AAG

Association of American Geographers

2010 Symposium Report:

Ecosystem Conservation Priorities in the Americas

On Friday, April 16, 2010, the **Association of American Geographers** (AAG) hosted a Symposium focused on "Ecosystem Conservation Priorities in the Americas" to bring together scientists, practitioners, and policy makers to discuss the relationships between their respective fields of discipline and the biological conservation of ecosystems worldwide. Several opportunities converged for this occasion to take place in 2010: the International Year of Biodiversity is observed this year; the United Nation's Global Biodiversity Outlook 3 was released to the public; and the Association of American Geographers held the largest-ever meeting of geographers worldwide in Washington, D.C. with an estimated 8,200 attendees from 81 countries.

The event formed a seminal part of the project, "Enhancing Knowledge for Establishing Ecosystem Conservation Priorities in the Neotropics by Integrating Biodiversity and Geospatial Data," funded by the **JRS Biodiversity Foundation**. The project was awarded to the Inter-American Biodiversity Information Network (IABIN) of the Organization of American States with partners City of Knowledge (Panama), National Biodiversity Institute (InBIO-Costa Rica), Neotropical Bat Risk Assessments (Belize), Virginia Polytechnic Institute and State University, and the AAG.

The Keynote session of the Symposium featured a Roundtable of leading experts and featured guests. Panelists were **Dr. Thomas Eugene Lovejoy III,** chief biodiversity adviser to the president of the World Bank, senior adviser to the president of the United Nations Foundation, past-president of the Heinz Center for Science, Economics, and the Environment, and a member of the Copenhagen Climate Council; **Jesús A. Ugalde-Gómez**, Associate Director of Biodiversity Science, Instituto Nacional de Biodiversidad (INBio); **Ben Wheeler**, Assistant to the Chief Biologist for Information in the Biological Resources Discipline (BRD), U.S. Geological Survey (USGS), and Liaison with the InterAmerican Biodiversity Information Network (IABIN), **Richard Huber**, Principal Environmental Specialist, Department of Sustainable Development, Organization of American States (OAS), and **Dr. Kenneth Young**, Professor and Chair, Department of Geography and the Environment, University of Texas at Austin. **Dr. Patricia Solís** of the AAG chaired the roundtable.

Three questions were used to frame the initial roundtable discussion. Panelists were asked to relate: 1) what insights they could share about the relationships among science, practice, and policy with respect to ecosystem conservation; 2) what role or potential they saw for information-intensive, spatially-extensive knowledge systems in progressing towards ecosystem conservation goals and 3) which do they consider the most critical priorities for ecosystem conservation that are implied by the current state of affairs.

Panelists made references to the changing state of biodiversity with respect to global change. Physical threats that stem from multiple pressures, from human impacts on the landscape to climate change are expected to hinder biodiversity protection. Beyond this, the claim was also advanced that the skepticism and uncertainty attributed to climate change poses a significant challenge, attributed as much to the dynamic that ensues when comprehensive policies cannot be created due to uncertainty and/ or skepticism as because of the actual damages to ecosystems resulting from climate change hazards.

On the global policy level, the panel addressed the problem of pitting "carbon versus biodiversity." While the global community is looking for new ways and places to sequester carbon, panelists pointed out that on the ground, the biodiversity conservation agenda may come into conflict with carbon sequestration agendas. The example was given of how planting large areas with eucalyptus trees would be beneficial in sequestering carbon; however creating monocultures of eucalyptus would be detrimental to biodiversity. The concern was voiced that in the future, carbon sequestration may take increasing priority in policy discussions, leaving biodiversity conservation as an issue of secondary importance, or worse, in conflict with new policies. Further scientific research is needed to discover how much carbon can be sequestered by different intact ecosystems and further advances in developing better mechanisms for measuring carbon will be critical. In policy recommendations where carbon sequestration is given priority, ecosystems might be protected by demonstrating an optimized carbon sequestration potential that maintains ecological biodiversity. Related issues were discussed, such as the similar impact that reforestation as a climate change mitigation measure can have on biodiversity in certain places. Greater understanding of how these dynamics coincide in space is needed.

So while considering the local impact of decisions on particular ecosystems and places is necessary, panelists also mentioned the contradictory challenge of creating policies that are at large enough scales to thoroughly address biodiversity conservation issues. Ecosystems that span across political borders are not equally addressed by national or even regional level programs and this results in gaps in efforts over space and time. The complexity of ecosystems themselves is difficult to translate into policies, let alone to generate agreement across political borders about how to respond. Additional complexity arises when biodiversity conservation is coupled with expected changes in species distribution due to a changing climate. Because species adapt individually, ecosystems disassemble and then reassemble in response to broader change, doing so at different rates and over different spaces; other factors include crossing biological thresholds, feedbacks, and systemic changes. Conservation must also consider human systems. This dynamic implies that both science and policy must keep adapting as well. Knowledge goals and action objectives should be continually moving targets. The big challenge identified by the panel will be real political leadership at "a scale that matters" to overcome these impacts and deal with the hard questions posed by such threats.

Panelists advanced a number of perspectives and recommendations to begin to partially address some of the challenges raised. Research, analysis, and information systems that are spatially-extensive and data-intensive such as those which utilize GIS, remote sensing, and bioinformatics can help to manage issues of complexity and scale that biodiversity conservation policies should take into account. Furthermore, the panel discussed the advantages of applying current known approaches such as research that is integrated with education and/or outreach, community-based education, policy-relevant research, involvement of land managers, incorporation of practitioner perspectives, engagement with women, developing institutional and technical capacity at local, national, and regional levels, emphasizing conservation management with local communities rather than in opposition to them. The roundtable also contemplated global programs such as the REDD (United Nations Programme on Reducing Emission from Deforestation and Forest Degradation) and REDD+ programs (which adds conservation and sustainable management of

forests and forests carbon stocks) with respect to their potential to serve as "off the shelf" types of global programs which might also help biodiversity conservation goals. Nonetheless, the need to address so-called leakage problems across borders was raised. Other programs such as subsidies to offset the current bias within the global economic system were noted. Best practices for environmental ministries are available to be implemented and regional programs for linking decision-makers with scientists are valuable and relevant for regional biodiversity goals. It was also noted that significant progress with the establishment of national parks, biological corridors, and marine protected areas as well as some successes with experimental wildlife property rights programs within existing reserves hold promise for making future improvements. With respect to areas for development of new approaches, the roundtable identified that indices and indicators for biodiversity conservation should incorporate both quantitative as well as qualitative factors in order to be more useful to establishing priorities. Also, additional means for managing the entire landscape of areas including but not limited to protected areas are required. Further knowledge and practices that recognize the importance of coupled natural-human systems will advance the conservation agenda greatly. Finally, institutional innovations are needed to build long-term, multi-scale and stable capacity to address ecosystem conservation that spans spatial and temporal constraints (i.e. political borders and political terms).

Geospatial methods and applications for biodiversity monitoring and conservation

Ten research paper presentations were offered in the sessions leading up to the roundtable event. They provided contextualization for the discussion and drew from research conducted both within and beyond the Americas. The presentation sessions were co-organized by Tatiana Loboda and Kelley O'Neal of the University of Maryland – College Park and were co-sponsored by the AAG Biogeography Specialty Group, Remote Sensing Specialty Group, Geographic Information Science and Systems Specialty Group, and by the Association of American Geographers.

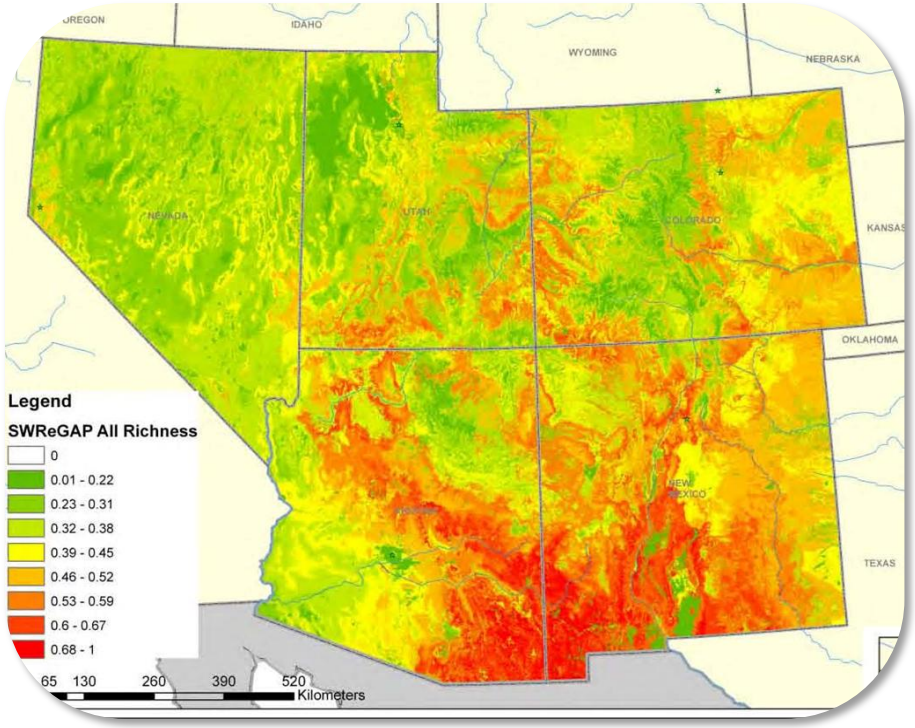
The monitoring of biodiversity has been broadly utilized as a means to evaluate ecosystem functions through various spatial scales. With recent advancements in the areas of remote sensing, GIS, and the construction of models, it has been possible to study many aspects of biodiversity and conservation in a specific spatial context.

The incorporation of new data sources and geospatial tools has made it possible to advance the understanding of links between distinct components of landscapes and biodiversity. The presentations focused on geospatial methods to monitor biodiversity and well as geospatial applications for the conservation of flora and fauna, including but not limited to remote sensing applications for the monitoring of biodiversity, geospatial systems for information dissemination, geospatial analysis and understanding landscapes and biodiversity, construction of models which depict the present and future states of biodiversity in various spatial and temporal scales, innovative methods for the generation of geospatial data and analysis, analyses of biodiversity hazards, observed and projected impacts of climate change on biodiversity, and impacts from land cover and land use changes on biodiversity.

Mapping Biodiversity Metrics Representing Ecosystem Services at the Landscape Scale in the American Southwest

Kenneth Boykin (New Mexico State University), William Kepner (Environmental Protection Agency), David Bradford (Environmental Protection Agency), Rachel Guy (New Mexico State University), Michael Calkins (New Mexico State University), Kevin Gergely (U.S. Geological Survey), Anne Neale (Environmental Protection Agency)

Kenneth Boykin and his team from New Mexico State University consider that the mapping and quantifying of ecosystems has been become a theme of national strategic interest. In their study they use habitat models for 817 species of terrestrial vertebrates that reflect biological diversity and other aspects which are appreciated by human beings in five states: Arizona, New Mexico, Nevada, Utah, and Colorado.



It is widely understood that human condition is intrinsically linked to the quality of the environment and the services it provides. Ecosystem services, i.e., "services provided to humans from natural systems," have become a key issue of this century in resource management, conservation, human well-being, and environmental decision analysis. Mapping and quantifying ecosystem services have become a strategic national interest in integrating ecology with economics to help explain the effects of human policies and the subsequent impacts on both ecosystem function and human welfare. Aspects of biodiversity are valued by humans in many ways, and thus are important to include in any scheme that seeks to identify and quantify the value of ecosystems to humans. Some biodiversity metrics clearly reflect ecosystem services (e.g., abundance and diversity of game species), whereas others reflect indirect and difficult to quantify relationships to services (e.g., relevance of species diversity to ecosystem resilience, cultural value of native species).

Wildlife habitat has been modeled at large spatial scales and can be used to map a number of biodiversity metrics. In this study, we use the deductive habitat models for 817 terrestrial vertebrate species developed under the USGS Southwest Regional Gap Analysis Program to map metrics reflecting ecosystem services or biodiversity aspects valued by humans over a large 5-state area (Arizona, New Mexico, Nevada, Utah, and Colorado). Metrics included species-of-greatest-conservation-need, threatened and endangered species, harvestable species (i.e., upland game, migratory birds, and big game), total species richness, and taxon richness.

Monitoring Changes in Woody Plant Cover in Northern Chihuahuan Desert Grasslands

Kelley J. O'Neal (University of Maryland)

Kelly O'Neal from the University of Maryland shows how the desert grasslands in northern Chihuahua have been managed since the integration of human and natural systems, accomplishing to proportionate a valuable economic resource for the raising of livestock, with 90 percent of grasslands open to grazing, and relying on rich biodiversity and many endemic species. She makes a reference that this region is similar to other grazing systems, which occupy 25 percent of global lands, as they are also are very sensitive when it comes to land use, land management practices, climactic variability, edaphic and topographic conditions, and invasive species.

She highlights the increase in woody plants that affect multiple interest groups that have implications for the role of grasslands, the conservation of biodiversity, and the control of carbon. For this investigation she used the Landsat Thematic Mapper, to depict the annual coverage of woody plants and to quantity the changes between the years 1985 and 2008.

Northern Chihuahuan Desert grasslands are highly managed coupled human and natural systems which support rich biodiversity and many endemic species as well as provide a valuable economic resource for cattle ranching livelihoods, with 90% of the grasslands open to grazing. Northern Chihuahuan Desert grasslands share many characteristics with other managed grazing systems, which occupy 25% of the global land surface and are the most extensive form of land use. Grasslands around the globe, including those located within the Chihuahuan Desert ecoregion, are experiencing land cover modification from woody encroachment and increasing woody plant cover. Grasslands are particularly sensitive to land use and land management practices, climate variability, edaphic and topographic conditions, and invasive species. The observed increases in woody plant cover affect multiple stakeholders and have implications for rangeland carrying capacity, biodiversity conservation efforts, and carbon accounting. This research used Landsat Thematic Mapper data to map annual woody plant cover and quantify changes in cover from 1985-2008. The woody plant cover change map provides a valuable tool for understanding the influence of grazing, fire, and climate variability within Northern Chihuahuan Desert grasslands. Results of this research will enable better decision making for sustainable land use and conservation efforts in the region.

Assessing grassland productivity dynamics impacted by climate variability and land-use and management on the Mongolia Plateau since the early 1980's

Jun Wang (University of Michigan), Daniel Brown (University of Michigan), Kathleen Bergen (University of Michigan)

Jun Wang and his team from the University of Michigan affirm that the grasslands in Mongolia have sustained millions of herdsmen and farm laborers during thousands of years but that in the last few decades climate variability and the intensification of land use have caused serious edaphic degradation. Therefore, the construction of ecosystem models based on remote sensing constitutes an effective

strategy for the study of vegetation dynamics. They collected data from GIMMS AVHRR (1982-1997), SPOT VEGETATION (1998-1999), and MODIS (2000-2005), and they integrated them to create images showing the classification of vegetables and productivity estimated since 1982.

The Mongolian grasslands (Mongolia and Inner Mongolia Autonomous Region [IMAR], China) have supported millions of pastoralists and farmers over thousands of years. However, climate variability and human land-use intensification have caused serious grassland degradation in recent decades. Grassland sustainability has become a major ecological, economic, and social issue there. Remote sensing based ecosystem modeling provides an effective approach to study large scale vegetation dynamics. GIMMS AVHRR (1982 - 1997), SPOT VEGETATION (1998 – 1999), and MODIS (2000 – 2005) NDVI image data were acquired and integrated to create a time series beginning in 1982 for the vegetation classification and productivity estimation. Field observations from six ecological field sites (three each in Mongolia and IMAR), each with many sampling sites, were used to support the vegetation classification. The annual grassland productivity was estimated using the vegetation classification, light-use efficiency theory, photosynthetically active radiation data, and daily records of precipitation and temperature. Field biomass measurements from the above six ecological sites were used to validate the remotely sensed estimates. By analyzing the variations of the estimated vegetation productivity and the spatial-temporal relationships between vegetation productivity variations and climate variability, the results show that: (1) the annual vegetation productivity shows spatial heterogeneity and its interannual variability is different among vegetation types and eco-regions; (2) the annual vegetation productivity is sensitive to climate variability, especially to the interannual variations of precipitation; (3) socioeconomic records about land-use and management can explain the interannual variations of vegetation productivity left unexplained by climate on the Mongolian Plateau.

<u>Using LIDAR to monitor barrier island forests for effects of sea level rise</u>

Michael O'Connell (University of Maryland)

Michael O'Connel, from the University of Maryland, has studied the islands in the middle Atlantic, which are dynamic formations that maintain and protect coastal ecosystems and continents. The islands Assateague and Parramore are subject to increasing destabilization resulting from climate change and the increase in sea level rise which has altered communities of vegetation and biophysical structures. Utilizing a lidar instrument, he has been able to represent the forest structure and incorporate the monitoring of foliage to detect the changes in humidity in short periods of time. The analysis from this lidar instrument in conjunction with the description of the system in the ecohydrological field has allowed him to monitor the effects of climate change on sea level rise.

Mid-Atlantic barrier islands are dynamic landforms that support unique vegetation assemblages and provide protection to coastal bay and mainland ecosystems. Assateague and Parramore Islands are subject to increasing destabilizing pressures from climate change. Upward vertical forcing on freshwater bodies by rising sea surface elevation is expected to significantly alter vegetation community and biophysical structure. This talk documents the existing spatial gradient of Pinus taeda L. (loblolly pine) biophysical structure, and develops a water availability proxy well correlated with forest structural metrics. This new variable, DWST, a product of depth to water table and a soil textural index, is well-suited for dynamic monitoring and modeling of vegetation change as water tables change. A lidar instrument, EAARL (Experimental Advanced Airborne Research Lidar), is shown to provide accurate representations of forest structural metrics. Canopy reflection ratio (CRR) predicts ground-based plant area index (PAI) at a forest-wide r2 of 0.73. PAI incorporates leaf area and thus can potentially track foliar adjustments due to changes in soil moisture levels at short time scales. The waveform-returning nature of the EAARL also enables very good representation of foliage density distribution. The height of peak canopy density (HPCD) is proposed as a surrogate for maximum canopy height in lidar-based studies and as an indicator of hydrological gradients. The lidar analyses and field ecohydrological system description together comprise the basis for a candidate monitoring scheme of sea level effects. It is expected that this measurement system will infer changing forest water relations from incremental forest structural chanae.

Exploring the utility of ASTER thermal bands in measuring protected area effectiveness

Pinki Mondal (University of Florida), Jane Southworth (University of Florida)

Pinki Mondal, from the University of Florida, has researched forest degradation in a tiger reserve located in Central India. For this she has utilized the ASTER system, which converts superficial temperature into thermal bands. This allowed her to obtain an important parameter to study the changes in the types of terrestrial coverage, since by using remote thermal sensing one can differentiate between bare land and land covered with vegetation.

Ecologists require spatial and temporal land cover data for assessing the relationships between land degradation, human activities and global climate change. The capability of ASTER sensor for collecting multispectral thermal infrared images allows for unprecedented surface temperature estimation accuracy for a variety of land cover types. Surface temperature, converted from ASTER thermal bands is an important parameter in the characterization of energy exchange between the ground surface and the atmosphere. This study explores the utility of ASTER thermal bands to identify subtle changes in single land cover types, such as forest degradation or thinning, in and around a tiger reserve in Central India. Using thermal remote sensing as an indicator of land degradation is advantageous since thermal data can differentiate between bare soil and vegetation cover, determine differences in forest type, and can be used in high-biomass tropical regions without being saturated. While there is no single way of measuring protected area effectiveness, remote sensing techniques, as illustrated in this research, prove effective for monitoring purposes, specifically the use of thermal remote sensing to better determine the 'within-class' changes.

Developing a Quantitative Assessment of Habitat Suitability for the Amur Tiger from Qualitative Sources and Geospatial Data

Tatiana Loboda (University of Maryland, College Park)

Tatiana Loboda from the University of Maryland considers that habitat aptitude maps constitute a very important component for the evaluation of the capacity that an ecosystem has to sustain the necessities from any one given species. In this work she presents a methodology to map the sustainability of the habitat for the conservation of the Amur tiger (Panthesa tigris altaica), a species of tiger in danger of extinction in the remote Russian orient. To do this she will develop a geospatial model which is the product of a combination of literary descriptions of the tiger and his dominant prey (dear, wild boar, and moose), and the detection of remote sensing data.

Habitat suitability mapping is an important component of evaluating an ecosystem's ability to sustain the needs of a given species. Habitat suitability analysis provides opportunities for assessing the potential for spread of the species outside its known area of presence, the ability of the given area to sustain the minimum viable population, the impact of anthropogenic and natural modifications of the ecosystem on the short- and long-term well-being of a given species, and the potential changes in the habitability of a given area under the projected scenarios of climate change. Although the importance of the habitat suitability mapping is well-recognized, the lack of reliable observations of many animal species makes it extremely difficult to develop statistically sound approaches to map habitat suitability as a function of landscape features directly. At the same time, long-term qualitative descriptions of animals' habitat use and preference for specific conditions present a unique source of data which can be utilized to develop quantitative estimates of habitat suitability. This paper presents a methodology for habitat suitability mapping for the Amur tiger (Panthera tigris altaica) - a critically endangered species in the Russian Far East. A quantitative assessment of habitat suitability is developed from a combination of literature descriptions of the tiger and its major prey (red deer, wild boar, and moose) habitat preference and remotely-sensed data within the geospatial modeling framework. The resultant maps are evaluated against the statistically derived habitat suitability maps based on the snow track surveys conducted in

Converting the New York State Herpetology Atlas to GIS Format

Wendy Miller (SUNY Cortland)

Wendy Miller from SUNY Cortland says that in 1990 the New York State Department of Environmental Conservation began an Atlas of Amphibians and Reptiles (Herpetology Atlas) which was an important document about the existence and geographic distribution of the state's herpetofauna. Currently they are discussing about project which will convert this database to a GIS format with the cooperation of the state department and the students of the biology and geography departments.

In 1990, the New York State Department of Environmental Conservation (NYS DEC) began the Amphibians and Reptile Atlas (Herpetology Atlas) which sought to document the existing geographic distributions of the State's herpetofauna. The data collection phase of the project officially lasted nine years and was primarily composed of data collected by volunteers using field data cards. Additional records have been added to the database until present day and historical records have been included as well. The full database contains approximately 60,000 records at this time.

The data in the Herpetology Atlas records have already been used for numerous studies, public presentations, and publications. Despite these achievements, it has been recognized that more precise geographic location data would allow for finer scale analyses that are needed for local conservation planning, for documenting population shifts over time, for analyzing particular habitat associations especially for endangered and threatened species, and for the modeling to understand current distributions and to predict future changes in these distributions. In most cases, the field data cards used to record animal locations during the Herpetology Atlas do contain detailed geographic information that could be used for such analyses. However, the verbal format of these data on the cards is not compatible with the software used for the geographic analyses.A project is currently underway to convert the database into GIS format with cooperation from the NYS DEC and students and faculty from the Biology and Geography departments. Issues with data conversion and preliminary results will be discussed.

Delivering satellite-derived fire information for conservation: benefits and impacts

Minnie Wong (University of Maryland)
Diane Davies (University o f Maryland)
Giuseppe Molinario (University of Maryland)

Minnie Wong from the University of Maryland refers to FIRMS (Fire Information for Resource Management Systems) that provides data about fires through the MODIS sensor, aboard NASA's satellites which monitor land and water. Individuals responsible for protected areas need this information as quickly as possible to know if they should suppress fires or if the fires will be beneficial. By providing the information through different formats like textual files, shape files and e-mail alerts through GIS interactive interfaces, the mapping of fire can be utilized in remote areas where it is difficult to count on vigilance of the terrain.

This paper describes the conservation benefits and impacts of delivering satellite-derived fire information through the Fire Information for Resource Management System (FIRMS). Wildfire is a worldwide phenomenon that can have both positive and negative effects on ecosystems. Knowing where and when fires occur is important for decision makers to make informed decisions on whether to fight the fire, or to leave the fire burning. Protected area managers need this information rapidly to assist in the decision making process and FIRMS contributes to this process. FIRMS provides active fire data from the MODIS sensor, on board NASA's Terra and Aqua Earth Observing Satellites, to decision makers in near-real time and in easy-to-use formats. By providing data in several data formats, such as text files, shape files and email alerts and through an interactive web-based GIS interface, Web Fire Mapper, FIRMS ensures users have access to data that otherwise would be difficult to attain. In this paper, we describe how the system is routinely used for conservation and biodiversity monitoring. We present results from a user survey completed by 345 people, and provide case studies in regions where the provision of FIRMS data has made an impact on conservation, especially in remote areas where it is difficult to have on-the-ground surveillance.

Satellite Monitoring of Congo Basin Forests for Conservation

Alice Altstatt (University of Maryland)
Matthew Hansen (South Dakota State University)
Jean-Robert Bwangoy (South Dakota State University)
Erik Lindquist (UN Food and Agriculture Organization)

Alice Altstatt and her team from the University of Maryland are dealing with the Central African Regional Program for the Environment (CARPE) which depends on the United States Agency for International Development (USAID) and whose initiative is to promote the sustainable management of natural resources in the Congo watershed. To complete their objectives they have associated themselves with South Dakota State University, the University of Maryland, and NASA, utilizing remote sensors to monitor forest cover. The resulting maps, generated by an innovative application of MODIS combined with Landsat and radar data, show forest losses and flooded forests.

The Central African Regional Program for the Environment (CARPE) is a United States Agency for International Development (USAID) initiative aimed at promoting sustainable natural resource management in the Congo Basin. The strategic objective of CARPE is to reduce the rate of forest degradation, deforestation and loss of biodiversity in the Congo Basin by increasing local, national, and regional natural resource management capacity. To assess its progress meeting this objective, CARPE uses a remote sensing forest cover monitoring program implemented by its partners, South Dakota State University, the University of Maryland and NASA. Regional maps of forest cover, forest loss and inundated forest are produced from an innovative application of combined MODIS, Landsat and radar data. These maps are used for identifying conservation priorities and threats and for developing sustainable land use management plans, as well as providing statistics on forest cover and forest cover loss.

Ehancing Knowledge for Establishing Ecosystem Conservation Priorities in the Neotropics by Integrating Biodiversity and Geospatial Data

Jesus A. Ugalde-Gomez (Instituto Nacional de Biodiversidad)

Jesus A. Ugalde-Gomez from the National Biodiversity Institute of Costa Rica (INBIO) states that since the loss of more than 100,000 plant and animal species in the last five years, it was considered a priority to address ecosystem issues. For this reason, the Inter American Biodiversity Information Network (IABIN), the Association of American Geographers (AAG), the Institute for the Management of Conservation at the University of Virginia, Dr. Bruce Miller, and the INBIO are making efforts to study various critical species through the spatial integration of biological and geographic data, in a project that will take into account at least seven Mesoamerican countries. The methodology is based on the digitalization, geo-referencing, and analysis of bat and plant information.

The loss of more than 100,000 species of plants and animals in the last five years alone is a major challenge for conservation of biodiversity. Enhancing our knowledge of what is happening to which species, and where, is critical for organizations to effectively identify highest-priority concerns and mount multi-sector regional efforts to address them at ecosystem levels. IABIN, AAG, Conservation Management Institute of Virginia Tech University, Dr. Bruce Miller, and INBio joint efforts to understand critical species via spatial integration of biological and geographical data. Through the digitalization, georereference and analysis of information from bat and plants, the project will advance biodiversity informatics in at least seven developing countries of Mesoamerica through addressing five main goals: to enhance the availability and usability of existing biodiversity information in Mesoamerica, to build human resource capacity and strengthen institutional infrastructure for biodiversity conservation, to promote access to interdisciplinary applications of this information for acquiring new knowledge and for improving decision-making on conservation through freely available online publishing of data online in a format accessible through user-friendly tools that allow users to integrate it with other biological and socio-economic data, to support the establishment of ecosystem conservation priorities in the region in part via the preparation and broad dissemination of a synthesis of biodiversity status and trends that serve as the basis of recommendations for utilizing the resources and innovations developed by the project.

Advocacy in Biogeographic Science

In addition to the Symposium sessions a panel organized by Stockton Maxwell of West Virginia University brought together five respected biogeographers to discuss the issue of advocacy in biogeographic science, including Kenneth R. Young, University of Texas at Austin; Laura C. Schneider, Rutgers University; Lori D. Daniels, University of British Columbia; Glen M. MacDonald, UCLA; and John Kupfer, University of South Carolina. Key questions were discussed : 1) What is the role of the researcher in advocating for biogeographic research? 2) Should biogeographers speak with elected representatives to inform and advocate for positions supported by research? 3) Are there other avenues of advocacy? 4) Should researchers and students publish/present in layperson magazines/forums as well as scientific journals/conferences? 5) Should the biogeography community train new scientist to be savvy in the presentation and dissemination of their findings? 6) Should research questions be focused on application in the real world or with a specific "cause" in mind?

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