

**2022 CANADIAN  
LAND TRUST  
SUMMIT**

**SOMMET NATIONAL  
DES ORGANISMES DE  
CONSERVATION 2022**

**October 24 to 26 | Ottawa | 24 au 26 octobre**

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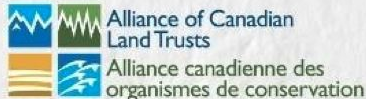



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada



Fondation de la faune du Québec





# Climate Adaptive Planning Tool for British Columbia

## CAP-BC

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Conservation Solution Lab

University of Northern British Columbia



# CAP-BC

Team:



Oscar Venter

Principal Investigator



Peter Arcese

Co-Principal Investigator



Xavier Llano

Investigator PhD student



Karen T. Dietrich

MSc student



THE UNIVERSITY  
OF BRITISH COLUMBIA



UNBC UNIVERSITY OF  
NORTHERN BRITISH COLUMBIA



# CAP-BC

Partners:





# Problem

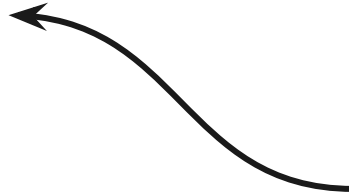
Where to protect



- Science based solutions
- Communities interests/needs
- Economic/private interests
- Political barriers

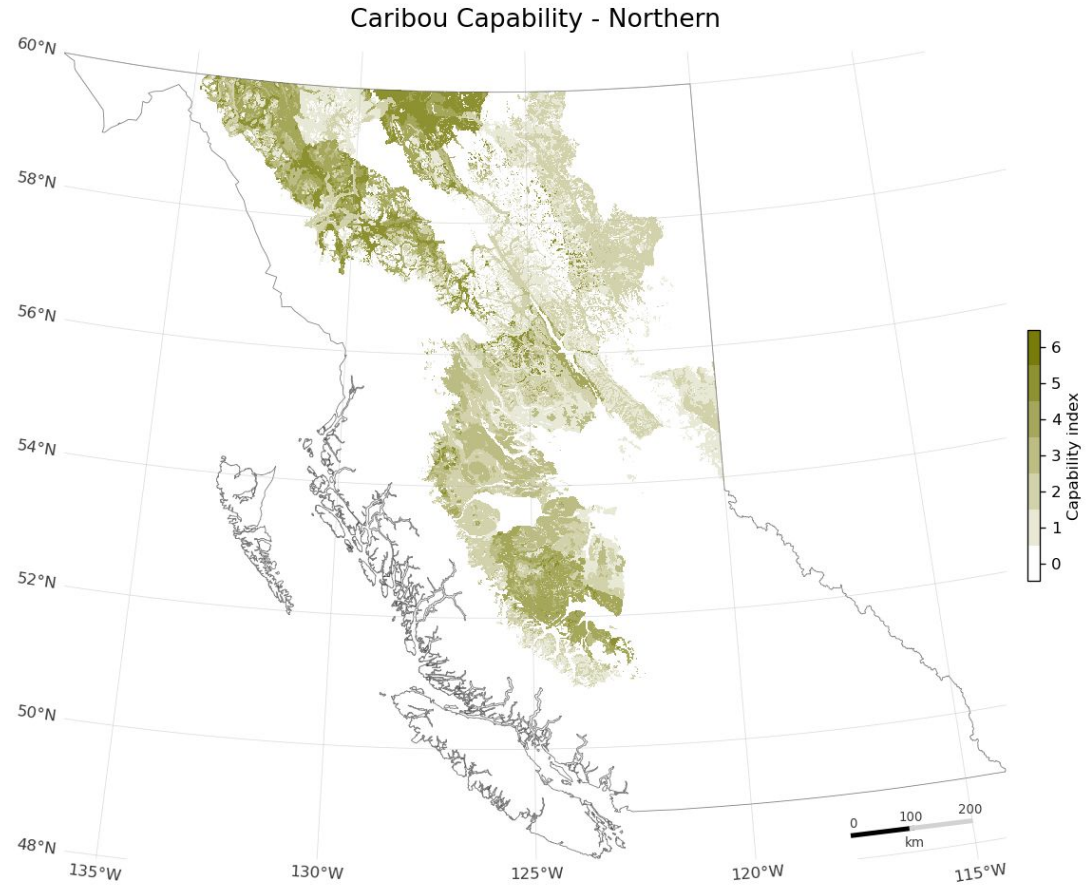
Systematic conservation planning steps:

- Measure biodiversity
- Identify conservation goals
- Review existing PA
- Select additional PA
- Implement conservation actions
- Maintain PS system



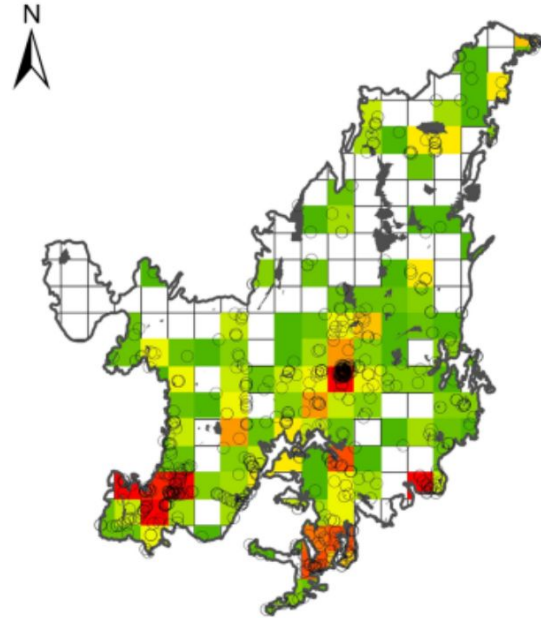
# Problem

Where to protect



# Problem

Where to protect



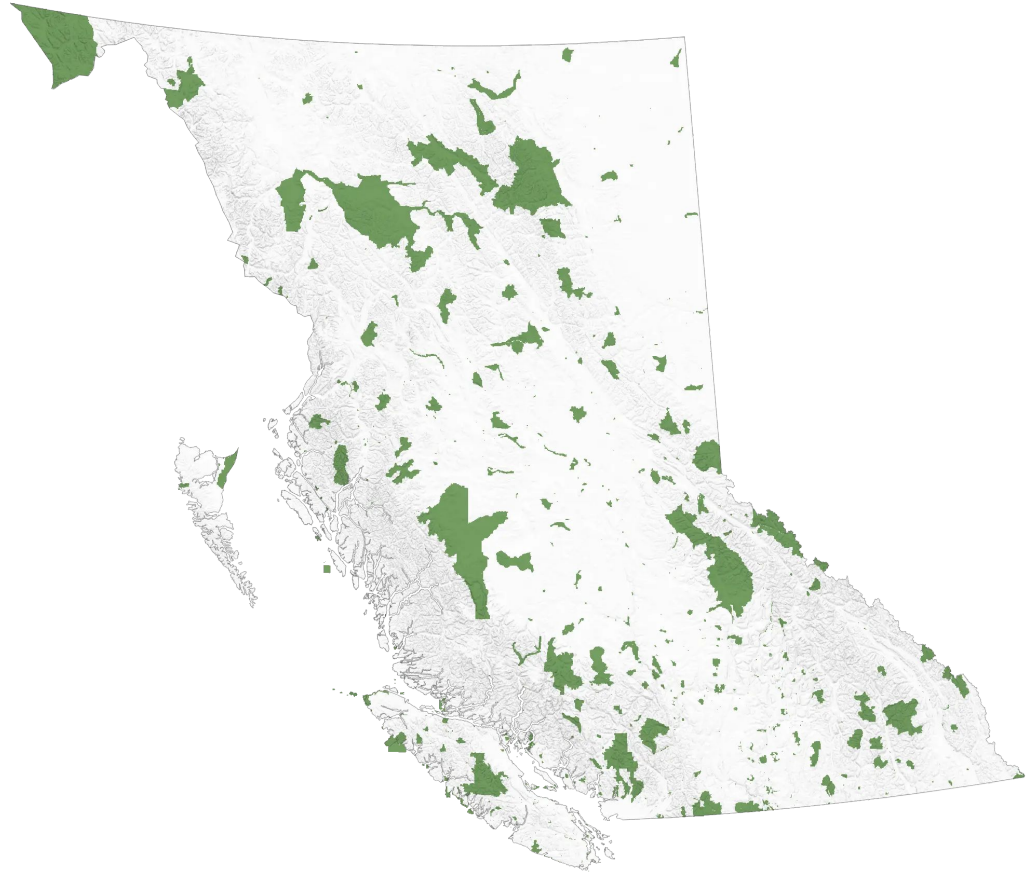


# Problem

Classical conservation planning



The current protected areas system



Current protected lands cover 11.5% of B.C.'s land base (excluding waters and marine areas).

Source: BC Data Catalogue <https://catalogue.data.gov.bc.ca/>





# Problem

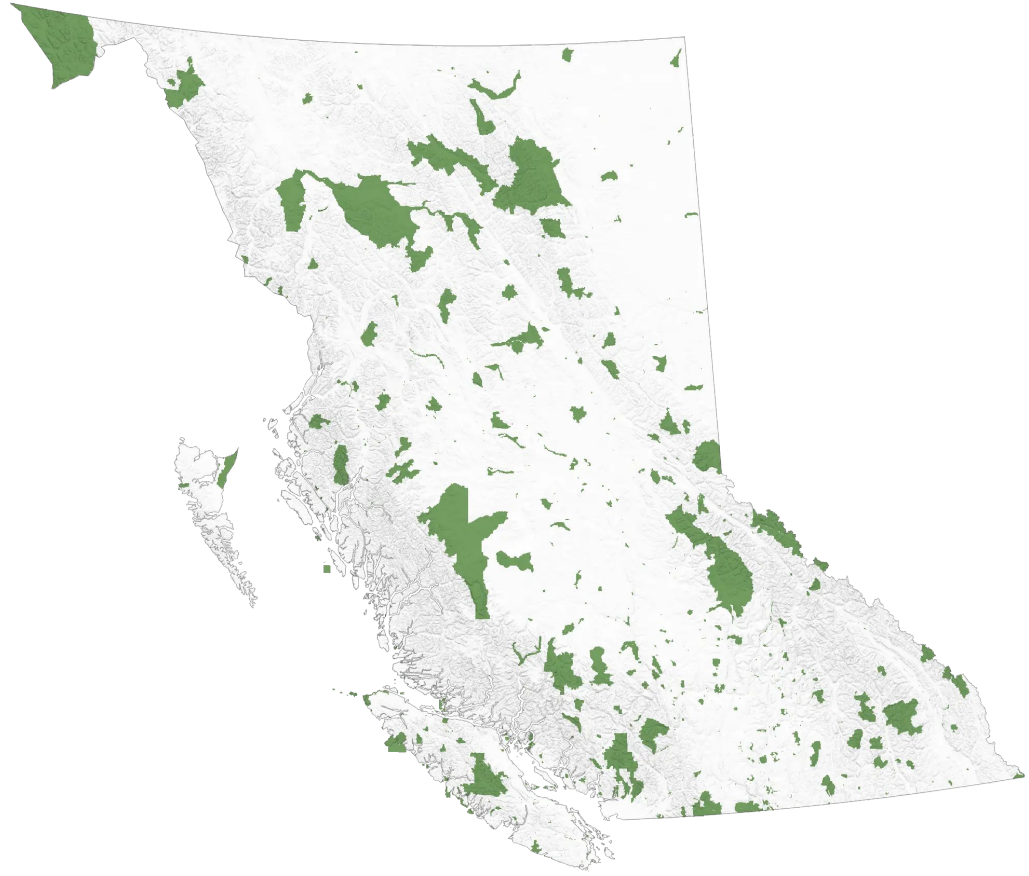
Classical conservation planning



The current protected areas system



The present ... the future?



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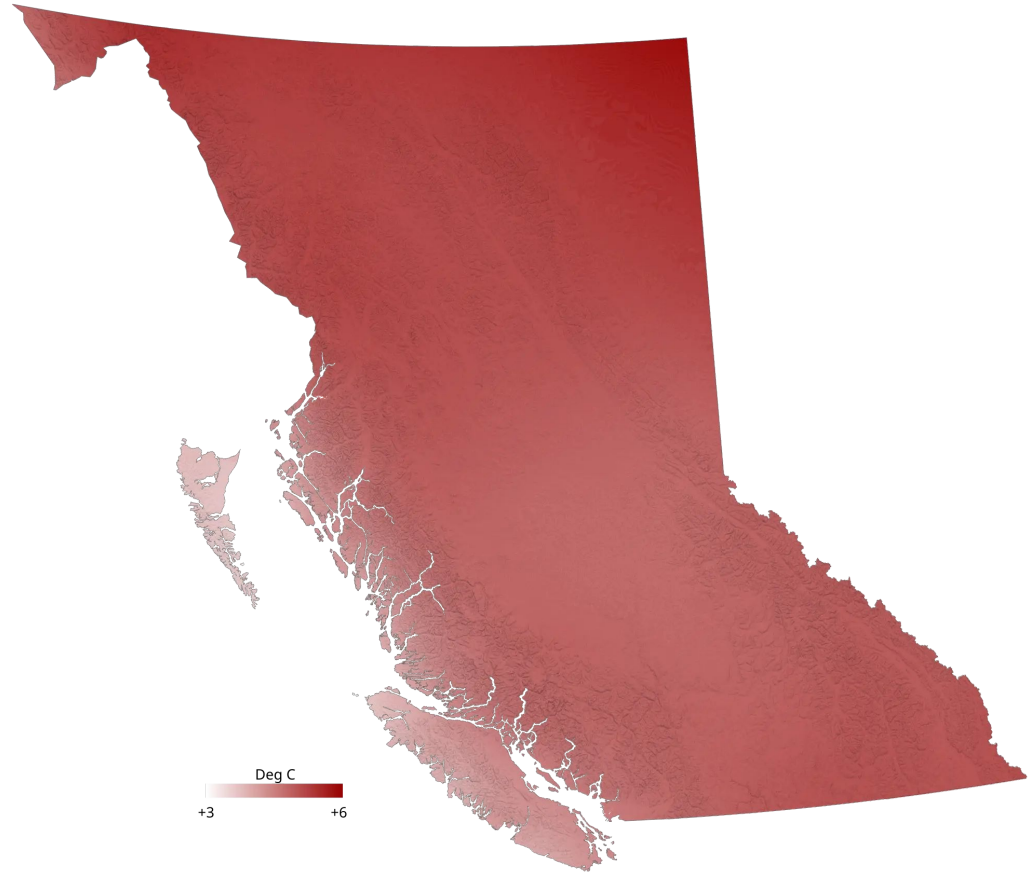


# Problem

When you are **planning for the future**



**Climate change**



Mean annual temperature change for BC, Ensemble Emission  
SSP3-7.0 Scenario for 2071-2100.

Source: Climate data from AdaptWest Project and IPCC.

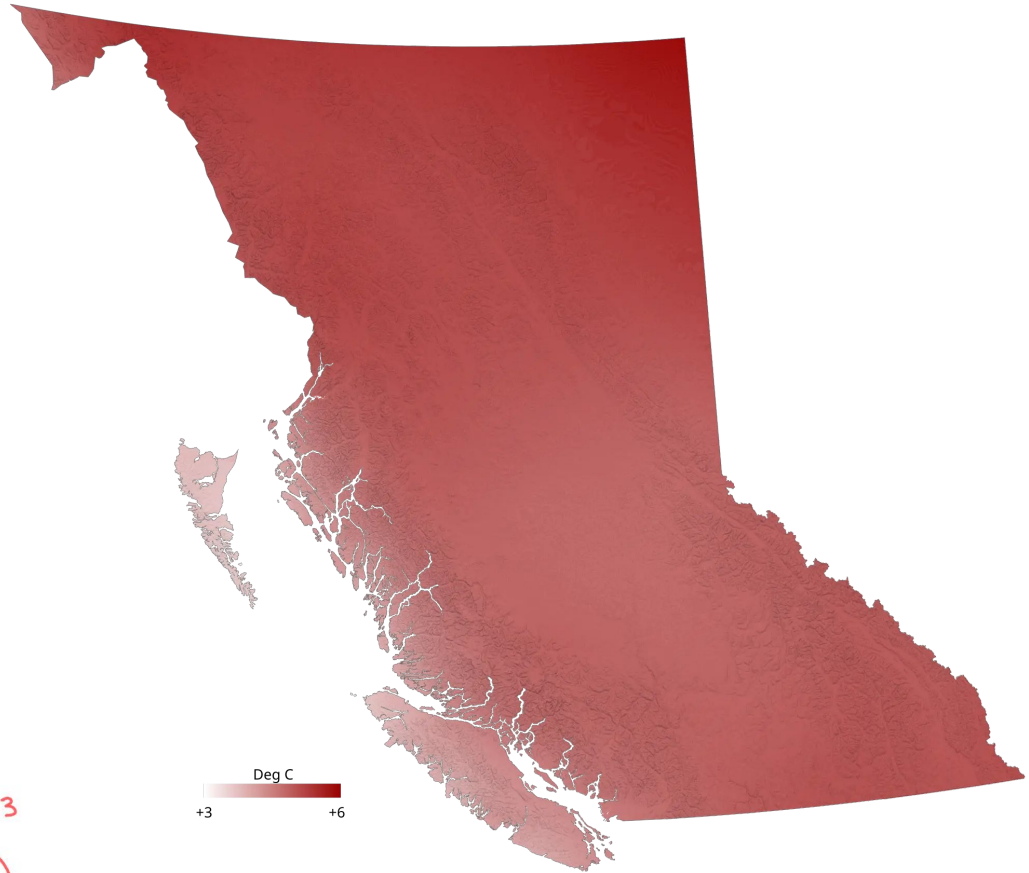
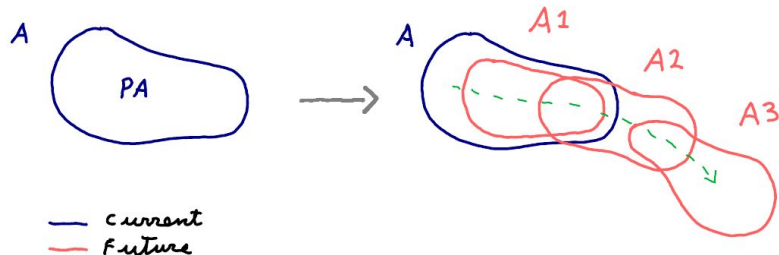


# Problem

Climate change



Threatens biodiversity and natural systems



Mean annual temperature change for BC, Ensemble Emission SSP3-7.0 Scenario for 2071-2100.

Source: Climate data from AdaptWest Project and IPCC.

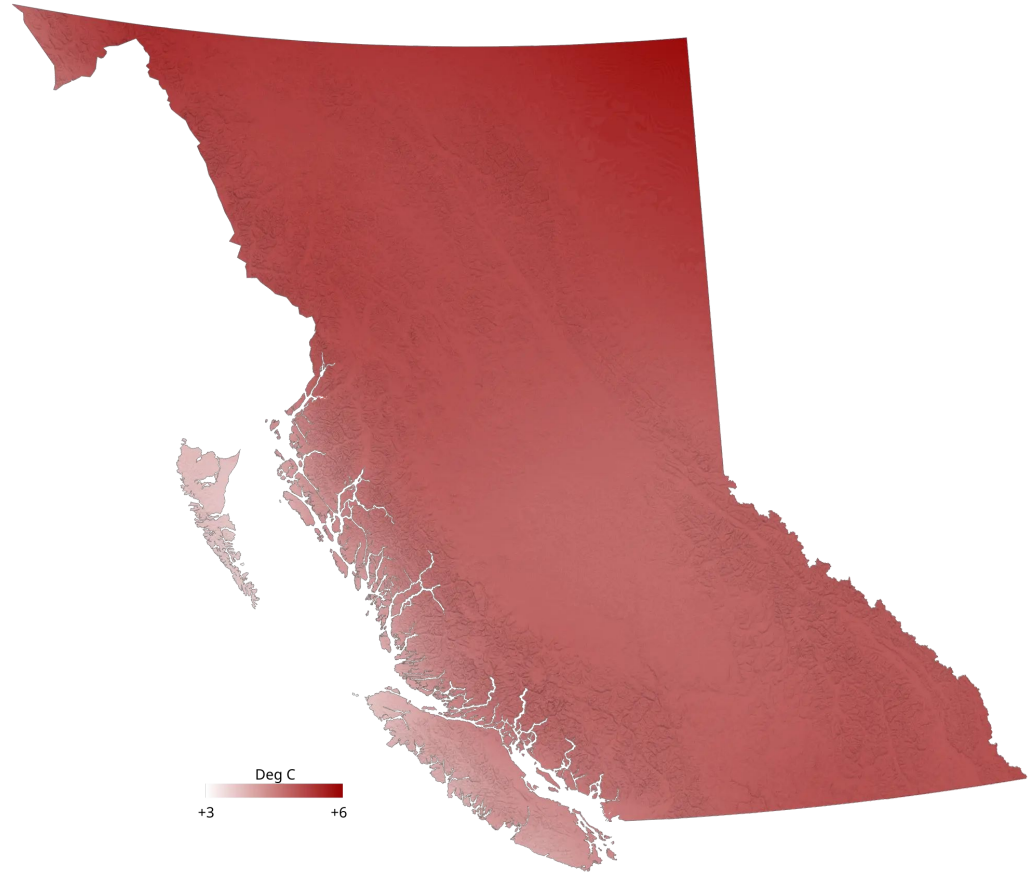


# Problem

“Preserve the current and future  
biodiversity”



Are we correctly preserving  
biodiversity for the future?



Mean annual temperature change for BC, Ensemble Emission  
SSP3-7.0 Scenario for 2071-2100.

Source: Climate data from AdaptWest Project and IPCC.



## CAP-BC

“How can we adapt our conservation plans in BC to minimize the impacts of a changing climate?”

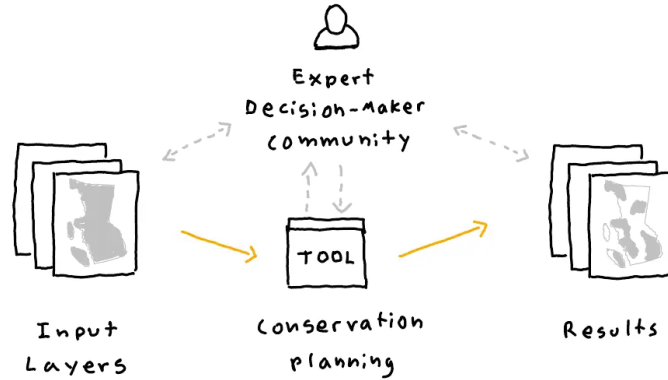
# CAP-BC - Objectives



Provide a flexible systematic conservation planning web-tool:

- Ready and easy to use
- Preloaded with data
- Climate change oriented

# CAP-BC - Objectives



Provide a flexible systematic conservation planning web-tool:

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- Climate change oriented



Include all the authors in conservation planning

# How to include climate change?

## Yale Framework



understand, organize and structure the different conservation strategies into major objectives



integrate climate change adaptation strategies



SCP

The screenshot shows the Yale Framework website. At the top, it says "Yale Framework" and "INTEGRATING CLIMATE ADAPTATION AND LANDSCAPE CONSERVATION PLANNING". There is a search bar and a "powered by DATA BASIN" logo. Below the header is a navigation menu with "Get Started", "Explore", "Create", "Community", and "Workspace". The main content area has a sidebar with "What is the Yale Framework?", "What is included?", and "What can I do?". The main text states: "The Yale Framework includes advice and tools to assist conservation planners in selecting the assessment and modeling strategies that fit their needs." There is an image of deer. Below this is a section titled "The Challenge" with a photo of a snow leopard and text: "Debates about anthropogenic origins aside, scientific evidence demonstrates that the Earth's climate is changing. Many species are responding to this changing climate by shifting their geographic ranges. The differential rates at which species will shift their ranges will also result in a reshuffling of species relationships, ecological processes, and related ecosystem services. As a result, conservation planners are now faced with the challenge of developing and implementing strategies that will support wildlife to adapt to climate change. The large number and diversity of models and data that can be applied to climate-impact analyses and adaptation strategies can often be confusing." At the bottom right, it says "Sponsored by:" with logos for "THE KRESGE FOUNDATION" and "Willburforce Foundation".

<https://yale.databasin.org/>





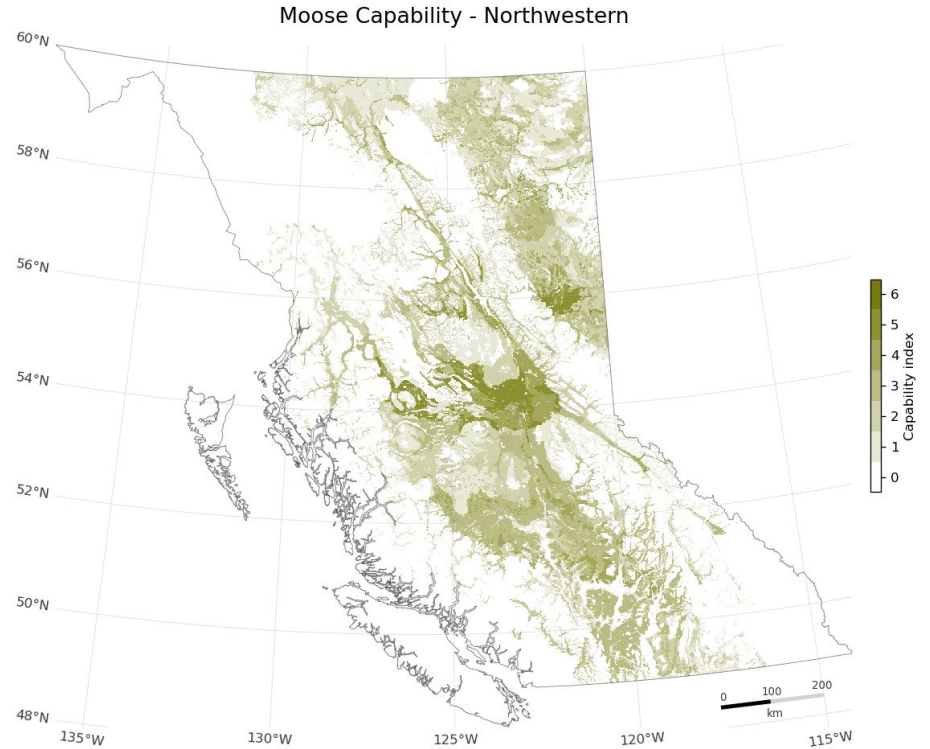
# Yale Framework

<i>Major adaptation objectives</i>	1	Current patterns of biodiversity
	2	Natural landscapes and ecological processes
	3	Geophysical setting
	4	Future climate space
	5	Climate refugia
	6	Ecological connectivity

**Six major adaptation objectives**

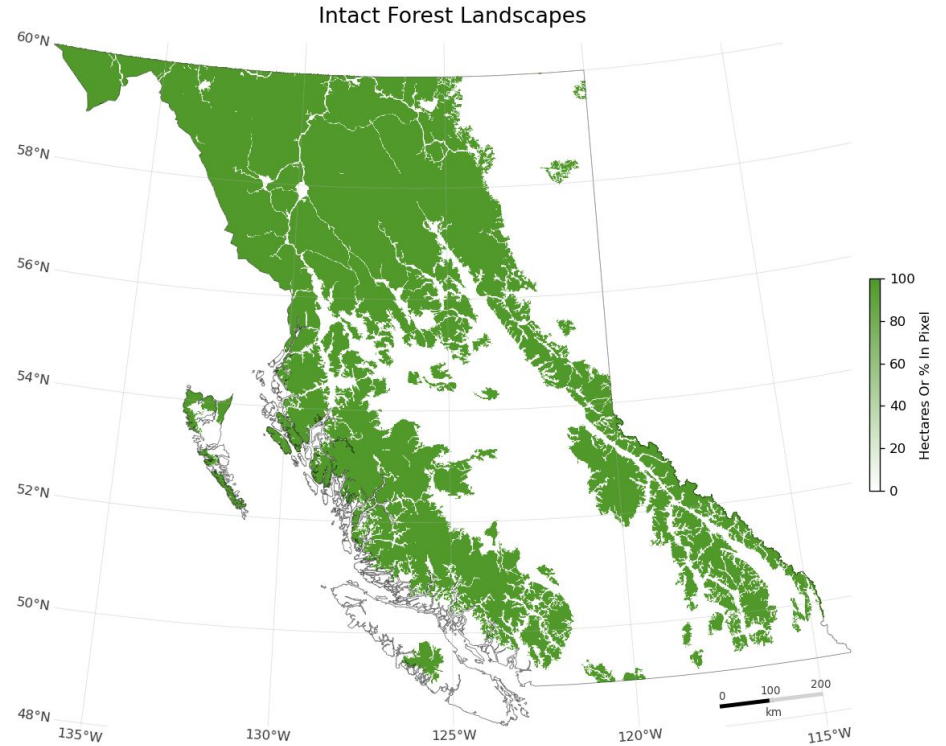
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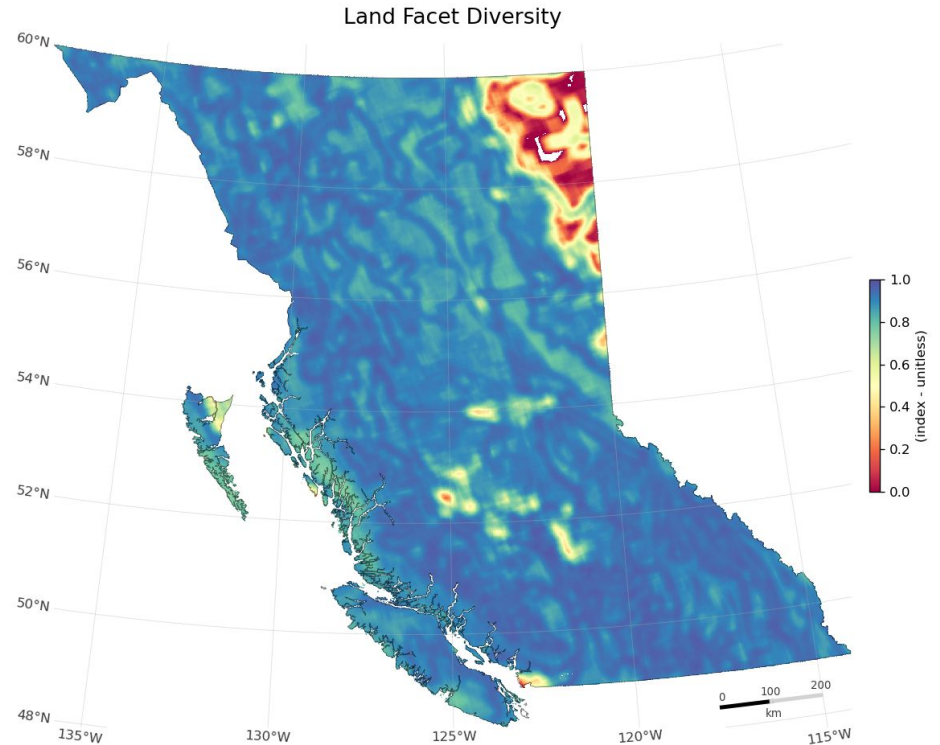
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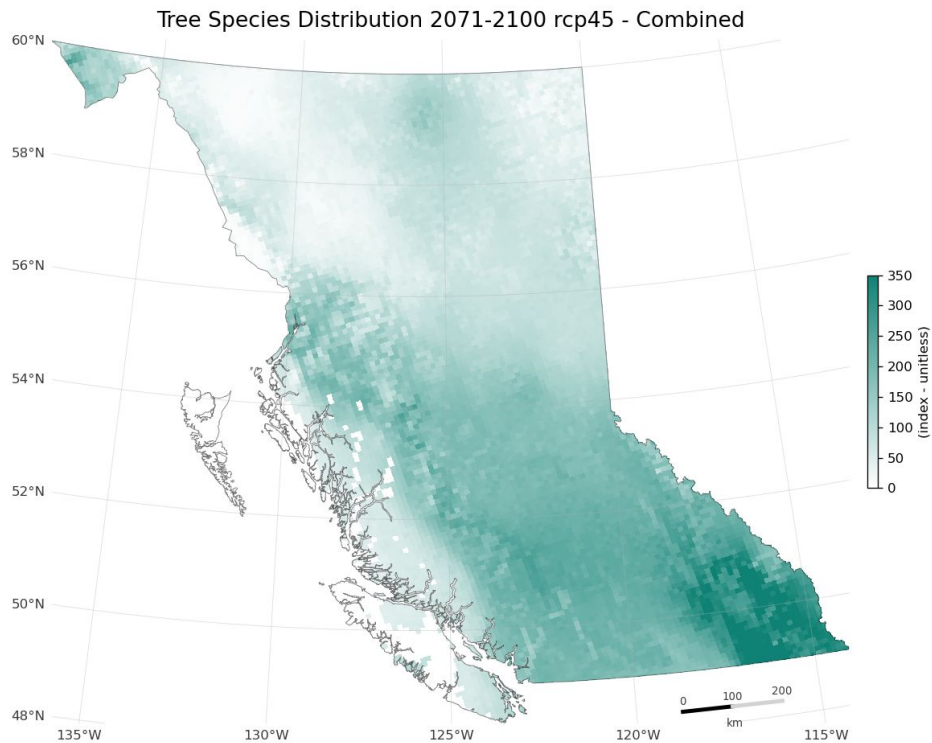
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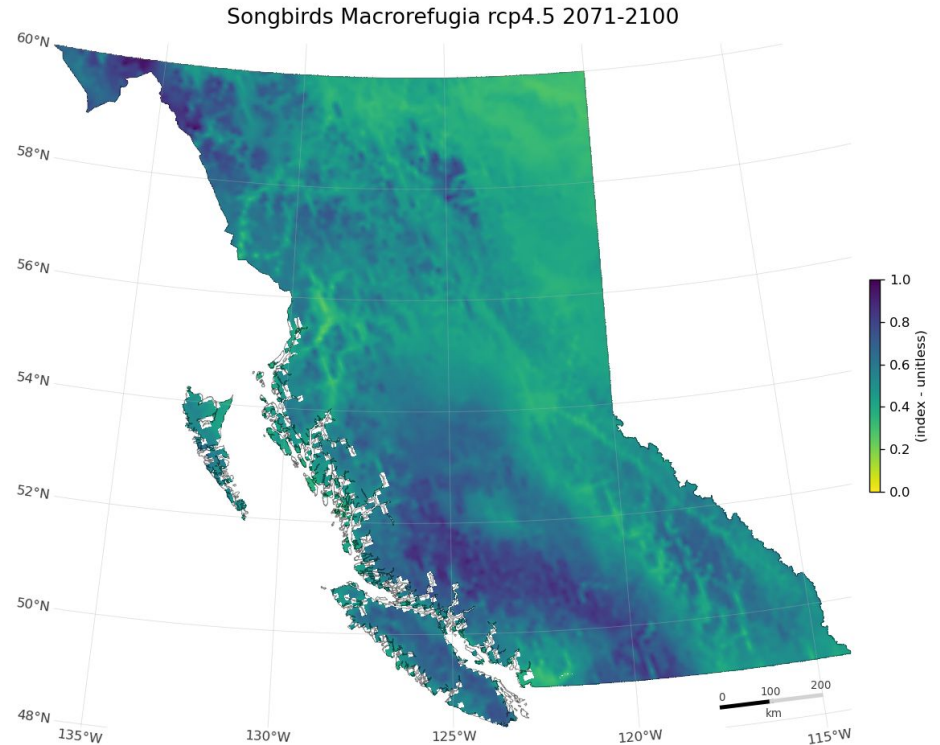
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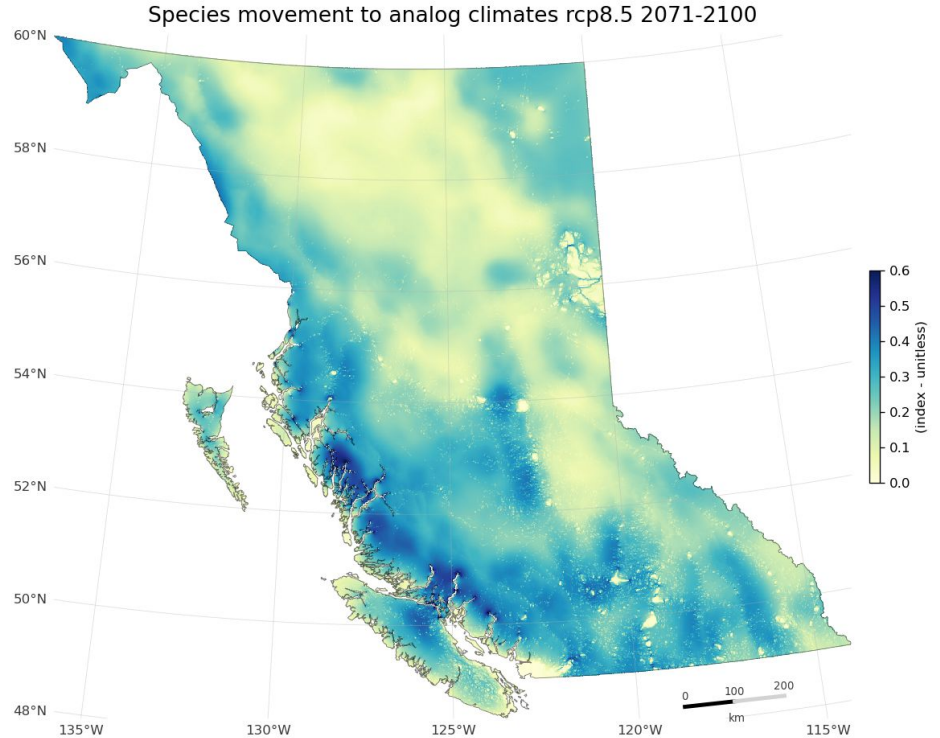
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Strengthen current conservation efforts





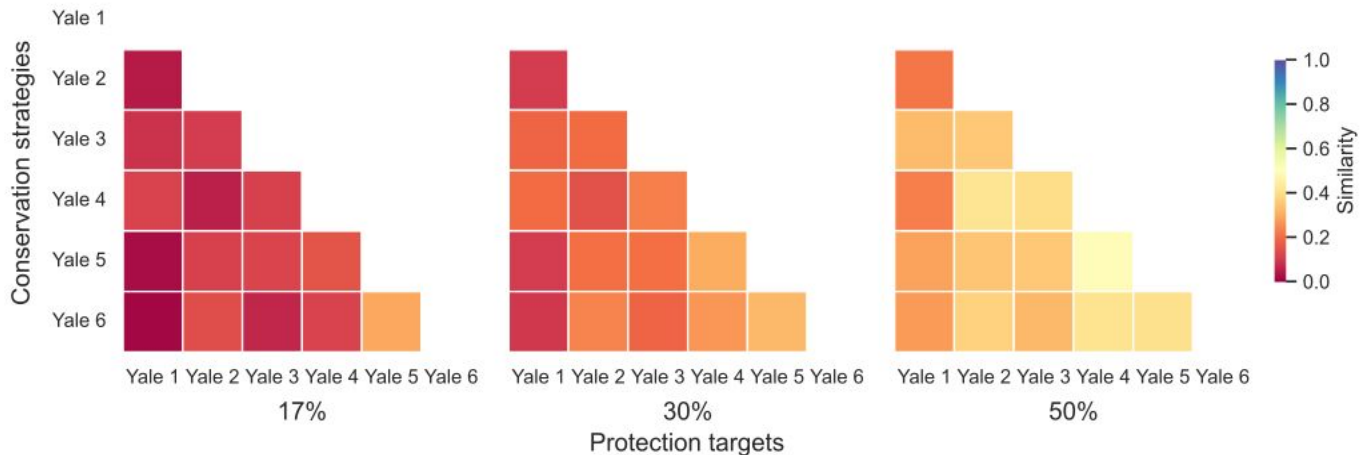
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Anticipate and  
respond to future  
conditions

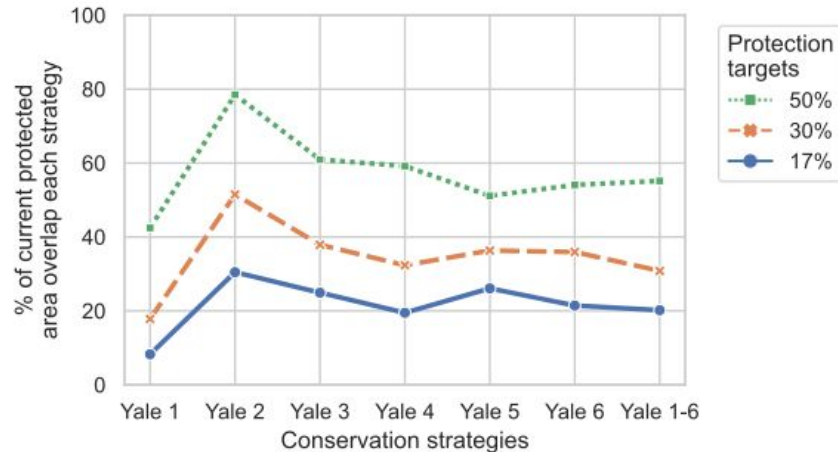
# Yale Framework

## Spatial similarity index designs between Yale approaches



# Yale Framework

% of the current protected area in BC is covered by each Yale approach



**Results:** Current protected areas in BC are possibly off-track in the climate global situation



# CAP-BC

DATA: around 90 layers

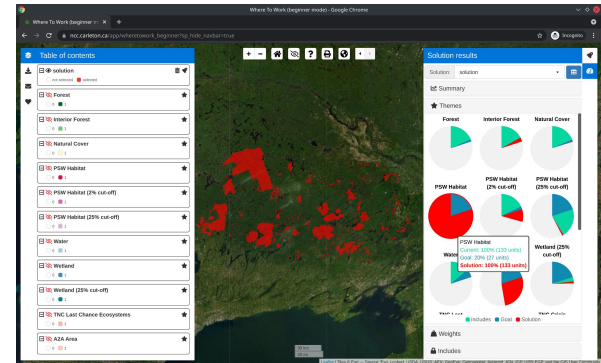
		Layers	
<i>Planning features</i>	<i>Six Yale Major adaptation objectives</i>	Current patterns of biodiversity	27
		Natural landscapes and ecological processes	3
		Geophysical setting	2
		Future climate space	34
		Climate refugia	5
		Ecological connectivity	2
		Ecosystem services	4
		<i>Cost</i>	5
		<i>Constraints</i>	3
		<i>Includes</i>	1

# CAP-BC

## CAP-BC web-tool



- WhereToWork
- Shiny+Golem
- Docker+Linux



# CAP-BC - Homepage

PICS NATURE TRUST NATURAL COLLEGE CPAWS


Climate Adaptive Planning for British Columbia Home App

u/bc

Project  
Why?  
Objectives  
Framework  
- Yale 1-3  
- Yale 4-6  
Data  
Partners  
About  
References

## Project

Climate Adaptive Planning for British Columbia (CAP-BC) is an online, open-access web-tool to provide climate-adapted systematic conservation planning to partnerships, government, NGO, private institutions and individuals in BC. CAP-BC provides a means of adapting our conservation plans to the projected impacts of climate change, thereby ensuring that our protected lands are as resilient as possible moving forward and providing a tool to our partners that promote the development of a network of protected areas in BC that is adaptive to future climate change



**Current protected areas for BC**  
Current protected lands cover 11.5% of B.C.'s land base (excluding waters and marine areas). Source: BC Data Catalogue  
<https://catalogue.data.gov.bc.ca/>

# CAP-BC - App

The screenshot displays the CAP-BC App interface. At the top, a green header bar contains the logos for PICS, NATURE TRUST, CPAWS, and UNBC, along with the text "Climate Adaptive Planning for British Columbia" and navigation links for "Home" and "App". The background is a world map. A white dialog box is centered on the screen with the following content:

Welcome to CAP-BC

**Project availables**

- **CAP-BC-1km:** Fine resolution (1km) better and closer to the actual data and features, however it takes more time to load and process
- **CAP-BC-5km:** Coarse resolution (5km) works faster than fine resolution and provides to users with a quick exploration

**Select project**

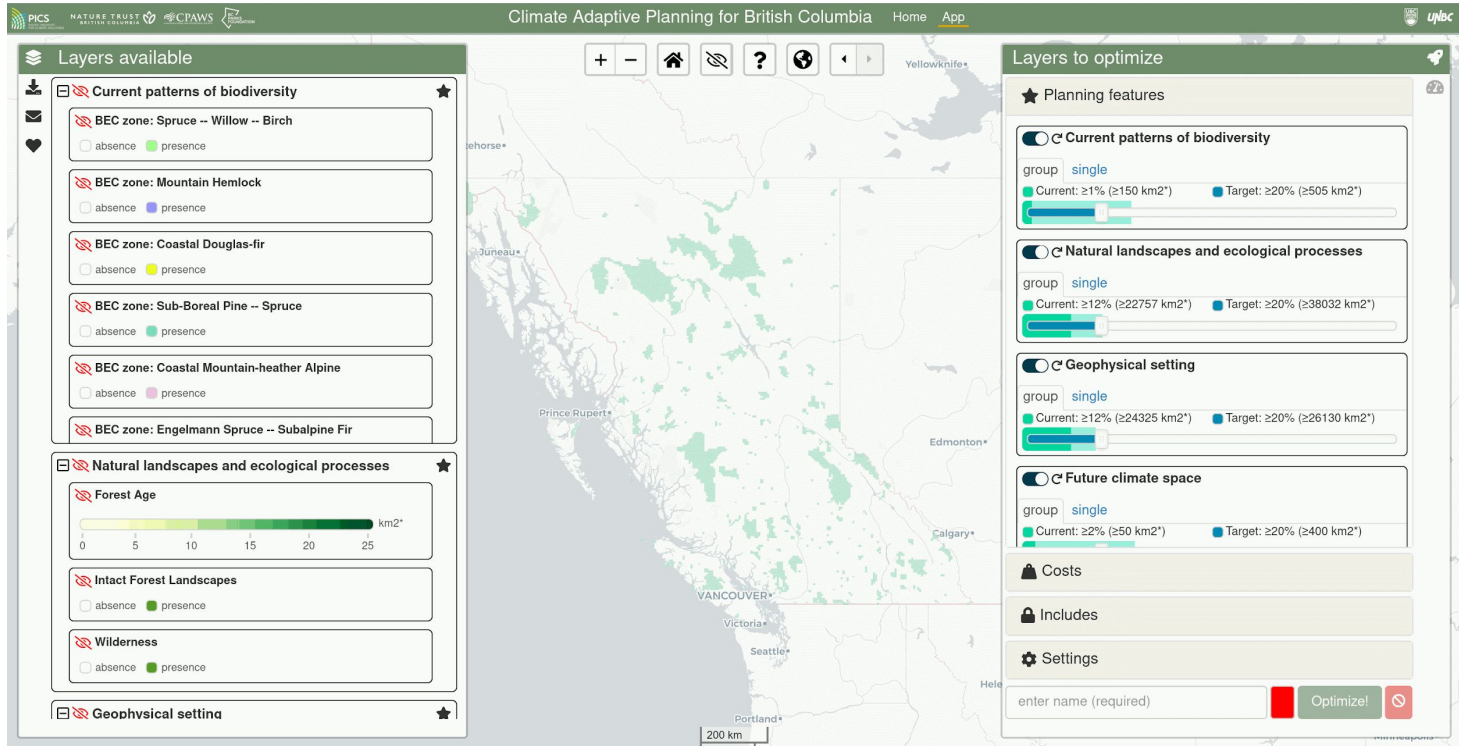
CAP-BC-1km

CAP-BC-1km

CAP-BC-5km

Import

# CAP-BC - App







## Is it enough?

- There is not a simple solutions to fix the effects of climate change
- We need to work with climate change
- We need to work with “no-experts” people and local communities
- We need to work with technology/algorithms

---

# Thanks

Xavier Llano

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