Quantifying uncertainty in satellite-derived fire severity using actual tree mortality

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IALE Annual Meeting
April 8, 2019
Estimating fire effects from space

Which severity index is best?

What is the **range in fire effects** that may appear equivalent based on satellite-derived severity?

\[ dNBR = 320 \]
Study design

54 0.25-ha stem-mapped plots

Study design

Summarized observed mortality of stems $\geq 10$ cm DBH

Evaluated accuracy with non-parametric regression (random forest and LOESS)

Quantified uncertainty and scaled to the entire landscape

Results – mortality by basal area

Results – mortality by number of stems

Results – uncertainty at the landscape scale

Greatest uncertainty in low-to moderate-severity
Conclusions

No single index was always best

\textit{dNBR} was best overall

\textbf{RBR} was generally equivalent to \textit{dNBR}, while \textit{RdNBR} reduced accuracy

\textit{dNDVI} and \textit{dSWIR:NIR} may be useful for detecting specific fire effects

There is \textbf{considerable uncertainty} in satellite-derived estimates of tree mortality

Acknowledgements

YFDP PIs: Jim Lutz, Mark Swanson, Andrew Larson
YFDP colleagues: Alina Cansler, Sean Jeronimo, Jan Ng, and many students and volunteers
Lutz lab: Kendall Becker, Erika Blomdahl, Sara Germain
PhD committee: Larissa Yocom, Doug Ramsey, Andrew Larson, Mark Brunson, Jim Lutz

Yosemite National Park