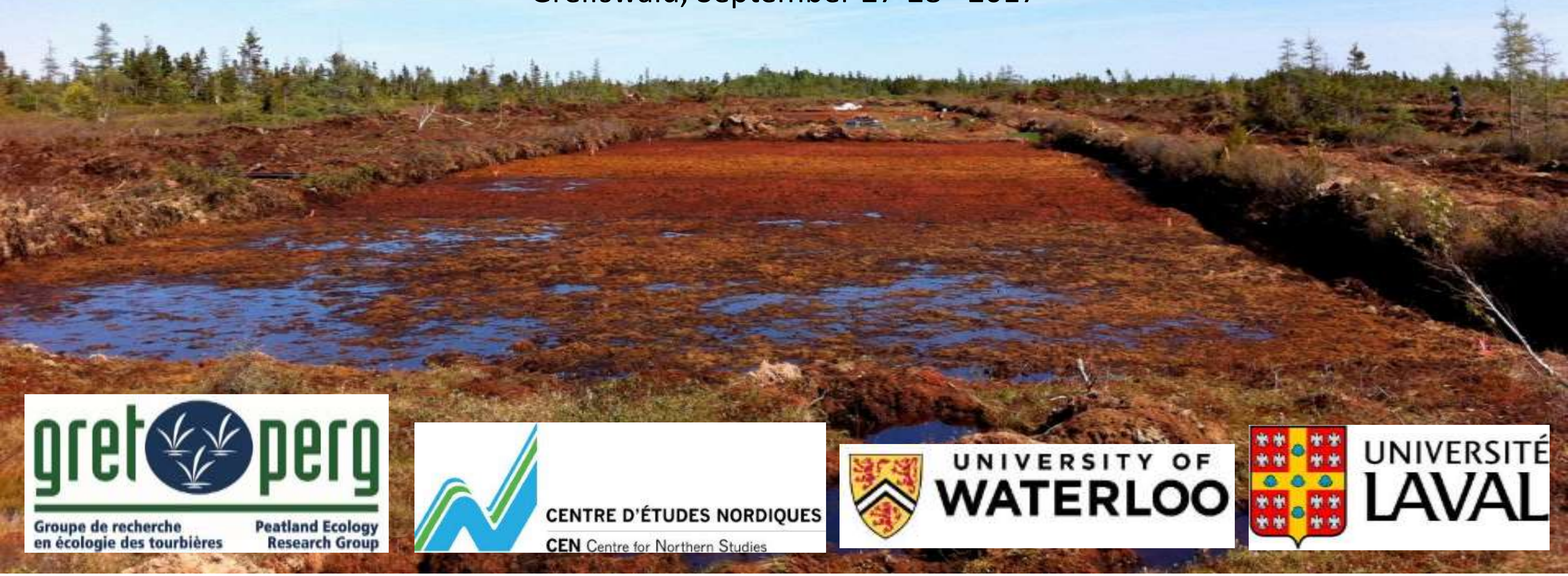
Sphagnum farming initiatives in Canada : an overview

S. Hugron, L. Rochefort, C. Brown, M. Strack and J. Price

RRR2017: Renewable Resources from Wet and Rewetted Peatlands
Greifswald, September 27-28th 2017



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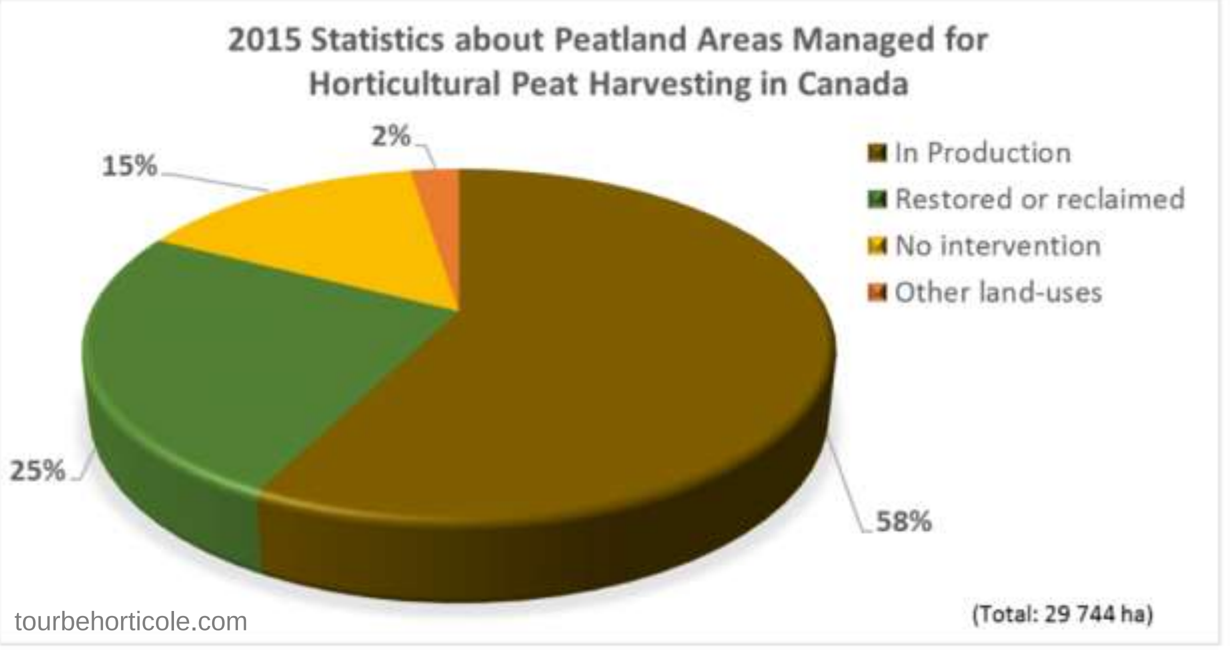
Canadian Context :

Peatlands in Canada: 113.6 million hectares (Tarnocai et al. 2011)

↳ 0.03 % Managed for **Horticultural Peat production**



Canadian Context : Sphagnum farming

- Climate:
  - 1000 mm/yr
  - 6 months winter
  - Hottest month = July (average = 18°C)
- Landscape:
  - At or above sea level (0 to 100 m)
  - Block-cut peatland (no compaction)
- Residual peat :
  - > 50 cm (up to 1.5 – 2.0 m)
  - Acid (p*H* = 3.6)
  - Low nutrients
  - Von Post = H3-H4

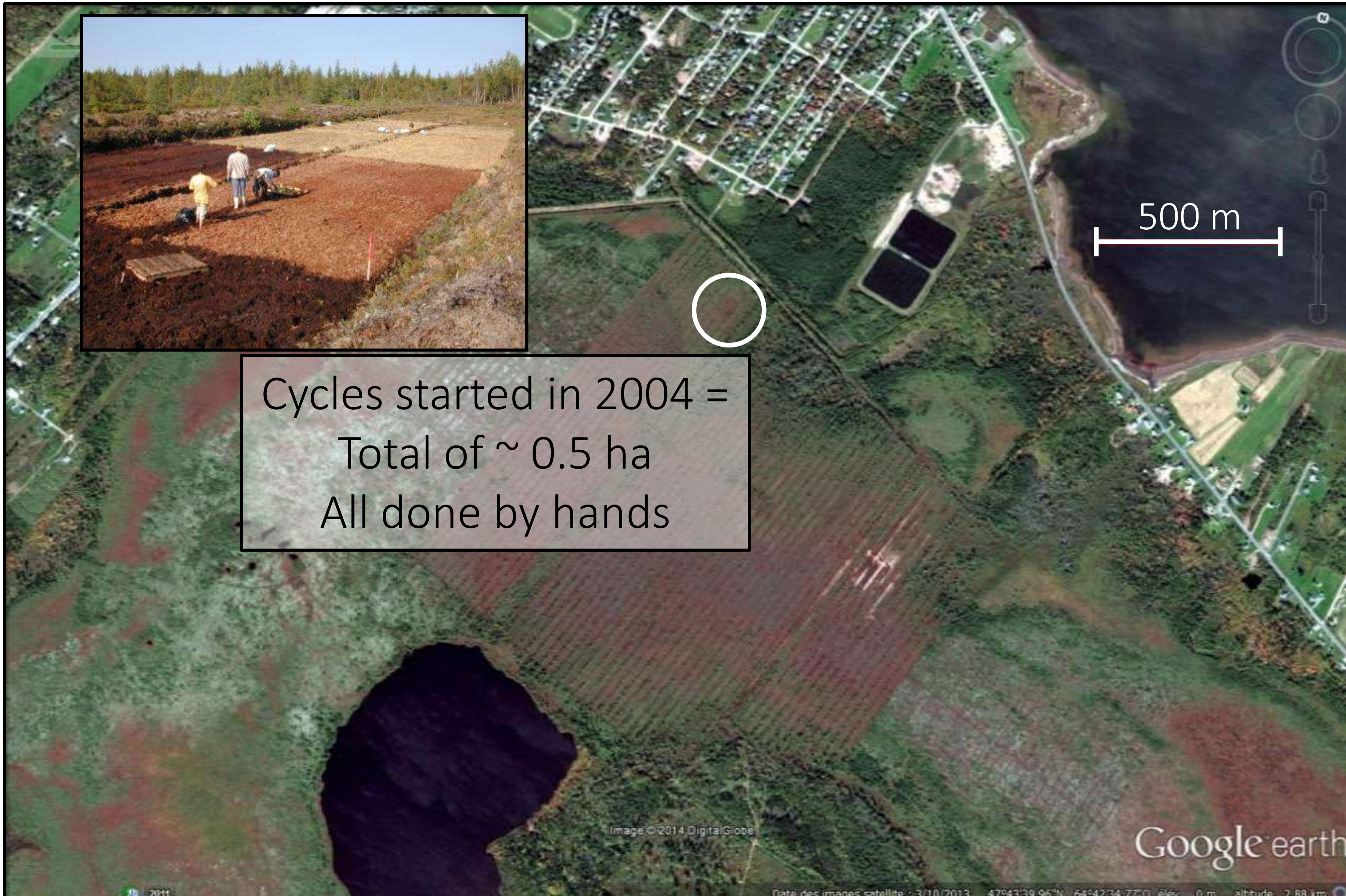
Sphagnum farming in Canada: the past

First small-scale trials (before 2000):
(Rochefort and Bastien 1998; Campeau et al. 2004)

- Better in basins than flat peat fields
- Avoid inundations
- Surface irrigation = No, if DOC water

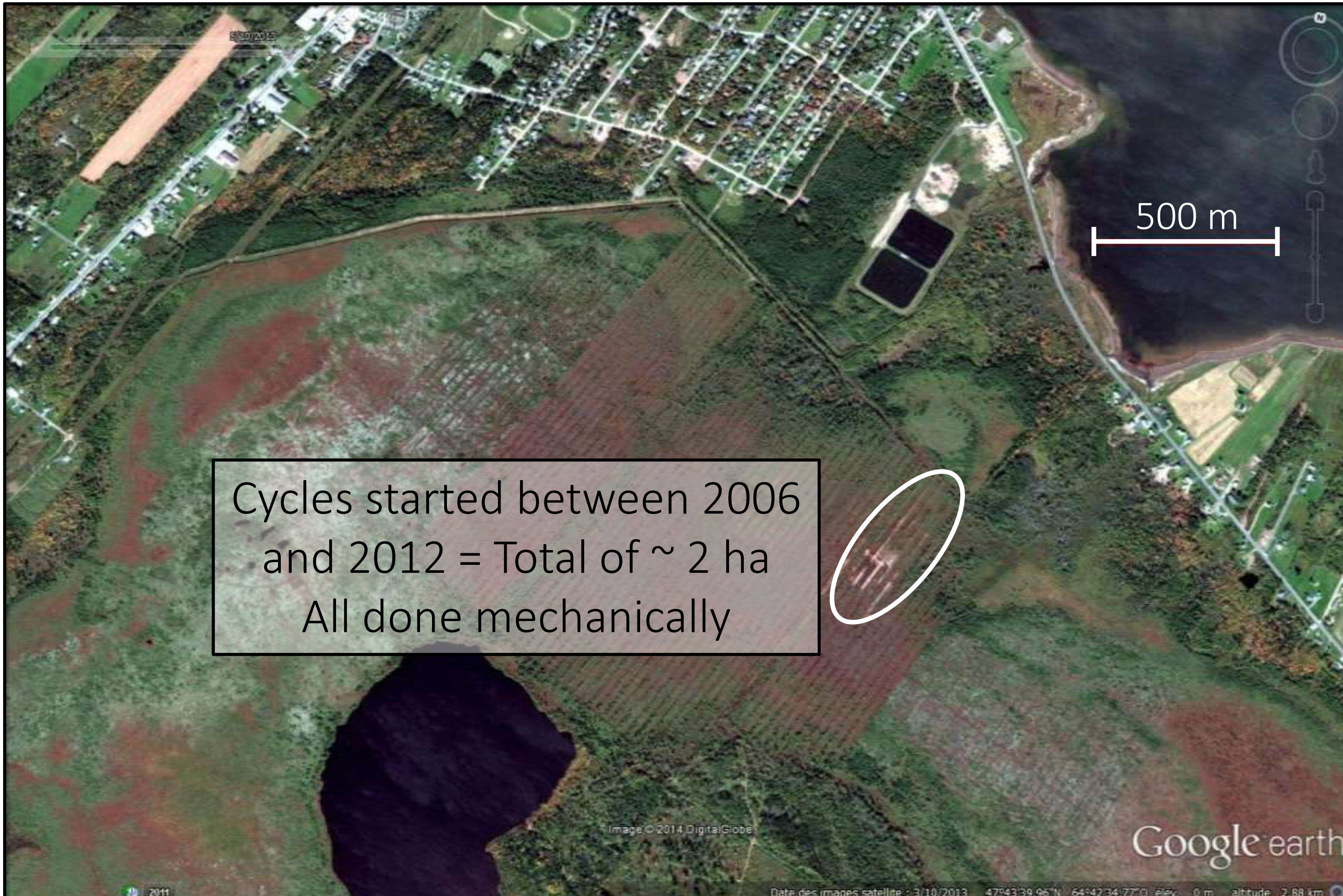
Sphagnum farming in Canada: the past

First large-scale trial: New Brunswick



Sphagnum farming in Canada: the past

First large-scale trial: New Brunswick



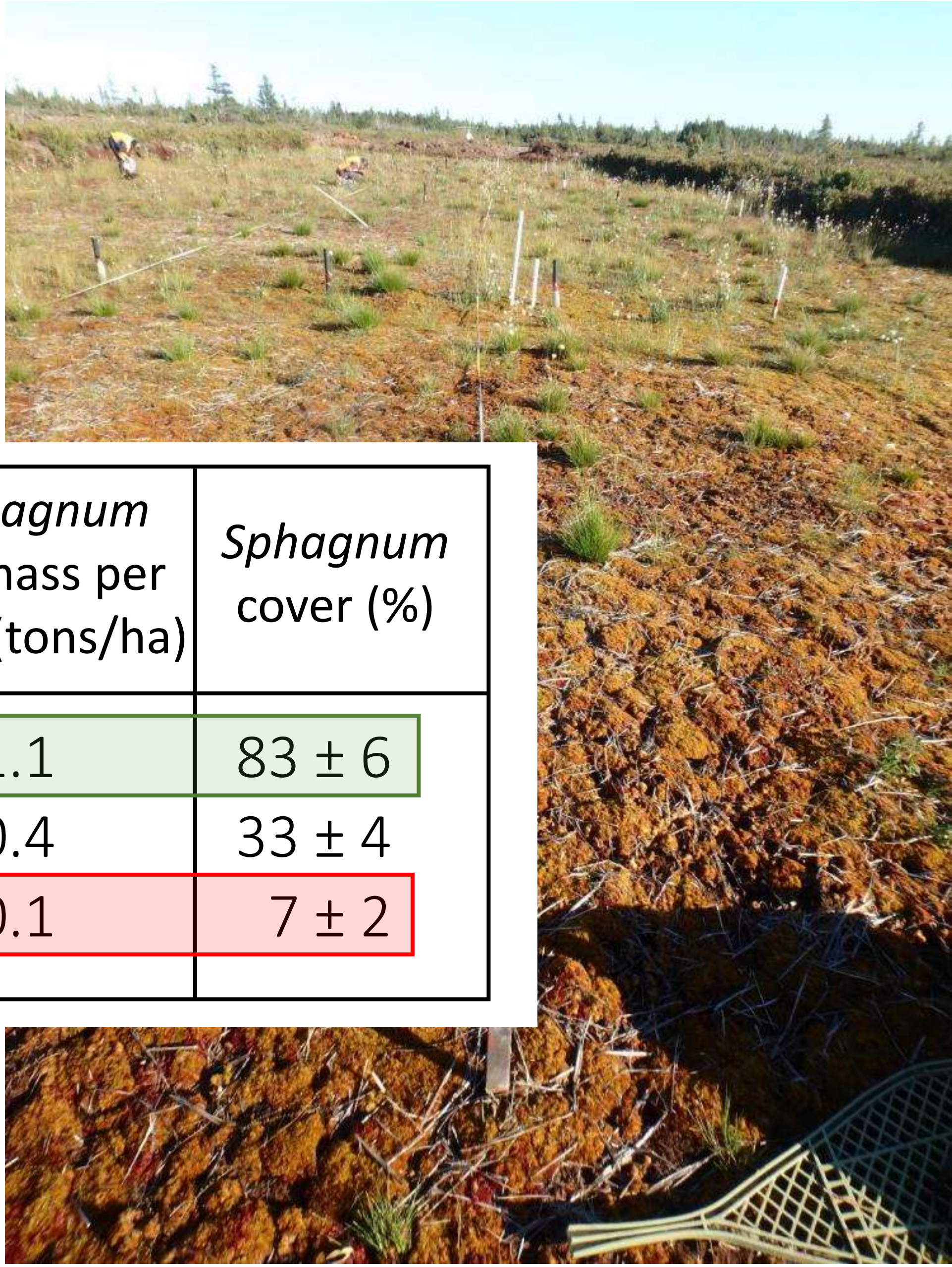
Mechanized implementation of *Sphagnum* farming

Sphagnum harvesting *Sphagnum* spreading Mulch spreading

What we learned

- *Sphagnum* farming is feasible

Production cycle	Number of growth season(s)	*Sphagnum* biomass per year (tons/ha)	*Sphagnum* cover (%)
2006	7	1.1	83 ± 6
2008	5	0.4	33 ± 4
2009	4	0.1	7 ± 2



but variability among cycles is high…

What we learned

Factors influencing yields:

(Pouliot et al 2015; Chirino et al. 2006, Campeau et al. 2004,

Price et al. 1998)

- Climate first growing season
- Distribution of water (topography of the fields)
- Water fluctuation during season

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Sphagnum farming: A long-term study on producing peat moss biomass sustainably

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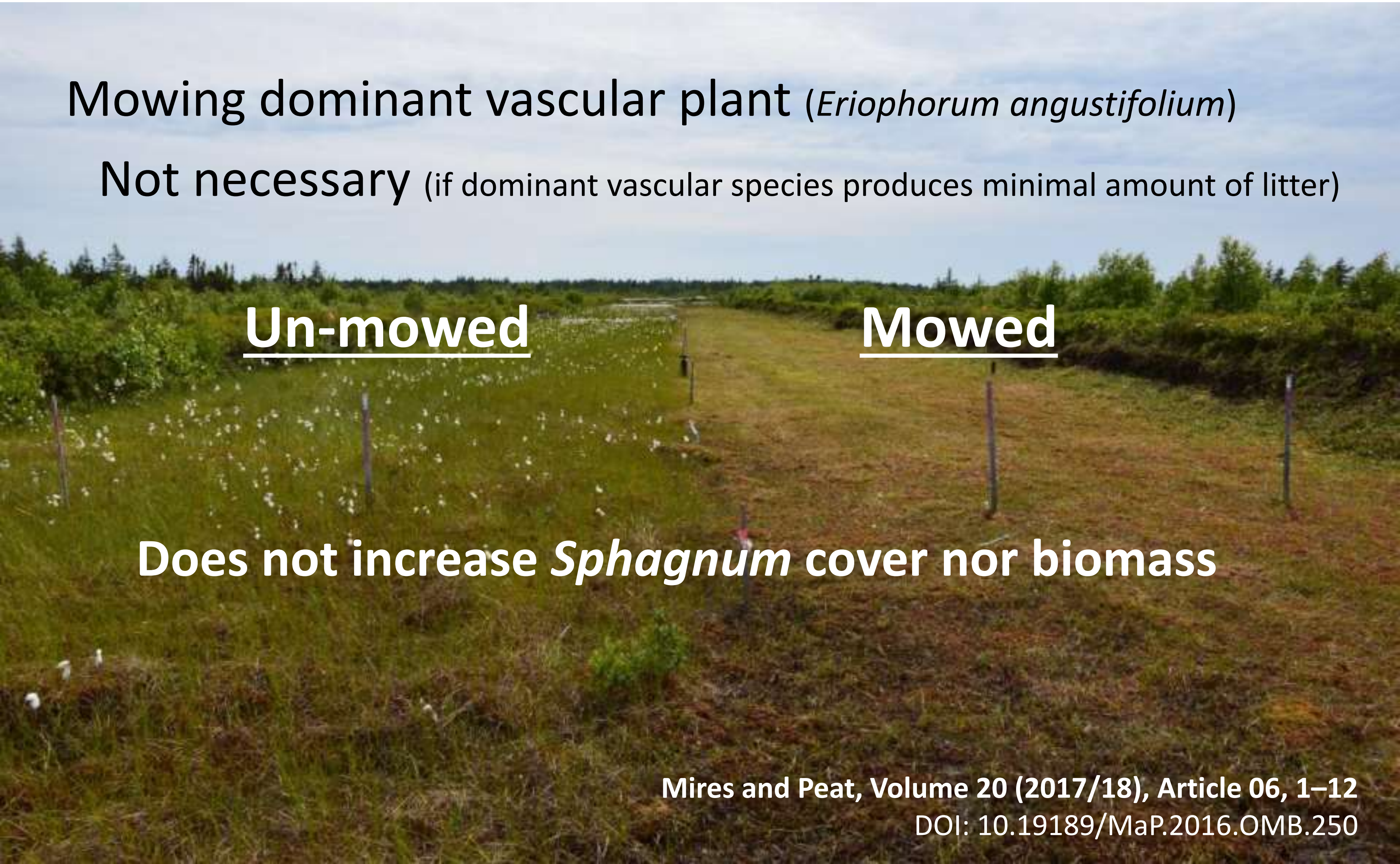
What we learned

Mowing dominant vascular plant (*Eriophorum angustifolium*)

Not necessary (if dominant vascular species produces minimal amount of litter)



Does not increase *Sphagnum* cover nor biomass

Mires and Peat, Volume 20 (2017/18), Article 06, 1–12
DOI: 10.19189/MaP.2016.OMB.250

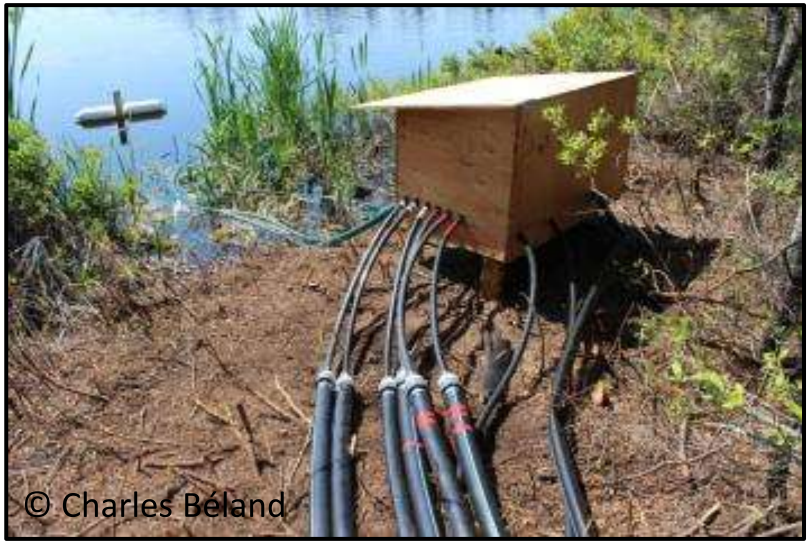
Sphagnum farming in Canada: the present

Large-scale trials with **automated irrigation**

Irrigation system

Quebec

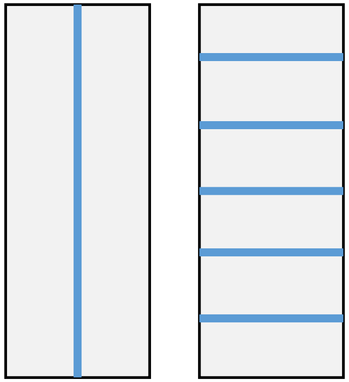
New Brunswick



Basins design

Quebec

New Brunswick



Underground drains

Treatments tested

Quebec

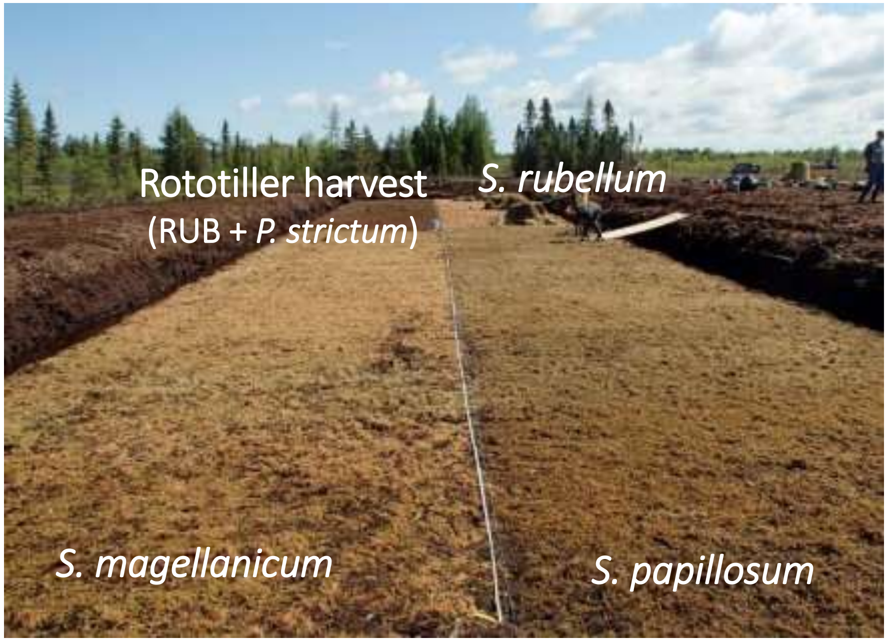
New Brunswick

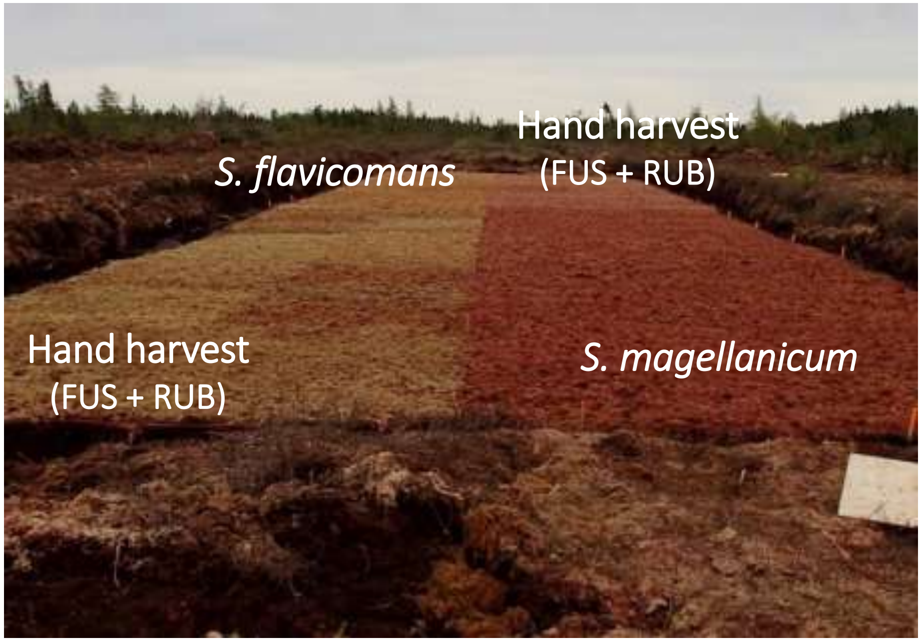
Water target

-10 cm

-20 cm

Species introduced



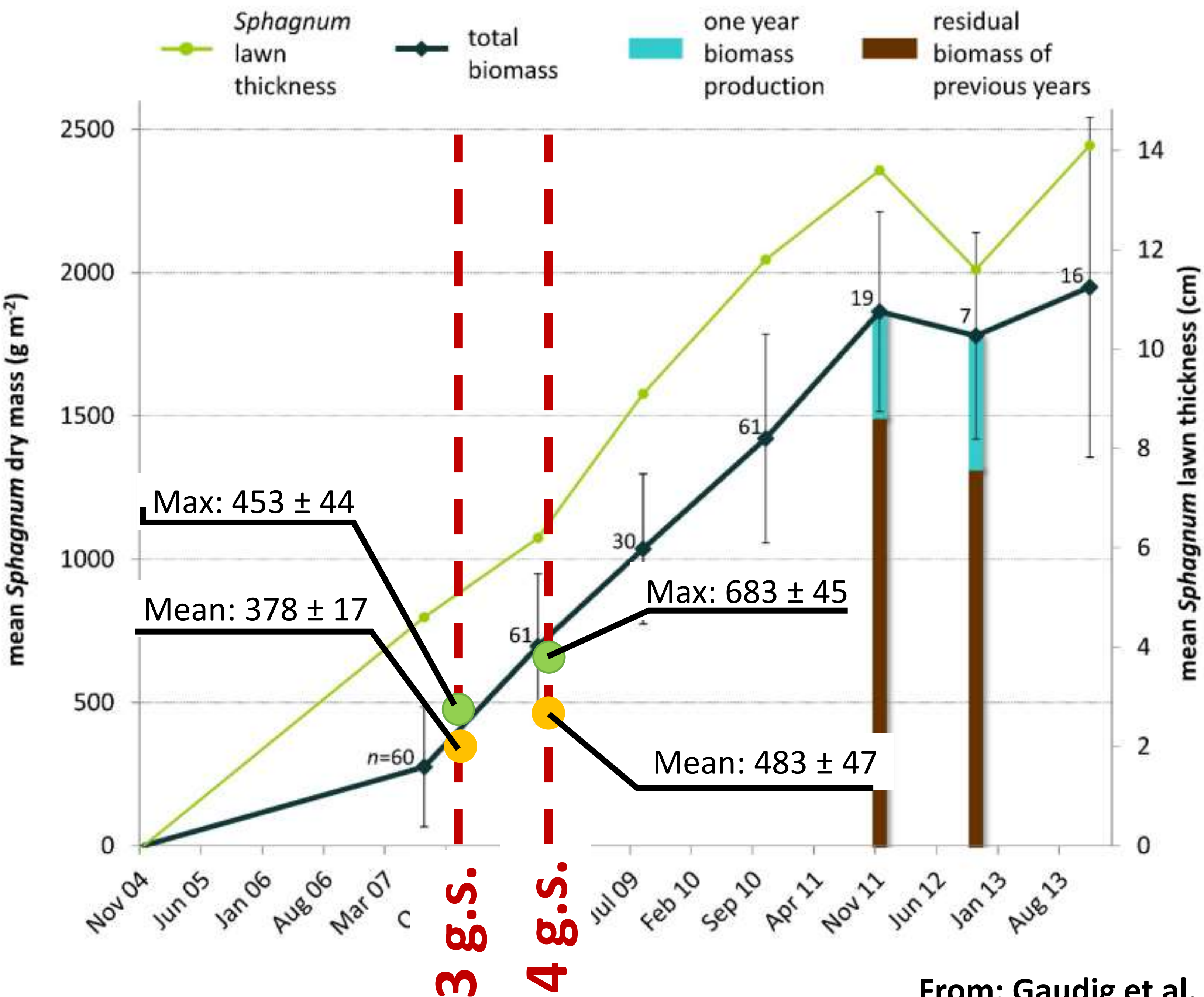


Main results : Vegetation

Same tendancies observed in the two sites

Water table target :

-10 cm target **yields 1.5 times more biomass** than -20 cm target



From: Gaudig et al. (2017)

Main results : Vegetation

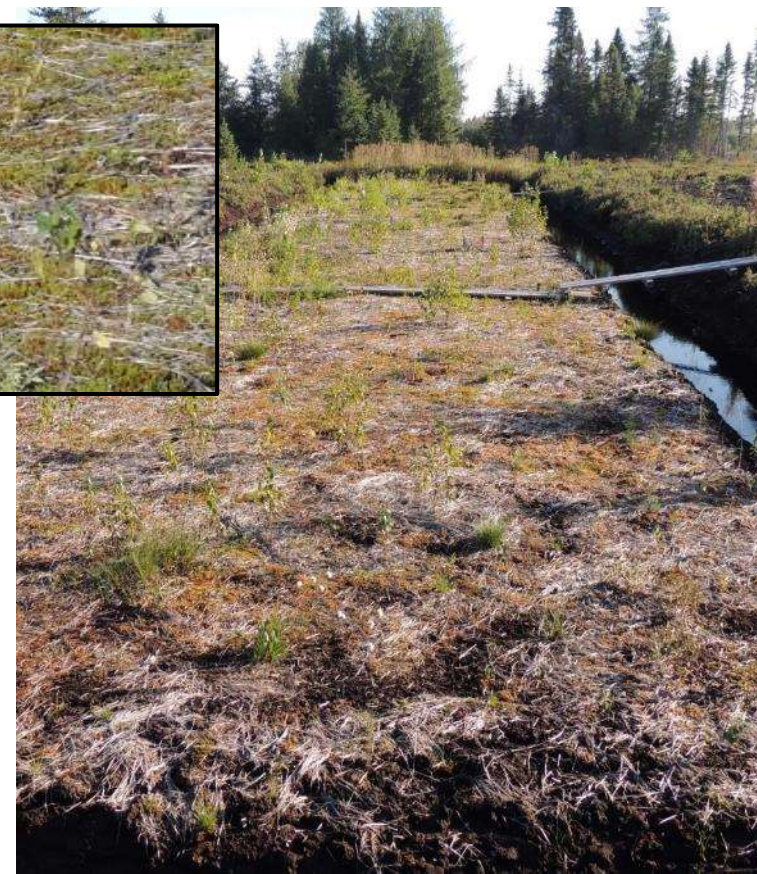
Irrigation (after 3 to 4 years):

Irrigated basins **are more productive** than unmanaged basins

Cover: 2 to 3 times higher
Biomass: 1.5 to 2 times higher

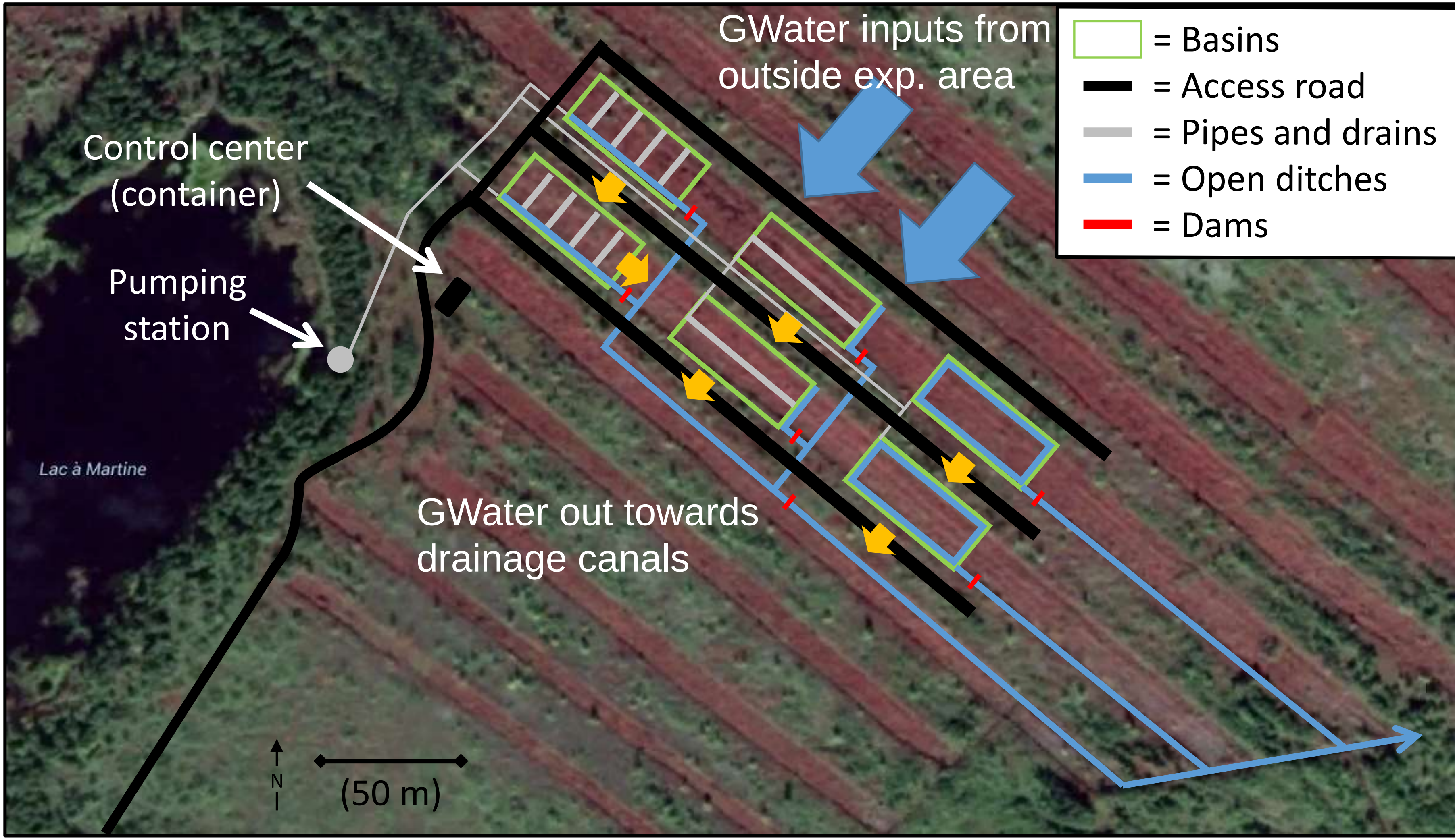
Automated

Non-automated

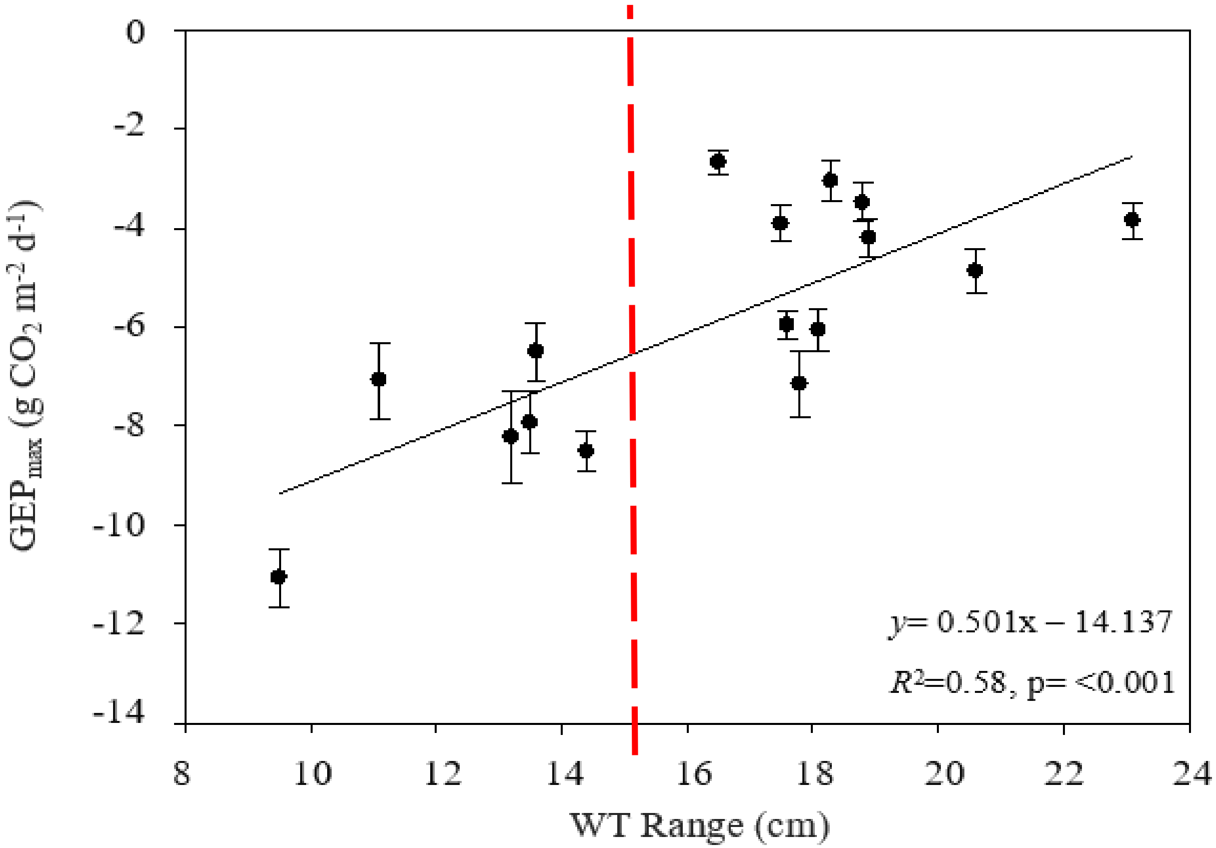


Main results : Hydrology

Basin water management design affected by site scale hydrological processes



Main results : Hydrology



- CO_2 uptake was not limited by dry (WT -15 to -25 cm) or wet (WT < -15 cm) treatments.

- Fluctuations in WT (range) were more important for limiting/ increasing CO_2.

- 15 cm = threshold for increasing productivity.

Main Results: Hydrology

- To maintain target WT levels:
  - Combination of pipes and canals to increase water distribution, and reduce WT fluctuations
  - Use WT levels in basin, and not canals, to monitor when to activate irrigation

Sphagnum farming in Canada: the future

1) Scale up for better economic assessment
2) Re-design irrigated basins for optimal water budget
3) Initiate new cycles
4) Develop further automatisation and remote control of irrigation system

Acknowledgments

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Canadian Sphagnum Peat Moss
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responsible peatland management
gestion responsable des tourbières

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