Ecological Scenarios and RAD

Shelley Crausbay, Brian Miller, Helen Sofaer, Imtiaz Rangwala

North Central CASC - Climate Solutions Days

As you enter the session - Please open a browser and go to Menti.com and enter code 7924 652
to answer a few “get to know each other” questions

Photo: Brian Miller

Session Goals:

1. Raise awareness that multiple ecological futures are possible and can be considered in planning.

2. Start to brainstorm ideas for how to develop and apply ecological scenarios.

3. Cultivate interest in participating in future discussions on ecological scenarios and RAD decision making.

Session Agenda:

- Workshop Overview
- Menti Poll / Introductions

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- Brief Introductory Presentations (with Q&A)
- Breakout Groups - *Explore opportunities & hurdles to creating and using ecological scenarios, and gather ideas on processes and resources that could be used to develop ecological scenarios*
- Re-Convene in Plenary - Share reflections from breakouts and discuss next steps

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Ecological Futures & Scenario Planning

Shelley Crausbay, Conservation Science Partners
Brian Miller, USGS, North Central Climate Adaptation Science Center

Photo: Brian Miller

This land is your land

Is this the end of forests as we've known them?

'Now's a good time to go visit national parks with big trees.' Illustration: Veronica Bolivar/The Guardian

Los Angeles Times

CLIMATE & ENVIRONMENT

Mojave Desert fire in August destroyed the heart of a beloved Joshua tree forest

The Guardian

Seascape: the state of our oceans
Canada

'Heat dome' probably killed 1bn marine animals on Canada coast, experts say

Seascape: the state of our oceans is supported by

About this content

Leyland Cecco *in Toronto*

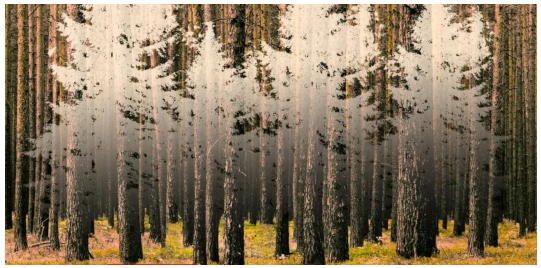
Thu 8 Jul 2021 05.00 EDT

▲ Dead mussels at the waterline in British Columbia. Photograph: Christopher Harley

British Columbia scientist says heat essentially cooked mussels: 'The shore doesn't usually crunch when you walk'

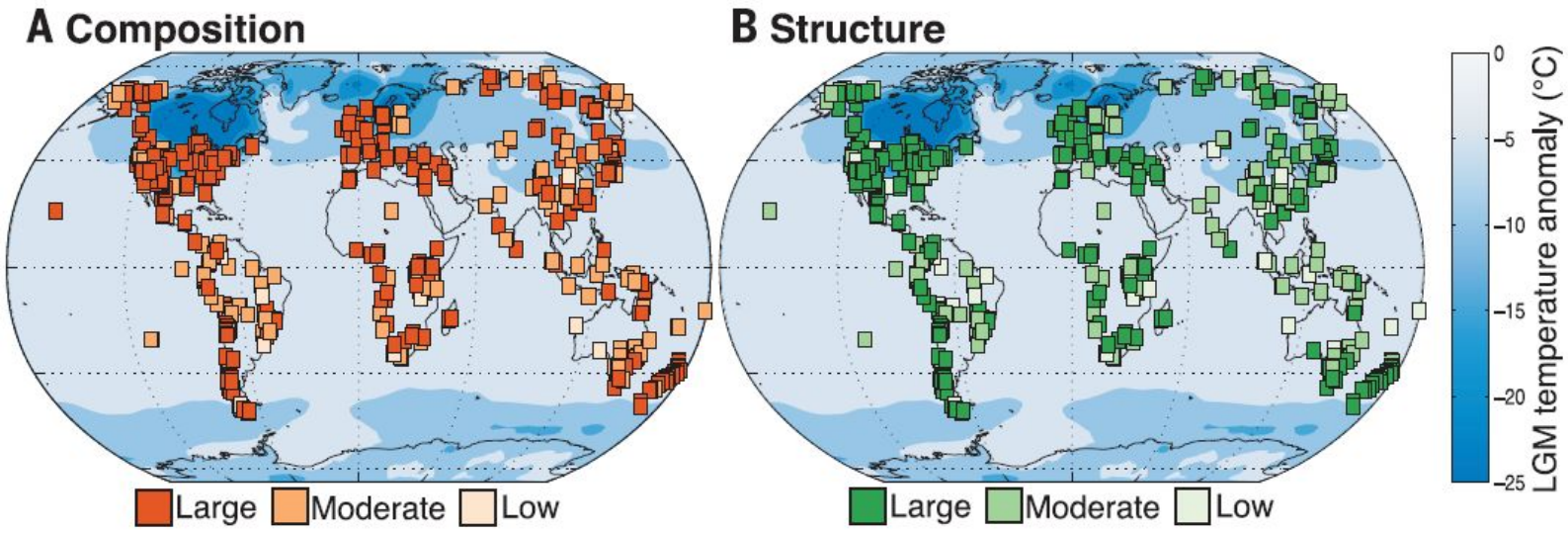
ECOLOGICAL TRANSFORMATION:

the dramatic and irreversible shift in multiple ecological characteristics of an ecosystem, the basis of which is a high degree of turnover in ecological communities



Crausbay et al. 2022 BioScience

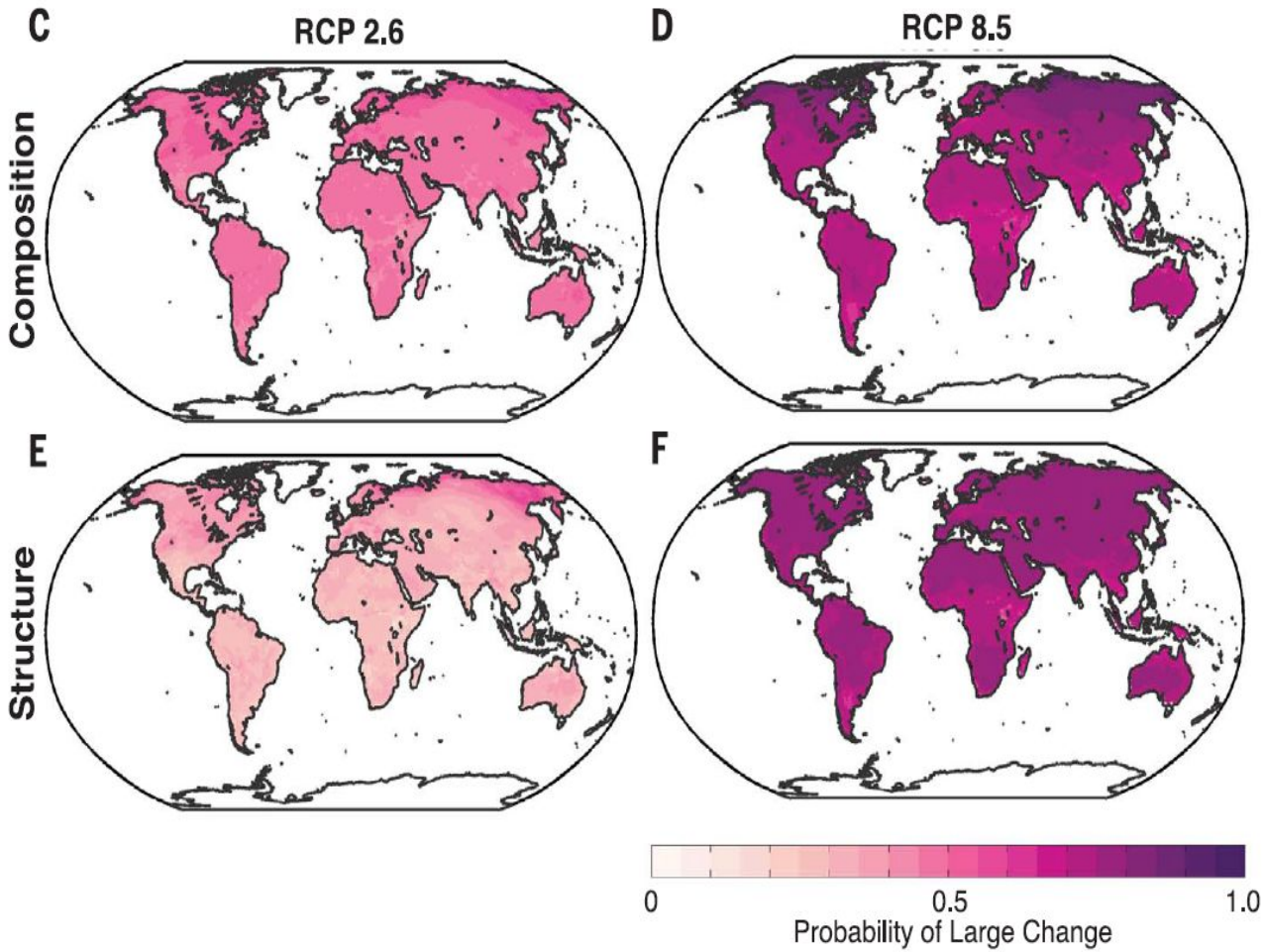
Ecological transformation in the paleorecord



Paleo-transformations were pervasive when climate change was rapid

Nolan et al. 2018 Science

Ecological transformation in the future

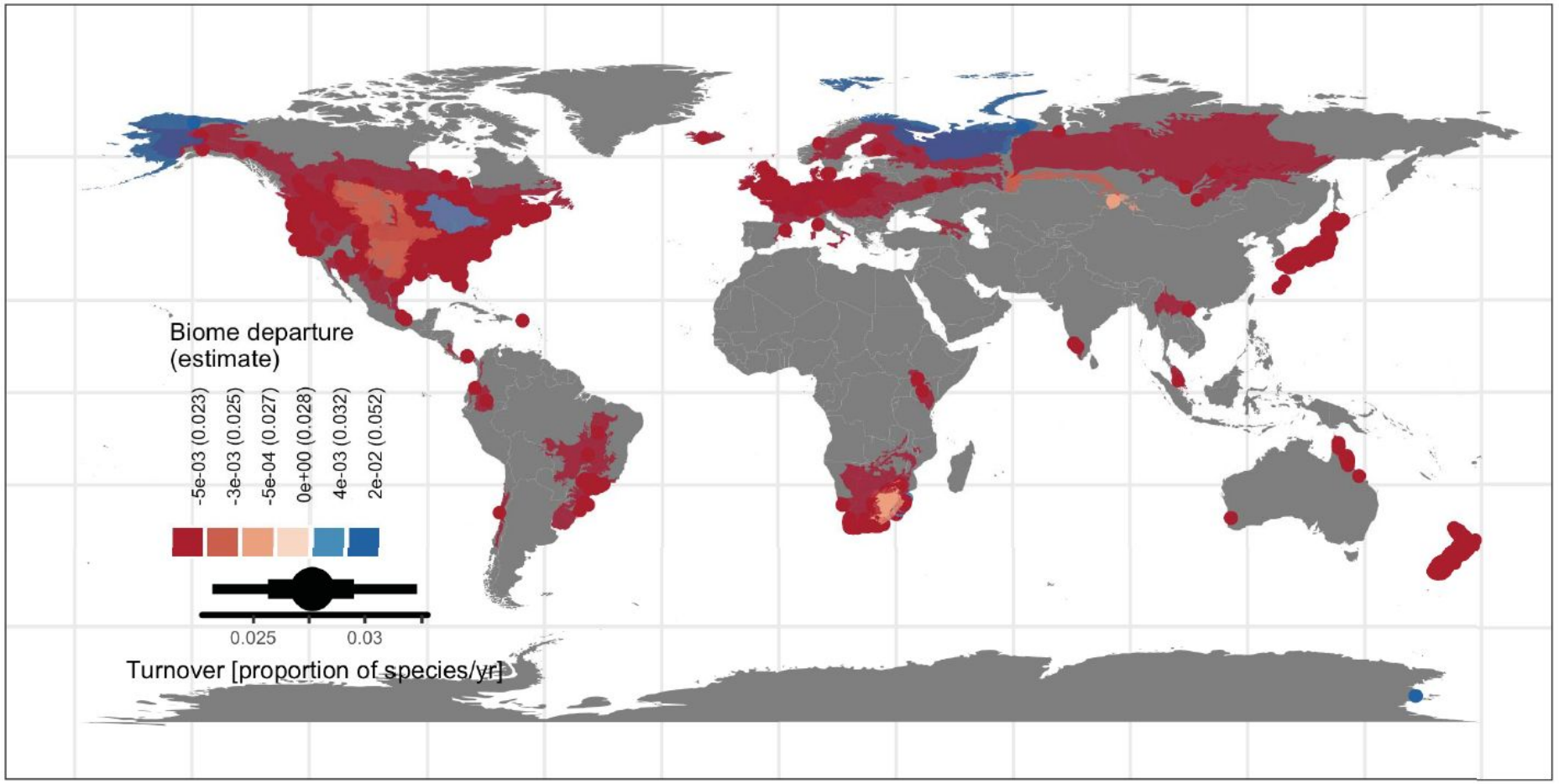


The threat of future transformations is everywhere

Nolan et al. 2018 Science

Recent turnover in ecological communities

median 28% of species replaced / decade



Blowes et al. 2019 Science

As nature shifts, climate change forces rewrite of U.S. conservation strategy

by Carey L. Biron | @clbtea | Thomson Reuters Foundation

Wednesday, 1 September 2021 01:00 GMT

THOMSON REUTERS FOUNDATION NEWS

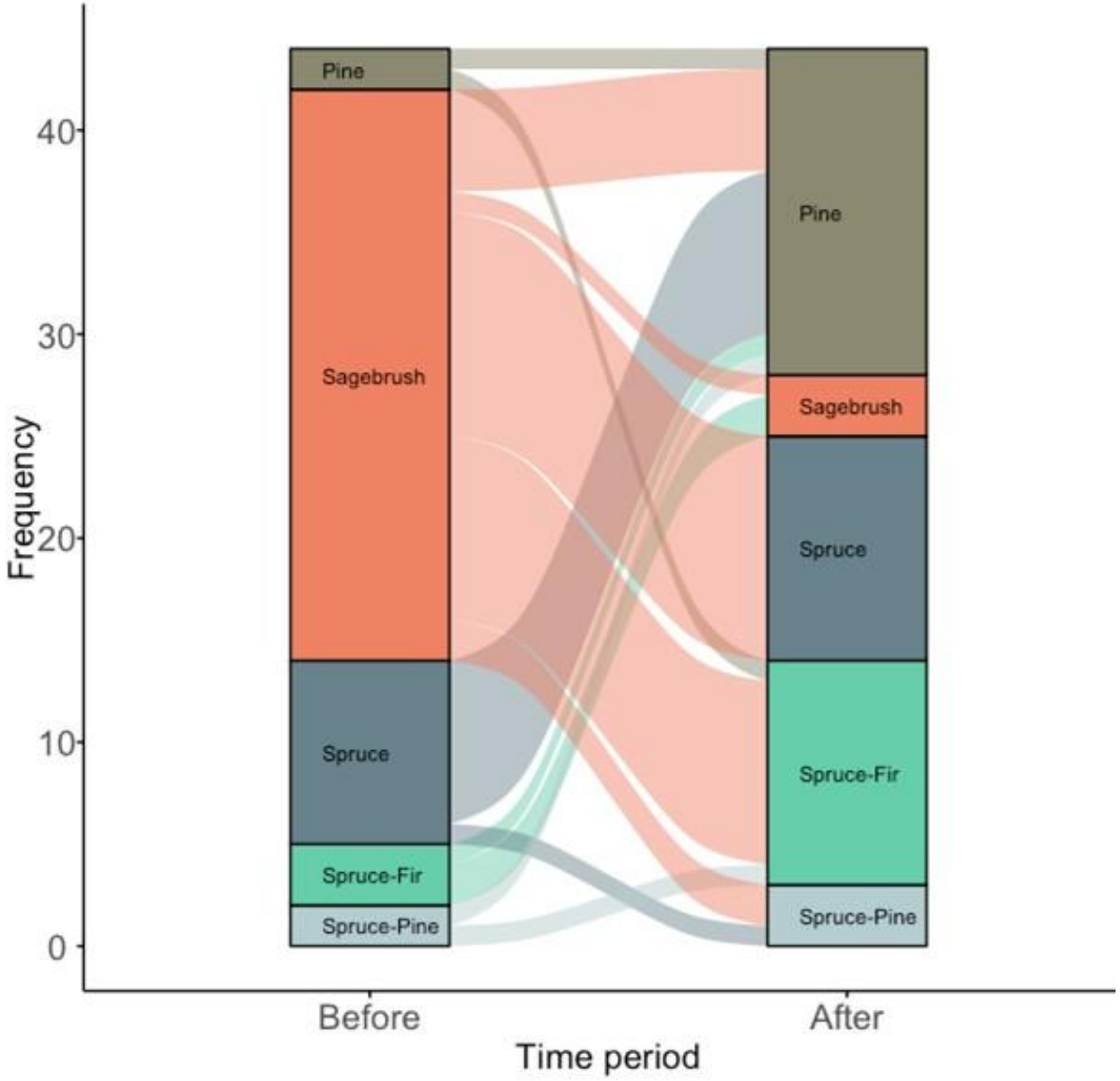
What will ecological transformation look like?

Challenging!

- A diversity of ecological processes at play
- Biotic and environmental novelty
- Environmental contingencies
  i. Stochastic weather/climate
  ii. Stochastic demographic events
  iii. Historical legacies

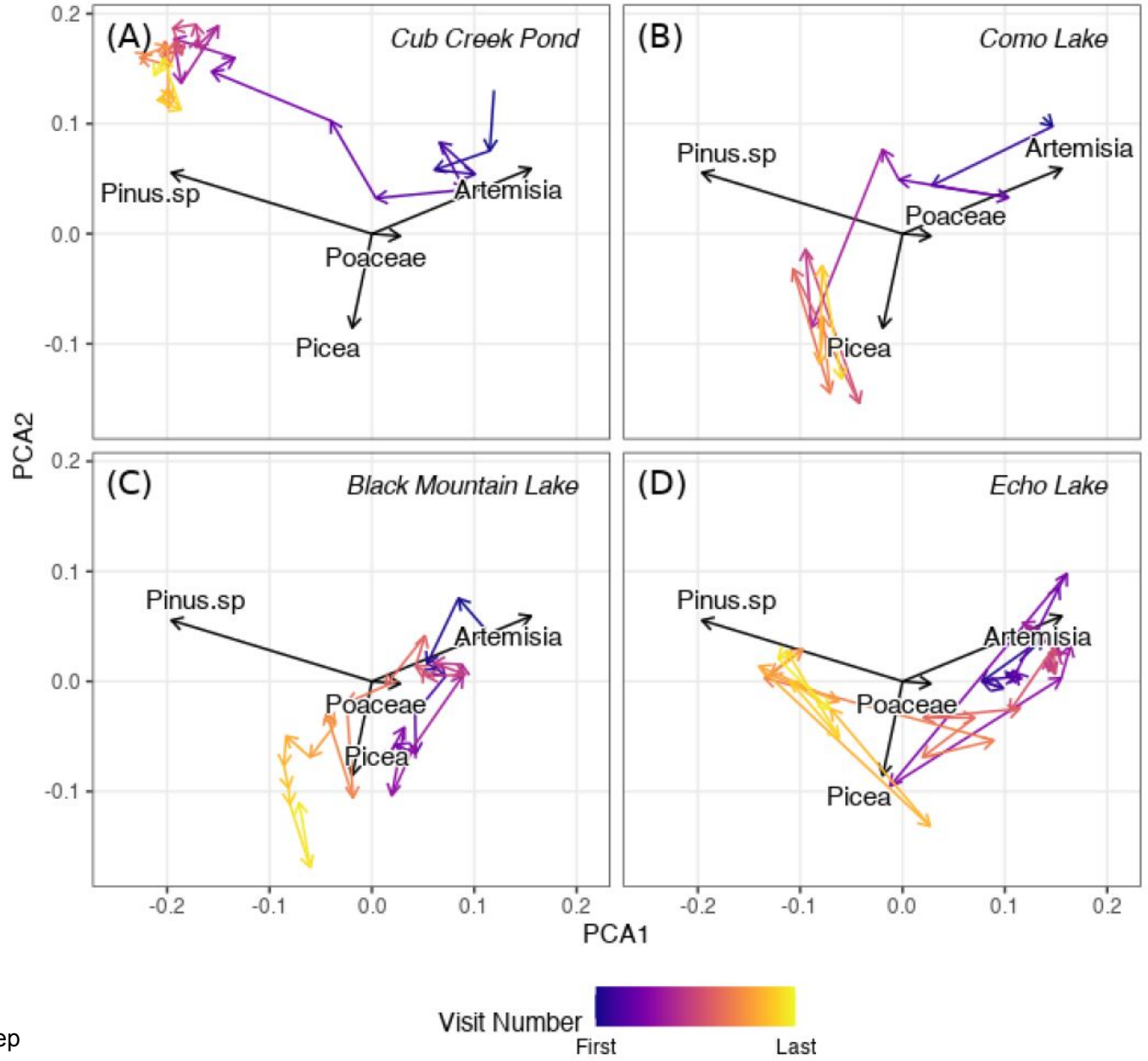
Past ecological transformations

Occurred between 21,000 and 7,500 years ago



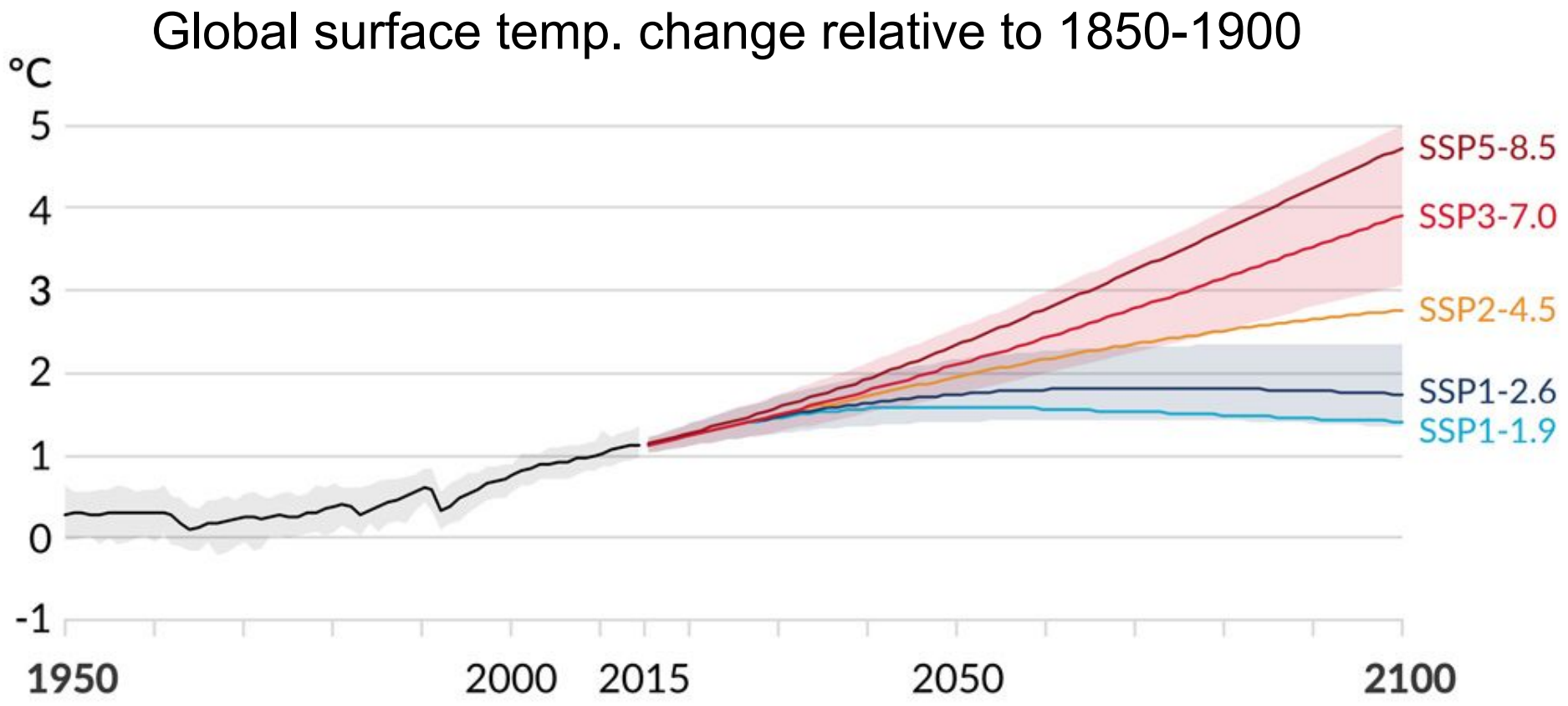
Crausbay et al in prep

Trajectories out of Late Glacial Sagebrush

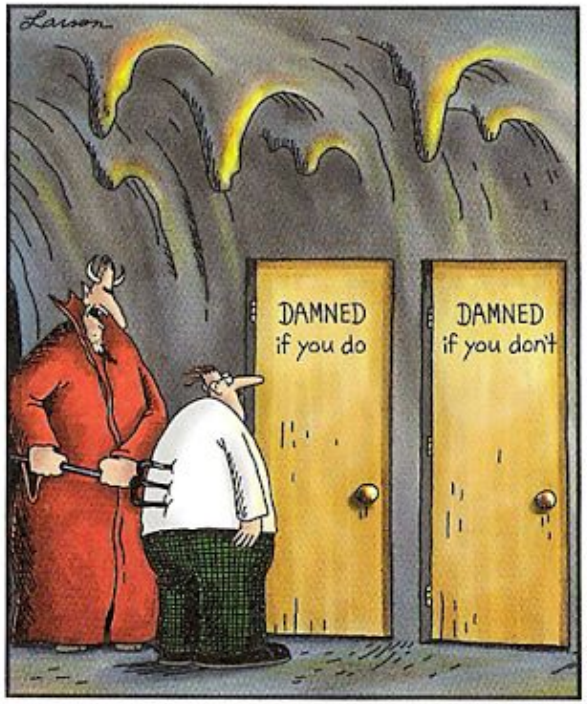


Crausbay et al in prep

Ecological trajectories are uncertain, like climate change



IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. In Press



"C'mon, c'mon—it's either one or the other."

Despite uncertainty, resource managers need to make decisions and act to meet goals.

In a changing world with an uncertain future, how can we know what to do?

Image: Gary Larson
http://allyduncan.blogspot.com/2009/09/daily-lol-far-side-damned-if-you-do.html

Scenario planning!

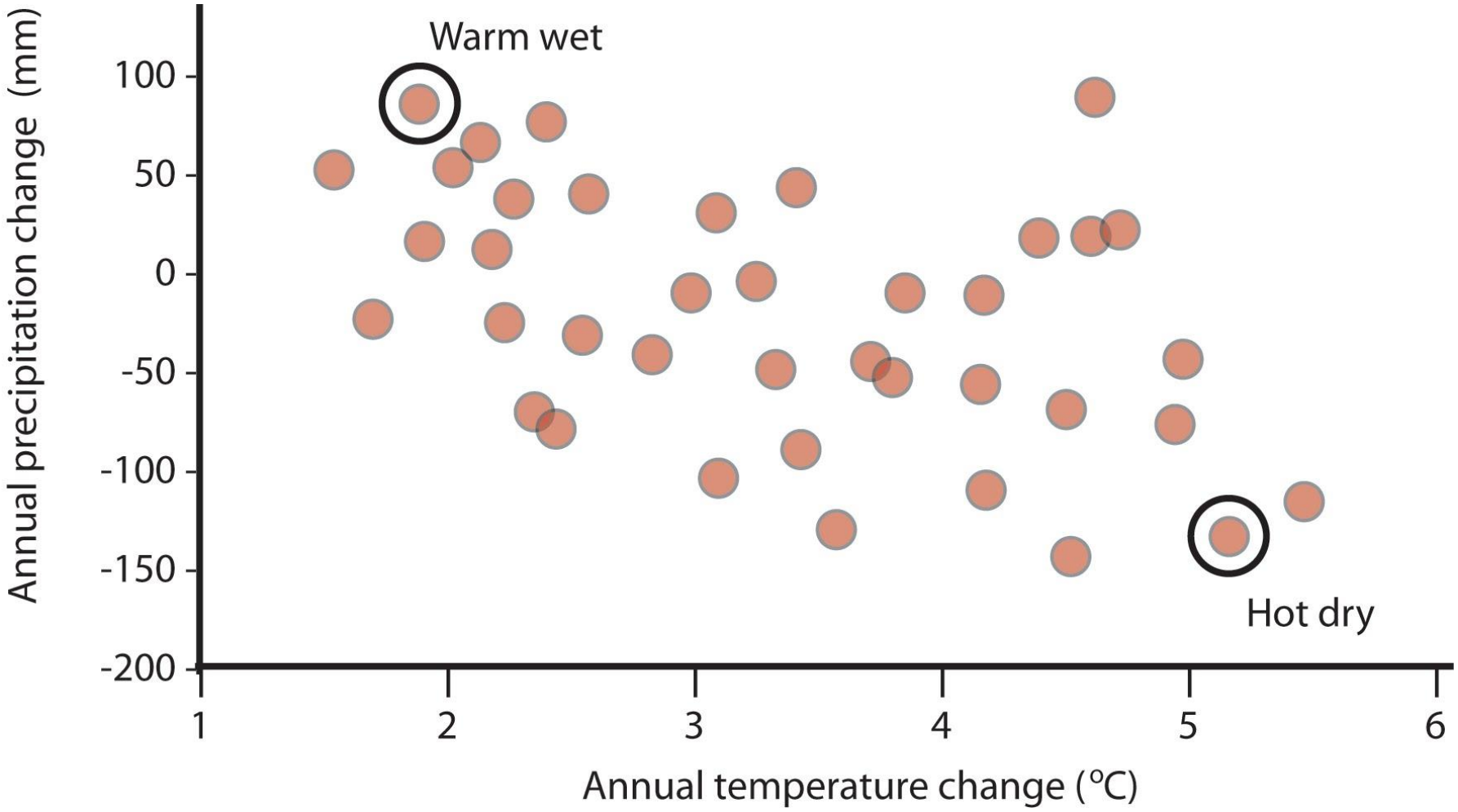
Scenario Planning

- Framework to support decisions under uncertain & uncontrollable conditions
- Scenarios offer a range of plausible futures – not predictions

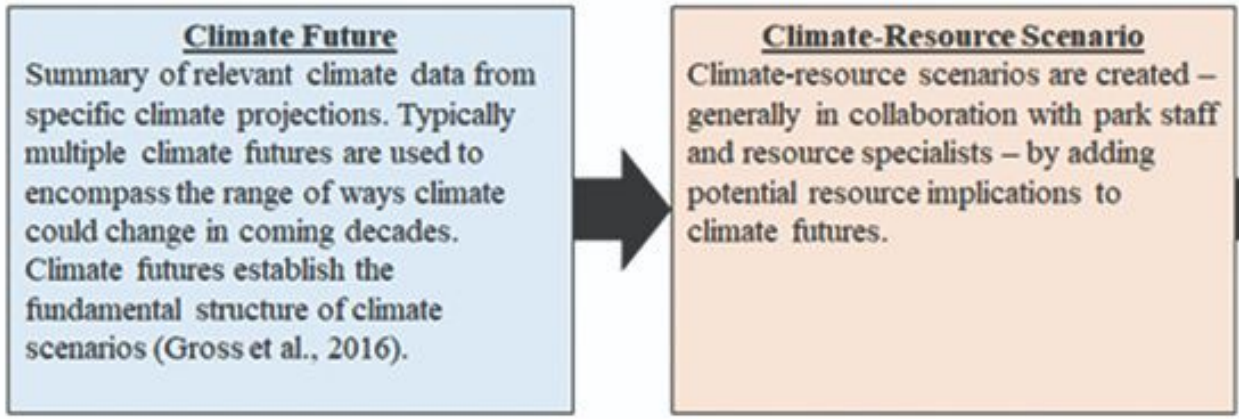
Graphic: NPS Climate Change Response Program

Climate Future

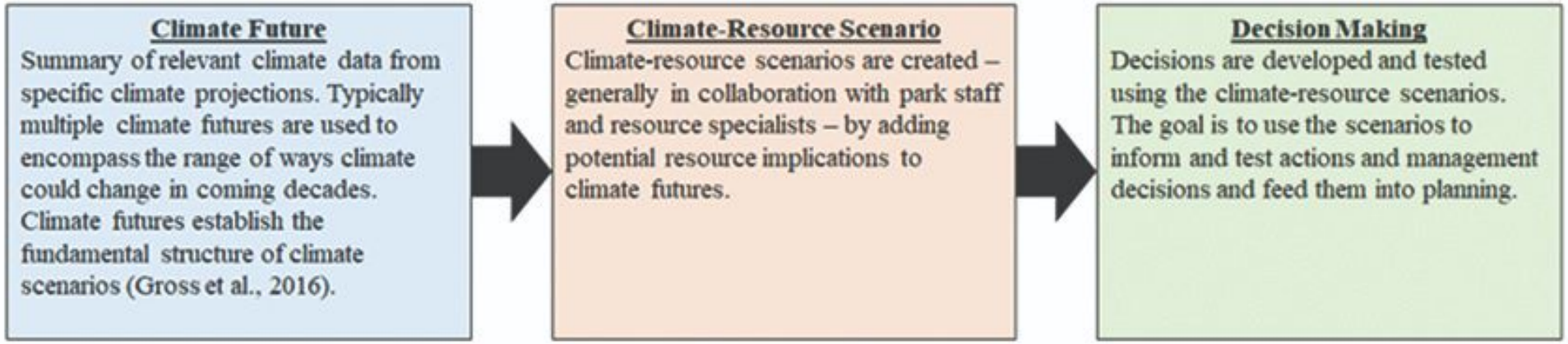
Summary of relevant climate data from specific climate projections. Typically multiple climate futures are used to encompass the range of ways climate could change in coming decades. Climate futures establish the fundamental structure of climate scenarios (Gross et al., 2016).



After Lawrence et al. 2021 Climatic Change



Runyon et al. 2020 Parks Stewardship Forum



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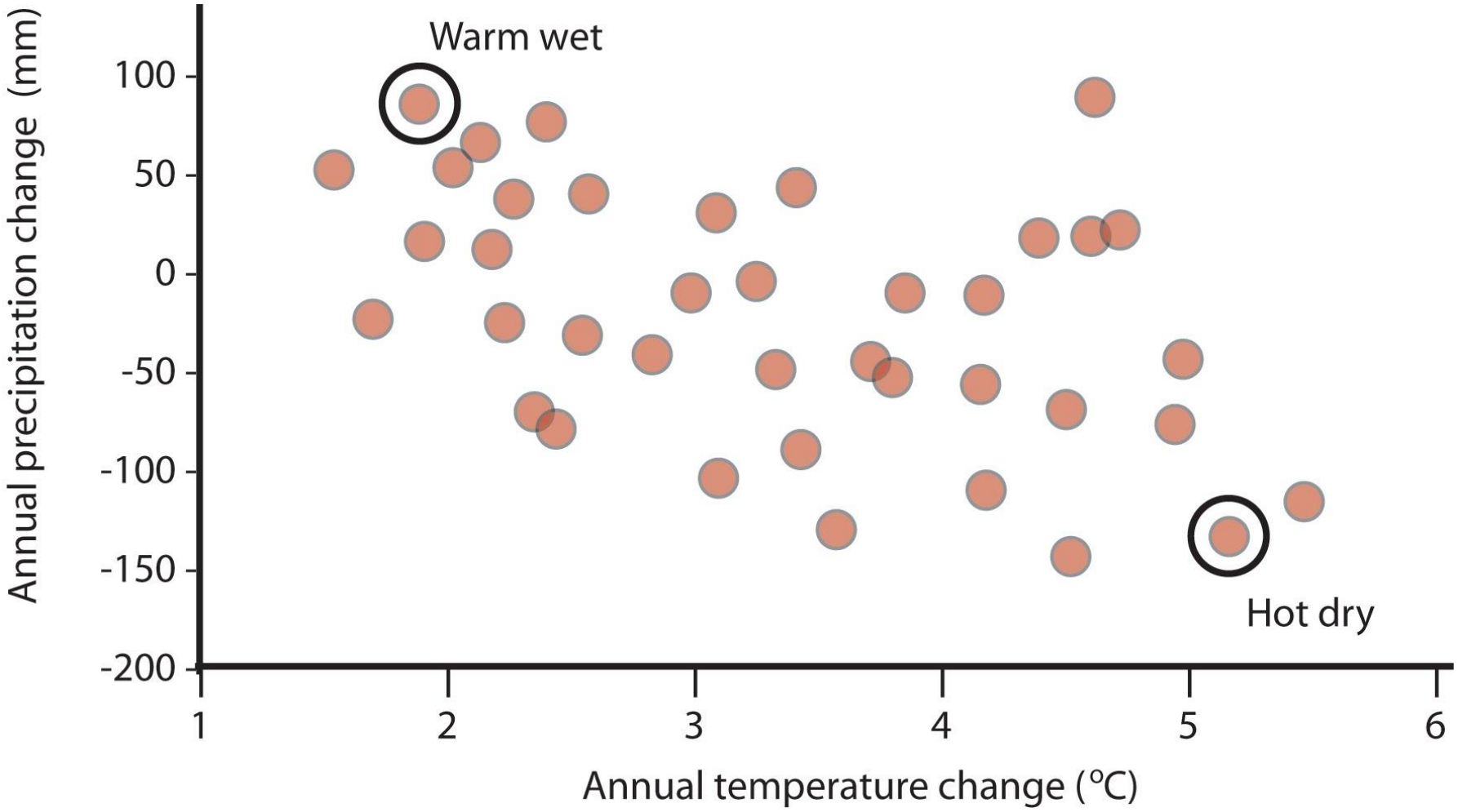

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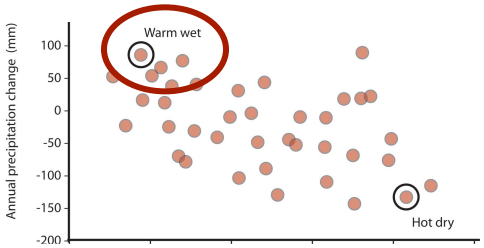
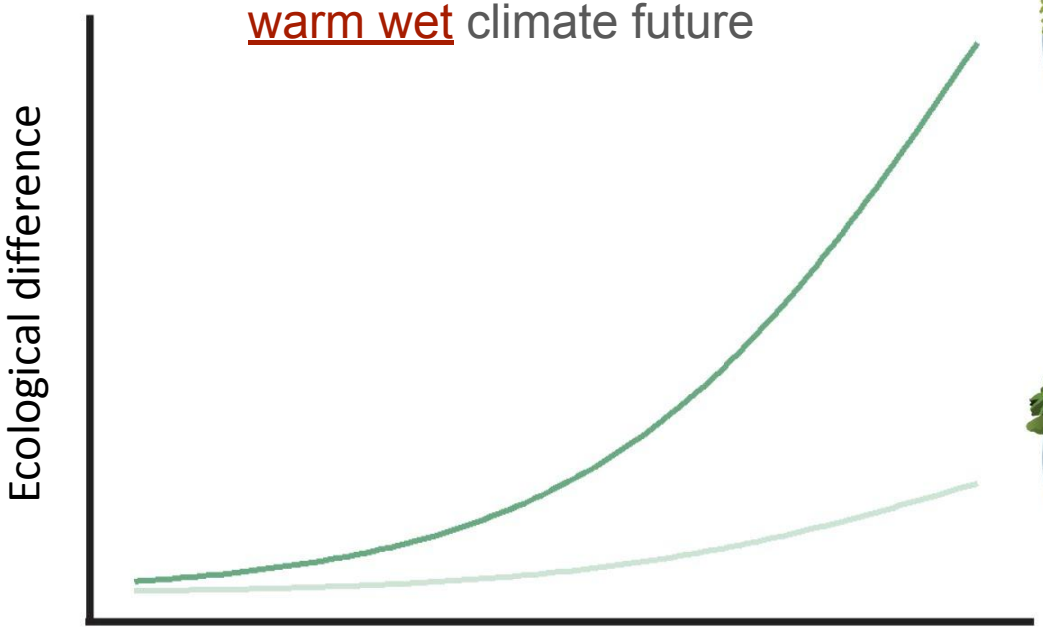
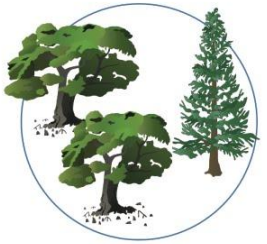
We need to consider multiple ecological scenarios per climate future



Ecological scenarios for a warm wet climate future





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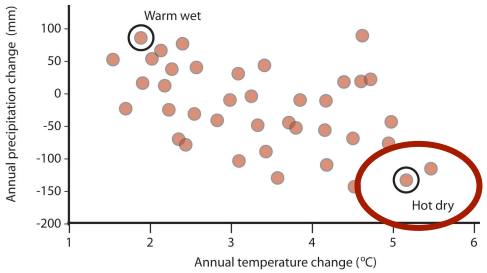
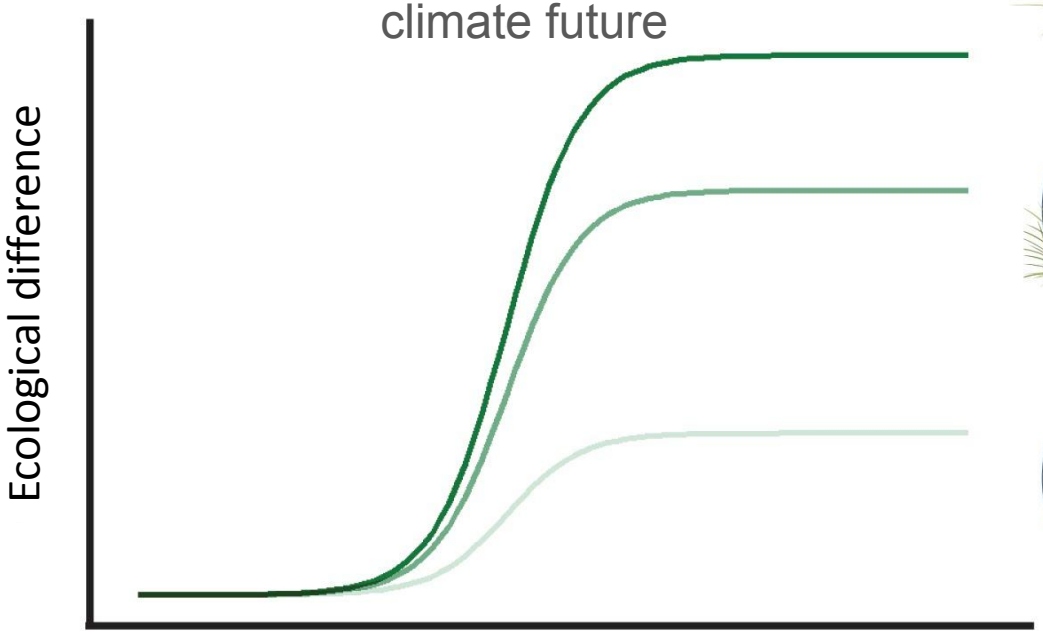


Ecological scenarios for a hot dry climate future



Crausbay et al. 2022 BioScience

https://www.nps.gov/subjects/climatechange/resistacceptdirect.htm

Questions

Photo: Brian

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Menti Poll! - Please open a browser and go to Menti.com and enter code 6806 7891

BREAKOUT GROUP AGENDA:

- Introductions (15 mins)
- Warm-Up Exercise (15 mins)
- Jamboard/Brainstorming on opportunities and hurdles to creating and applying ecological scenarios (10 mins)
- Group discussion on jamboards (30 mins)

Warm-Up Exercise:

- Given what you know about current and future climate changes expected in the ecosystem where you most like to vacation - what are two or more plausible ecological scenarios for that vacation destination?

- Can you think of at least one way that those ecological scenarios might be relevant to making vacation decisions?

- 3 mins to think - then we'll share

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