Warming mean temperatures are already impacting agricultural production in the Pacific Northwest and are expected to cause increasingly severe impacts in coming decades. The majority of crop damage occurs during periods of stress associated with extreme temperatures and precipitation. Vulnerability to weather extremes depends on numerous interrelated factors including the phenology of different crops and pests, local topography and microclimates, and long-term stressors such as droughts. On regional scales, climate attribution of extreme weather remains a contentious topic because of the noisy climate signal at surface weather stations exacerbated by local sensitivities to weather patterns and land use changes. This study demonstrates that a risk-based approach provides a pathway to probabilistically attribute extreme weather events to climate change vs. natural variability. By performing extreme value analysis on a large volume of historical surface weather observations from NOAA and the Washington State University AgWeatherNet, an assessment of extreme weather events between a reference period and the most recent decade is conducted in agricultural regions of eastern and western Washington. This localized approach to extreme weather attribution will allow for more effective deployment of climate mitigation strategies to specialized agricultural interests.