Climate variability and change can impose significant stresses on water quality. Water temperature is an important barometer of stream health, and is directly affected by two effects expected from climate change: rising air temperature and reduced summer streamflow. We investigated the effects of hydroclimatic variability and potential warming on water temperature in the mainstem of the Tualatin River in Oregon. Analysis of US Geological Survey data for the period between 1990-2009 shows that the temporal variations of water temperature can be best explained by lagged air temperature and streamflow amount ($R^2 = 0.80$). CE-QUAL-W2 simulations of synthetic warming (2°C, 4°C) and streamflow decline (10%, 20%) showed that 7-day running average of water temperature increased when the most extreme scenarios are used. The number of days on which the 7-day running average of water temperature exceeded 20°C increased substantially during summer months. The spatial extent of reaches that violate the threshold value of temperature also expanded under the combined scenarios. When riparian areas are completed vegetated, water temperatures fall below the threshold level in the majority of summer days. Results of this study would be useful for establishing adaption strategies in water temperature management under climate change scenarios.