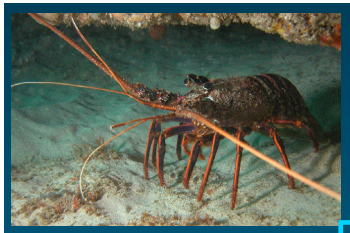
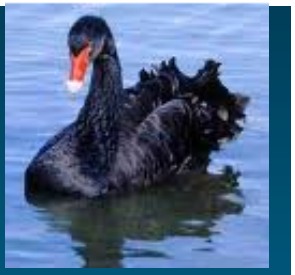




Simple Governance models for Ecosystem Based Fisheries Management

Sarah Metcalf
Murdoch University & Department of Fisheries WA, Perth Australia
Sarah.Metcalf@fish.wa.gov.au

Jeffrey Dambacher
CSIRO Mathematics, Informatics and Statistics, Hobart Australia

Rick Fletcher, Dan Gaughan
Department of Fisheries WA, Perth Australia

western australian marine science institution

Murdoch UNIVERSITY

Government of **Western Australia**
Department of **Fisheries**

EBFM in Western Australia

- EBFM adopted by WA Department of Fisheries
- Qualitative models produced for a range of severe/high risk assets

Governance:

- consultation with external stakeholders

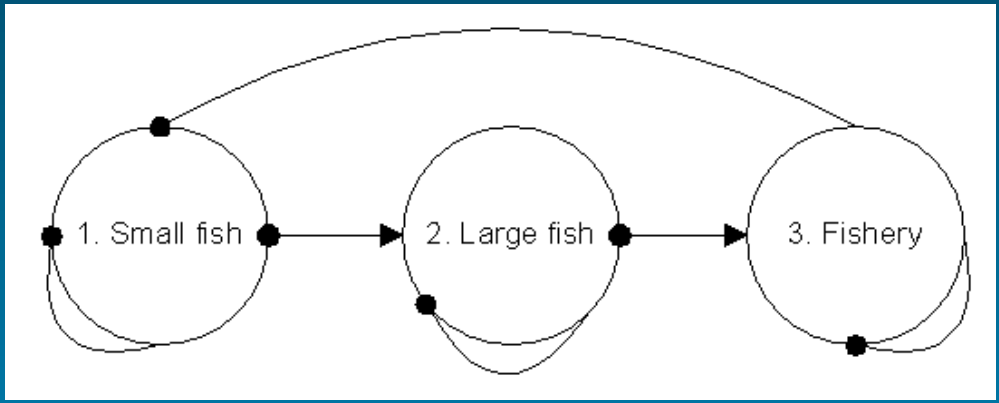
- estuaries & embayments

Why use qualitative modeling?

- Few data required – signs of interactions
- Can investigate direct and indirect interactions
- Predict direction (+, - , 0) of response to disturbance
- Identify data gaps and hypotheses for further investigation

- Provides a means of clarifying system dynamics and processes through stakeholder workshops - Collective understanding of the system

Qualitative modeling



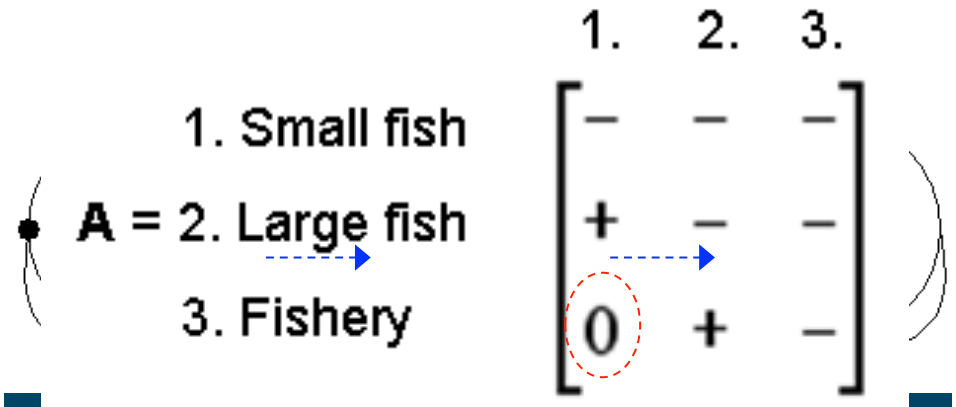
- Community matrix (**A**) displays direct interaction as shown in signed digraph

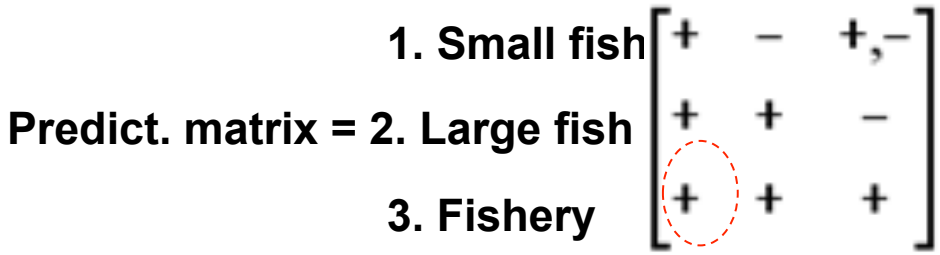
$$\mathbf{A} = \begin{array}{c} \\ \text{1. Small fish} \\ \text{2. Large fish} \\ \text{3. Fishery} \end{array} \begin{array}{c} \begin{array}{ccc} \text{1.} & \text{2.} & \text{3.} \end{array} \\ \begin{bmatrix} - & - & - \\ + & - & - \\ 0 & + & - \end{bmatrix} \end{array}$$

Qualitative modeling predictions

Calculation of the predictions matrix (adj. (-**A**)) allows:

- direct and indirect effects to be taken into account
- predictions (+, - , 0) of response to perturbation/ disturbance to be identified using feedback





QUALITATIVE MODELLING:

Model construction

Models constructed during multiple workshops

Workshops Identified:

- Variables of importance in each system (including threats)
- Relationships (links) between variables
- Potential management scenarios – the 'best' scenario presented today

Governance and risk

- Asset: Consultation with key stakeholders – **High risk**

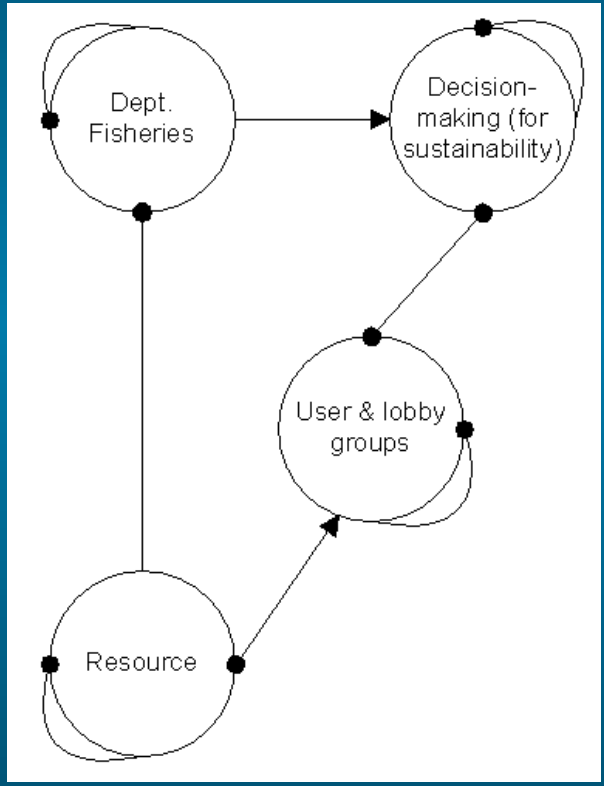
‘General fishery consultation model’ objective:

To identify generalized links representing different consultation processes and to assess the impacts on decision-making and system stability

General fishery consultation model – Current situation

'Past' model

- Minister (i.e. decision-making) consults directly with user & lobby groups as well as Department of Fisheries



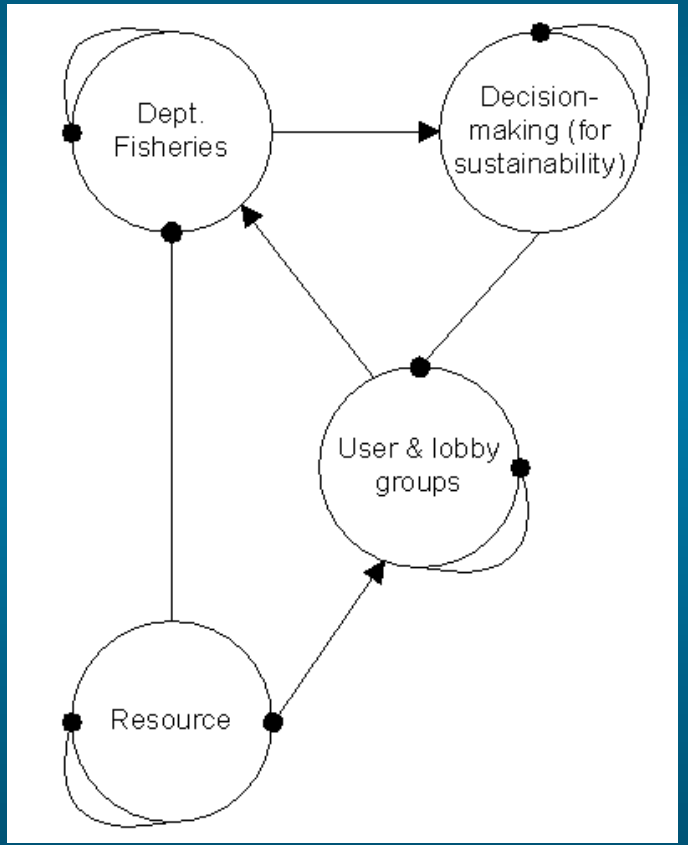
- Moderately stable (wFn= -0.50)
wFn: 0 = Unstable, -1 = Perfectly stable

- Positive feedback creates instability:
User & lobby groups ⟷ Decision-making

General fishery consultation model – Future scenario

'Current' model (2010 onwards)

- Minimizes the consultative process from the lobby groups directly to decision-making



- Perfectly stable (wFn= -1.00)
- Removed positive feedback and Included negative feedback (stabilizing)

Governance and risk

Risk to:

- Estuaries & embayments – **High**
  - Peel Harvey estuary – **High**
- Social outcomes, direct stakeholders (community well-being, rec. fishers) – **SEVERE**

'Governance model' objectives:

1) To identify key pathways and barriers to effective governance in the Peel Harvey estuary
2) To identify changes that can improve governance and ecosystem management

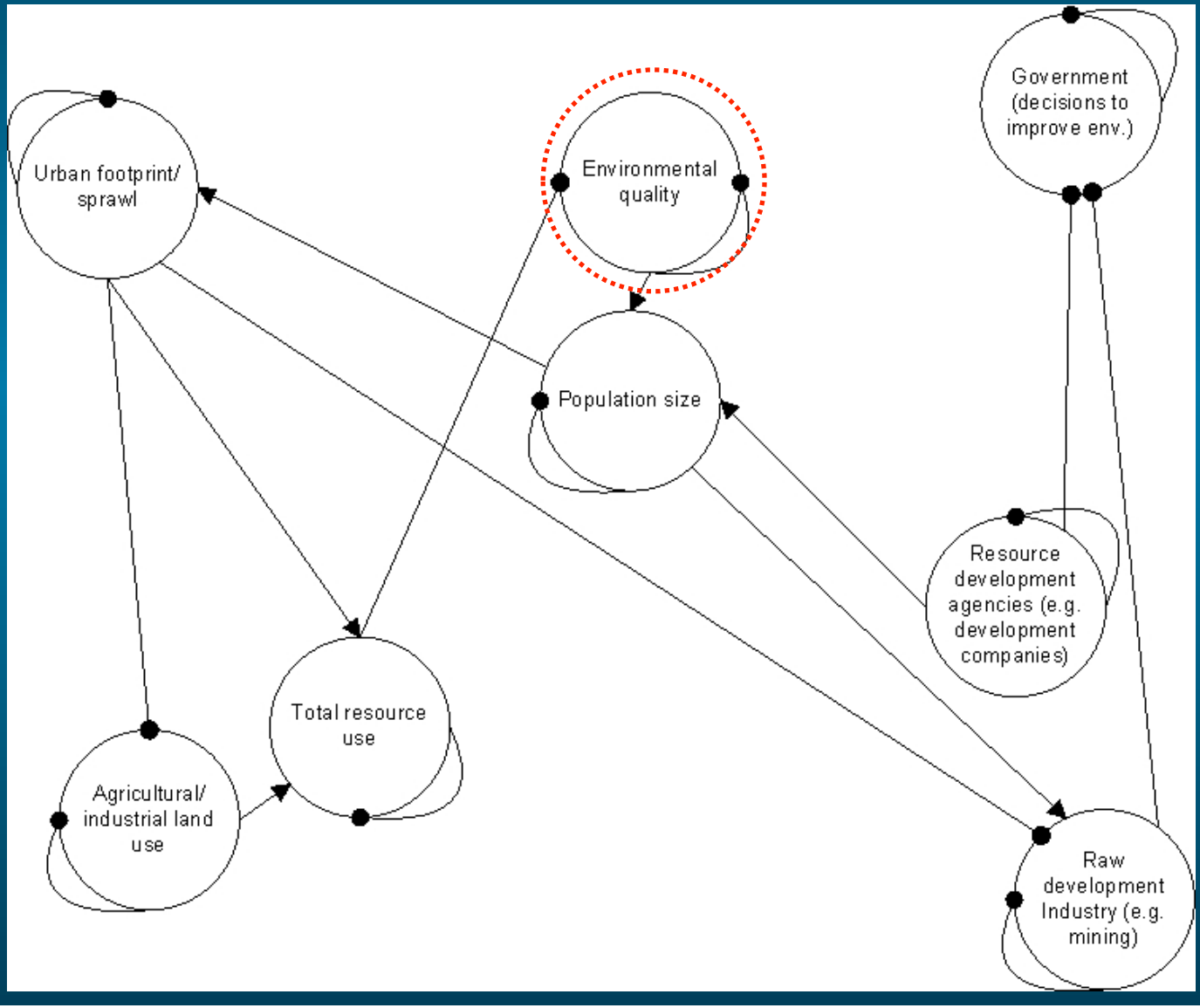
Peel Harvey Estuary

- Wetlands of International Importance- RAMSAR Convention on Wetlands
- Estuary of high social importance, fastest growing region in Australia

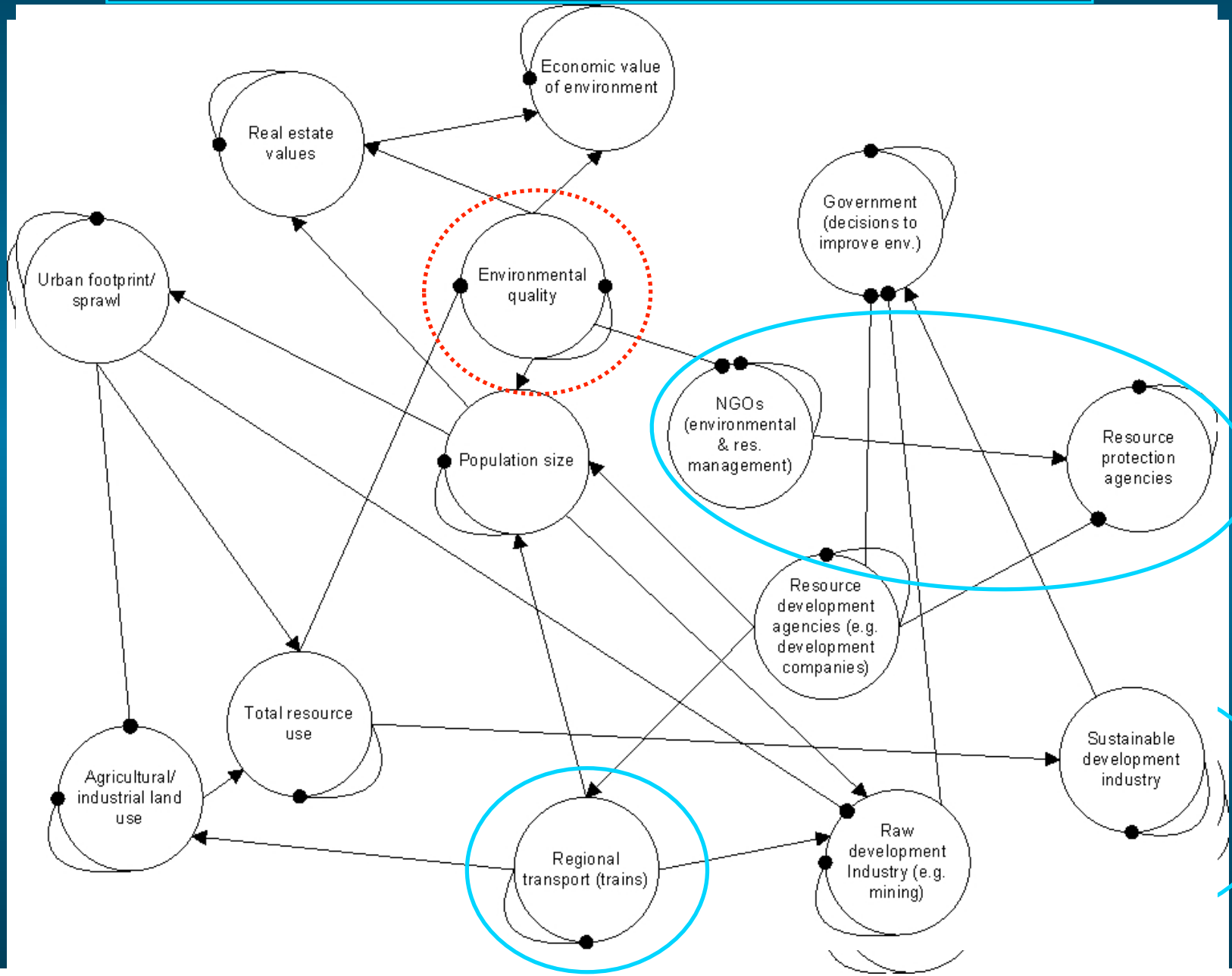
High nutrients & reduced freshwater flushing →

Macroalgal growth, mosquitoes, microalgal blooms

Governance in the Peel Harvey Estuary



Governance model – Current situation



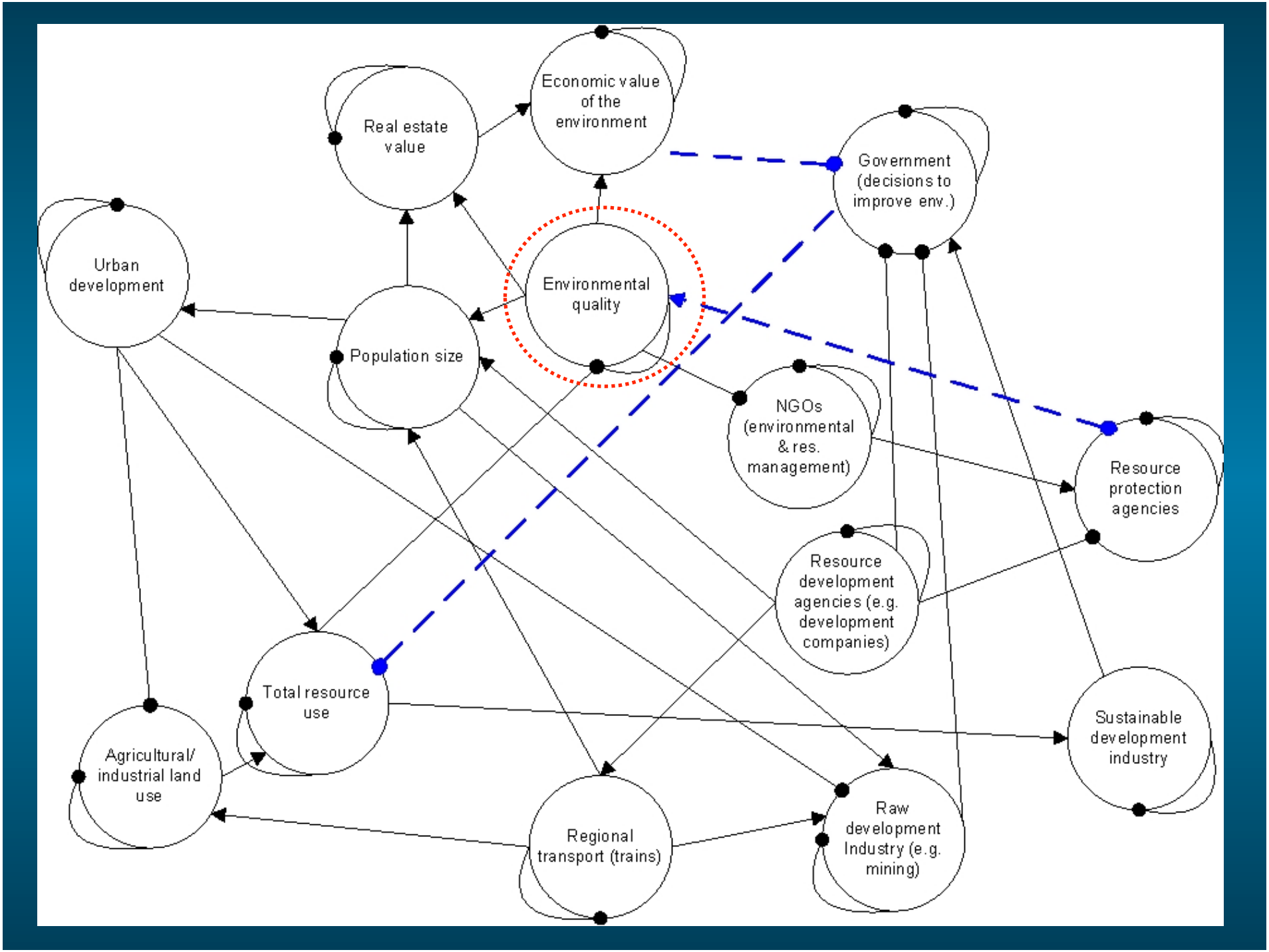
Governance model – Current situation

‘Current’ model- low stability (wFn = -0.33)

Overall governance is ineffective

- No management agencies/depts. improve environmental quality, lack of accountability

- Environmental quality predicted to decline or not be impacted by the majority of variables in the system


Economic value of the environment
Real estate value
Government (decisions to improve env.)
Urban development
Environmental quality
Population size
NGOs (environmental & res. management)
Resource protection agencies
Resource development agencies (e.g. development companies)
Total resource use
Sustainable development industry
Agricultural/ industrial land use
Regional transport (trains)
Raw development Industry (e.g. mining)

Governance model – Future scenario

‘Future’ model- Stable (wFn= -0.69)

Environmental quality, real estate values and the economic value of the environment were all predicted to respond positively to an increase in decisions by government

Regardless of the cause, when environmental quality increases so does the economic value of the environment and real estate values




Conclusions for further investigation

Qualitative models

- provides a visual representation that can be easily understood by stakeholders and politicians etc. with limited data

- allowed identification of conclusions for further investigation

- Collective (whole of government) agreement for environmental decisions is necessary to improve social and economic outcomes via improved environmental quality

Conclusions identified can be used to aid the prioritization of quantitative data collection and funding

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City of Mandurah

Peel Harvey Catchment Council

Peel Development Commission

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