



Monitoring Vegetation Condition and Disturbance Patterns

Importance

Vegetation condition describes several characteristics of vegetation over time, including phenology (the timing of natural life-cycle events), primary production, and greenness or vigor. Trend information on the date of vegetation “green-up” and growing-season length is important for assessing climate change and its effects. Data on vegetation condition can help us to identify areas under stress from drought, pests, and human influences, and areas with high vegetation mortality due to fire or other disturbances. The need to monitor these patterns has increased in the semiarid and montane ecosystems of Southern Colorado Plateau Network (SCPN) parks because of the combined effects of recent drought, altered fire regimes that have created conditions favoring more frequent and intense fires, and an associated response in insect outbreaks.



NPSC LAUVER

Recently burned pinyon-juniper woodland, Mesa Verde NP.

Long-term Monitoring

Vegetation condition will be monitored seasonally and annually for most SCPN parks beginning in 2009. Satellite data from the MODIS (Moderate Resolution Imaging Spectroradiometer) sensor—with a spatial resolution of 250×250 m and processed every 16 days—will be the primary source of information. The Normalized Difference Vegetation Index (NDVI), derived from MODIS data, is the primary measure of vegetation greenness and production. NDVI data are also used to determine the start and end dates of the growing season, and dates of maximum production for dominant vegetation types. Disturbance patterns will be determined from Landsat data analysis, which will produce maps and data on the extent, frequency, and severity of disturbances. Monitoring of disturbance patterns will occur every five years, and may be coordinated with ground-based monitoring of vegetation to identify the causes or mechanisms of species under stress, decline, or mortality. These disturbance patterns will be analyzed in combination with NDVI data to provide a better picture of the dynamics between vegetation condition and its disturbances, both in parks and on adjacent lands.

Management Applications

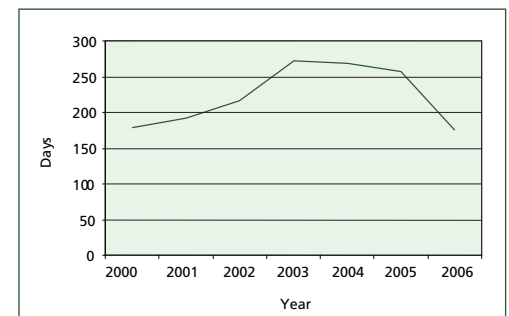
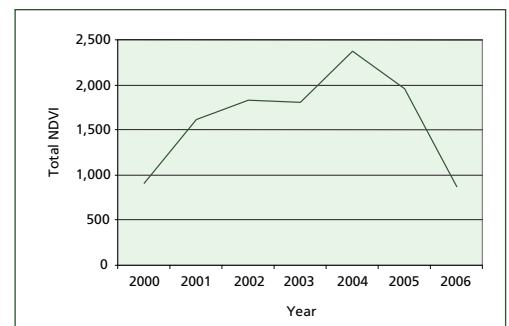
The first few years of monitoring data will be used to detect seasonal and annual growth patterns for dominant vegeta-

tion at each park. Subsequent monitoring data will be used to examine changes in condition, particularly relative to vegetation disturbance patterns. Over time, these data will be used to assess trends in condition and to compare status and trends in vegetation growth within and adjacent to parks. Better knowledge of these widespread changes to system drivers (e.g., climate, fire) and their effects on vegetation condition will help resource managers to make informed decisions. Tracking the duration of the growing season, as well as season-long primary production, will help park managers to understand the effects of climate change on SCPN systems.

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From MODIS data, estimated total production of woody vegetation (top), and estimated growing-season length (in days) of woody vegetation (bottom), Mesa Verde NP, 2000–2006.



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