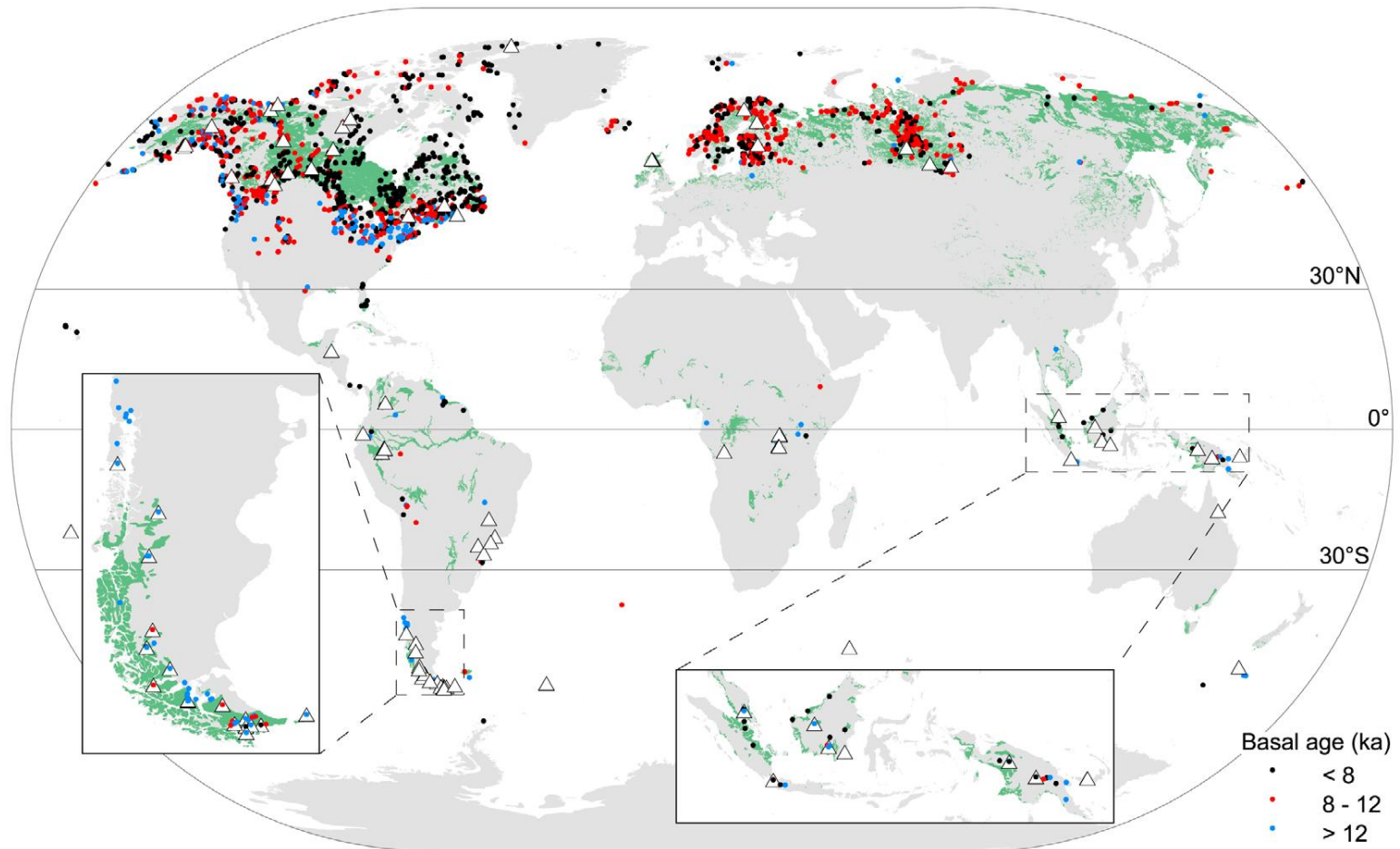


# Fire & Carbon Cycling in Boreal North American Peatlands

An aerial photograph of a vast, flat landscape, likely a peatland. The terrain is a mix of green and brown, with a winding stream or channel of water visible in the lower-left quadrant. The horizon is flat and distant under a clear sky.

**Brian W. Benscoter<sup>1</sup> and Merritt R. Turetsky<sup>2</sup>**  
***<sup>1</sup>Florida Atlantic University, <sup>2</sup>University of Guelph***

# Global Distribution of Peat-Forming Wetlands



(Yu et al. 2010-Geo. Res. Let.)





# Fire is the most important natural disturbance in Canadian forests & peatlands

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*Ericson Creek Fire © Turetsky*

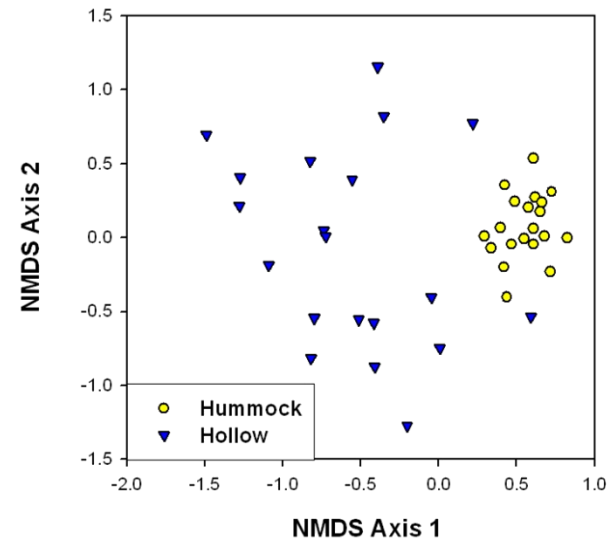
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# Forested Bog Peatlands



(Benscoter et al. 2005-J. Veg. Sci)

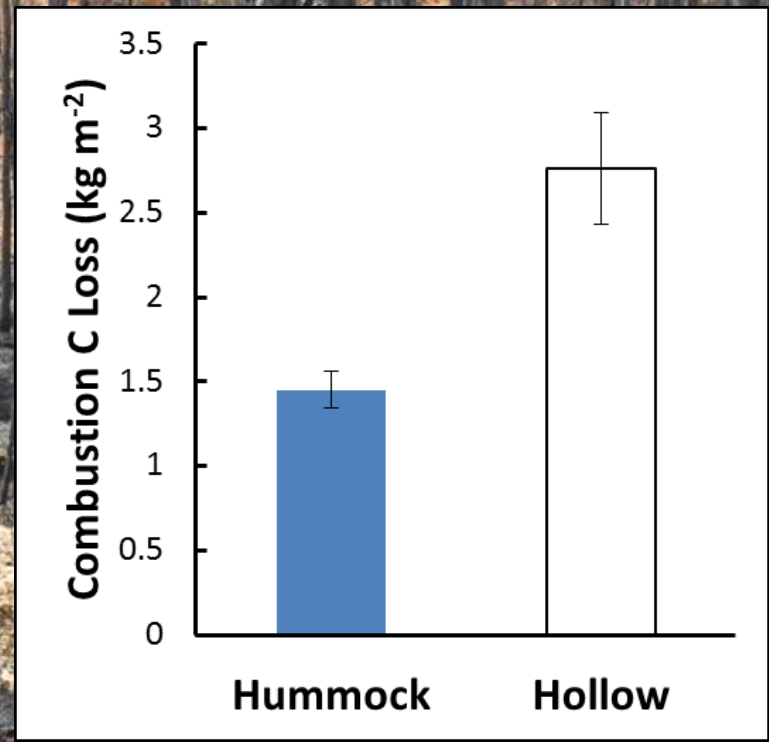
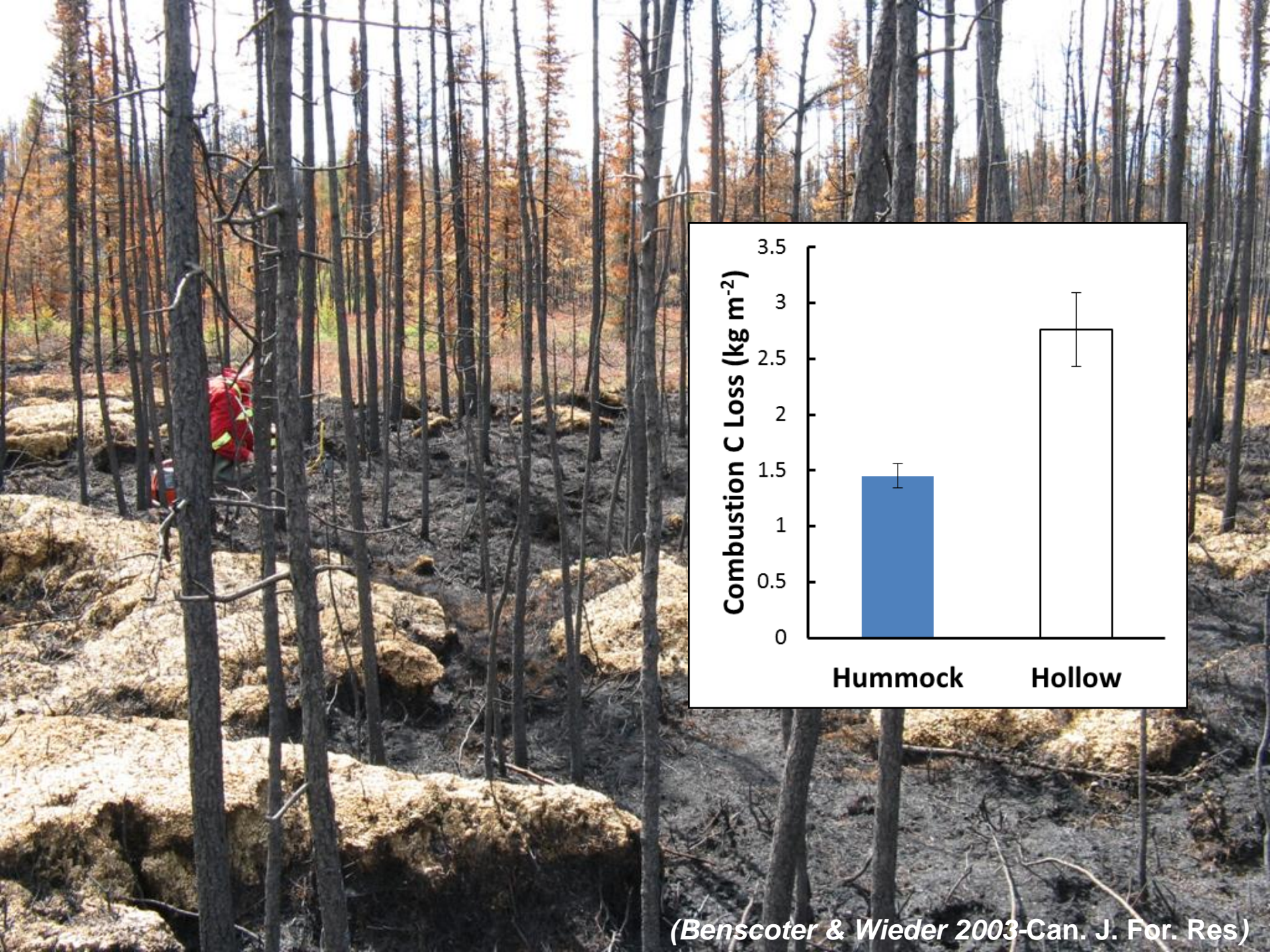


# Effects of Wildfire on Peatland C Cycling

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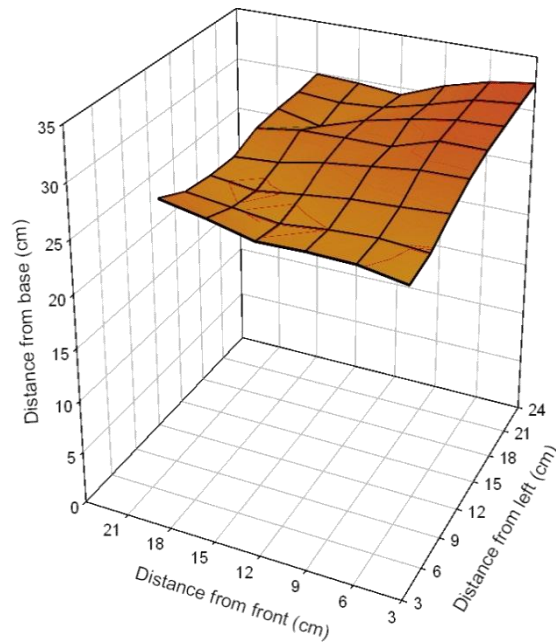
(Benscoter & Wieder 2003-Can. J. For. Res)



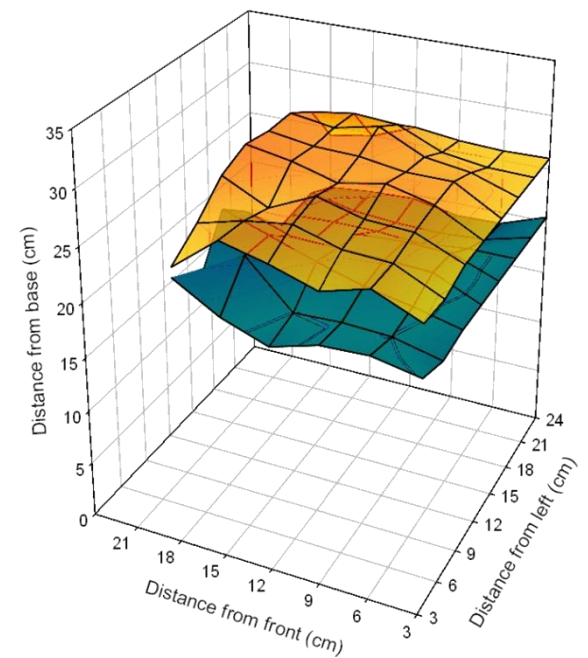
# Community Controls on Peat Burning



## Hummock

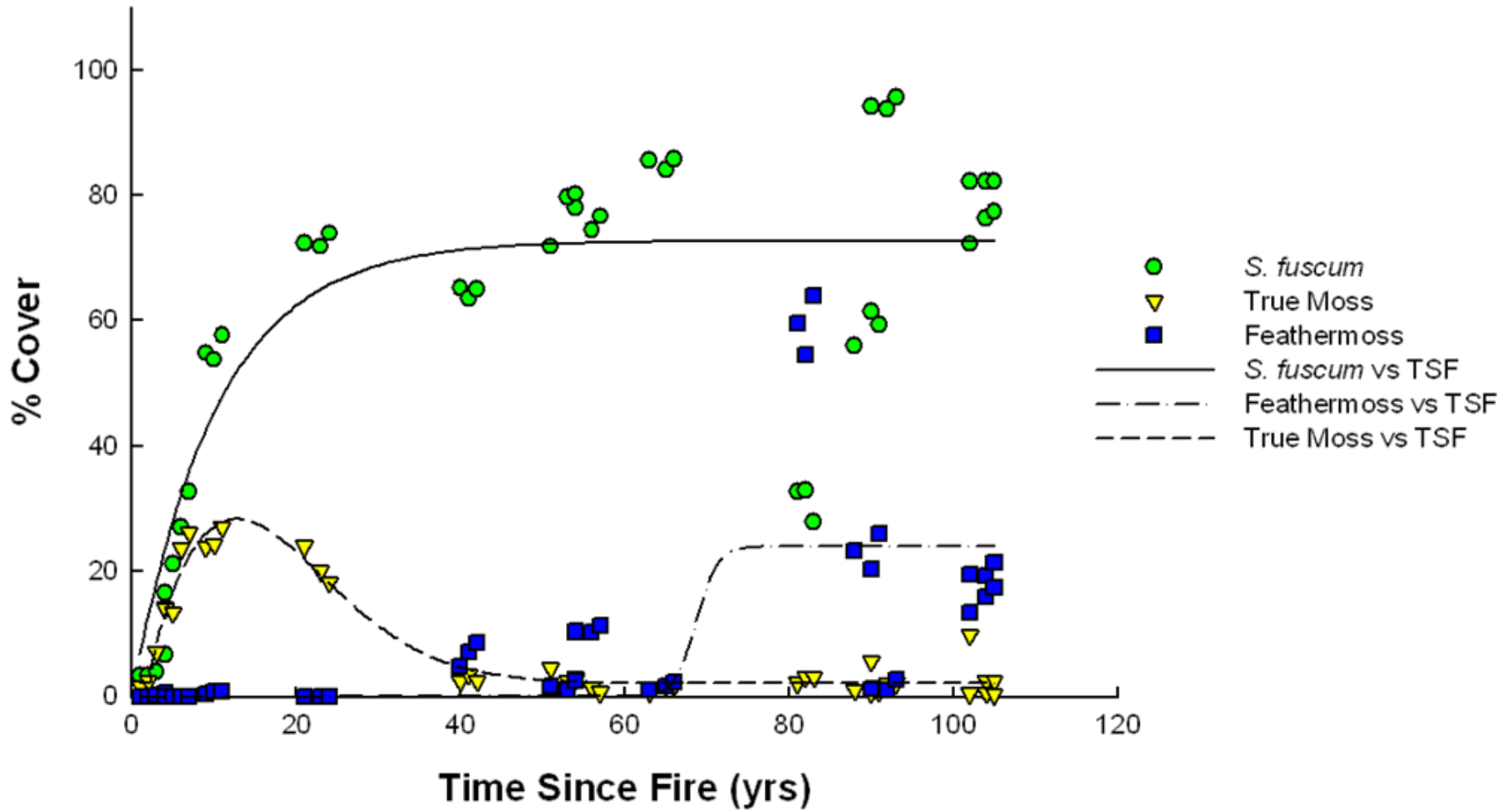


## Hollow



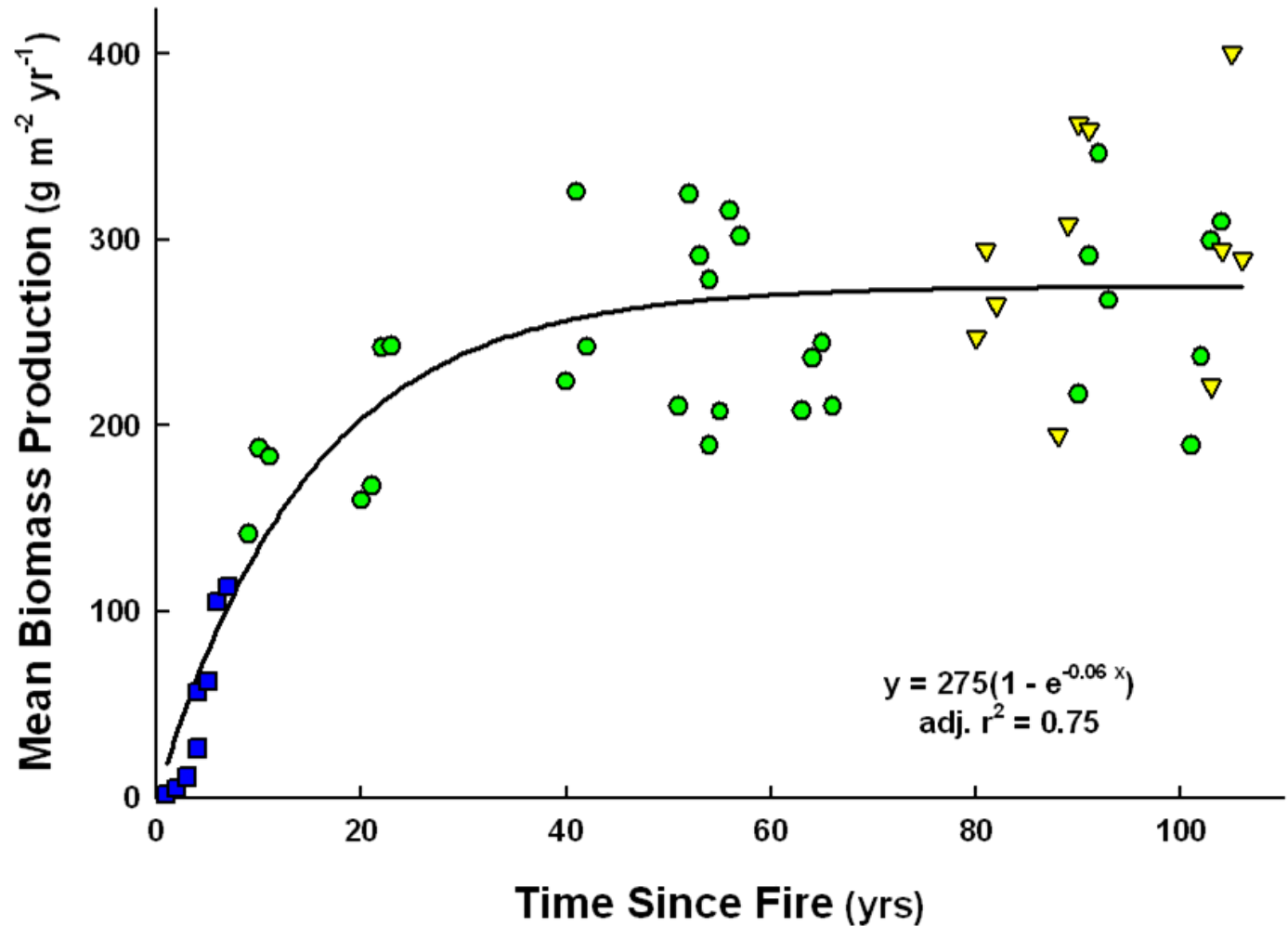


# Trends in Community Development



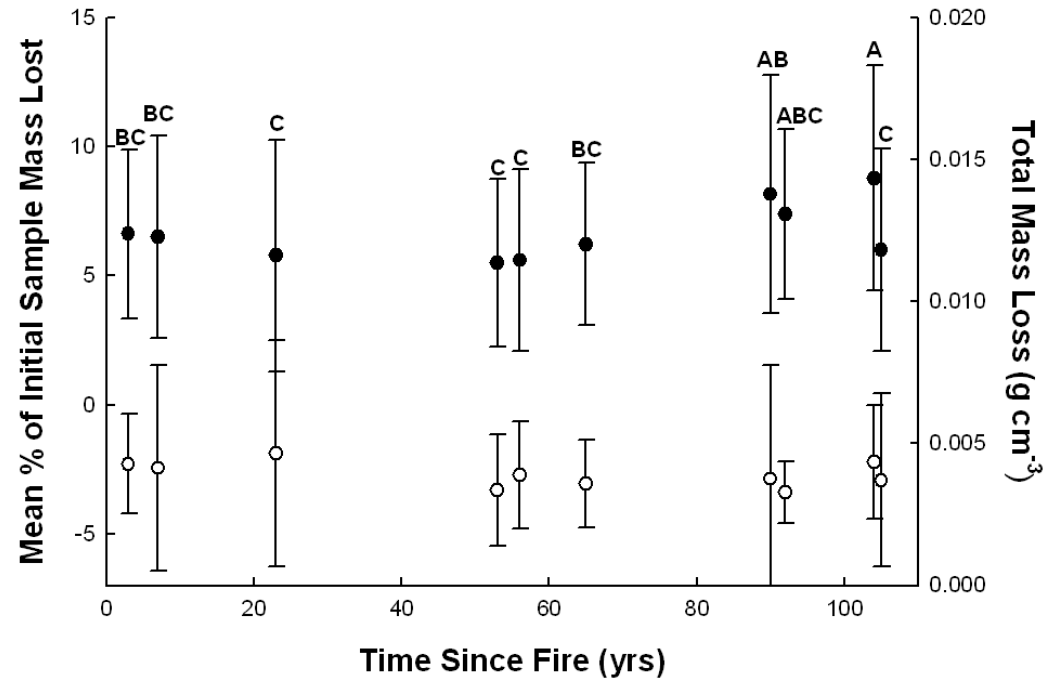
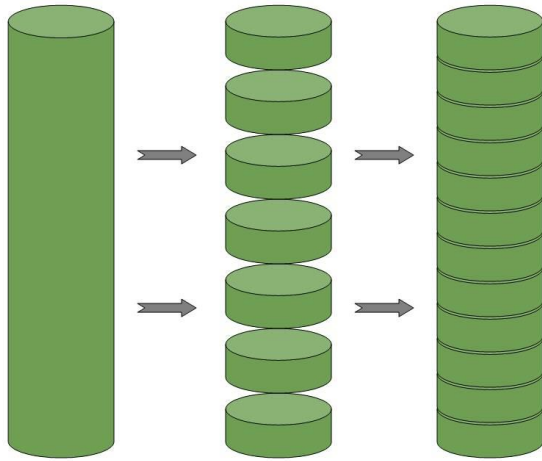


# Post-fire Trajectory in Moss Productivity





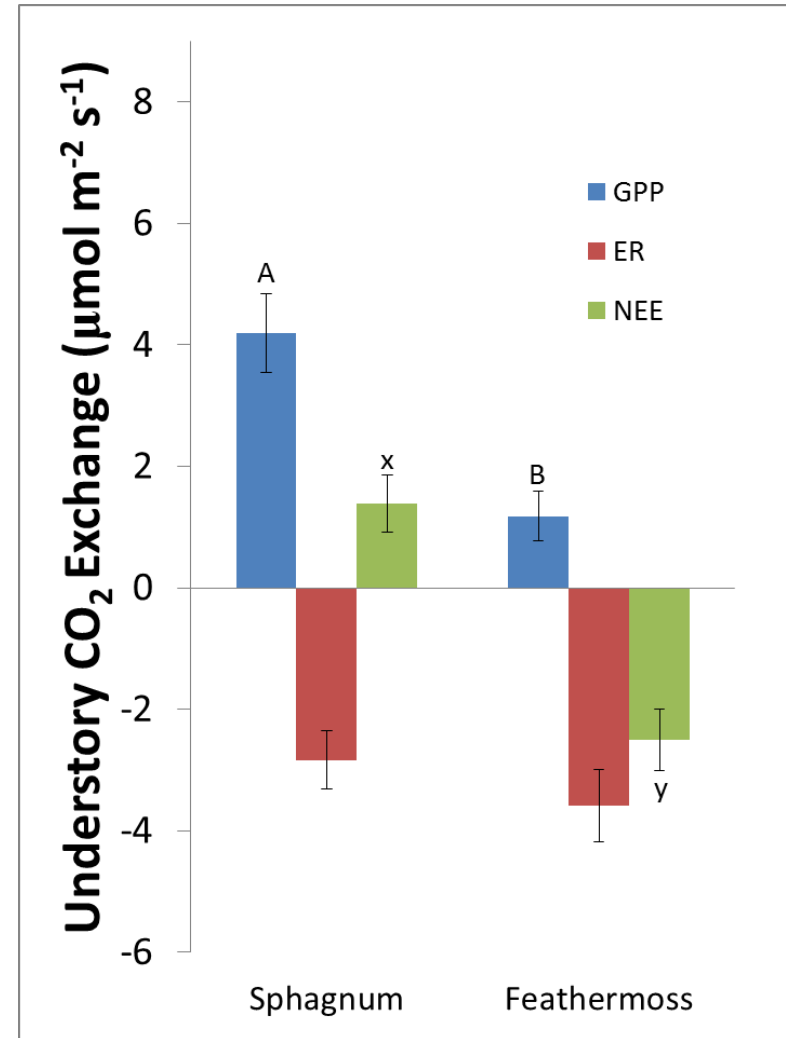
# Uncoupling of Decomposition & Succession



- % Mass Loss
- Total Mass Loss

# Fire Exclusion may Decrease C Storage

- Decreased productivity with feathermoss encroachment in 100+ year old stands
- *Sphagnum fuscum* consistent over chronosequence



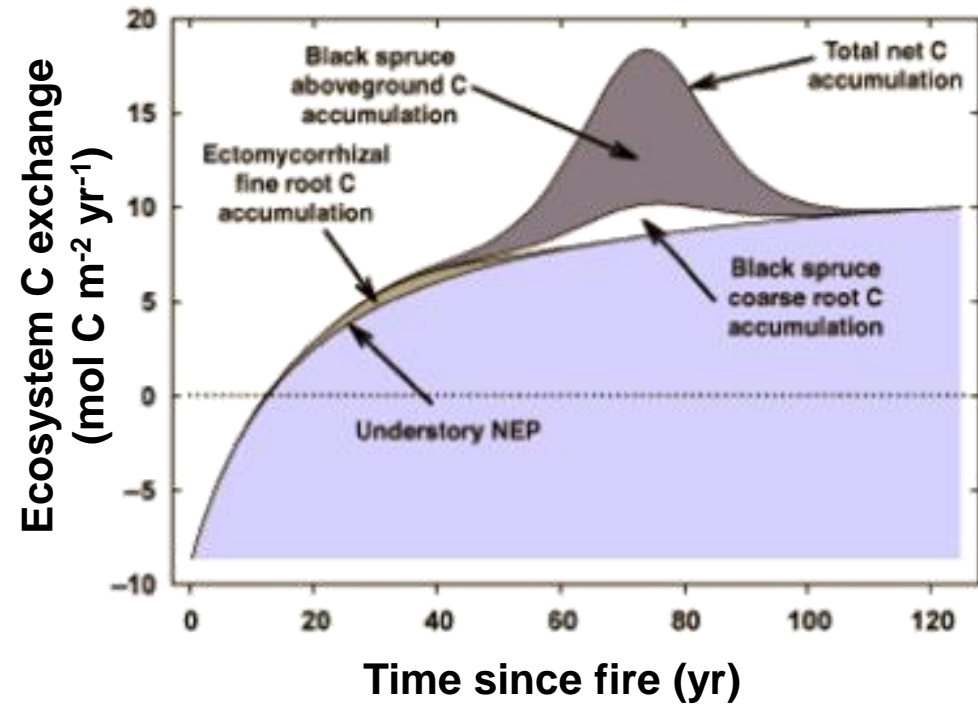
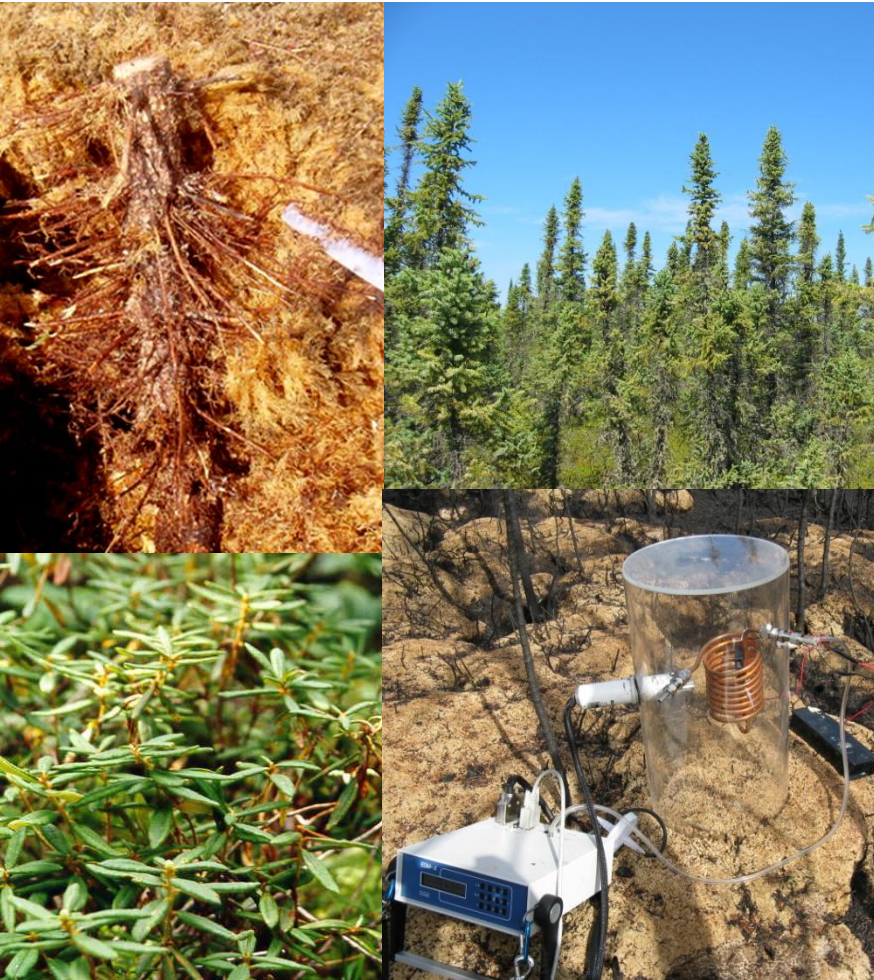


# But, Canopy Recovery Also Important



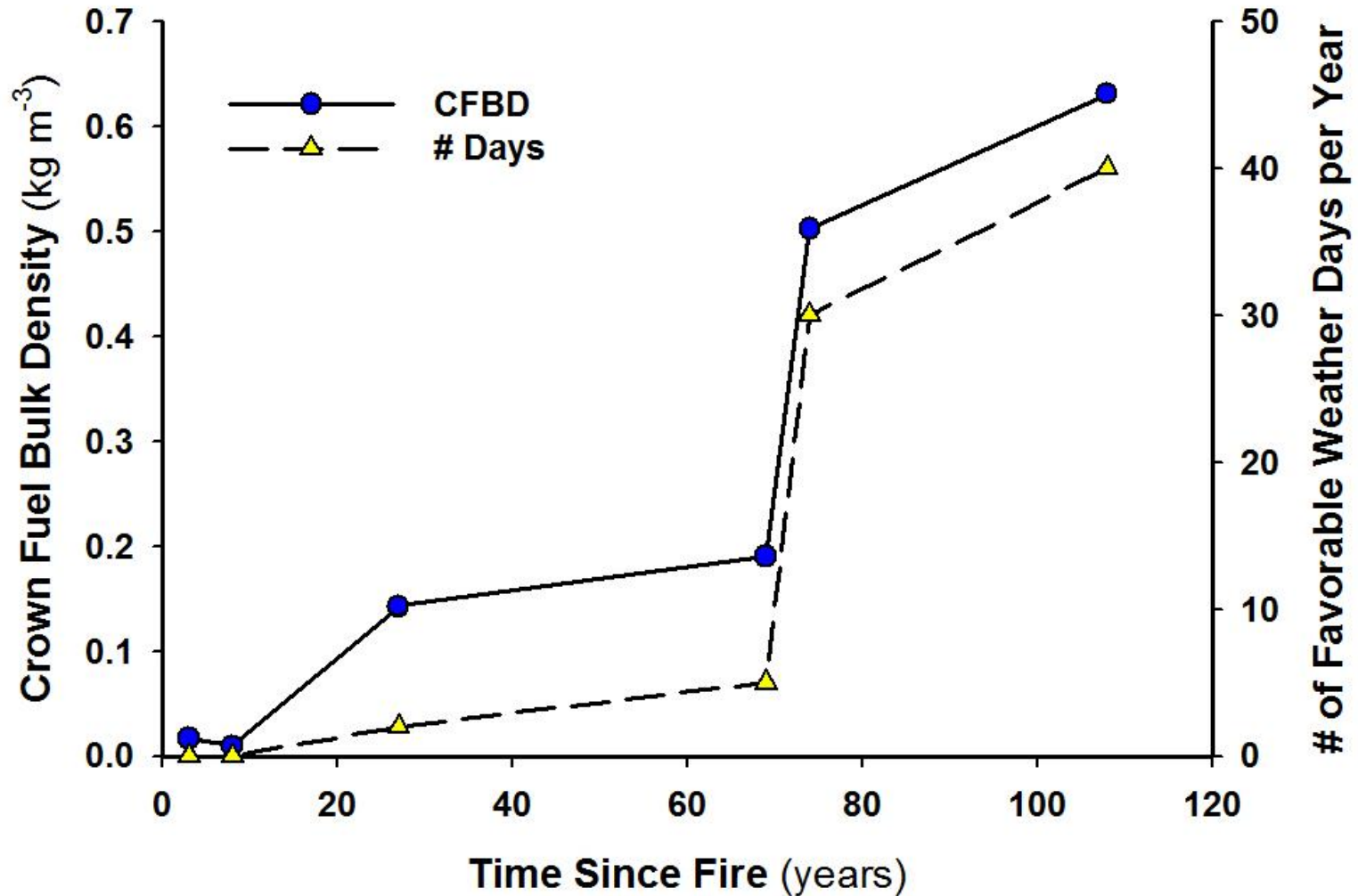


# Trends in Ecosystem Carbon Exchange





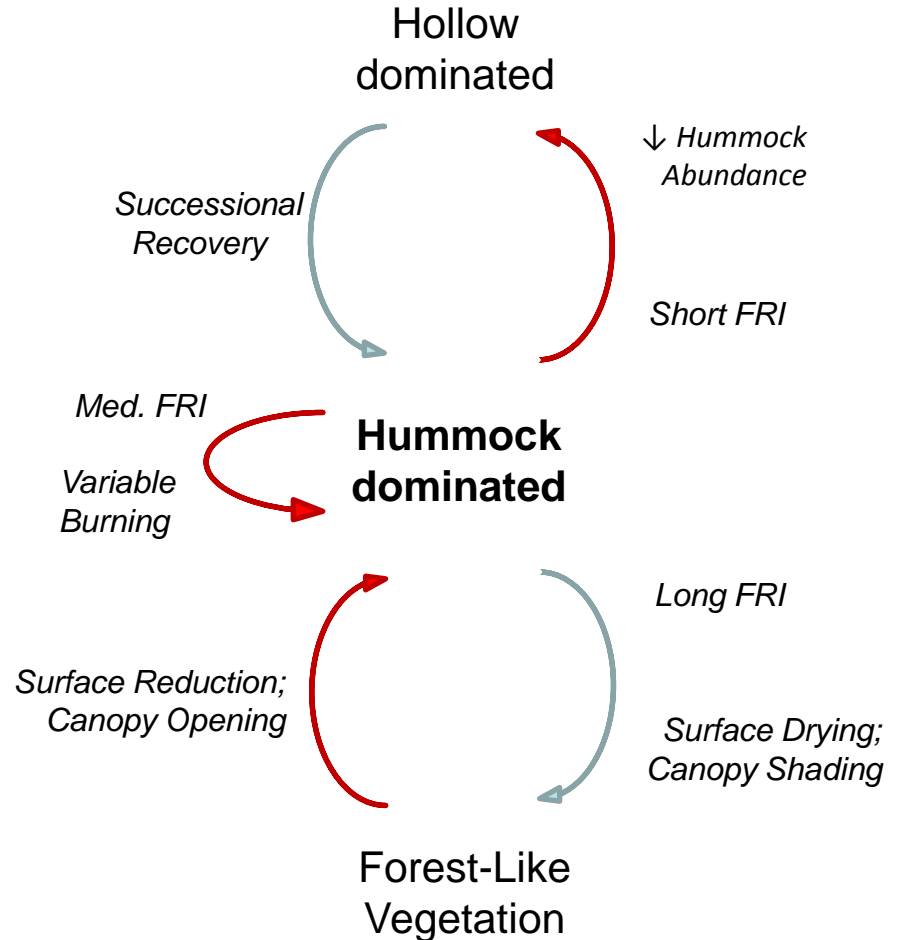
# Canopy Recovery Drives Future Fire Risk



# Treed Peatlands as a Fire-Maintained Ecosystem

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- **Low-moderate burning maintains peatland composition**
- **Vegetation maintains carbon storage**





# Northern Peat Fire Working Group

## Science, Management, and Policy

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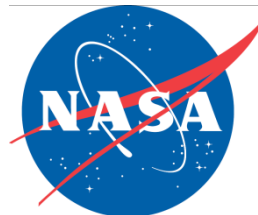
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- Mike Waddington (McMaster U)
- Bill DeGroot (CFS-GLFC)
- Mike Wotton (UToronto)
- Eric Kasischke (UMD)
- Laura Chavez (MTU-MTRI)
- Dan Thompson (CFS-NoFC)

.....*and many dedicated students!*

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- National Science Foundation
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- Society of Wetland Scientists
- NASA
- Canadian Forest Service
- Natural Sciences and Engineering Research Council (NSERC) of Canada
- US Geological Survey



**NSERC  
CRSNG**



A photograph of a forest floor covered in vibrant green vegetation, including ferns and various leafy plants. Sunlight filters through the dense canopy of tall trees, creating a dappled light effect on the ground. The overall scene is bright and verdant.

[www.uoguelph.ca/peatfire](http://www.uoguelph.ca/peatfire)  
[www.science.fau.edu/benscoterlab](http://www.science.fau.edu/benscoterlab)