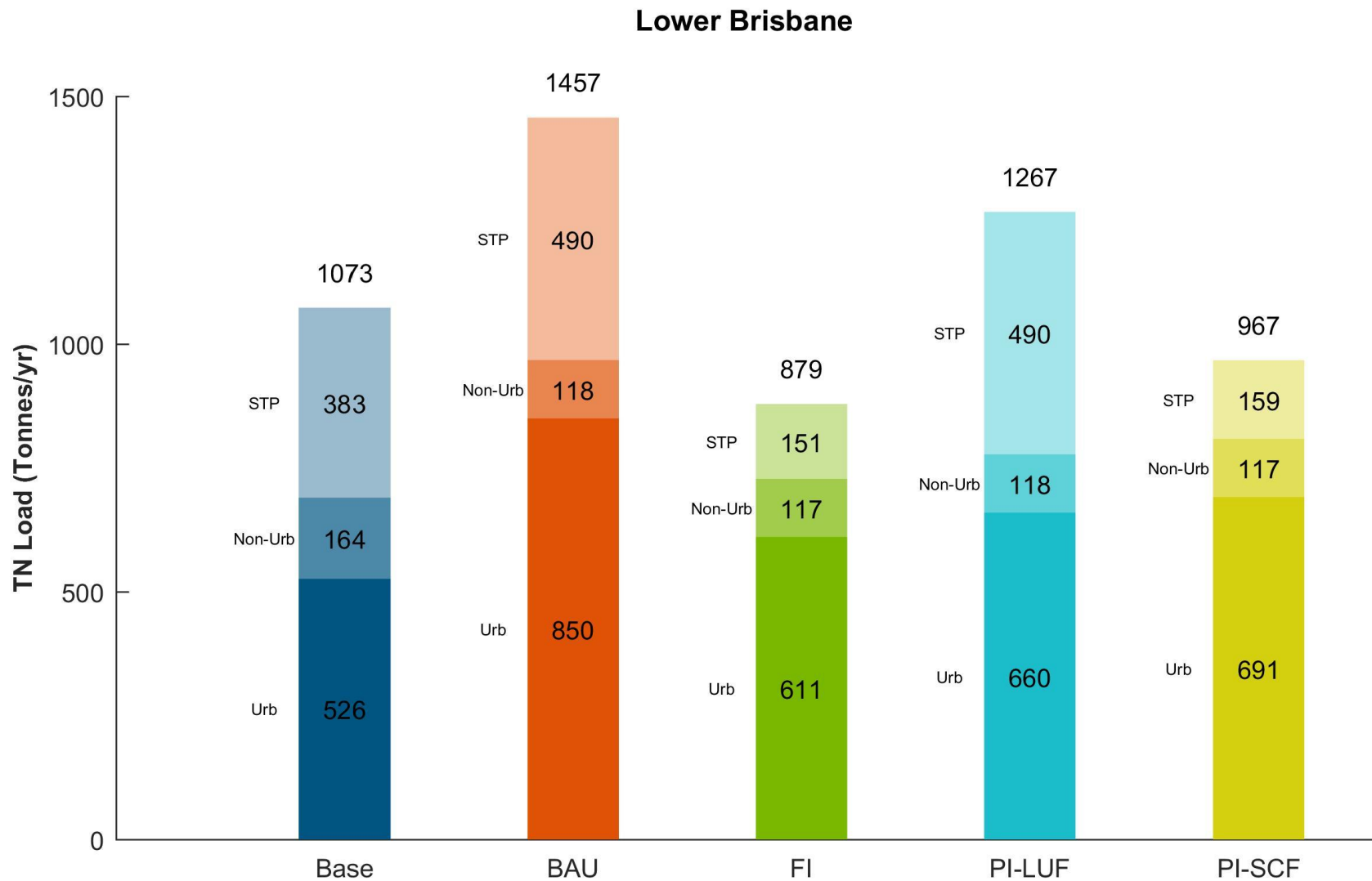


<p>Key pressures and management measures Used for model inputs to track progress towards targets</p>	<ul style="list-style-type: none">  Riparian, wetland & gully extent  Land use (eg agricultural land management)
<p>Models To predict waterway condition</p>	<ul style="list-style-type: none">  Source model (catchment) →  Stream health model (waterway condition)
<p>Monitoring Used to validate waterway condition</p>	<ul style="list-style-type: none"> ● Aquatic invertebrates ● Fish ● Rates of primary productivity & respiration ● Water quality ← ● Load-based monitoring of sediments and nutrients

Benefits of the models

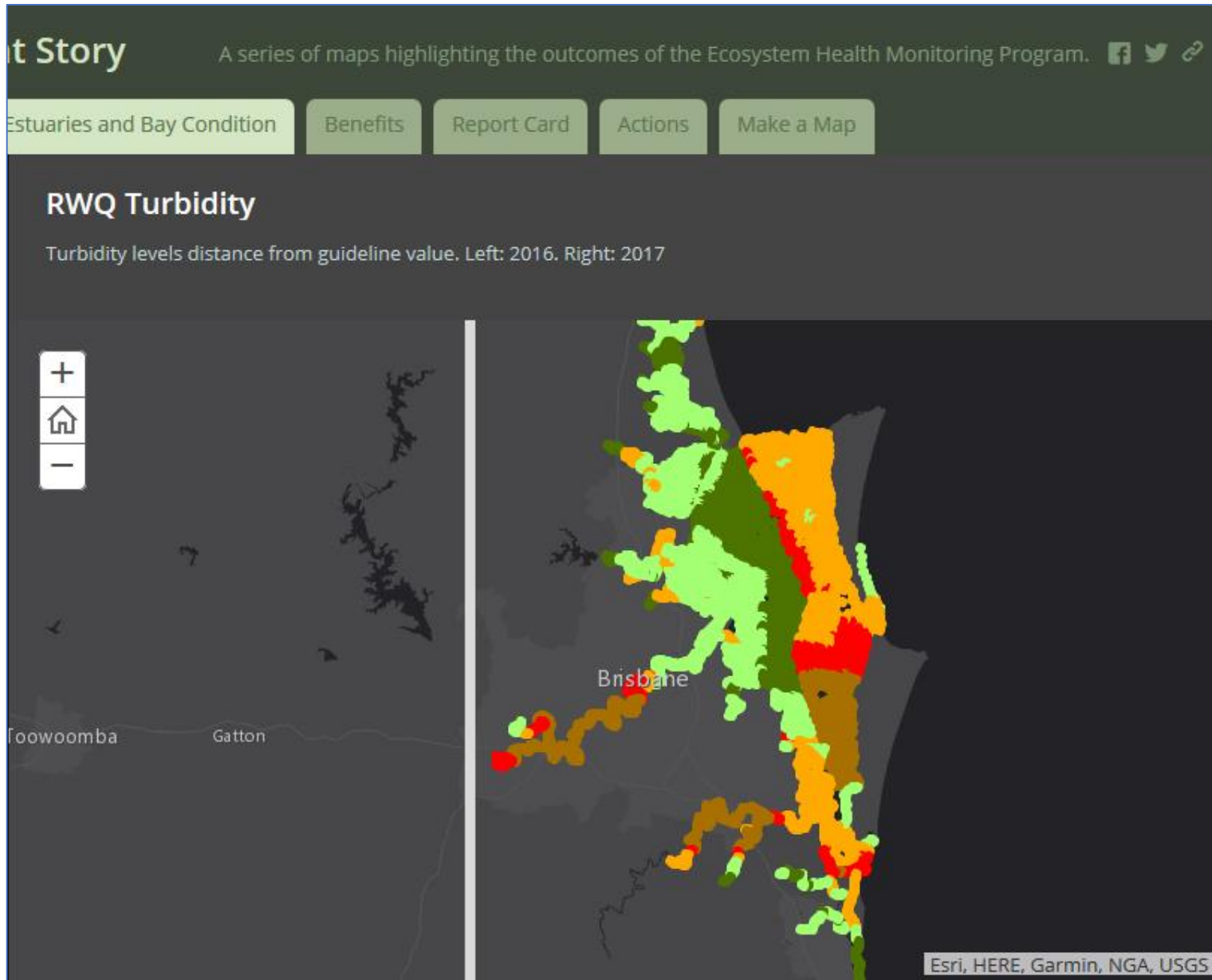


EHP Sustainable Loads Project





Communication



Questions

