

# Using early land surveys to reconstruct presettlement forest composition in Quebec

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<http://labdendro.uqar.ca>

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# Early North American Land surveys

Division of land into townships  
(6 miles x 6 miles)

- Drawing lines (rectangular grid)
- Erecting posts
- Soil type
- Topography
- Tree species occurrences
- Natural disturbances
- Location of streams, rivers, marshes

USA

Metes and bounds surveys

Private company land surveys

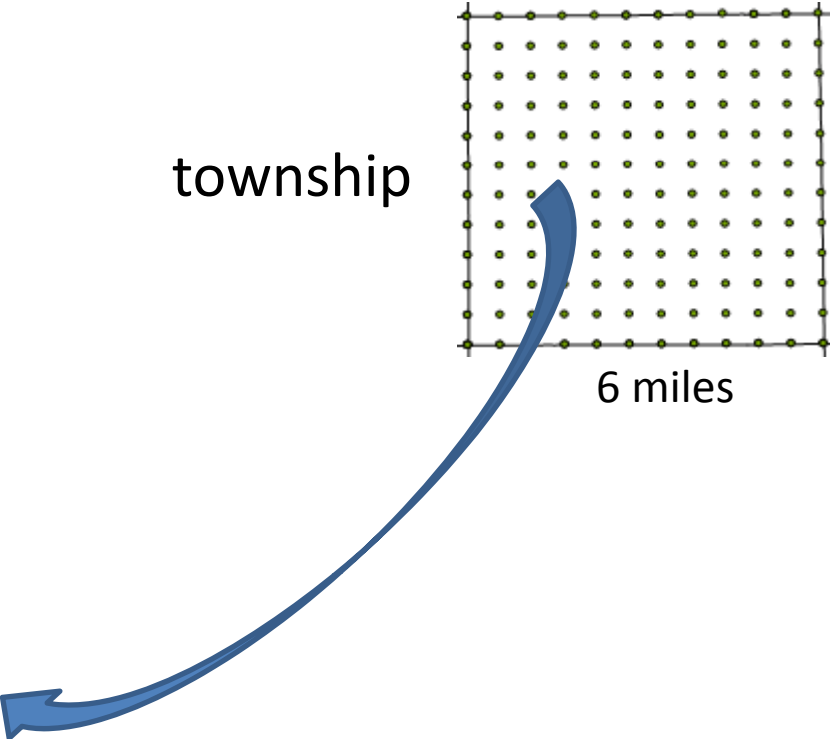
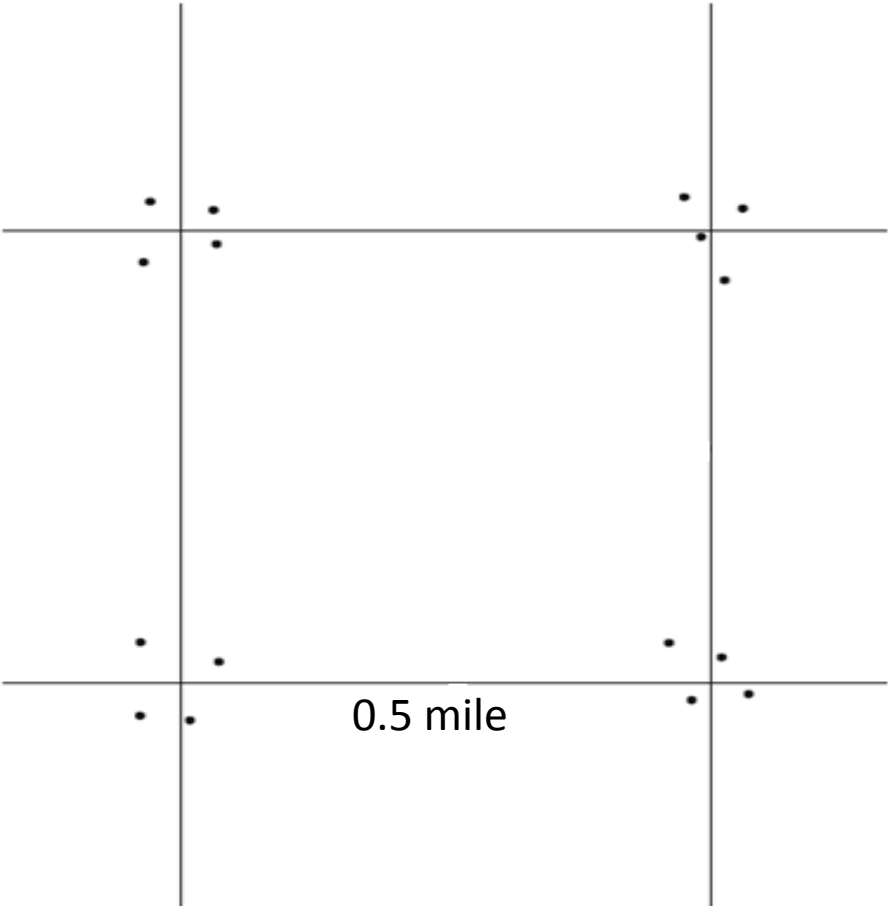
Public land surveys (GLO 1812)

CANADA

Seigneurial lands (Quebec)

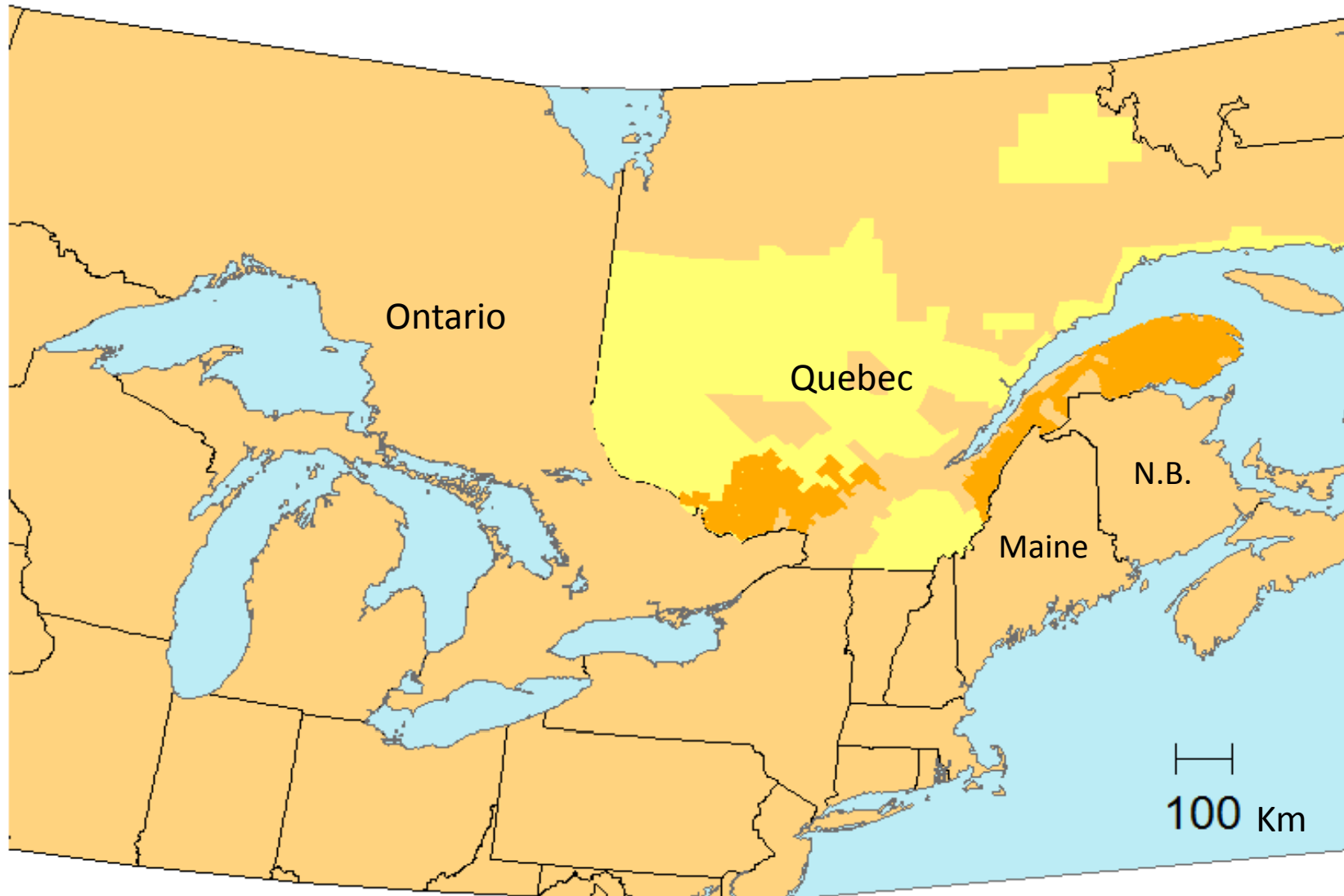
British system

# Bearing tree data



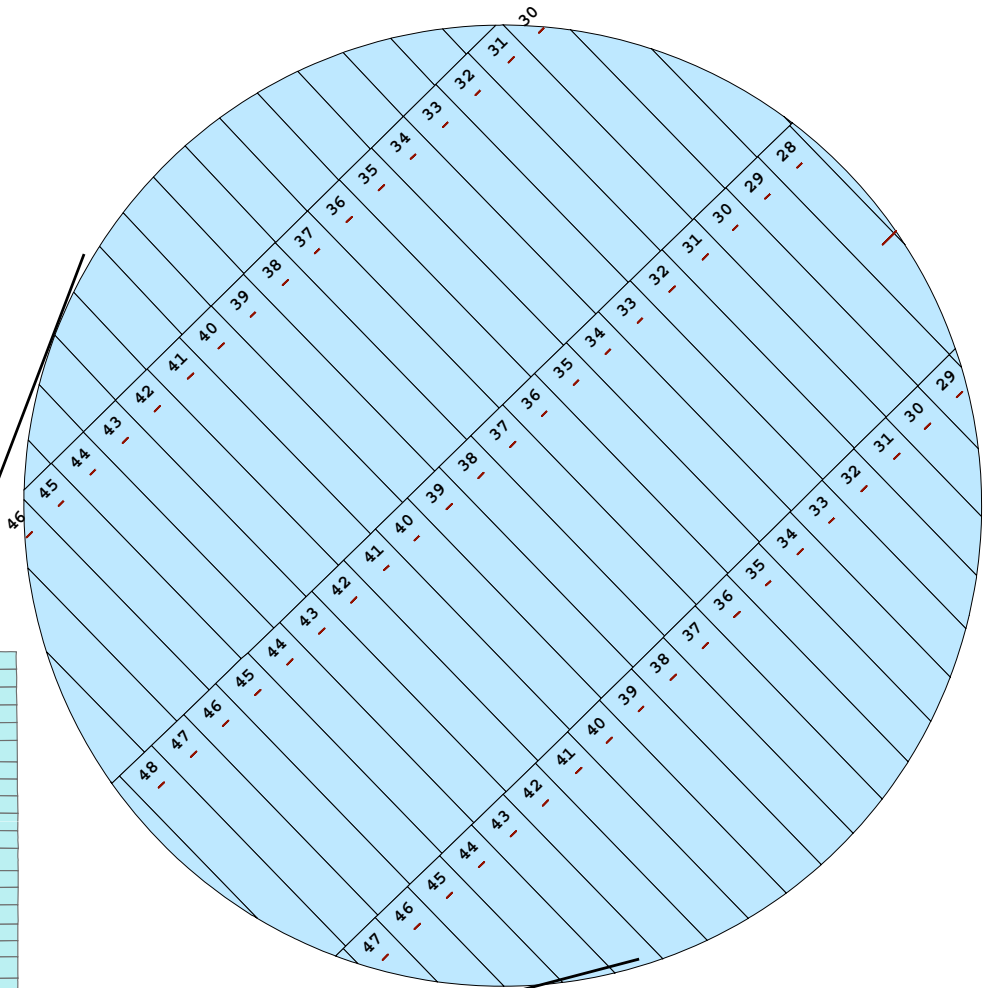
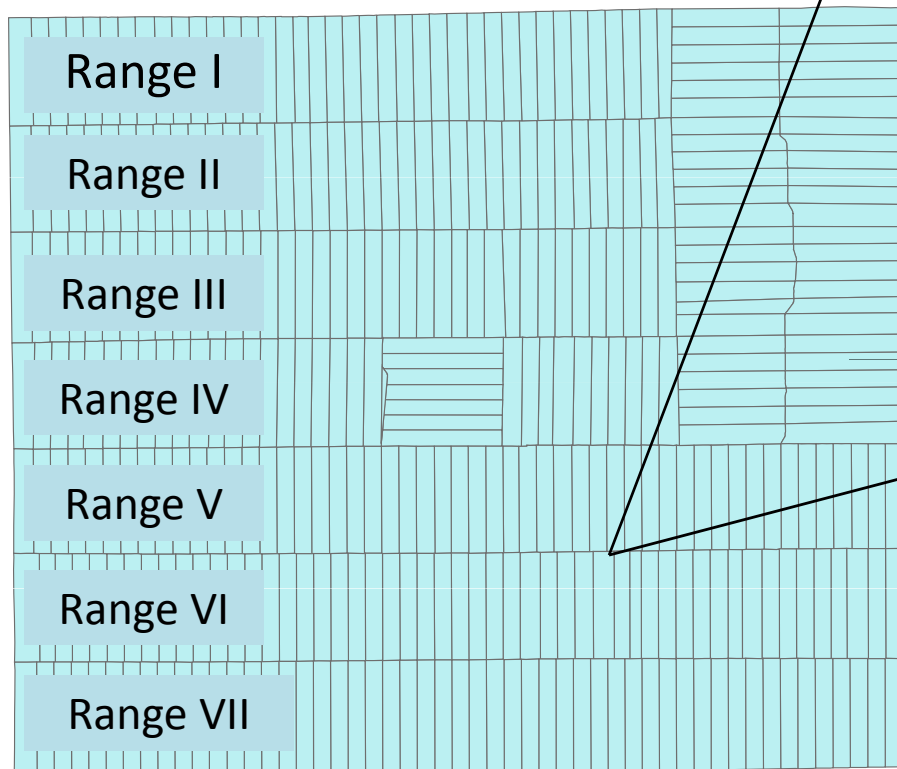
Posts erected at:  
township corners            6 miles  
section corners            1 mile  
quarter-section corners    0.5 mile

## Quebec studies (and potential areas)



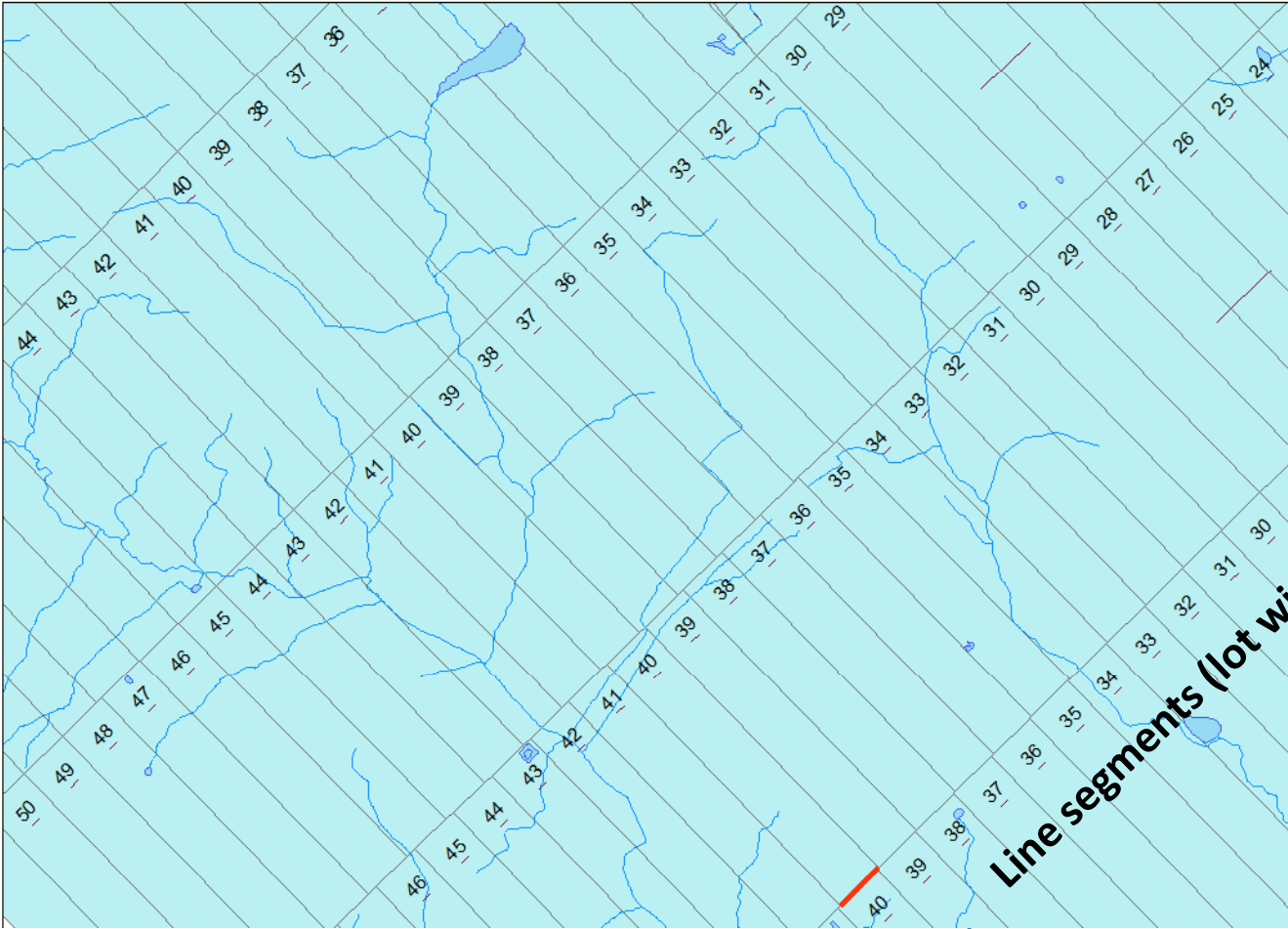
300 survey reports  
80 000 observations of vegetation

# A Quebec township

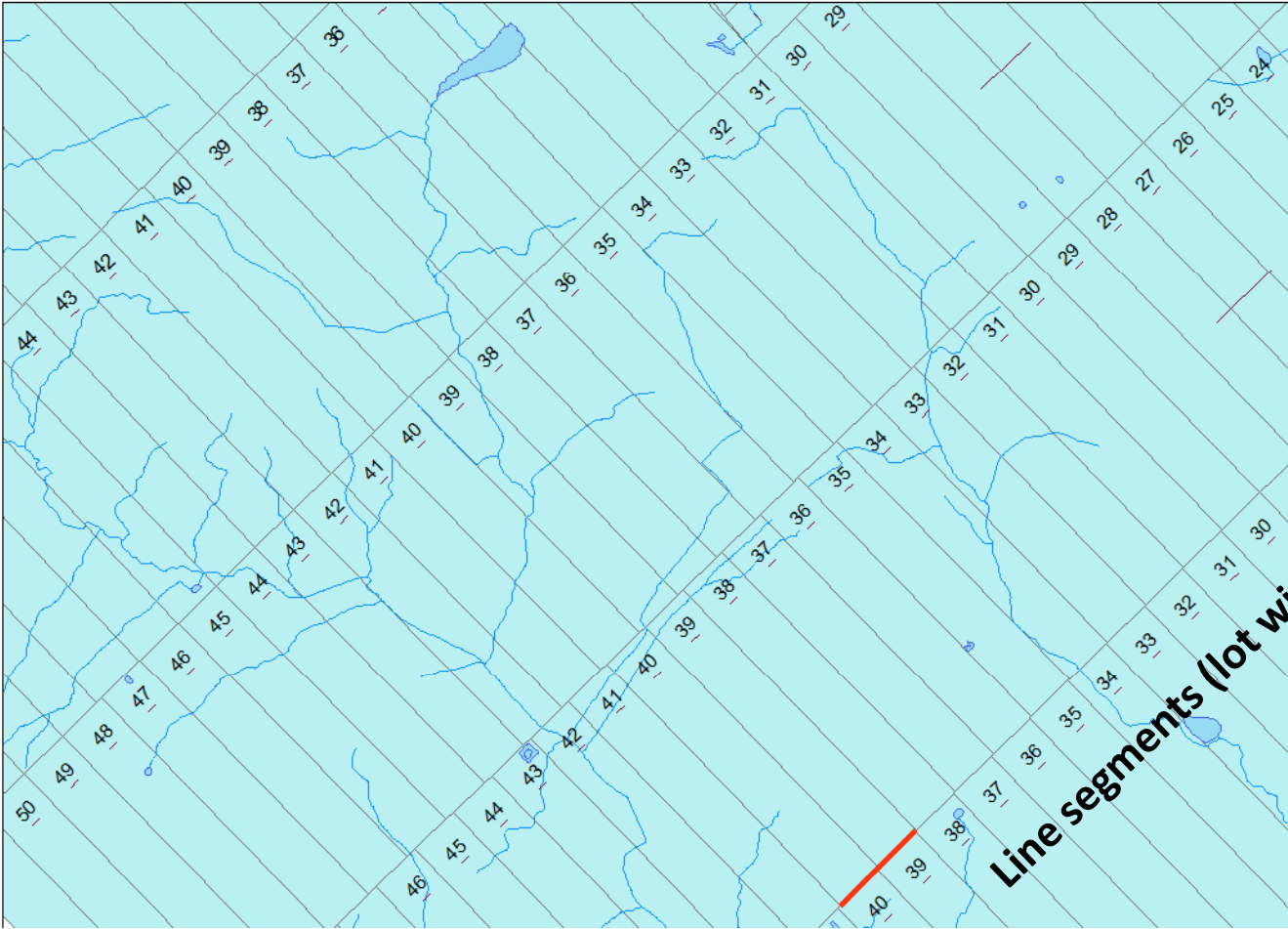


Dimension of each lot:  
= 13ch x 80ch  
= 260m x 1600m  
= 100 acres (40.5ha)

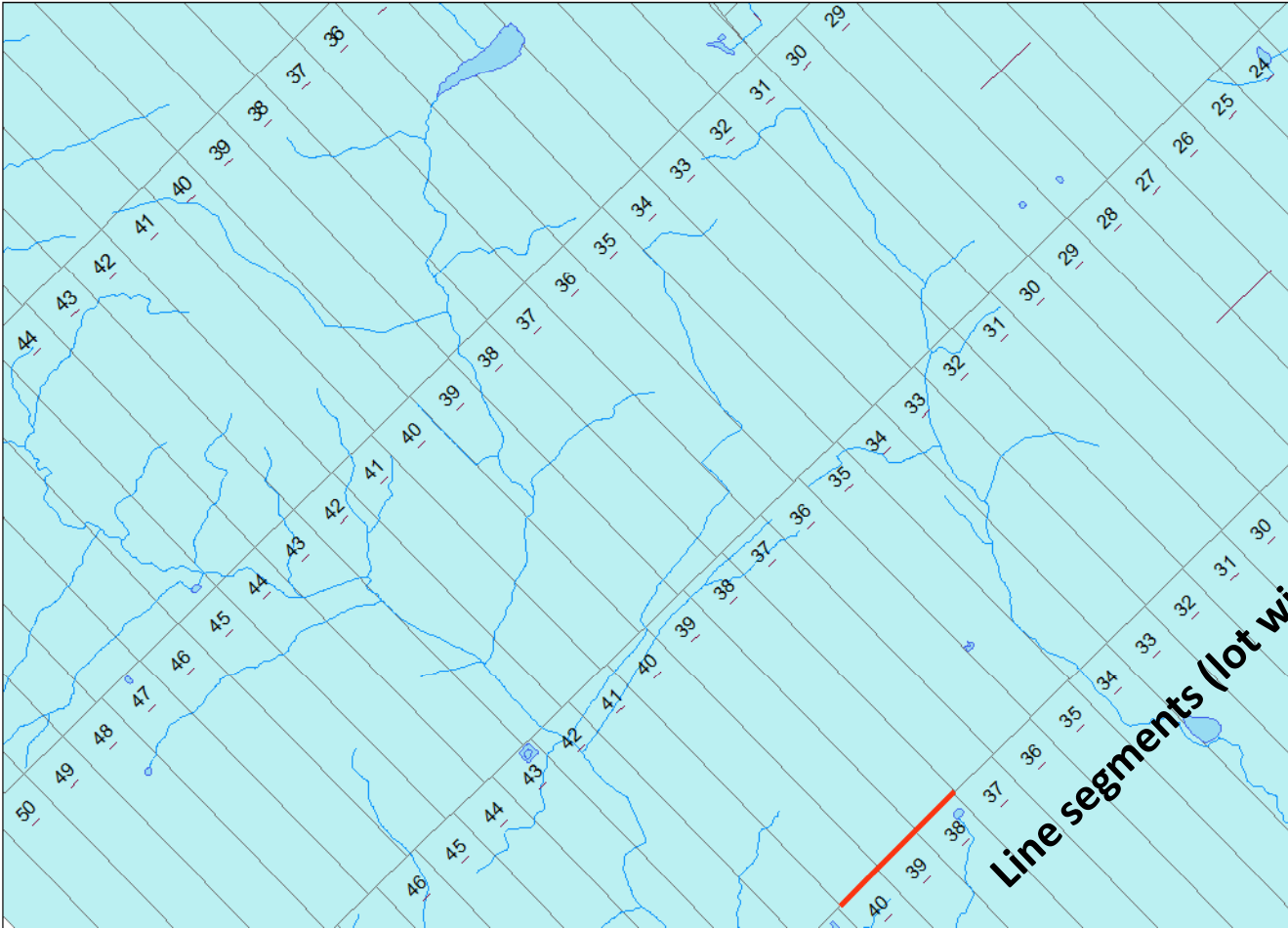
# Illustration of georeferenced linear and point observations



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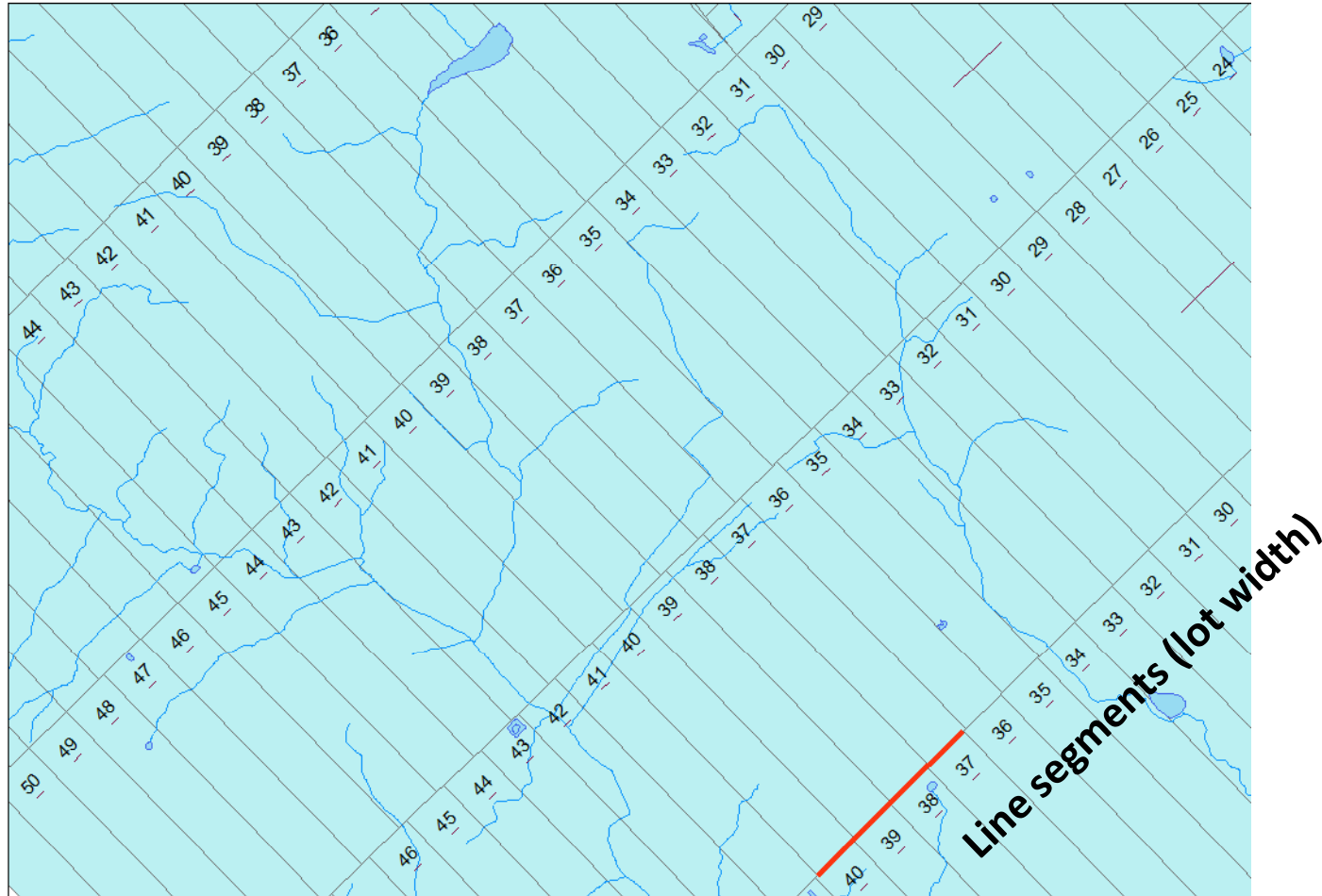


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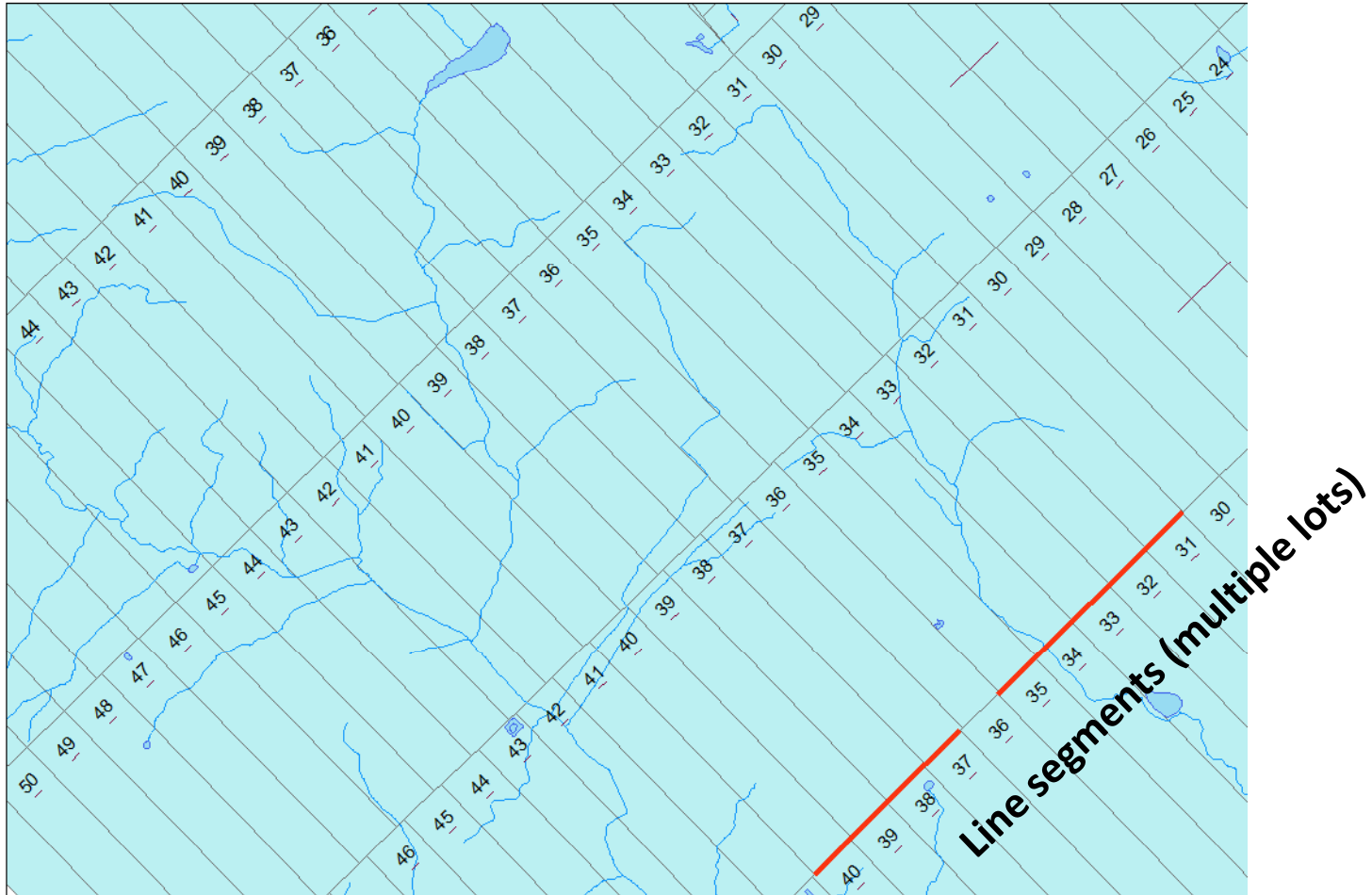




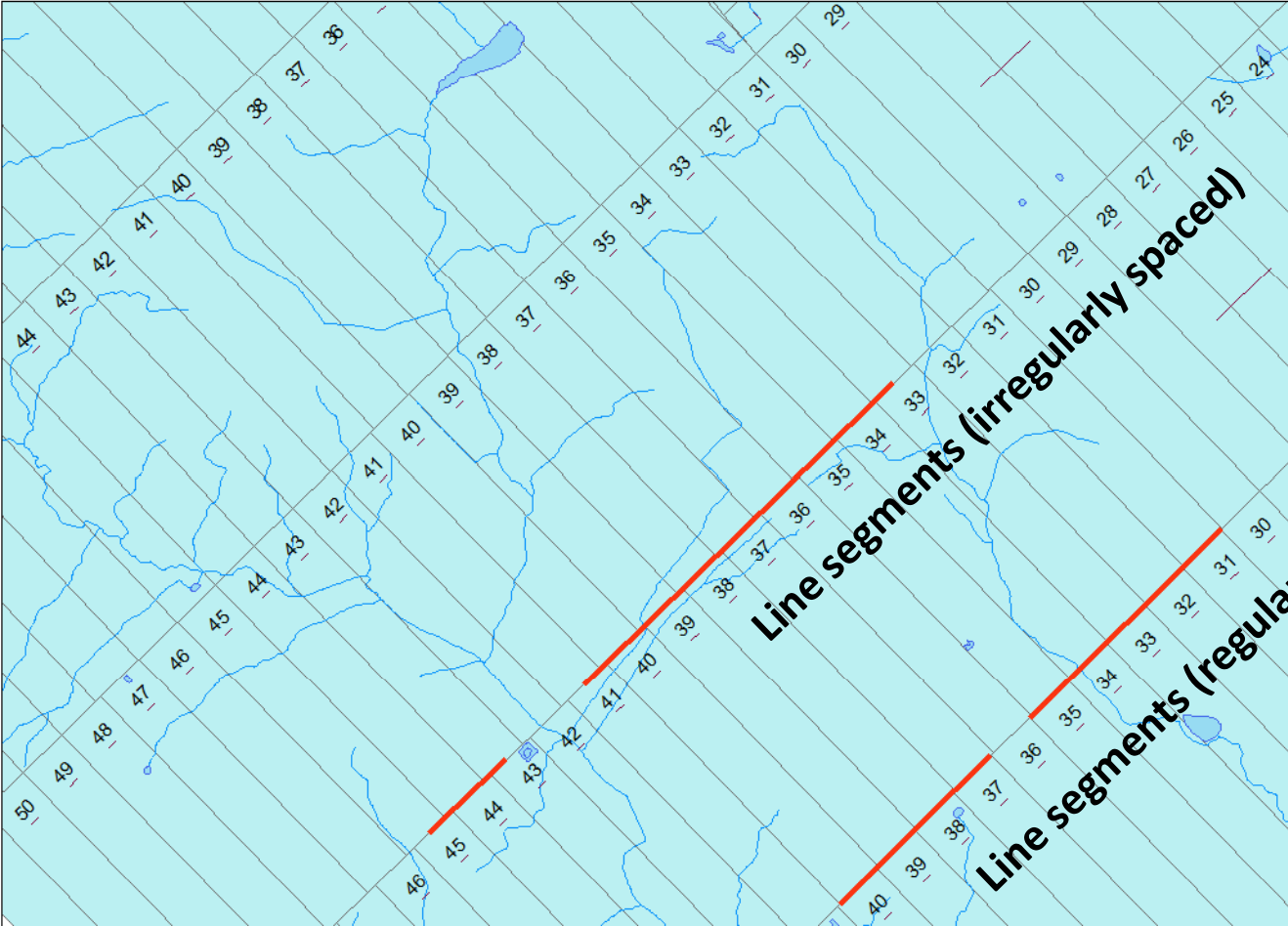
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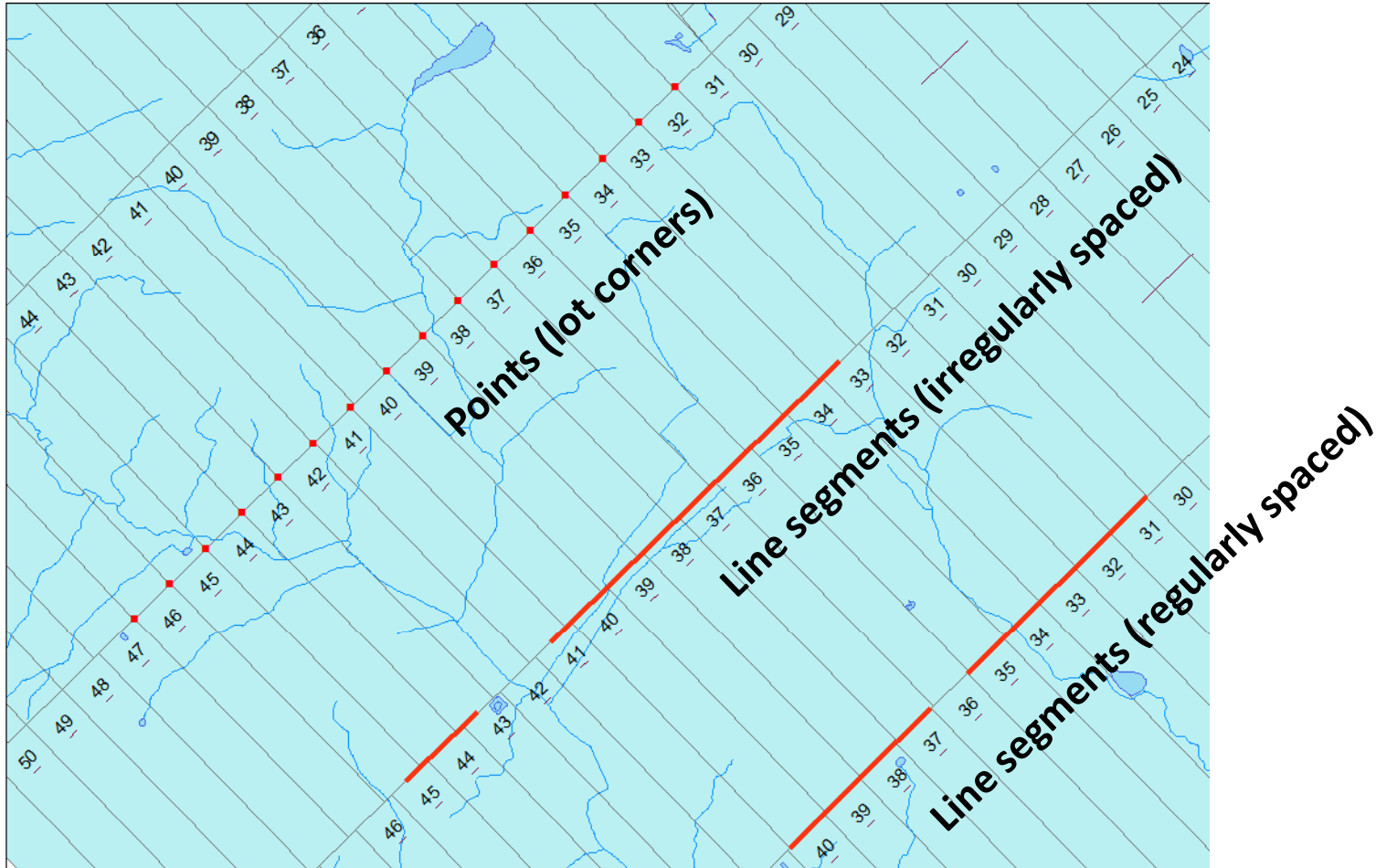
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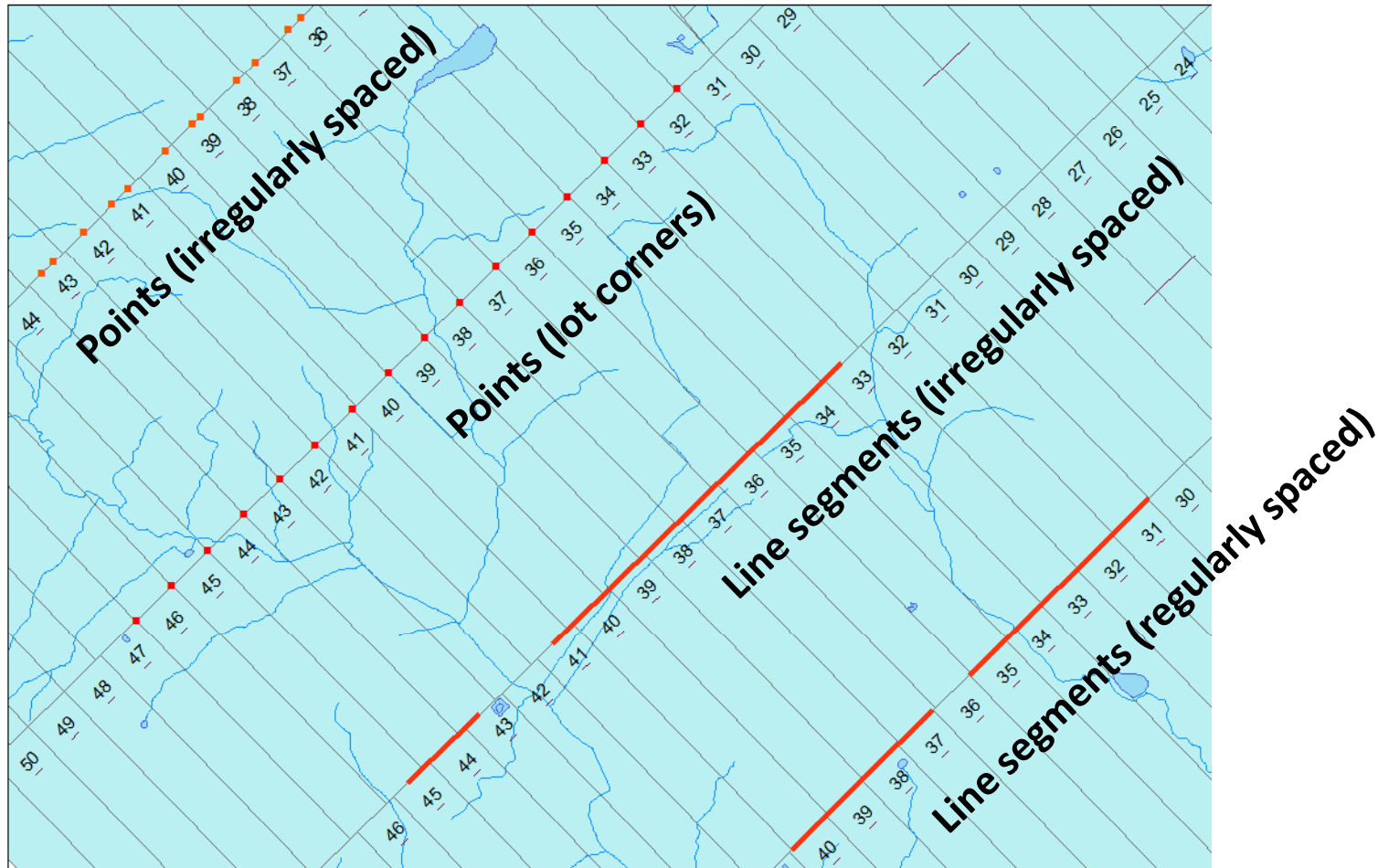
# Illustration of georeferenced linear and point observations



# Illustration of georeferenced linear and point observations



# Illustration of georeferenced linear and point observations



# Example of a linear observations

Range or Lot.	DISTANCE.		REMARKS.	
	Chains.	Links.	Intersection of Rivers, Lakes, Brooks, Mountains, Swamps, &c.	Soil and Timber.
West W lot 21	13		Erect Post No 169 lot No 21 No 20	Spruce Pine Cedar Sapin Birch
20	13		Erect Post No 1610 No 9 lot No 20 No 19	White Birch Spruce Sapin
19	13		Erect Post No 1610 No 9 lot No 19 No 18	Spruce White Birch Larch
18	13		Erect Post No 1610 No 9 lot No 18 No 17	Spruce Larch Sapin: White Birch Small Pine
17	6		Descending gently	
	10		Small steep ascent	
	11		Descending Gently	
	13		Erect Post No 1610 No 9 lot No 17 No 16	Sapin Spruce White Birch
16	4	30	a brook runs to north west. then to 46 met an old post ascending gently marked No 9. 86 links North East of line	

(Metgermette township 1872)

# Example of a linear observations

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	Chains.	Links.	Intersection of Rivers, Lakes, Brooks, Mountains, Swamps, &c.	Soil and Timber.
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21	13		Erect Post No 169 Lot No 21 No 20	Spruce Pine Cedar Sapin Birch
20	13		Erect Post No 166 No 9 Lot No 20 No 19	White Birch Spruce Sapin
19	13		Erect Post No 166 No 9 Lot No 19 No 18	Spruce White Birch Larch
18	13		Erect Post No 166 No 9 Lot No 18 No 17	Spruce Larch Sapin White Birch Small Pine
17	6		Descending gently	
	10		Small Steep ascent	
	11		Descending Gently	
	13		Erect Post No 166 No 9 Lot No 17 No 16	Sapin Spruce White Birch
16	4	30	a brook runs to north west. Then to 4.6 Met an old Post ascending gently marked No 9. 8.6 links North East of line	

## Taxa mentioned

## Distance (m.) along line

spruce, pine, cedar, fir, birch

1040-1300

white birch, spruce, sapin

780-1040

spruce, white birch, larch

520-780

spruce, larch, fir, w. birch, small pine

260-520

sapin, spruce, white birch

0-260

a brook at 4.30 chains

(Metgermette township 1872)

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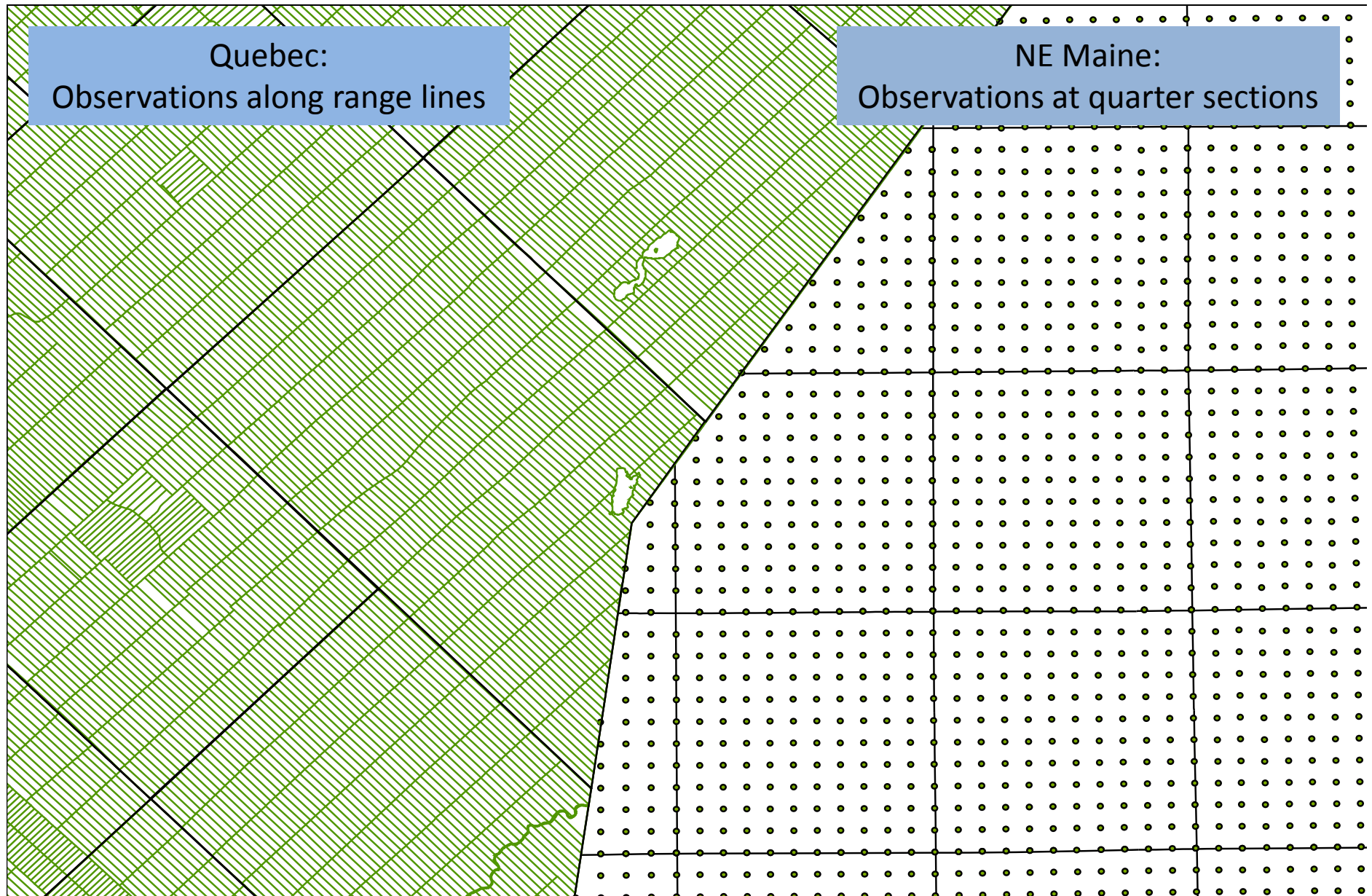
# Example of a mixture of linear and point observations

Lot	chs	lks	Notes and Remarks	Taxa mentioned	Distance along line	Lot post
18	14	00	Gradual Descent Slope to South White Birch	white birch	0	
	15	00	Ascending Gradually Slope to West			
	19	00	Descending Rapidly a Great Slope to South Planted a Post marked N <sup>o</sup> 18 + N <sup>o</sup> 19			100
19	3	00	Level - Luce a timber the same	same timber	160	
	7	00	Descending Rapidly a Great Slope to South			
	12	00	Level Spruce Sapin and Alder Swamp	spruce, sapin, alder swamp	340	
	17	00	Cedar Spruce Sapin and Alder Swamp Good	cedar, spruce, sapin, alder swamp	440	
	17	70	a Brook 10 Links Wide runs to South West	brook at 454m		
20	19	00	Planted a Post marked N <sup>o</sup> 19 + N <sup>o</sup> 20			480
	1	00	a <u>Cavan</u> Stunted Spruce and Larch	a savanne, stunted spruce and larch	500	
	4	00	a clear <u>Cavan</u> extending to South West	a clear savanne	560	
	6	00	Stunted Spruce Cedar and Larch	stunted spruce, cedar and larch	600	
	9	00	End of <u>Cavan</u> Spruce Sapin and White Birch	end of savanne, spruce, sapin, w. birch	660	
	19	00	Planted a Post marked N <sup>o</sup> 20 + N <sup>o</sup> 21			860
21	2	00	a Cedar Swamp - a small stream runs to South	cedar swamp	900	
	9	50	the same stream runs to East	stream at 1050m		
	11	00	parted Cedar Swamp a Gentle ascent Spruce	end of cedar swamp; spruce	1080	

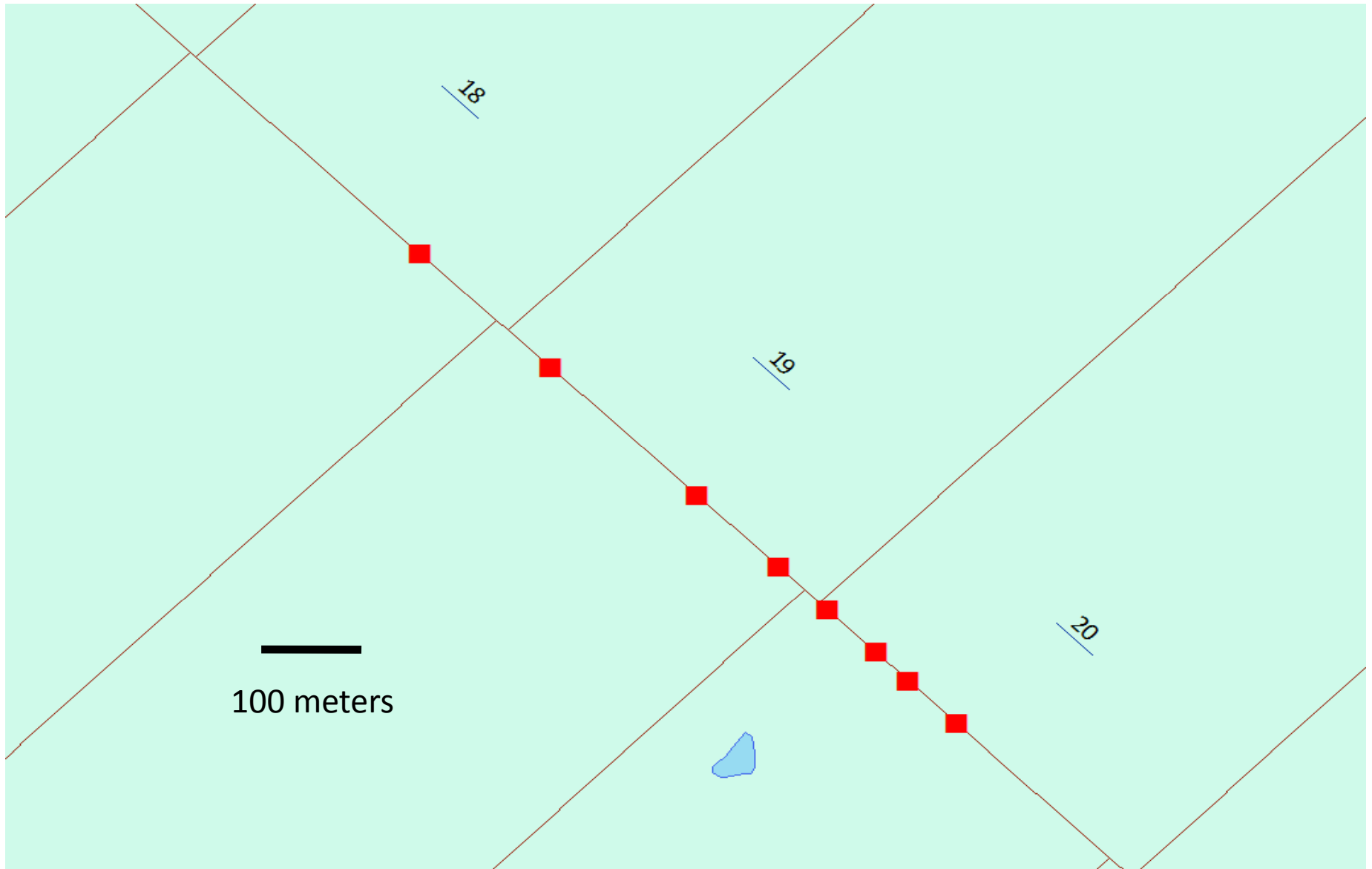
(in meters)

(Standon township 1836)

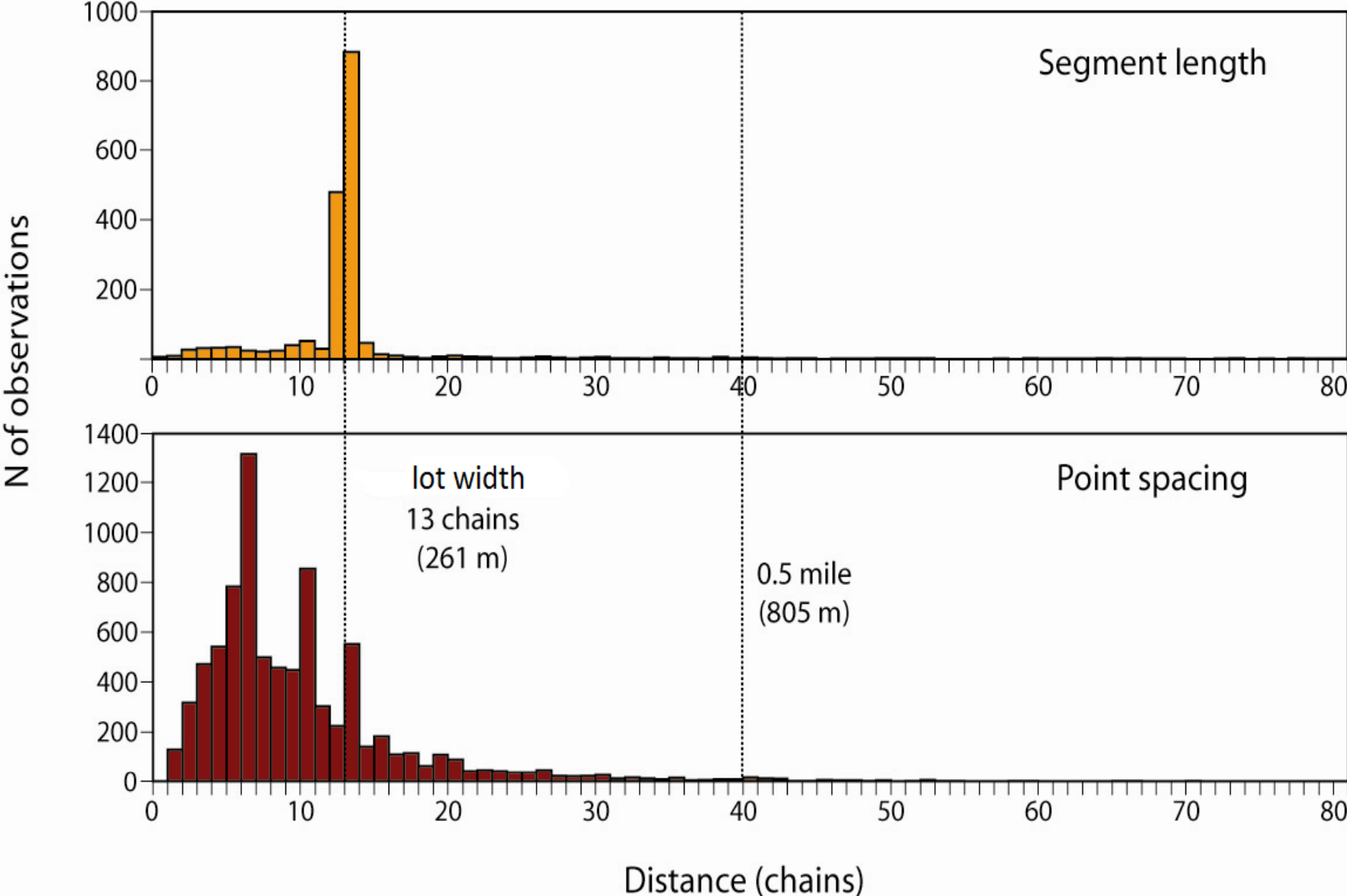
# A different spatial organisation of data



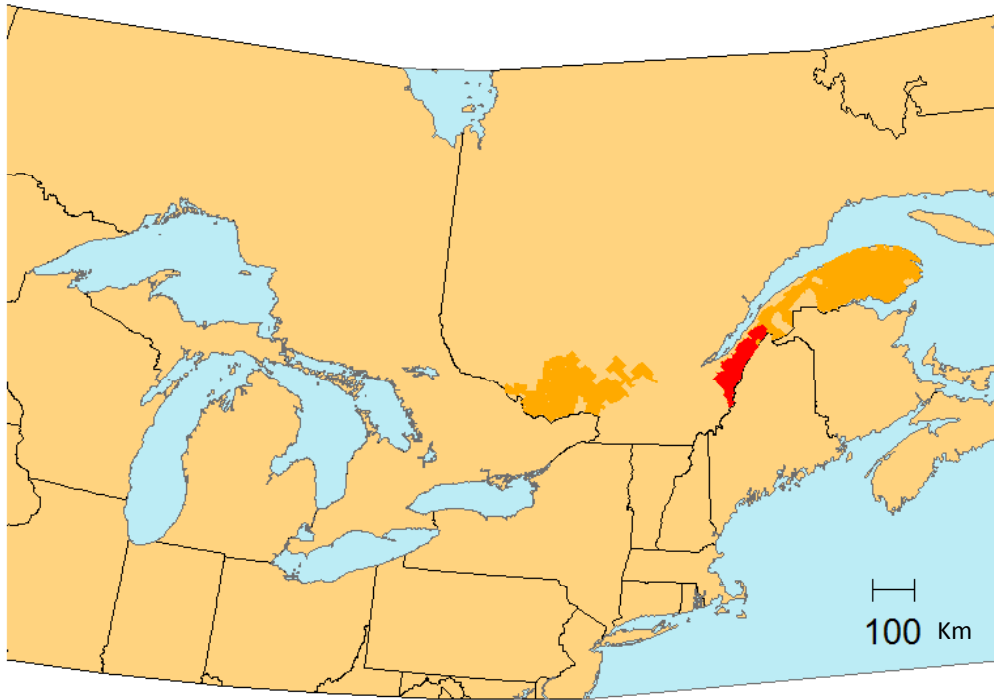
## Irregularly spaced point observations (example)



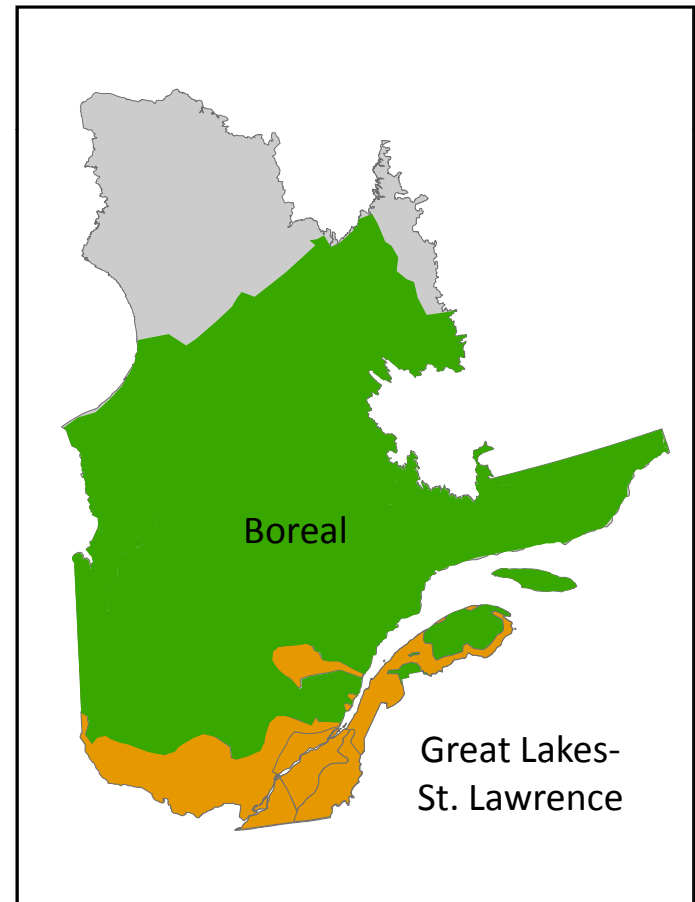
# Density of observations in one region of East Quebec



# Study area of preliminary findings

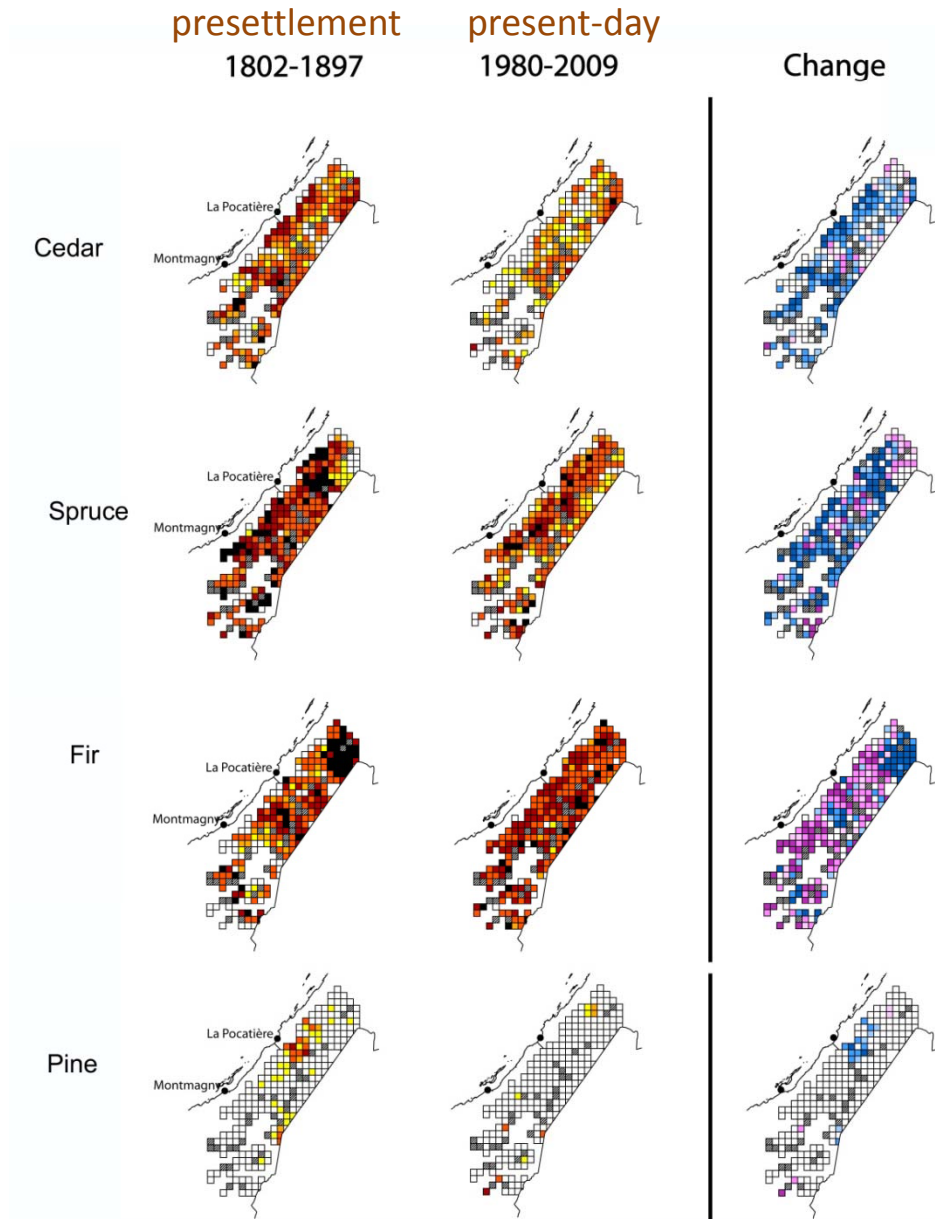
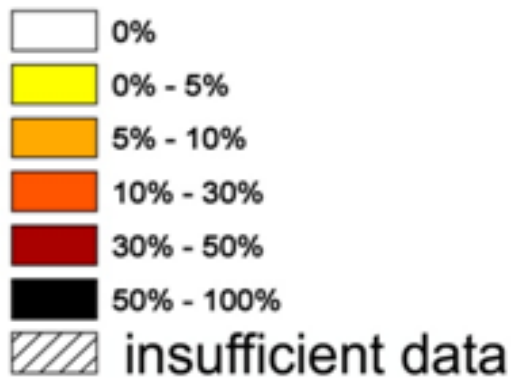


Forest zones (Rowe 1972)



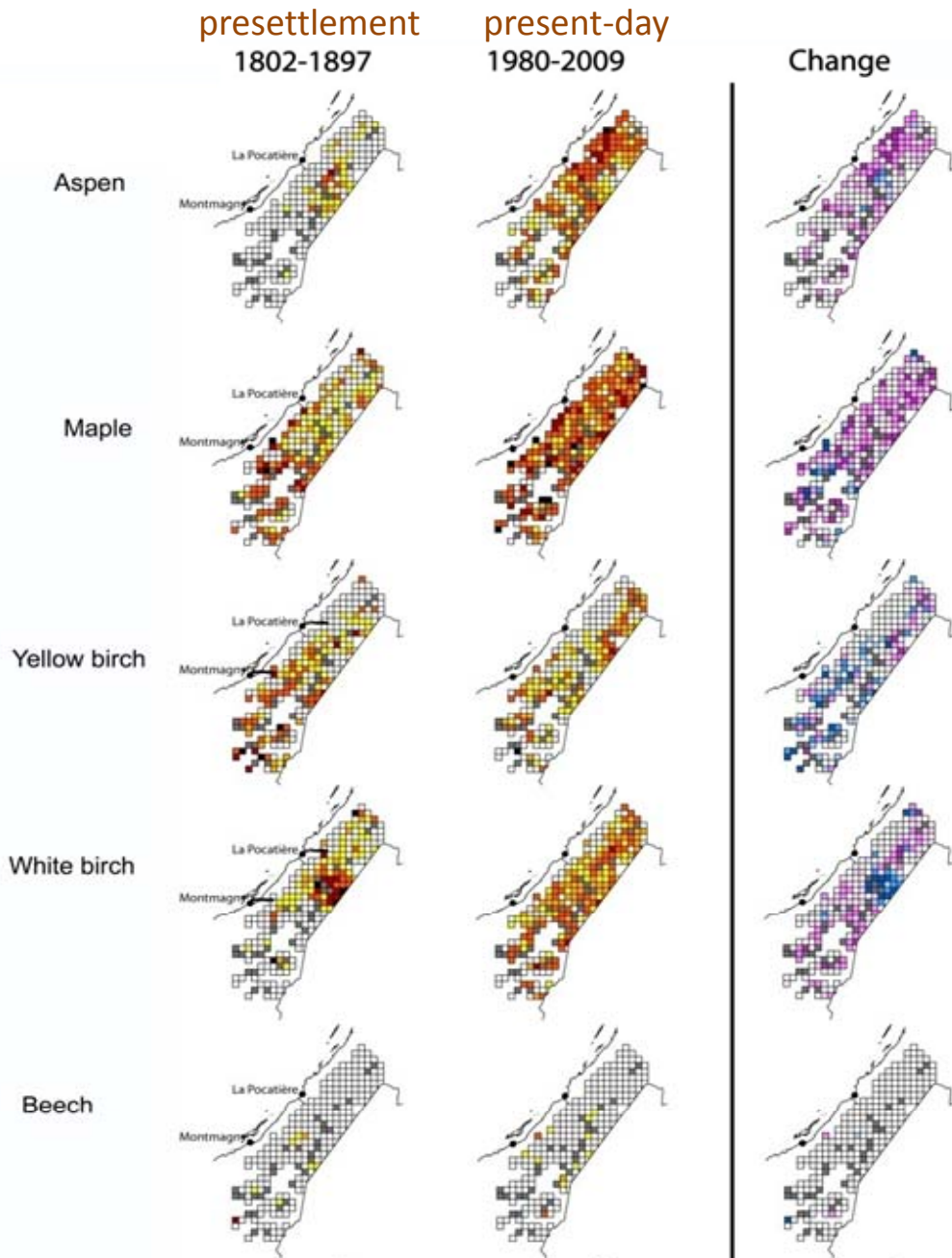
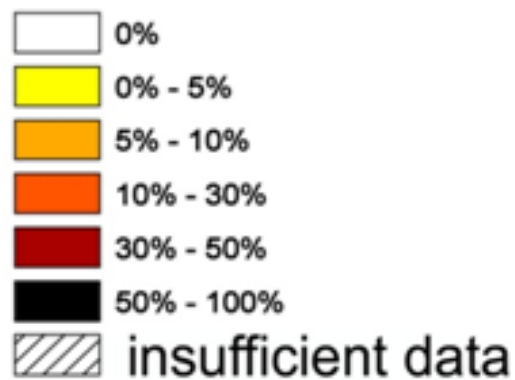
# Predominant taxon in 25km<sup>2</sup>cells: Conifers

% of observations in cells



# Predominant taxon in 25km<sup>2</sup>cells: Deciduous

% of observations in cells



# Original aspects of the data base

- Obtaining baseline reference forest conditions
  - Insignificant impact of First Nation peoples (north + east)
  - Pre-agricultural, not necessarily pre-logging
  - In most areas: only repeated cuts (minimal agriculture) (fires ?)
- Description of tree communities
  - rather than of individual trees, or generalized forest conditions
- Uninterrupted descriptions of vegetation along transects
  - Co-occurrence of communities
  - Location of communities/species along environmental gradients
- Repeat surveys
  - Progressive forest change
  - Validate surveyor's work
  - Effect of particular disturbance events



# Surveyor camp in 1872

