

Foreword

This special issue of *PE&RS* contains an interesting and informative selection of articles that is intended to represent some of the discussions and activities that took place at the August 1992 ASPRS/ACSM/RT 92 Convention on "Mapping and Monitoring Global Change," which was held in Washington, D.C. in conjunction with the XVII ISPRS Congress. A major goal of this Convention was to provide a forum for the examination, discussion, and debate of the scientific, technological, and social challenges represented by the urgent need for **mapping and monitoring global change!** The convention was rather unique in several respects. It was the first ASPRS/ACSM convention ever held in conjunction with an ISPRS Congress; first ASPRS/ACSM convention ever held in conjunction with the Resource Technology Institute; first convention having three Plenary Sessions focused on the theme of the convention; first time for "Neat Stuff" sessions designed to highlight topics of interest and to describe to the press, general public, and professional colleagues how photogrammetry, remote sensing, and GIS are being applied to everyday "real world" situations; and, finally, this convention had the largest number of technical papers and sessions of any ASPRS/ACSM convention ever held!

The purpose of this special issue of *PE&RS* is to highlight some of the papers presented at the convention that describe how photogrammetry and remote sensing are being utilized to assess, map, and monitor many aspects of global change. These papers were selected from among those that had been initially recommended by session moderators as worthy of consideration. Those authors were asked to consider submitting their paper for review and possible publication. The manuscripts submitted were subsequently reviewed by a very competent and dedicated group of reviewers, whose efforts we gratefully acknowledge. Based on the review comments, the final set of papers was selected for publication. The authors and editors appreciate the thoughtful and very helpful comments of the reviewers, which allowed many improvements in the final manuscripts. We believe that this process has resulted in a rather unique and interesting array of papers in this special issue of *PE&RS*. Some of the papers thus selected represent "overview" papers while most represent specific research activities involving data from a wide variety of remote sensing instruments, various analysis techniques, and several different Earth surface features or cover types.

The first paper in this special issue on Mapping and Monitoring Global Change is by former astronaut Jack R. Lousma, who gave the keynote address during the first plenary session of the convention. Dr. Lousma's paper, entitled "**Rising to the Challenge: The Role of the Information Sciences,**" does an excellent job of addressing several of the key issues facing the mapping sciences communities.

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"**The 'Greyware' Required to Deal with Global Change Issues**" is the title of the interesting and thought-provoking paper by Thomas M. Lillesand. This was one of the plenary session invited papers presented at the convention. The section of Dr. Lillesand's paper entitled the "Academic Report Card" provides a number of challenges for those in the academic and research communities. This paper also gives some very interesting perspectives on methods for monitoring global change and some of the potential impacts of global change.

One of the best papers at the convention describing agency global change programs was entitled "**Terrestrial Process Research Using a Multi-Scale Geographic Approach.**" This paper, by John A. Kelmelis, provides an excellent synopsis of some of the global change programs of the U.S. Geological Survey, as well as some of the results obtained thus far. This is followed by the paper entitled "**Using Multisource Data in Land-Cover Characterization: Concepts, Requirements, and Methods**" by Jesslyn F. Brown, Thomas R. Loveland, James W. Merchant, Bradley C. Reed, and Donald O. Ohlen. This paper describes a very detailed and interesting procedure that was utilized to develop a land-cover database for the conterminous United States, using both remote sensor and ancillary data.

The next paper in this special issue deals with the evaluation of indicators of global change in Africa. Entitled "**Long Sequence Time Series Evaluation Using Standardized Principal Components,**" this paper by J. Ronald Eastman and Michele Fulk involved the analysis of 36 AVHRR-derived data sets obtained for the entire continent of Africa. Their interpretation of the principal component images provides an excellent example of the value and potential for this type of data and these analysis techniques.

Moving from Africa to South America, the next paper, "**Simulating Land-Use Change in Central Rondônia, Brazil,**" authored by Virginia H. Dale, Robert V. O'Neill, Marcos Pedlowski, and Frank Southworth, deals with a region of the world that has undergone significant changes in land cover and land use in recent years. The work involved an interesting combination of field work, GIS database development, and modeling. Spatially explicit ecological information was combined with various socioeconomic factors in the model, thereby creating a useful tool to explore various social and economic as well as the physical implications of land-use changes in this portion of the world.

Another aspect of global change is addressed in the paper, "**Assessing Fire Emissions from Tropical Savanna and Forests of Central Brazil,**" by Philip J. Riggan, James A. Brass, and Robert N. Lockwood. This paper examines the potential for synoptic measurements of fire impacts on the global environment through the use of AVHRR, Landsat MSS and TM, and aircraft data to estimate emissions from fires. As the authors point out, "These estimates will improve global accounting of radiation-absorbing aerosols and particulates that may be contributing to climate change..."

The next paper takes us from Brazil to Peru, and from satellite and aircraft remote sensing to ground-based photogrammetry. Authored by Henry H. Brecher and Lonnie G. Thompson, this paper, titled "**Measurement of the Retreat of**

Qori Kalis Glacier in the Tropical Andes of Peru by Terrestrial Photogrammetry," clearly documented the significant retreat of the terminus and decrease in ice volume of the Qori Kalis Glacier over the time period from 1963 to 1991, based on four sets of photography. The results indicate a definite warming trend in this region, particularly during the 1983 to 1991 time period.

Another example of using ice as a potentially useful indicator of global climate change is given in the paper, "**Satellite Observation of Lake Ice as a Climate Indicator: Initial Results from Statewide Monitoring in Wisconsin,**" by Randolph H. Wynne and Thomas M. Lillesand. Based on a rather interesting and unique analysis of AVHRR data, their "results suggest the potential of using current and archival satellite data to monitor changes in the date of lake ice breakup as a means of detecting regional 'signals' of greenhouse warming."

The next paper continues with the use of aquatic habitats to assess change, but rather than AVHRR satellite data and ice, as were the focus of the last paper, this paper concentrates on the use of aerial photography and seagrass. "**Monitoring Spatial Change in Seagrass Habitat with Aerial Photography**" is the title of this paper by Randolph L. Ferguson, Lisa L. Wood, and Douglas B. Graham. Seagrasses are common throughout the world, and "are adversely affected by ... pollution, turbidity, and potentially by global climate change." This paper, one of only a small number ever written to address the use of remote sensing to study changes in seagrass habitat, clearly shows the value of aerial photography for this type of research. In addition, even though *global* change may be the focus of research involving seagrass habitat, the results of this work indicate that aerial photography is the best remote sensing tool available for assessing seagrass habitat and spatial change in such habitat.

The last paper in this special issue also deals with coastal habitat and the use of remote sensing to monitor changes, but involves the use of Landsat data and computer-aided analysis techniques. Titled "**An Evaluation of Coast-**

Watch Change Detection Protocol in South Carolina," this paper by John R. Jenson, David J. Cowen, Sunil Narumalani, John D. Althausen, and Oliver Weatherbee describes some of the research results that are coming out of the NOAA C-CAP (CoastWatch Change Analysis Program). The goal of C-CAP is to "utilize remote sensing technology to produce a comprehensive, nationally standardized database on coastal habitat change." This very interesting paper addresses and makes recommendations concerning many of the data analysis issues with which an operational monitoring and change detection program, such as C-CAP, must deal.

In summary, this special issue of *PE&RS* contains a very interesting array of papers using a wide array of remote sensing instruments (from AVHRR to Landsat to aerial photography and even terrestrial photography) and analysis techniques (from computer processing to photo interpretation to traditional photogrammetry) as well as the overall approach to the research (from modeling to empirical data analysis and interpretation). Geographically, the papers include work in various countries on three continents. The subject matter ranges from forests to rangelands to coastal habitats, and from fire to ice. Yet, in spite of such diversity, the one common denominator in all of these papers is the focus on the use of photogrammetry and remote sensing for "Mapping and Monitoring Global Change." Clearly, remote sensing is an increasingly valuable and useful science in today's complex world! We sincerely hope you will enjoy this special issue of *PE&RS*!

Roger M. Hoffer
Special Issue Co-Editor and
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ASPRS SEEKS AWARD NOMINATIONS

The American Society for Photogrammetry and Remote Sensing is currently soliciting nominations for its 1994 awards. Our awards program is designed to recognize individuals and organizations who have made outstanding contributions in advancing the science and use of the mapping sciences (e.g., photogrammetry, remote sensing, surveying, geographic information systems, and related disciplines). They include the Outstanding Papers Awards, the Professional Achievement Awards, the Service Awards, and the Special Awards.

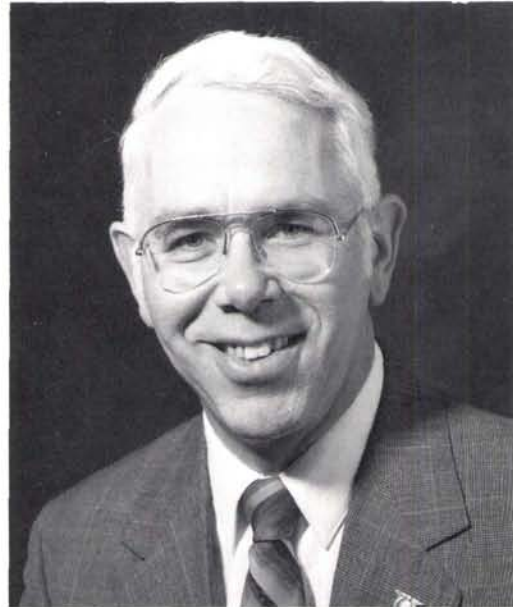
All awards are open to deserving candidates, regardless of whether they are employed in the public, private, or academic sector. If you have a candidate in mind for one or more awards, please contact Mindy Saslaw, Awards Secretary, at headquarters for a complete list and description of all awards, as well as a nomination form.

The deadline for nominations is **December 31, 1993.**

Guest Editors

Roger M. Hoffer

Roger M. Hoffer is Professor of Forestry and Remote Sensing and also Director, Remote Sensing and G.I.S. Program, College of Natural Resources, Colorado State University. He received a B.S. in Forestry from Michigan State University, and the M.S. and Ph.D. degrees in Watershed Management from Colorado State University. Dr. Hoffer has over 28 years of experience in remote sensing research and teaching at Purdue University and Colorado State University, and has been a principal investigator on Landsat, SKYLAB, Shuttle Imaging Radar (SIR-B), and many other projects involving remote sensing of Earth resources. He is the author or co-author of over 200 scientific papers and publications, including presentations in over 20 countries throughout the world. Roger served as the 1989-1990 President of the American Society for Photogrammetry and Remote Sensing (ASPRS), and has received numerous awards from NASA, ASPRS, the Society of American Foresters, and others.



Alan W. Voss



Alan W. Voss is the Manager of the Project Development Section, Tennessee Valley Authority (TVA) Maps and Surveys Department, in Chattanooga, Tennessee. He is responsible for strategic planning, external coordination, and marketing. He represents TVA on the Federal Geographic Data Committee and the National Aerial Photography Committee. He is also responsible for coordinating new process development, recommending standards and policy for operations and system development to promote production efficiency and customer satisfaction. He received his B.S. and M.S. degrees in Civil Engineering from the University of Wisconsin - Madison in 1970 and 1971.

Mr. Voss has over 20 years of production experience in all aspects of photogrammetry and remote sensing. He has been involved in the development of geographic information systems, image processing capabilities, digital topographic mapping, close-range photogrammetry, and digital cartographic product generation. He is the author of ten technical papers published by the American Society for Photogrammetry and Remote Sensing (ASPRS) as well as many agency publications. He has been active in the mid-south region and served on the Board of Direction of the ASPRS for eight years. He has received numerous awards from ASPRS and TVA, and is a registered land surveyor.