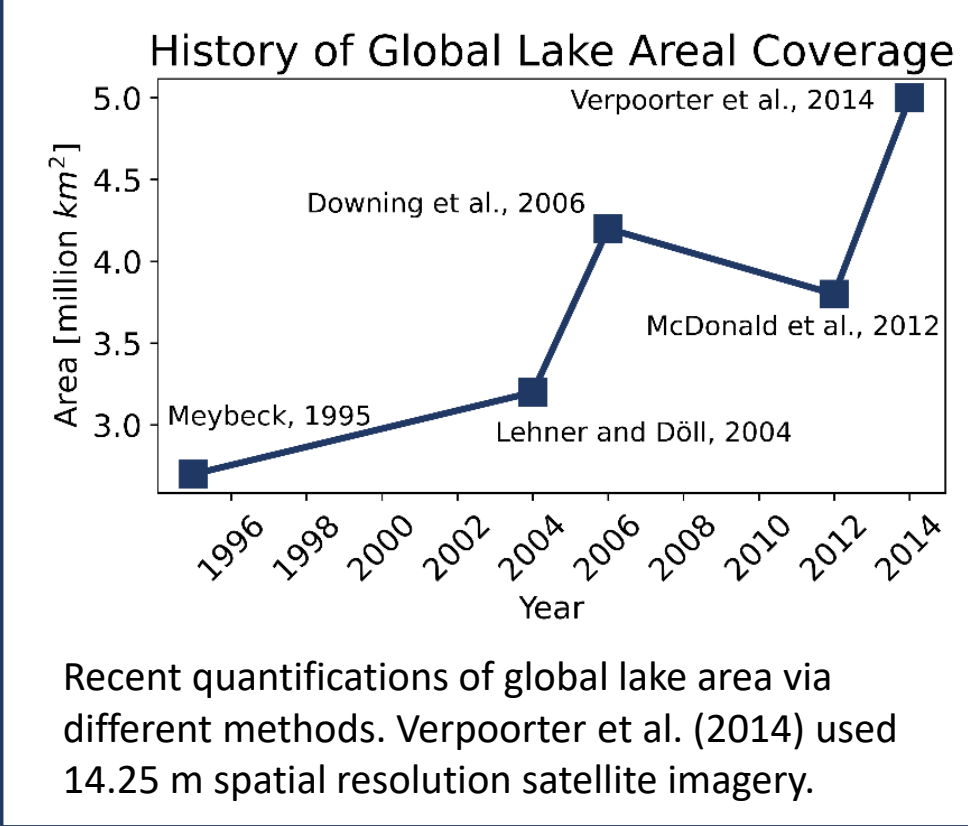


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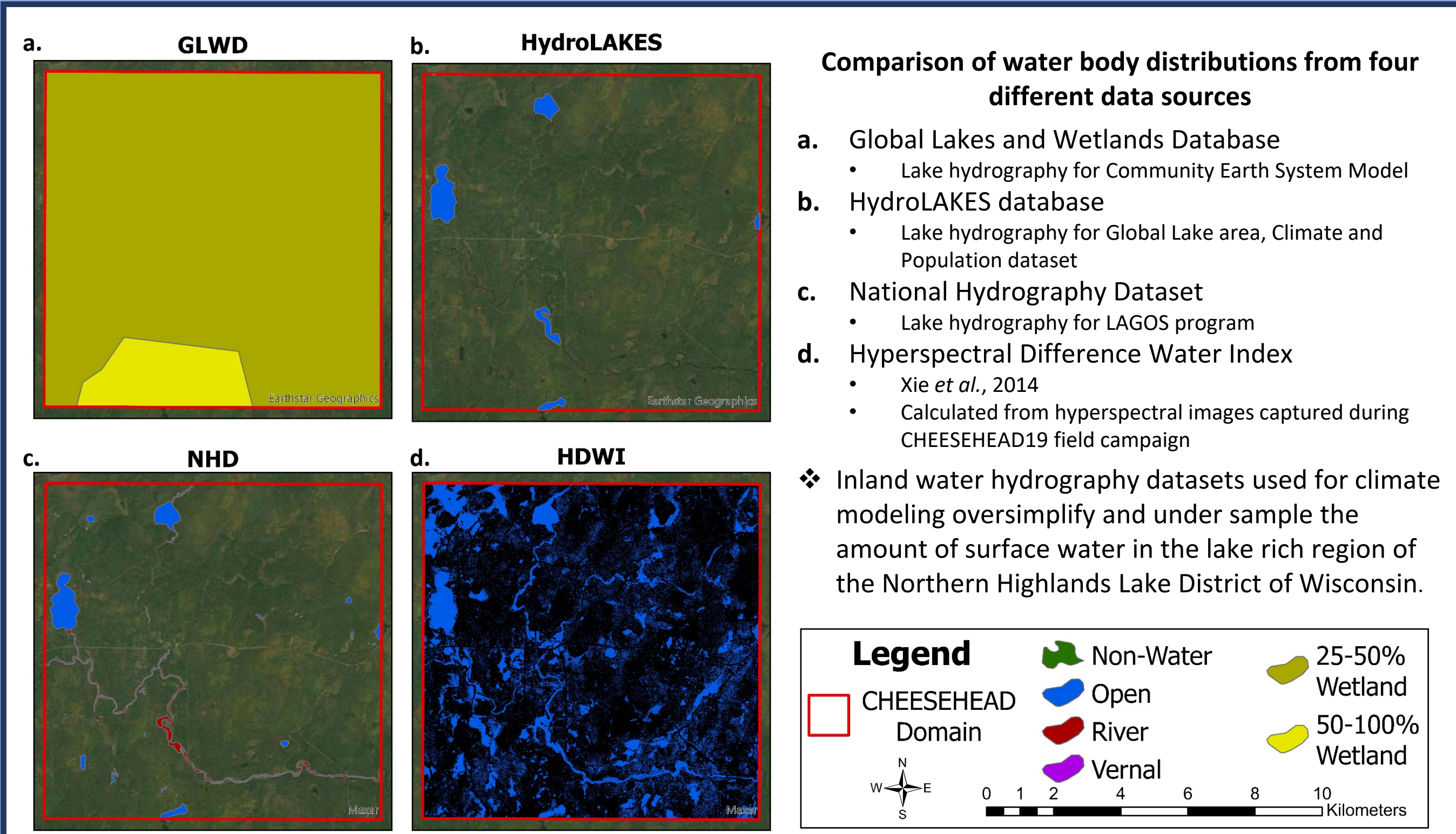
1. Introduction

- The land carbon sink remains the source of greatest uncertainty.
- Inland waters are a significant source of carbon to the atmosphere
- Determining contribution to the global carbon budget is difficult
- Relative to their size, small water bodies emit more carbon to the atmosphere than large bodies
- Small water bodies are hard to map and not well included in carbon models

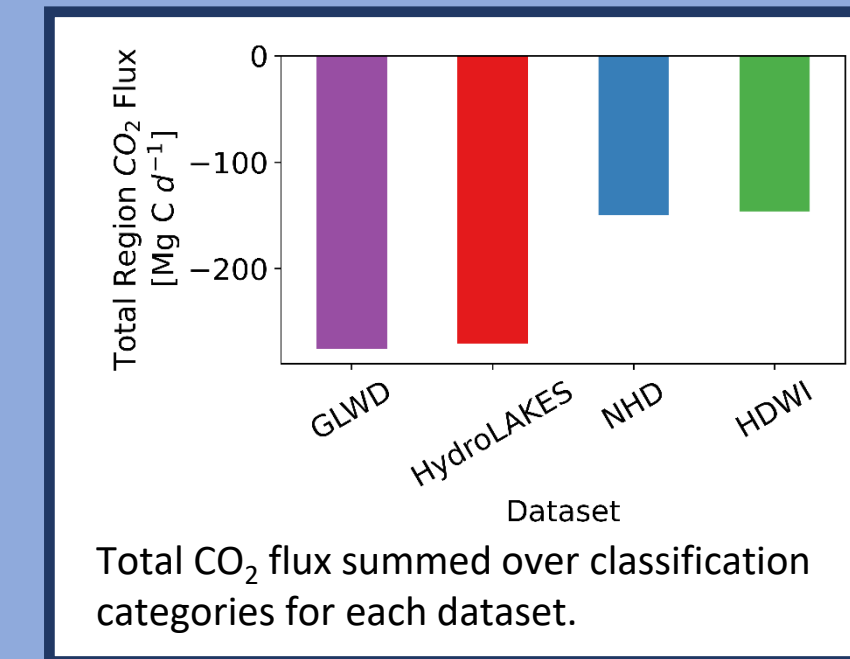


- Global inland water coverage has increased over time with additional investigations
- Recent advances in remote sensing provide the opportunity to reevaluate inland water carbon budgets

3. Water Body Distributions



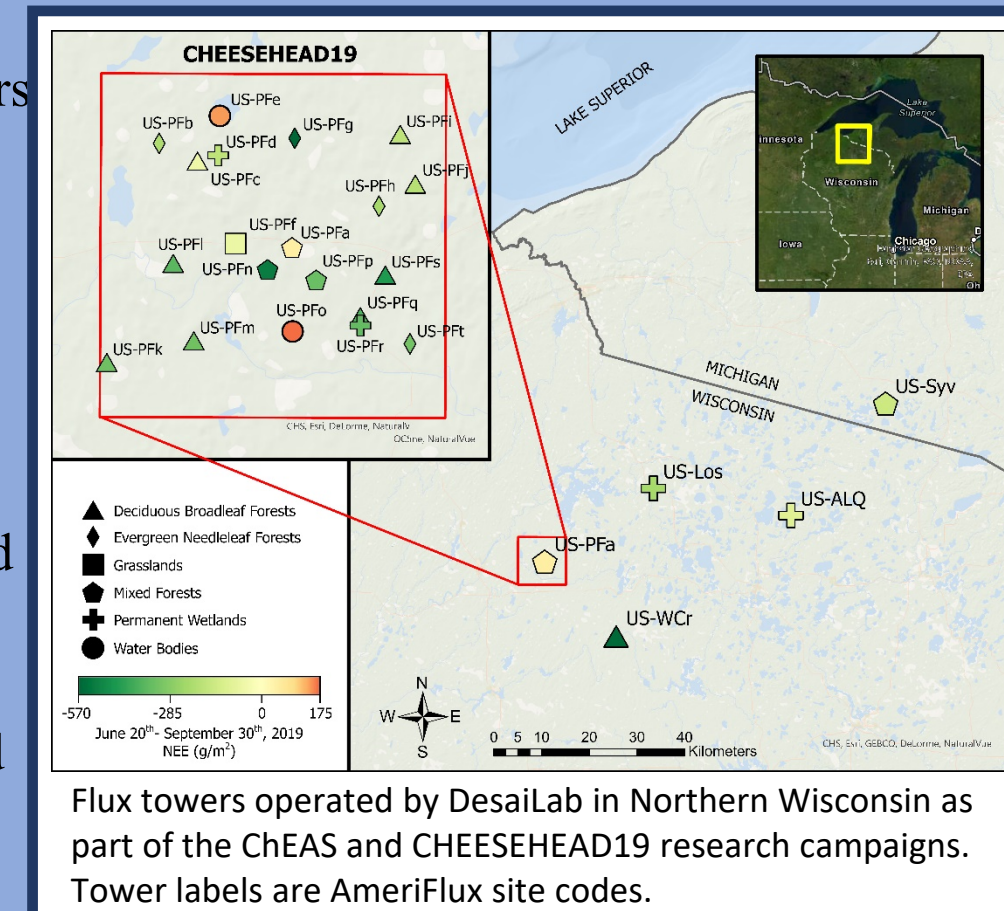
5. Preliminary Conclusions



- Higher resolution data results in more positive CO₂ fluxes for the CHEESEHEAD Domain
- Rivers are significant contributors of CO₂ to the atmosphere
- Further effort and resources should be expended to create a global high resolution water map
- Lake rich regions such as the Northern Highlands Lake District of Wisconsin have to potential to experience drastic changes in our understanding of their carbon budgets.

2. The Region

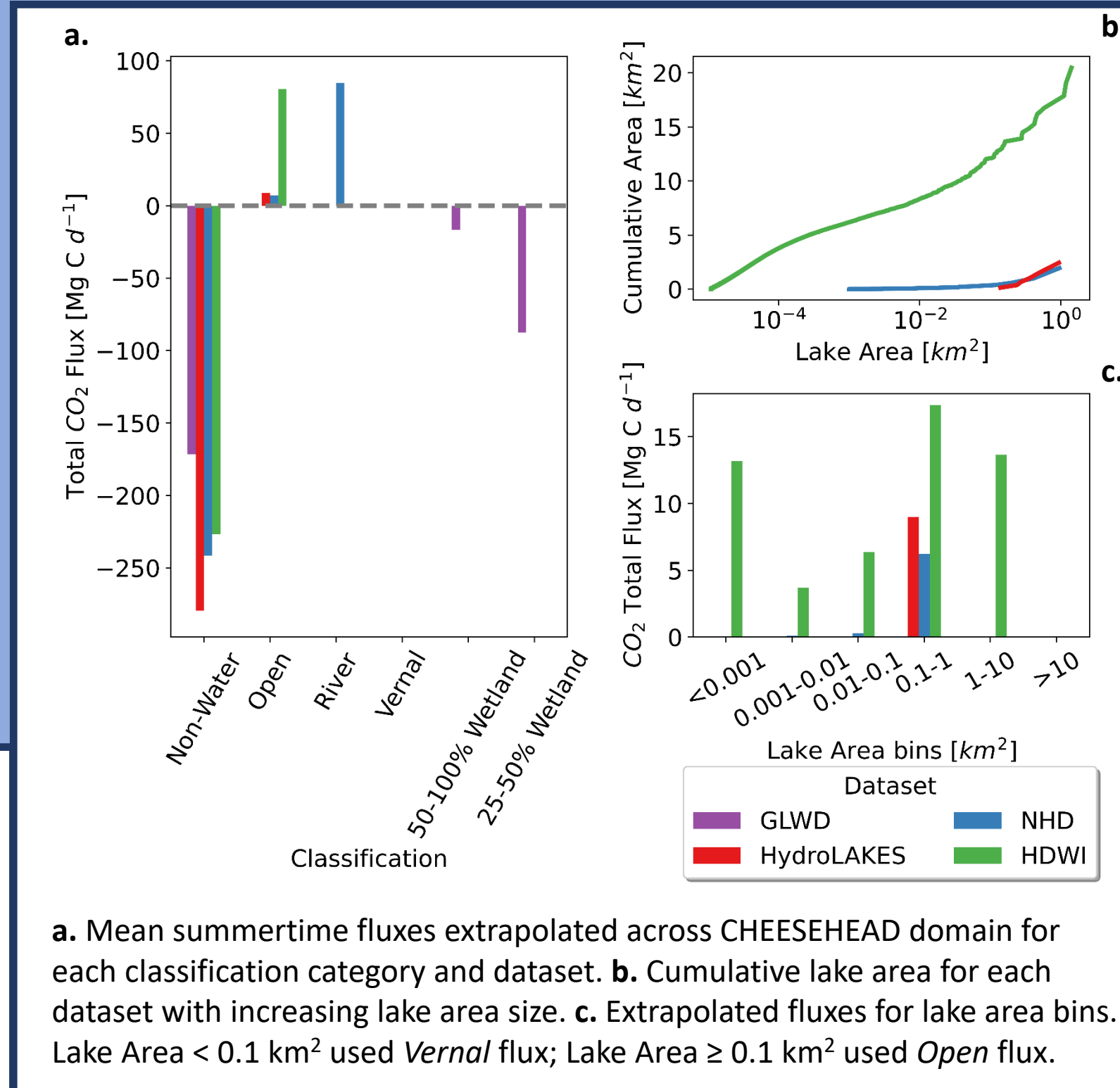
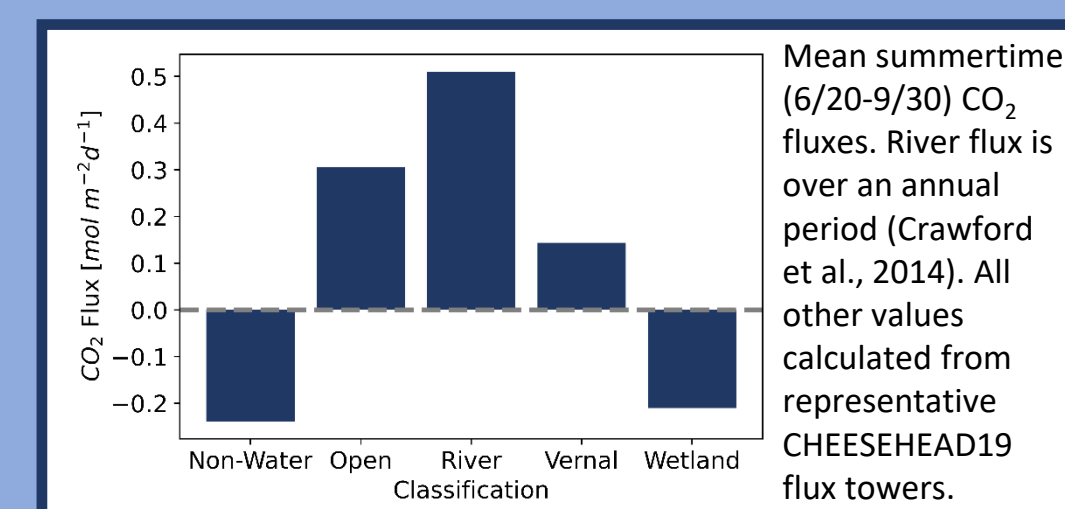
- Located within the Chequamegon-Nicolet National Forest
- Includes the NSF-funded Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD) project
- Located in the Northern Highlands Lake District (NHLD) of Wisconsin
- Characterized by repeated glaciation, the NHLD is relatively flat with lakes and wetlands filling in depressions
- Covered by a mix of upland and lowland coniferous and deciduous forest of mature age with patches of recent clearings



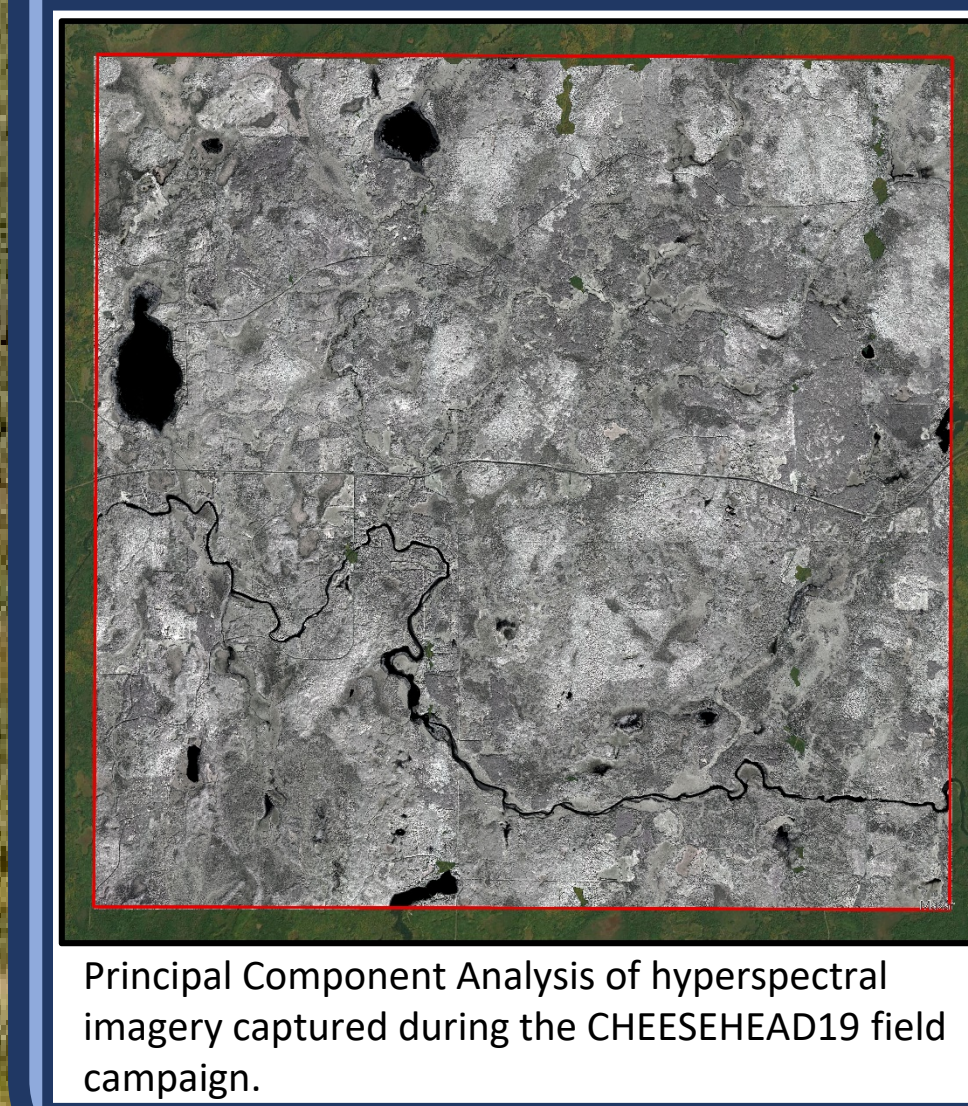
4. Carbon Budget

Using CO₂ fluxes measured during the CHEESEHEAD19 campaign and from nearby rivers reported in literature, total CO₂ fluxes for the CHEESEHEAD domain are extrapolated.

- Vernal flux (US-PFo) is lower than expected, likely due to encroaching canopy and low wind
- HDWI has a significantly more open water area, especially from small water bodies, leading to more positive fluxes
- River flux in NHD is of similar magnitude to the flux resulting from the addition of small bodies in HDWI, highlighting importance of including rivers in the carbon budget



6. Future Work



- Future work includes:
- Perform Support Vector Machine Classification on PCA image to create water type classification map
 - Compare classified map with different datasets
 - Evaluate the HDWI compared to other images
 - Apply results to similar lake-rich regions
 - Perform more in-depth analysis of river fluxes
 - Extrapolate fluxes to an annual scale
 - Publish my first paper as the primary author

Acknowledgements

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