

*research for a sustainable future*

# How Do We Sustain Production Landscapes?



**Max Finlayson & Peter Waterman**

**Institute for Land, Water & Society,  
Charles Sturt University, Australia**

# Contents



Institute for Land,  
Water and Society  
Charles Sturt University

## Developing a vision for production landscapes – a common view

1. Preamble
2. Social-ecological systems
3. The Australian landscape
4. Climate variability
5. Environmental change
6. Responding to change
7. Looking forward – the hard questions

# 1. Preamble - developing a common vision



**We have been talking about developing a vision for our land and water since Federation**

**We've had strategies, agencies, authorities, commissions, strategies, plans, legislation and spent a lot of money....**

**Despite all this it is still contested .... ecologically, economically and socially .... and drought and flood and fire still stalk the landscape – these are the real Grim Reapers and we need to take notice of them**

**Have these efforts provided a widely accepted vision for our production landscapes?**



**Institute for Land,  
Water and Society**  
Charles Sturt University

**And lets give credit where it is due – yes, to some extent. The words are in place in support of sustainable social, economic and ecological systems, with sharing, equity and transparency**

**But is sustainability? Can we show what has worked? How do we cope with emerging issues and deal with uncertainty and complexity? What does the future hold?**

## 2. Socio-ecological systems

**Our production landscapes operate within a complex social-ecological system – realities of the system need to be acknowledged. Uncertainty is part of it – manage with uncertainty.**

**Complex and uncertain – it's the reality of our landscapes and we need to work with it and not against it**

# Managing the complexity of social-ecological systems

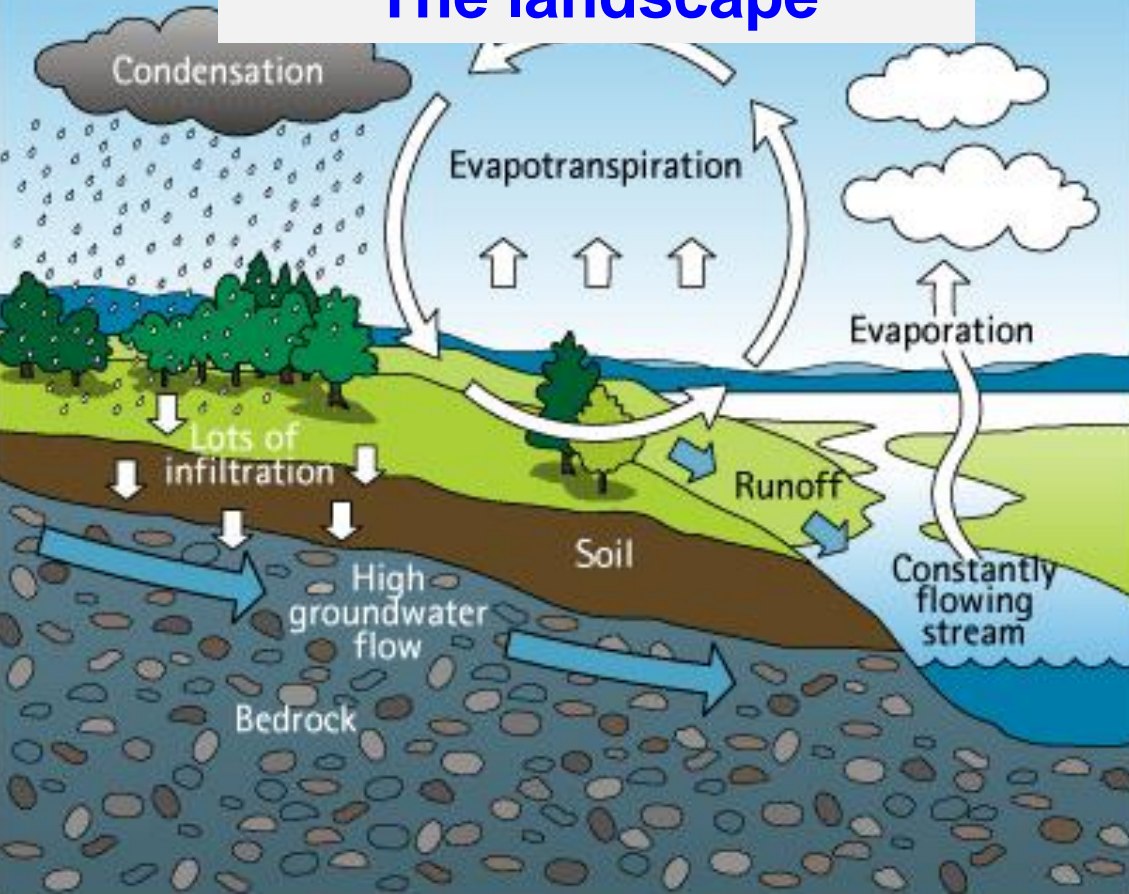


## **The human dimension is fundamental**

- **There are neither natural systems without people nor social systems without nature**
- **Social and ecological systems are inter-connected and co-evolving across time and spatial scales**

# 3. The Australian land and water system(s)

## The landscape



Comprising many parts – the climate, the water, the land, the soil and vegetation, animals, the production, and the people

- All of it is also affected by human activities far and near

# Water availability and use



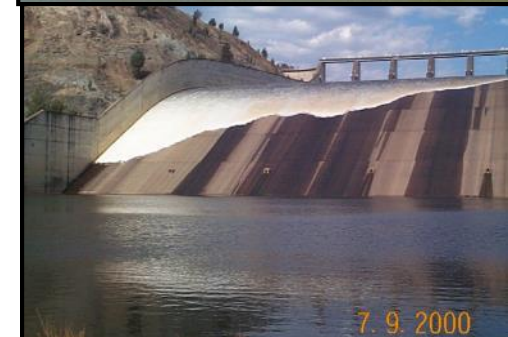
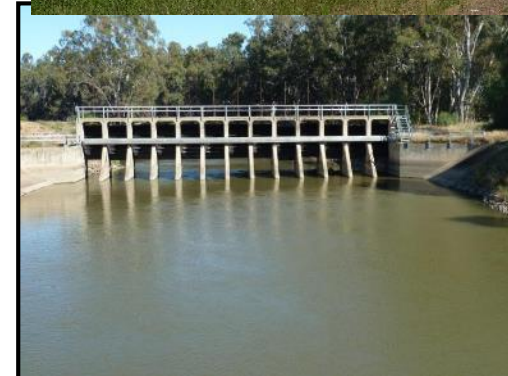
Institute for Land,  
Water and Society  
Charles Sturt University

**Australia uses about 5% of its total renewable freshwater resources - 20% for the USA and 43% for Italy (2006 data)**

**Regional distribution of use is highly uneven - some regions extracting half the available water**

**Per person, we use more water than most other countries of the OECD**

**Irrigation – important industry - 40% food from the MD Basin; 70% of this from the 2% of land that is irrigated**

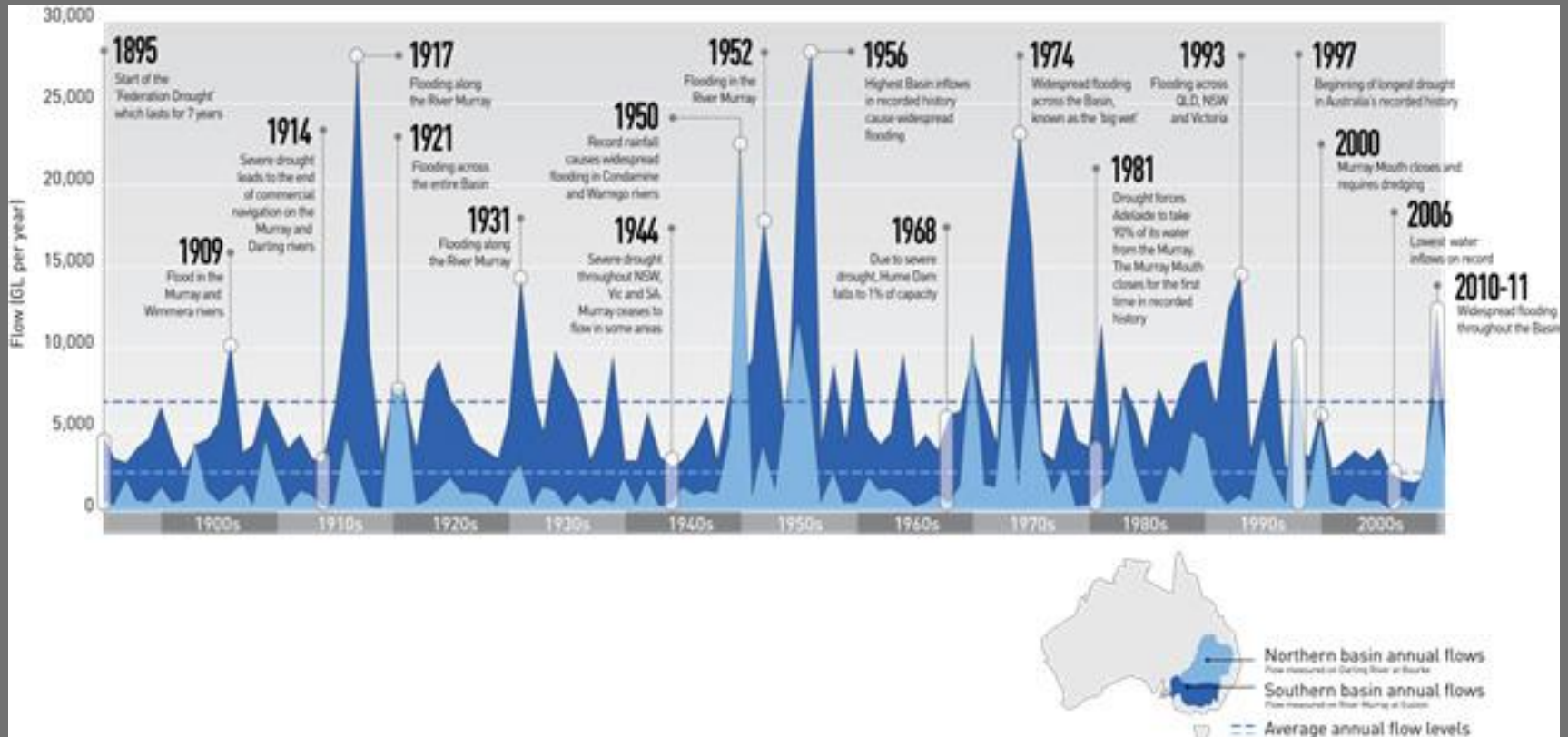




# Coal seam gas - fracking



# 4. Climate variability



# 5. Environmental change



Institute for Land,  
Water and Society  
Charles Sturt University

**Water, land and biodiversity decline**

**Highly variable environment with ‘boom and bust’ responses, including fire, to rainfall**

**Inappropriate land/water uses – salinity, erosion, fertility issues etc....**

## **6. Responding to change /establishing baselines**



**Major efforts to restore landscapes including the  
rivers/wetlands**

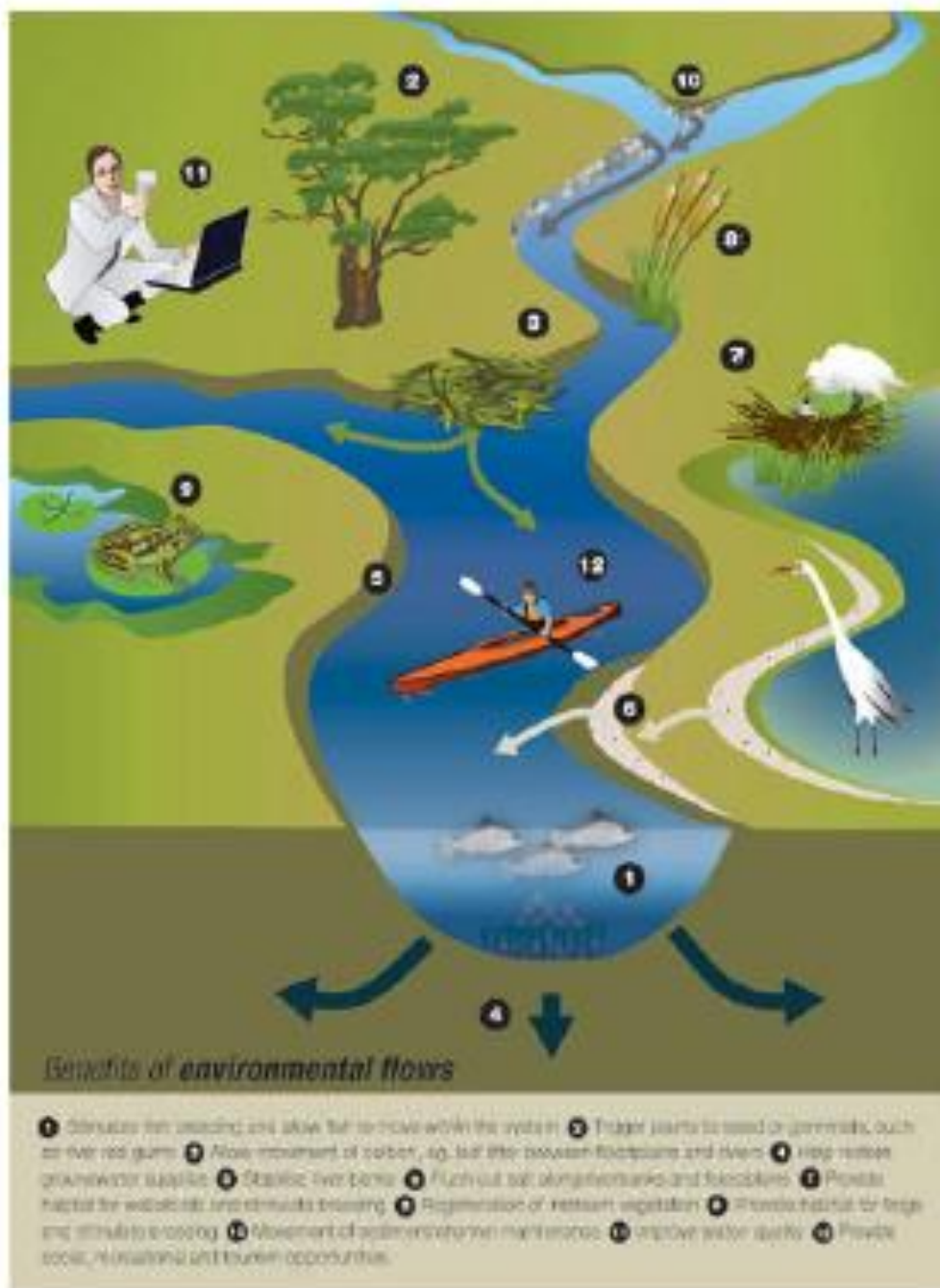
**Land and water have changed – irrevocably?**

**Pressures still mounting – production demands**

**What is a realistic baseline or the future – have  
reached our limits or will technology save us?**

# Environmental Flows

- River regulation has altered natural wetting and drying patterns
- Water diversion increased – not enough water left in the river systems
- Environmental flows: water put aside for environmental use, managed by government agencies
- Supplements natural flows in times of need



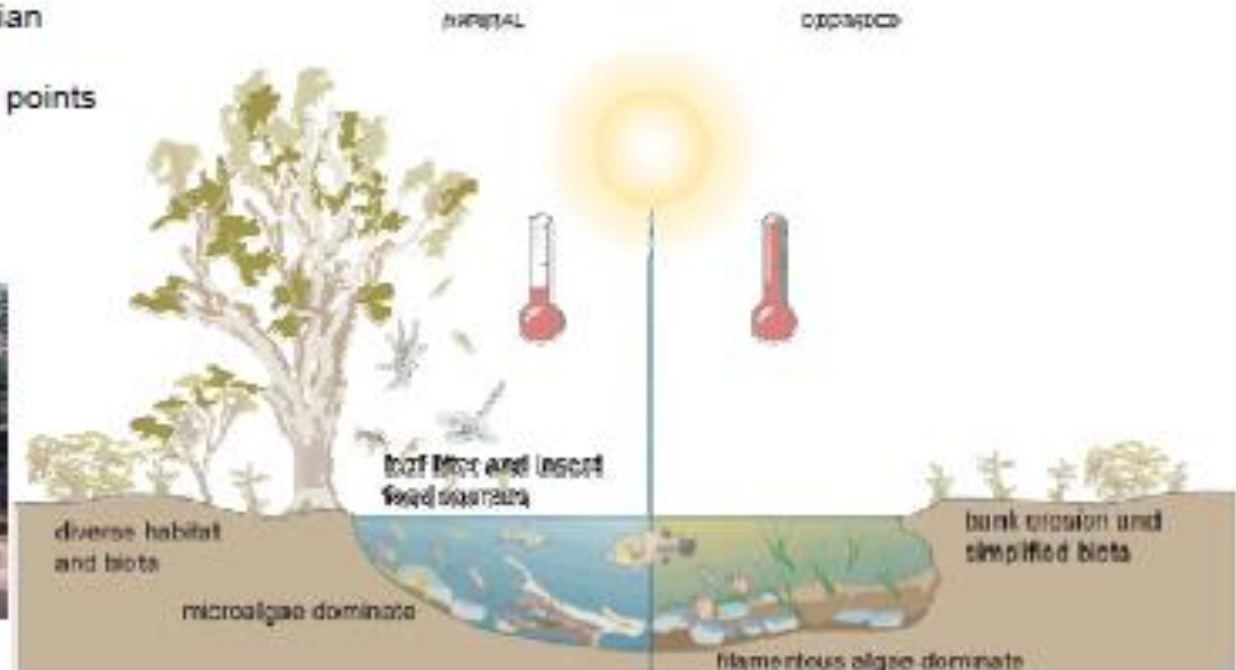
# Restoration of Riparian Vegetation

## Actions include:

- planting riparian flora
- fencing off riparian zones
- ongoing weed control in riparian zones
- provision of off-river watering points for domestic stock
- Improves resilience
- Lowers water temperature



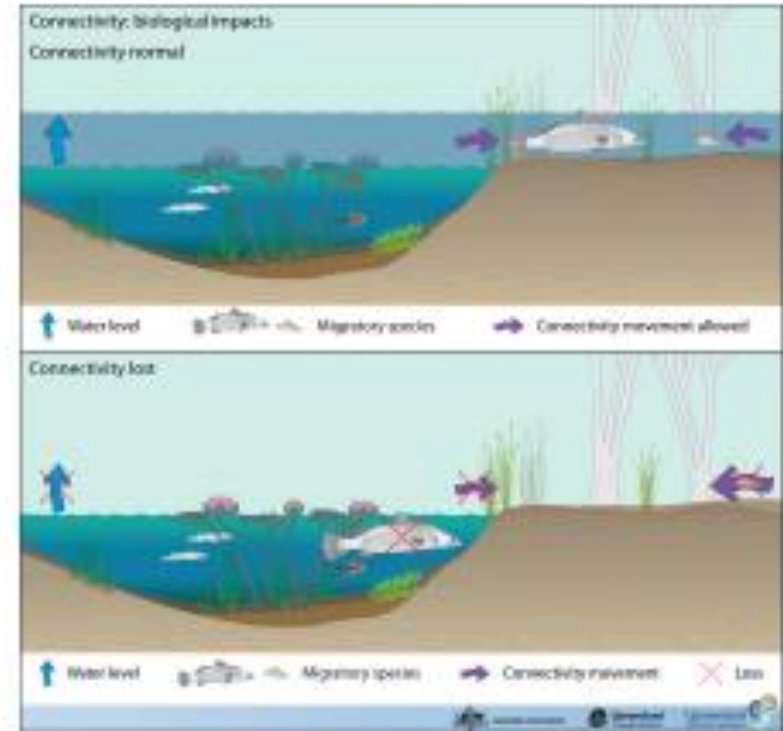
## Effects of loss of riparian vegetation and catchment degradation on rivers.



# Habitat Connectivity

## Actions include:

- Removing unnecessary obstructions
- Providing fishways and ladders
- Reconnection of wetlands to rivers
- *Allows species to migrate*



# Geomorphic Restoration

## Actions include:

- conserving deep pools
- controlling bank instability and erosion
- stabilising or removing sand slugs
- re-snagging
- Increases habitat quality → resilience





# 7. Looking forward

**Developing a vision – a common view ?**

**A socio-ecological approach to restoring/managing the production landscape, under a changing and variable climate, within bounds of environmental change, and future looking resource planning**

**Driven by informed communities, supported by governments and is participatory (not just consultative!) and forward looking**

# Some questions – possibly hard questions?



- **Do we understand Australian production landscapes? Who is doing the measuring? And how well?**
- **How are we ensuring land and water use (including irrigation and energy) and environmental outcomes, including repair? What is the balance?**
- **Do we need more dams or better use of existing dams? Do we need more fracking and CSG? Do we need different crops? Can we support the communities across our landscapes?**

# Some more .....about water



- **What are the socio-economic costs of reduced irrigation? Or what changes are needed?**
- **What are the socio-economic/cultural benefits of environmental flows and resultant ecosystem outcomes?**
- **Where does coal seam gas / coal mining fit into the water equation? Who decides?**
- **Will we see more urban demands for inland water? And how much will they pay? Who can pay the most?**



**With these questions  
do we have a common  
vision?**

**I think we have, it's the road  
map that is a worry.**

**Thank you**

