

Transformation for Resilient Landscapes and Communities Partnership

What are social-ecological systems in NRM?

Resource Sheet No 7 (RS 7)

Systems & conceptual models

It is sometimes useful to think of the world around us as a series of functioning systems and to represent these using conceptual models. Constructing models helps us to predict whether particular courses of action (interventions) are likely to work as intended or whether there may be some unintended consequences.

NRM regions in Australia are starting to explore systems analysis of social-ecological interactions in landscapes as a way of improving both the understanding and practice of landscape management.

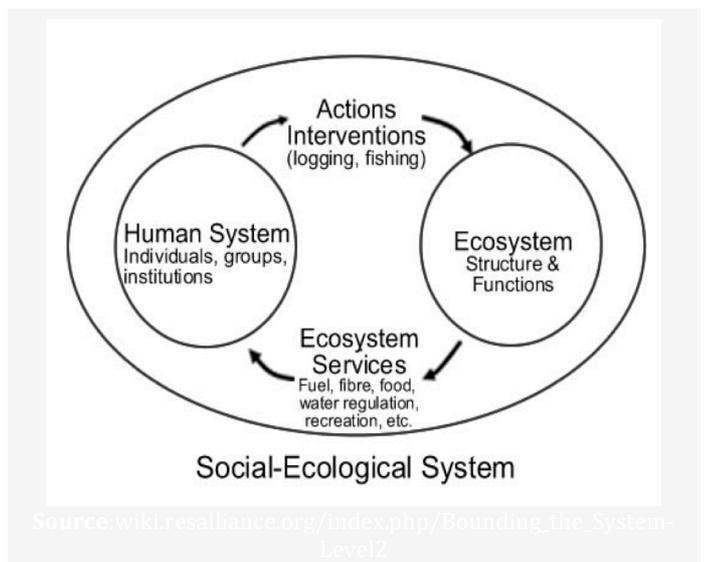
What are systems?

Systems thinking focuses on relationships between entities and how the parts and the whole work together. Systems generally have a purpose, a boundary, multiple relationships, feedback loops, processes, inputs, outputs and properties. They can sit within bigger systems and have subsystems. Systems can be simple or highly complex. A simple system has a small number of component parts linked in a straightforward and predictable way; such as a hot water system. A highly complex system can have self-organising interactions between large numbers of components linked in complex feedback loops; such as our human bodies, communities, landuse systems or ecosystems. Properties like **resilience** (RS 3) emerge from these complex interactions.

Systems analysis is a process of enquiry aimed at understanding how particular systems function. Models are very useful in this process. Hard systems models assume the system is real and try to arrive at a single best representation which can guide intervention for improvement. Soft and critical system models accept that humans see the world differently so the aim is to uncover and share different assumptions to arrive at an agreed course of action.

What is a SES in theory?

Social-ecological systems (SESs) are constructs from resilience theory. This theory recognises that



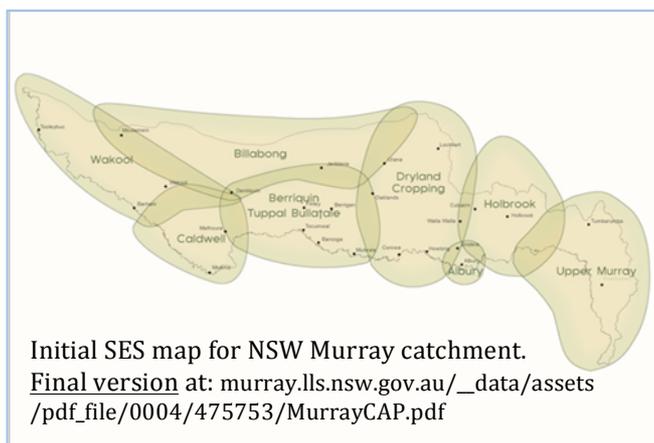
SESs have interacting social (including economies) and ecological systems. SES theory has been criticised for being overly focused on heuristics derived from ecological studies that falsely assume social and ecological processes work in much the same way. We have tried to

address this criticism in this study while retaining the overall idea of SESs.

Practice examples from NRM

Over 25 NRM regions have identified and engaged with SESs in some way in recent rounds of strategic planning. The most common interpretation has been to recognise place-based landscape scale SESs, which in our Murray and Wet Tropics case studies are called 'local landscapes'.

The Murray CMA community consultation process led to the identification and mapping of eight SESs.



For each SES it was then possible to develop a conceptual model. Murray CMA went on to design strategies for intervention to maintain the delivery of important values for each SES. Just as this process was near completion the CMA's western boundaries changed, which in keeping with this method, simply led to the addition of two more SESs.

Other interpretations of SES include:

- Whole regions (Western; Hunter)
- Vegetation communities (Central West)
- Nested landscapes (Border Rivers/Gwyder)
- Asset based systems such as river floodplains (Murrumbidgee)
- Self-selected groups which are place, identity, and problem based (Cape York)

- Indigenous concept of country (Cape York).

Analysis tools and techniques

- **Empirical models** (Torres Strait) these sophisticated models require skill and resources to build but allow scenarios to be played out, i.e., what happens if this driver or this variable changes?
- **State and transition models** (Northern Rivers, Wet Tropics) good visual devices for exploring potential states of an SES that can be easily built in workshops
- **Causal loop diagrams** (Western NSW) highlight relationships and identify positive and negative feedback loops in SES
- **Pathways analysis** (Murray) a form of causal loop that identifies potential pathways of change towards goals.

Benefits to partner regions

- More meaningful engagement – especially when communities are encouraged to participate in SES definition
 - Good way of getting different interests to hold conversations about identity and futures
 - Farmers in particular 'get' systems and find conceptual models relatively easy to build – they can see themselves in them
- “ can pick the CAP document up and relate to it....I can see my region....and these are the programs and policies that apply to my part of the region.....”*
- Complements Indigenous ways of thinking
 - Transparent method of tackling intractable issues

Further information

Partnership Study Resource Material:

www.ausresilience.com.au/research/transformation

Partnership Study:

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