

FIT FOR FUTURE ASSESSMENT



Bryan Jenkins

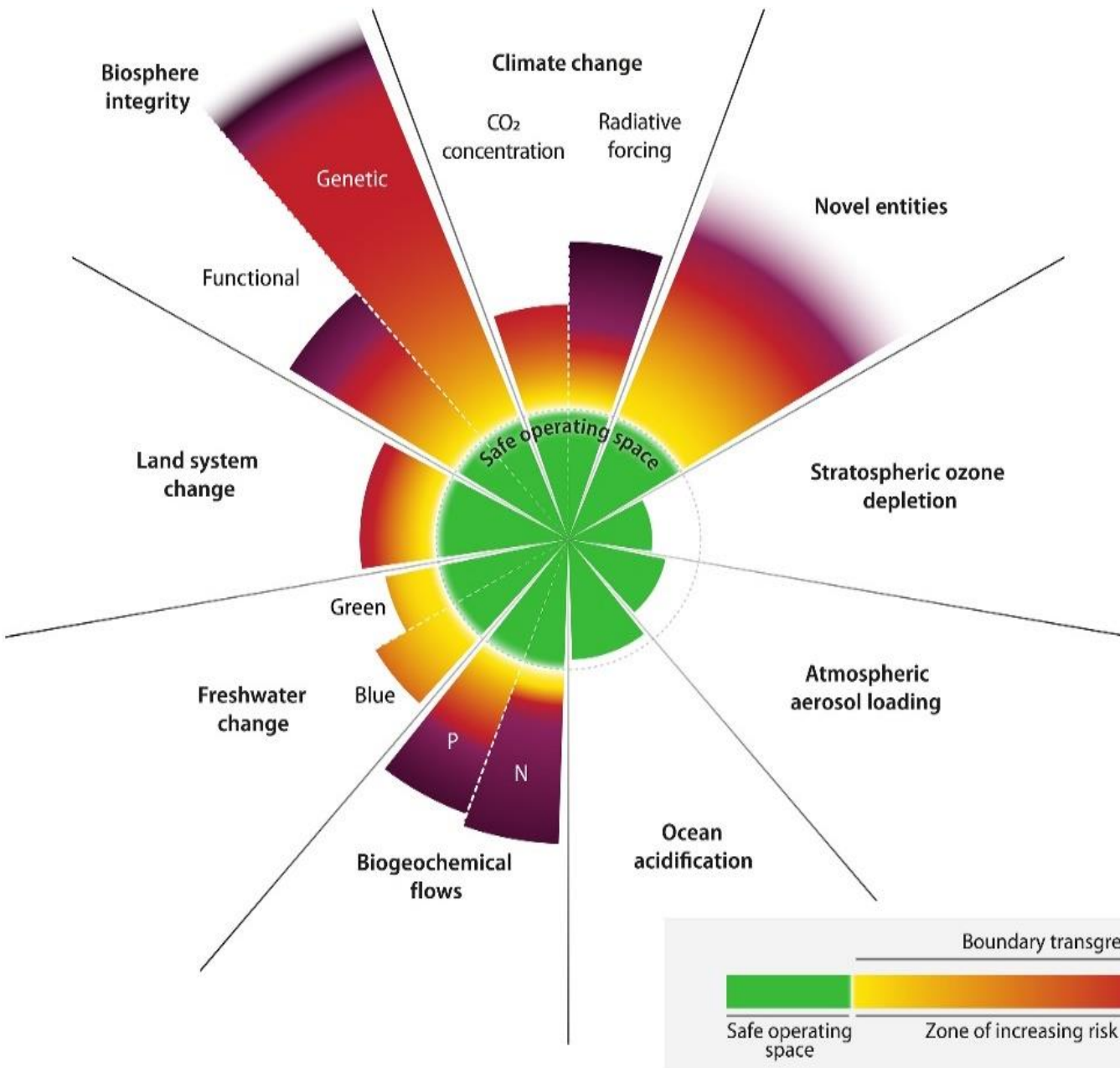
*Adjunct Professor, University of Adelaide
Australia*



FIT FOR FUTURE ASSESSMENT

- Impact Assessment, one of our main tools of environmental management, has been around for 50 years
- While successful in reducing adverse effects, we are seeing sustainability limits being exceeded at local, regional and global levels
- We need additional tools for:
 - Assessing sustainability thresholds (*resilience assessments*)
 - Reducing adverse effects when limits exceeded (*recovery assessments*)
 - Multiple scale assessments (*nested adaptive systems analysis*)
 - Proactive rather than reactive assessments (*strategic planning with sustainability assessments*)
 - Achieving sustainability (*sustainability transition strategies*)

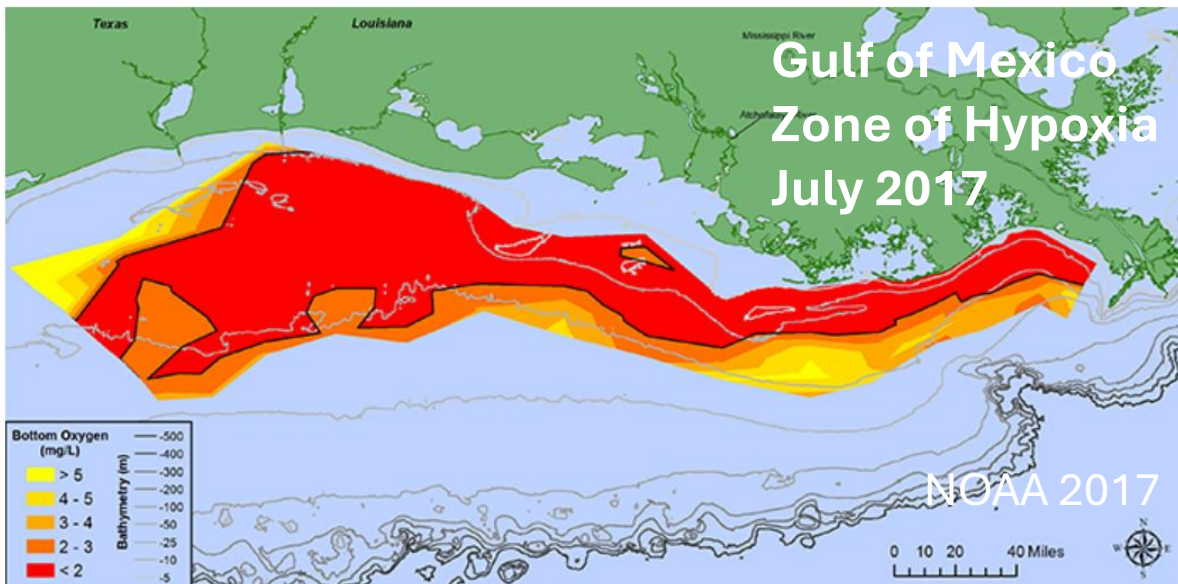
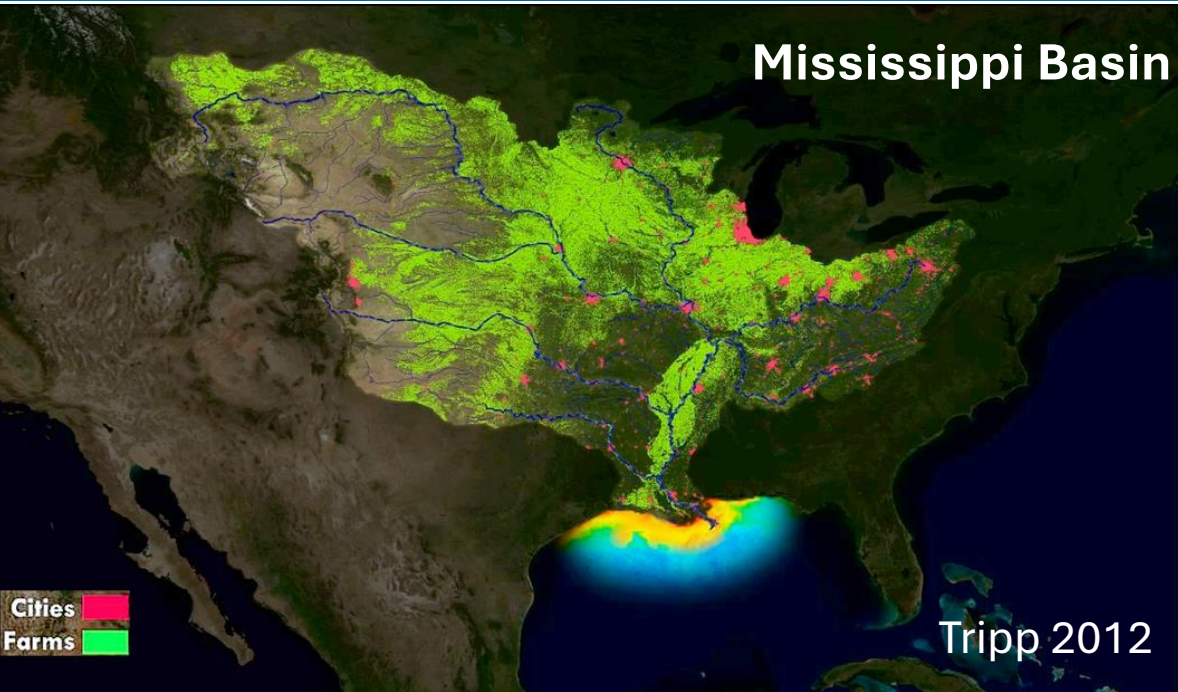
SAFE AND JUST EARTH SYSTEM BOUNDARIES



- Nine Planetary Boundaries affected by anthropogenic activities based on earth system science
 - climate, biodiversity, land systems, freshwater, nutrients, ocean acidification, aerosols, ozone depletion, novel entities
- Six Boundaries transgressed
 - suggesting Earth is outside the safe operating space for humanity

Richardson, Steffen et al (2003)
Rockström, Gupta et al (2003)

BIOREGIONAL IMPACTS



- “Dead Zone” in Gulf of Mexico in the outflow from the Mississippi River
- Nutrient pollution primarily from runoff from agricultural and developed land
- Nutrients stimulate massive algal growth which decomposes and uses oxygen
- Loss of oxygen causes loss of fish habitat, fish death, decreases fish reproduction and reduced fish size
- Zone of hypoxia 8,776 m² (in 2017) compared to target 1,900 m²

LOCAL IMPACTS

Fish kills in Darling River downstream of Menindee Lakes

2019

- Severe drought and very low river flows
- Stagnant stratified water with extensive blue-green algae blooms
- Cold front weather system led to mixing deoxygenated bottom waters throughout the water column



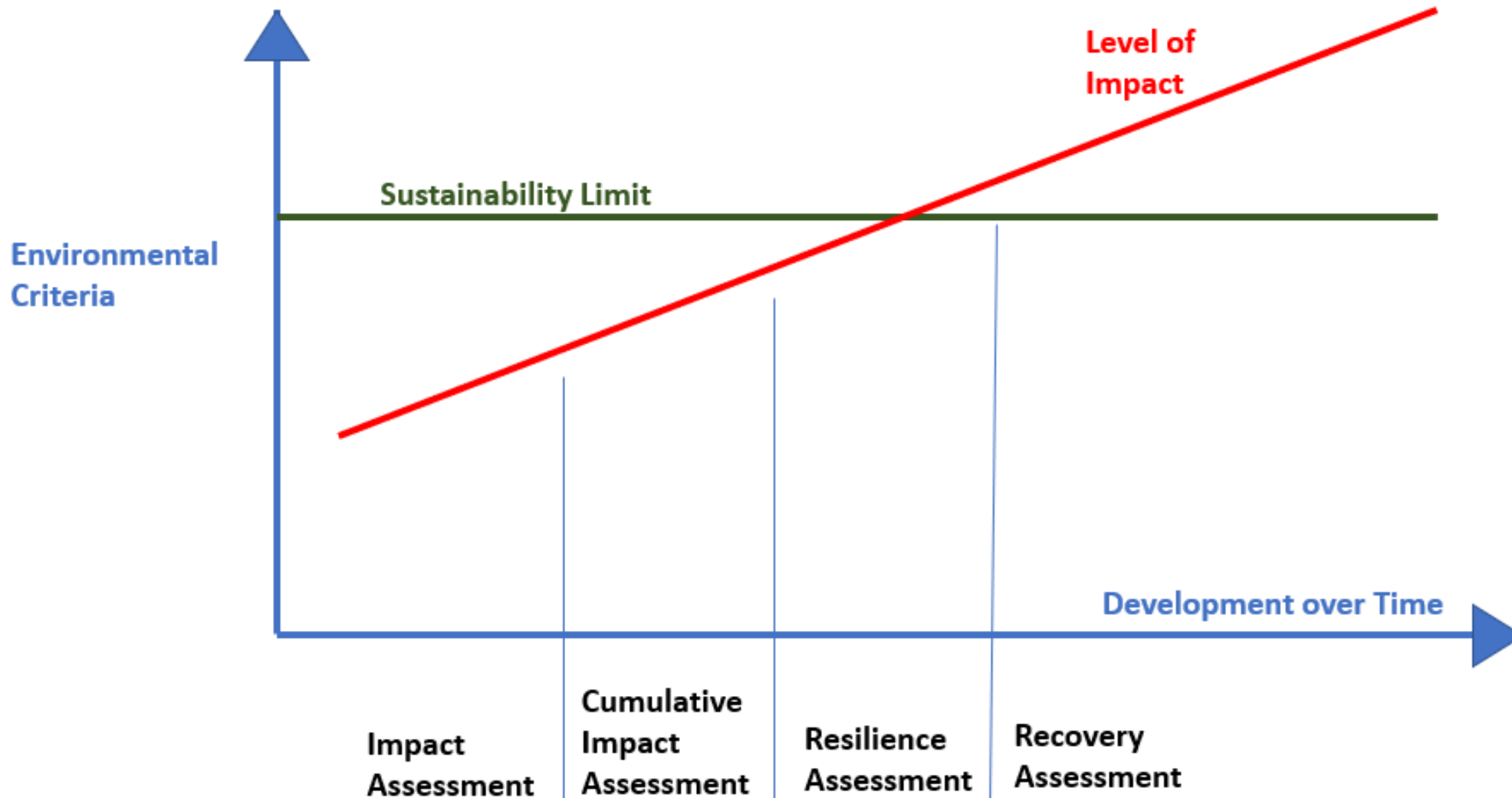
2023

- Extensive flooding in Menindee Lakes leading to boost in fish population
- After flood recession, high concentration of organic material and sediment in water
- Water quality deteriorates, low dissolved oxygen
- Fish become more concentrated, essentially competing for oxygen

ASSESSMENTS FOR WHEN SUSTAINABILITY LIMITS EXCEEDED

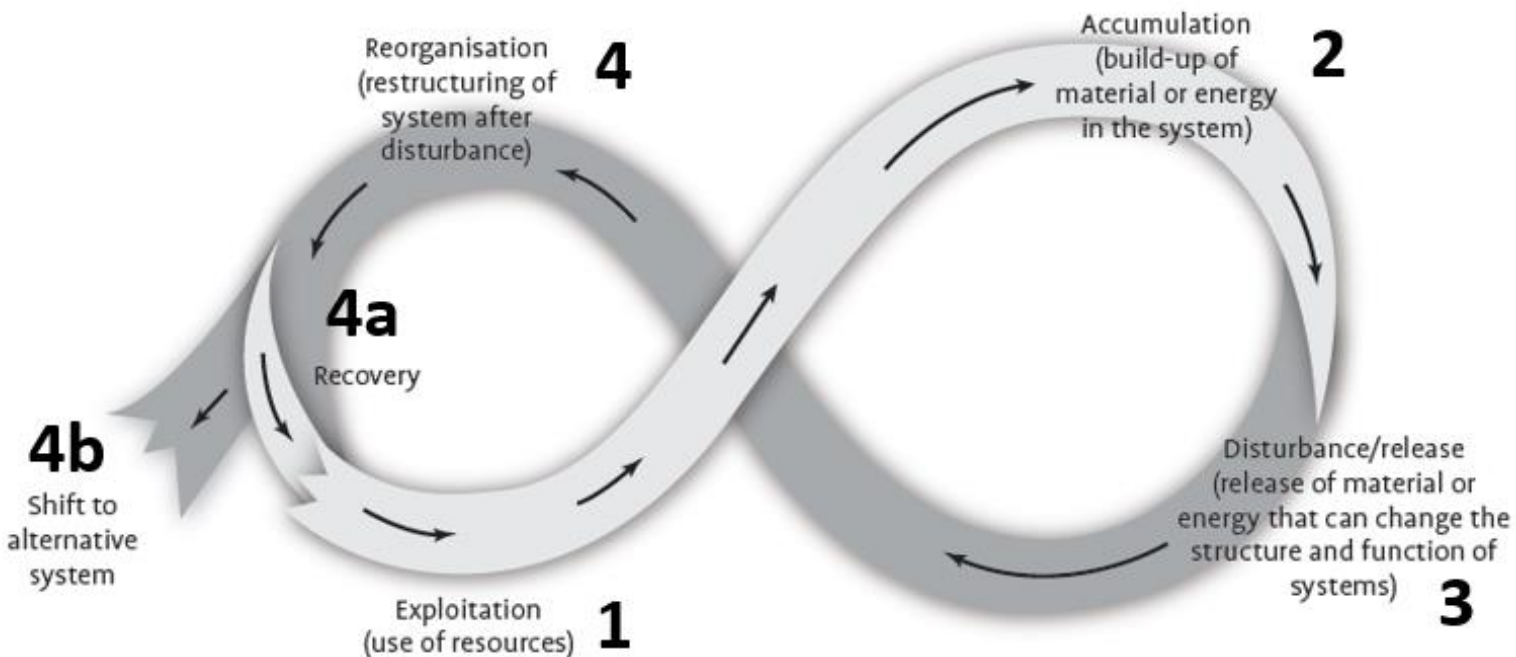
- Systems approaches needed to devise appropriate management interventions
 - need to incorporate natural variability, multiple variables, multiple sources of impacts, time lags, complex interactions
- Resilience Assessment
 - analysis of failure pathways
 - critical variables on failure pathways
 - thresholds of critical variables associated with system collapse
- Recovery Assessment
 - the process of developing management interventions to address environmental damage and degradation

ASSESSMENTS RELATED TO LEVEL OF IMPACT COMPARED TO SUSTAINABILITY LIMITS



OPERATIONAL BASIS FOR SUSTAINABILITY

- From Panarchy theory, the adaptive cycle describes how ecological or social systems can be sustained



Adapted from Gunderson and Holling 2002

PHASES OF ADAPTIVE CYCLE

1 Exploitation

- Use of resources

2 Accumulation

- Build-up of material or energy

3 Disturbance

- Release that can change system

4 Reorganisation

- 4a Recovery, or
- 4b Shift to alternative system

TYPES OF ASSESSMENT AND THE ADAPTIVE CYCLE

- Assessment associated with each phase of the adaptive cycle

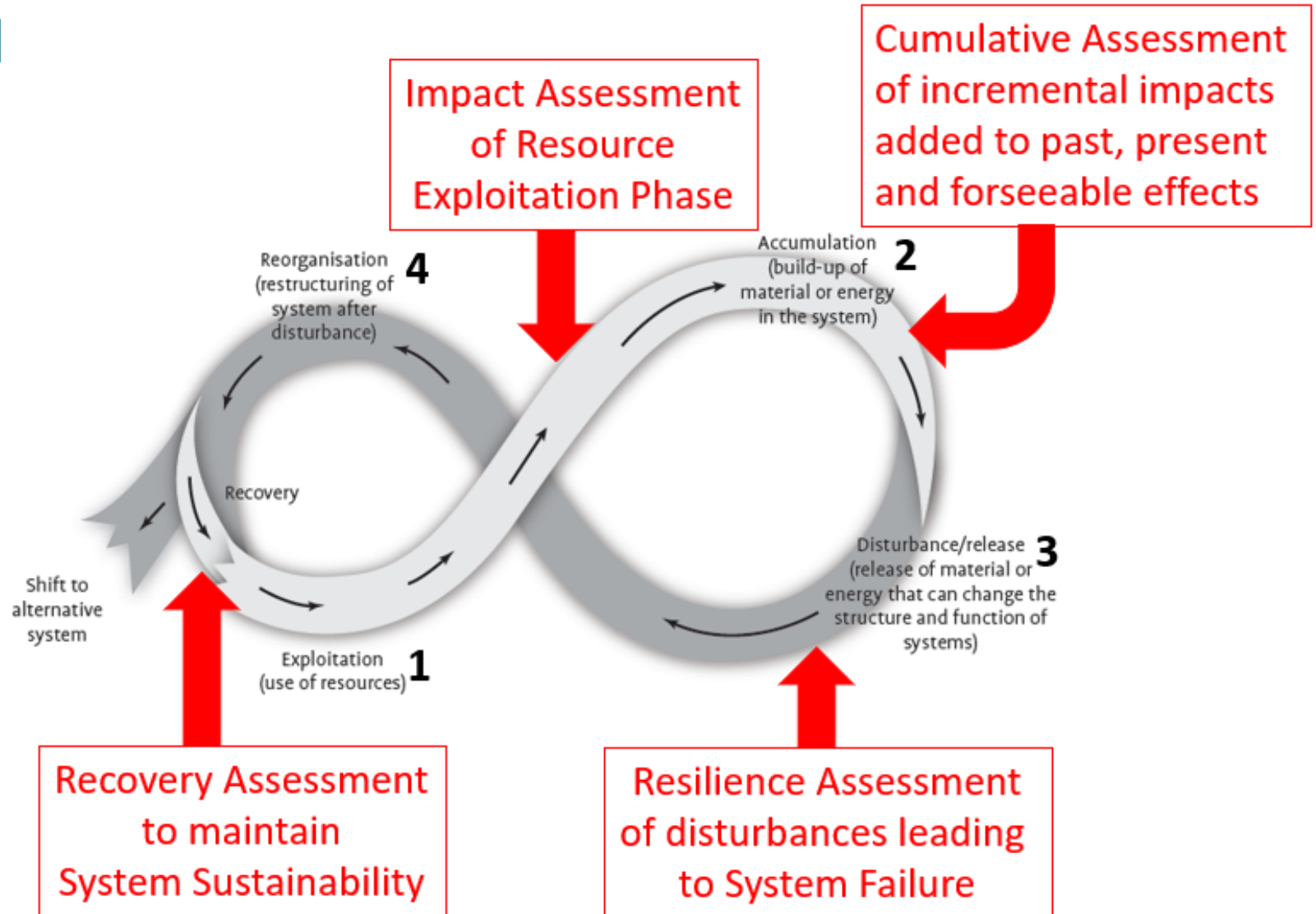
ASSESSMENT METHODS

Exploitation Phase
- impact assessment

Accumulation Phase
- cumulative impact assessment

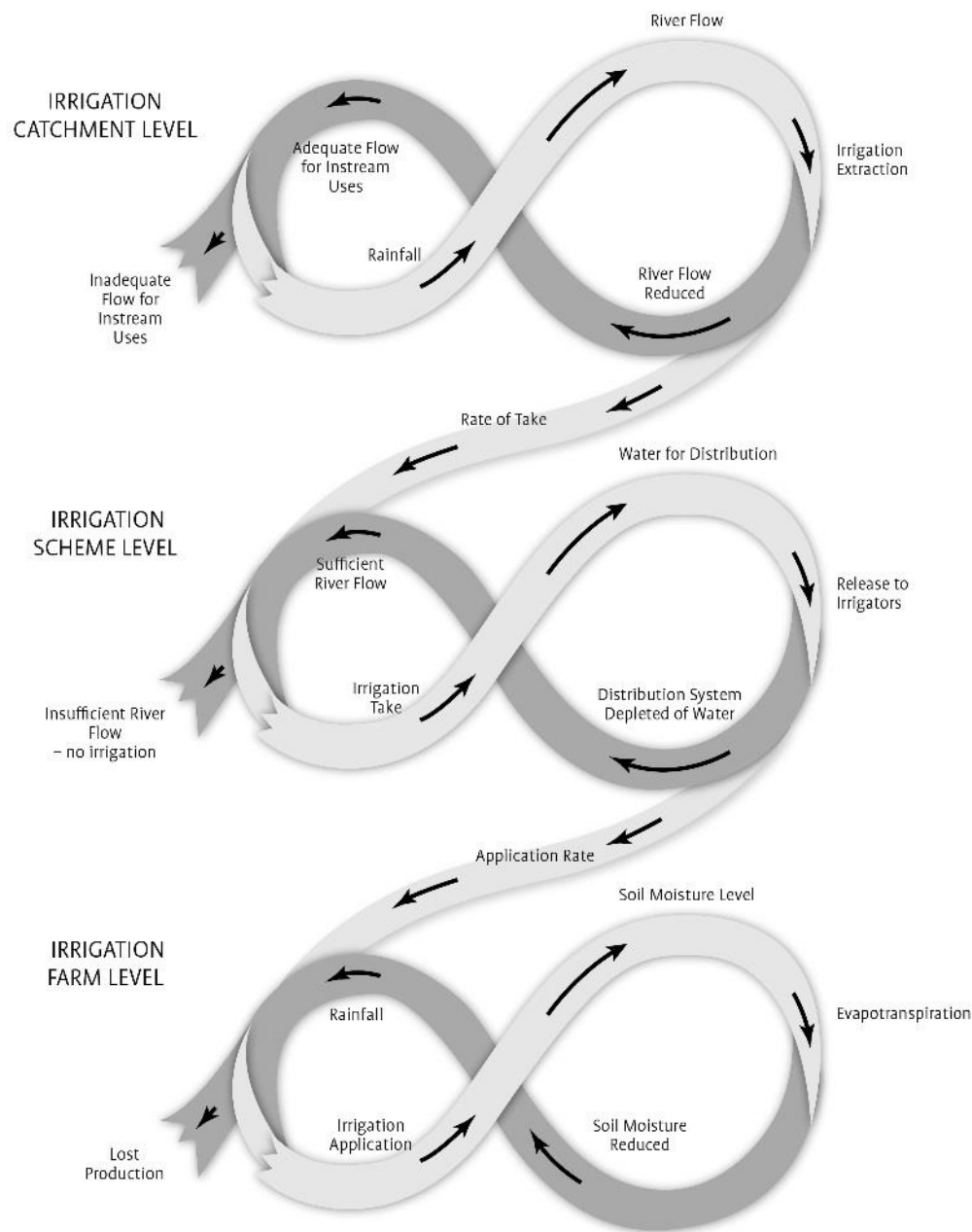
Disturbance Phase
- resilience assessment

Reorganisation Phase
- recovery assessment



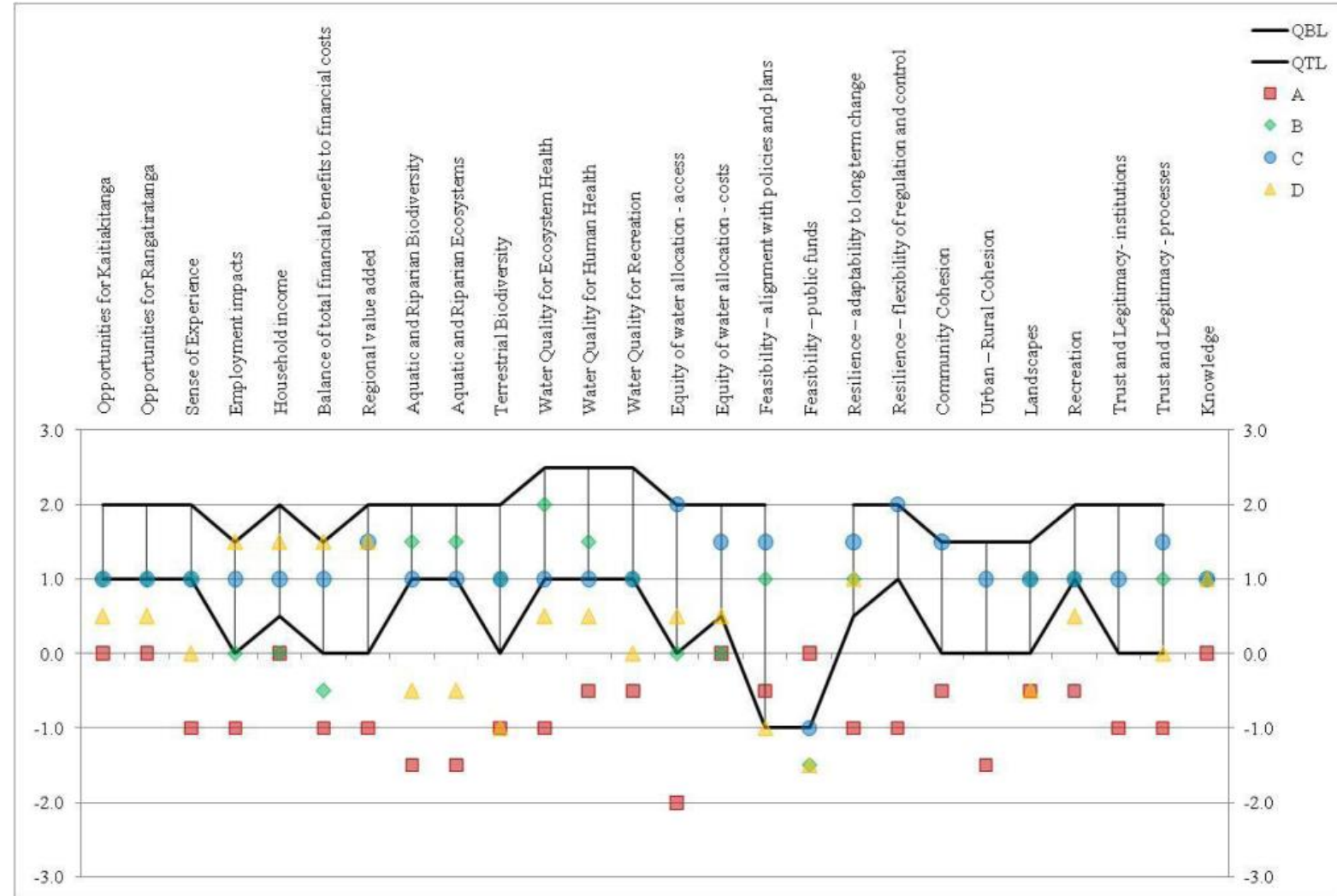
NESTED ADAPTIVE SYSTEMS

- Exceedance of limits is occurring at multiple geographical scales
- project, catchment, bioregional, planetary
- Assessments needed across multiple scales
- Tiered assessments have been the traditional method of placing projects in context
- Nested adaptive systems provide linkages between multiple spatial scales



POLICIES AND PROGRAMMES

- **Strategic assessment** is a valuable policy tool
- However, SEA is in **response** to proposed policies
- For addressing exceedance of limits, need **proactive** policies
- Proactive policy options need to be subjected to **sustainability appraisal**



SUSTAINABILITY APPRAISAL MATRIX FOR CANTERBURY WATER STRATEGY OPTIONS (Jenkins et al 2014)

QTL desirable sustainability objective

QBL acceptable minimum position

Option C ● is the only option with outcomes between QTL and QBL

SUSTAINABLE PROJECTS

EU Taxonomy for Sustainable Investments

- System for recognising investments that address climate and environmental objectives
- Recognition of investment as “taxonomy aligned”
 - make a substantial contribution to at least one environmental objective
 - do no significant harm to any other environmental objective
 - comply with minimum social safeguards, and
 - comply with technical screening criteria for “substantial contribution” and “do no significant harm”

REGIONAL SUSTAINABILITY TRANSITION STRATEGIES

- Shift from unsustainable industries to sustainable alternatives
 - e.g. from coal-fired to renewable energy
- Not only assess new industry but also closure of existing industry and associated infrastructure
 - e.g. impact assessment of wind farms, closure strategy for coal mines
- Consider social and economic consequences
 - e.g. loss of employment and economic activity for project closures, new skill requirements and shifts in location of employment opportunities
- Need for transition strategy well in advance of project closure and commissioning of new development
 - e.g. continuity of power supply

TRADITIONAL PRACTICE	FUTURE PRACTICE
<i>Types of Assessment</i>	
Impact Assessment	Impact Assessment
Cumulative Impact Assessment	Cumulative Impact Assessment
	Resilience Assessment
	Recovery Assessment
<i>Different Scales of Assessment</i>	
Tiered Assessments	Nested Adaptive Systems
<i>Policies and Programmes</i>	
Strategic Environmental Assessment	Strategic Planning with Sustainability Appraisal
<i>Achievement of Sustainability</i>	
	EU Taxonomy for Sustainable Investments
	Regional and Global Sustainability Transition Strategies

CHANGES IN THE NATURE OF ASSESSMENTS

- shift to **systems thinking** and not just cause-effect relationships,
- shift to staying within **sustainability limits** rather just minimizing adverse effects,
- shift to **sustainability outcomes** as the basis of assessment and not just significance of impacts,
- shift to **management interventions** to achieve sustainability rather than just mitigation actions to reduce impacts, and
- shift from reactive assessments to **proactive projects and strategies** for transitions to sustainability.



Let's continue the conversation!

Message me your questions or comments in the IAIA25 app.

Bryan Jenkins

*Adjunct Professor, University of Adelaide
Australia*

bryan.jenkins.au@gmail.com

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