A Decision Support System for Monitoring, Reporting and Forecasting Ecological Conditions of the Appalachian National Scenic Trail (A.T. MEGA-Transect DSS)


APPALACHIAN TRAIL
0   100 miles

This project represents a collaborative multi-agency effort to improve decision-making on management of the Appalachian National Scenic Trail (A.T.) by providing a coherent framework for data integration, status report and trend analysis. The A.T. MEGA-Transect DSS will integrate NASA multi-platform sensor data, NASA Terrestrial Observation and Prediction System (TOPS) models, and *in situ* measurements from A.T. MEGA-Transect partners to address identified national biological diversity priorities of ecological forecasting. The TOPS models allow multi-platform sensor data to be integrated, making it possible to obtain near real-time observations of current (*nowcast*) ecological conditions as well as predictions for future ecological condition over extensive areas (Nemani et al., 2003; 2009). TOPS data products alone will be a DSS tool that can provide near-real time information on ecological conditions over large regions. By integration of NASA EOS data and modeling products that link climate models (e.g., through TOPS) and ecological models (e.g., habitat suitability) with *in situ* observations, the A.T. MEGA-Transect DSS will provide needed geospatial information and improve the effectiveness of decision-making in management of the A.T. lands and environment for conservation of biodiversity. The objectives of this project include to 1. develop a comprehensive set of seamless indicator data layers consistent with selected A.T. "Vital Signs"; 2. establish a ground monitoring system to complement TOPS and integration of NASA data with *in situ* observations; 3. assess historical and current ecosystem conditions and forecast trends by coupling TOPS with habitat models; and 4. develop an Internet-based implementation and dissemination system for data visualization, sharing, and management to facilitate collaboration and promote public understanding of the A.T. environment.

This project will focus on three primary vital signs of *Phenology and Climate Change, Forest Health,* and *Landscape Dynamics*, plus four supplementary vital signs of *Mountain Birds, Migratory Breeding Birds, Water Resources,* and *Alpine and High Elevation Vegetation*. Those vital signs are most relevant and can be well monitored, reported and forecasted using NASA EOS data and TOPS modeling capacities.

A.T. Vital Signs
- Ozone
- Visibility
- Atmospheric Deposition
- *Migratory Breeding Birds*
- *Mountain Birds*
- *Forest Vegetation (Health)*
- R.T.E. Species
- Invasive Species
- Visitor Usage
- *Alpine and High Elevation Vegetation*
- *Landscape Dynamics*
- *Phenology and Climate Change*
- *Water Resources*
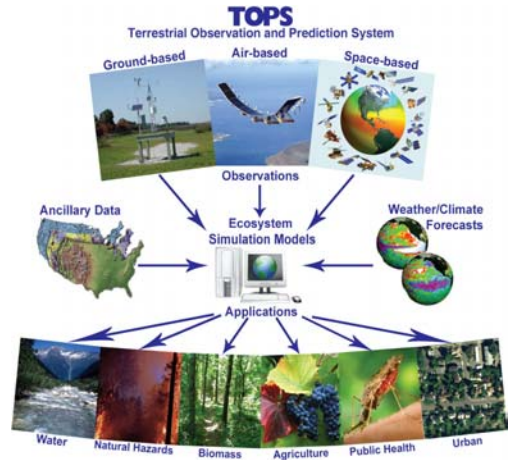
TOPS is a modeling framework that integrates operational satellite data, microclimate mapping, and ecosystem simulation models to characterize ecosystem status and trends (Nemani et al., Remote Sensing of Environment 113(2009): 1497-1509.)

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