University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

How Urban Trees Keep Our Campus Cool?

Assessing the resilience of UBCV campus in coping with summer heatwaves using Spatial Multi-Criteria Evaluation

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Prepared for:

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How Urban Trees Keep Our Campus Cool?

Assessing the resilience of UBCV campus in coping with summer heatwaves using Spatial Multi-Criteria Evaluation

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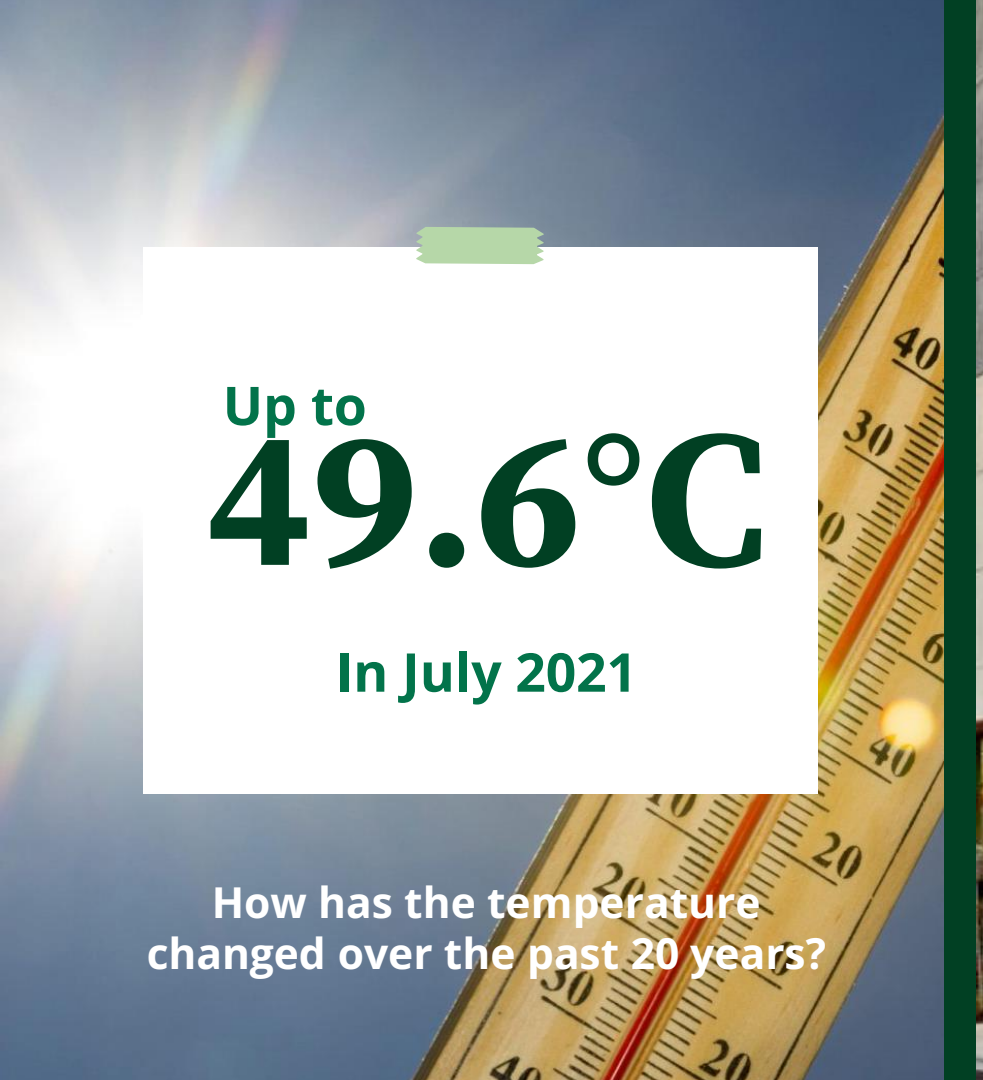
FCOR 599 Project
University of British Columbia



Up to

49.6°C

In July 2021

How has the temperature changed over the past 20 years?

More than

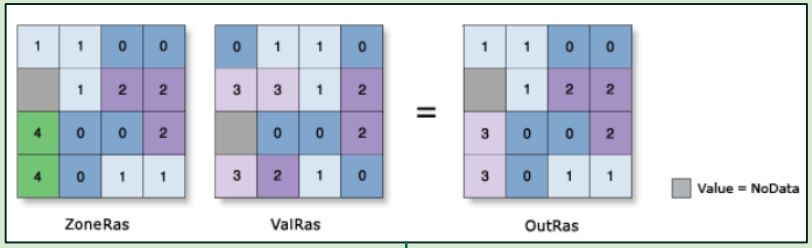
20,000

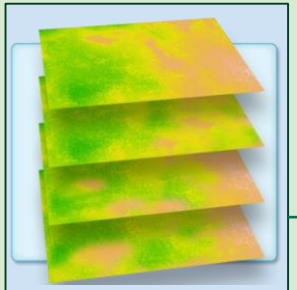
People live on campus

Are campus communities resilient to extreme heat?

Methods

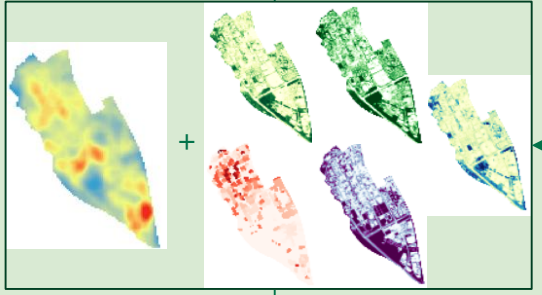
- Zonal Statistics
- Multi-Criteria Analysis





2000-2020 Summer Temperature

Mean Summer Temperature



Raw Data

Downsampling & Vectorization

Linear Regression Model (OLS)

Factor Correlation Coefficients

Pairwise Comparison

Cat		Priority	Rank
1	Soft Landscape Area	9.1%	4
2	Canopy Area	28.6%	2
3	Canopy Density	28.6%	2
4	Canopy Height	30.9%	1
5	Building Age	2.9%	5

Factor Weights

Normalize Factors

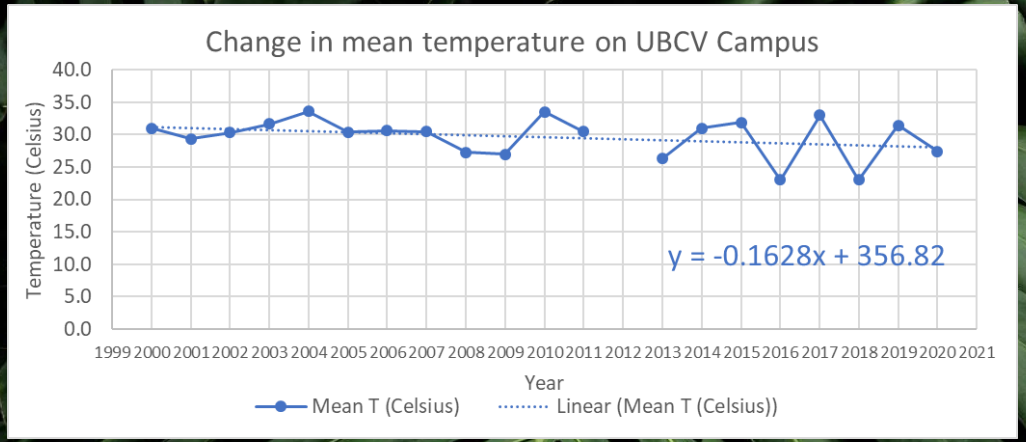
Weighted Values

Visualization

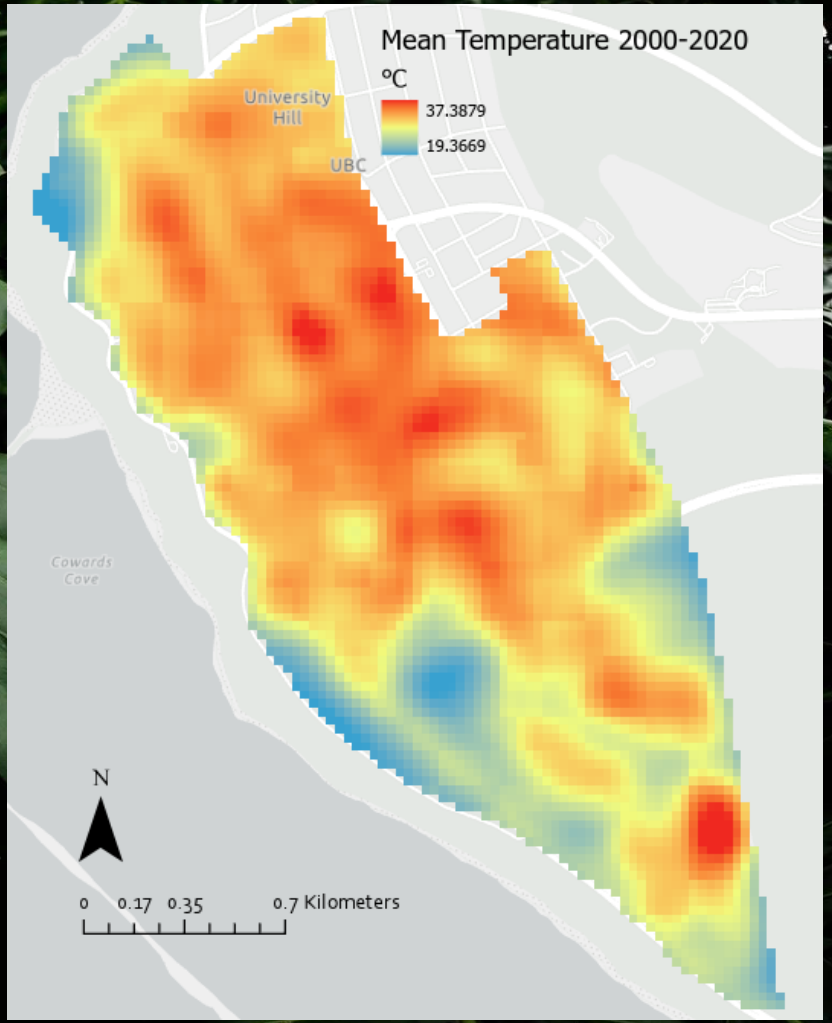
Community Resilience Map

Results

Mean Temperature Change
UBCV Campus
2000-2020

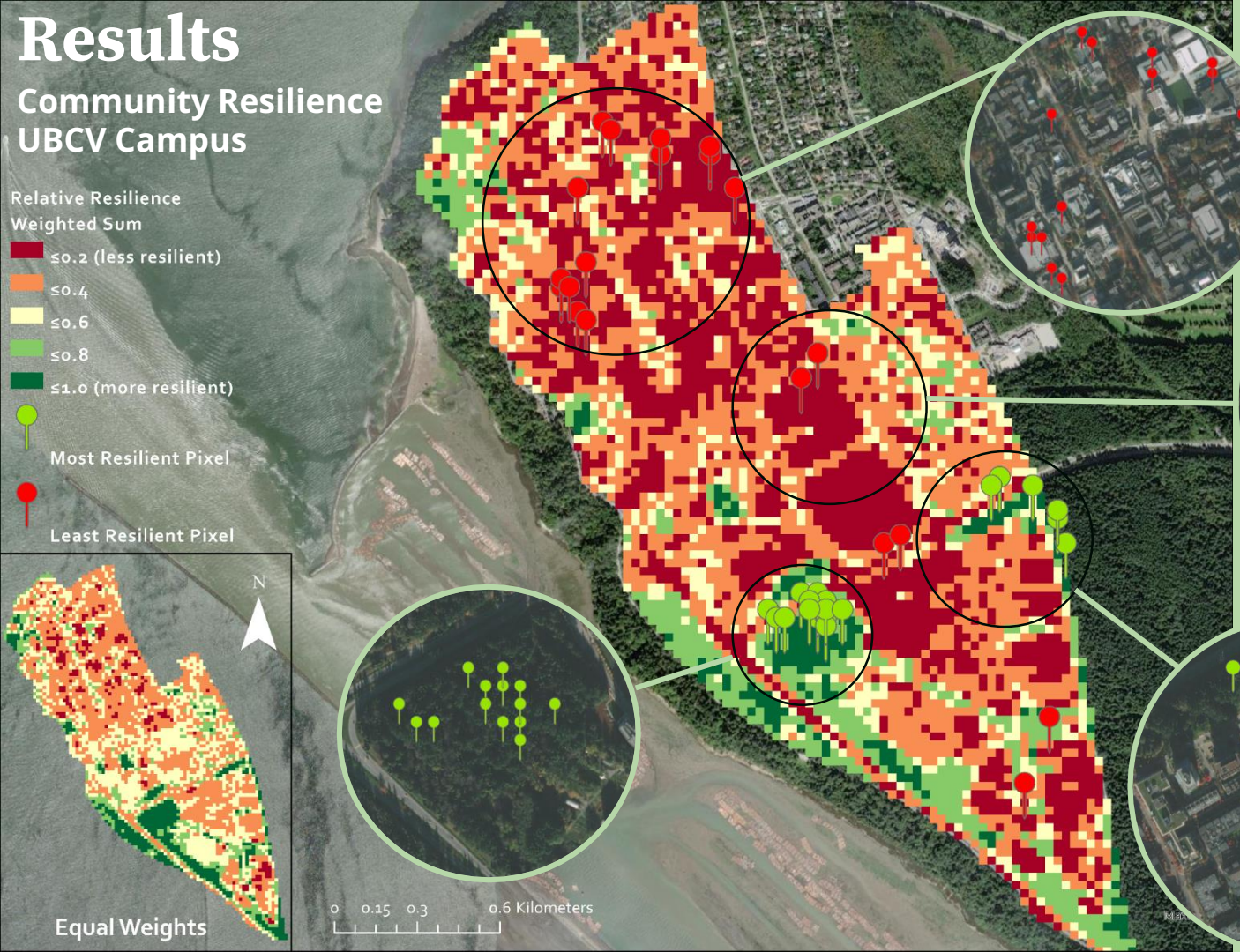


Mean temperature has fluctuated over the past 15 years, but has shown a slight downward trend overall



Results

Community Resilience
UBCV Campus



Discussion

Mean summer temperatures on campus have dropped slightly over the past two decades.

Multi-criteria analysis highlights areas that are resilient or vulnerable to extreme heat.

Uncertainty

Spatial resolution
LiDAR point classification
Explanatory variables
Factor weights
.....

Future Directions

- Higher data resolution is required.
- Include variables that cover broader categories.
- Use better fit models when determining factor weights for each variable.