Forests mediate the flow of carbon from the atmosphere to the terrestrial biosphere. However, once the carbon enters the biosphere it can be difficult to determine how it is allocated among the various components of the forest (e.g. leaves, woody biomass, roots). A combination of techniques can be used to constrain allocation estimates to these various components, and each brings with it its own uncertainty contribution. We hypothesize that tree cores can be used to derive accurate above ground biomass estimates for the recent past, and can provide insights into how allocation trends might change under projected future climate conditions. We collected tree cores from two forests in the Jemez Mountains of northern New Mexico. Here, we combine tree-ring derived estimates of above ground net primary productivity and eddy-covariance measures of net ecosystem exchange with climate information to determine under what conditions biomass accumulation is maximized. When compared with future projections of southwest climate, we would expect biomass accumulation to above ground biomass to **(increase/decrease).**