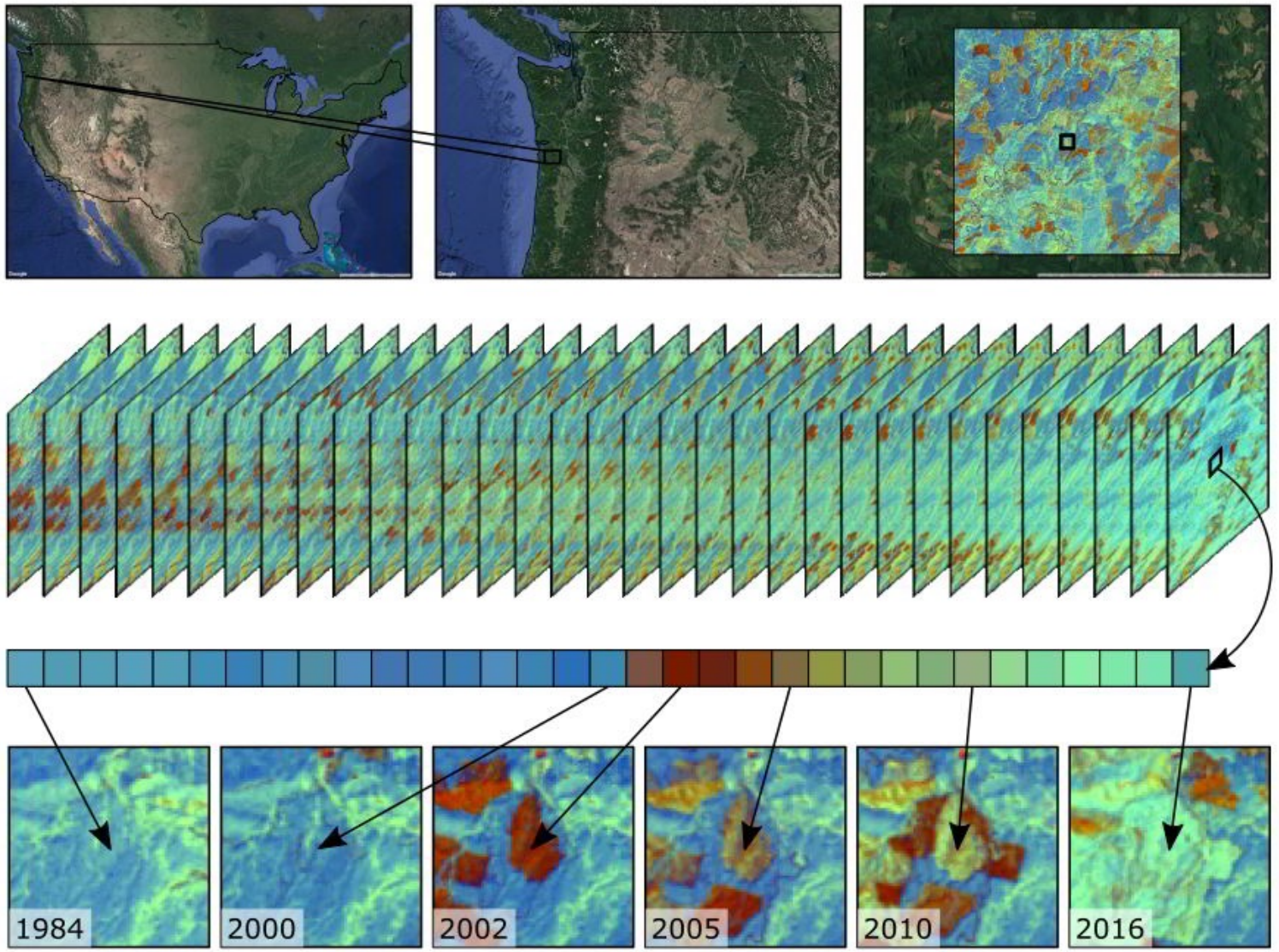
# Ground Truthing Forest Change Detection Algorithms in Working Forests of the US Northeast

FEMC 2022

# Forest Disturbance Detection Algorithms

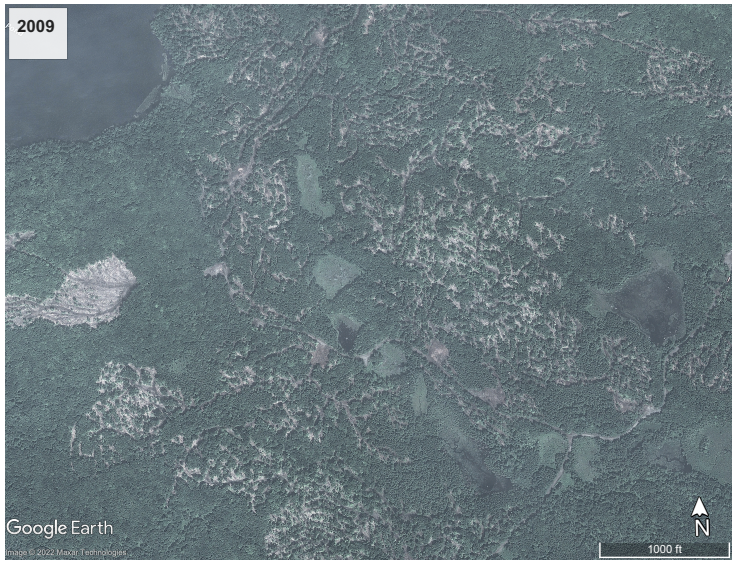



From Kennedy, R. E., & Braaten, J. (n.d.). LT-GEE Guide. eMapR.

# Why remote monitoring? Why now?

- Net Zero Carbon Legislation
- Forest Carbon Markets
- Sustainable Forestry Certifications (FSC, SFI)
- Increased Invasive Insect Presence
- Extreme Weather
- Climate Stress

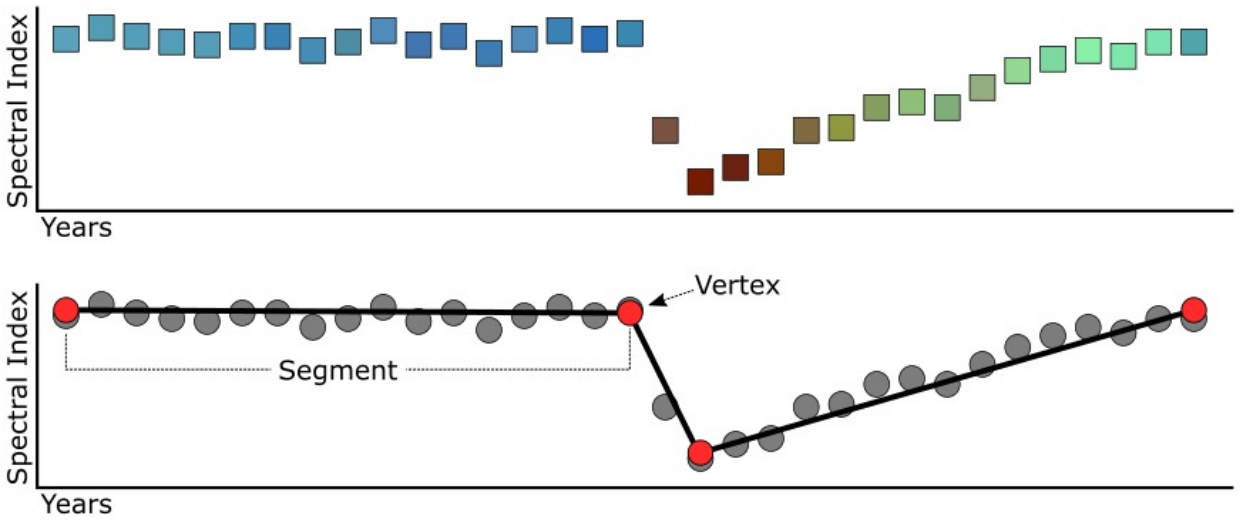
# Forest Disturbance Detection Algorithms






# Ground Truthing Assessment

- Continuous Change Detection and Classification (CCDC)
- LandTrendr (LT-GEE)
- Landscape Change Monitoring System (LCMS)

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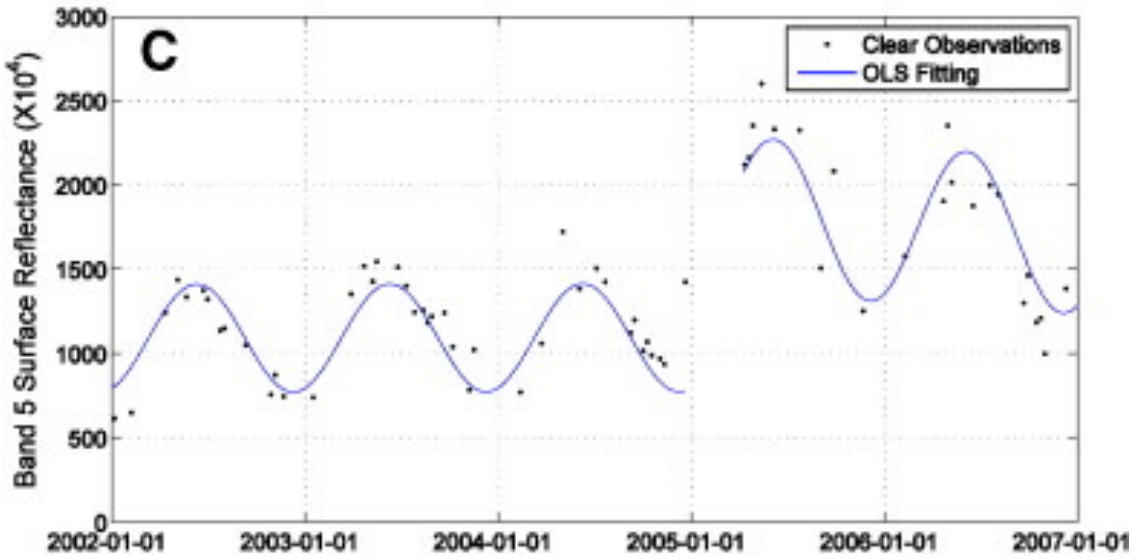
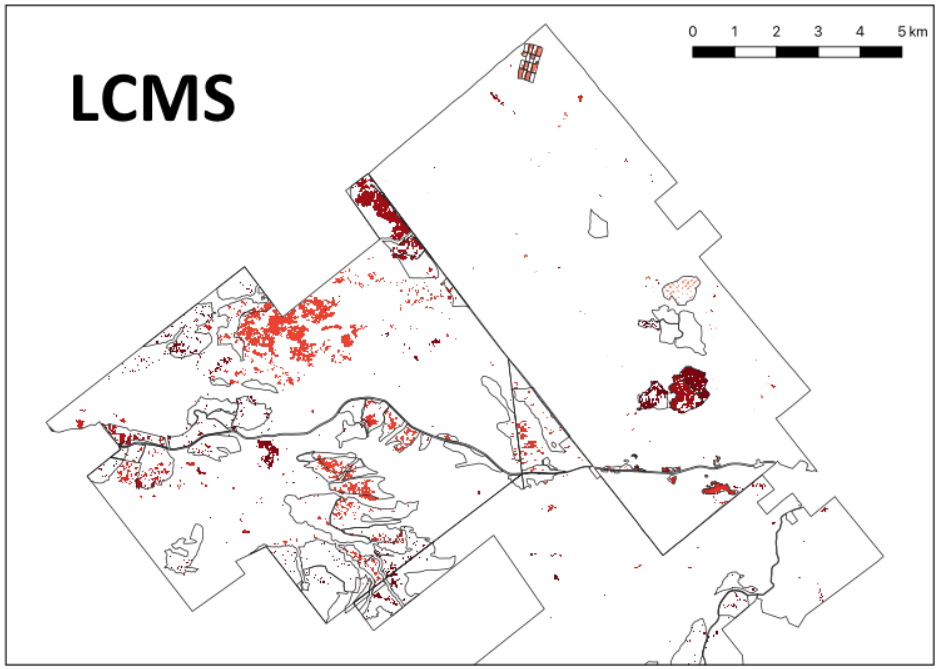
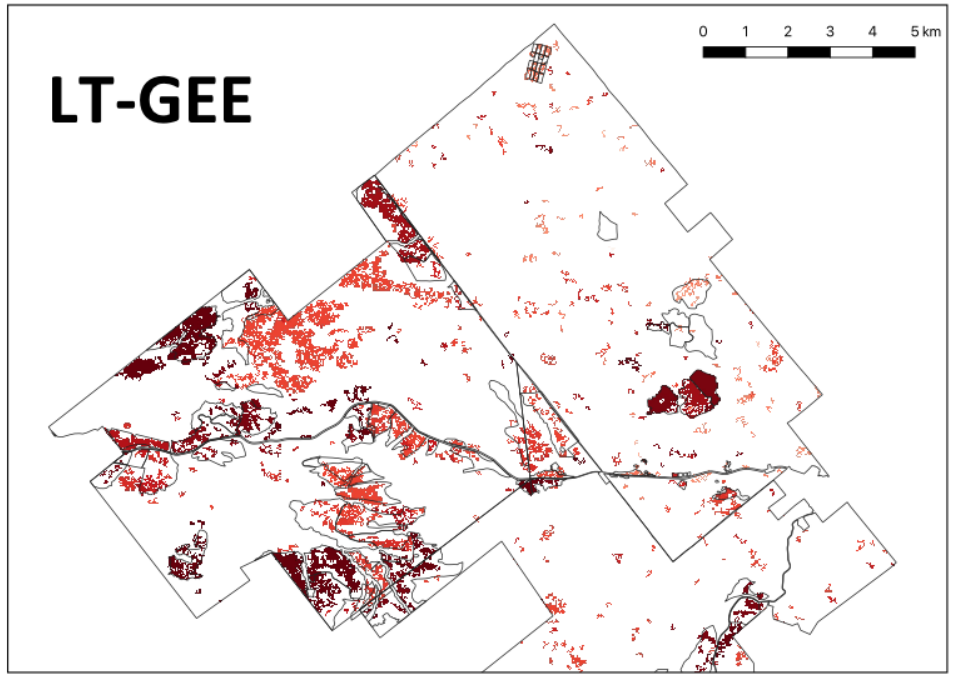
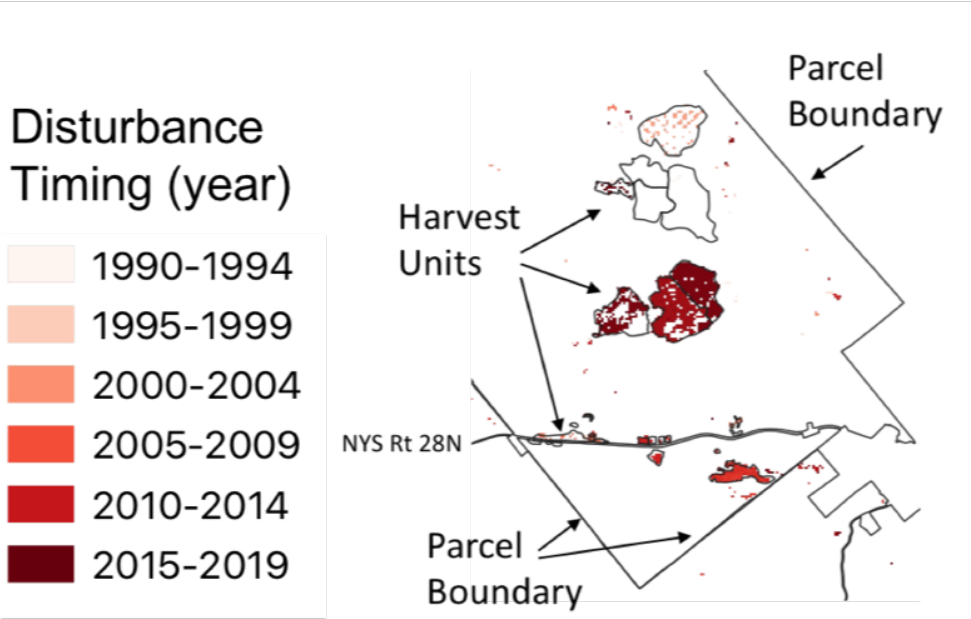



From Zhu, Z. & Woodcock, C. E. (2014)

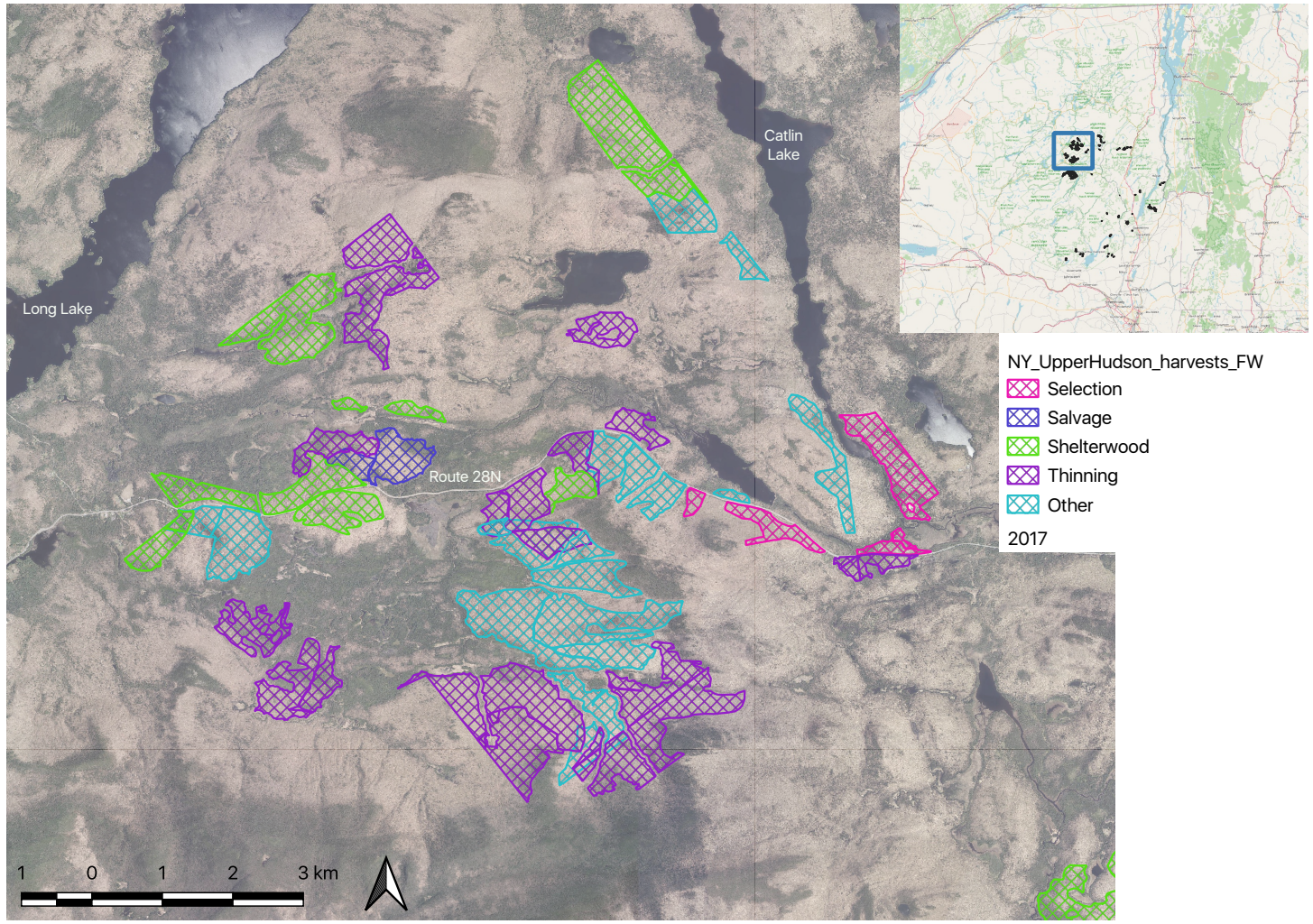

CCDC
0 1 2 3 4 5 km

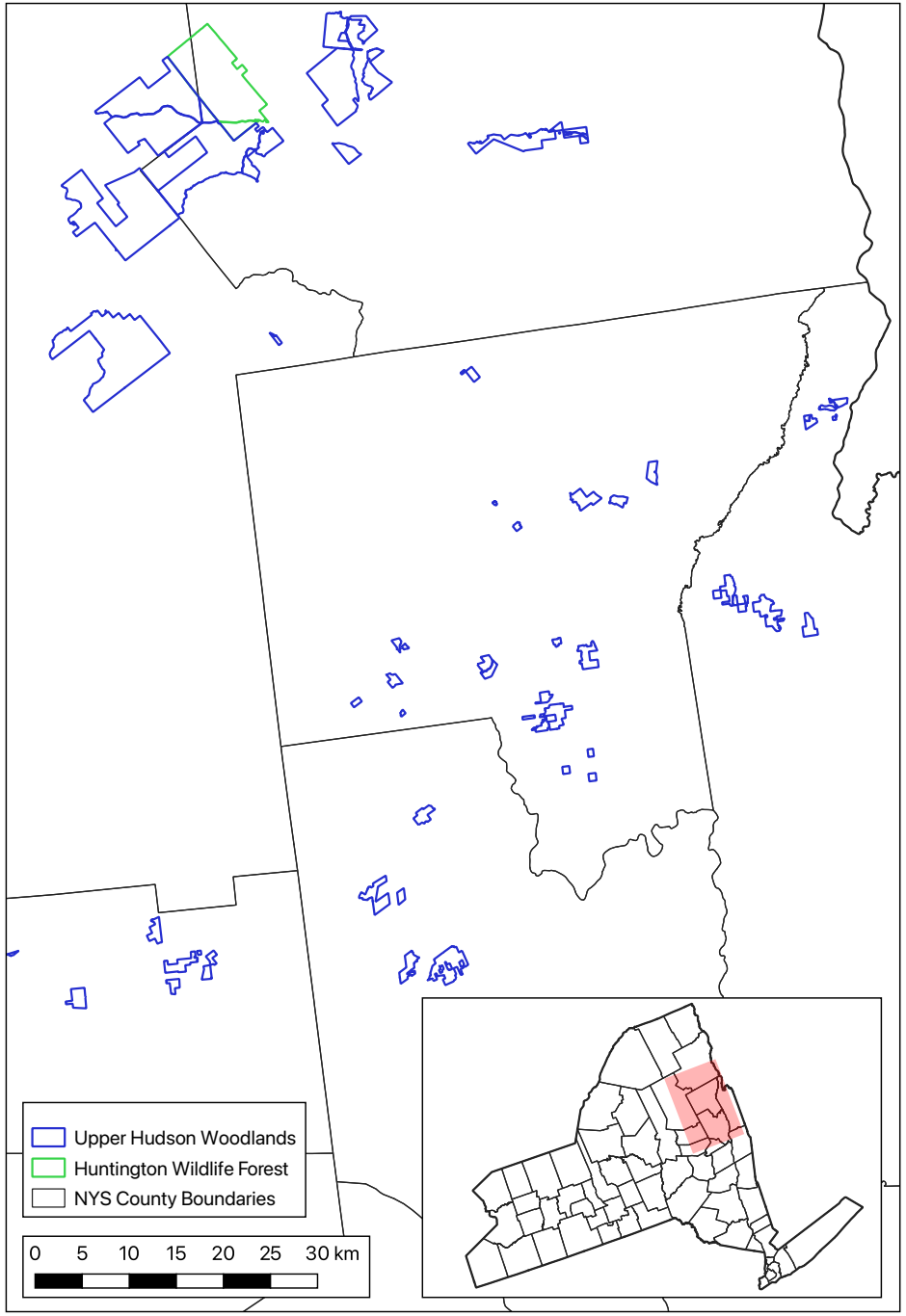

LCMS
0 1 2 3 4 5 km


LT-GEE
0 1 2 3 4 5 km

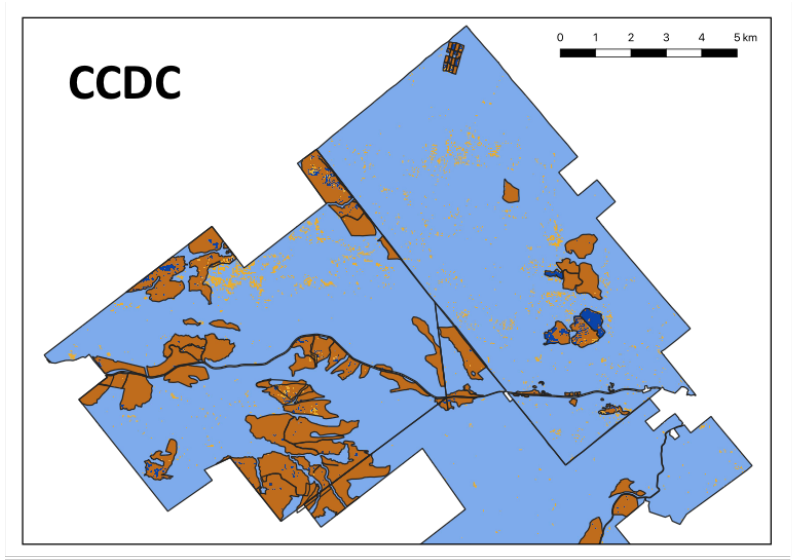

Disturbance Timing (year)
1990-1994
1995-1999
2000-2004
2005-2009
2010-2014
2015-2019
Parcel Boundary
Harvest Units
NYS Rt 28N
Parcel Boundary

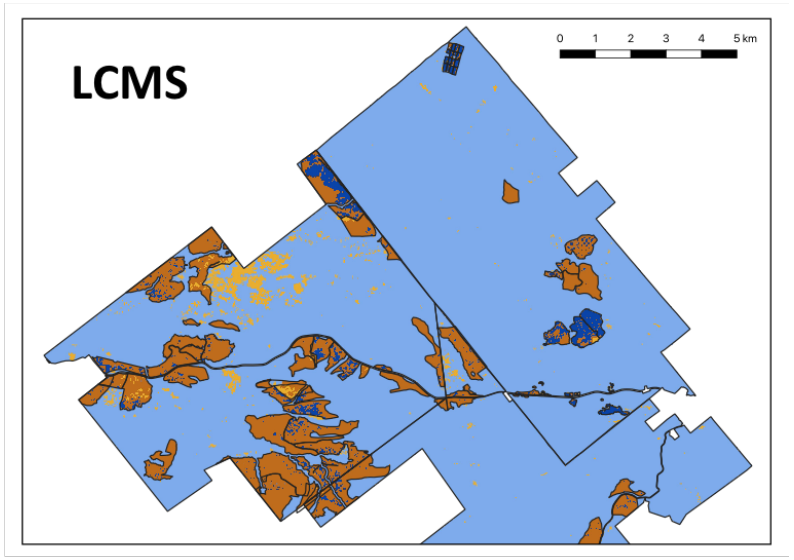
# Reference Data

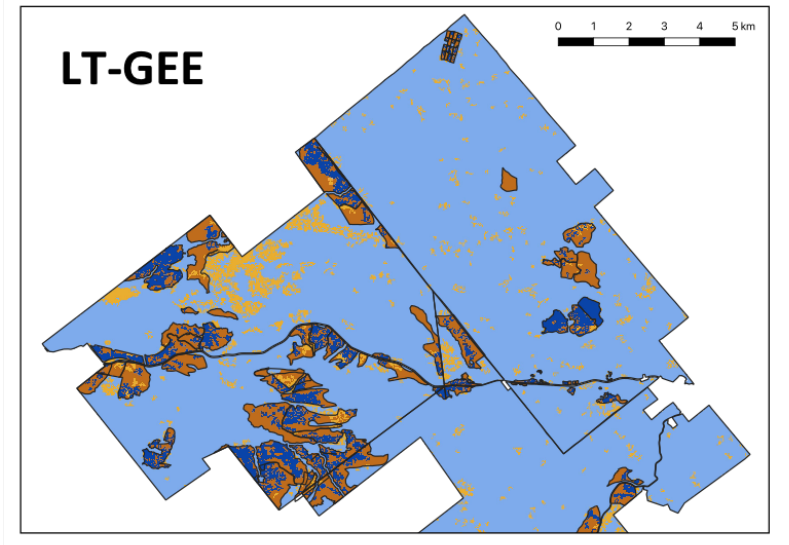


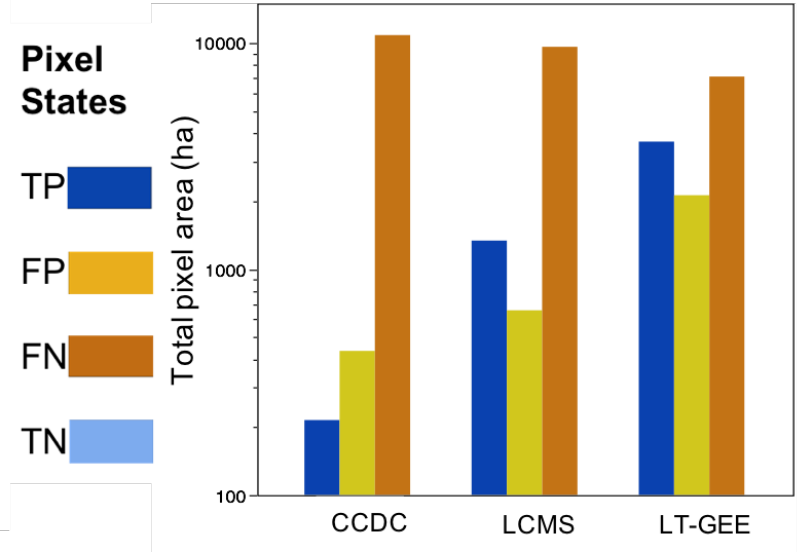



# Higher level of disturbance detection, higher level of accuracy

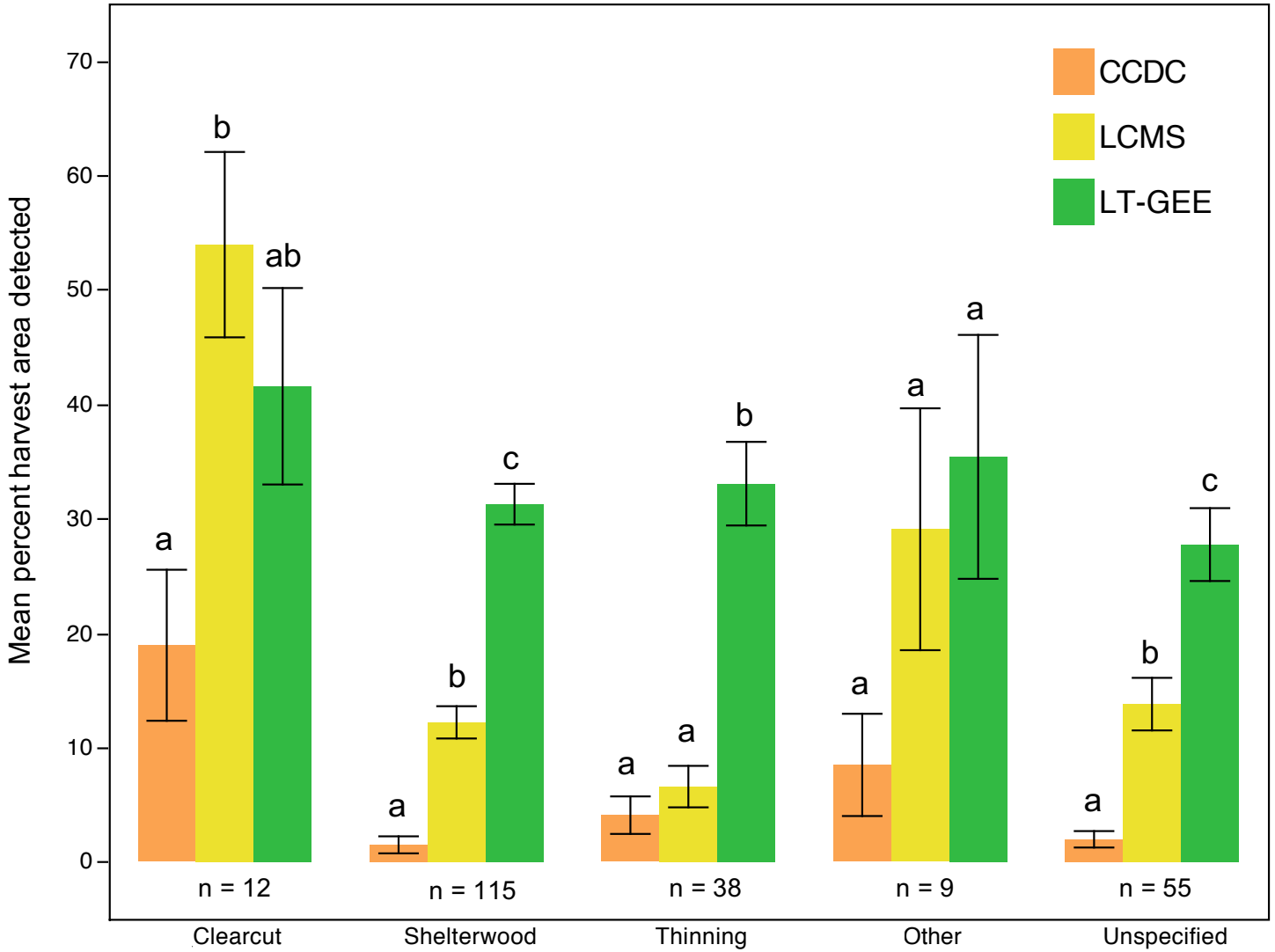


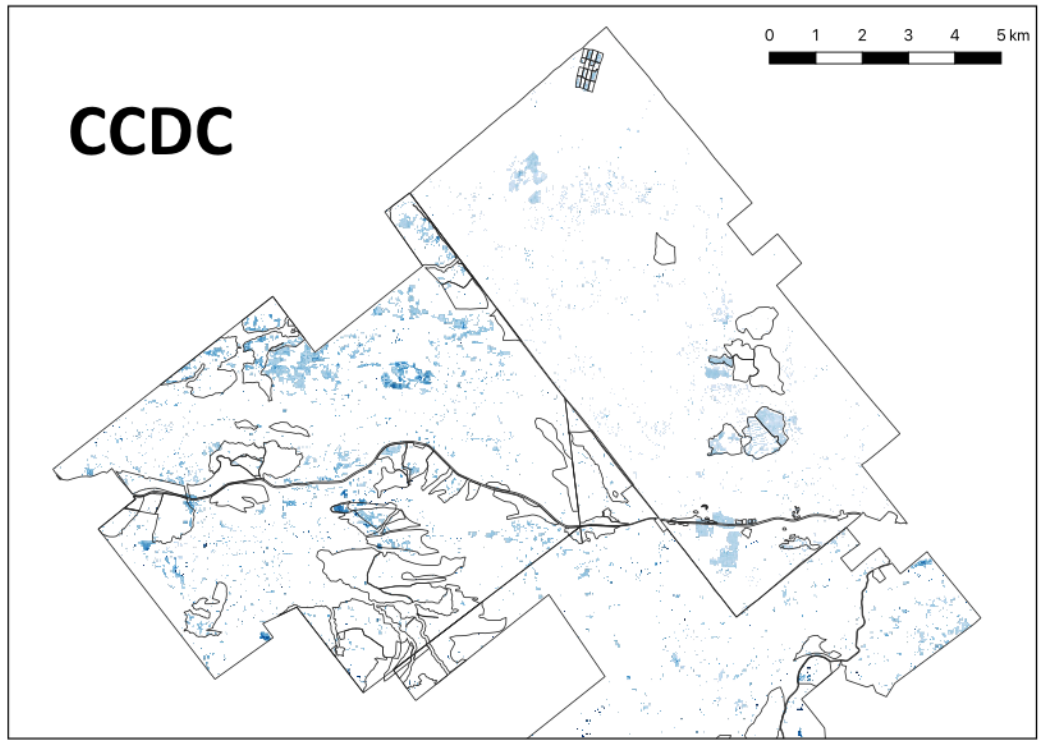



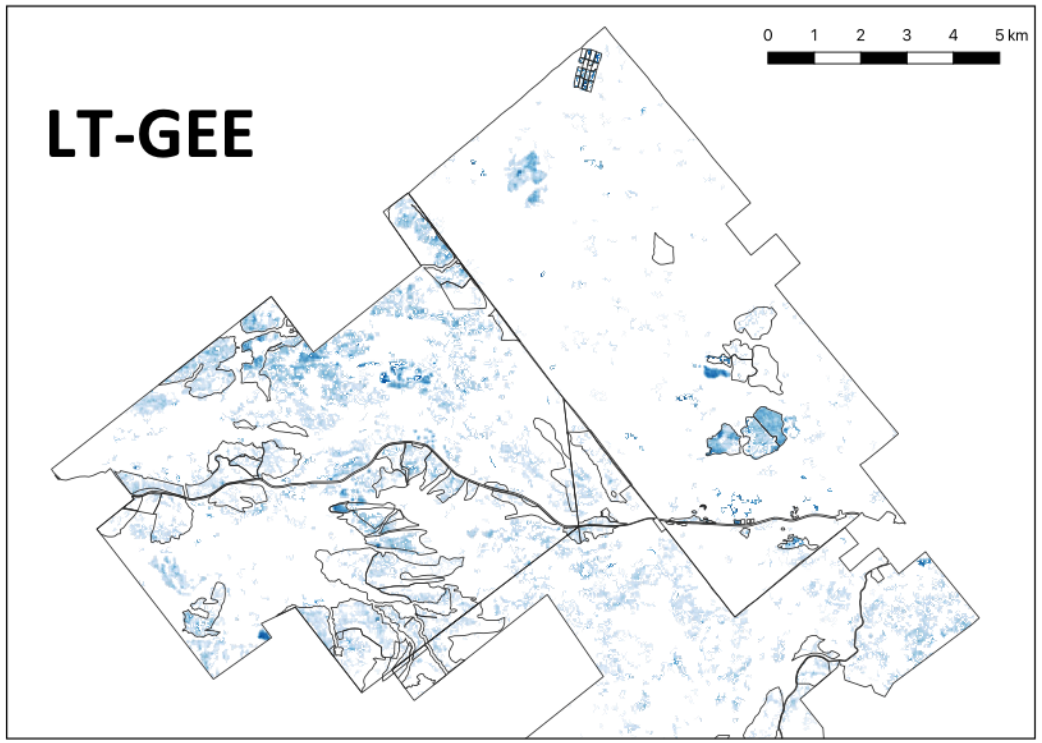



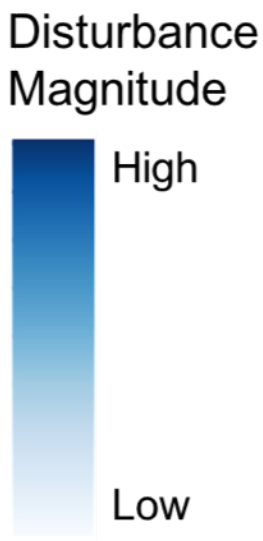



# Algorithms less likely to detect partial harvests

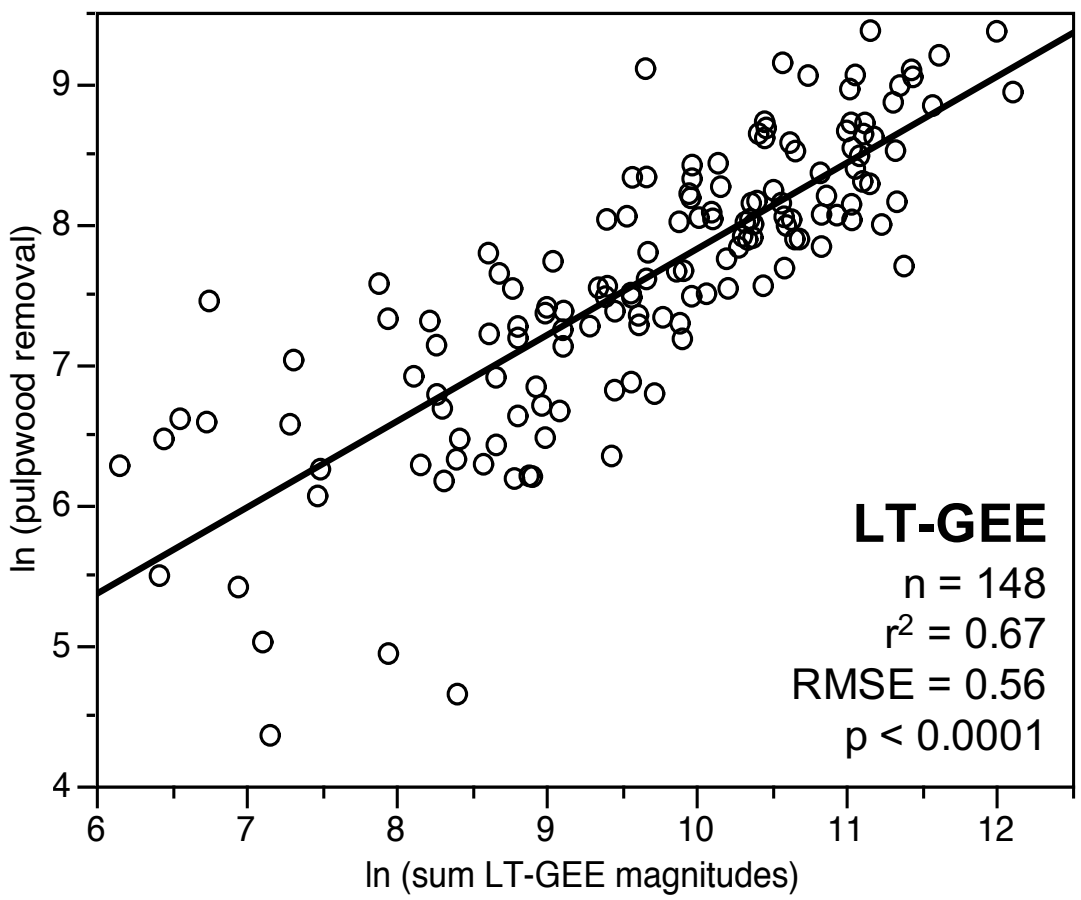


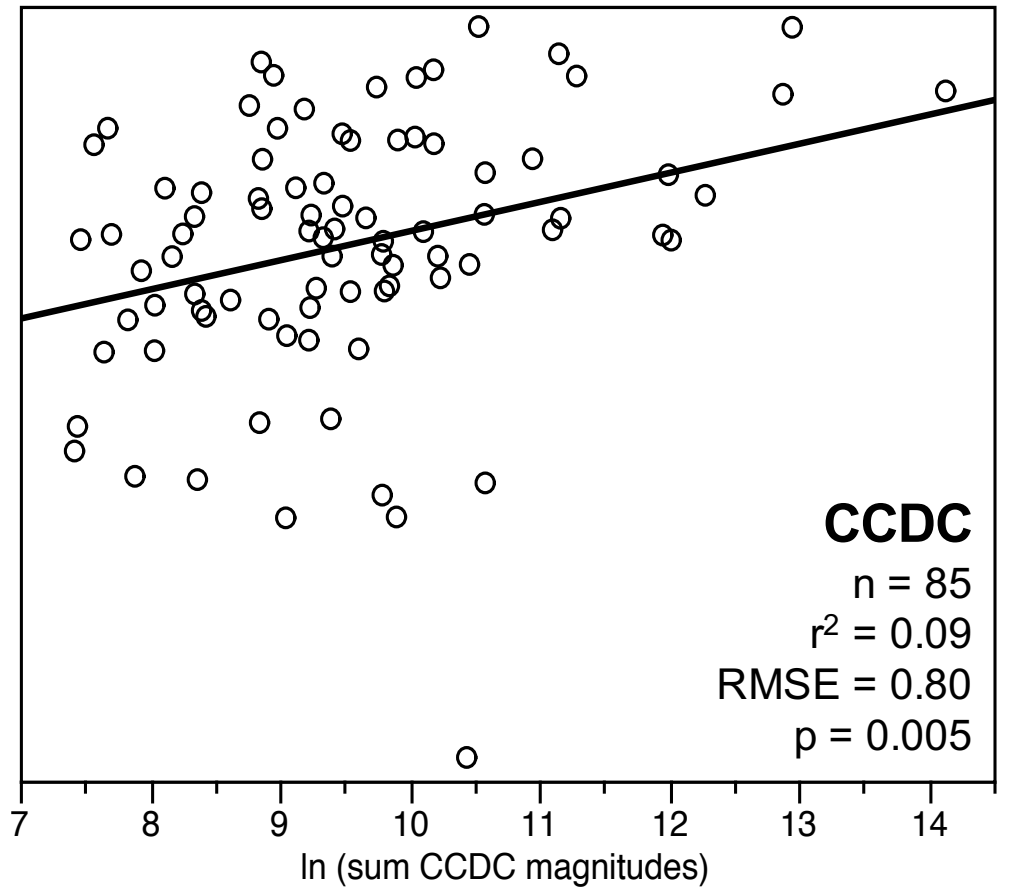

CCDC
0 1 2 3 4 5 km


LT-GEE
0 1 2 3 4 5 km


Disturbance Magnitude
High
Low

# Landtrendr magnitudes were the best predictor of pulpwood removals



# Summary

- Need for a regional monitoring tool
- Landtrendr preformed the best at detecting partial harvest and estimating magnitudes
- Remote monitoring will play an important role in the future of forest management

# Acknowledgments

CAFRI
Climate & Applied Forest Research Institute

F&W
SINCE 1962

LAFCO
Lyme Adirondack Forest Company LLC

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