

## Climate Change, Vegetation Responses, and Disturbances

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Abstract: The recently completed National Assessment on Climate Variability and Change synthesizes the best available science on interactions among climate change, plant and animal species response, and natural and human-caused disturbances. I will present a summary of those findings. Changes in climate will likely alter ecosystem structure in three ways: 1) through changes in ecosystem productivity, 2) through changes in the biodiversity, and 3) through changes in the natural disturbances of ecosystems such as hurricanes, fire, landslides, ice storms, wind storms, insects, disease, and introduced species. Based on two climate scenarios, analyses using several ecological models indicate that forest productivity is likely to increase over the next 50 years if the fertilizing effect of atmospheric carbon dioxide is included. Synthesis of recent experimental literature and modeling analyses suggest that the potential ranges of many tree species will likely shift, with the potential habitat of some species retreating entirely into Canada. Expansion of potential habitats is possible for oak/hickory and oak/pine in the eastern US and Ponderosa pine and arid woodland communities in the West. Analyses suggest that acres burned annually could increase 25 to 50% in the US. How well plant and animal species adapt to or move with changes in their habitats is strongly influenced by their dispersal abilities and the disturbance to these environments. Climate-induced changes in plant species distribution and natural disturbances will be encompassed by land use change, and air pollution—global changes that have and will continue to affect the socio-economic benefits obtained from ecosystems. Management activities are also sensitive to climatic features and the potential changes in climate, ecosystem structure and function, and land use shifts will pose challenges and opportunities to the management of native and managed ecosystems.