Data, data everywhere: detecting spatial and temporal patterns in fine-scale forest health information collected across a continent. Potter, K. (*North Carolina State University, USA; kpotter@ncsu.edu*).

For more than a decade, U.S. government agencies have collected standardized fine-scale forest health data that span the width and breadth of the country. These data sets include the Forest Inventory and Analysis system of approximately 120 000 plots, daily MODIS satellite detections of fire occurrences, and aerial surveys of forest insect and disease damage. Making this information useful for forest health monitoring efforts poses a challenge, however. Here, I describe methods that detect spatial and temporal patterns within fine-scale data sets collected nationally, and I provide examples. One approach aggregates data within ecoregions, which are defined based on environmental characteristics. It then quantifies the degree of deficit or excess of a phenomenon (fire occurrences per area of forest, for example) within the ecoregion in a given year relative to previous years. Another approach identifies statistically significant geographic hot spots of a phenomenon. It divides the country into hexagonal cells of approximately 2 500 km^2, within which data are aggregated. It then identifies clusters of cells within which values exceed those expected by chance. Such analyses have become standard components of recent annual U.S. Forest Service, Forest Health Monitoring Program reports on the status and trends of forest health across the nation.

Using vascular plant inventory data to derive indicators of forest health. Schulz, B. (*U.S. Forest Service, USA; bschulz@fs.fed.us*).

Detailed species composition and structural arrangement data from a subset of forest inventory plots provide measurements from which meaningful indicators can be derived. A wide variety of species traits, such as nativity or origin, contributions to or regulation of nutrient cycling, forage or fuel qualities, or sensitivity to pollutants, can be assessed in a straightforward manner when data collection includes a full species census. For example, species composition has been assessed in terms of percentage of introduced species and their relative abundance over large regions of the United States using the U.S. Forest Service's Vegetation Diversity and Structure (VEG) indicator. However, when resources are limited, can less detailed measurements, such as cover by growth habit or most abundant species, be used to monitor forest health conditions as they relate to emerging threats? This presentation will highlight the trade-offs between more detailed data from a subset of plots and less detailed data collected over a higher proportion of plots as a part of a national forest inventory. Lessons learned from a decade of implementation and pathways forward will be discussed, addressing the questions: Can affordable be meaningful? Can meaningful be made affordable?

Is the western United States running out of trees? Shaw, J. (*U.S. Forest Service, USA; jdshaw@fs.fed.us*), Long, J. (*Utah State University, USA; james.long@usu.edu*).

During the past 2 decades, the forests of the Interior West of the United States have been impacted by drought, insects, disease, and fire. When considered over periods of 5–10 years, many forest types have experienced periods of negative net growth, meaning that mortality exceeded gross growth at the population scale. While many of these changes have been attributed almost solely to climate change, the factors contributing to widespread mortality, and their interactions, are much more complex. For example, the dominant forest age class distribution, in which a high percentage of acreage is in the 80- to 120-year age class, is largely the result of Euro-American settlement of the area in the late 1800s. This history, coupled with aggressive fire suppression during the past century, has resulted in disproportionate areas of forest being in a highly susceptible condition. For example, most of the lodgepole pine population is at high risk from mountain pine beetle attack, and much of the aspen population is becoming senescent and increasingly susceptible to succession by conifer species. In this presentation, we analyze the status and trends of Interior West forests, and highlight some of the important, and in some cases unexpected, changes.

Comparison of tree mortality rates on reserved vs non-reserved land the Interior West using Forest Inventory and Analysis annual inventory. Thompson, M. (*U.S. Forest Service, USA; mtthompson@fs.fed.us*).

The objective of this study was to evaluate differences in tree mortality on forest land in the Interior West (IW) by reserved status using annual inventory data from the IW Forest Inventory and Analysis (IW-FIA) program. In many IW regions, recent estimates of tree mortality have greatly exceeded those reported by IW-FIA in the past. Mortality currently exceeds net growth for most of the major species and species groups in the IW. Contributing factors include recent episodes of insect infestations such as bark beetle epidemics. However, very significant differences in tree mortality estimates have been recorded between reserved and non-reserved forest land. Mortality is significantly higher and is increasing at a much larger rate on reserved land. Using IW-FIA's annual inventory data that began in 2000, differences in mortality rates by reserved status will be presented. Reasons that explain these differences will also be presented such as analysis of stand structure, age, species composition, and management regimes on reserved and non-reserved lands.

Overview of the U.S. Forest Service, Forest Health Monitoring Program. Tkacz, B. (*U.S. Forest Service, USA; btkacz@fs.fed.us*).

The Forest Health Monitoring Program (FHM) of the United States (US) was initiated >2 decades ago in response to increasing concerns about health of the nation's forests. Since its inception in 1990, the program has provided holistic assessments of the major factors affecting the health and sustainability of forested ecosystems across all ownerships. The conceptual approach to FHM is multi-tiered. The initial component, detection monitoring, consists of aerial and ground monitoring to detect changes in a suite of forest health indicators. This is followed by evaluation monitoring projects which determine extent, causes, and impacts of forest health concerns detected through the first component. The third component of FHM, intensive site monitoring, consists of long-term research studies to determine forest health processes at a more detailed level. All of these components are supported by research on monitoring techniques, analysis, and reporting. This paper presents the development of the FHM program through the last 2 decades and highlights some of the most significant findings regarding the health of US forests.

Primary drivers of forest regeneration dynamics in the eastern United States. Woodall, C., Domke, G., Walters, B. (*U.S. Forest Service, USA; cwoodall@fs.fed.us; gmdomke@fs.fed.us; bfwalters@fs.fed.us*), D'Amato, A. (*University of Minnesota, USA; damato@umn.edu*).