A number of studies have suggested that cold-air drainage and pooling, which is a common occurrence in many mountain valleys, may provide areas of microclimate refugia for various plants and animals under projected climate changes. Conservation and natural resource managers are particularly interested in identifying areas on the landscape that may help to buffer organisms from the effects of increased temperature. Regional climate models, as well as most observational records of temperature, have relatively coarse spatial and temporal resolution, which may preclude accurate identification of locations prone to cold-air pooling. Here we use long-term (1987-2015), spatially dense records of air temperature from the H.J. Andrews Experimental Forest, a forested basin in the western Cascade Range of Oregon, to quantify the locations, frequency and persistence of cold air pooling and evaluate how these processes affect the frequency with which local air temperatures exceed given thresholds. We further consider how landscape drivers of cold air pooling may be used to identify potential refugia where temperature measurements are not available.