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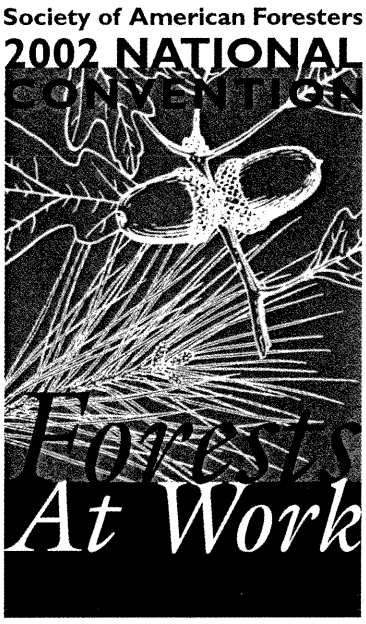
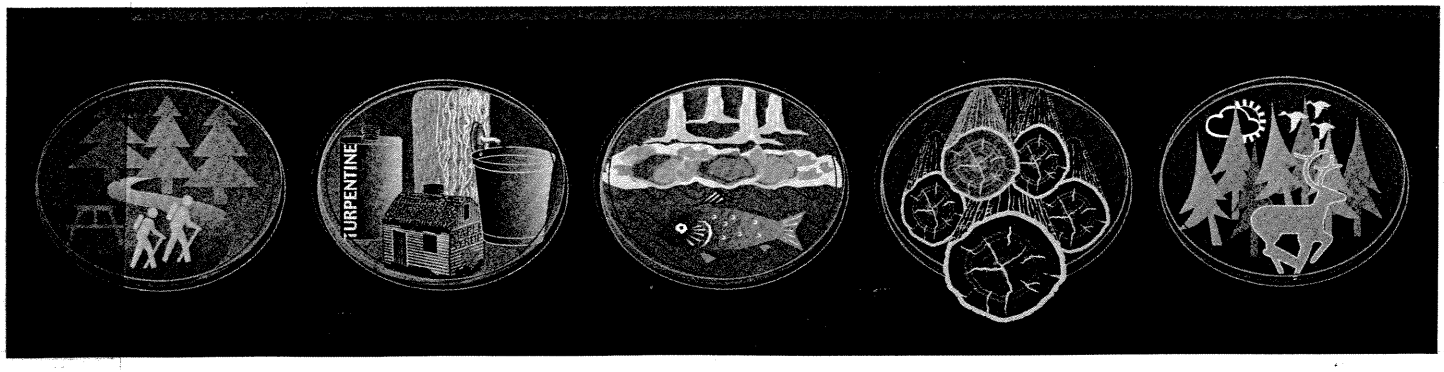
PROCEEDINGS

SOCIETY OF AMERICAN FORESTERS
2002 NATIONAL CONVENTION



O'Neill, Katherine; Amacher, Michael; Palmer, Craig; Conkling, Barbara L.; Liknes, Greg. 2003. Soil quality as an indicator of forest health: an overview and initial results from the USFS Forest Inventory and Analysis Soil Indicator Program. In: Proceedings, Society of American Foresters 2002 national convention; 2002 October 5-9; Winston-Salem, NC. SAF Publ. 03-01. Bethesda, MD: Society of American Foresters: 347-349.

Winston-Salem, North Carolina • October 5–9, 2002



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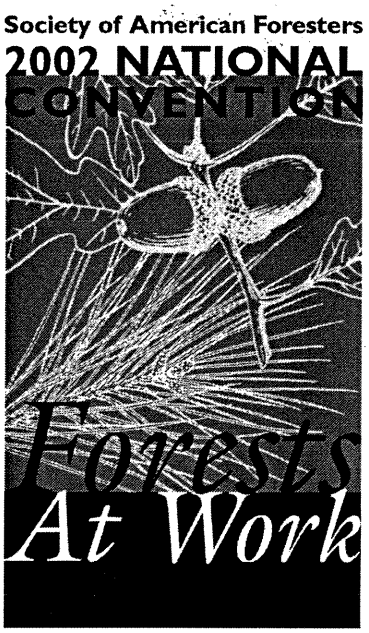

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Society of American Foresters
5400 Grosvenor Lane
Bethesda, MD 20814-2198
www.safnet.org
SAF Publication 03-01
ISBN 0-939970-85-6

PREFACE

More than 1,400 foresters and natural resource managers from around the world attended the 2002 Society of American Foresters National Convention, held October 5–9, in Winston-Salem, North Carolina. Organized around the theme of "Forests at Work," the convention offered attendees the opportunity to recognize and celebrate the role of both forests and forestry in providing for America's long-term physical, social, and economic well-being.

The heart of the 2002 SAF National Convention was the three-day science and technology program. Featuring more than 100 hours of concurrent sessions, the workshops and presentations in the convention's program offered the latest developments in forest science and land management techniques honed in the nation's working forests. More than 70 posters were also displayed.

The 2002 convention's focus on both working forests and those who sustain them permeated every aspect of the gathering in Winston-Salem.

Nowhere was this more apparent than during the convention's keynote address by Weyerhaeuser Chair, President, and CEO Steve Rogel. Rogel spoke of the benefits forests and foresters provide, the integral connection between the health of the profession and the forest products industry, and what SAF can do to ensure that both survive. It was also evident during the convention's plenary session, "How Should We Manage Our Forests?" in which SAF members examined, discussed, and debated the finer points of forest management for the benefit of all who depend on them.

Exploring the components of leadership and creating a professional society where it could thrive was also a focus of the 2002 SAF National Convention.

To that end, the SAF convention featured "Lunch with the Leaders," an event offering convention attendees the opportunity to hear from leaders in government, industry, and the nonprofit sector about how they define leadership in their own words and discuss how SAF can lead the growth of the forestry profession at local, state, and national levels.

Leadership was also a common theme within the convention's student-oriented activities. More than 300 engaged and energized students came to convention to participate in programs designed to help them attain and develop the leadership skills necessary to help them succeed in their future careers.

The Proceedings of the 2002 SAF National Convention include general, technical, and poster session papers. Submission of papers is at the discretion of the presenters. Papers are printed as submitted; they are neither reviewed nor edited.

SOIL QUALITY AS AN INDICATOR OF FOREST HEALTH: AN OVERVIEW AND INITIAL RESULTS FROM THE USFS FOREST INVENTORY AND ANALYSIS SOIL INDICATOR PROGRAM

Katherine O'Neill, Michael Amacher, Craig Palmer, Barbara Conkling, and Greg Liknes

ABSTRACT. The Montreal Process was formed in 1994 to develop an internationally agreed upon set of criteria and indicators for the conservation and sustainable management of temperate and boreal forests. In response to this effort, the USDA Forest Service Forest Inventory and Analysis (FIA) and Forest Health Monitoring (FHM) programs implemented a national soil monitoring program to address specific questions related to: (1) the current status of soil resources and (2) the contribution of forest soils to the global carbon cycle. As the first and only nationally consistent effort to monitor forest soil quality in the United States, this program provides critical baseline information on the current status of the soil resource and the potential effects of natural and human disturbance on forest health and productivity. This poster provides an overview of the FIA/FHM soil indicator program and summarizes initial results with respect to the criteria and indicators outlined in the Montreal Process.

KEY WORDS. FIA, Forest Health Monitoring, soil, sustainable management

INTRODUCTION

FIA is responsible for conducting inventories to determine the extent and condition of the nation's forest resources. FIA soil indicator measurements are collected on a plot network in which one plot represents approximately 96,000 forested acres. Initial results were determined from an inventory sampled in 1998-2000 as part of the Forest Health Monitoring program (FHM). The field sampling component of the program was transferred to FIA in 2000.

METHODS

Soil indicator measurements are divided into three general categories: compaction, erosion, and soil chemistry. Surface compaction is determined through a combination of visual estimates and associated evidences (e.g., changes in density or soil structure). Erosion measurements including percent cover, plant canopy height, and forest floor thickness are used to parameterize existing soil erosion models such as the Universal Soil Loss Equation (USLE) and the Water Erosion Prediction Project (WEPP). Soil chemical and physical properties are determined by laboratory analysis of volumetric forest floor and mineral soil samples collected from each plot. Mineral soil samples are sampled using an impact-driven coring device to collect samples of known volume at depths of 0-10 and 10-20 cm. Analyses include: bulk density, texture, pH, exchangeable cations, phosphorus, nitrogen, and carbon.

RESULTS

Erosion

Soil erosion measurements were designed to address Criterion 4, Indicator 18 from the Montreal Process (area and percent of forestland with significant soil erosion). In general, erosion rates were small with 49 percent of plots modeled with erosion rates of less than 0.1 ton per acre (USLE). Less than 1 percent of plots had modeled erosion rates greater than 10 tons per acre. In the eastern and western U.S., areas of high erosion were generally associated with steep slopes. In the central U.S., plots with high erosion rates were more closely associated with increased soil erodibility.

Compaction

The purpose of the FIA soil compaction measurements is to quantify the extent of human induced changes to soil physical characteristics that might adversely affect productivity and ecosystem processes.

Initial data indicates that soil compaction was primarily a localized phenomenon. More than 75% of the 1,924 plots measured during this time period reported only trace levels of soil compaction (< 1% of the plot area). Of those plots reporting compaction, the majority (62%) showed evidence of surface compaction on less than 10% of the plot. Only 1.5% of the total number of plots measured reported levels of compaction greater than 50%. However, soil compaction may be a serious problem on a local scale as indicated by the high proportion of compacted area on individual plots.

Soil Chemistry: Examples of Analyses

Unlike soil survey data from existing soil maps, FIA soil monitoring data are dynamic and can reflect changing conditions in forest soils in response to disturbance and management practices.

Soil pH is a primary factor in determining soil fertility and stand productivity through its regulation of soil nutrient availability, aggregate stability, and microbial activity. In general, FIA data indicate that pH is lower in regions of higher precipitation, such as the eastern United States and the coastal regions of the Pacific Northwest. In these areas, rainfall tends to leach base cations (e.g., Ca, Mg, K) from the surface of soil particles. More arid regions, such as the interior west, tend to have a neutral to slightly alkaline pH. These data are in agreement with estimates obtained from soil survey data such as the State Soil Geographic Survey (STATSGO). Monitoring changes in soil pH in conjunction with extractable aluminum, calcium, and sulfur, will provide valuable information on the extent and potential impacts of soil acidification resulting from atmospheric pollutants.

Soil organic matter (SOM) stabilizes soil aggregates, improves aeration and water holding capacity, and increases nutrient holding capacity. In highly weathered soils, such as those typical of the southeastern U.S., SOM may provide the dominant reservoir for soil nutrients. Soil indicator data suggest that spatial patterns of organic carbon in forest soils tend to be strongly correlated with gradients of climate and vegetation. In general, greater carbon concentrations in both the forest floor and upper mineral soil were found in regions of high precipitation and low temperature, such as the northern and

northeastern U.S. General trends compare favorably with estimates derived from STATSGO.

SUMMARY

As the FIA soil indicator program becomes fully implemented, data may be used to address regional and national reporting requirements for the Montreal Process Criteria and Indicators, such as: soil erosion, soil compaction, the effects of acid deposition, and carbon sequestration.

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