Effects of Drought Conditions on CO_2 Flux in Semi-arid Chaparral Ecosystems.

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As global atmospheric carbon dioxide (CO_2) increases due to human activity, it is vital that we create measures to reduce levels of CO_2 in the atmosphere. Carbon flux in semi-arid shrublands has rarely been studied using eddy covariance techniques. Semi-arid shrublands, especially old-growth shrub ecosystems, could mitigate the rising levels of CO_2 in the atmosphere. Under normal weather conditions, such ecosystems can become carbon sinks, ultimately absorbing the excess levels of carbon in the atmosphere. However, as global temperatures change due to human activity, precipitation patterns are likely to change resulting in an increase in drought events. As the prevalence of drought events increase in semi-arid shrubland ecosystems, gaining a better understanding of how these ecosystems act under non-normal weather conditions is key. In this study, eddy covariance measurements of the net ecosystem exchange (NEE) of CO_2 over a 14 to 20-year period were analyzed for three Mediterranean-type chamise (*Adenostoma fasciculatum)*-dominated chaparral ecosystems in Southern California. Findings from this study may suggest a shift in the carbon source-sink dynamics of these semi-arid chaparral ecosystems.

Keywords: carbon flux, eddy covariance, semi-arid shrublands, chaparral ecosystems, net ecosystem exchange (NEE)

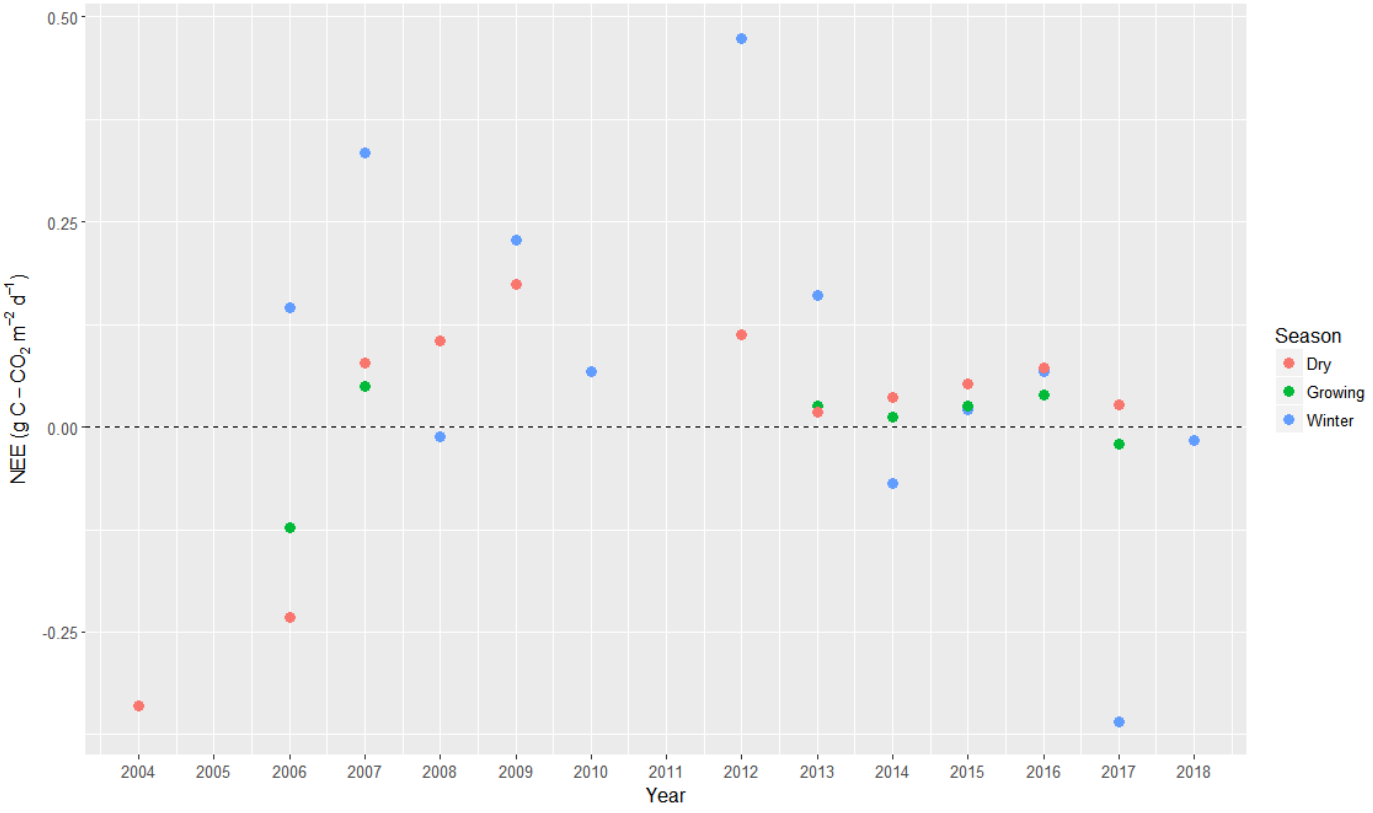

Figure 1. Average seasonal net ecosystem exchange (NEE) during the years of 2004 to 2018 collected by the New Stand eddy covariance tower. Winter season (November 1st to February 28th), growing season (March 1st to June 30th), dry season (July 1st to October 31st).