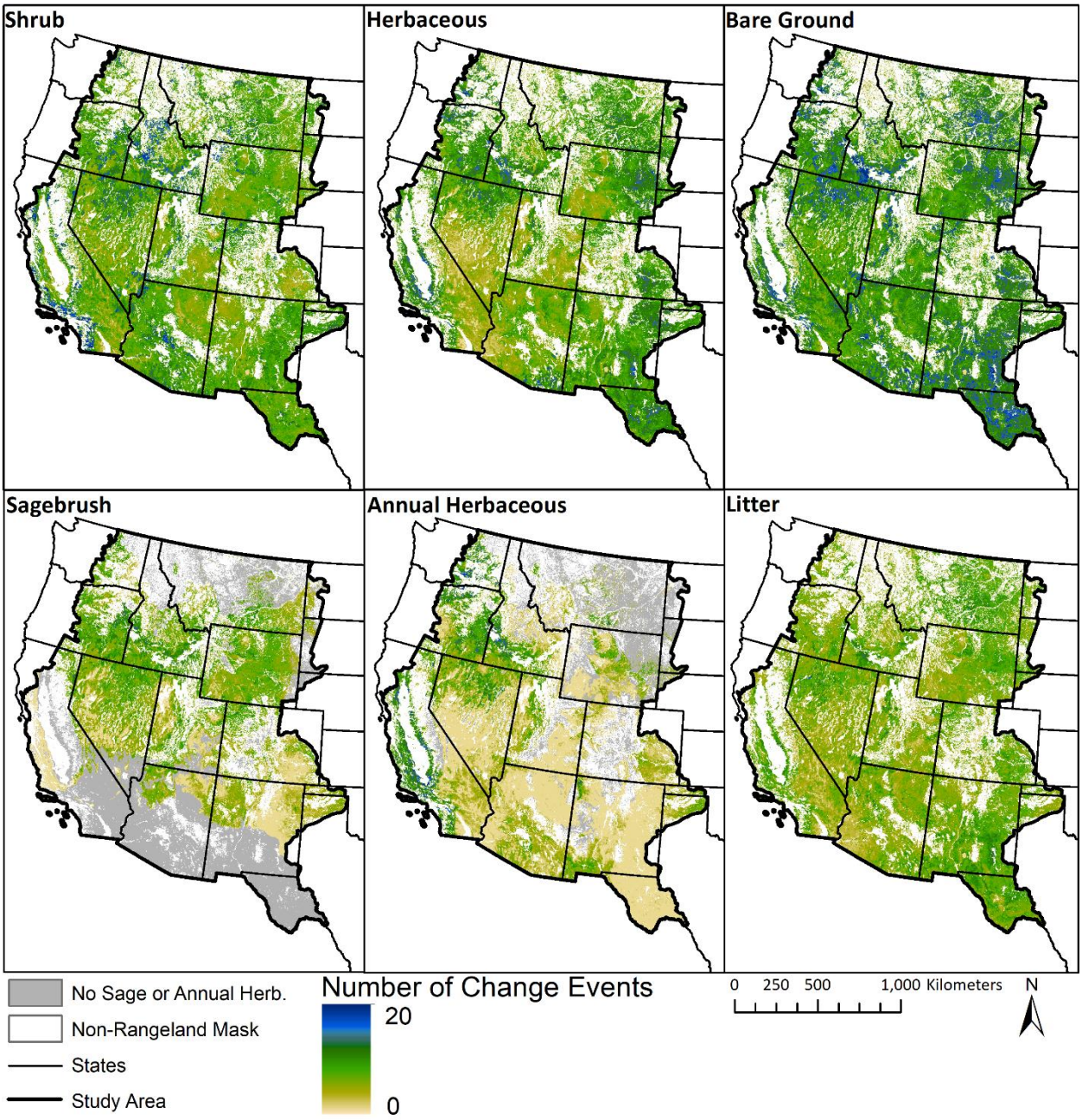
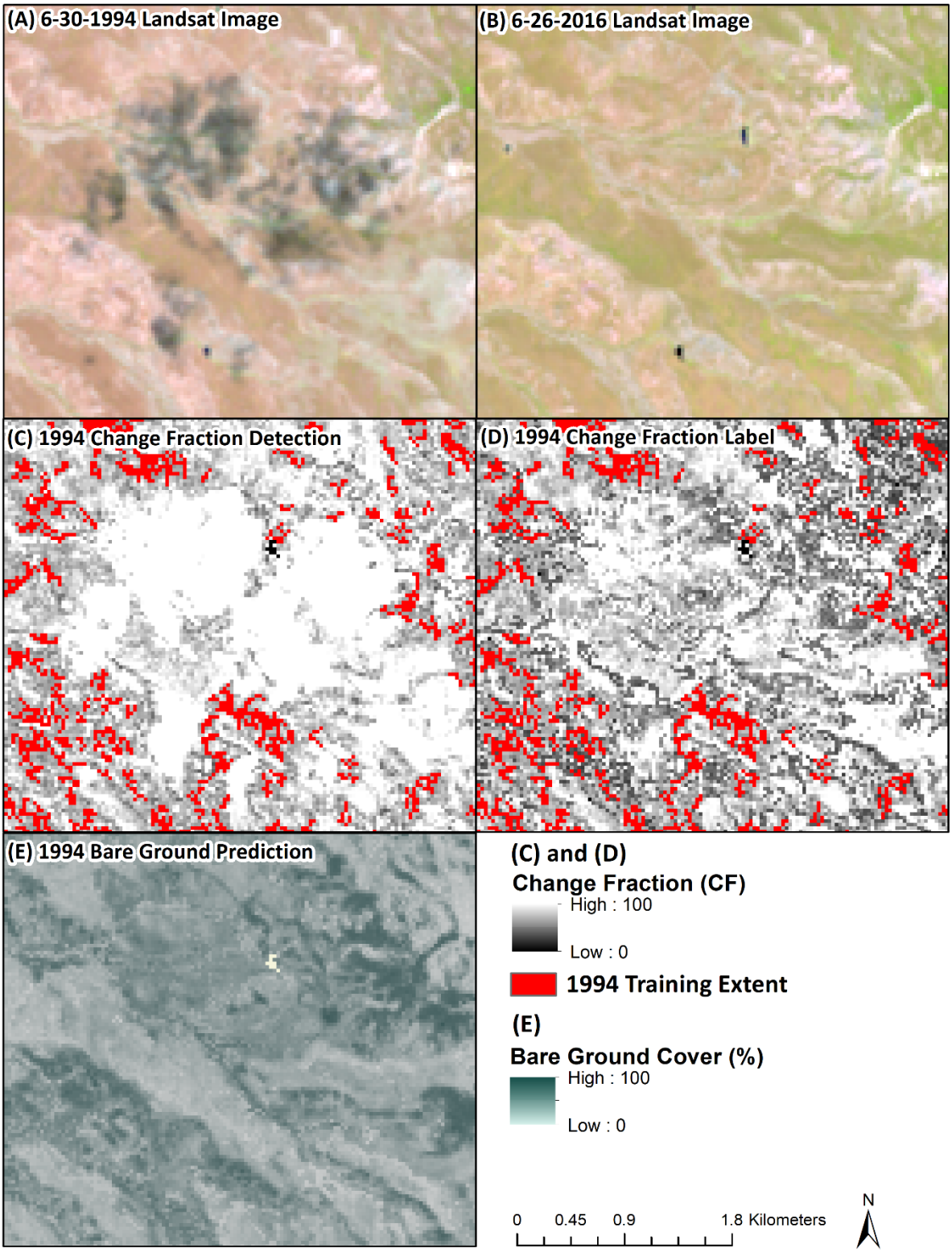


Supplement 1. Number of component change events per pixel over the 33-year time-series. Inset figures are the proportion of the study area (y-axis) by number of component change events (on the x-axis) for each component. Note that the y-axis varies among the inset figures by component.



Supplement 2. Utility of two levels of Change Fraction (CF) data, example in southwest Wyoming. Summer 1994 (target year) image with cloud and shadow/haze cover not captured by the Quality

Assessment (QA) bands (A) and summer 2016 (base year) image. We produced two levels of CF data, a more aggressive version CF_{detect} to detect change and exclude pixels from the training data pool (C) and a second CF_{label} to label changed pixels relative to the base year (D). In C and D, pixels included in the training data pool are shown in red. Higher CF values indicate higher confidence a pixel changed between the target and base year. Resulting bare ground prediction for 1994 (E) shows no influence of the cloud or shadow cover.