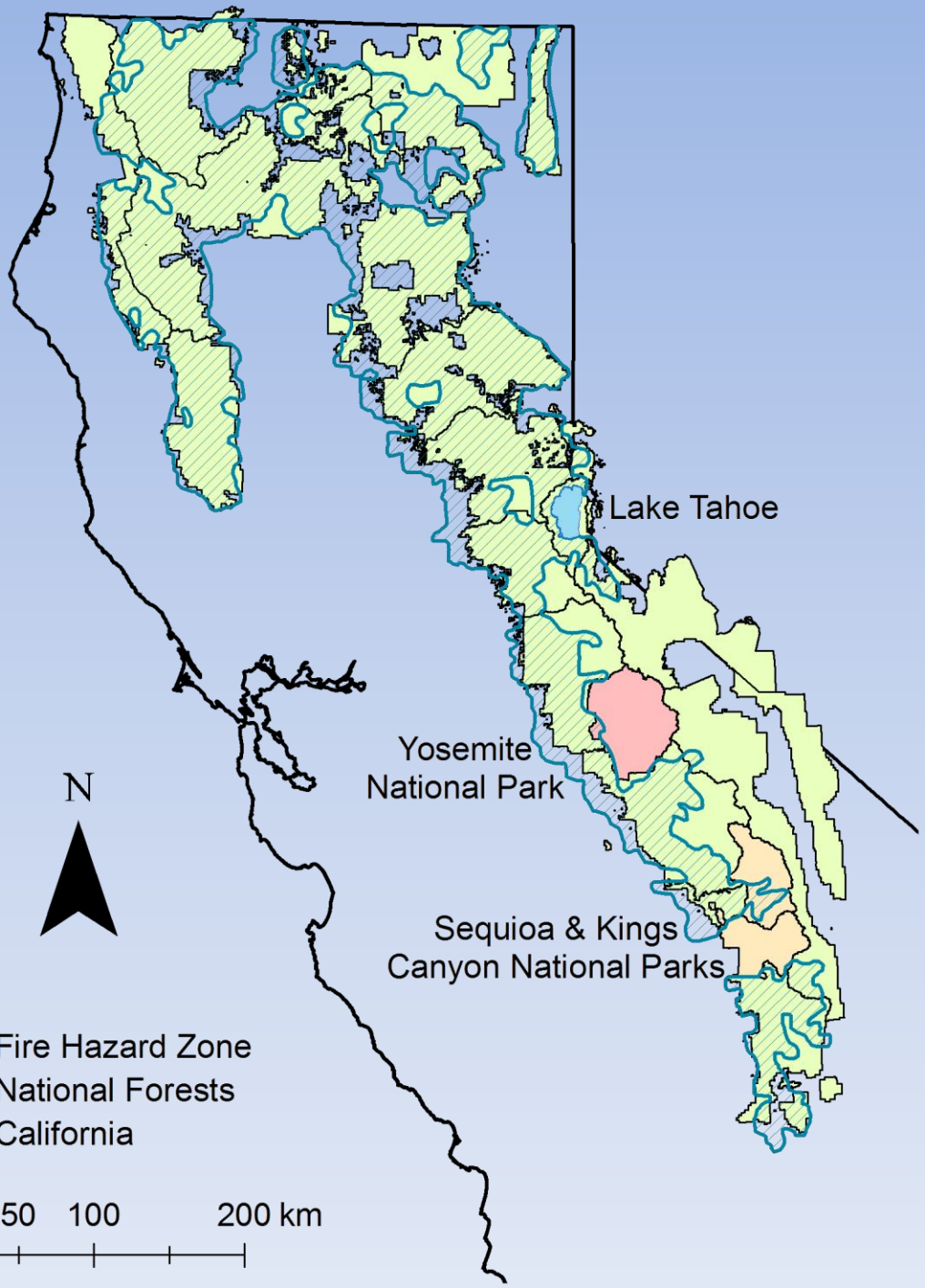
Learning from large-scale drought and wildfire in Sierra Nevada forests

“Early suppression” fire records 1911-1924

Source: Show and Kotok (1923,1929)
Area: ~18,300,000 ac
Elevation: 550-11,500 ft.
mean: 4700 ft.
No. fires: 11,618

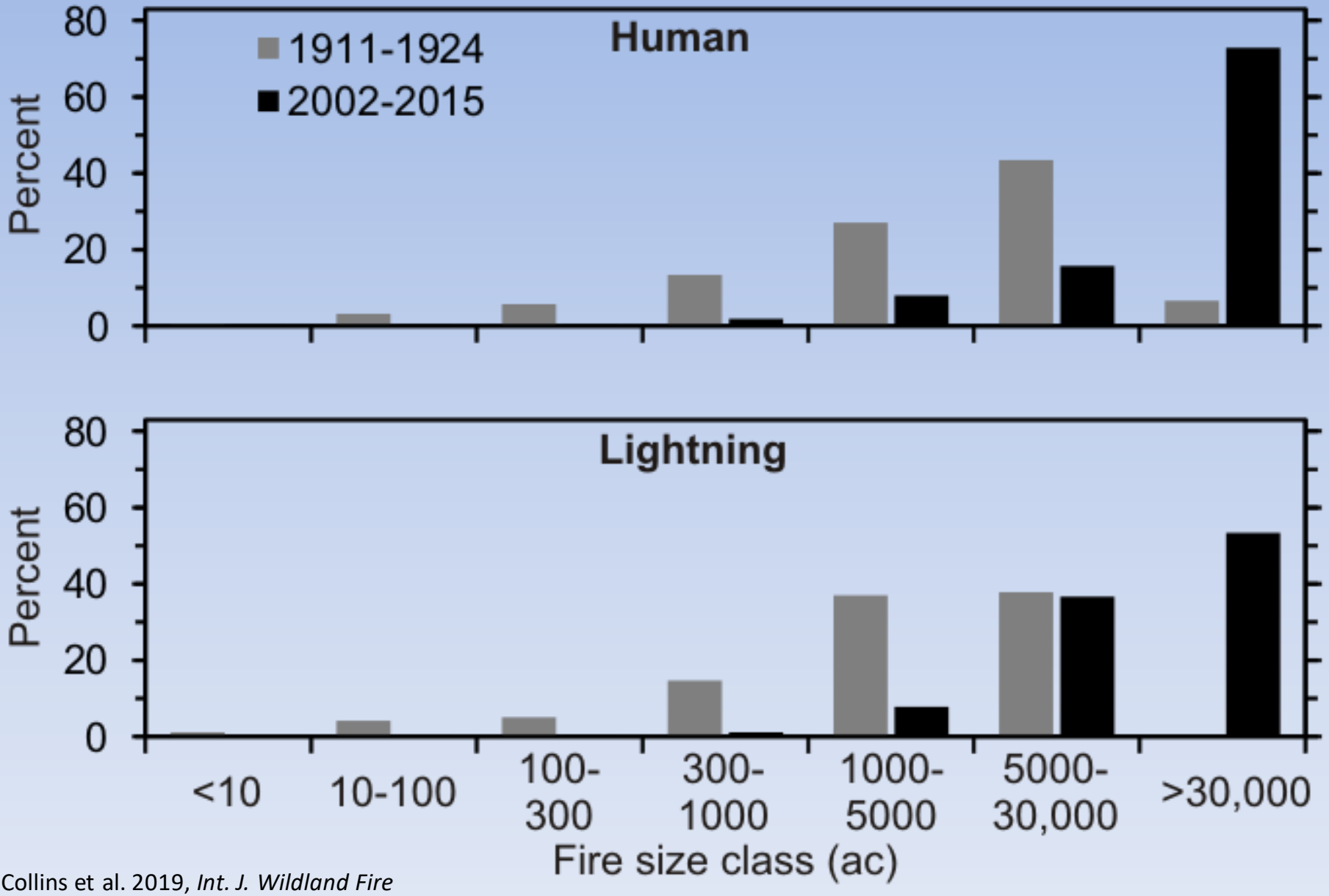
Contemporary fire records 2002-2015

Source: Short, K. (2017)
Area: same
Elevation: same
No. fires: 13,241



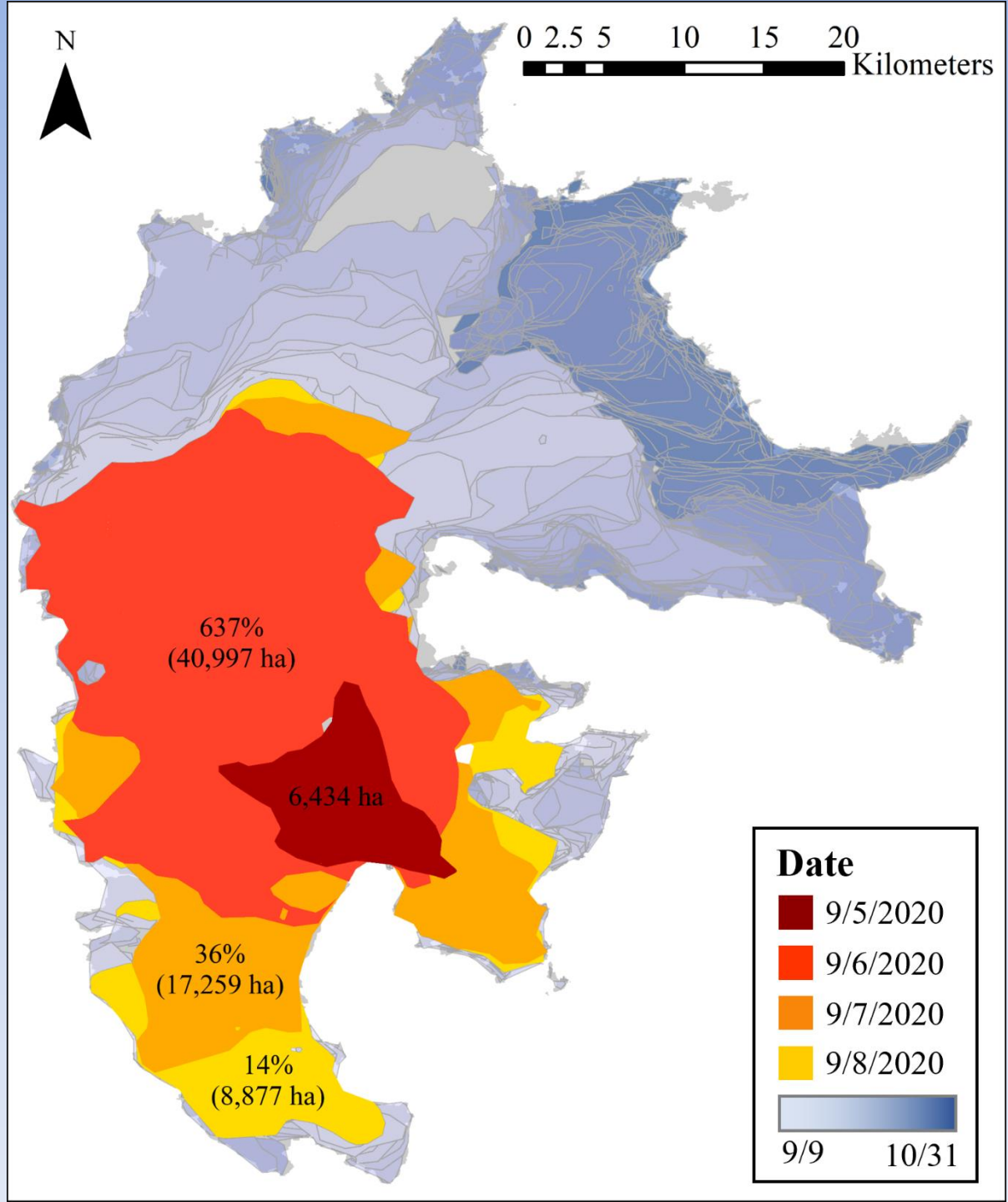
Collins et al. 2019, *Int. J. Wildland Fire*

Percent of total area burned by size class



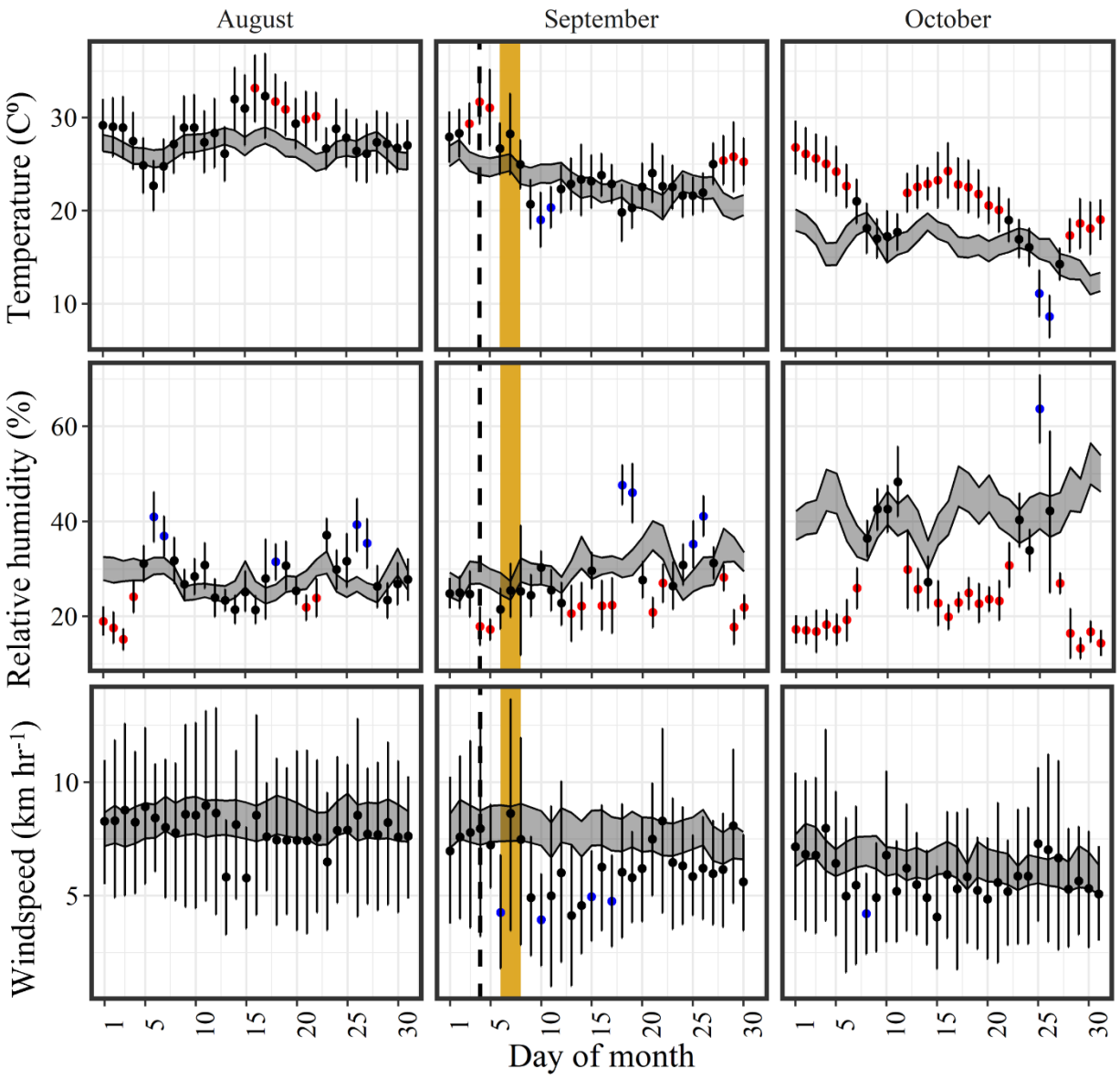
Collins et al. 2019, *Int. J. Wildland Fire*

Creek Fire (2020) – Early fire progression

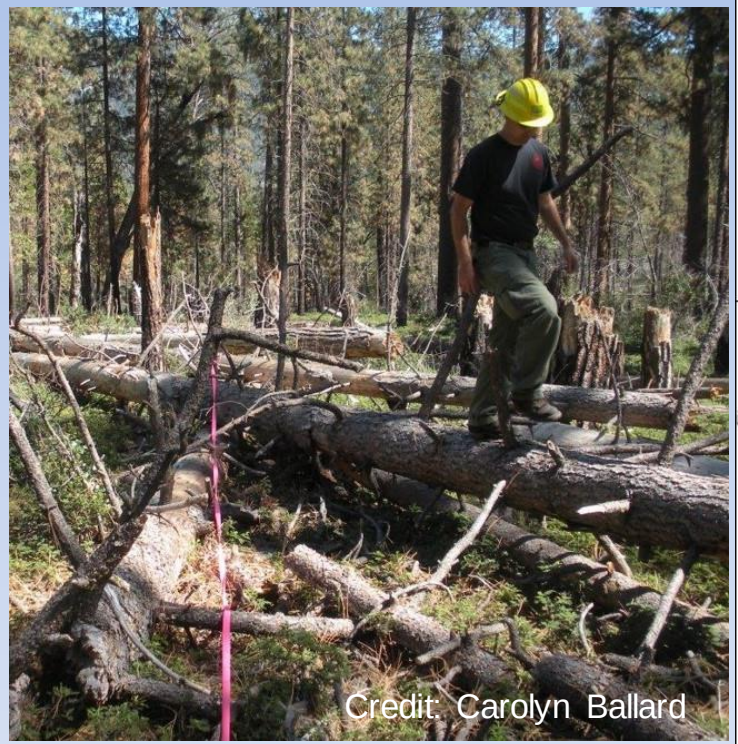


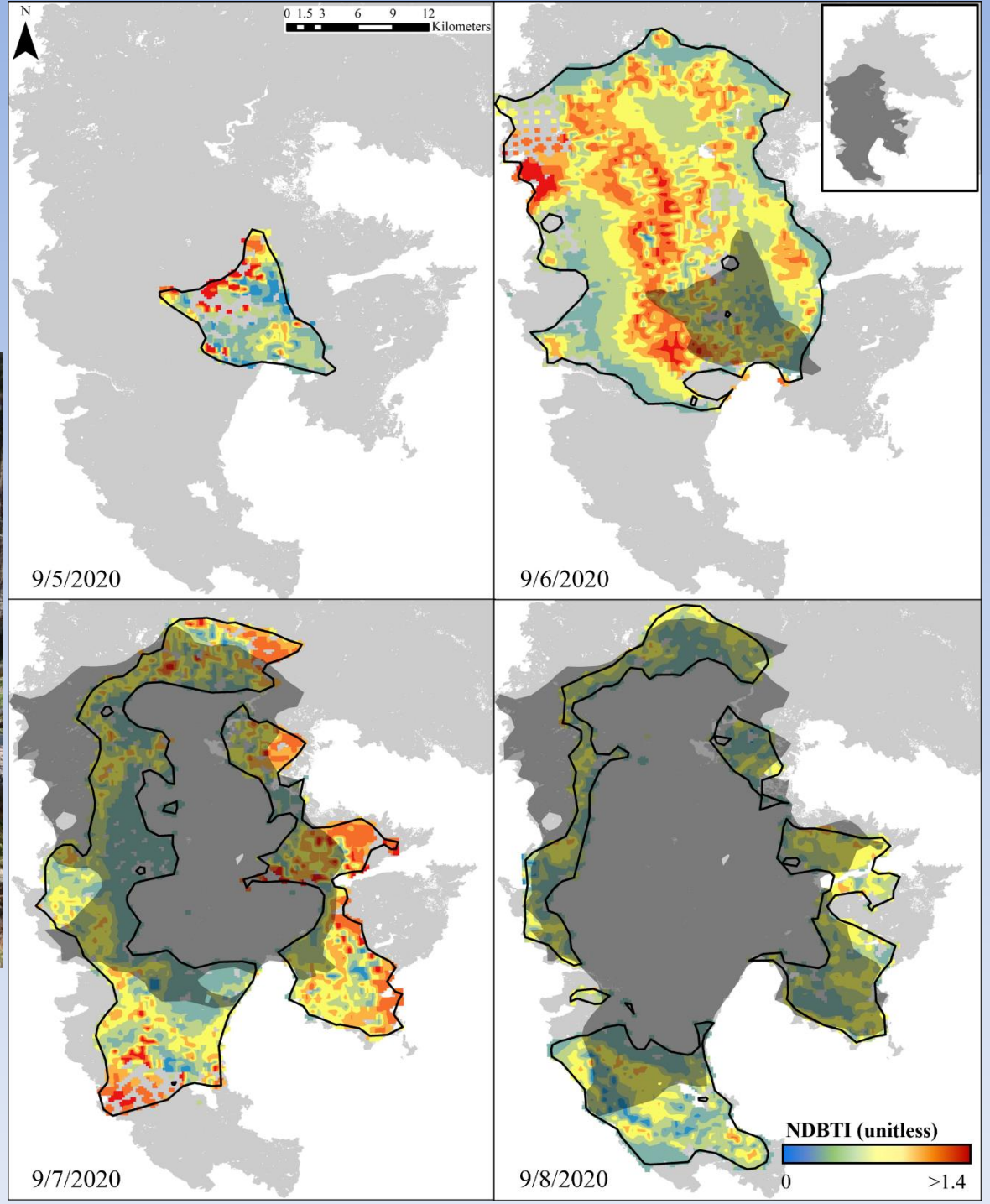
Stephens et al. 2022, *Forest Ecol. Manage.*

Creek Fire weather: relative to previous 20 years



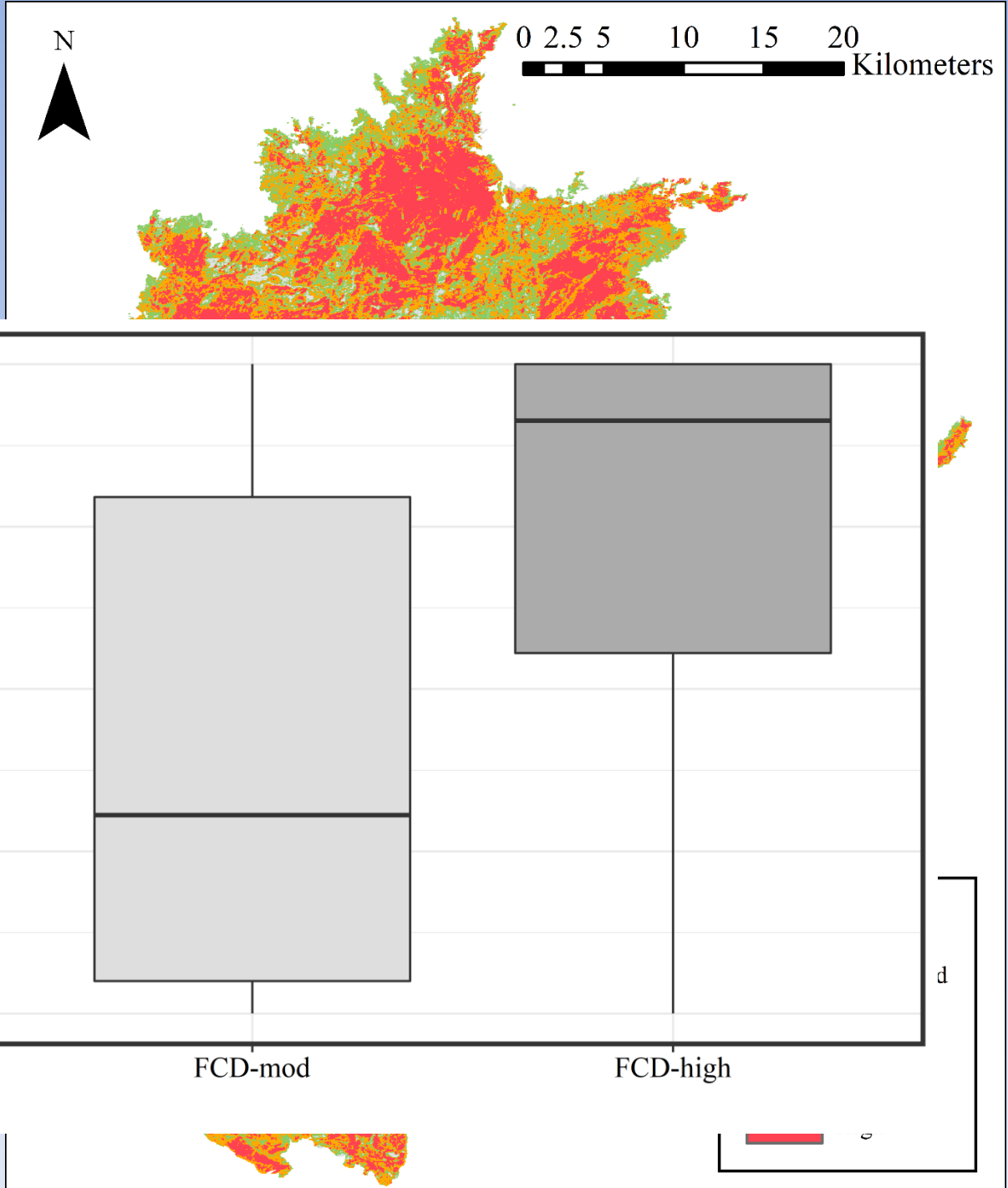
Creek Fire (2020) – Remotely sensed fire intensity (NDBTI)





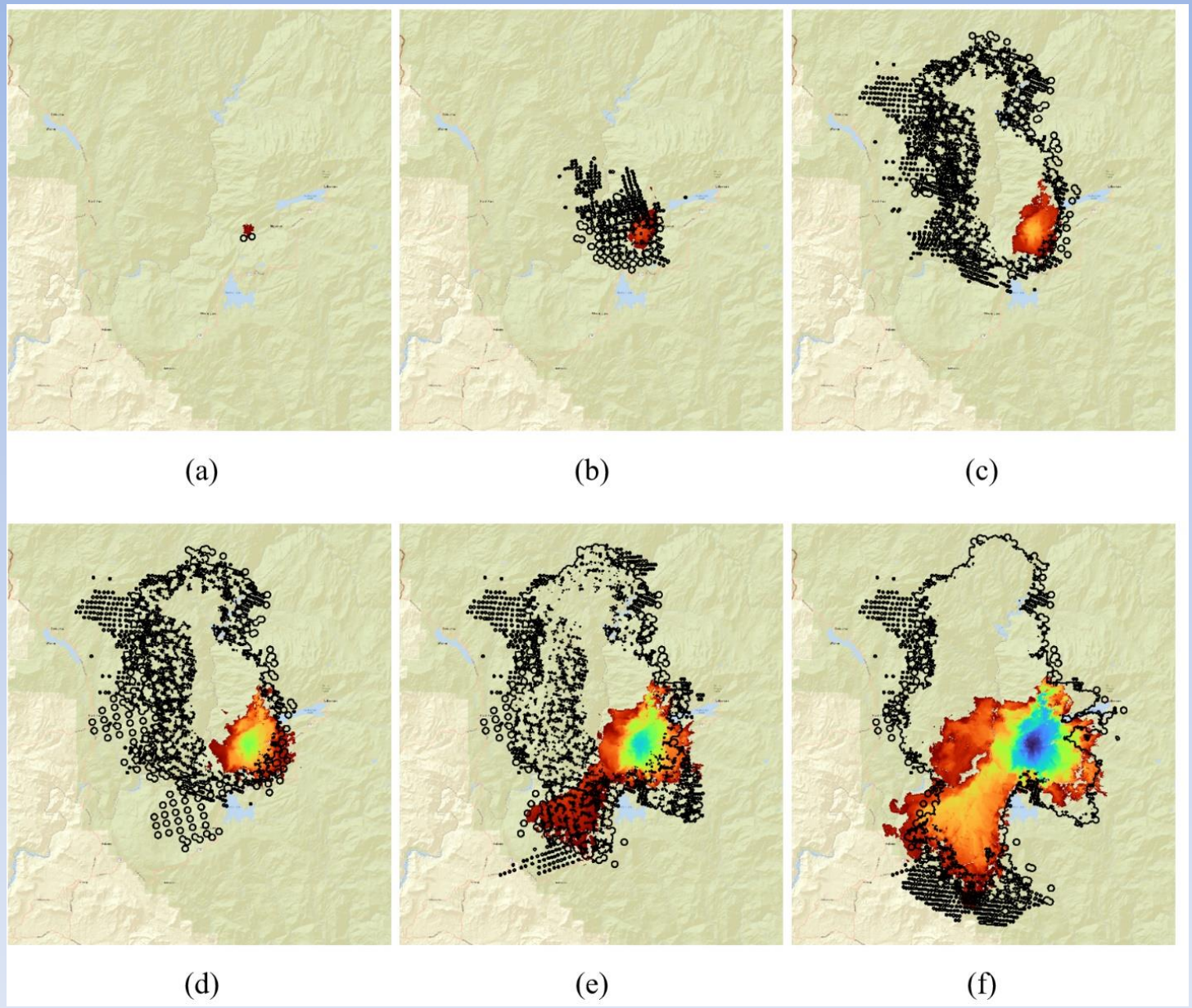
Stephens et al. 2022, *Forest Ecol. Manage.*

Creek Fire (2020) – RdNBR based fire severity



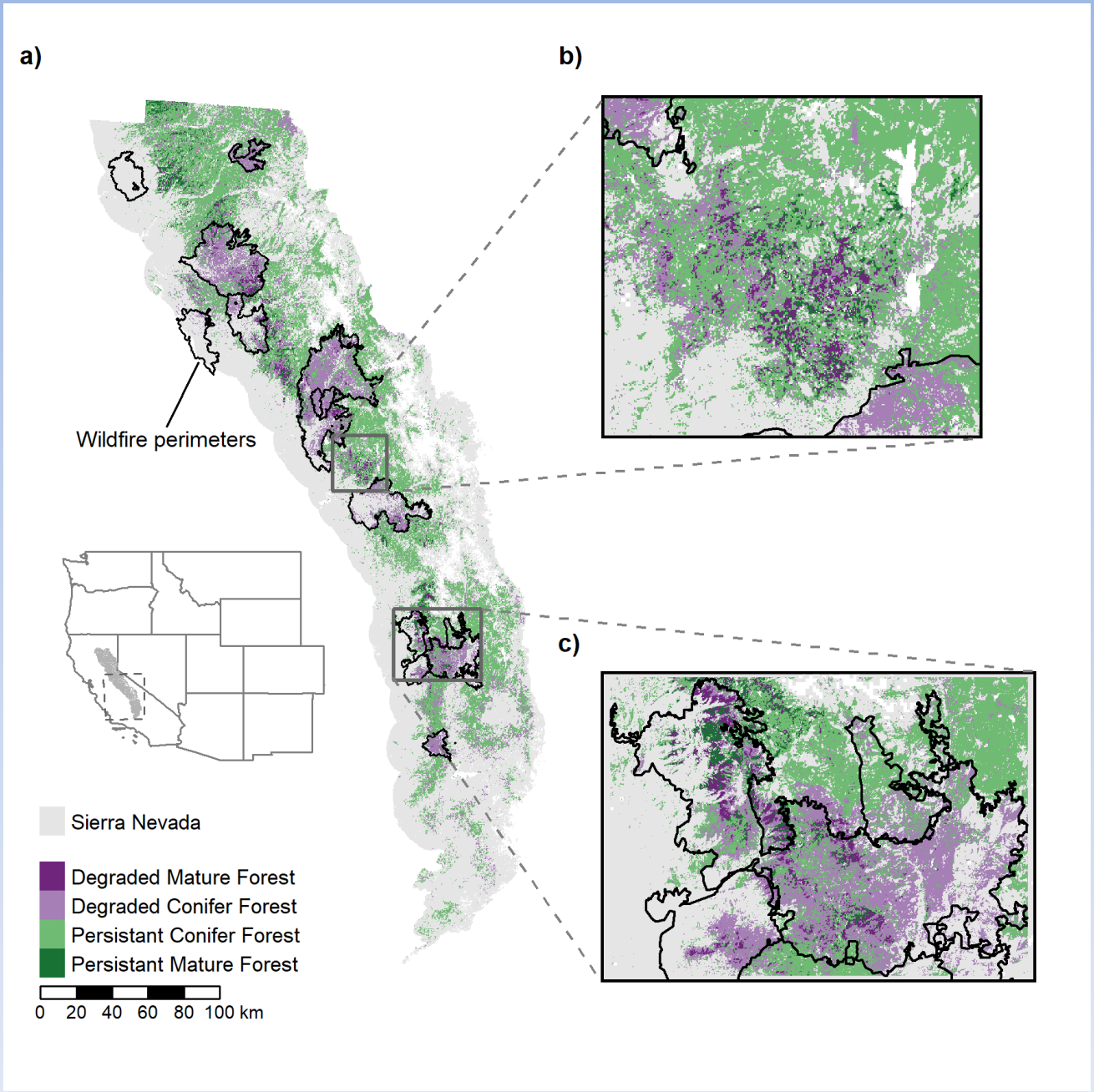
Stephens et al. 2022, *Forest Ecol. Manage.*

Creek Fire actual vs. modeled fire spread



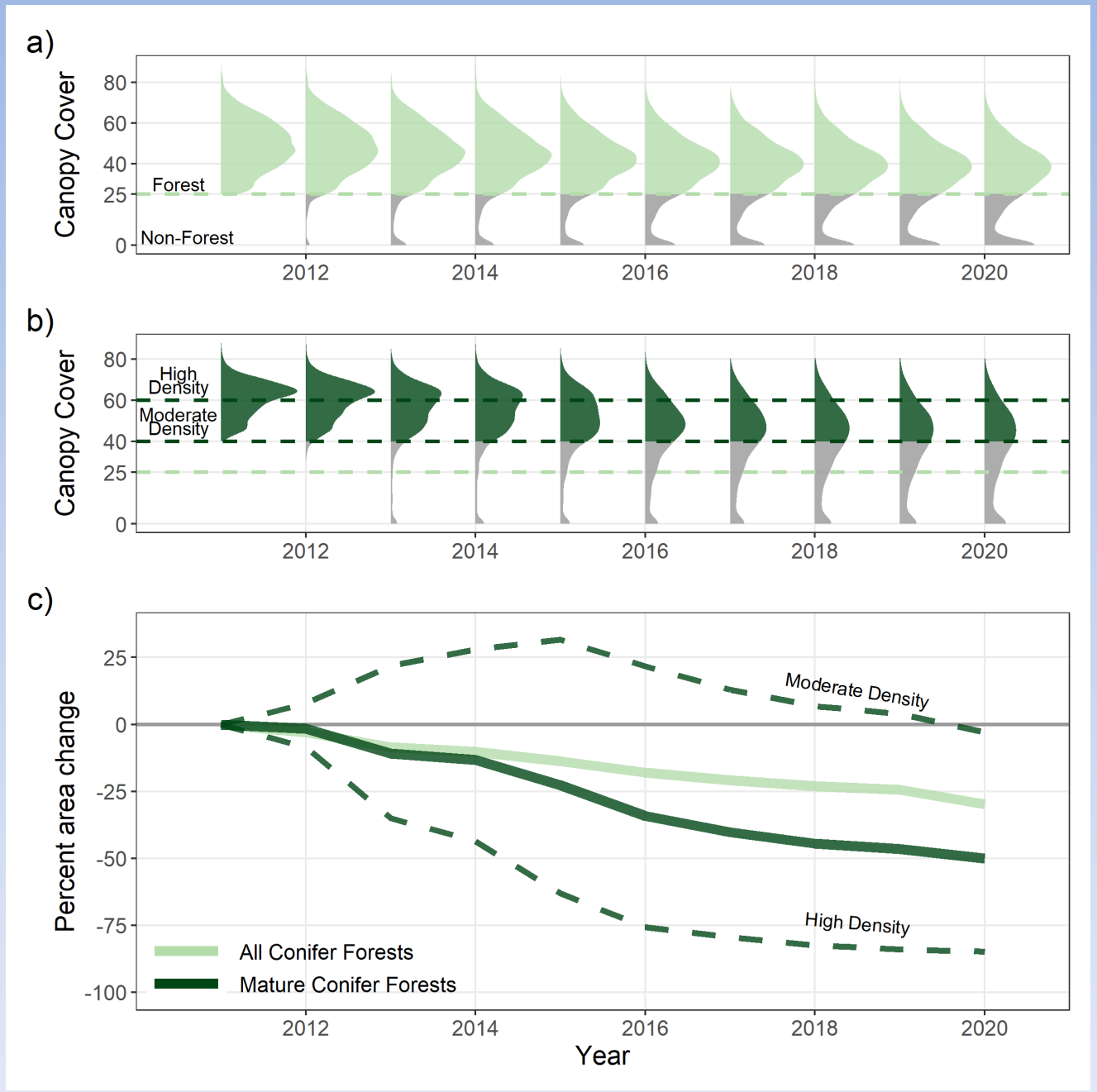
Stephens et al. 2022, *Forest Ecol. Manage.*

Change in mature forest habitat: 2011-2020



Steel et al., *in revision*

Change in mature forest habitat: 2011-2020



Steel et al., *in revision*

Forest management implications:

- **Historical forests were generally low density, yet highly <u>variable</u>**
  - **Maintaining high density, mature forest habitat is UNLIKELY**

- **Forest change = greater vulnerability to fire AND drought-related mortality**
  - **Vegetation/fuel development following these can lead to long-term <u>forest loss</u>**
- **<u>Large-scale</u> forest restoration is needed**
  - **A plan for EVERY acre…not just strategic placement**
  - **Creative and varied silvicultural approaches with fire use**