



LANDSCAPE LOGIC

LINKING LAND AND WATER MANAGEMENT TO RESOURCE CONDITION TARGETS

www.landscapelogic.org.au

The Fenner School of Environment and Society



The Australian National University

This poster presents the part of Landscape Logic being undertaken by The Australian National University. The other 13 project partners are listed below.

Aim: To improve the link between investment and management actions undertaken by Australia's NRM Regions, and the subsequent impact upon the Resource Condition Targets.

Focus Issues: Victoria: Native vegetation condition
Tasmania: Water quality and quantity

Project timeline: July 2006 to June 2010

Contacts:

Communications: Liam.Gash@utas.edu.au

Knowledge Brokering: Geoff.Park@nccma.vic.gov.au

Knowledge Integration: Jenifer.Ticehurst@anu.edu.au

Project Structure

KNOWLEDGE DISCOVERY

Improving the knowledge underlying the social, biophysical and economic assumptions linking management actions to environmental outcomes

KNOWLEDGE INTEGRATION

Integrating the best information available, and packaging decision support tools and techniques suitable for use by NRM Regions

KNOWLEDGE BROKING

Dissemination of knowledge between project partners, including the 6 partner NRM Regions, and the other 50 NRM Regions in Australia

Primary contribution by the 14 project partners

University of Tasmania, Charles Sturt University (CSU), RMIT University, Tasmanian Department of Primary Industries & Water, CSIRO, Forestry Tasmania, Victorian Department of Sustainability & Environment (DSE).

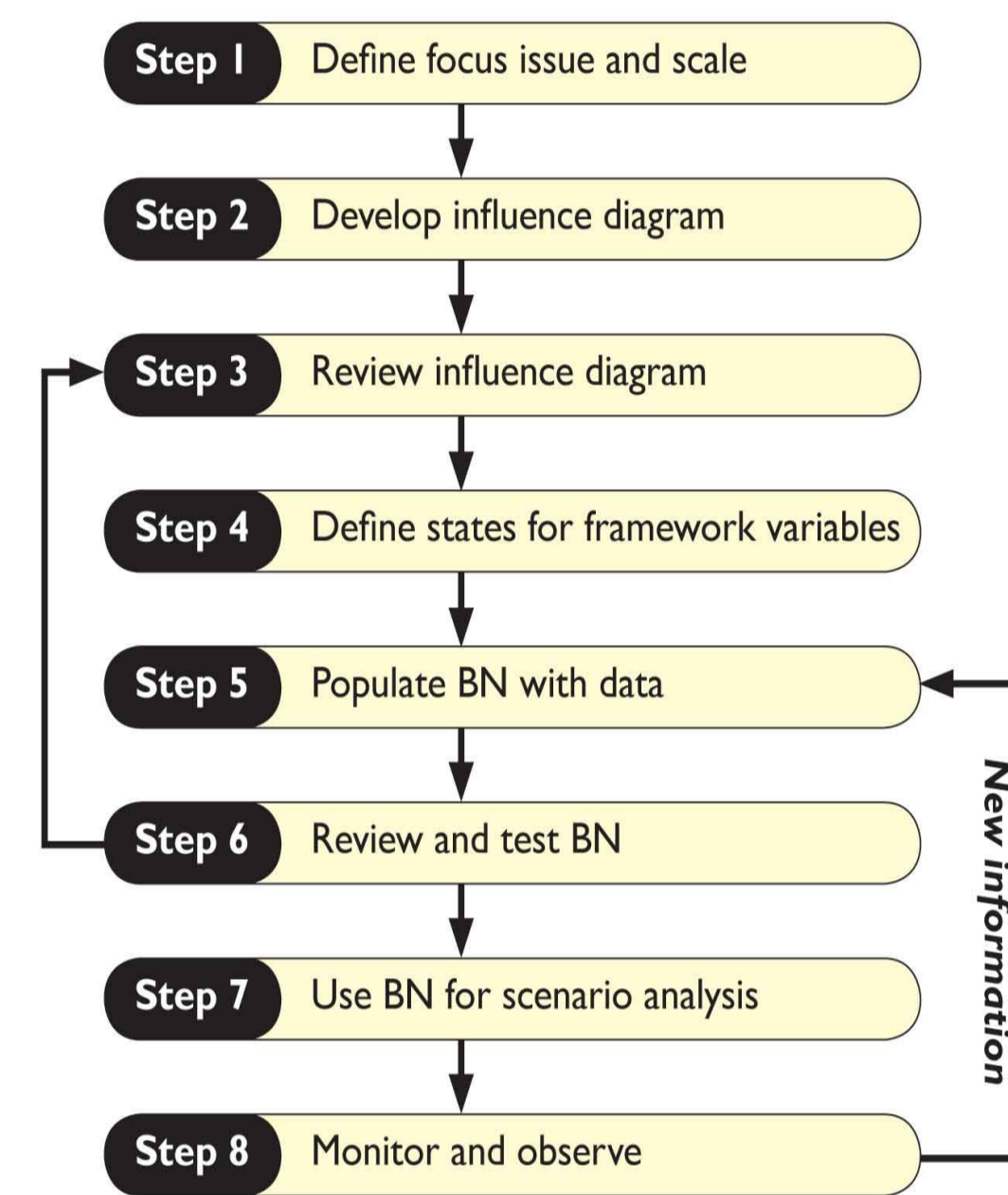
The Australian National University (ANU)

North Central, North East & Goulburn Broken CMAs, NRM North, South & Cradle Coast, University of Tasmania.

Knowledge Integration and Participatory Modelling

Participatory Modelling, typically completed in workshops, uses stakeholder feedback to scope, develop and test a model. It assists in increasing system understanding and the adoption and ownership of the end product.

Typical steps used to develop a Bayesian Network



BAYESIAN NETWORKS (BNs)

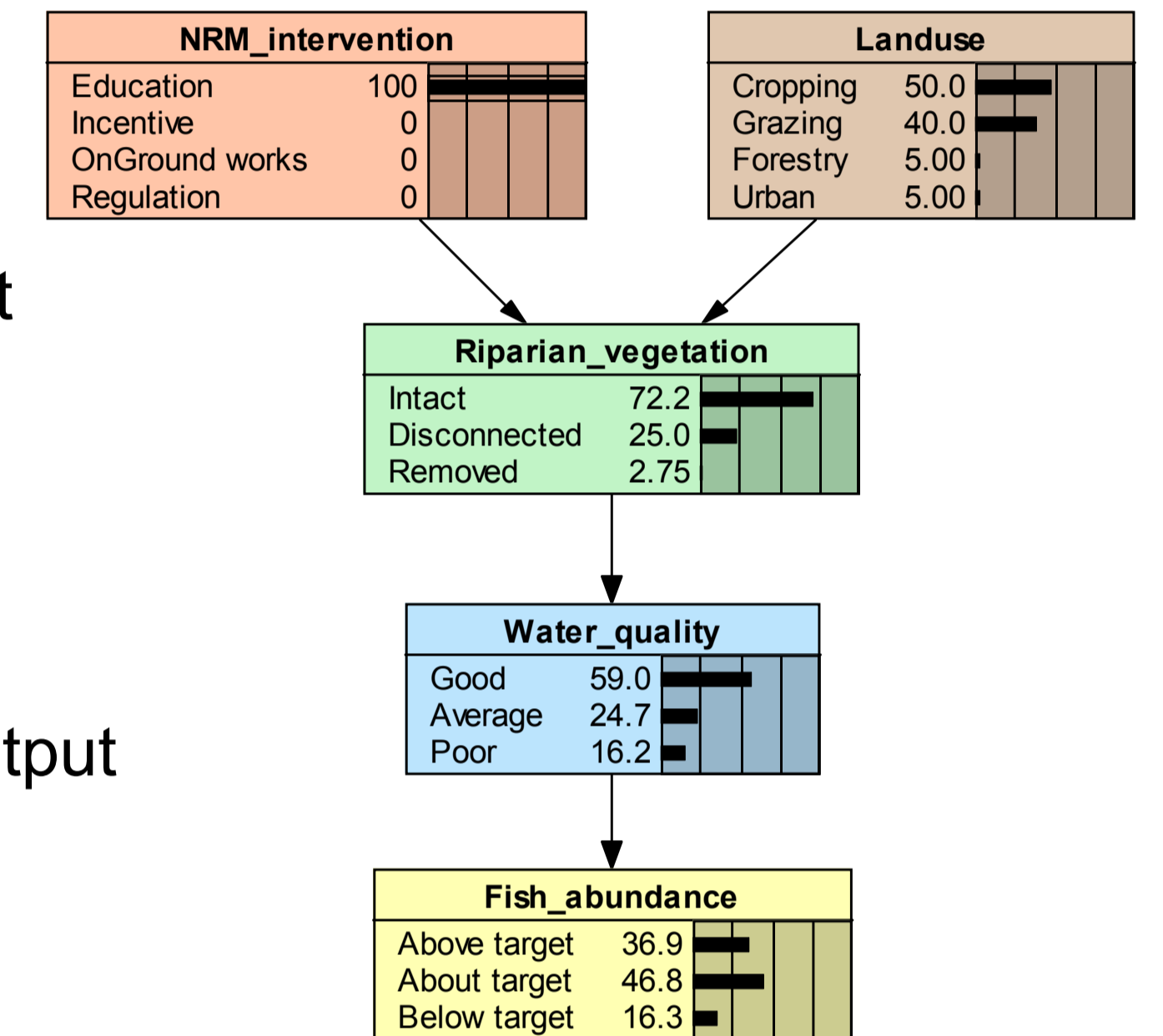
BNs are the primary approach, chosen by the project partners, to integration for the focus issues (vegetation condition and water quality and quantity) within the project.

BNs are well suited to participatory modelling (see diagram to right), as the stakeholders can contribute to all 8 steps to model development.

Properties and benefits of BNs

- Use links between variables to represent cause within a system
- Utilise qualitative & quantitative data
- Document underlying assumptions
- Promote systems thinking
- Represent uncertainty in input data & output predictions
- Identify knowledge gaps

Example of a Bayesian Network

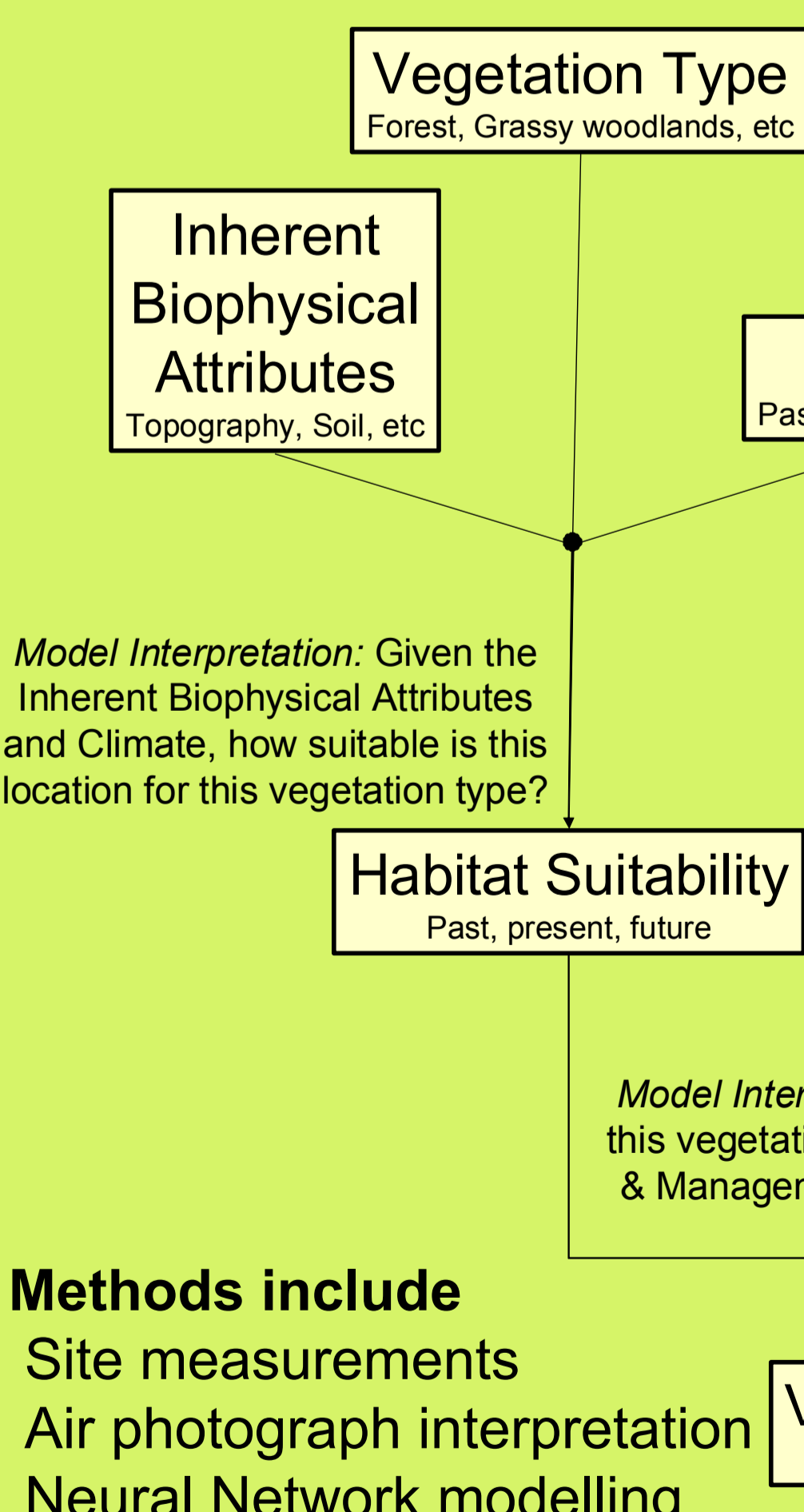


Vegetation Condition VICTORIAN CASE STUDY

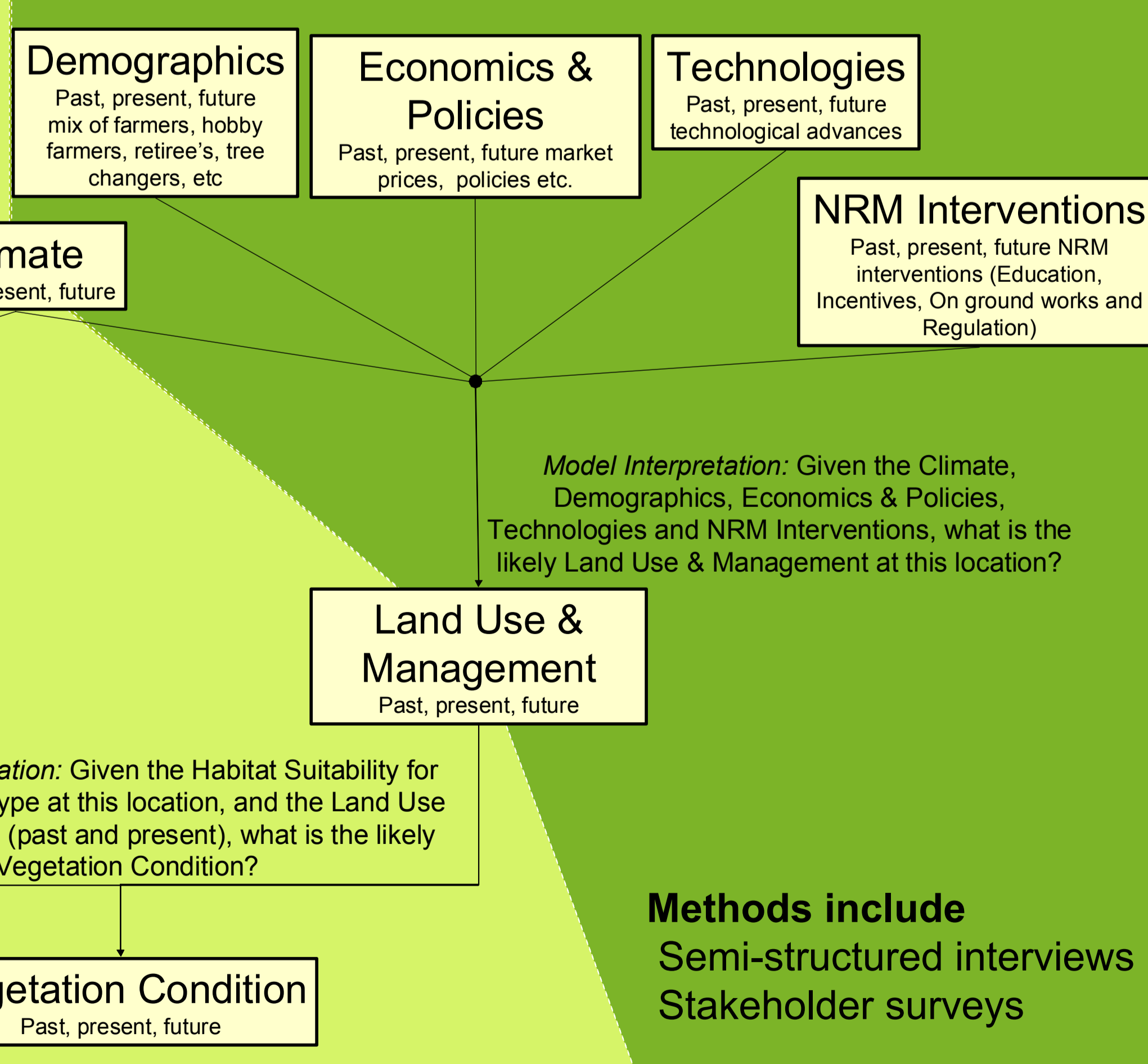
Project Aims

- *Biophysical Investigation (DSE):* Identify the relative impacts of targeted interventions for native vegetation condition (extent & quality) in the context of broader landscape change resulting from drivers, such as changes in land use, land management and climate
- *Social Investigation (CSU):* Improve understanding of past and present management of native vegetation, including adoption and response to a mix of recommended practices and policy interventions, in light of external drivers such as climate variability

Biophysical Investigation



Social Investigation



Methods include
Site measurements
Air photograph interpretation
Neural Network modelling

Methods include
Semi-structured interviews
Stakeholder surveys

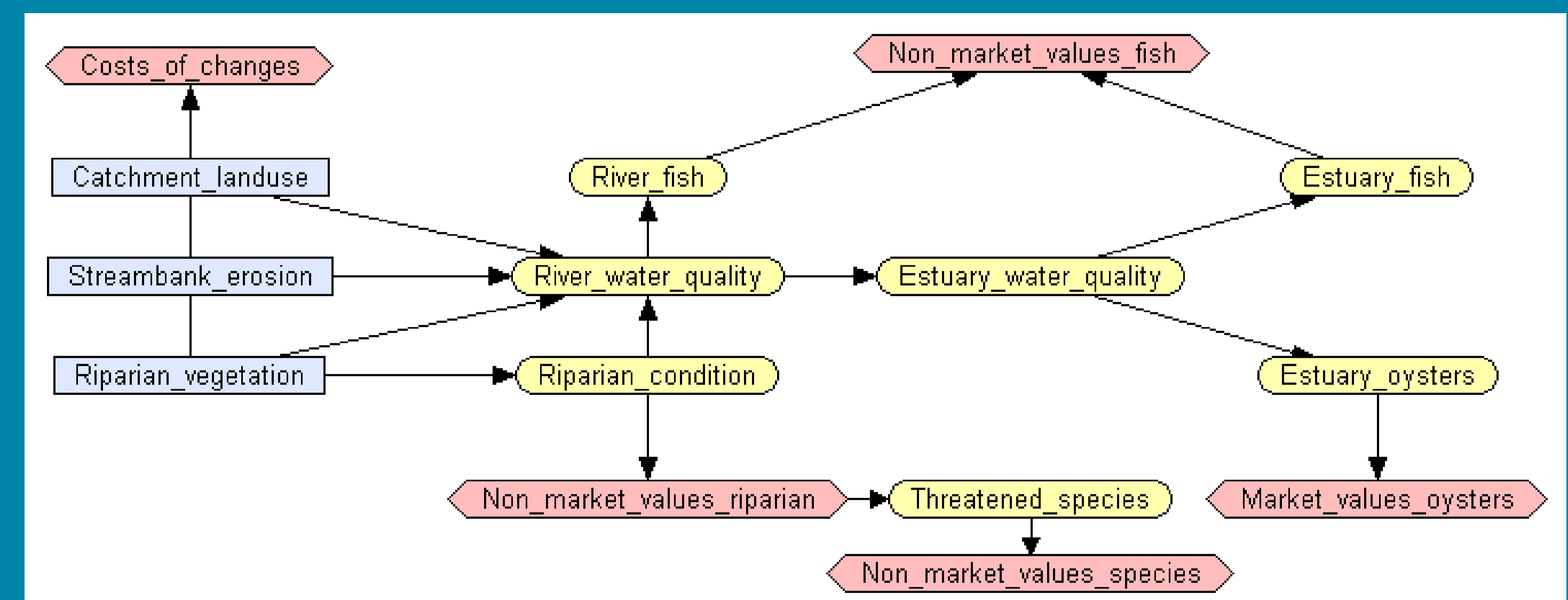
This model can evaluate the effectiveness of NRM interventions on vegetation condition, in light of other influences (e.g. climate, demographics, economics).

Water Quality, Ecology & Economics GEORGE'S BAY CASE STUDY

Project Aims

Integrated Assessment (ANU):

- Assess the economic and ecological impacts of changed catchment management activities implemented by landholders and NRM organisations, designed to improve river water quality
- Assess the impacts of changes in water quality on the ecology and industries operating in estuaries
- Assess the impacts of changed environmental conditions on human welfare



Methods include

- Assessment of management scenarios and costs through literature review and stakeholder interviews (landholders and policy makers)
- Assessment of water quality through development of an integrated hydrological and water quality model
- Assessment of ecological changes through expert interviews and analysis of existing models
- Industry economic analysis using market data and stakeholder interviews
- Human welfare economic analysis using non-market economic valuation survey techniques (Choice Modelling)

This model can be used to evaluate the economic and ecological trade-offs presented by alternative management options.

Decision Support Systems

Can integrate across complex systems, communicate the predictions simplistically, and therefore assist catchment managers in making informed management decisions. Communicating complex information is more than running a model.

A software interface is being developed to assist in :

- Running the complex BNs represented in the simple conceptual diagrams above
- Interrogating the data and assumptions used to develop the BNs
- Interpreting the model predictions.