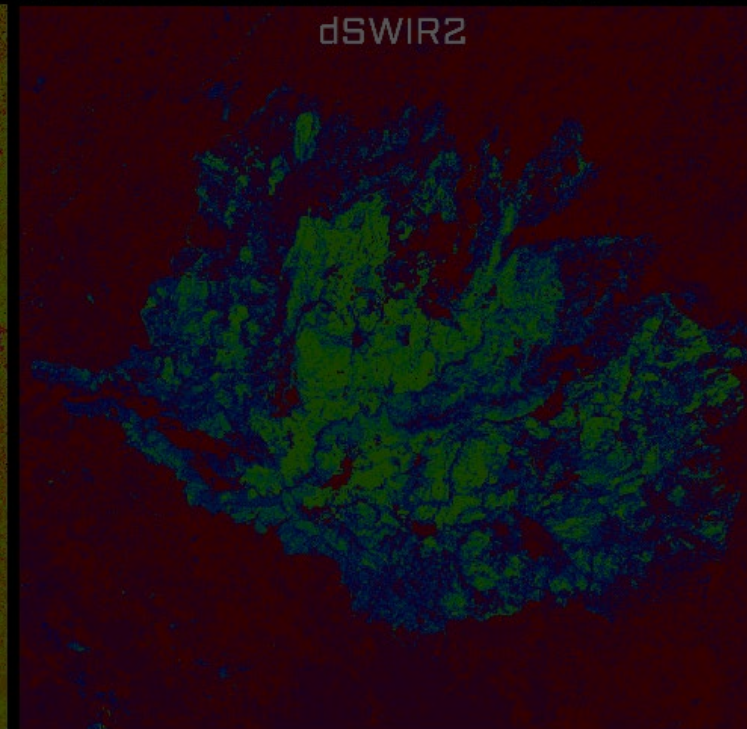
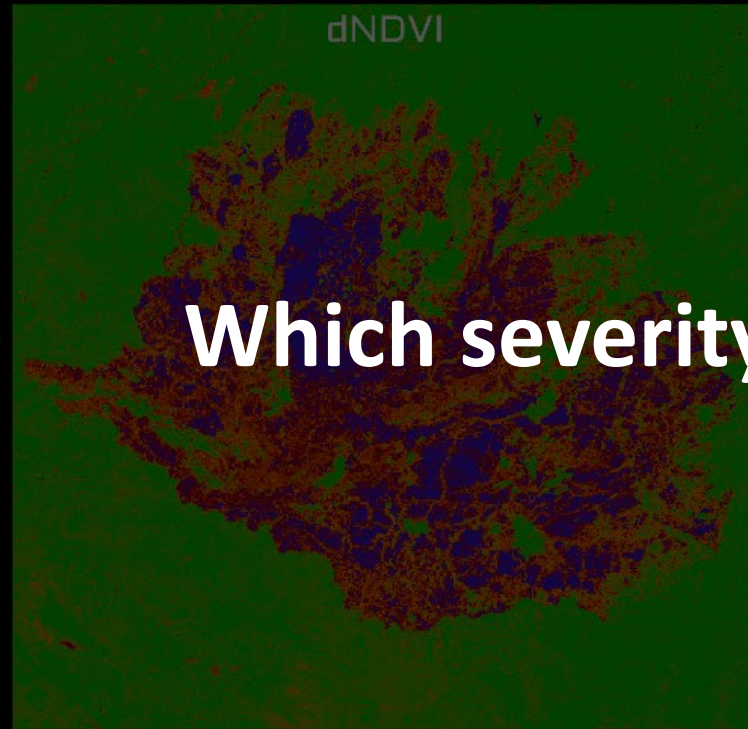
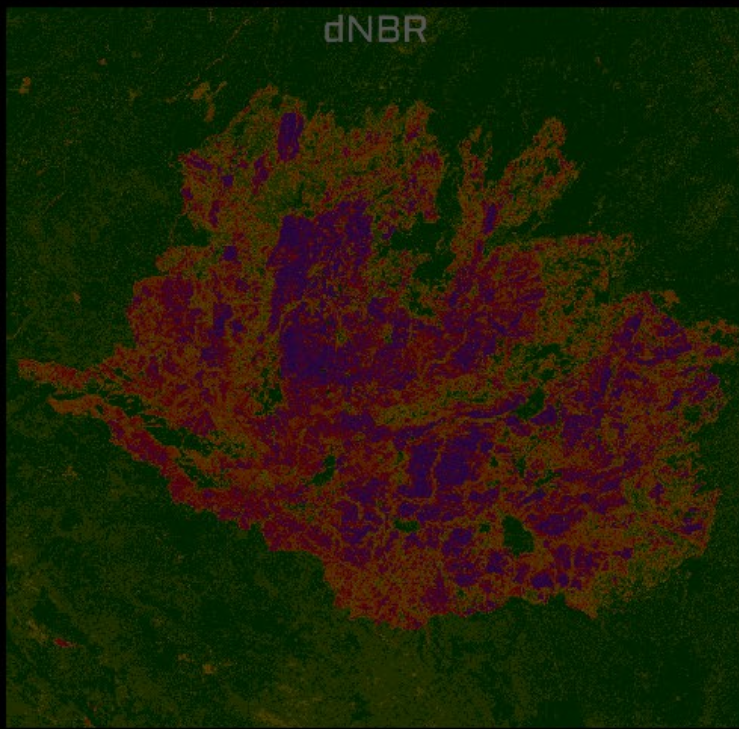


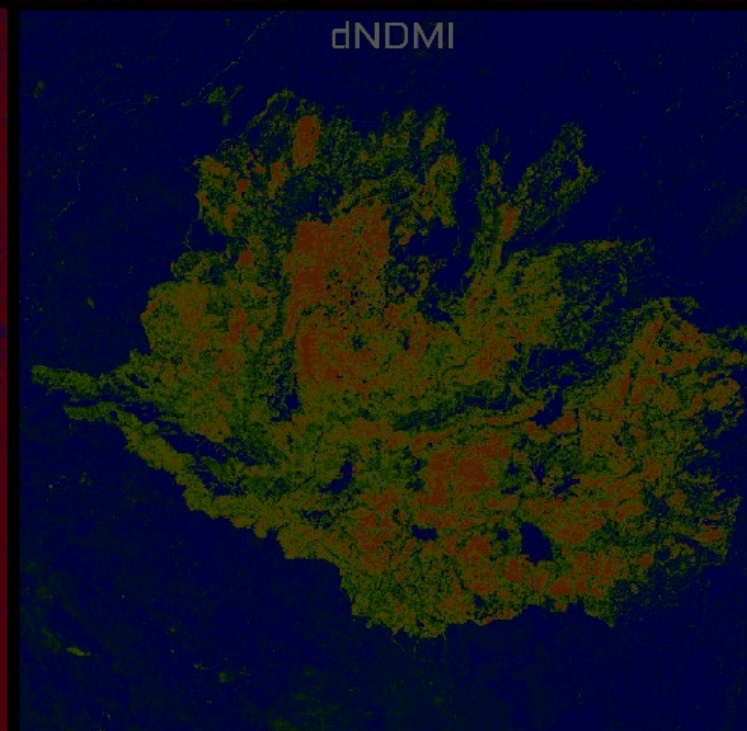
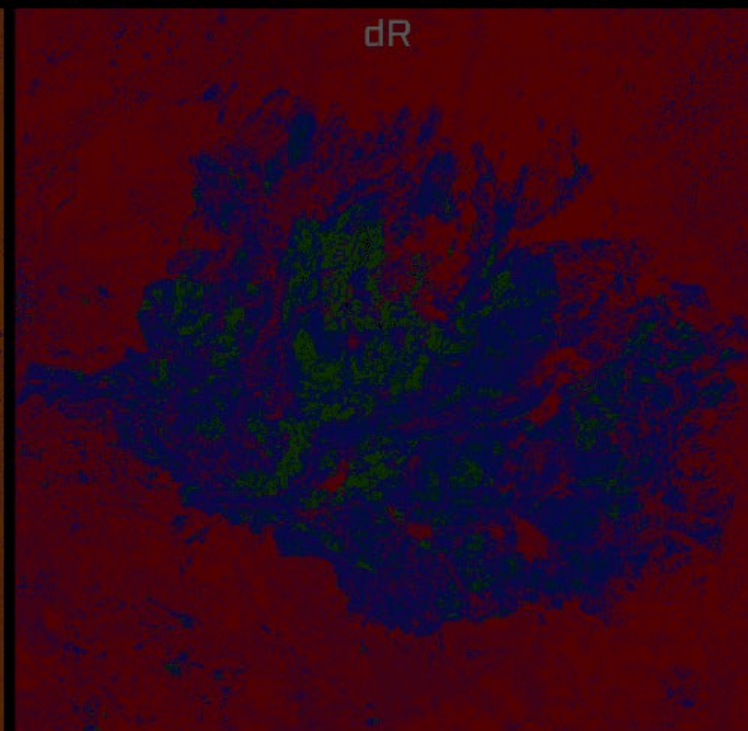
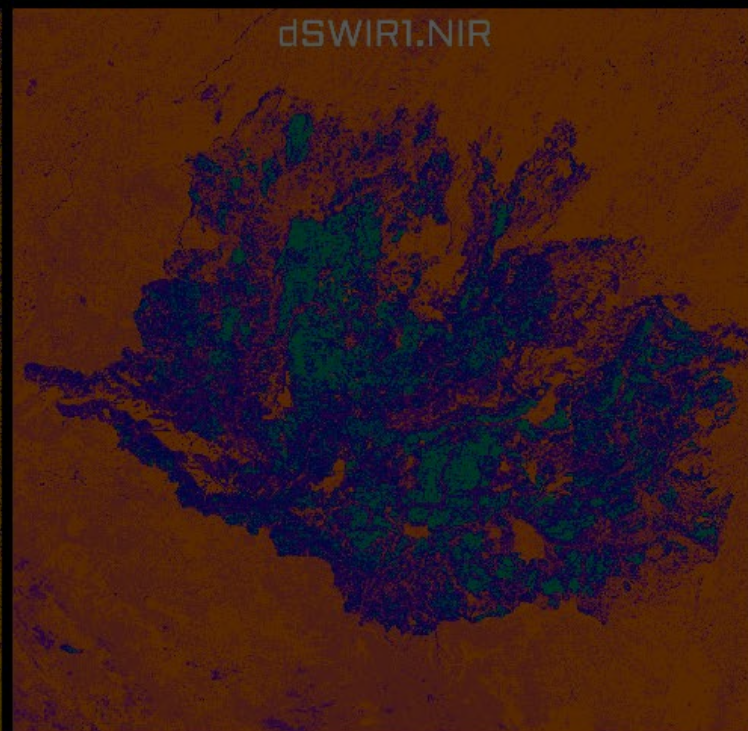
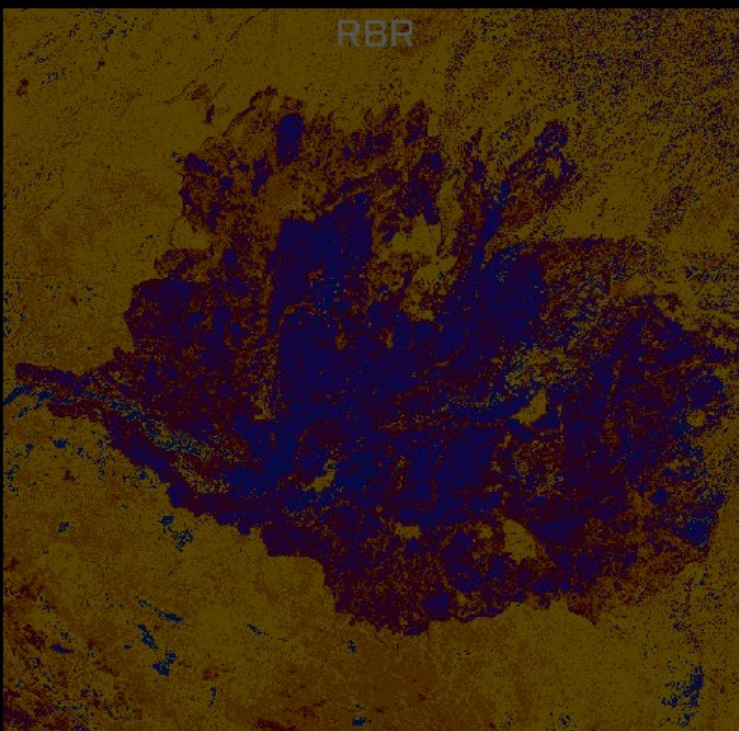
Quantifying uncertainty in satellite-derived fire severity using actual tree mortality

Tucker J Furniss
Sean Jeronimo, Andrew Larson, Van Kane, and James Lutz
IALE Annual Meeting
April 8, 2019

Estimating fire effects from space



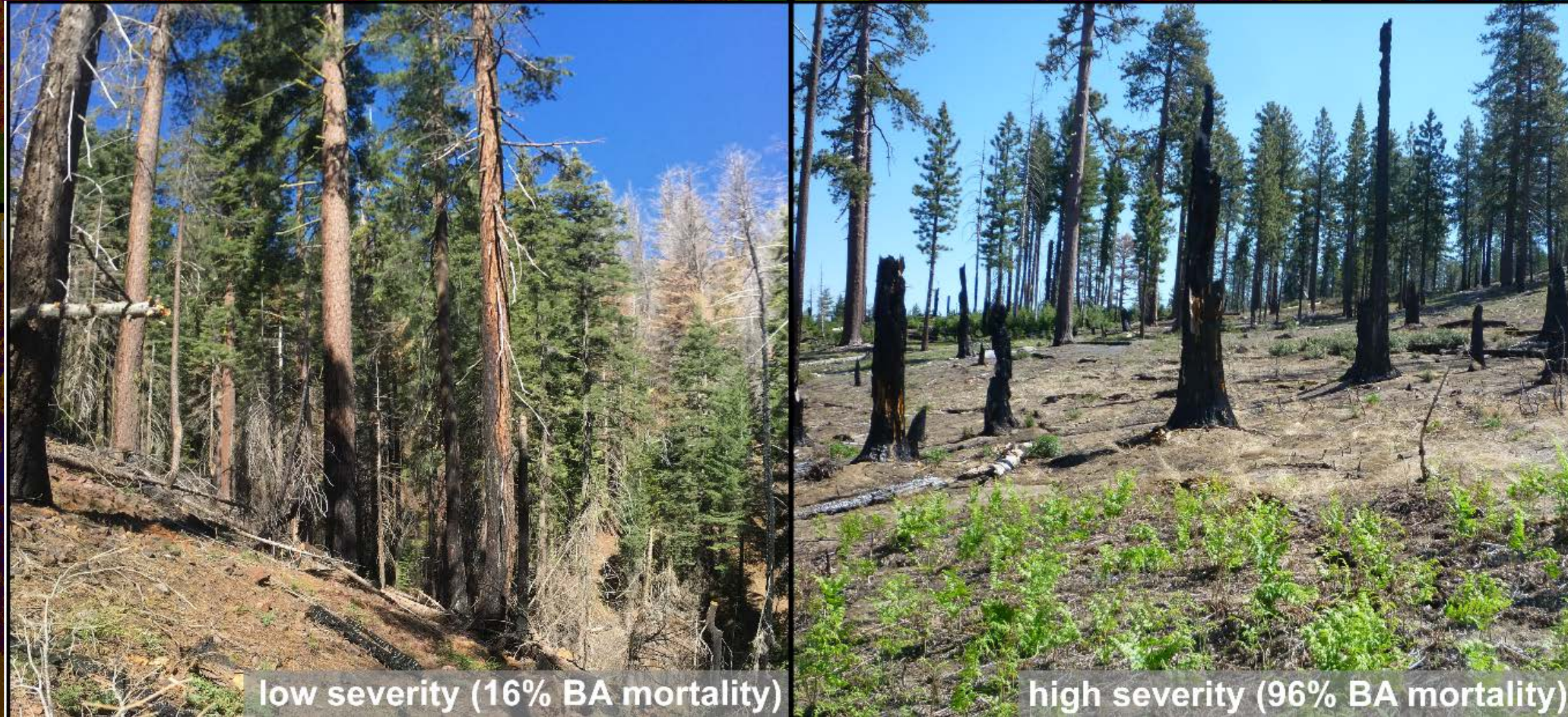
Which severity index is best?



Estimating fire effects from space

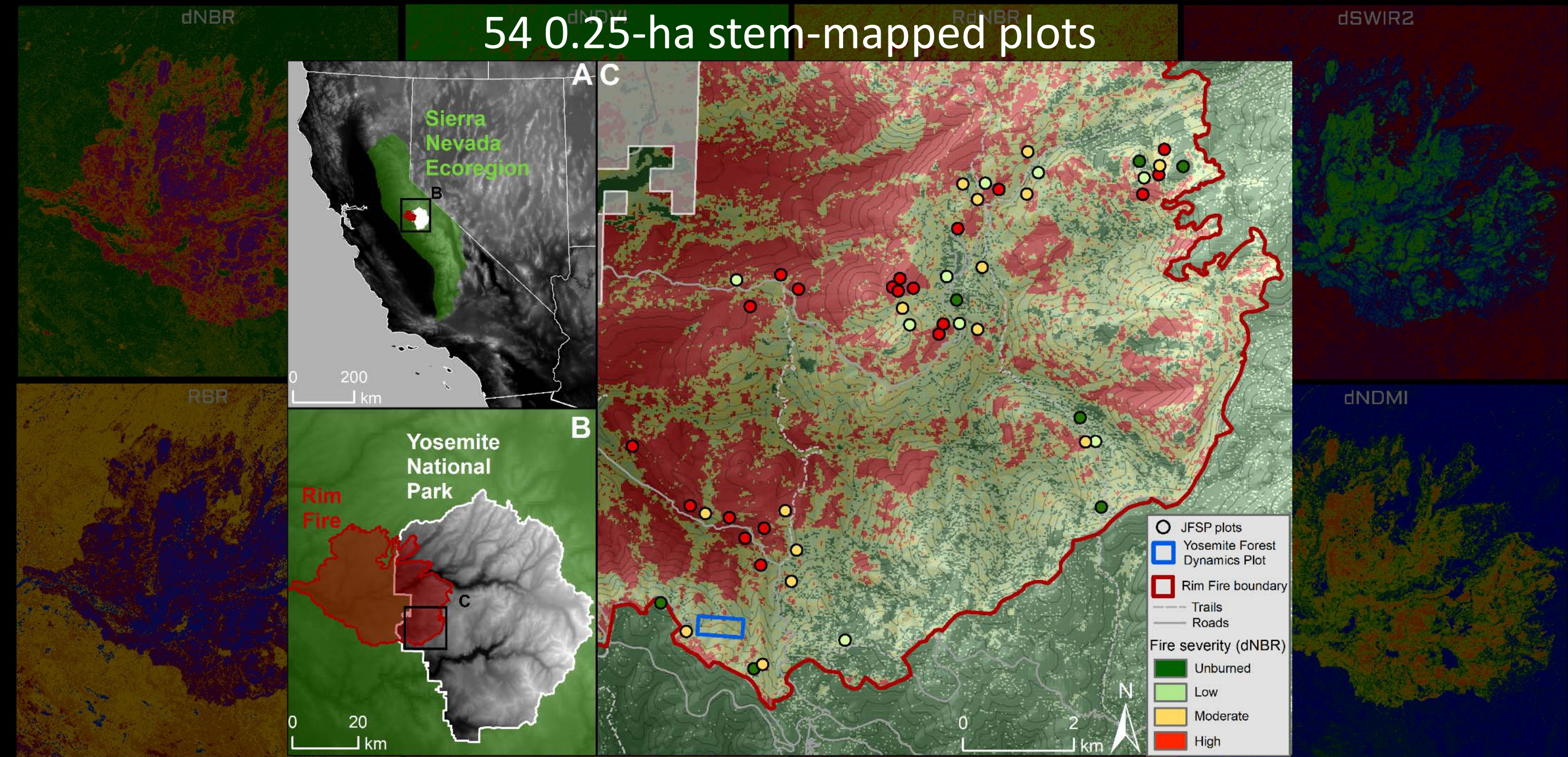
What is the **range in fire effects** that may appear equivalent based on satellite-derived severity?

dNBR = 320



Study design

54 0.25-ha stem-mapped plots



Study design

dNBR

dNDVI

RdNBR

dSWIR2

Summarized observed mortality of
stems ≥ 10 cm DBH

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

RBR

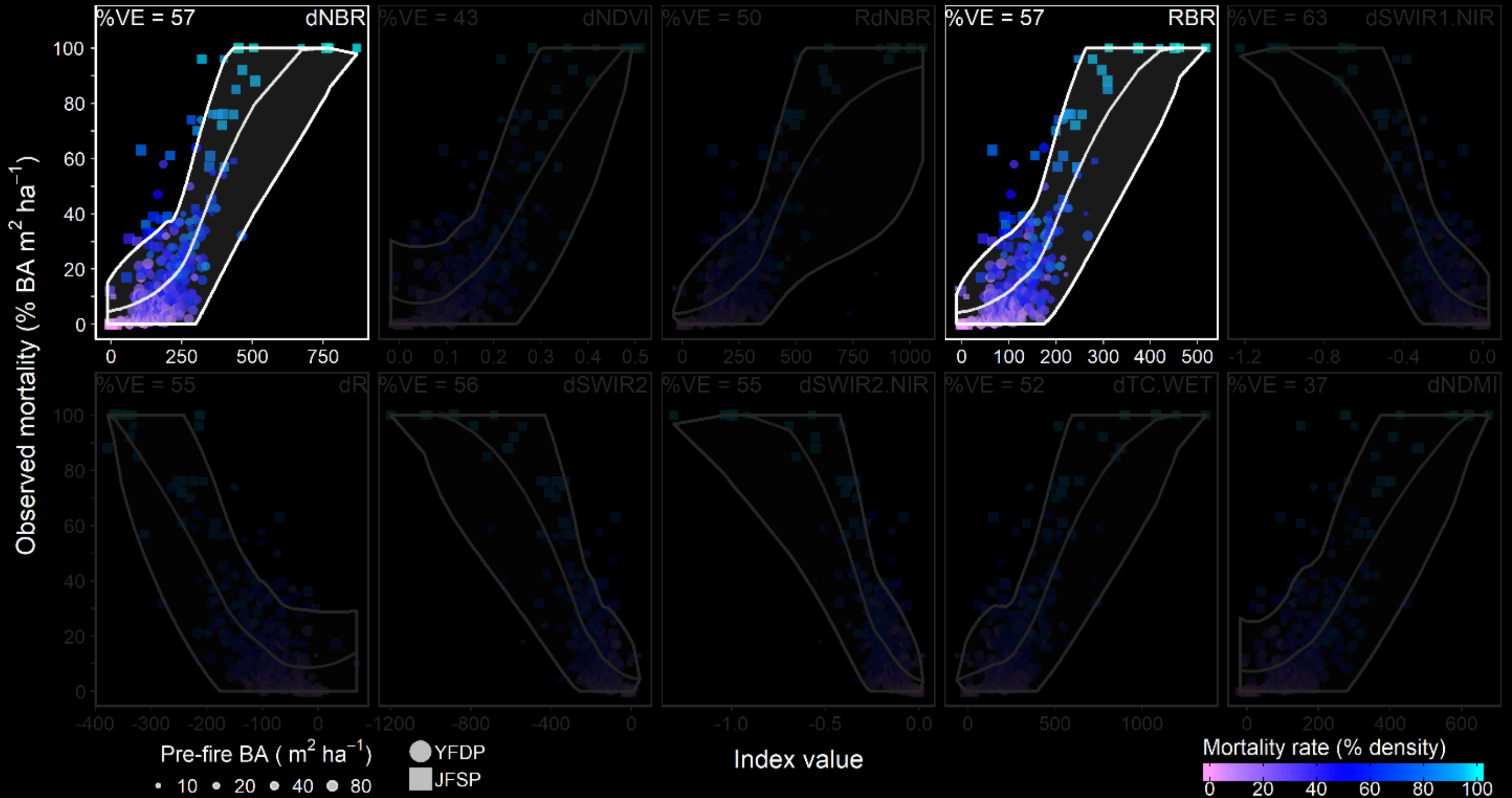
dNBR

RdNBR

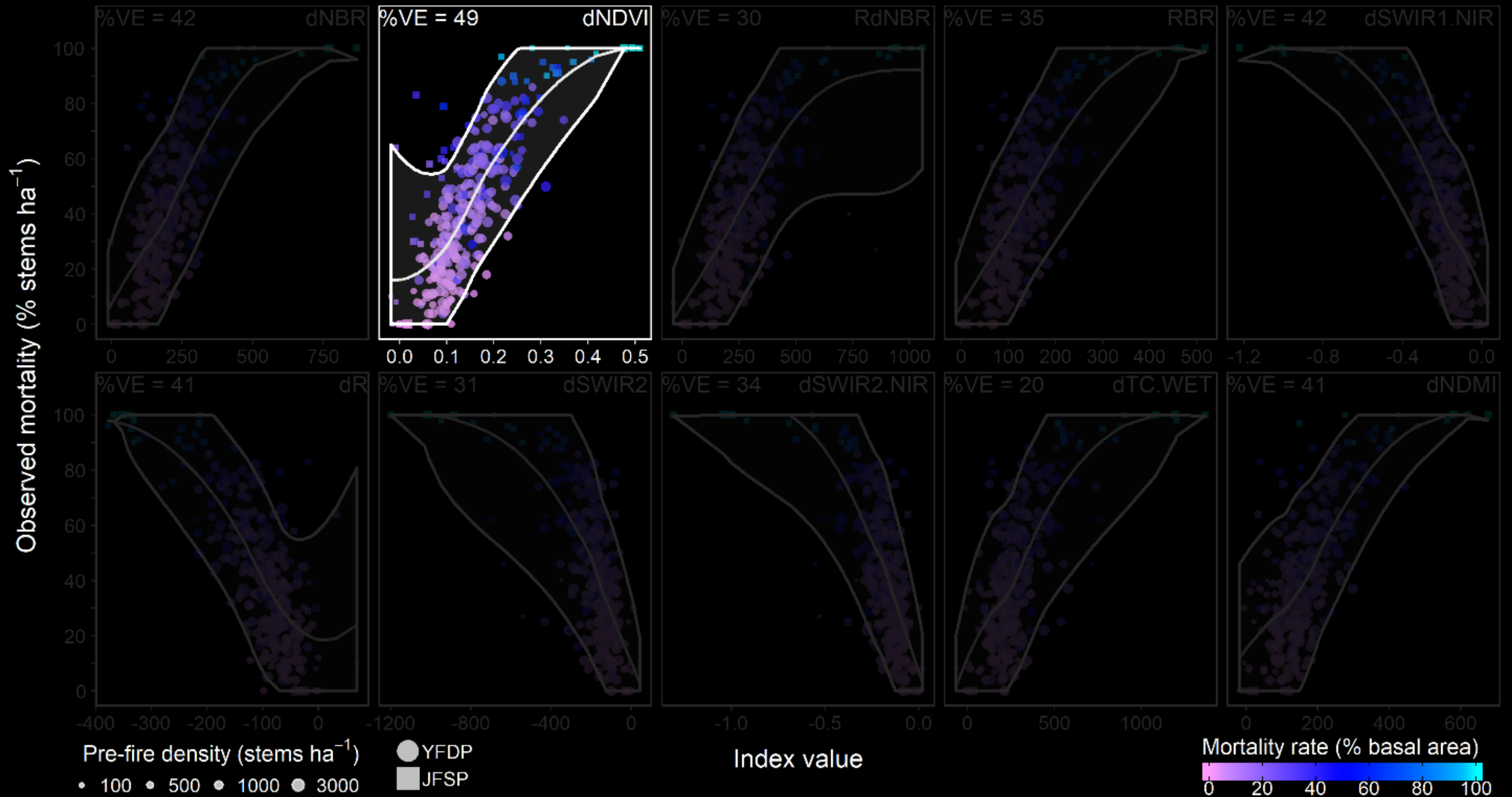
dNDMI

Quantified uncertainty and scaled
to the entire landscape

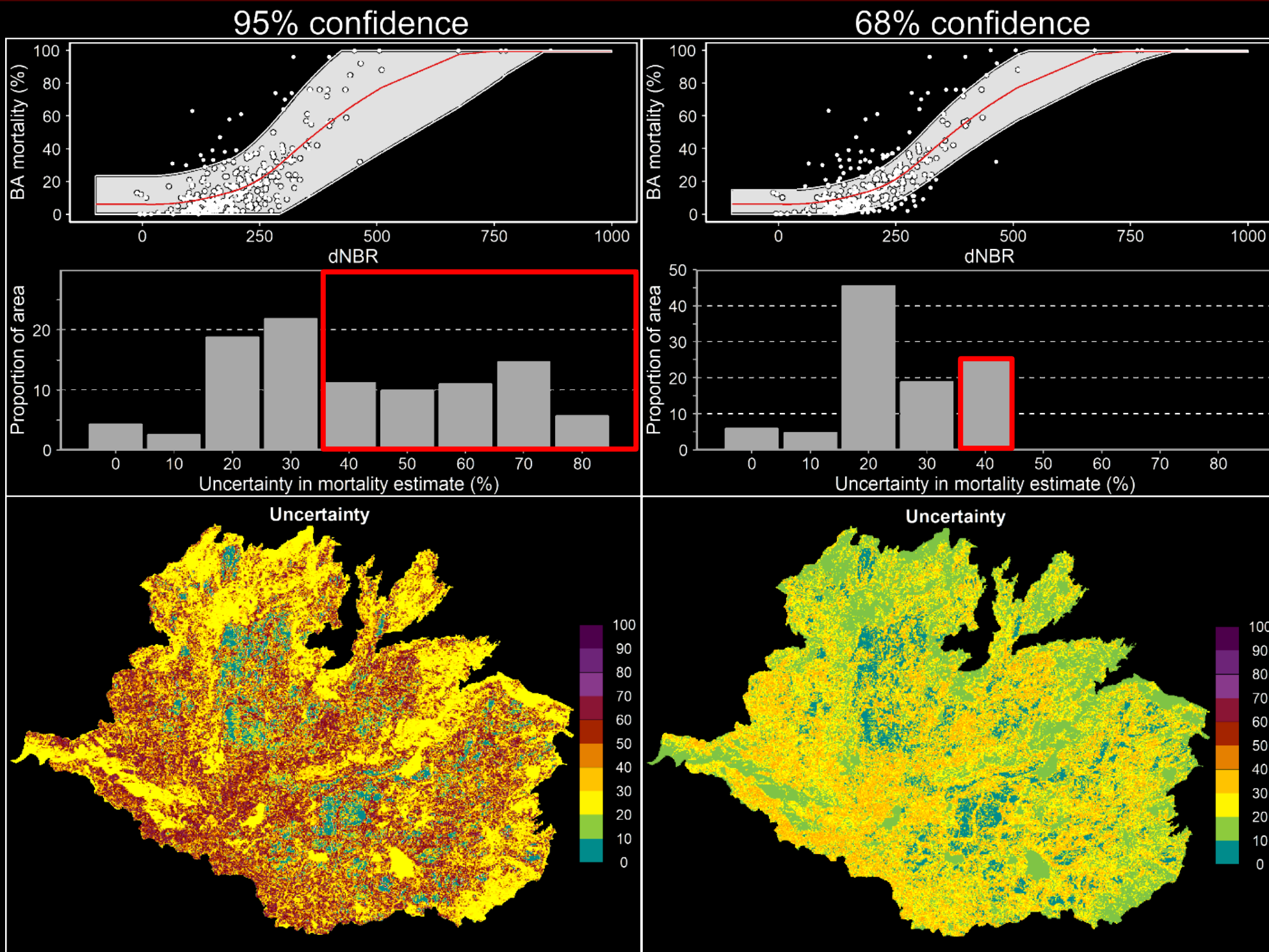
Results – mortality by basal area



Results – mortality by number of stems

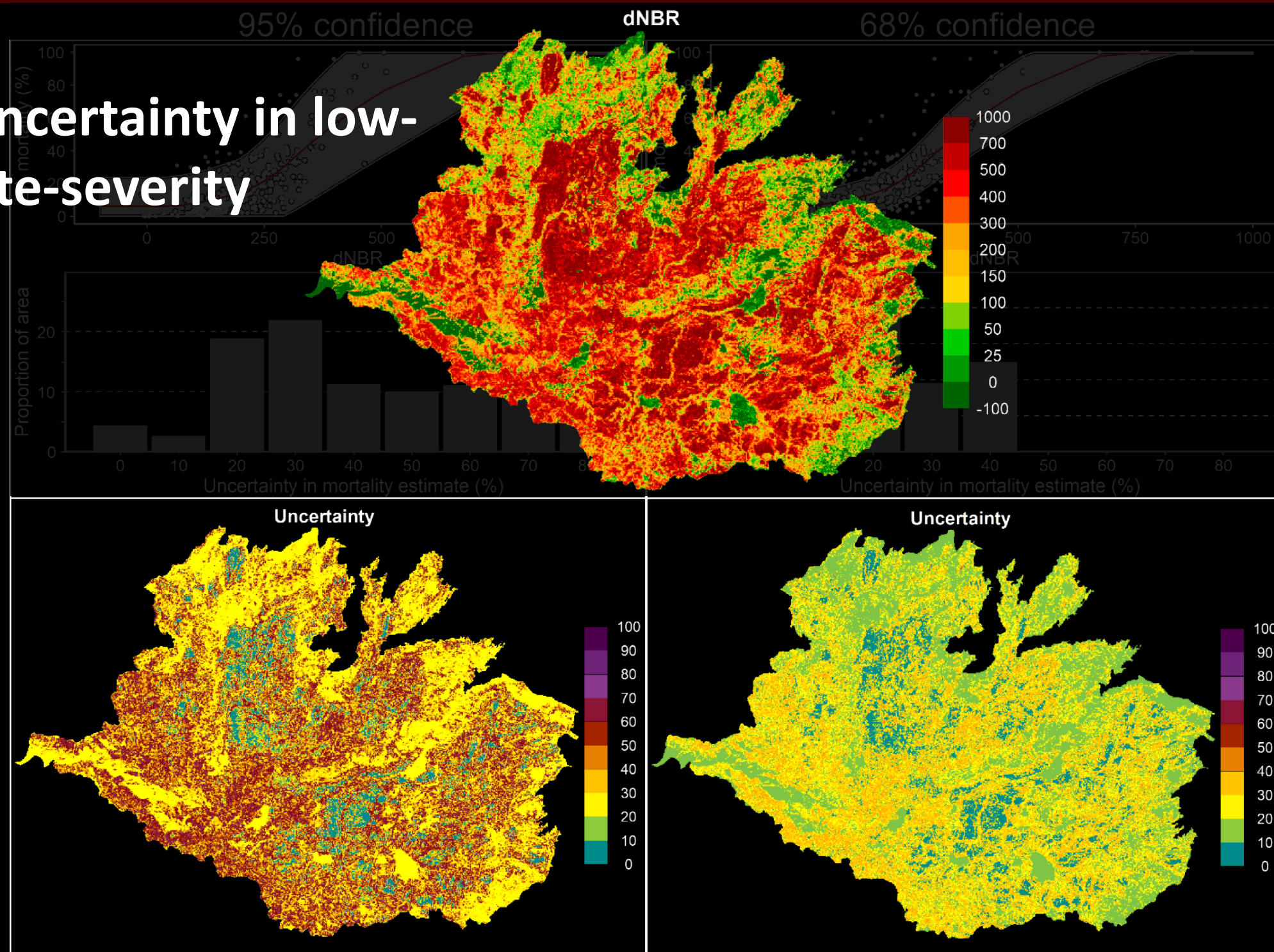


Results – uncertainty at the landscape scale

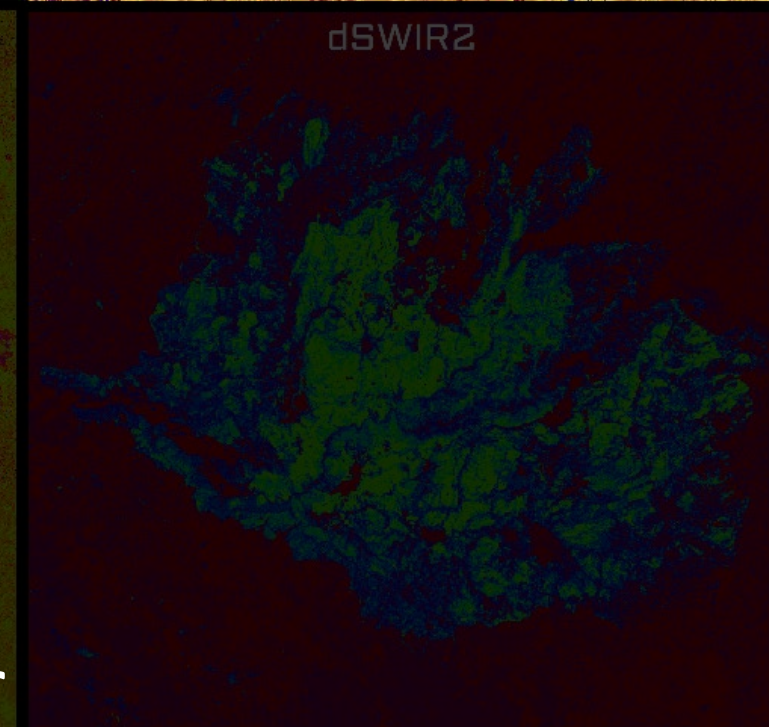
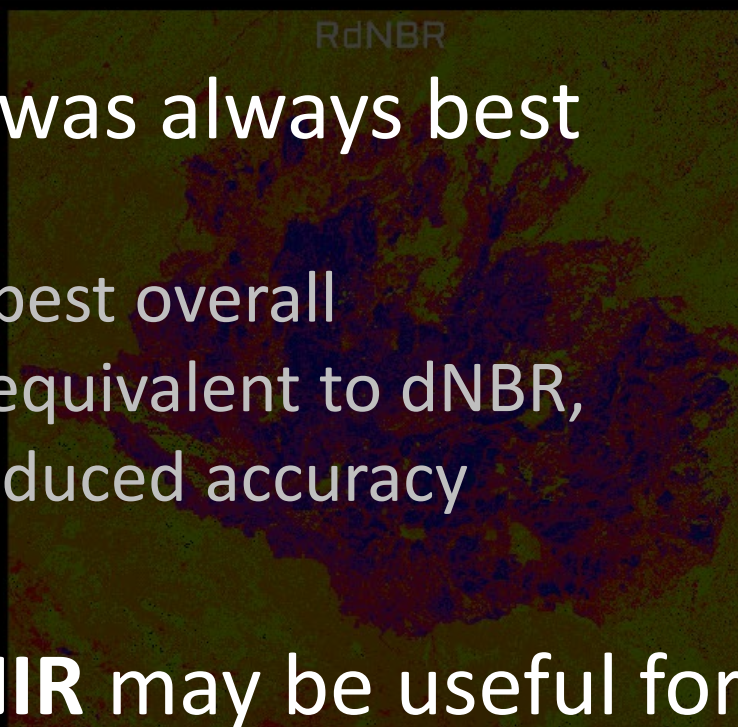
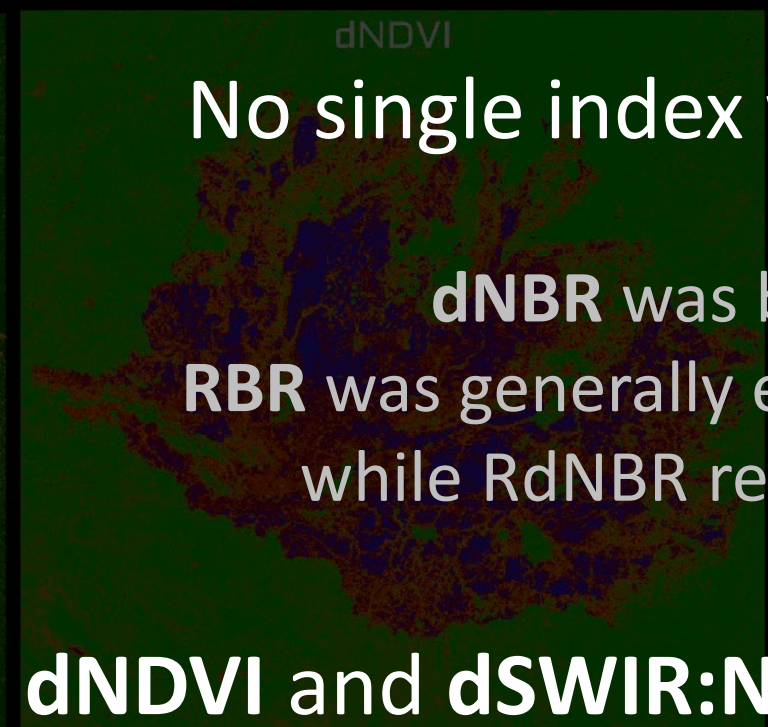
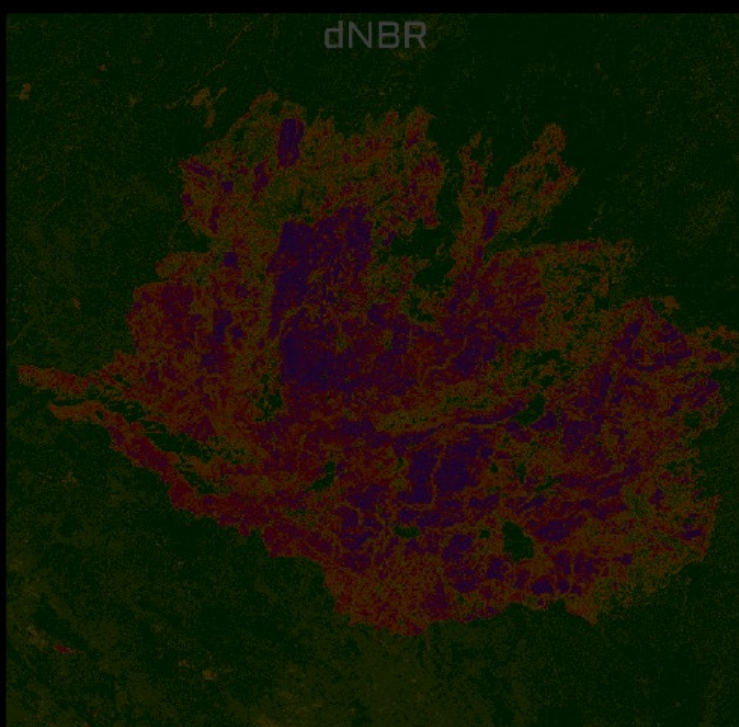


Results – uncertainty at the landscape scale

Greatest uncertainty in low- to moderate-severity



Conclusions

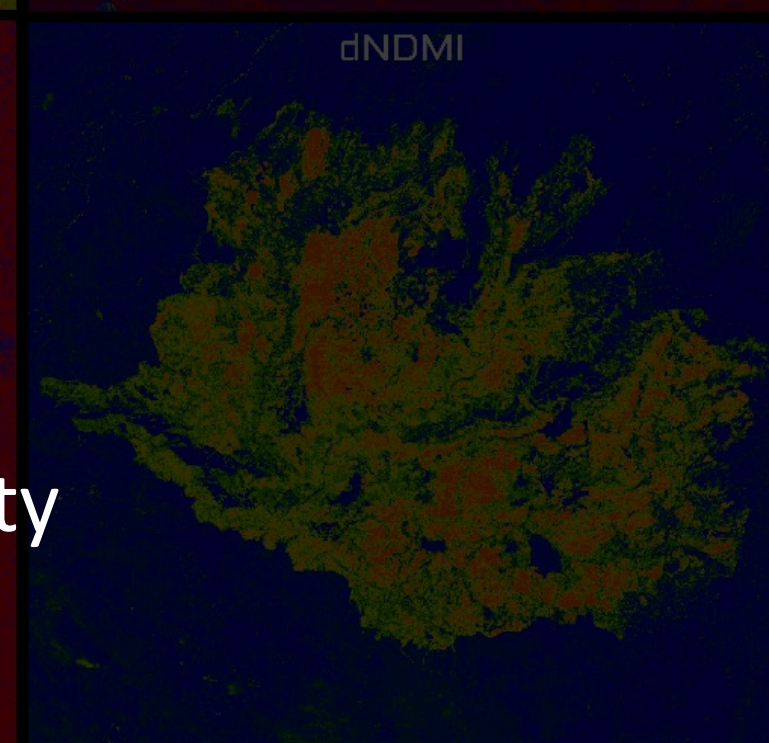
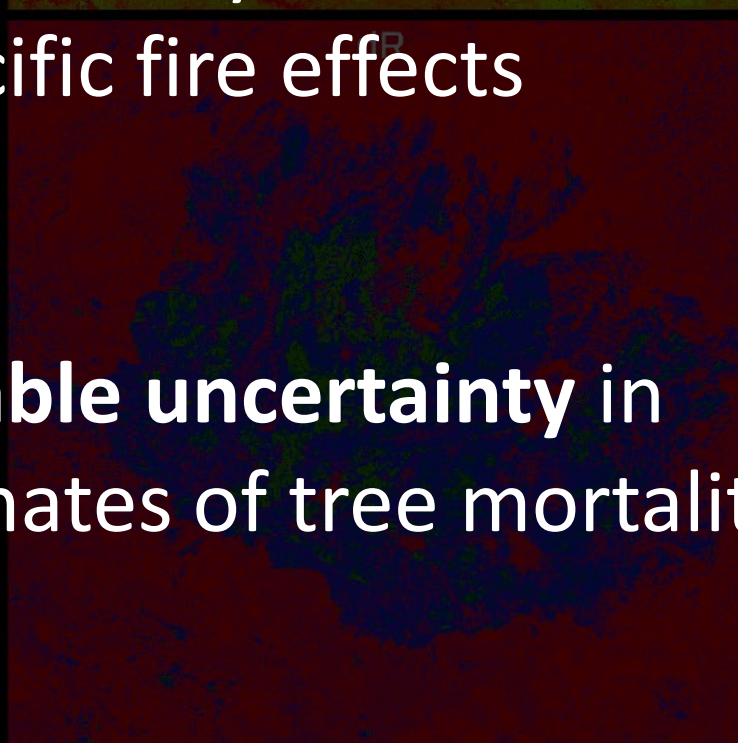
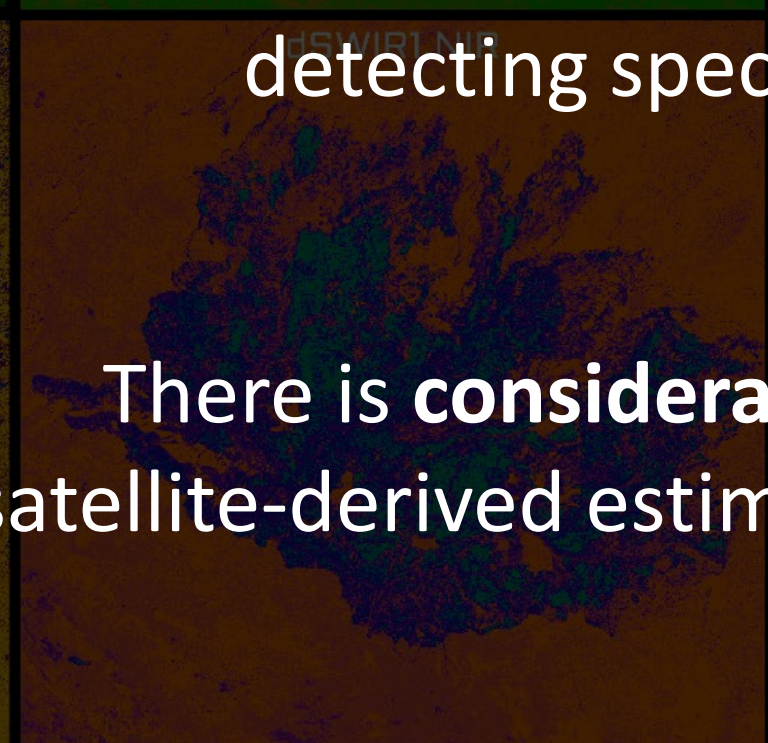
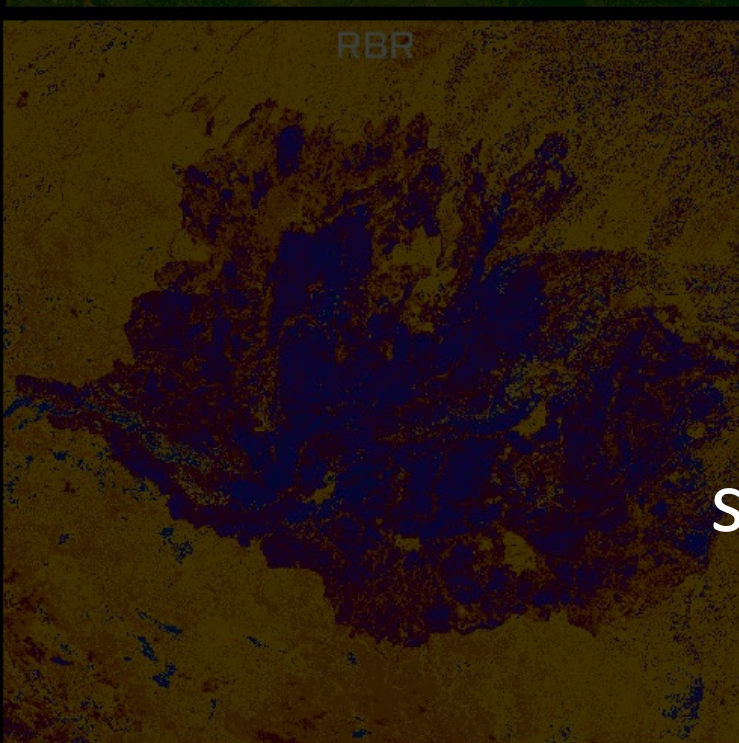


No single index was always best

dNBR was best overall

RBR was generally equivalent to dNBR,
while RdNBR reduced accuracy

dNDVI and **dSWIR:NIR** may be useful for
detecting specific fire effects



There is **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

