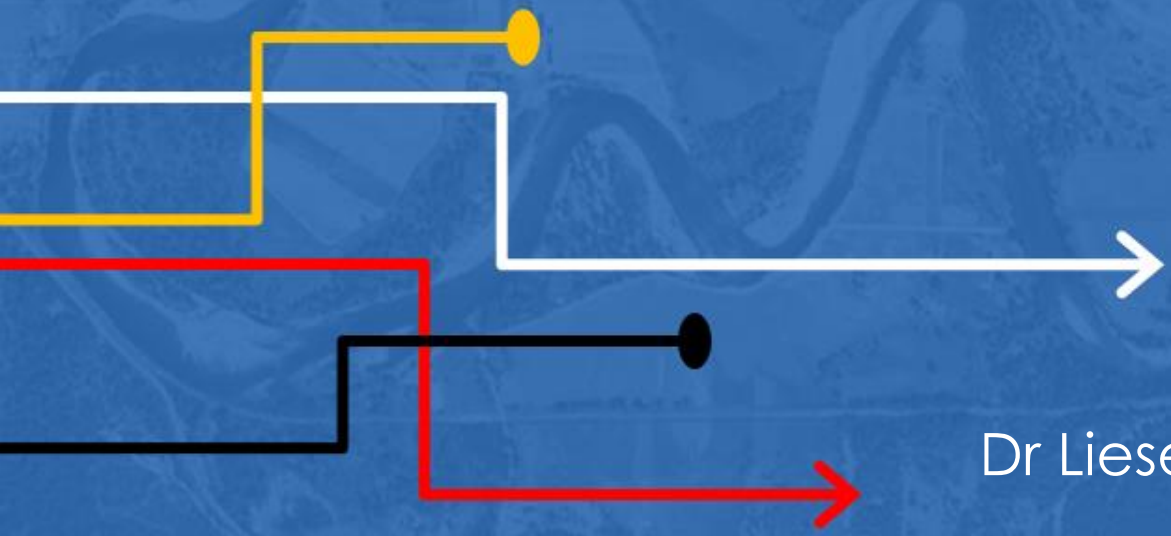
Draft Climate Change Adaptation Pathways Framework

Supporting sustainable local food in B.C.



Dr Liese Coulter

2018-19 Mitacs Science Policy Fellow
B. C. Ministry of Agriculture

How to plan when the climate ... keeps on changing?

Become more resilient?

Build new infrastructure?

Plant different crops?

Move houses, farms or businesses?

Who decides what, and when?

How to plan when the climate ... keeps on changing?

Let’s look at low river flows as an example …

Photo - Cowichan Lake and River Stewardship Society

<u>October 2012</u> - All fishing is banned on the Cowichan River, we are trying to rescue this year's run of chinook salmon from drought conditions …

Photo - Lake Cowichan Weir 2019

<u>March 2019</u> - Last summer, record-breaking heat and low rainfall forced the Cowichan Valley into the highest drought classification available. This year, we expect one of the worst summers yet in the Cowichan.

Who

Dr Liese Coulter

PhD Griffith University, Brisbane

MSC Communication, Australian National University, Canberra

- 2018-19 Mitacs Canadian Science Policy Fellow, B.C. Ministry of Agriculture
- 2019-21 Research Fellow in Climate Risk Storylines, University of Leeds UK

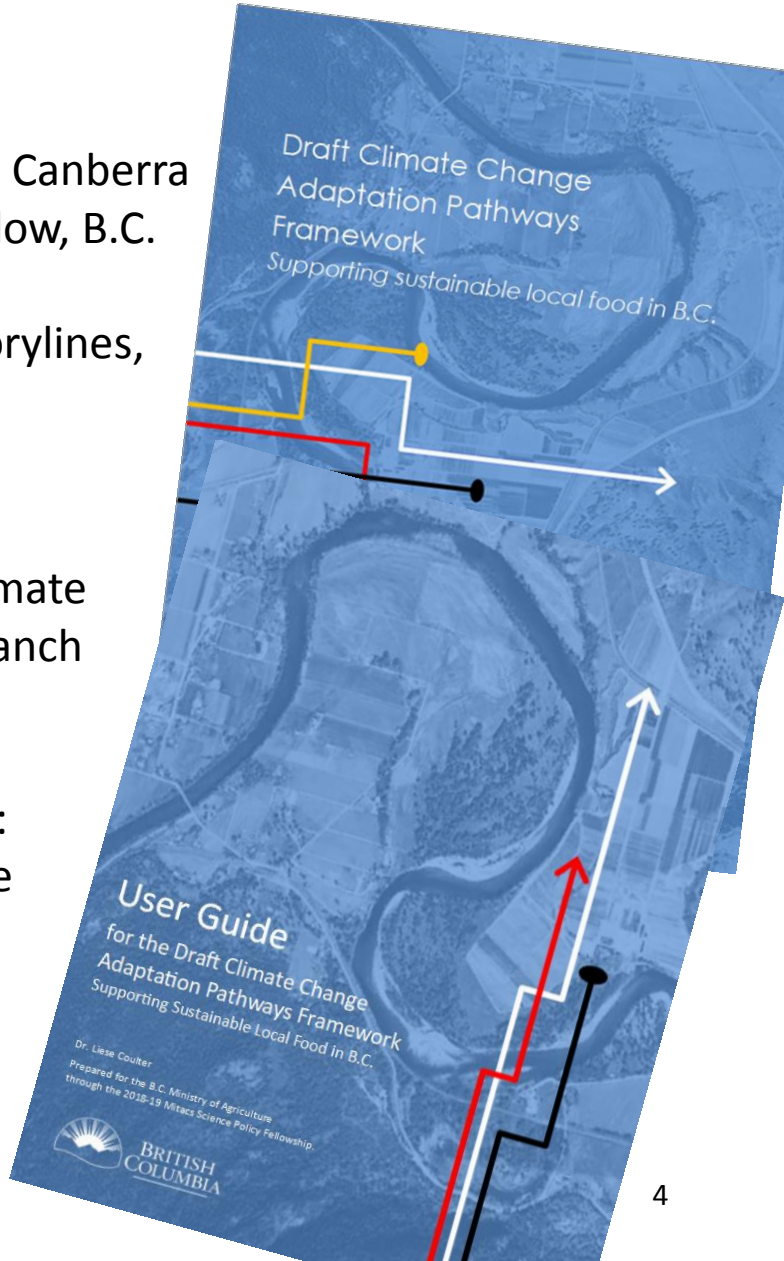
What

Adaptation Pathways Framework prepared with Climate Action Team, Innovation and Adaptation Services Branch

Why

Supporting B. C. government climate action through:

- B.C. Food and Agriculture Climate Action Initiative Regional Adaptation Strategies and Projects
- Preliminary Climate Risk Assessment, 2019
- Provincial Adaptation Strategy, 2020



Climate Change Adaptation Pathways: Supporting sustainable local food in B.C.

A pathways approach enables communities to develop shared adaptation understandings, goals and plans

Proven use in Netherlands, Australia and internationally

ECCA 2019 | CCB, Lisbon | 28–31 May | 4th European Climate Change Adaptation conference

Adaptation pathways for climate-resilient development

Saskia Werners (Netherlands) 1; Edmond Totin (Benin) 2; James Butler (Australia) 3; Russell Wise (Australia) 3; Sharlene Gomes (Netherlands) 4; Leon Hermans (Netherlands) 4

Theme

1. Data, methods and approaches in Climate Change Adaptation and Disaster Risk Reduction

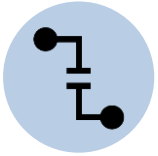
1.4 Integrating methods and tools for disaster risk and adaptation

Why use the adaptation pathways approach?

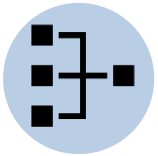
Adopting an adaptation pathways approach helps planners to:

Apply climate knowledge -> agriculture is less vulnerable

Structure long-range planning -> agriculture in community



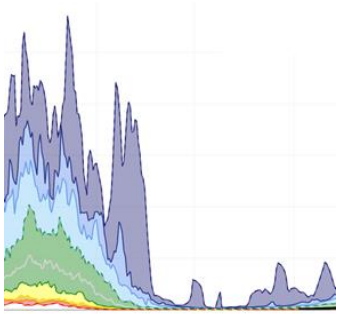
ID climate, social and economic triggers -> transformation



Coordinate multiple pathways -> food security & other goals

A climate change pathway

Streams flow



Crops don’t grow

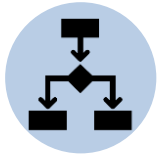
Kids go

Why use the adaptation pathways approach?

Pathways support climate change adaptation planners to:

Make decisions for multiple possible futures

Explicitly identify and prepare for likely future decisions



Employ flexible and adaptive planning processes

Strengthen the adaptive capacity of people and organizations

Why use the adaptation pathways approach?

Pathways require community participation so that

Whole communities set adaptation goals and preferred actions

Involved participants better support proposed ideas and realise actions

Participants identify, assess and sequence options on a pathways map

Five staged approach to adaptation pathways planning,

After Serrao-Neumann, 2015

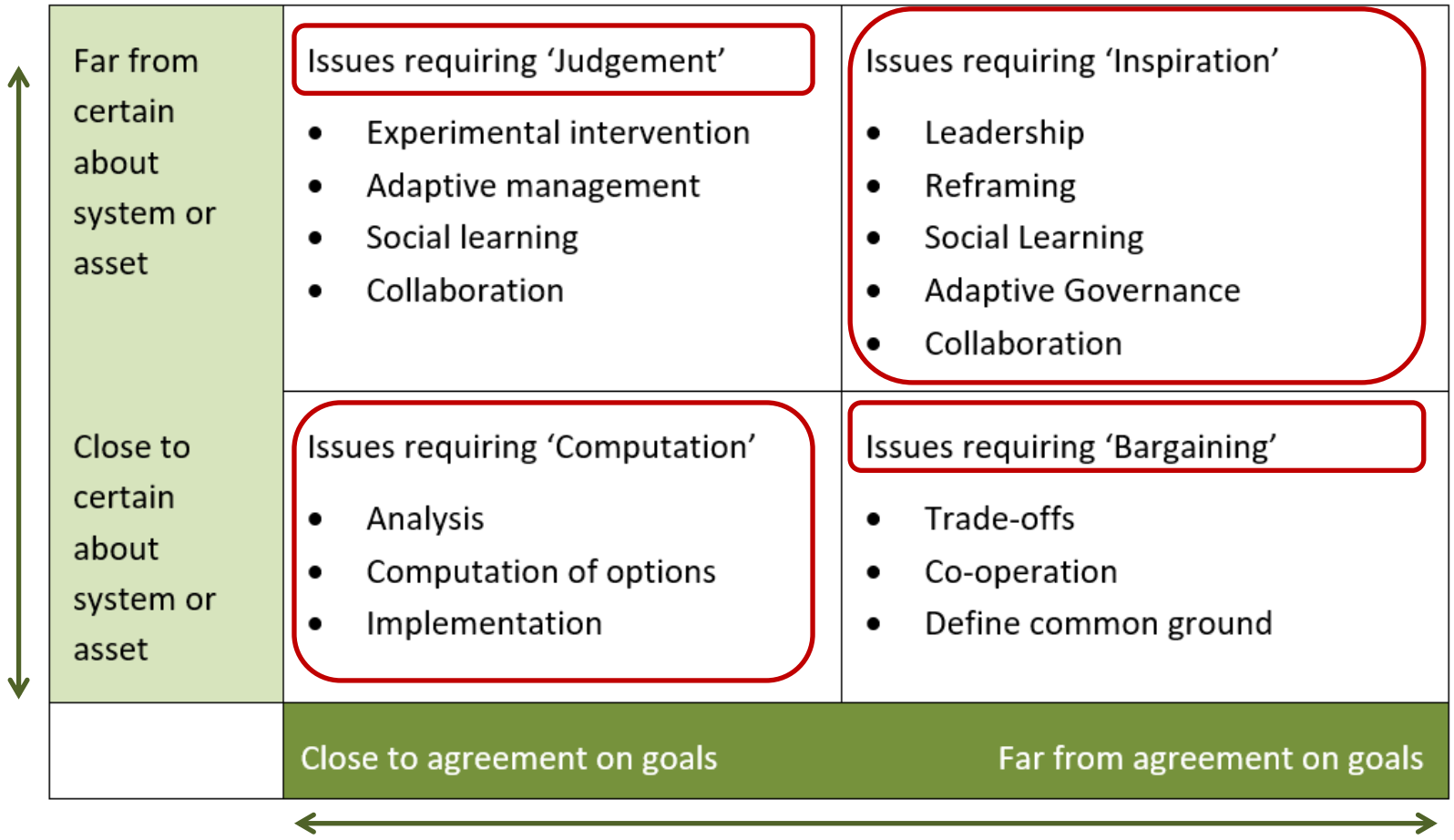
Stage 1 Define objectives

Output: Statement on key decision areas & agreement on goals and objectives

Climate narratives are framed within personal, cultural and employment communities

Let's look at low river flows as an example …

Approaches to issues by certainty and level of agreement on values and goals.

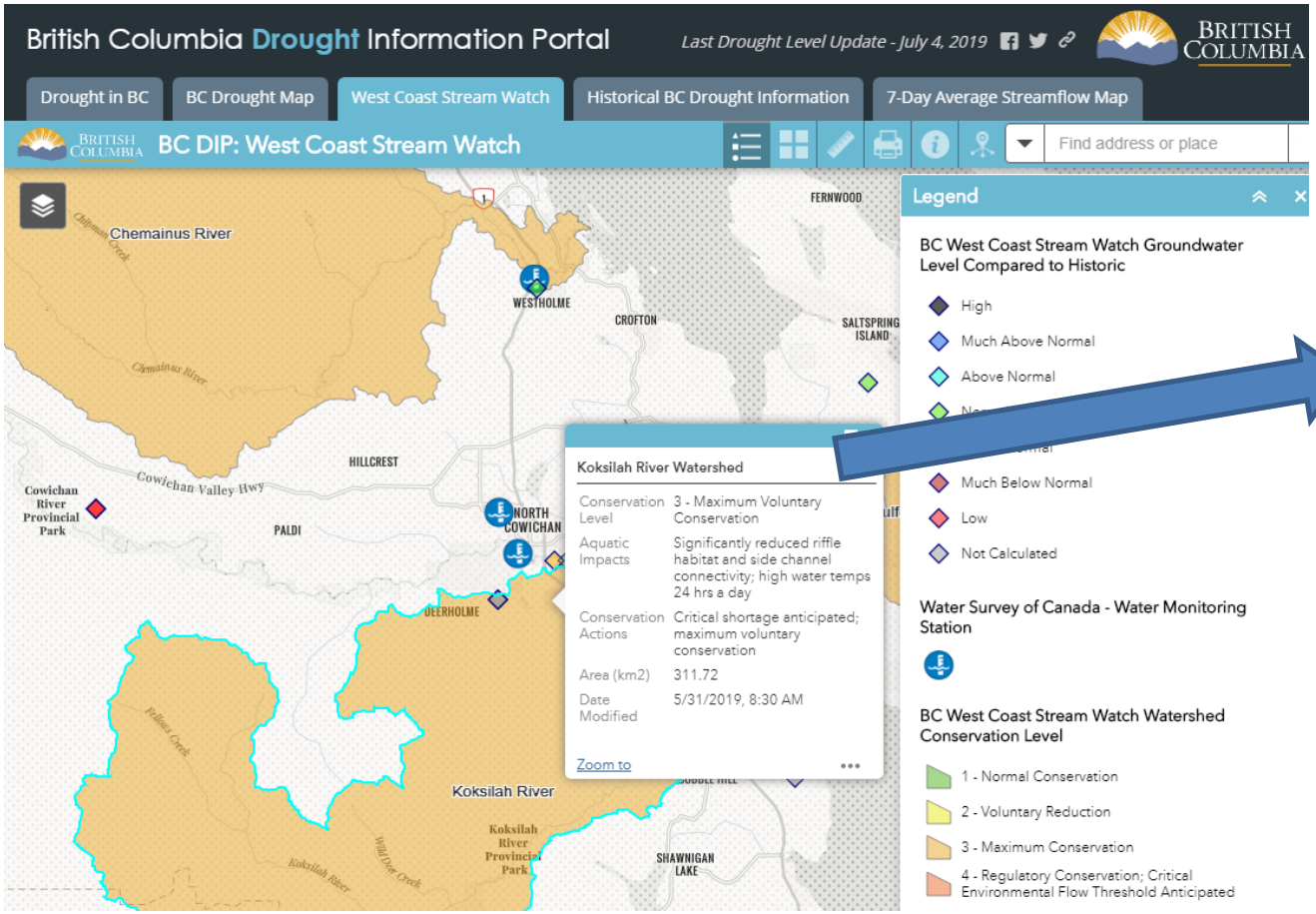


After Bosomworth, 2015

Stage 2 Analyse the current situation

Output: Documented current practices and their limitations with climate change

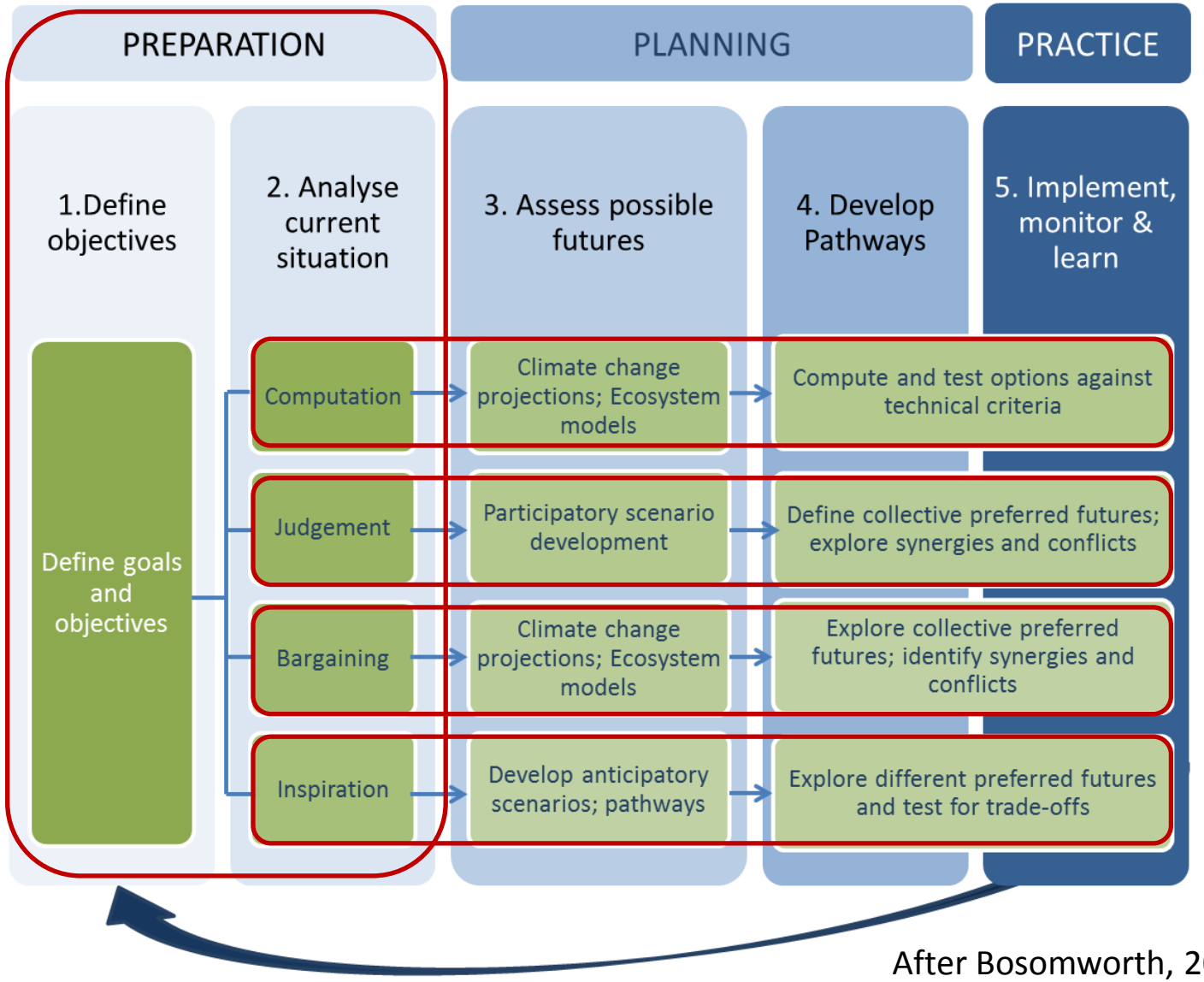
Climate system changes present previously unlikely stories



KOKSILAH RIVER WATERSHED

Critical water shortage anticipated
31 May, 2019

Phases in developing adaptation pathways



After Bosomworth, 2015

Stage 3 Assess possible futures

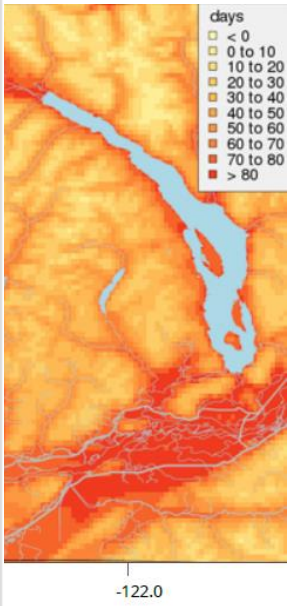
Output: Scenarios requiring adaptation

It takes a lot of mental effort to reflect new knowledge in adaptation decisions

Forest Carbon Risk of Reversal

Forestry-based carbon sequestration projects in some areas have potential for investment by the carbon market and risks to that investment…

2080s Change (°C)	
Average	(Range)
4.4	(2.8 to 5.7)
4.7	(2.8 to 7.3)
6.0	(3.7 to 8.4)
4.5	(2.9 to 6.2)
4.9	(3.0 to 6.6)



Already, climate change is

- altering rain and snow patterns,
- changing the timing and amount of precipitation,
- increasing water temperatures,
- shrinking snow packs and glaciers, with
- snowmelt occurring earlier in the spring.

Therefore …

Coastal regions of Southern BC expect worse drought within the coming decades than any in the past 350 years.

Therefore …

Less water is available to sustain summer flows with a higher likelihood of water-stressed communities and increased conflicts.

After Simms & Brandes, 2016

Stage 4: Develop Adaptation Pathways

Output: Set of agreed initial pathways

Adaptation pathways steps:

A) Address existing vulnerabilities

B) Bookmark decision points

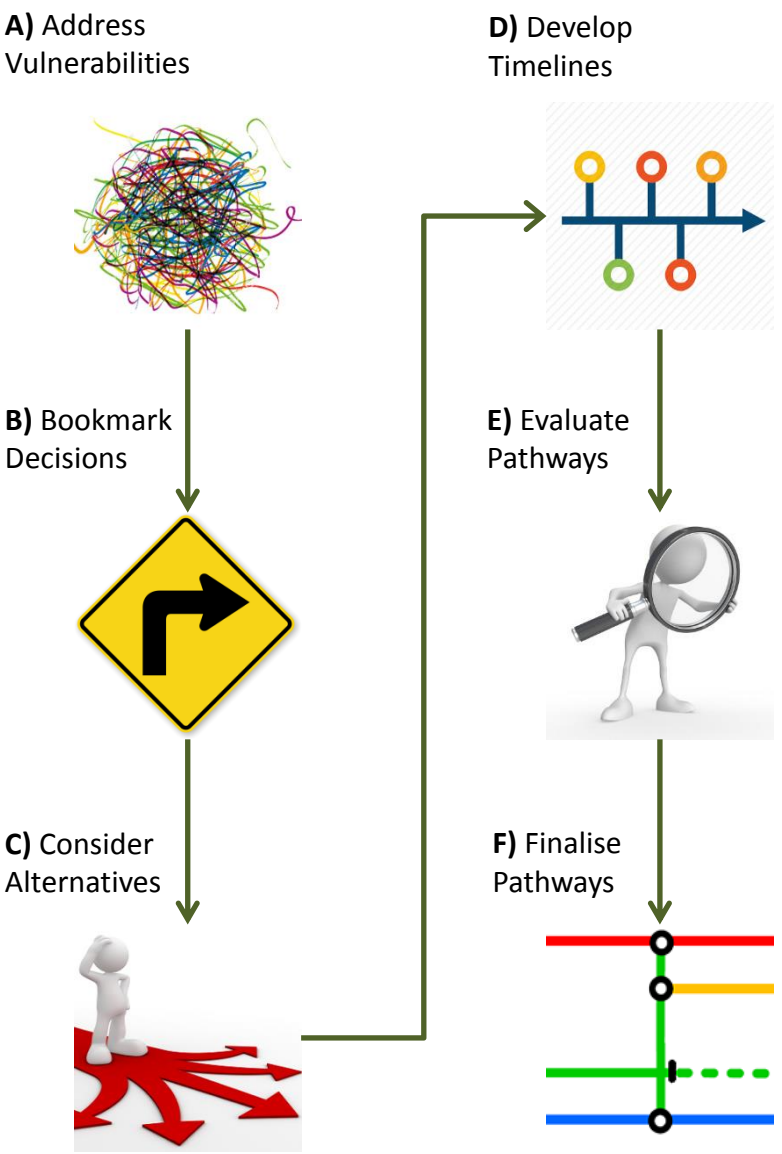
C) Consider alternative actions

D) Develop plausible timelines

E) Evaluate and refine pathways

F) Finalise and visualise pathways

After Bosomworth, 2015



A) Address Vulnerabilities

Identify options to address existing drivers of vulnerabilities under current conditions.

How to improve water outcomes in current conditions?

- Increase water use efficiency …
- Increase seasonal water storage (high winter flows, low in summer) …
- Work across all governments to align practices and regulations …
- Understand issues: habitat needs, agricultural users, drinking water …
- Introduce monitoring and controls on water extraction …

B) Bookmark Decisions

Identify tipping points, turning points and trigger points

Signals of ineffective actions, approaching thresholds or changing systems

Agriculture uses surface and groundwater

Possible Tipping Point:
Critical environmental flow threshold
(water flow so low it is likely cause significant or irreversible harm to the aquatic ecosystem)

Possible Implication: no ground or surface water is available for irrigation and farm systems

Next options must be decided such as;

- changing crop frequency or type …
- buying water elsewhere …

Tipping points: thresholds where current management strategies no longer meet objectives

Turning points: thresholds in social–political systems that may be passed due to changes in climate, policy objectives or social values.

Trigger points: mark the start of lead time needed for action, before a turning point is reached.

C) Consider Alternatives

Identify alternate options to address objectives under the range of potential futures

How do options help achieving objectives? What are the stakeholders' roles?

If the streamflow cannot support agriculture for sustainable food production …

Consider policy and behaviour change?

- Prioritization: First in Time, First in Right vs. Highest and Best Use
- $$ Incentives for efficiency; $$ compensation for giving up rights
- Accepting fewer hay cuts per year
- Not all at once, scheduled irrigation days; (i.e. odds and evens …)

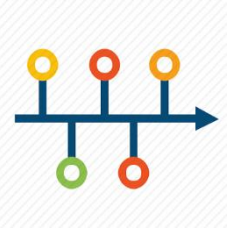
Consider infrastructure projects?

Aquifer storage: Lake water, treated waste water and/or desalinated water is pumped into groundwater aquifers for storage.

Desalination: Seawater piped to a desalination plant has salt removed, is treated to drinking standards, then stored in groundwater aquifers or dams.

D) Develop Timelines

Sequence potential actions into draft pathways



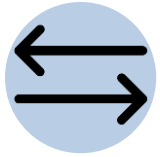
Use all early work to sequence potential options in pathways

Use tipping, turning and trigger points to identify

- when, or under what conditions, specific options no longer work
- earlier points when action can or must be taken.

Document existing activities and decision points to locate

- no-regret options and
- options that are robust across most futures



Check alignment of sequences to show gaps between

- current practices and resources,
- political and community support
- language and culture

E) Evaluate Pathways

Analyse and evaluate the pathways

What enables transitional or transformational action?

Criteria to evaluate adaptation pathways in agricultural communities:

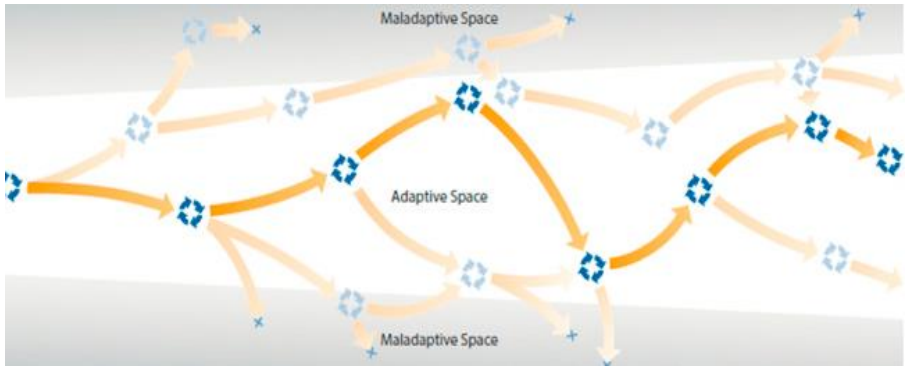
- **Co-benefits:** also supports biodiversity, mitigation, wildfoods?
- **Maladaptation:** does not create a 'dead-end' by other impacts?
- **Limits:** limits constraints on physical, socio-political, or social systems?
- **Flexible:** avoids lock-in and provides options to be adapted or replaced?
- **Sustainable:** supports physical & social pathways under different futures?
- **Responsive:** enables strategies to be switched, postponed or re-evaluated?

F) Finalise Pathways

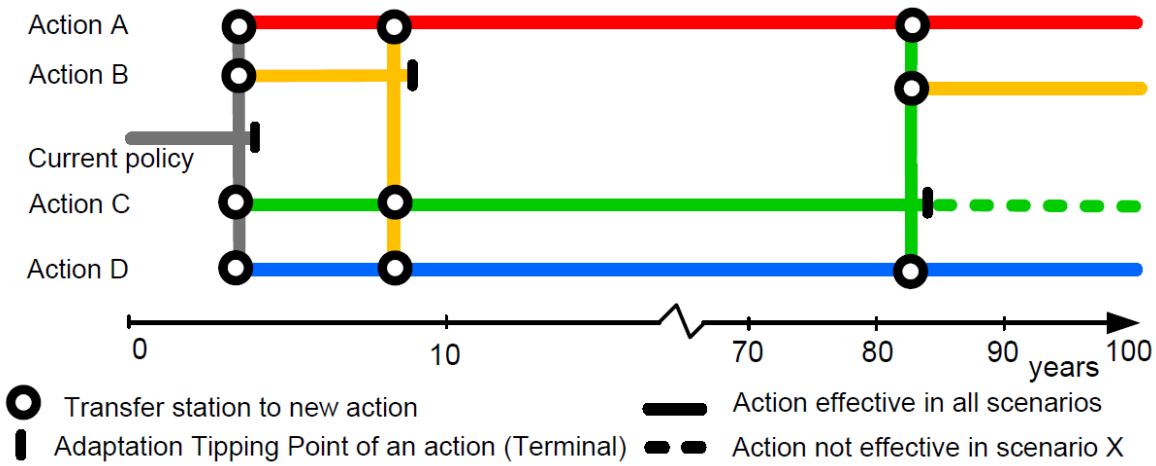
Finalise and document or map pathway

Maps are visual communication tools

Choose a way to visualise pathways that is meaningful to the community.



After Wise, 2014



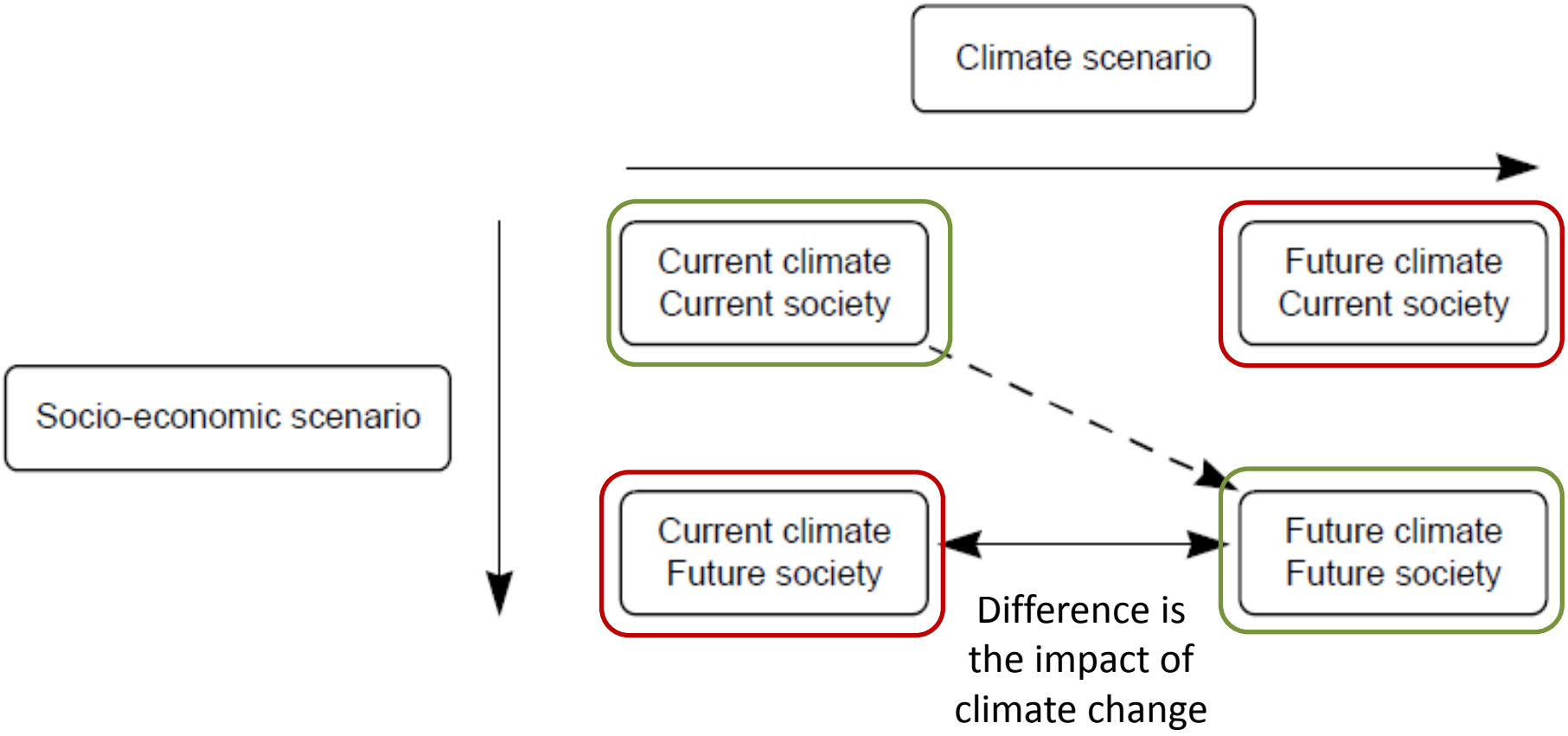
After Walker, 2013

Stage 5

Implement, monitor & learn

When to start?

Environmental changes and new policy or funding opportunities can trigger implementing an adaptation pathway.

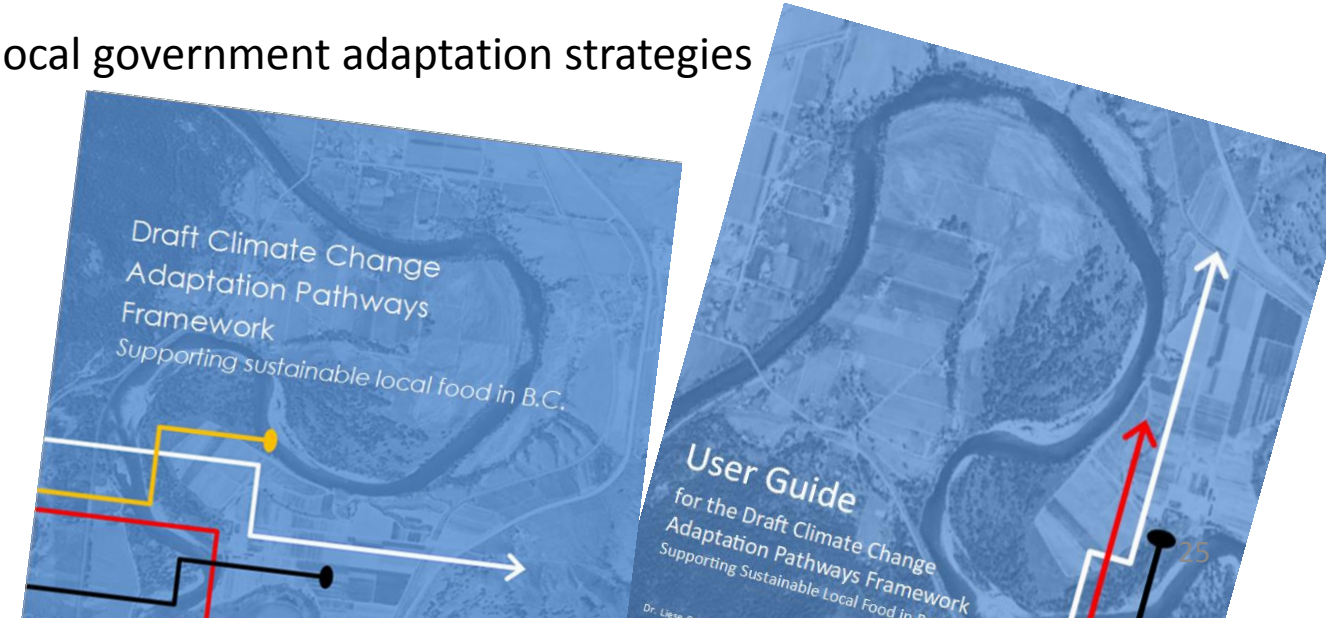


After Feenstra, 1998

Policy and Pathways

Adopting a pathways approach:

- Supports the government mandate to take action on climate change and increase the capacity of B.C. farmers to adapt to climate change.
- Addresses recommendations in B.C. Office of the Auditor General report *Managing Climate Change Risks – An Independent Audit.*
- Offers structure to address climate hazards identified in *Addressing the New Normal: 21st Century Disaster Management in B.C*. (Abbot and Chapman Report)
- Links provincial and local government adaptation strategies

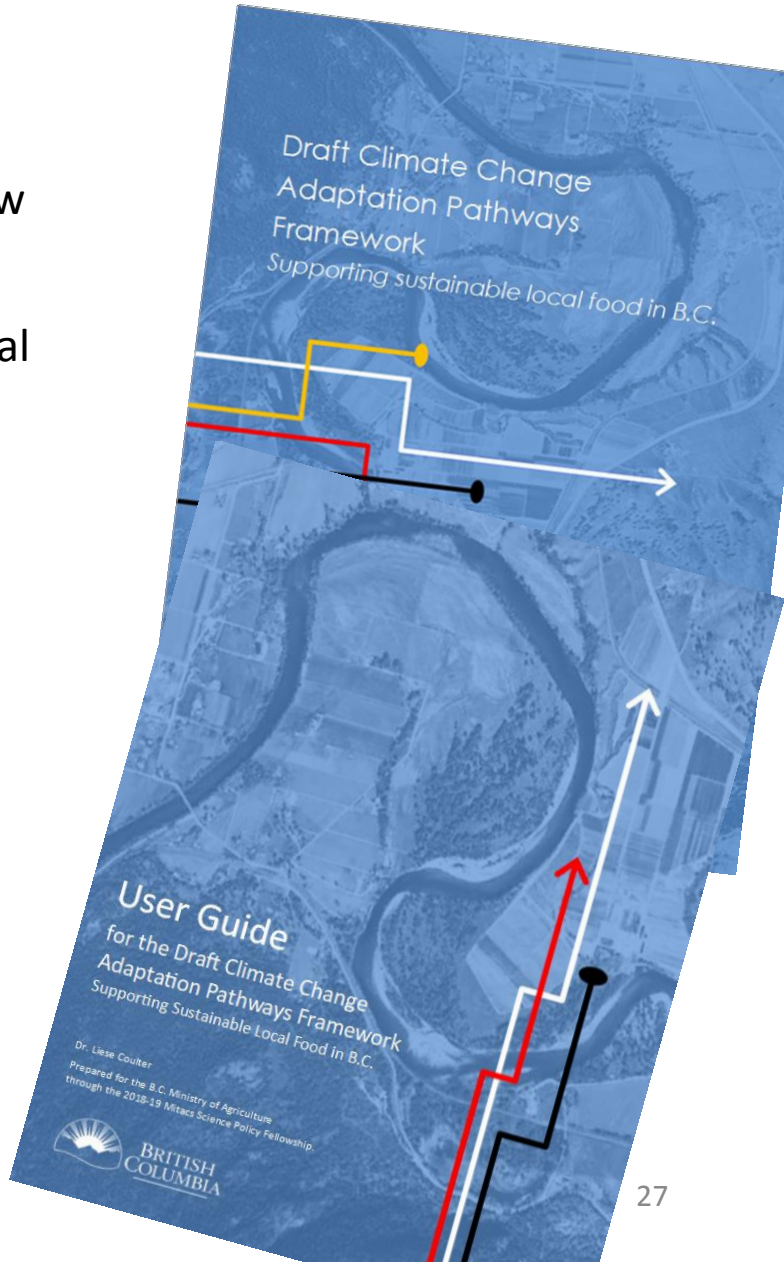


Five staged approach to adaptation pathways planning,

After Serrao-Neumann, 2015

Adaptation Pathways framework and User Guide

- **Provide** a non-technical, user-friendly overview to start developing adaptation pathways,
- **Highlight** agriculture to enable sustainable local food production into the future, and
- **Sequence** critical steps that any organisation, community or local government can take to develop long-term adaptation plans.



Presentation available on the webinar page

The Framework and User Guide will soon be on the B.C. government website and posted to Retooling for Climate Change
https://www.retooling.ca

Acknowledgement
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