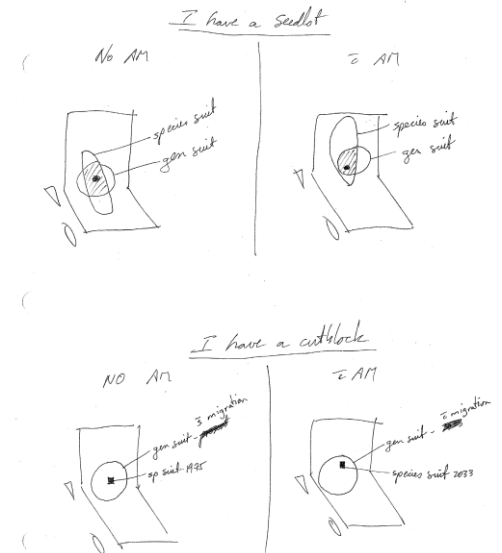
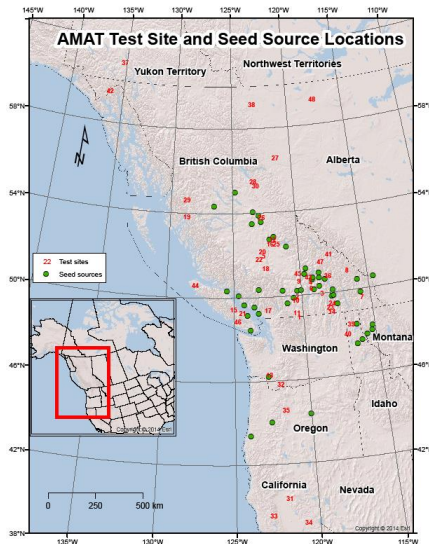




Climate Change Adaptation Research

Extension update 2019

- Updates: Sx genecology/CC, AMAT, CBST
- Multiple seedlot study
- Drought study
- Extreme event frequency study
- Custom seedlot collections



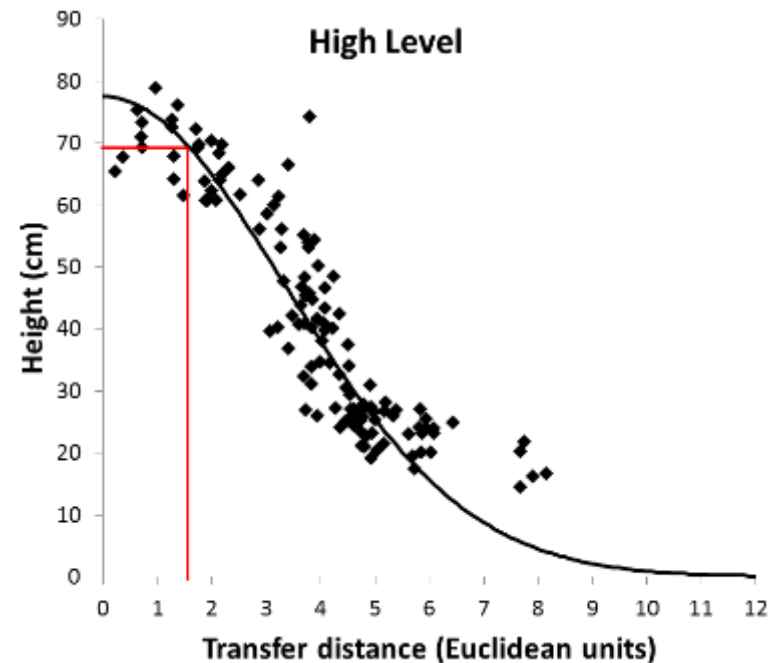
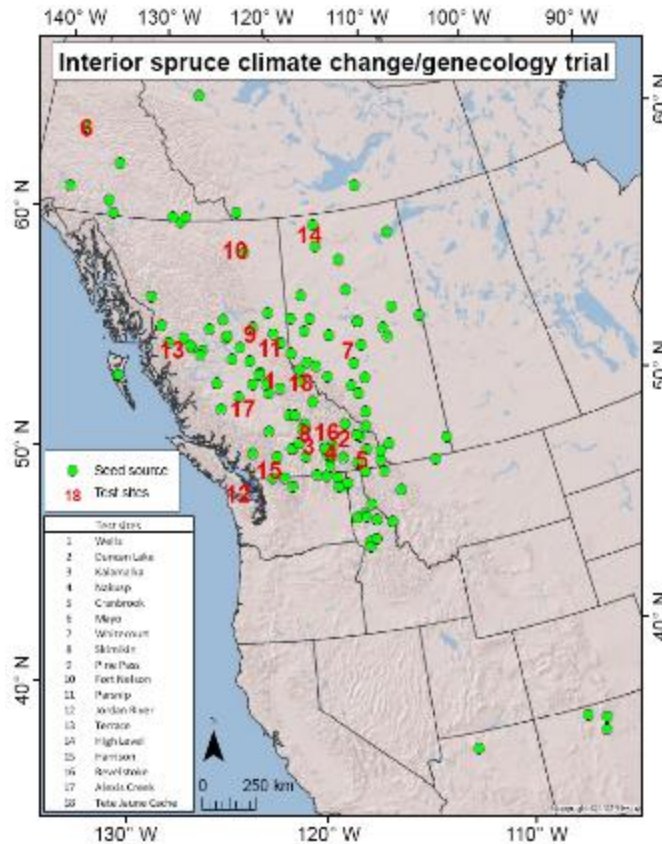


Climate Change Adaptation Research

Project updates

Sx genecology

- Seedlot transferability
 - Improved seedlot selection
- } CBST

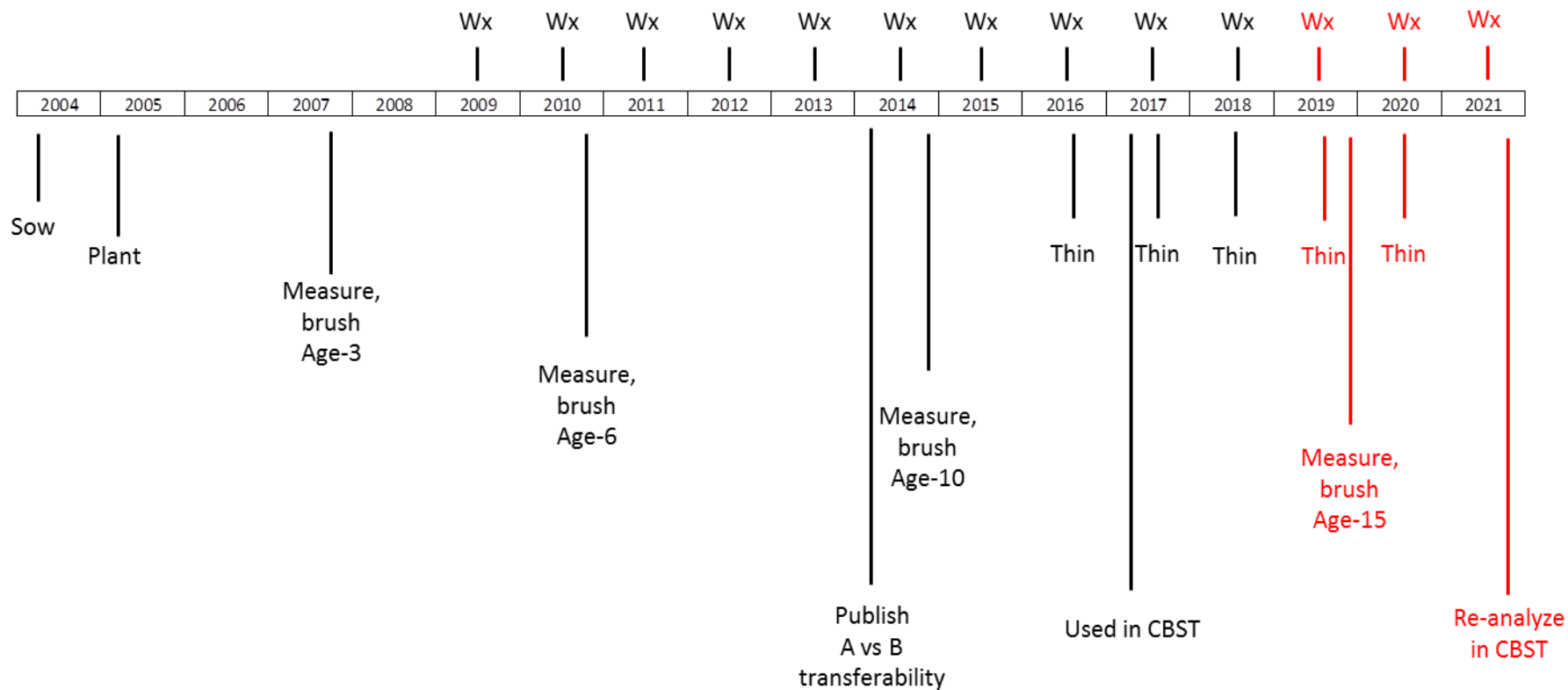




Climate Change Adaptation Research

Project update

Sx genecology





Sx genecology

Forest Ecology and Management 325 (2014) 122–130

Contents lists available at ScienceDirect

Forest Ecology and Management

journal homepage: www.elsevier.com/locate/foreco

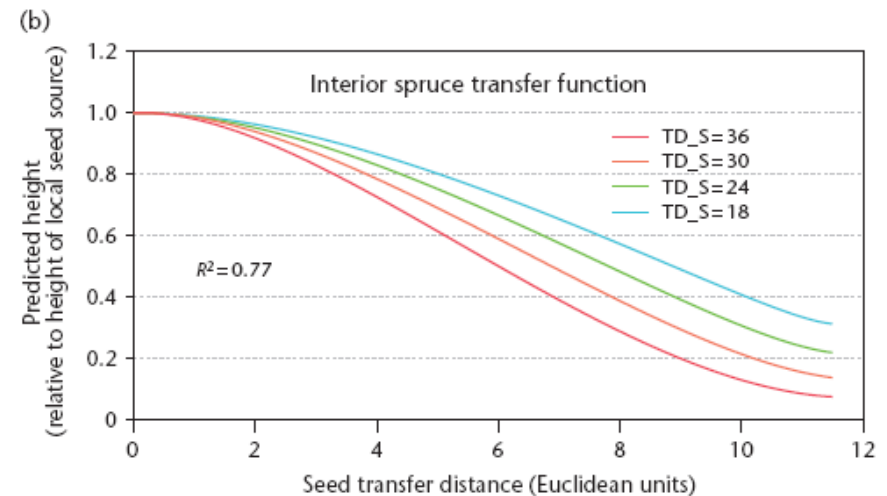
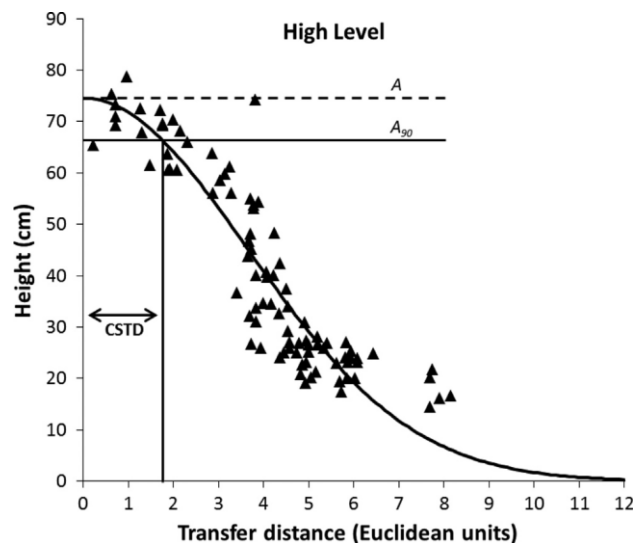


Quantifying safe seed transfer distance and impacts of tree breeding on adaptation

Gregory A. O'Neill^{a,*}, Michael Stoehr^b, Barry Jaquish^d

^aBC Ministry of Forests, Lands and Natural Resource Operations, Kalamalka Forestry Centre, 2001 Kesteven Road, Vernon, BC V2B 2C7, Canada

^bBC Ministry of Forests, Lands and Natural Resource Operations, 2001 Kesteven Road, Victoria, BC V8M 1K3, Canada





Climate Change Adaptation Research

Project update

Sx genecology

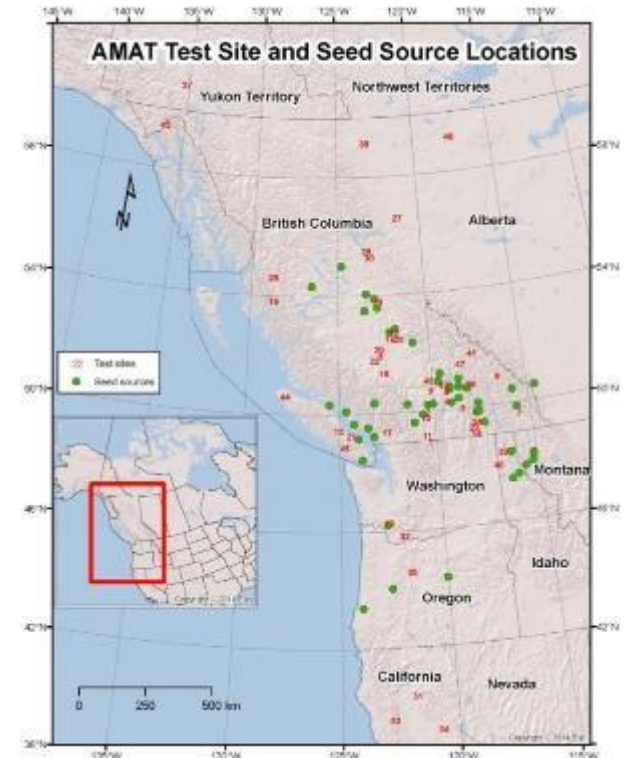
	2014	2014	2015	2015	2016	2016	2017	2017	2018	2018	2019	2019	2020	2020	2020
Site	measure-10y	weather	thin	weather	thin	weather	thin	weather	thin	weather	thin	weather	thin	weather	measure, brush
Cran	yes	yes						Charlotte		skip		2030 contractor		2030 contractor	contractor
Dunc	yes	yes			No/Armillaria	contractor	No/Armillaria	skip	No/Armillaria	Amy	No/Armillaria	NA	No/Armillaria	NA	contractor
Ftne	yes	none	MB	none	2015	no station	2015	none	2015	no stn	2015	none	2015	none	contractor
Harr	yes	yes	MB	yes	2015		2015	Greg	2015	Amy	2015	contractor	2015	contractor	contractor
High	yes	yes		ABFS		ABFS		see AMAT		ABFS	2025	ABFS	2025	ABFS	Alberta FS
Jord	yes	yes		yes	contractor	contractor	2015	skip	2016	Keith	2016	NA	2016	NA	contractor
Kala	yes	yes		Vicky		Greg		Greg		Amy	Amy	Amy	2019	Amy	Amy
Mayo	yes	yes		YFS		YFS		Steve/Blake	2025	Yukon FS	2025	Yukon FS	2025	Yukon FS	contractor
Naku	yes	yes		yes				not done	Amy	Amy	2018	contractor	2018	contractor	contractor
Pars	yes	yes		Vanessa		Vanessa	RWW	Vanessa	2017	Vanessa	2017	contractor	2017	contractor	contractor
Pine	yes	yes		Vanessa		Vanessa	RWW	Vanessa	2017	Vanessa	2017	contractor	2017	contractor	contractor
Reve	yes	yes	MB	yes	2015		2015	Charlotte	2015	Amy	2015	contractor	2015	contractor	contractor
Skim	yes	yes	Hilary	Vicky	2015	Greg/Rob	2015	Rob	2015	Rob	2015	Amy	2015	Amy	Amy
Terr	yes	yes	MB	yes/removed	2015	no station	2015	N/A	2015	NA	2015	Amy	2015	NA	contractor
Tete	yes	yes		Vanessa		Vanessa	RWW	Charlotte	2017	Vanessa	2017	contractor	2017	contractor	contractor
Well	yes	yes		Vanessa		Vanessa		Charlotte		Amy	2025		2025	Amy	contractor
Whit	yes	yes		ABFS		ABFS		Cole	2019	ABFS	contractor	ABFS	2019	ABFS	Alberta FS



Climate Change Adaptation Research

Project update

AMAT



- **Orchard** seedlot transferability
 - Improved **orchard** seedlot selection
- } CBST

[illegible]



Climate Change Adaptation Research

Project update

AMAT

Site Name	2019			
	centre stake	brush/remove wildlings	measure	download
Placer Mountain	no	no	no	contractor
Loon Lake	no	no	no	contractor
Winnifred Creek	no	contractor	no	contractor
Deep Creek	no	contractor	no	contractor
Riske Creek	no	no	no	no
Kalamalka	no	FIRM	no	FIRM
Cranbrook	no	no	no	no
Spillimacheen	no	no	no	no
Barnhartvale	no	FIRM	no	FIRM
Shrimpton	no	no	no	no
Lynx Creek	no	no	no	no
Likely	no	contractor	no	no
Mt St Helen WA	no	collaborator	no	collaborator
Glenmerry	no	no	contractor	contractor
Port Alberni	no	no	contractor	contractor
McLeese Lake	no	no	contractor	contractor
Malcolm Knapp	contractor	contractor	contractor	N/A
Churn Creek	no	contractor	contractor	contractor
Kitimat	contractor	no	FIRM	contractor
Strouse Lake	no	contractor	contractor	contractor
Parksville	no	no	contractor	contractor
Fletcher Lake	no	contractor	contractor	contractor
Bulldog	no	no	contractor	contractor
Ladybird	no	no	contractor	contractor
Gavin Lake	no	no	contractor	contractor
PGTIS	no	no	no	FIRM
Ft St John	no	no	no	contractor
Mackenzie North	no	no	no	collaborator
Kitsumkalum	no	no	no	contractor
Mackenzie South Hwy39	no	no	no	contractor
Lyman Springs CA	no	no	no	collaborator
Wind River WA	no	no	no	collaborator
Mendocino NF CA	no	no	no	collaborator
Forest Hill CA	no	no	no	collaborator
Sisters OR	no	no	no	collaborator
Revelstoke South	no	no	no	contractor
Whitehorse ResFor YK	no	no	no	collaborator
Fort Nelson	no	no	no	no
Priest River ID	no	no	no	collaborator
Spirit Lake ID	no	contractor	no	collaborator
Golden	no	contractor	no	no
Haines	no	contractor	no	collaborator
Skimikin	no	contractor	no	FIRM
Holberg	no	contractor	no	contractor
McLure	no	no	no	FIRM
Nitinat	no	contractor	no	contractor
Revelstoke North	no	contractor	no	contractor
High Level AB	no	no	no	collaborator



Climate Change Adaptation Research

Project update

CBST



Current seed transfer zones
(geography)



CBST
(climate)

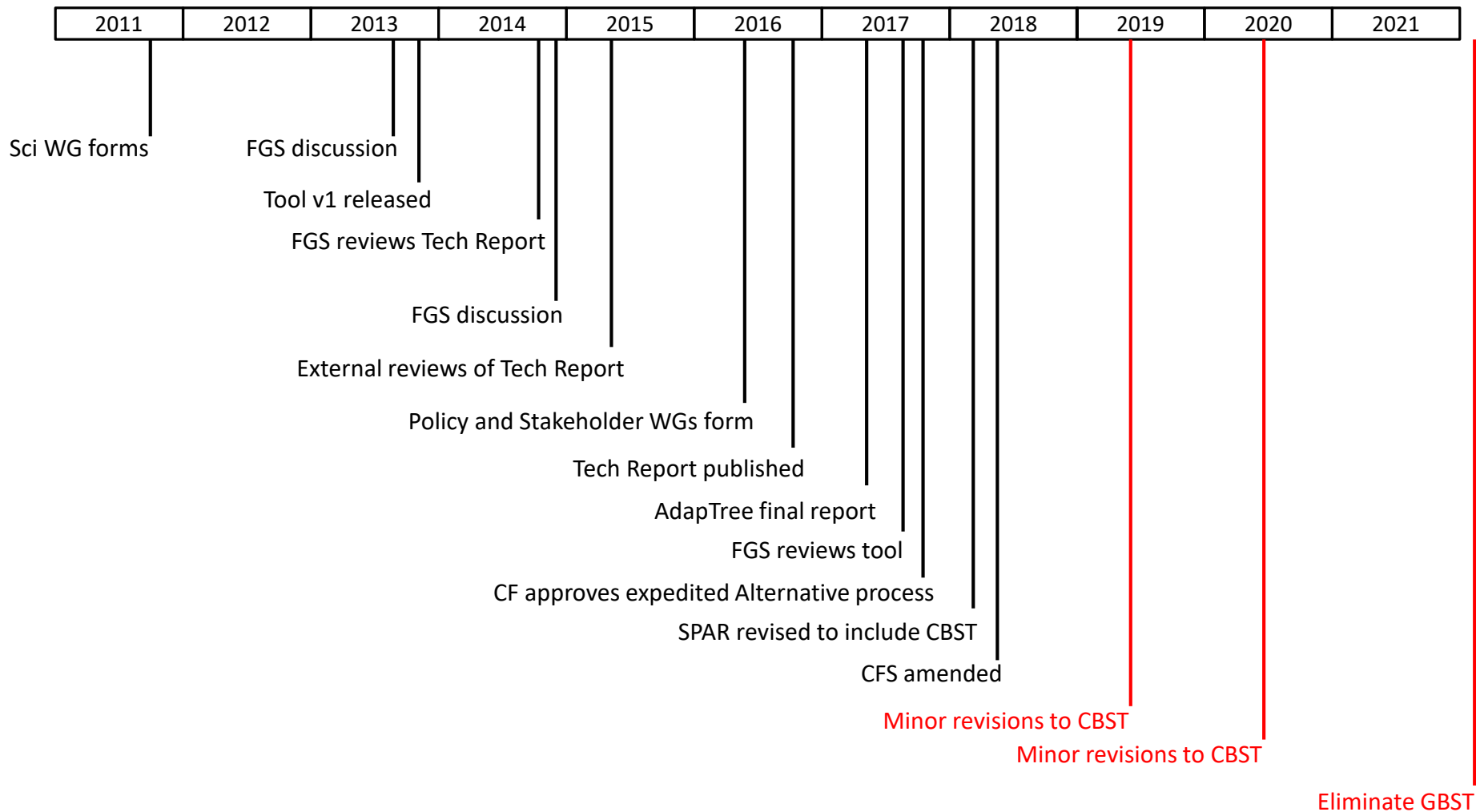
- Better matching of seedlots with plantations
- Facilitates accurate assisted migration
- Maximizes deployment area



Climate Change Adaptation Research

Project update

CBST





Multiple Seedlot – Genetic Diversification Study

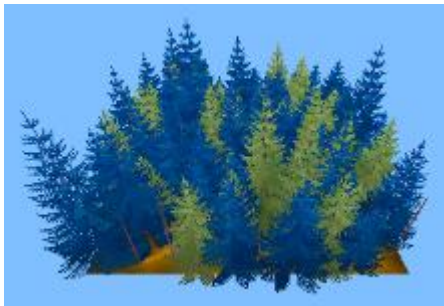
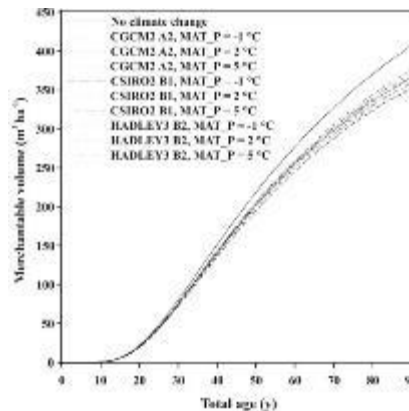
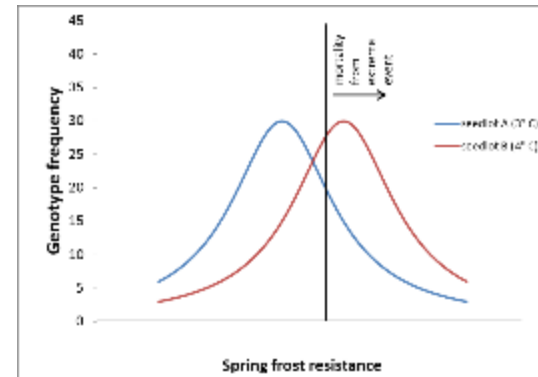


Image: Dave Simpson

+



+



= ?

Objective

Examine opportunities for using multiple, differently-adapted seedlots as a bet-hedging strategy to buffer extreme climate events.

Funding

Forest Enhancement Society – \$76,000

FAIB – \$12,500

FIRM – \$12,500

Team

Tongli Wang, Derek Sattler, Kate Peterson, Greg O'Neill



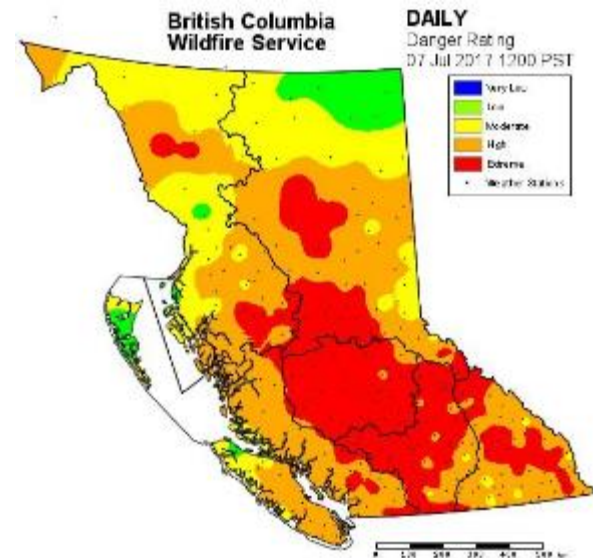
Climate Change Adaptation Research

Project update

Drought Study



Photo: Andy Slizak



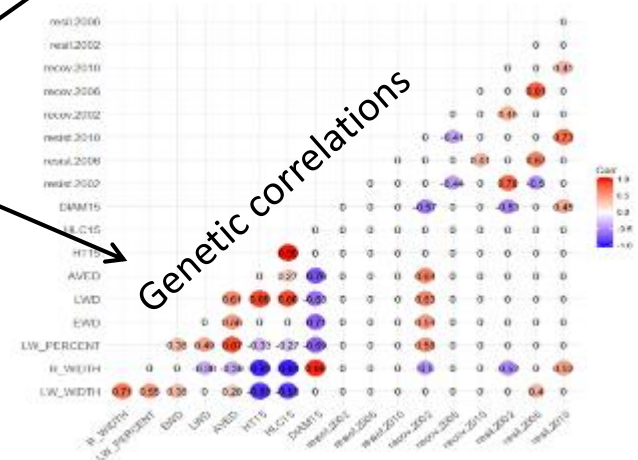
Climate Change Adaptation Research

Project update

Drought Study

120 Pl fams
at 4 sites

- Height
- Diameter
- Ring width
- Ring density

$$\frac{G \times E}{h^2}$$


Objective

Examine opportunities for using ring width and density from progeny tests to select for drought tolerance.

Funding

\$0

Team

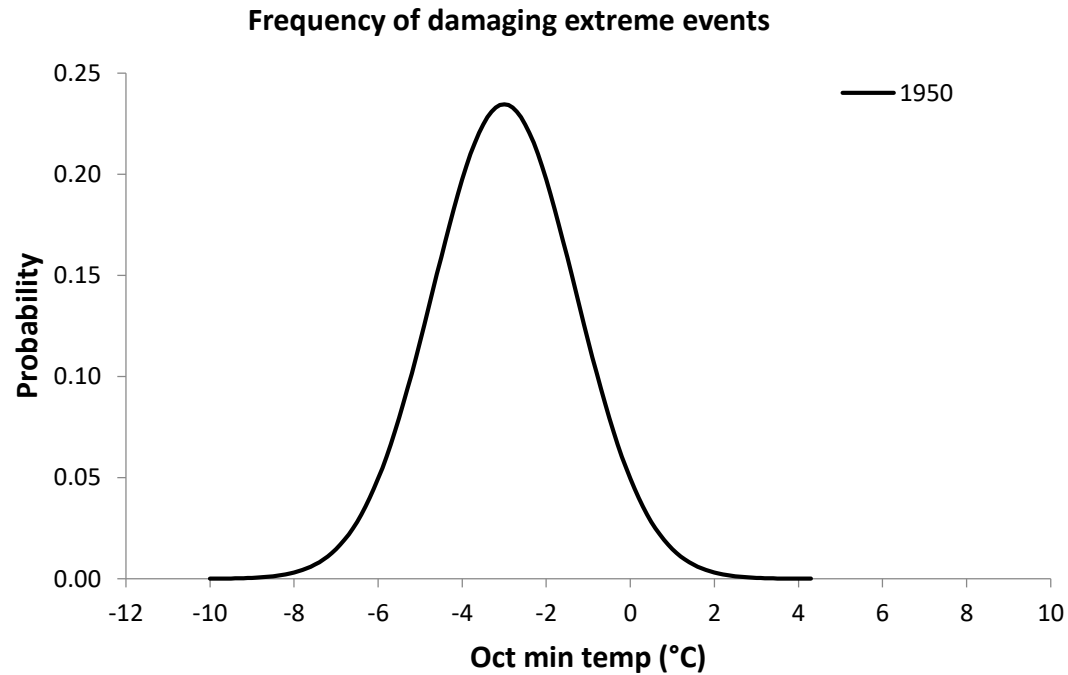
Hardy Griesbauer, Nick Ukrainetz, Greg O'Neill



Climate Change Adaptation Research

Project update

Extreme event study

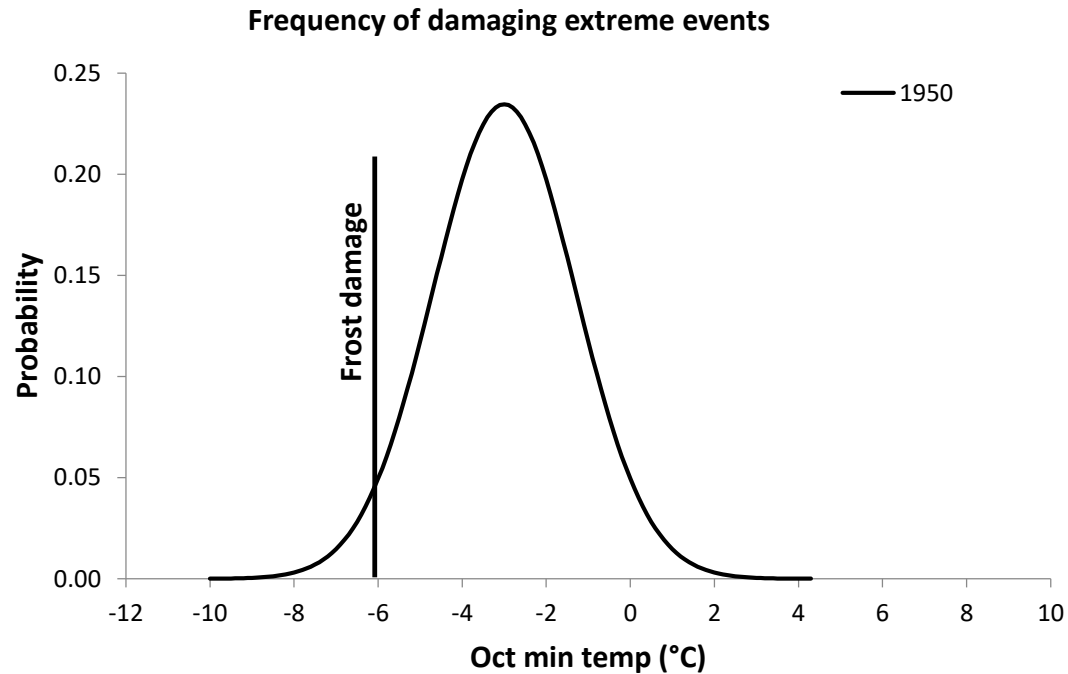




Climate Change Adaptation Research

Project update

Extreme event study

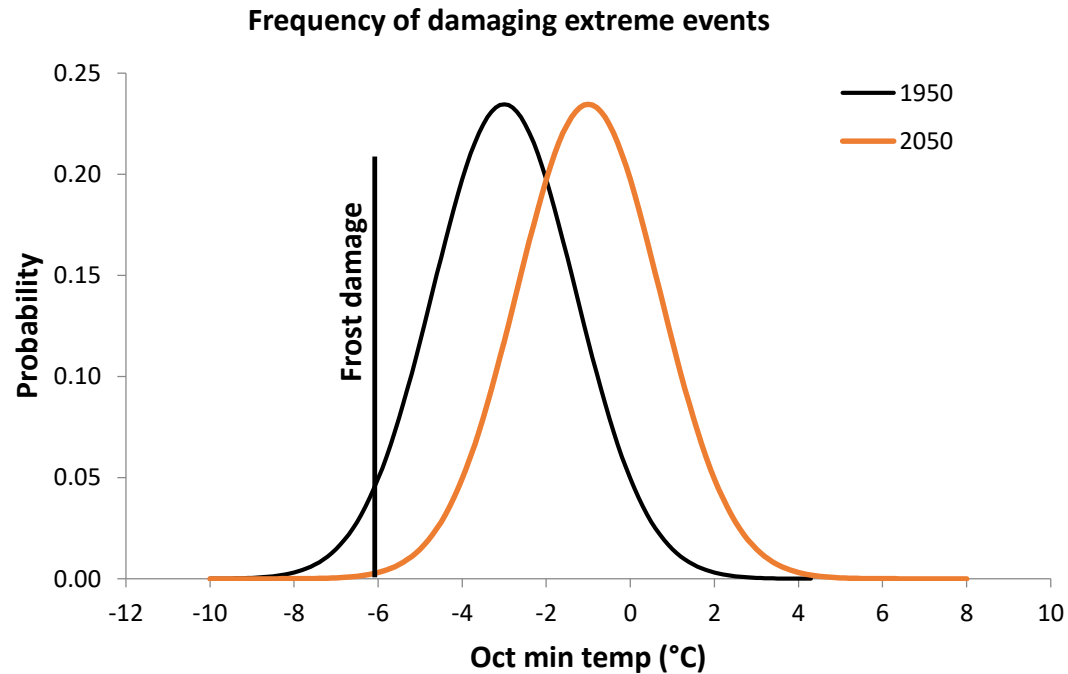




Climate Change Adaptation Research

Project update

Extreme event study

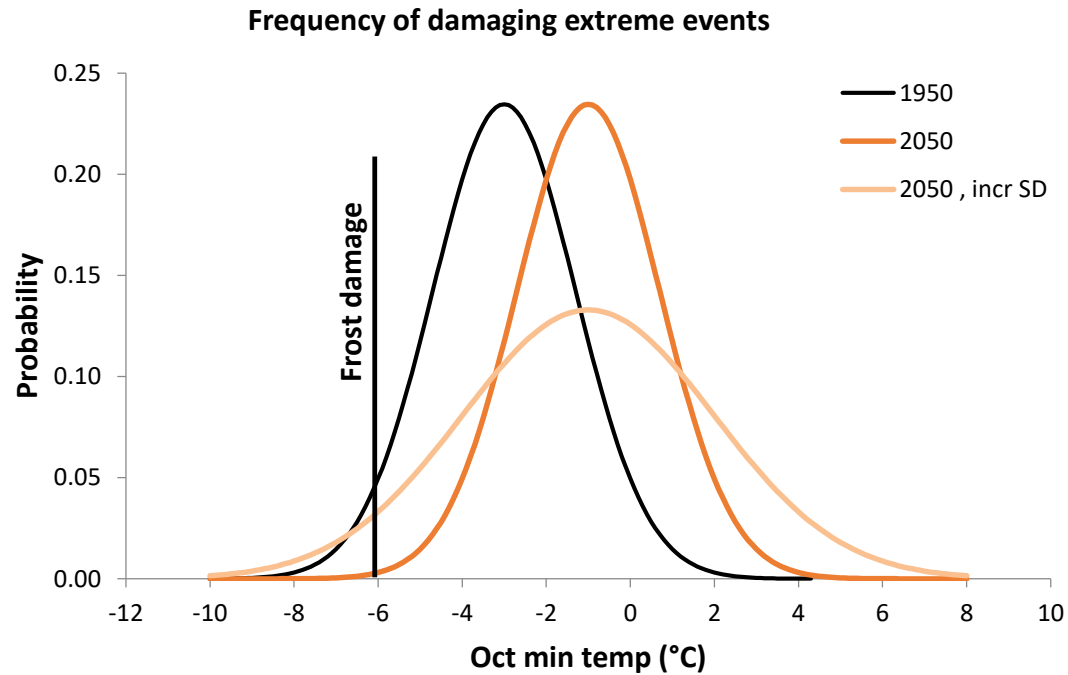




Climate Change Adaptation Research

Project update

Extreme event study

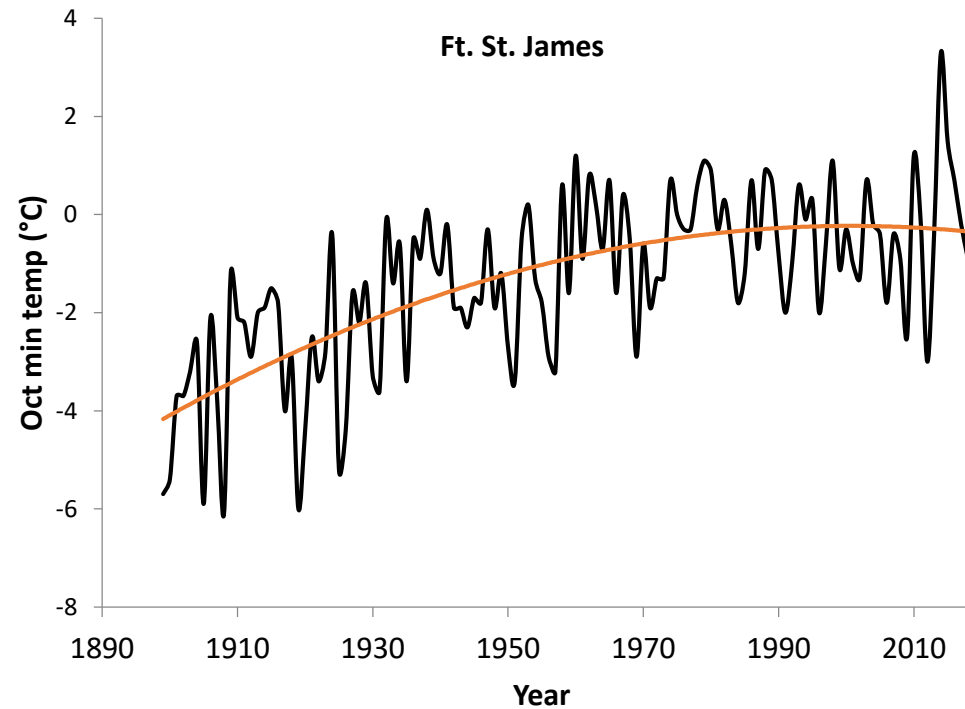




Climate Change Adaptation Research

Project update

Extreme event study

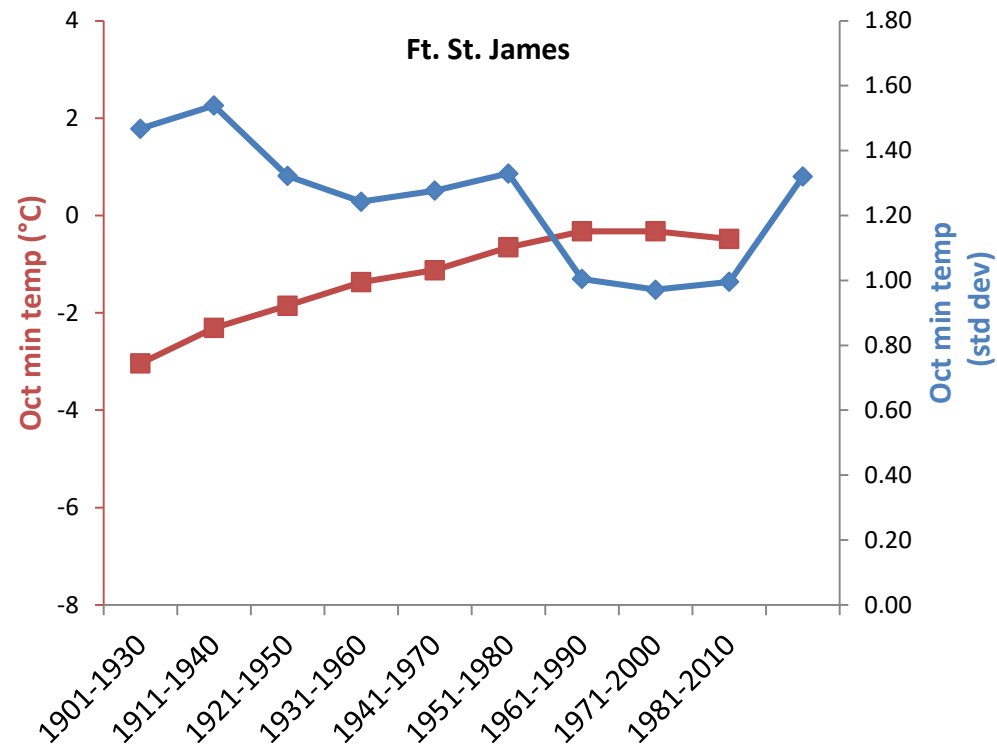




Climate Change Adaptation Research

Project update

Extreme event study

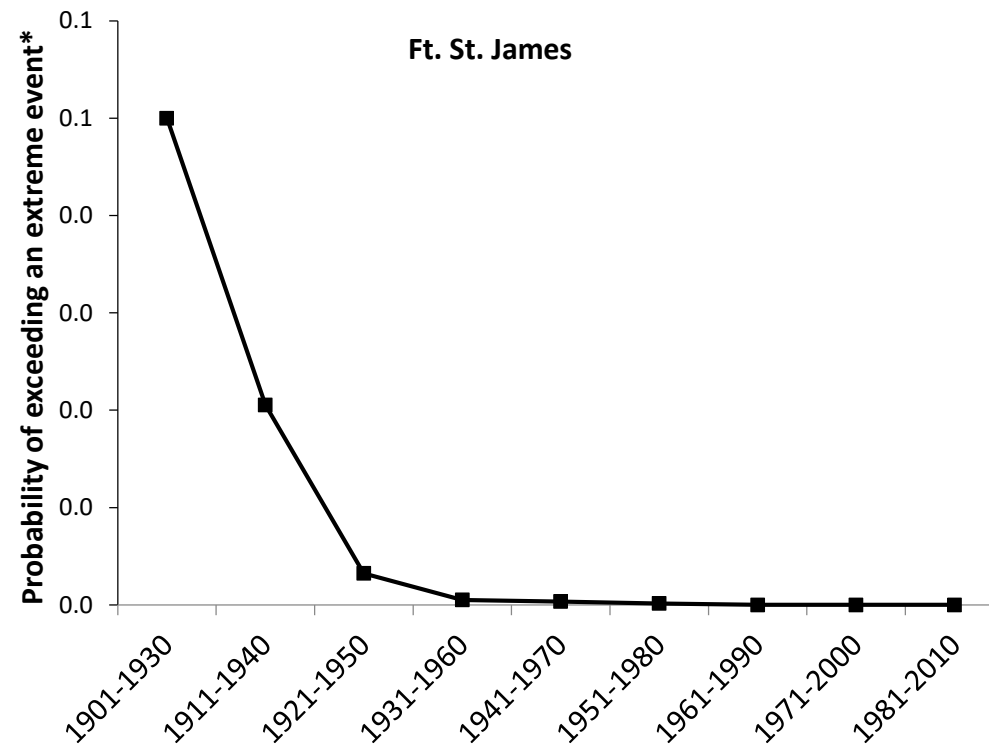




Climate Change Adaptation Research

Project update

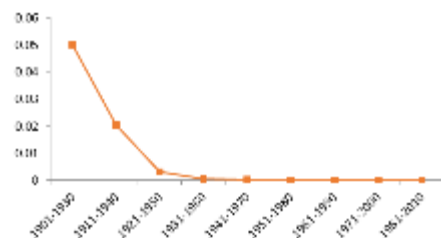
Extreme event study



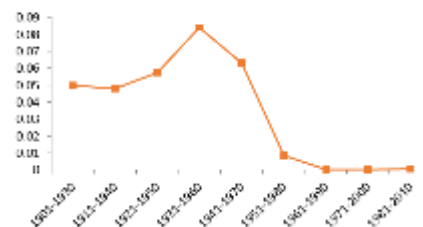
* Extreme event – a year in which Oct min temp < a 1-in-20 year event during the 1901-1930 period.

March min temp – probability of exceeding an extreme event temp

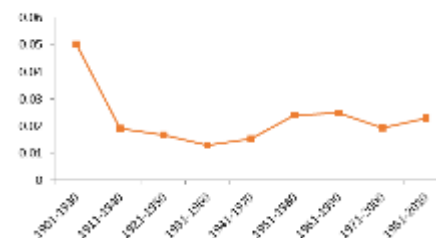
Fort St James



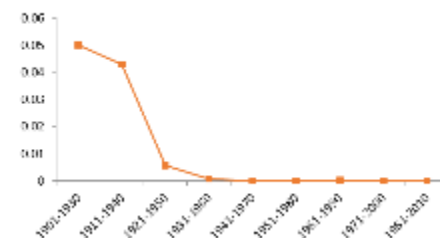
Bella Coola



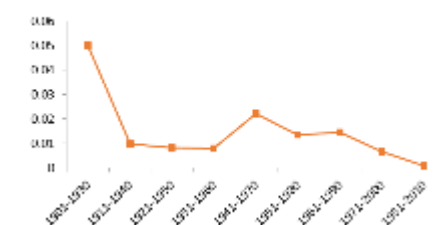
Glacier



Princeton



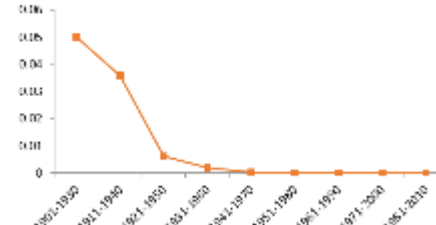
Vancouver



Golden

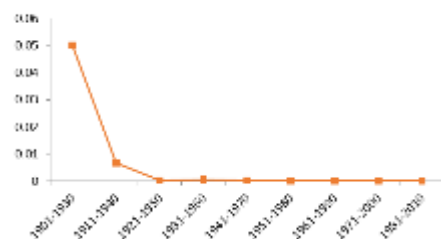


Cranbrook



Oct min temp – probability of exceeding an extreme event temp

Fort St James



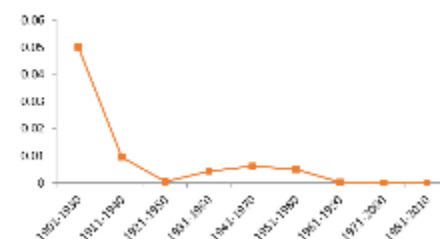
Bella Coola



Glacier



Princeton



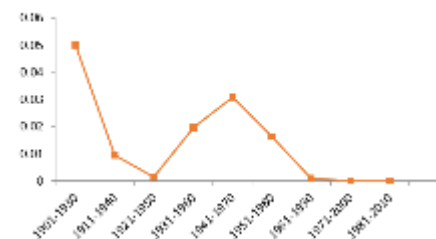
Vancouver



Golden



Cranbrook





Climate Change Adaptation Research

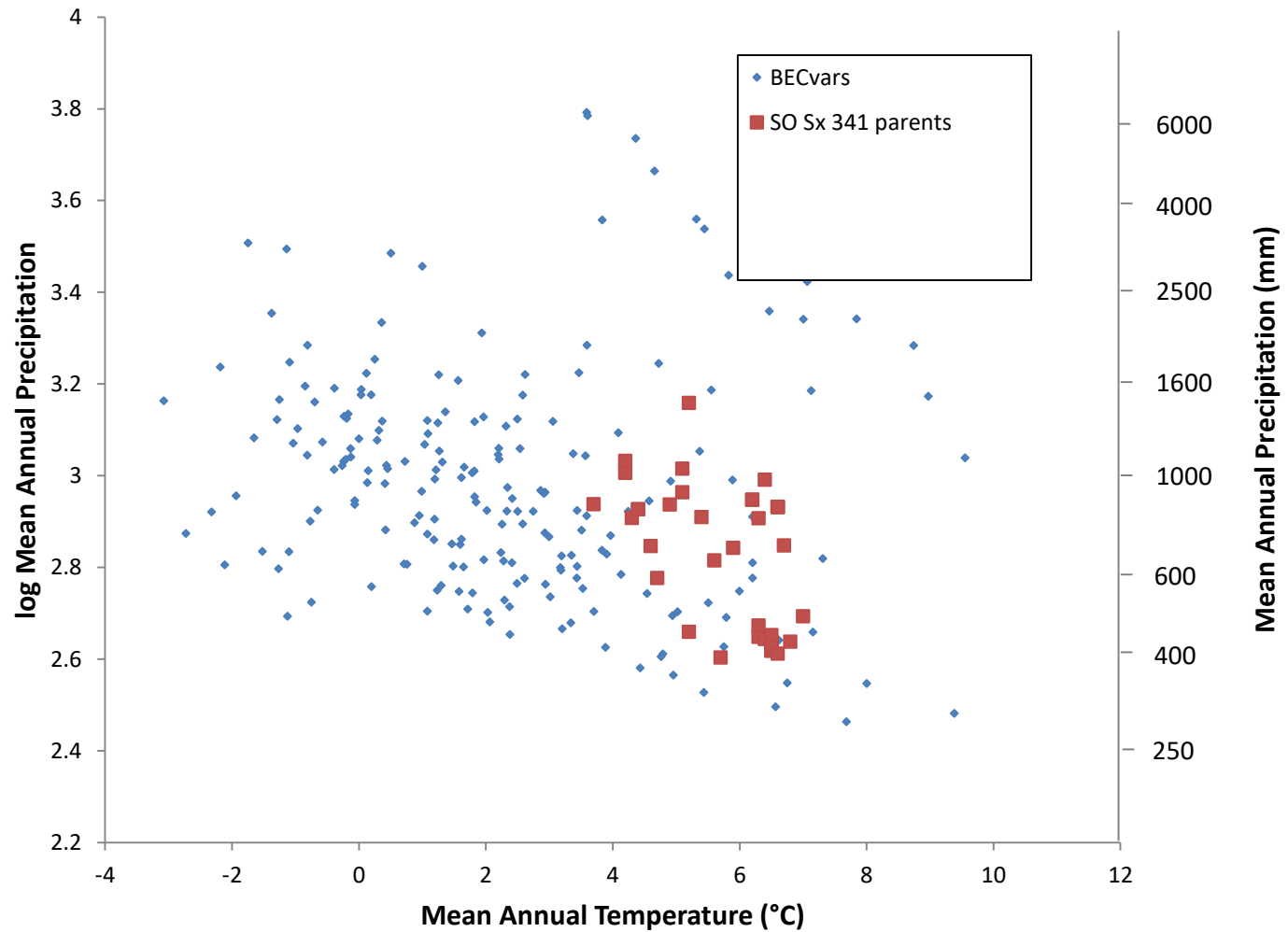
Project update

Extension

2018 Presentations, tours, meetings

Feb	ITAC – presentation
Feb	USDA FS SW Region – webinar
Feb	UBCO teachers – tour
April	ABCFP magazine - letter
April	International Agriculture group – tour
April	Chief Forester and Thompson Okanagan staff - tour
May	FLNR Forest Health Working Group – webinar
May	FIRM Management Team - tour
June	Weyerhaeuser Staff - field tour - Princeton
June	SFU MPM students - field tour
June	Silviculturalists from WA and ID - tour
July	Forests For Tomorrow - Webinar
Sept	Vancouver Island University – tour
Sept	Forest Genetics Council – AMAT field tour
Oct	Tree Seed Centre – presentation
Nov	University of Michoacan - presentation

Custom collections

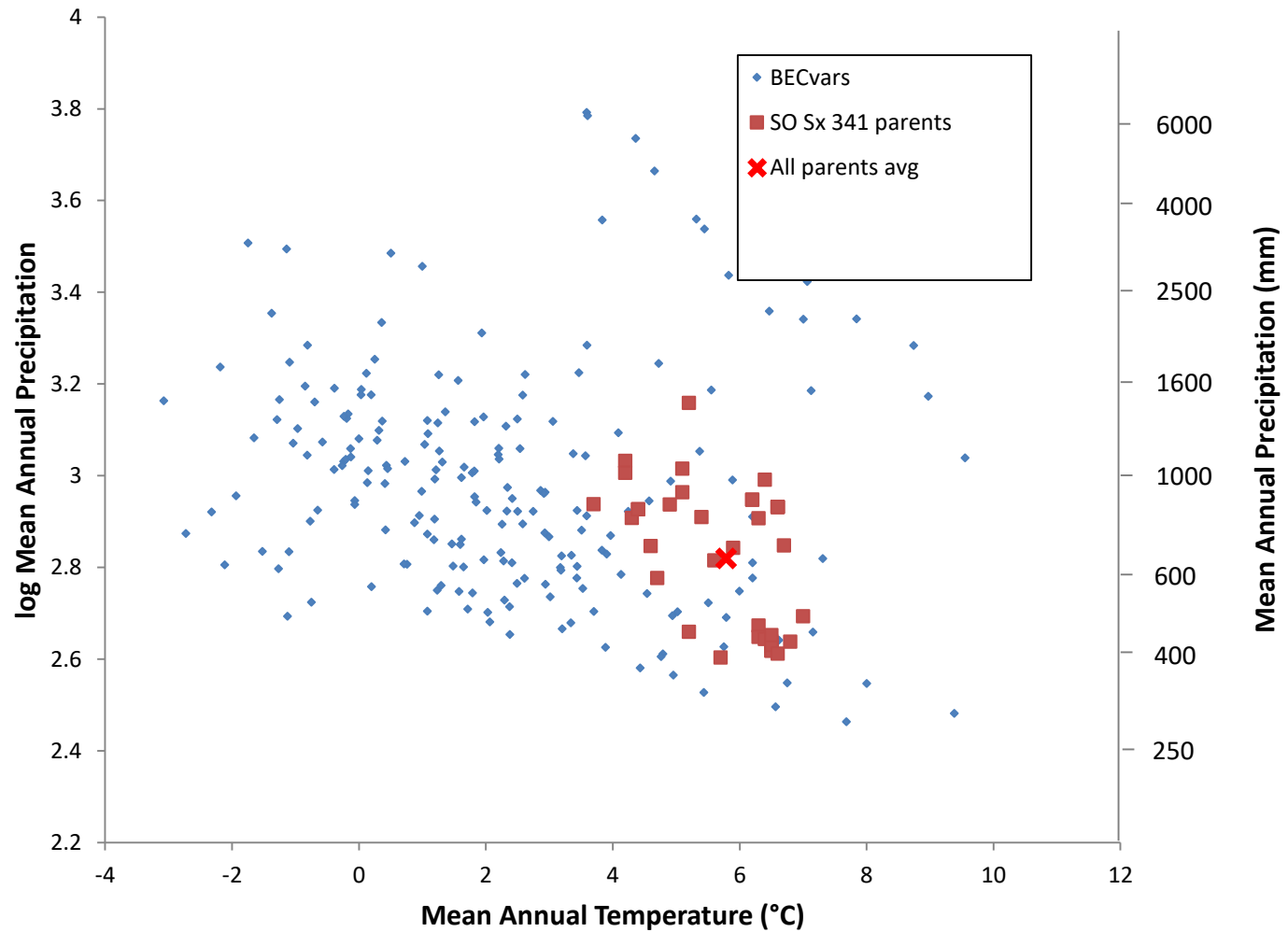




Climate Change Adaptation Research

Project update

Custom collections

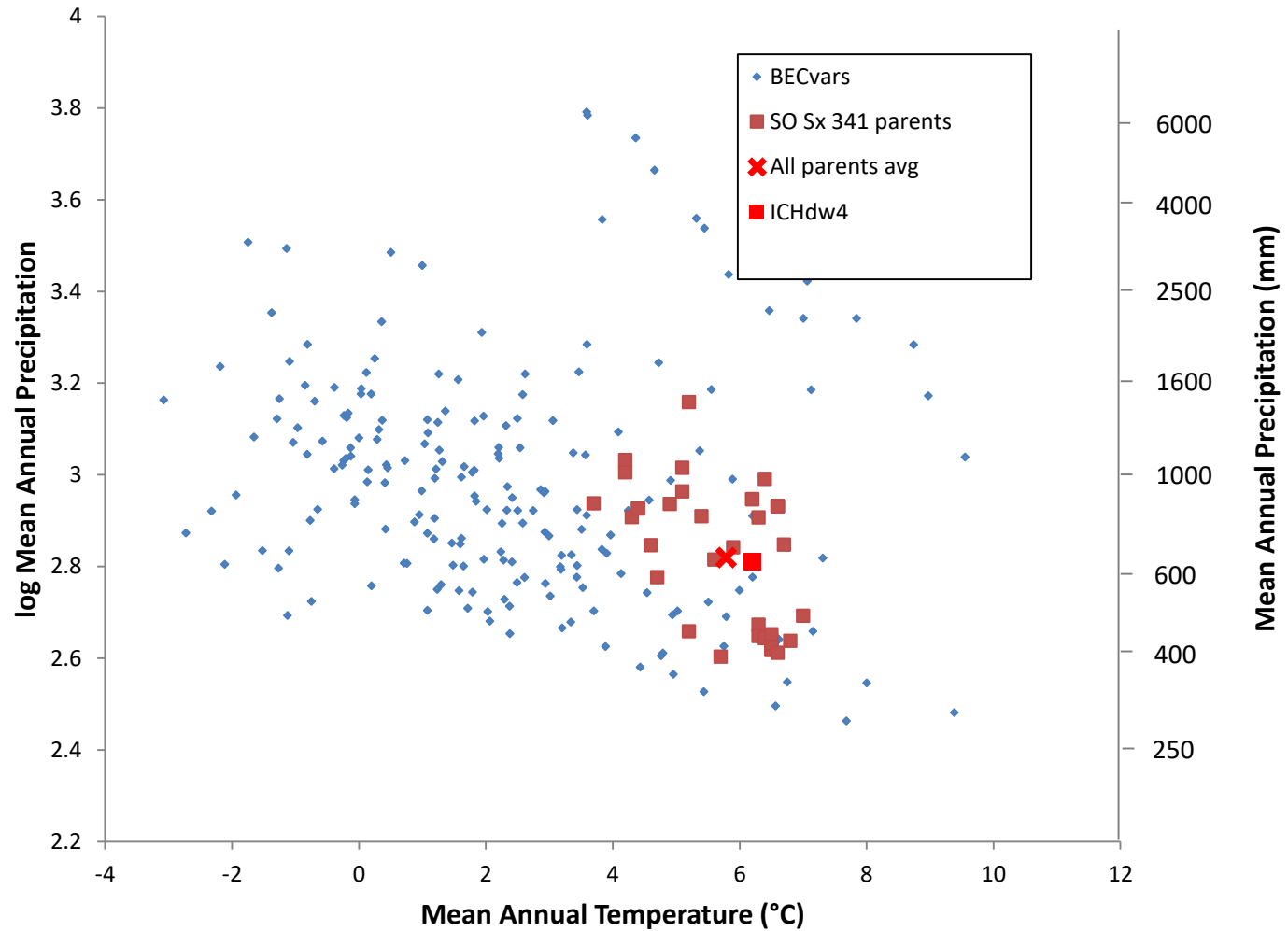




Climate Change Adaptation Research

Project update

Custom collections

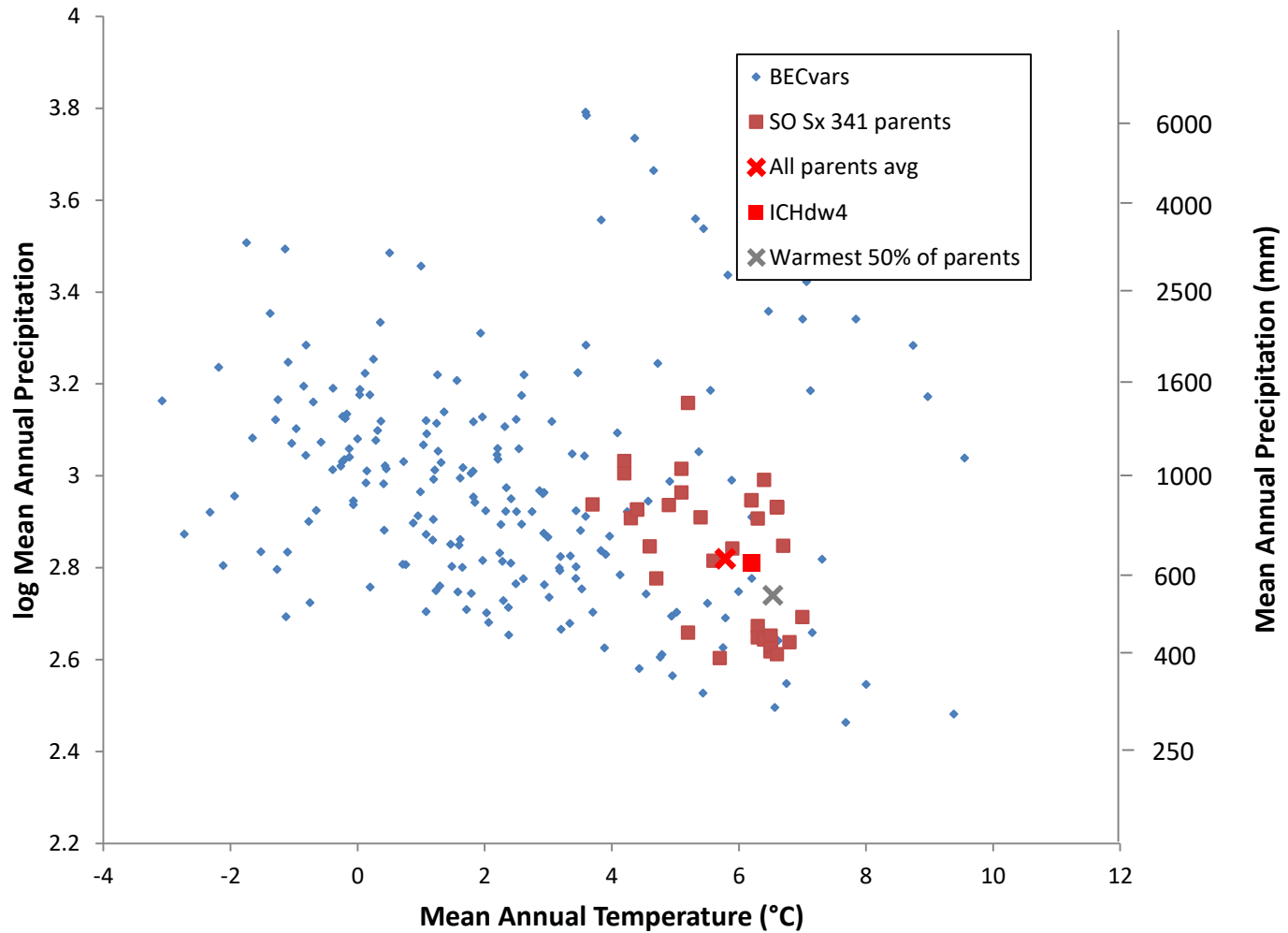




Climate Change Adaptation Research

Project update

Custom collections

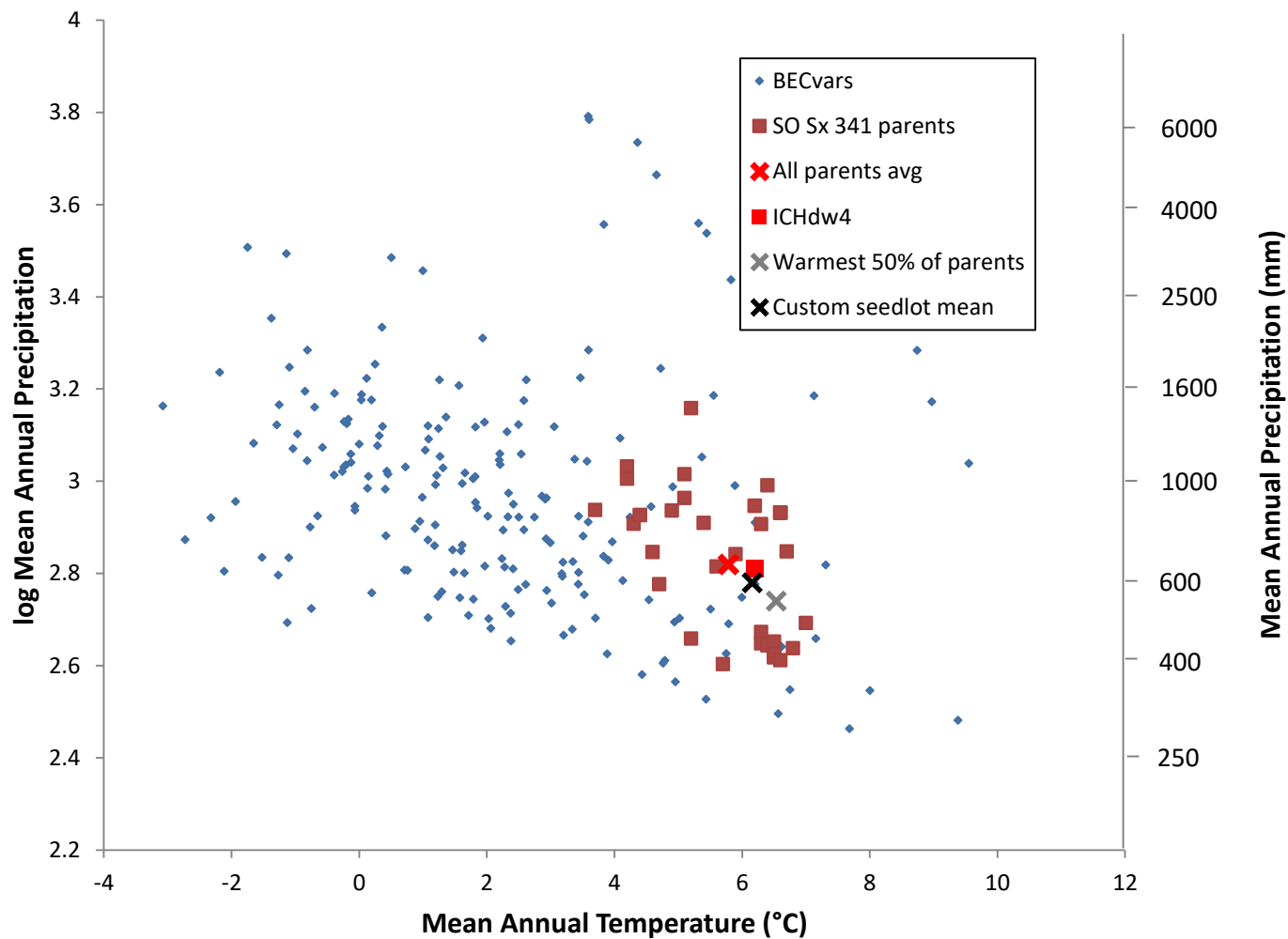




Climate Change Adaptation Research

Project update

Custom collections



Welcome to  Sovereign
Lake
NORDIC CENTRE

