

DEVELOPING A RESILIENCE FRAMEWORK TO ASSESS TOURISMS' RESPONSE TO CLIMATIC EVENTS

Susanne Becken, Lincoln University

University of Surrey : 27 June to 1 July 2011



Centre for Land
Environment
& People

A Lincoln University Research Centre.
New Zealand's specialist land-based university.



**Lincoln
University**
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

Stress and Disturbances



Centre for Land
Environment
& People

A Lincoln University Research Centre.
New Zealand's specialist land-based university.

What is resilience

“... measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables”
(Holling, 1973: 14)

The essence of resilience thinking is that it explicitly seeks to address change rather than avoid it.



Centre for Land
Environment
& People

A Lincoln University Research Centre.
New Zealand's specialist land-based university.



**Lincoln
University**
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

Further definitions

- Related concepts: ecological resilience, social resilience, adaptive capacity, vulnerability.
- Different views – but Klein et al. (2003) propose that ‘adaptive capacity’ is the collective ability to manage resilience.



Centre for Land
Environment
& People

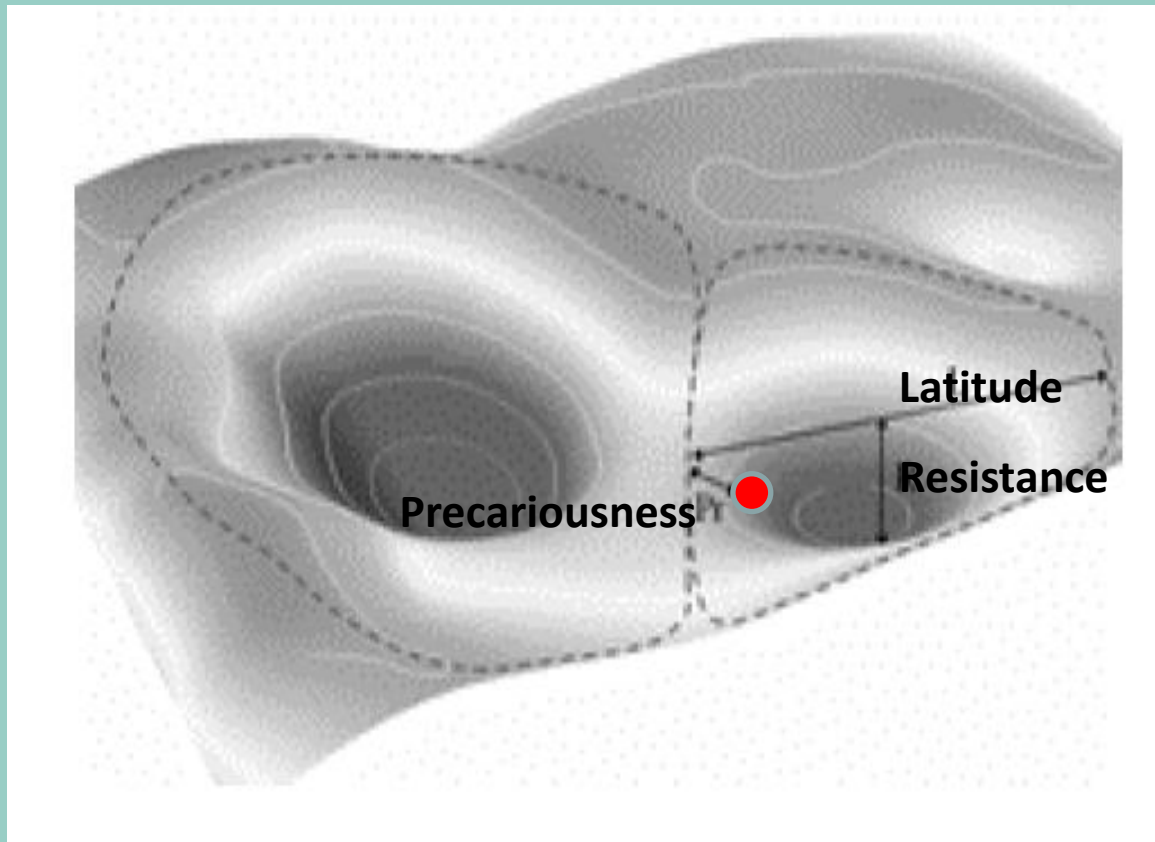
A Lincoln University Research Centre.
New Zealand's specialist land-based university.



**Lincoln
University**
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

State space



Three dimensional stability landscape with two basins of attraction showing (Walker et al., 2004).



Centre for Land
Environment
& People

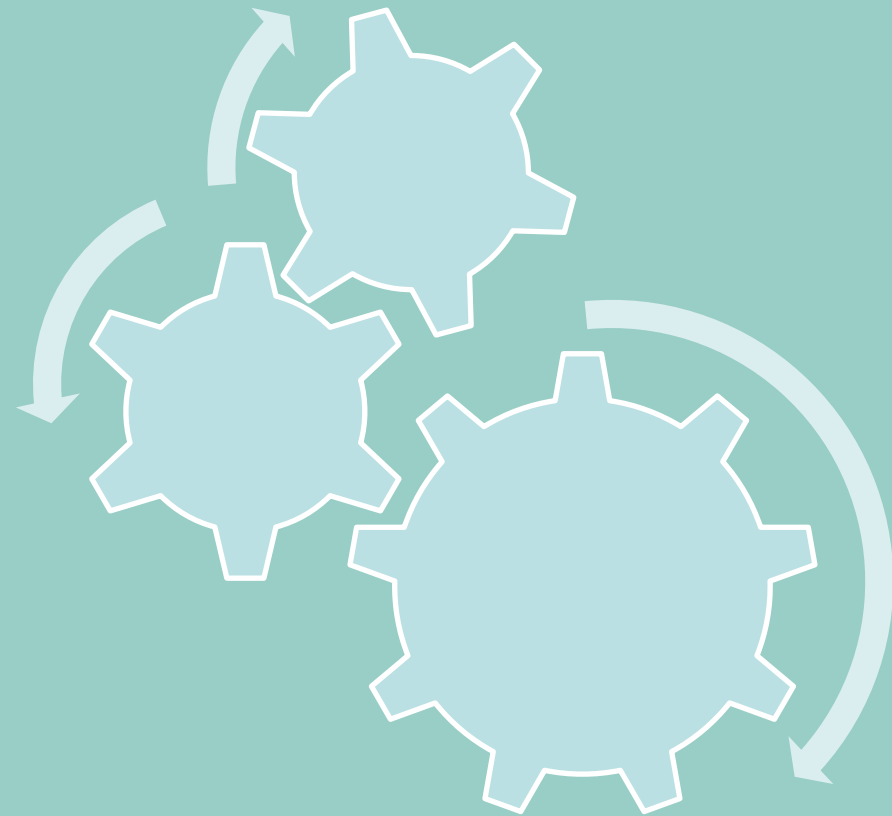
A Lincoln University Research Centre.
New Zealand's specialist land-based university.



New Zealand's specialist land-based university

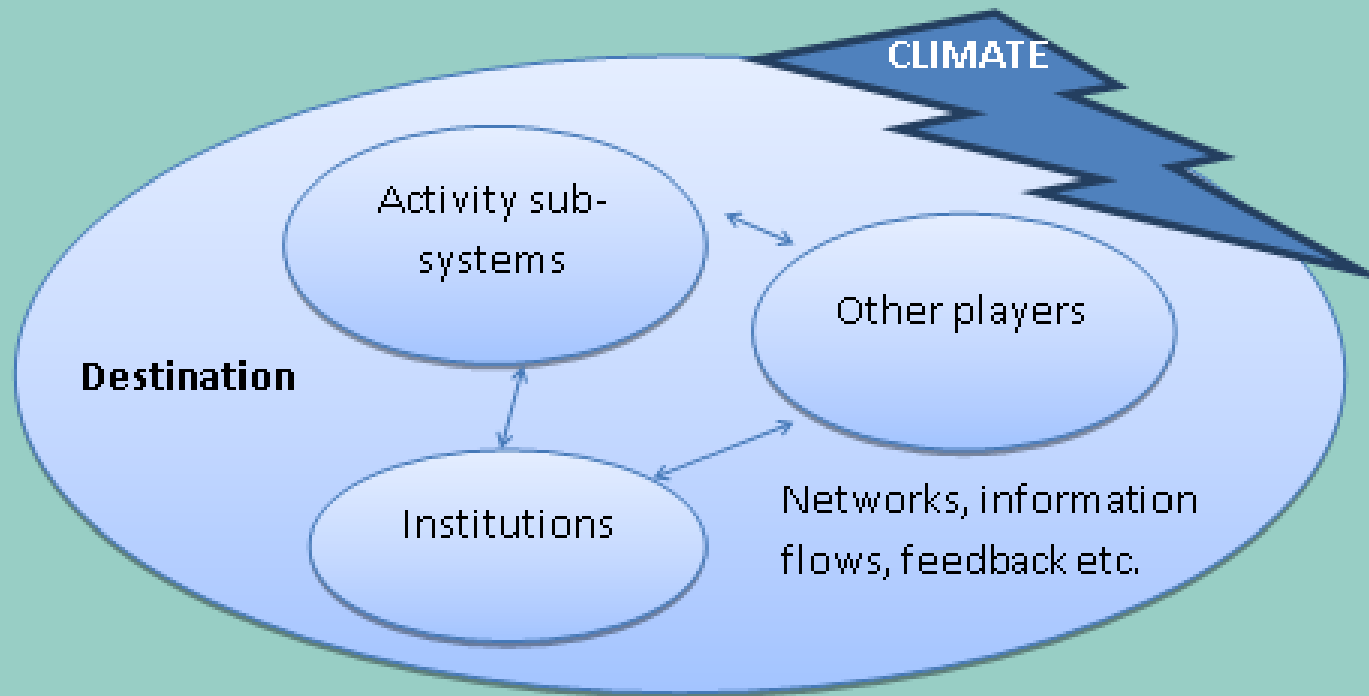
Panarchy

Because of cross-scale interactions, the resilience of a system at a particular focal scale will depend on the influences from states and dynamics at scales above and below.



A tourist destination

Example of a socio-ecological system



Centre for Land
Environment
& People

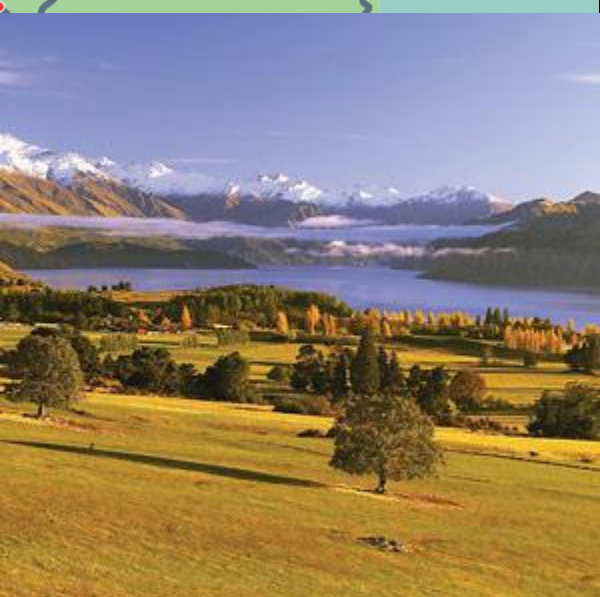
A Lincoln University Research Centre.
New Zealand's specialist land-based university.



Lincoln
University
Te Whare Wanaka o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

Case study Queenstown-Wanaka (NZ)



Methodology

1. Understand the context:

- subsystems and their functional units
- relationships within subsystems

2. Identify relevant climate/weather disturbances and interactions with subsystems

3. Development of proxies for measuring or assessing L, R, P for each functional unit

For this present paper: **34 interviews** with business operators



Centre for Land
Environment
& People

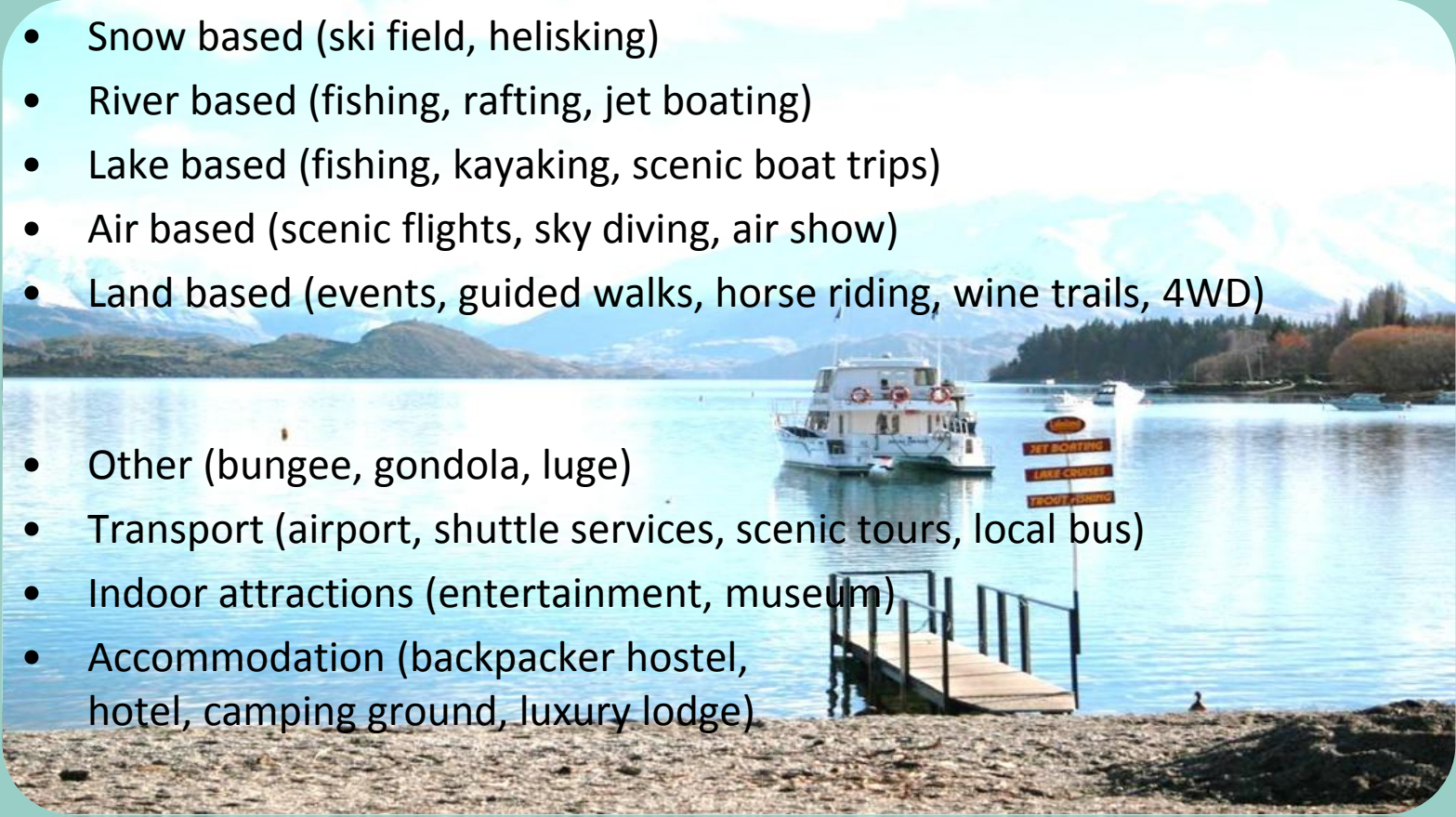
A Lincoln University Research Centre.
New Zealand's specialist land-based university.



**Lincoln
University**
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

Tourism activity sub-systems

- Snow based (ski field, helisking)
 - River based (fishing, rafting, jet boating)
 - Lake based (fishing, kayaking, scenic boat trips)
 - Air based (scenic flights, sky diving, air show)
 - Land based (events, guided walks, horse riding, wine trails, 4WD)
- 
- Other (bungee, gondola, luge)
 - Transport (airport, shuttle services, scenic tours, local bus)
 - Indoor attractions (entertainment, museum)
 - Accommodation (backpacker hostel, hotel, camping ground, luxury lodge)



Centre for Land
Environment
& People

A Lincoln University Research Centre.
New Zealand's specialist land-based university.



Lincoln
University
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

Climatic factors

Sub-system	Adverse	Favourable
Snow	Lack of snow and precipitation, wind, rain; heavy snow increases avalanche risk; warm temperatures	Heavy snow early in the season, regular snow, cold temperatures
River	Heavy rain and flooding; frost and ice on river; extremely low river levels	Normal rainfall patterns leading to normal river flows
Lake	Wind and high waves; debris on the lake after flooding	Road closures elsewhere and tourists redirected onto lake activities
Air	Wind, rain and poor visibility	Settled weather periods
Land	Heavy rain and flooding; heavy snow (avalanches); wind	Wind, if other activities have to be cancelled and tourists are diverted
Indoor	Wind can lead to power cuts; ice on carparks; heavy rain increases maintenance costs (e.g. leaks)	Rain and wind that lead to cancellation of other activities
Other	Wind leads to closure of gondola; frost makes luge and bungee hazardous; poor visibility	
Transport	Frost and ice; heavy snow	Heavy snow for those providers that have 4WD vehicles
Accom.	Rain for campgrounds	Rain, frost for non-camping accommodation

Determining thresholds

Activity	Sub-system	Thresholds	Notes
Heli skiing	Snow based	If marginal snow conditions more often than the current 1 in 4 years	Affects business viability
Ski field	Snow based	30km wind shuts down T-bar, less wind shuts down chair lift; gusty winds have lower threshold	Have own weather station/ wind sensors on lift towers; Visual appraisal for gustiness
Scenic flights	Air based	Flights need 100% visibility as they are 'scenic' flights	Wind thresholds vary dependent on plane type
Airshow	Air based	15-18 knots limit for WW1 planes, 32 knots other types; Low cloud or fog	Wind thresholds dependent on plane type
Skydive	Air based	CAA rules for daylight hours; Solid cloud base above 15,000 ft; Wind <21 km/hr on ground wind	Direction of wind important; own weather stations and sensors
Fishing	River based	20mm rain in < 2 hours	Flooding of river
Jet boat I	River based	River flow: 9.5-1250 m3 Council restrictions on operating hours	Not just flow – also clarity
Jet boat II	River based	Maybe cancel at 80 m3; Ice in river	Variable water pressure
Rafting	River	Optimum river flow 10-70 m3 >400 m3 stops operation	Depends on specific conditions
Gondola	Other	Gondola < approx 75km/hr wind speed. otherwise	Depends on wind gusts

Proxies for Latitude

- **PRODUCT:** Diversity of tourist activities that allows operation across many weather conditions.
- **CUSTOMER BASE:** Diversity of markets and segments.
- **STAFFING:** Degree of operational flexibility, and retention of experienced staff.
- **SEASONALITY:** Extent of operating window (ideally all year round).
- **ACCESS:** Dependence of activities in sub-system on a particular location or resource (e.g. cultural ties to one specific river).
- **NETWORKS:** Connectedness of activity sub-system, within and across other sub-systems to allow diversification in the face of adverse conditions.
- **COMPETITION:** Degree to which profitability and flexibility are compromised by competition.



Centre for Land
Environment
& People

A Lincoln University Research Centre.
New Zealand's specialist land-based university.



**Lincoln
University**
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

Proxies for Resistance

- **WEATHER SENSITIVITY:** Degree to which activities in the sub-system are limited by adverse climatic conditions.
- **COPING RANGE:** Level of critical threshold above which operation is not possible.
- **RESPONSE OPTIONS:** Range of response options to disturbance/stress in the sub-system (i.e. feedbacks).



Proxies for Precariousness

- **FREQUENCY:** Extent to which operations in activity sub-system are disrupted under current climate conditions.
- **CLIMATE CHANGE:** Extent to which climate change will exacerbate climatic impacts.



Challenges

- Fully operationalise framework
- Development of quantifiable indicators and integration of qualitative information (e.g. power relationships)
- Diversity within sub-systems (weighting of keystone activities?)
- Scale (e.g. how to “add up sub-systems” to destination?)
- Other, complex destination issues (e.g. flow of information)
- Multiple stress factors, etc. etc.



Centre for Land
Environment
& People

A Lincoln University Research Centre.
New Zealand's specialist land-based university.



**Lincoln
University**
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university

Outlook

- Importance of the concept of Resilience
- Researching destinations as socio-ecological systems represents a holistic approach
- Further extension: Panarchy in tourism systems



Centre for Land
Environment
& People

A Lincoln University Research Centre.
New Zealand's specialist land-based university.



**Lincoln
University**
Te Whare Wānanga o Aoraki
CHRISTCHURCH • NEW ZEALAND

New Zealand's specialist land-based university