Society of American Foresters

International Forestry Working Group Newsletter

Working Group B3

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Note from the editor

As editor I am pleased to have so many contributions from members of the now dormant International Society of Tropical Foresters. These articles show there is still interest in shared communication among those people. One of our articles is in Spanish and I am happy to take foreign language articles. Unlike ISTF which operated on lots of volunteer support and very little money, this newsletter operates on all volunteer support (including your articles) and no money. This means translations cannot be provided. Thanks again to all who sent in a contribution to the newsletter.

- Blair Orr, IFWG Newsletter Editor
(bdorr@mtu.edu)

Contributed Articles

Southern Pine Beetles Reach Outbreak Levels in Honduras (Again)

Ronald Billings

Texas A&M Forest Service

Honduras has an estimated 5.4 million hectares of forest lands, covering almost half of the total area of the country. Of this land, 2.8 million hectares are suited to pine forests. Much previously-forested land has been denuded by poor exploitation practices, shifting agriculture and cattle grazing. Furthermore, about 5.5 million cubic meters of timber are used annually for firewood, placing an additional burden on the pine and hardwood resource.

A 1974 forestry law (in effect until 1992) nationalized rights to all timber and created the state-owned forestry corporation (Corporación Hondureña de Desarrollo Forestal or COHDEFOR) in charge of forest protection, management, harvesting, as well as the manufacture and exportation of primary forest products. In 1992, a new Law of Agricultural Modernization and Development was passed which caused great impacts on forestry practices in Honduras. As a result of this law, large portions of the forested lands were assigned to private landowners,

communities, or indigenous tribes. The remainder is national forests, of which most have been set aside as national parks, protected areas, and watersheds. Timber harvest and utilization was assigned to the private forest industry.

In 2008, a new forestry organization entitled National Institute of Conservation and Forest Development, Protected Areas and Wildlife (Instituto Nacional de Conservación y Desarrollo Forestal, Areas Protegidas y Vida Silvestre or ICF) replaced COHDEFOR.

The principal species of conifers found in Honduras are *Pinus caribaea* and *P. oocarpa*. *P. pseudostrobus*, *P. maximinoi*, and *P. tucunumani* are present at higher elevations. *Pinus caribaea* (Caribbean pine) grows from sea level on the Lowland Pine Savanna of eastern Honduras up to elevations of 600-800 m; *P. oocarpa* is found between 500-1200 m; and white pine, *P. pseudostrobus*, is found primarily above 1200 meters. *Pinus maximinoi*, and *P. tucunumani* are commonly found in stands together with *P. oocarpa* above 500 m. *Pinus oocarpa* is the major source of pine for exportation and domestic use, although all species are used to a certain extent.

With the exception of forest fires, the southern pine beetle (SPB), *Dendroctonus frontalis*, causes the greatest economic losses to the pine forests of Honduras. From 1962-1965, more than 2 million hectares were affected by this insect. In 1964, it was estimated that the outbreak was spreading at a rate of 150,000 hectares per month. This remains the most devastating epidemic of southern pine beetle on record. The 1962—1965 southern pine beetle outbreak originated at Gualaco, in the Olancho Region, and later spread throughout the entire pine zone with exception of the lowland pine savannah (La Mosquitia), prior to subsiding from natural causes.

During this outbreak infestations typically occurred in stands of *P. oocarpa* on the ridges and steep slopes with shallow, eroded soils. Affected trees in that outbreak were large, overmature, and slow growing, often over 100 years of age. Repeated fires had left extensive stands of pure pine consisting of widely spaced trees and no reproduction. Due to the magnitude of the outbreak, rapid development of the beetle, lack of roads, trained personnel and financing, direct control on an area-wide basis was deemed impractical. Control with 0.5 percent benzene hexachloride (BHC) in diesel oil was recommended on individual segments in fringe areas of the main infestation, but apparently little control was carried out.

Since the collapse of that historic outbreak in 1965, populations of southern pine beetle remained at endemic levels, except for scattered local outbreaks, until 1982. In 1982-83, a severe outbreak of *D. frontalis* occurred in second-growth pine stands, primarily in the Yoro Region. Over 8,000 hectares of young pine forests were attacked and killed.

Following the 1982 outbreak, Honduras developed an effective forest pest management program for pine bark beetles, following my recommendations. Under the leadership of Vicente Espino M., a Honduran forester who worked as pest coordinator with AFE-COHDEFOR for 26 years, a bark beetle record-keeping system and regional forest protection coordinators were established in each forested region. Honduras is the only country in Central America to maintain long-term records of bark beetle infestation occurrence and associated losses, although Nicaragua, Guatemala, and El Salvador are beginning to collect similar records of SPB outbreaks.

From 1984 to 1998, losses to bark beetles in Honduras were kept to a minimum by early detection and prompt application of control measures, particularly cut-and-leave. Cut-and-leave, a mechanical control method specific to SPB, was developed in the late 1960s in east Texas. This simple but effective tactic consists of disrupting expanding infestations by felling currently-

infested trees and adjacent uninfested buffer trees. Developing beetles either die in felled trees from direct solar radiation or competition from other insects or are forced to disperse out of the infestation upon emergence, often dying before they can initiate new infestations.

The next major SPB outbreak occurred from 1998 – 2003 and killed an estimated 45,885 ha. of pine forests in this 6-year period. Of the 2.4 million cubic meters of dead timber resulting from this most recent outbreak, only 17% (403,000 cubic meters) were salvaged. The outbreak, which peaked in 2002, occurred principally in young (15-25 year) stands of *Pinus oocarpa* (76%) and *P. caribaea* (20%), with the remainder in stands of *P. pseudostrobus, P. maximinoi*, and *P. tucunumani*.

Despite recent outbreaks, Honduras is considered to have the most well-developed bark beetle program in Central America. Pine forests in Honduras, as well as those in Belize, Guatemala, El Salvador, and Nicaragua, continue to be susceptible to periodic outbreaks of pine bark beetles, due to lack of forest management, frequent fires, and other predisposing factors.

Other bark beetles of the genus *Dendroctonus* also occur in Honduras and occasionally cause economic losses in pine forests (Wood, 1982). Among the most common are *D. mexicanus, D. approximatus, D. parallelocollis , I. apache* (= *calligraphus* or *interstitialis*), *and I. cribricollis (= I. grandicollis)*.With the exception of *D. mexicanus*, these species play a secondary role, preferring to attack very weakened, dying or downed trees.

In 2000, Norwegian entomologists Fred Mitgaard and Karl Thunes identified a new species of *Dendroctonus* in Belize. This beetle was later collected from Mexico, Guatemala, El Salvador, and Honduras. This new species has recently been named *D. mesoamericanus*. It tends to be somewhat larger (2.7-4.3 mm.) than *D. frontalis* (2.3-4.0 mm) and constructs an egg gallery that tends to be horizontal or more openly "S"-shaped than those of *D. frontalis*. The new species does not respond to frontalin, the principal pheromone of *D. frontalis*. It is believed to be less aggressive than *D. frontalis* and often occurs in trees first attacked by the latter. Clearly, more studies are needed on its biology, attack behavior, and the role it plays in bark beetle outbreaks in Central America.

In 2013, another SPB outbreak began to develop in the Olancho Region of central Honduras – the same region that supported the 1962-1965 outbreak and several more recent ones. Little was done to address this outbreak, reportedly due to lack of funds. Perhaps a major contributing factor was that 2013 was a presidential election year, an event that tends to disrupt forestry operations at both local and national levels every four years in Honduras. By the summer of 2014, several thousand hectares had become infested. In November, the forestry department (ICF) and US Forest Service International Programs requested my assistance to evaluate the current outbreak and train a new cadre of Honduran forestry technicians to cope with the outbreak. I spent two weeks in the Olancho area, accompanied by USFS entomologist Dr. Stephen Clarke and Paulo Ortiz, the forest pest specialist from Guatemala.

The current outbreak, centered near the town of Gualaco, consisted of numerous small and large infestations coalescing into one large outbreak, due to insufficient control. Lack of timber markets, poor access, and insufficient funding contributed to the dire situation. Also, Honduras has been declared one of the most dangerous countries in the world, due to an active drug trade and other factors. Consequently, forestry crews (and visiting forestry advisors) are required to be accompanied by armed military guards when in the field.

Our accomplishments consisted of conducting helicopter flights over the infested areas and visiting controlled and untreated infestations on the ground. We also trained a group of

recently hired forestry technicians on SPB behavior, plus outbreak detection, evaluation, prevention and suppression. We utilized several SPB field guides I had prepared in Spanish for previous training throughout Central America. On the final day of our two-week mission, we presented our findings to ICF forestry officials, along with an action plan. Several potential national and international financial donors in the audience were encouraged to support the needed suppression efforts.

The action plan calls for prompt detection and evaluation of the current outbreak, the setting of control priorities, and suppression of expanding infestations on the leading edge of the outbreak using cut-and-leave and salvage harvesting where feasible. Progress toward containing this outbreak is currently being made. Former forest pest specialist Vicente Espino M., who left COHDEFOR in 2008, has been brought out of retirement to oversee suppression operations.

(Photos by the Author)

Photo 1: The mountainous terrain and lack of good roads hinder southern pine beetle control programs in Honduras.

Photo 2: Native pine forests are once again under attack by the southern pine beetle in the Olancho Region of central Honduras (November 2014).

Photo 3: Resin masses (pitch tubes) resulting from a mass attack of SPB on *Pinus oocarpa* in Olancho, Honduras.

Photo 4: A southern pine beetle infestation treated by felling currently infested pines and adjacent buffer trees (cut-and-leave).

Photo 5: Ron Billings (right) and a group of Honduran forestry technicians evaluate a SPB infestation near Gualaco, Honduras.

Photo 6: Honduran forestry trainees in Gualaco, with instructors Stephen Clarke (front, left) and Ron Billings (front, right).

Photo 7: Former COHDEFOR forest pest specialist Vicente Espino examines a bark beetle-killed pine in Honduras.

EL INSTITUTO DE INVESTIGACIONES FORESTALES DE LA UNIVERSIDAD VERACRUZANA, FUNDADO EN 1989 CUENTA CON UN NÚCLEO DE INVESTIGADORES QUE HAN TRABAJADO DESDE SUS INICIOS EN LOS ASPECTOS FORESTALES, DESARROLLANDO CONOCIMIENTOS SOBRE EL BOSQUE INCLUYENDO ASPECTOS SOCIALES ASOCIADOS DIRECTAMENTE A LA ECOLOGÍA FORESTAL. DE AHÍ NACE EL INTERES DE CREAR LA MAESTRÍA EN CIENCIAS EN ECOLOGÍA FORESTAL, ENCAUSADA AL AMBITO CIENTÍFICO

YA QUE EXISTEN MUY POCAS INSTITUCIONES EN VERACRUZ DEDICADAS AL MANEJO DE LOS BOSQUES. ESTA MAESTRÍA ESTÁ EVALUADA POR EL CONSEJO NACIONAL DE CIENCIA Y TECNOLOGÍA, EL CUAL BRINDA APOYO ECONÓMICO A CADA ESTUDIANTE DE ESTA MAESTRÍA.

UNO DE LOS ASPECTOS ECOLOGÍCOS IMPORTANTES EN ESTA MAESTÍA ES LA DE

RESTAURACION DE BOSQUES, QUE CONSISTE EN REINTEGRAR LAS CONDICIONES NATURALES ORIGINALES DE UN ECOSISTEMA DESPUÉS DE SU PERTURBACIÓN O DESTRUCCIÓN.

PARA LOS JOVENES QUE QUIERAN ESTUDIAR ESTA MAESTRÍA SE REQUIERE QUE TENGAN UNA VINCULACIÓN CON PROYECTOS DE INVESTIGACIÓN.

UNA PARTE IMPORTANTE EN LOS ECOSISITEMAS SON **LOS SUELOS**, PUES ELLOS SON LA VIA DE NUTRICIÓN Y DONDE SE DESARROLLA TODA LA ACTIVIDAD BIOLÓGICA; SIN LOS SUELOS SERÍA IMPOSIBLE LA EXISTENCIA DE LOS BOSQUES Y SELVAS. LA MAESTRÍA EN CIENCIAS EN ECOLOGIA FORESTAL, APORTA CONOCIEMIENTOS AL RESPECTO DE ÉSTOS, DE TAL MANERA QUE EL ALUMNO TENGA LAS HERRAMIENTAS E INFORMACIÓN GENERADA A NIVEL NACIONAL E INTERNACIONAL, NECESARIA PARA AFRONTAR EL PROBLEMA DE LA PERDIDA DE SUELOS FORESTALES, EN UN PROCESO DE RESTAURACIÓ.

LA ABSORCIÓN EFICAZ DE LOS NUTRIENTES, ES PRIMORDIAL EN LAS INVESTIGACIONES FORESTALES QUE SE REALIZAN EN EL INIFOR, YA QUE POR LA DEFORESTACIÓN Y DEGRADACIÓN DE LOS SUELOS LAS ESPECIES PEQUEÑAS QUE INICIAN EL PROCESO DE REGENERACIÓN DEL ECOSISTEMA Y ENCARGADAS DE PROTEGER Y RETENER LOS NUTRIENTES, SE PIERDEN Y LA REGENERACIÓN NATURAL DEL BOSQUE ES NULA; SE DEBE ENTERDER LA IMPORTANCIA DE LOS SUELOS Y SU ESTUDIO PROFUNDO, QUE GENERE INFORMACIÓN PARA LA TOMA DE DESICIONES EN ACCIONES SONTENIBLES Y SUSTENTABLES.

LA BIOTECNOLOGÍA DE PLANTAS ES EL ESTUDIO DE LA VARIACIÓN GENÉTICA EN ESPECIES FORESTALES Y SU CULTIVO IN VITRO.

EL ESTUDIO DE LOS BOSQUES VA MAS ALLA DE LA OBSERVACIÓN DE CARACTERISTICAS VISIBLES, EL ESTUDIO MOLECULAR Y GENÉTICO DE LAS ESPECIES

PERMITE IDENTIFICAR SIMILITUDES Y DIFERENCIAS PARA TRAZAR ESTRATEGIAS PRIORITARIAS EN EL MANEJO USO Y CONSERVACION DE LOS BOSQUES.

LA PROPAGACIÓN MASIVA DE ESPECIES QUE MANTENGAN LA PRODUCTIVIDAD DEL BOSQUE ES LLEVADO A LAS COMUNIDADDES PARA MEJORAR SUS RECURSOS MADERABLES Y LA REPOBLACIÓN CON SEMILLA MEJORADA QUE TIENE UN IMPACTO ECONÓMICO EN LA PRODUCTIVIDAD Y GENERA UN BANEFICIO SOCIAL.

EL ESTABLECIMIENTO Y MANTENIMIENTO DE UN **HUERTO SEMILLERO CLONAL**, CONLLEVA A LA SELECCIÓN DE ARBOLES CON CARACTERISTICAS GENÉTICAS QUE CUMPLAN CON REQUISITOS COMO RECTITUD DEL FUSTE, BUENA PODA NATURAL, COPA PEQUEÑA, MAYOR CRECIMIENTO, CARACTERISTICAS QUE SE CLONAN PARA ASEGURAR UNA PRODUCCIÓN PRINCIPALMENTE DE SEMILLA MEJORADA.

EL ENRAIZADO DE ESTACAS Y TÉCNICAS DE INGERTADO SE LLEVAN A CABO CON EL FIN DE LOGRAR UNA ALTA PRODUCCIÓN DE SEMILLAS CON CARACTERISTICAS DE SOBREVIVENCIA Y ALTA CAPACIDAD DE ADAPTACIÓN DE LA ESPECIE FORESTAL. EL OBJETIVO DE RECOLECTAR GERMOPLASMA, BROTES Y SEMILLAS DE ESPECIES FORESTALES SELECCIONADAS DE UNA ZONA, ES OBTENER LAS MEJORES CARACTEÍSTICAS DE LA ESPECIE CON LA QUE SE DESEA REFORESTAR, GARANTIZANDO SU

ADAPTABILIDAD A LA ZONA Y CAPACIDAD DE SUPERVIVENCIA.

LA **VARIACIÓN ADAPTATIVA** DE LAS ESPECIES FORESTALES CONSISTE EN DETERMINAR LAS CONDICIONES EXTREMAS QUE INFLUYEN EL DESARROLLO DE LOS BOSQUES Y SU RESISTENCIA; ESTO ES COMO LAS ESPECIES RESPONDEN A CONDICIONES DE STRES, SEQUIA, BAJAS TEMPERATURAS O SALINIDAD.

LAS TÉCNICAS EMPLEADAS MEJORAN LA ESPECIE Y ACORTAN EL TIEMPO PARA SU APROVECHAMIENTO, BENEFICIANDO ASÍ A LAS COMUNIDADES ELEBANDO DE ESTE MODO LA PRODUCCIÓN MADERABLE.

"***QUE LA CIENCIA LLEGUE AL CAMPO***"

EL CONOCIMIENTO ADQUIDIRO EN LA MAESTRÍA EN CIENCIAS EN ECOLOGÍA FORESTAL PERMITE A LOS ALUMNOS EXTENDER SU CAMPO LABORAL DENTRO Y FUERA DEL ESTADO, COMO ALTERNATIVA A SU DESARROLLO PROFESIONAL.

EL AISLAMIENTO DE SUSTANCIAS A PARTIR HONGO, ES OTRO CAMPO DE ESTUDIOS DENTRO DEL INSTITUTO DE INVESTIGACIONES FORESTALES, DONDE SE DESARROLLAN INVESTIGACIONES EN LA OBTENCIÓN DE SUSTANCIAS PARA COMBATIR EL CANCER, ASI COMO EL CULTIVO DE HONGOS COMESTIBLES, PROMOVIENDO PROYECTOS PRODUCTIVOS EN TODO EL ESTADO.

LA VINCULACIÓN CON EL INSTITUTO DE ECOLOGÍA Y LA UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO, FORTALECEN EL APRENDIZAJE DEL ALUMNADO EN ESTE CAMPO, PROPORCIONANDOLES UN AMPLIO PANORAMA DE ESTUDIO E INVESTIGACION A NIVEL INTERNACIONAL.

LOS BOSQUES CUMPLEN UNA TRIPLE FUNCIÓN, AMBIENTAL, ECONÓMICA Y SOCIAL, LA MAESTRÍA EN CIENCIAS EN ECOLOGÍA FORESTAL CONSTITUYE UNA ALTERNATIVA DE DESARROLLO PARA LOS ALUMNOS QUE DESEEN ENFOCAR SU CONOCIMIENTO EN LAS ÁREAS AGRÍCOLA Y FORESTAL; EN EL DESARROLLO DE INVESTIGACIÓN;

EN EMPRESAS PRODUCTIVAS; FARMACEUTICAS Y ALIMENTARIAS Y DE EXPLOTACIÓN SUSTENTABLE DE RECURSOS MADERABLES, ENTRE OTRAS.

Generar investigación básica y aplicada en torno a las necesidades y demandas de las comunidades del Sector Forestal.

Formar investigadores con la capacidad de generar y transferir el conocimiento y experiencia en el manejo de los recursos forestales a las comunidades del sector forestal.

Integrar las actividades de Tutorías y fortalezas académicas del Instituto en el proceso de formación del estudiante.

Difundir el conocimiento científico y tecnológico desarrollado por los alumnos en beneficio de la conservación y el aprovechamiento sustentable de los recursos forestales.

Tree plantations in the Caribbean lowlands of Costa Rica:

The beginnings and EARTH University.

Ricardo O. Russo [1] and Carlos L. Sandí [2],

The role of tree plantations: The establishment of native tree plantations in the Caribbean lowlands of Costa Rica started in the early 90s after previous experimental plots were undertaken at Diamantes Experiment Station in Guápiles in the 70s and the Organization of Tropical Studies (OTS) in La Selva Biological Station in Sarapiquí. Originally they were proposed as a strategy to recover abandoned and degraded pasture and agricultural lands. The usefulness of establishing native tree plantations for restoration of degraded pastures is widely recognized. Other beneficial effects of native tree plantations include the recovery of biodiversity within agricultural landscapes. Trees remove carbon dioxide (CO_2) from the atmosphere and store (sequester) it as carbon in the plant material and in the surrounding soil. So, tree plantations are seen as carbon sinks due to their potential to sequester large amounts of carbon dioxide from the atmosphere in tree biomass, and also as suppliers of other environmental services including restoration of soil fertility. Such native tree plantations have also economic returns when they are properly managed.

The role of EARTH University in Environmental Issues: Since the beginning, EARTH University was concerned with environmental issues. One year after inauguration, in 1991, a collaborative effort between EARTH and the (OTS) was carried out. As an immediate action of this agreement, Carlos Sandi was trained in nursery techniques and the Forestry Nursery was established. This nursery currently produces more than 500,000 seedlings annually. Then, a trial was established on EARTH campus with the general objective to evaluate the performance of eight native tree species that had been successful in a trial in La Selva. This trial, known as "Nativas 91", was planted on a 2.6 ha degraded pasture that had been grazed for many years. The trial was established according to a completely randomized block design (4 blocks with 8 species each one), where seedlings were planted in a 3x3 m pattern in monoculture within each block, at a density of 1,111trees/ha, The species selected for this study were: *Calophyllum brasiliense* ("cedro maría"), *Dipteryx panamensis* ("almendro"), *Hieronyma alchorneoides* ("pilón"), *Jacaranda copaia* ("gallinazo"), *Stryphnodendron excelsum* ("vainillo"), *Virola koschnyi* ("fruta dorada"), *Vochysia guatemalensis* ("chancho"), and *Zanthoxylum mayanum* ("lagarto"). The first thinning took place in 1994 in *Vochysia*, and subsequent thinnings were performed in the other species, except for *Stryphnodendron*, in 1996, 1999, and 2001 to reduce tree stocking. Actual stocking closeness at the time of biomass and soil sampling in July 2005 ranged between 190 and 491 trees ha^{-1} . Diameter at breast height (DBH) and total height of the trees were taken for each tree species to determine timber volume and mean annual increments (MAI). The best performance in growth was observed in *Vochysia guatemalensis* in which values of MAI duplicates those of the rest of the species. Statistical differences were also observed in diameter, height and volume, all in favor of *Vochysia*. *Hyeronima alchorneoides* and *Calophyllum*

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brasiliense showed a goog performance considering the species characteristics, slower growth and higher timber quality.

Table 1. Growth of three native tree species at fourteen years at EARTH campus.

Species	Current Stock trees ha^{-1}	Diameter cm	Height m	Volume m^3 ha^{-1}	M.A.I. m^3 ha^{-1} yr^{-1}
Vochysia guatemalensis	413 b	34.6 a	30.1 a	584.4 a	41.7 a
Hyeronima alchorneoides	481 a	23.5 b	26.9 ab	280.6 b	20.0 b
Calophyllum brasiliense	491 a	21.6 b	22.7 b	204.2 c	14.6 c

Means with the same letters in a column are not statistically different (P<0.05) according to Duncan test.

Later, between 1994 and 1997, the European Community Forestry Project (PROFORCE), established on campus more than 60 ha of Demonstration and Training plots with 17 native timber species for reforestation of abandoned pasture lands, including natural regeneration management, and small plots on farms in the surrounding communities. Additionally, the Project organized 24 workshops for small farmers on nursery and reforestation techniques.

Following that line, in 1997 an Institutional reforestation effort started to be carried out with support from the Board of Directors including six native species: *Calophyllum brasiliense* ("cedro maría"), *Dipteryx panamensis* ("almendro"), *Hieronyma alchorneoides* ("pilón"), *Terminalia amazonia* ("roble coral"), *Vochysia ferruginea* ("botarrama"), *Vochysia guatemalensis* ("chancho"), and two exotic species, *Gmelina arborea* ("melina"), and *Tectona grandis* ("teak"). A total of 140 ha were planted until 2000.

Since the year 2000, the Municipality of Rotterdam has funded two reforestation projects, a first phase of abandoned banana areas and a second phase including abandoned pasture lands, totaling the effort around 300 ha up to date. Furthermore, once a year in June, on Arbor Day, a journey is dedicated entitled "Siembra Institucional" when all personnel and students go out to the field and plant tree seedlings, covering around 2 ha each year. This practice has been extended to the surrounding communities in the last years. Also, the University sponsors the governmental "Blue Flag Program" in the communities and schools, whose objective is watershed protection through reforestation and waste management practices.

Finally, it can be said that between 1991 and 2005, but primarily in the last five years, EARTH University has implemented about 500 ha reforestation projects. Each reforested hectare, can fix annually around 4 tons of carbon in the biomass. This is equivalent to the sequestration of 14.6 tons of CO_2 from the atmosphere, to compensate part of the carbon dioxide emitted by the institutional car pool that produces CO_2 emissions equivalent to 180 tons per year[3] (sequestered by just 12.3 ha of reforestation).

[3] Based on calculations of fuel consumption of 36 vehicles, consuming 200 l/day. Each gram of fuel (C_8O_{18}) produces 3.52 gram of CO_2 after complete combustion.

Three figures of the EARTH University Costa Rican Tree Plantations.

Reforestation in Haiti

By Stan Hovey

As most people know the forest situation in Haiti is dire. Only in the last two years has the Haitian government begun a 4-point program to 1) plant trees, 2) enforce protecting trees, 3) education and 4) provide alternative fuels to charcoal. Many NGOs are continuing to help in various ways; which is encouraging with the current time of government stability.

I lived in Haiti during the 1940s when my father worked as a forester for SHADA, an organization implementing a U.S./Haitian partnership program to develop various natural resources. Me also, being a forester from the NYS College of Forestry (Class of 1955) has allowed me to go to Haiti over the past 10 years teaching children about their need to be engaged in reforestation and environmental reclamation of their country. In February, 2013 I conducted a 4-day workshop for about 25 Haitian agronomists to establish the start of an agroforestry/reforestation program for the United Methodist Committee On Relief (UMCOR) supporting the Haitian Methodist Church (EMH). By the winter of 2014 we had four active tree nurseries, had distributed over 30,000 seedlings and trained over 800 landowners in long-term tree care, set up hundreds of micro-credit entities and distributed some 800 goats. I just returned from Haiti yesterday (March 14, 2015) after taking computer mapping and data management tools (geographic information system software, digital GPS camera, etc.) to the Haitian agronomists team trained in 2013. Training was done on all the tools, guidance information was provided in Kreyol, field work was done over a four-day period at Tapion and Vialet, and an environmental club was established at school in Petit Goave. We are linking the children very directly into all the activities the individual tree nursery managers are performing. Five NYS College of Environmental Science and Forestry came with me over their spring break last week. They helped me last year prepare the technology materials we took and helped teach the field and management personnel in the EMH how to use it to better track nursery and landowner tree results over time, provide better fiscal control and have tools to communicate outside the EMH initiative with the Haitian government Ministry of Agriculture and other NGOs. Funding is assured for 2015-2016 and many plans are in place to encourage a large number of forestry "interested" people to be directly involved in the future to grow and sustain this overall program.

Please let me know if you have any questions and/or wish to learn more about the effort and how you might participate to assist the Haitians in bringing their country back to a well forested posture. I tell the children it took over 500 years to environmentally destroy Haiti and it will take at least that long to correct the damage, but we know what to do and we can do it with patience and tenacity if we work together in a collaborative manner. My contact information is Stan Hovey—218 Nimcock Road, Urbanna, VA 23175 or (804) 758-0258 or sshovey@verizon.net.

Vialet Tree Nursery--One of Four 2014 Tree Nurseries

2015 Automated Mapping and Data Management Tools For Agro/Forestry/Reforestation Agronomists

Associate Editors: *Forest Science*

The Society of American Foresters is seeking Associate Editors for *Forest Science*, especially international professionals from Latin America, Asia, and Africa. Please distribute the job description below to your applicable colleagues and contacts. Interested individuals can apply by sending a CV to Matt Walls (wallsm@safnet.org). There is no technical deadline, but those interested to contact Matt as soon as possible.

Forest Science currently has an editorial board comprised of one editor-in-chief, three applied research editors, and over 75 associate editors specializing in 18 areas of forestry and natural resources. Associate editors are responsible for assisting the editor in soliciting and developing articles of interest to forestry and natural resource researchers, academicians, and professionals, land managers, and policy makers; obtaining competent, timely reviews of assigned papers; and ensuring that the topics covered in *Forest Science* are balanced across discipline and employment categories.

In more specific terms, there are two broad areas of responsibility. The first is the peer-review process, coordinating the review of scientific and technical manuscripts in the associate editor's field that have been submitted to *Forest Science* for publication—generally by distributing them to three authorities in the relevant subject areas. To fulfill this task, associate editors must know the different subfields within his or her specialty, and who practices in these subfields, so that papers can be sent to appropriate, knowledgeable reviewers. Associate editors will be notified by the web-based peer review system, Rapid Review, that a manuscript has been sent for review. It is expected that the associate editor acknowledge the assignment and assign reviewers within 4 business days of receipt. Reviewers are asked to accept or decline a review assignment within 2 business days and return completed reviews within 15 business days; associate editors are expected to ensure that assignments are acknowledged and comments are returned in a timely manner. Associate editors are asked to review reviewer comments and ensure that they are delivered in a professional and constructive manner, then synthesize these comments for the *Forest Science* editor. If the reviewers should disagree markedly, the associate editor should recommend which course to take (accept, ask for revision, or reject), and provide guidance that the authors can follow when preparing their revision.

The second area concerns the broader, less-defined role of consulting with and advising the *Forest Science* editor-in-chief in determining the content, direction, and focus of *Forest Science*, particularly in the specialties that he or she is responsible for. This would include being aware of new developments in the field, current controversies, and subjects that have not been adequately covered in *Forest Science*. Associate editors are encouraged to suggest possible topics and authors for appropriate articles.

Deadline for Gregory Award extended to May 1, 2015

2015 Gregory Award

G. Robinson (Bob) Gregory was a pioneer in forest economics and resource development, but always thought of himself as a forester. Bob had a special interest in assisting low-income countries develop their forest resources in thoughtful ways for the good of society. With his wife, Ann, Bob traveled much of the world consulting for the Ford Foundation, the United Nations Food and Agriculture Organization, and host countries on matters related to forest development. Ann's intuition and social awareness of cultural attributes of each country were integral to Bob's success in partnering with individuals, governments and companies in various cultures and countries.

This award seeks to mark the achievements of the Gregorys' remarkable career and further their interest in international relations by providing economic assistance to outstanding students or professionals from outside of the US and Canada to attend the annual conference of the Society of American Foresters (SAF) and have meaningful engagement with foresters on this continent.

The 2015 Award is $1800 US and may be used toward:

- Travel
- Lodging
- Tickets to convention events or technical field tours.

SAF will work with the successful applicant to allocate the funds in the manner most useful to you.

Award Criteria:

1. Applicants should be graduate students or practicing professional foresters from a country other than Canada or the US, and working or planning to work in such a country.
2. Applicants shall have demonstrable past performance, desire and/or promise to contribute to their home or host country's forestry education, government or industry.
3. Applicants shall have demonstrated potential for future leadership in forestry.
4. Applications must be received electronically (preferred) or in hard copy on or before 23:59 EDT (US) **April 1, 2015**. [1]

Applications must include:

1. Information requested in Application Form (below).
2. A letter from the applicant describing:
   - how you meet the award criteria,
   - how attending the SAF convention will help you meet professional goals in your home or host country, and
   - the probability that you will be able to travel the United States.
3. A résumé or vita.

The successful applicant will be notified by June 1, 2015 and must accept the award by June 30, 2015.

[1] For more information about the conference, please visit the SAF website: www.eforester.org

2015 Gregory Award Application

Name:

Email:

Phone (including country code):

Mailing Address:

Academic Institution, if applicable:
Institution Name:

Academic Major or Department:

Employer, if applicable:

Organization Name:

Position:

Supervisor's Name:

Supervisor's email address:

Phone (including country code):

Mailing Address:

Submit application to:
World Forestry Committee Liaison
Society of American Foresters
5400 Grosvenor Lane
Bethesda, MD 20814 USA
Office: 301.897.8720
E-mail: watsond@safnet.org

NC STATE UNIVERSITY College of Natural Resources

Department of Forest Biomaterials

Doctorate Assistantships

The Department of Forest Biomaterials at North Carolina State University is offering two Doctorate Assistantships in the area of forest product conversion processes and economics. The anticipated start date for the program is: Spring 2016[1]. These assistantships will include internship in the industry and exposure to highly recognized companies in the US and other countries. These assistantships are tailored to prepare the future leaders of the global forest products and bio-energy industry. A minor in Business from the Poole College of Management is available for those interested in business.

Research area: Research topics will be outlined within the conversion of lignocellulosic feedstock into bio-based materials and/or bio-energy. Specific topics may include: supply chain, conversion process, process simulation, conversion economics, bio-based product development and life cycle analysis. Ideal research area will combine the outlined research topics to develop integrated system analysis to answer complex questions from the industry and society. Research areas will have fundamental and practical research components.

Advisory committee: Students will receive research and professional mentoring from a selected team of faculties with decades of experience in the pulp and paper, forest product and bioenergy industry. Students will have the opportunity to learn from global recognized professors and establish connections with different research groups around the world.

The assistantship: The assistantships will cover university tuition, health insurance and stipend for living for up to 3 years.

Candidate qualifications: Potential candidates should have a bachelor in science or engineering in one of the following areas: chemistry, chemical engineering, industrial engineering, forestry engineering, paper engineering. Preference will be given to candidates with scientific publications and completed master degree (no required).

The University: At North Carolina State University, ideas become solutions. With more than 35,000 students and more than 8,000 world class professors and staff, NC State has been consistently ranked among the top ten public universities in the U.S (4th in best overall public University value).

The Department: The Department of Forest Biomaterials is part of NC State University's College of Natural Resources (CNR), and is headquartered on-campus in the Robertson Pulp and Paper Laboratory, Hodges Wood Products Laboratory and Biltmore Hall. Our Master's and Ph.D. graduates are in high demand throughout the United States and around the world. Our alumni fill leadership roles in management, research, technical services, marketing, engineering, and academia across a wide variety of sectors involving wood and paper sciences, paper engineering and, most recently, forest biomaterials

Raleigh and the triangle research area: Rated the best city for business and careers by Forbes magazine, Raleigh is a top spot for young professionals and families. Raleigh is within the so called Research Triangle Park (Raleigh, Durham and Chapel Hill) one of the largest research park in the world.

Application deadline and submission: Deadlines for the two assistantships is April 15th. Please submit your complete curriculum vitae and one page cover letter summarizing background, experience, goals and reasons why you should be selected for this assistantship. Send application to Dr. Ronalds W Gonzalez at rwgonzal@ncsu.edu

[1] Start date can be delayed one semester

NC STATE UNIVERSITY College of Natural Resources

Department of Forest Biomaterials

Master and PhD in Paper Science & Engineering, Sustainable Materials & Technology, Visiting Scholar (PhD, Masters, Sabbatical)

The Department of Forest Biomaterials welcomes Masters, PhDs and sabbatical visiting scholars for internship and research in our facilities. The Department also assists individuals in the industry looking to pursue masters and Ph.D. degrees in the areas of: Paper Science and Engineering, Sustainable Materials and Technology, Bio-energy, Bio-based Product Developments and Bio-economics. The department can also support applications for international scholarships (for example: Fulbright, Colfuturo).

The Department of Forest Biomaterials is part of NC State University's College of Natural Resources, and is headquartered on-campus in the Roberston Pulp and Paper Laboratory, Hodges Wood Products Laboratory and Biltmore Hall. Our Master's and Ph.D. graduates are in high demand throughout the United States and around the world. Our alumni fill leadership roles in management, research, technical services, marketing, engineering, and academia across a wide variety of sectors involving Wood and Paper Sciences, Paper Engineering, Forest Biomaterials and Bio-energy.

Research areas: Research is outlined within lignocellulosic conversion into bio-based materials and/or bio-energy. Specific topics may include: supply chain, conversion process, process simulation, conversion economics, life cycle analysis, wood anatomy, wood physics, bio-based product development, nanoscale materials. For those in the industry, a master and Ph.D. can be tailored to accomplish specific knowledge areas needed in your organization (fiber yield, wet-end chemistry, bleaching, paper machine operations, process simulation, conversion economics and others). These traditional degrees (forest biomaterials, paper science and engineering, sustainable materials and technology), can be combined with a minor in Business from the Poole College of Management as well as with other disciplines.

Advisory committee: Students will receive research and professional mentoring from a selected team of faculties with decades of experience in the pulp and paper and forest product industry. Students will have the opportunity to learn from global recognized professors and establish connections with different research groups around the world.

The University: At North Carolina State University, ideas become solutions. With more than 35,000 students and more than 8,000 world class professors and staff, NC State has been consistently ranked among the top ten public universities in the U.S (4th in best overall public University value).

Raleigh and the triangle research area: Rated the best city for business and careers by Forbes magazine, Raleigh is a top spot for young professionals and families. Raleigh is within the so called Research Triangle Park (Raleigh, Durham and Chapel Hill) one of the largest research park in the world.

Contact information: Please send your questions and comments to Dr. Ronalds W Gonzalez at rwgonzal@ncsu.edu

Submissions are invited for a special issue of the **International Journal of Biodiversity Science, Ecosystem Services & Management**, entitled *Synergies between biodiversity and management for high-value timber species*. This issue is based on a technical session of the IUFRO 2014 World Congress, but the issue is open to authors who did not participate in the session. The deadline has been extended to April 15, 2015.

This Special Issue examines the scientific basis for managing to create a positive synergy between biodiversity and high-value timber species. Management to conserve biodiversity and management for the production of high-value timber species can be in conflict with each other. The increasing need to conserve biodiversity and the ongoing demand for high-value timbers prompt the goal to integrate these management objectives.

Therefore papers are requested for a Special Issue that explores positive interactions between biodiversity and high-value timbers. This Special Issue aims for a global scope, including tropical and temperate high-value timbers. Possible topics include:

- How biodiversity can protect high-value species from pests and pathogens
- How biodiversity, as an indicator of more intact ecosystems, can sustain production of high-value species
- How high-value species in restoration and plantations can reestablish or conserve biodiversity
- How high-value species in enrichment plantings or natural forest can help maintain intact forests and their biodiversity
- How high-value species themselves are examples of biodiversity in need of conservation

For more information, please see: http://explore.tandfonline.com/pages/cfp/tbsm-themed-paper-aug-2014 If you have any questions, please contact Sheila Ward at:

sheila.emily.ward@gmail.com

The link for the call for presentations and posters:
http://www.xcdsystem.com/saf/site14/wp-content/uploads/2014/10/15-Convention-Call-for-Presentations.pdf

The deadline for presentations is March 31, 2015.

The World Forestry Committee and International Forestry Working Group will be sponsoring a session with the topic "Payments for Environmental Services". We invite people who are planning to attend the SAF National Convention in Baton Rouge (http://www.safconvention.org) who would like to present on this topic to submit abstracts.

We are looking for presentations that focus on external support for practices that encourage the provision of environmental services from forests and trees. This may include, but is certainly not limited to, tax incentives related to forest land preservation, direct payments for watershed conservation, easements, and debt swaps.

Submit abstracts through the SAF website (www.xcdsystem.com/saf2015) Abstracts are due by March 31 and there is no grace period beyond that date. In the last box of the abstract submission form place the words "Payments for Environmental Services". Carefully read the Review Criteria (2015 Review Criteria) and submission guidelines (General Speaker Information) on the convention website. This is not an "Organized Session Proposal" in that the World Forestry Committee and International Forestry Working Group are not selecting who will present; we are providing a topic that we think will be of broad interest and inviting anybody to submit an abstract for consideration within the regular SAF convention review process.

Thanks,

Jason Gordon (Mississippi State; jgordon@cfr.msstate.edu)
Blair Orr (Michigan Tech; bdorr@mtu.edu)
Topic organizers.

CALL FOR EVENTS

XIV World Forestry Congress

7–11 September 2015, Durban, South Africa

Join us in Durban: organize an event!

The XIV World Forestry Congress (WFC) is a major opportunity for the world's foresters and forest supporters to gather, share expertise and experiences, and project a vision of the future role of forests in global sustainable development.

Make your voice heard by organizing a side event, networking event, launch or performance on the central theme of the Congress, "Forests and People: Investing in a Sustainable Future", and on topics that align with any of the six Congress sub-themes:

- Forests for socio-economic development and food security
- Building resilience with forests
- Integrating forests and other land uses
- Encouraging product innovation and sustainable trade
- Monitoring forests for better decision-making
- Improving governance by building capacity

KEY DATES

27 February 2015	**Deadline for submitting events**
March 2015	**Notification for accepted events**

For more information and to submit an event please visit www.fao.org/forestry/wfc

Extra time for abstracts

The call for abstracts for the XIV World Forestry Congress has been extended and you now have until 30 January 2015 to submit your ideas for papers, posters and videos. We welcome abstracts on the central theme and sub-themes of the Congress.

KEY DATES

30 January 2015	**Deadline for submitting abstracts**
15 February 2015	**Authors will receive evaluation of their abstracts and full instructions on how to submit the paper, poster or video**
15 April 2015	**Deadline for submission of posters, papers and videos**
15 June 2015	**Selected authors will receive notification to prepare a presentation at the Congress**

For more information and to submit an abstract please visit www.fao.org/forestry/wfc

Practical information

The Congress welcomes the participation of people from all countries, regions and sectors, whether representatives of government or non-governmental organizations, civil society, private companies, academia, scientific or professional bodies, associations, local practitioners, or simply those who have a personal interest in forests.

The Congress programme will be professionally and culturally rewarding, with a variety of sessions, events and dialogue, to ensure that all participants are engaged in defining a vision and strategies for the sustainable future of forests and forestry.

More details including how to register will be available at the main XIV World Forestry Congress website that will be launched shortly.

We look forward to welcoming you in Durban!

Spread the word

Please help spread the word to people you know who might like to learn more about the XIV World Forestry Congress and join the conversation on social media with the #WFC2015 hashtag.

Preliminary information about the Congress as well as downloadable banners and logos can be found on the FAO XIV World Forestry Congress website: www.fao.org/forestry/wfc

Hester Obisi
Secretary-General
of the XIV World Forestry Congress
Department of Agriculture, Forestry and Fisheries
South Africa

Food and Agriculture Organization of the United Nations

Tiina Vahanen
Associate Secretary-General
of the XIV World Forestry Congress
Forestry Department,
Food and Agriculture Organization

Contact
WFC-XIV-Info@fao.org

SAF World Forestry Committee News

SAF's World Forestry Committee is excited to explore new ways to engage the membership on international forestry issues in 2015. Be sure to check out Jason Gordon's interview of Dr. Changyou Sun regarding international trade in the forest products industry in the April edition of the Forestry Source. The Committee is also looking to engage international members and do outreach to potential partners. If you have ideas or would like to get involved, please contact Danielle Watson at watsond@safnet.org.

Jason Gordon, WFC Chair
Danielle Watson, SAF Policy Associate

Join an SAF Working Group

As a member of the Society of American Foresters you can join SAF working groups by going to the website:

http://www.safnet.org/workinggroups/join.cfm

If you want to join this working group, we are B3, the International Forestry Working Group. Please pass this information along to SAF members who might be interested in joining a working group – especially B3, the International Forestry Working Group.

TROPICAL NOTES
Frank H. Wadsworth
International Institute of Tropical Forestry
USDA Forest Service
San Juan, Puerto Rico

Recovery on Kilimanjaro

The forests of Mt. Kilimanjaro in Tanzania have been subject to selective logging for a long period prior to 1984, when removal of indigenous trees was prohibited. After 30 years selectively logged forests were compared with those not logged. There was an increased number of stems in general and of East-African camphor tree, *Ocotea usambarensis* in particular, due to higher relative abundances of smaller trees <50 cm dbh. For *Ocotea* the selectively logged sites with higher relative abundances of smaller trees suggest promise for future recovery. Selective logging may be a sustainable management option if logging cycles are considerably longer than 40 years, enough large trees remain, and open spaces are created for recruiting of *Ocotea.*

Gemma Rutten and others, Forest structure and composition of previously selectively logged and non-logged montane forests at Mt. Kilimanjaro. [Forest Ecology and Management 337:61-66 2015]

Floods and fires in the riparian Pantanal

The riparian forest along the Paraguay River is stable and resilient as long as natural patterns and periodicities of flooding and wildfires are maintained. The natural flooding regime is responsible for the diversity of habitats and species. Changes in the hydrology due to land management or of the fire regime may result in undesirable consequences for the pattern and ecosystem functions. Further study of the environmental forces will be necessary to preserve the huge wetlands of Brazil's Pantanal.

Maiby Teodoro de Oliveira and others, Regeneration of riparian forests of the Brazilian Pantanal under flood and fire influence. [Forest Ecology and Management 331:256-263 2014]

Bracken-fern recruitment after fires in Bolivia

Bracken-fern (*Pteridium* spp.) commonly colonizes for long periods after fires on the tropical mountains of Bolivia, presumably inhibiting succession. Fern shade and litter were found favorable for survival of seeds of shade-tolerant tree species. The dispersal of seeds of shade-tolerant tree species in bracken fern areas is recommended. Although further tests are needed, seeding ferns appears superior for forest recruitment on degraded sites to fern removal and planting with loss if shade and litter.

Silvia C. Gallegos and others, Bracken fern facilitates tree seedling recruitment in tropical fire-degraded habitats. [Forest Ecology and Management 337:135-143 2015]

***Eucalyptus* spacing and growth in Brazil**

A study was made with a clone of *Eucalyptus urophylla* and *E. grandis* between the ages of 3 to 6 years. Spacing ranged from 3x1m to 3x2.5mAt 3 years the trees at 3x1m spacing fell behind. The highest wood volume at 6 years was at the 3x2m spacing, higher than that of 3x2.5m.

Derek Halley Anthony Alves Ferreira and others, Growth of clone E*ucalyptus urophylla* and *E. grandis* in different spacing.[Floresta 44(3):431-440 2014]

Forest protection in Southwest China

A study compared the effectiveness of protected areas, a logging ban, and sacred areas to protect old-growth forests in a global biodiversity hotspot. We found that protected areas effectively conserved old-growth forests relative to non-protected areas. The logging bans led to increased logging in sacred forests, suggesting that bans weakened local government control institutions. The situation calls for stronger governmental policies.

Jodi S. Brandt and others, The relative effectiveness of protected areas, a logging ban, and sacred areas for old-growth forest protection in Southwest China. [Biological Conservation 181;1-8 2015]

Visitation management in southeast China

China has some 8,000 protected areas, many of global significance. In the heavily populated provinces in the south and east there are many small parks. A study covered 1,200 representative parks and was based on responses from park managers. Both environmental and visitor management was more intensive in the larger parks. A number of these parks receive more than 100,000 visitors per day. Key conservation concerns include air and water pollution and the sale of rare objects. The large parks have adopted infrastructure approaches that successfully minimize impacts and conserve natural values.

Linsheng Zhong and others. Environmental and visitor management in a thousand protected areas in China [Biological Conservation 181:219- 225 2015].

Tiger poaching in India

Poaching, prey depletion, and habitat destruction have reduced the Indian tiger population to fewer than 4,000. Despite focused efforts, poaching continues to be the major threat to tiger population, this the largest in the world. Tiger crime location is influenced by tiger habitats and proximity of rail transportation, preferred over roads. We found 73 tiger crime hotspots with high probability of tiger crime. Determining probability of crime location promotes efficiency in tackling tiger crime and trafficking.

Koustubh Sharma and others, Tiger poaching and trafficking in India. Estimating rates of occurrence and detection over four decades. [Biological Conservation 179:33-39 2014]

Elephants in African protected areas

Despite an overall decline in elephant populations there remain some over-abundance in protected areas, an undesirable condition for both conservation and the elephants. Management options are limited by the difficulty of safely approaching the elephants. Nevertheless, it is necessary because browsing by elephants can alter forest ecosystems. Over 50 years in Kibale National Park in Uganda increasing elephant numbers have caused a shift in tree community composition. Since 1996 elephant population has been rising with no detectable change in the forest composition because the elephants have moved to more open areas where they forage on tree reproduction.

Patrick A. Omega and others, Changes in elephant abundance affect forest composition or reproduction. [Biotropica 46(6):704-711 2014]

Ivory trade control urgency

Since 2007 illegal ivory trade has more than doubled. Proposals to permit a controlled legal trade in ivory call for a robust system to prevent illegal ivory from being laundered into a legal market. At present this is not feasible because of corruption among government officials. Addressing corruption that permeates countries across the globe will take decades, too late for wild African elephants at current rates of loss.

Elizabeth L. Bennet, Legal ivory trade in a corrupt world and its impact on African elephant populations. [Conservation Biology 29(1):54-60 2014]

Survival of macaws in Central America

Nesting success of scarlet macaws in the Maya Reserve of Guatemala and the Chiquibul Forest in Belize is critical to the survival of the species. Ironically, connecting tree canopies have a negative influence on nesting survival, apparently due to exposure to predators. Indications are that the Guatemala population could be growing, but in Belize poaching is heavy in accessible locations.

Charles R. Britt and others, Nest survival of a long-lived psittacid: Scarlet Macaws (Ara macao cyanoptera) in the Maya Biosphere Reserve of Guatemala and the Chiquibul Forest of Belize. [The Condor 116:265-276 2014]

Impacts on Malaysian forest mammals

A study of hunting and logging in the forests of Malaysian Borneo distinguished impacts on species groups, particularly mammals. Hunting was associated with 31% reduced species richness, and yet hunting continued. Impacts were particularly severe for species of ecological importance as seed dispersers. Newly logged forests had 11% less species richness but this recovered after 10 years. For 91% of the species hunting was a more serious long-term threat than selective logging.

Jedediah F. Brodie and others, Correlation and persistence of hunting and logging impacts on tropical rainforest mammals. [Conservation Biology 29(1):110-121 2014]

E*ucalyptus* prospects in Madagascar

Eucalyptus robusta plantations now cover some 140,000 ha around Antananarivo and are the main source of fuel for urban and rural households. At 6 years of age productivity is 18.8 m^3/ha/yr. Production is threatened by market pressures leading to fellings at two years. Genetic studies are finding more rapid growth, but most planters continue with locally selected seed. It is imperative that e*ucalyptus* planting continues.

D. Verhaegen and others. Eucalyptus robusta for sustainable fuelwood production in Madagascar. Review of knowledge and future prospects. [Bois et Forest des Tropiques 320(2):15-30 2014]

Secondary forest use in Madagascar

Secondary forests have become a major landscape feature in the Menabe region of southwestern Madagascar. Their use is helping to spare the primary forests that have come under stricter control. For light construction and fuel, three tree species have priority, and studies show them as useful as those formerly chosen in the primary forest. Conservation of these secondary forest species deserves a place in national forest policies.

V. Razafintsalama and others. Village uses and technological potential of timber from secondary forests in Madgascar's central Menabe region. [Bois et Forets des Tropiques 320(2):59-74 2014]

Harvesting and species in Para, Brazil

Selective logging of 23 m^3/ha of timber from 25 timber species in 1,050 ha near Moju, Para, Brazil took place in 1997, and 13 years later was studied. The search was for trees of the botanical family Lecythidaceae, that of the brazilnut. The opening of the canopy reduced the basal area of five species but produced a positive response in nine species, increasing their regeneration and even admitting a species not found in the original forest.

Pamella Caroline Marques dos Reis and others, Effect of timber harvesting on density and basal area of Lecythidaceae species in the eastern Amazon. [Floresta 44(2):229-238 2014]

Non-timber products for African livelihoods

A study made in Cameroon, Ghana, and Nigeria found that the contribution of non-timber forest products to rural families depended on accessibility and markets, as well as wealth, gender, and migratory status. Poorer households depended on non-timber product based income more than relatively wealthy communities. Non-timber forest product income is less important than farm income among accessible families. In times of economic and climatic uncertainty non-timber forest products make a significant contribution to the resilience of forest dweller's livelihoods.

R. Malleson and others, Non-timber forest products income from forest landscapes of Cameroon, Ghana, and Nigeria – an incidental or integral contribution to sustaining rural livelihoods. [International Forestry Review 16(3):261-277 2014]

Sustainability preferences in Malaysia and Japan

A study of certified tropical forest product purchasing preferences was made in Malaysia and Japan. It was found that people in both countries were willing to pay a premium for materials produced under sustainable forest management aimed at reducing CO_2 and preserving biodiversity. The study indicates the importance of certification for future development.

M. Sakagami and others, Estimating potential preferences for wood products sourced from forests that are managed using sustainable forest management schemes.[International Forestry Review 16(3):301-309 2014]

Congolese agroforestry, forest alleviation

A study was made of woodfuel agroforestry as a substitute for charcoal from natural forests in Kinchasa, Democratic Republic of the Congo. Results indicate that alternative agroforestry can deter families from working in the natural forests. The transition is favored by proactive measures implemented simultaneously.

C. Paul and I. M. Fraser, Woodfuel plantation projects in Kinchasa Province: potential contribution to the alleviation of pressure on natural forest. [International Forestry Review 16(6):507-523 2014]

Forest fire losses in the Amazon

A 2009 fire in upland and seasonally flooded forest in the Amazon cost in the upland forest only 16 percent of the stems and 21 percent of the basal area, whereas in the flooded forest 59 percent of the stems and 57 percent of the basal area were lost. The difference was due to dry understory that contributes to greater flammability in the flooded forest. This condition applies to 11 percent of the Amazon region.

Angelica F. de Resende and others, Fire damage in seasonally flooded and upland forests of the Central Amazon. [Biotropica 46(6): 643-646 2014]

Urban Curitiba temperature variation

Temperatures were monitored in 2011 in urban Curitiba, in southern Brazil. Differences along the northeast-southwest transect up to 5.8° C were found in the absolute maximum temperature and to 4.6°C in the absolute minimum. The highest temperatures were found in the areas of most human activity. The lowest temperatures were found in areas of little activity and remaining forest.

Luciana Leal and others, Effects of vegetation on thermal inter-urban variation of Curitiba, PR [Floresta 44(3):451-464 2014]

Impact of environmental services in Cambodia

The establishment of protected areas reduced deforestation, increased security of forest resources, but restricted household's capacity to expand and diversify their agriculture. The impact of environmental service payments on households depended on the payments provided. Those higher paying had significant impacts. Households that signed up for major environmental payment programs needed more capital assets. Environmental payment projects, when appropriately designed, can be a powerful tool for benefitting local people.

Tom Clements and E. J. Milner-Gulland, Impact of payments for environmental services and protected areas on local households and forest conservation in Cambodia. [Conservation Biology 29(1):78-87 2014]

Declining wild resource use in Ecuador

A study in the northern Ecuadorian Amazon revealed that participation in hunting, fishing, and forest product collection is high but declining across time and across ethnicities with no evidence of a decline in resource quality. Participation in timber harvesting did not decline and there is evidence of a decline in resource quality. Ethnicity, demography, wealth, livelihood diversification, access to forests, and participation in conservation programs are predictors of wild product harvesting. Participation is declining with urbanjzation and government services.

Clark L. Gray and others, Declining uses of wild resources by indigenous peoples of the Ecuadorean Amazon. [Biological Conservation 182:270-277 2015]

Brazilian restoration after *Pinus elliottii*

In Minas Gerais, Brazil, *Pinus elliottii* (slash pine in the USA), at a location where considered an invasive species, was abandoned as a plantation and its forest restoration assessed 20 years after abandonment. The pine retained dominance with 54.2 percent of the importance value. Also high in importance values were three pioneer species common in secondary forests of the region. Although 38 local species had entered, it was apparent that silviculture was needed to advance forest restoration.

F. A. Carvalho and others, The regenerating tree community in a “novel ecosystem” dominated by the invasive species, *Pinus elliottii* Engelm. [Interciencia 39(5):307-312 2014]

Ecosystem services vs. biodiversity

A study of ecosystem values in 30 tropical forests in Indonesia and Australia showed that focus strictly on ecosystem service development is not compatible with biodiversity conservation.

L. R. Carrasco and others, Economic valuation of ecosystem services fails to capture biodiversity values of tropical forests.[Biological Conservation 178:163-170 2014]

Tropical forest hunting and regeneration

Hunting is widespread in tropical timber concessions and may threaten the various processes that facilitate regeneration. Vertebrate seed dispersers are often heavily hunted, shifting forest composition toward species dispersed by small animals and other means. Timber species with large seeds are particularly at risk. Large vertebrate species decline with hunting pressure. A lack of appreciation and management of this relation can not only reduce future productivity of the larger tree species but expose declining forest to other land uses.

Cooper Rosin, Does hunting threaten timber regeneration in selectively logged tropical forests? [Forest Ecology and Management 331:153-164 2014]

Australian A*cacia* forest restoration

Tree species were assessed in 26 Ac*acia* secondary forests in the Australian wet tropics. The forests lacked A*cacia* recruitment but that of late successional species was recruiting with age beneath the *Acacia*. Secondary forest in a wet climate, even with only a single nitrogen-fixing legume, is seen as a viable source of restoration of rain forest if there is mature forest in the region.

WLJ.Yeo and R.J. Fensham, Will *Acacia* secondary forest become rain forest in the Australian wet tropics? [Forest Ecology and Management 331:208-217 2014]

Task force response to illegal logging in Ghana

A study was based on interviews with members of timber task forces and other stakeholders in Ghana. Task forces facing illegal logging are influenced by corruption, interference by powerful actors, and fear of violence. A recommendation is for policy reforms addressing fundamental issues such as property-owner's rights to trees and their benefits.

M. Franck and C. P. Hansen, How effective are task forces in tackling illegal logging? Empirical evidence from Ghana.[International Forestry Review 16(3);354-362 2014]

Addressing chainsaw operators in Ghana

A study found that chain-saw operators, using perceived economic and other benefits from their operations, have established a tight relationship with their communities. The damage to crops caused by chainsaw operators is compensated for, and they are perceived as less damaging than the large-scale timber harvesting firms. The paper concludes that there is a need to establish farmer ownership of farm trees to assure compensation.

M. Amoah and R. K. Boateng, Adressing illegal logging in Ghana: do value, social identity, and corporate social responsibility theories matter? [International Forestry Review 16(6):524-536 2014]

Brazilian *Pterocarpus* for particleboard

Pterocarpus violaceous is an unused timber in natural forests of Brazil that is fast-growing to usable sizes. Since it is available it has been tested as a possible source of wood for particleboard in mixture with standard wood of *Pinus oocarpa*. Samples were tested with Pterocarpus contents as high as 40 percent. No differences in physical and mechanical properties were found, so *Pterocarpus violaceus* wood at 40 percent is technically suitable for particleboard.

Camilla Laís Farrapo and others, Utilization of *Pterocarpus violaceus* in the particleboard production. [Scientia Forestalis 42(103):329-336 2014]

*B*razilian *Pinus caribaea* wood variation

A study in Brazil of the wood of 38 trees found differences in density from pith to bark, in juvenile and mature woods, and in early and late woods. The results highlight the potential of nondestructive characterization of the wood.

Vinicius Resende de Castro and others, Evaluation of radial profile of the wood of pine trees (*Pinus caribaea* var. *hondurensis* Barr. et Golf.) by x-ray densiometry [Scientia Forestalis 42(103):353-360 2014]

CIFOR and ebola

A note from Boris Matejcic of Croatia cites CIFOR (Center for International Forest Research in Bogor, Indonesia) Director General Peter Holmgren as foreseeing a relation between forests and ebola that calls for research. In the short term, reviews are needed to clarify the scientific knowledge of forest management in the affected area. Whatever is known, for example, it would not be helpful to condemn summarily bushmeat but rather what is needed is health care, awareness, and food regulation.

Chigbu, U.E. Repositioning culture for development: women and development in a Nigerian rural community published in *Community, Work and Family*. The study uses interview and ethnographic data from Nigeria to investigate women's narratives of themselves concerning their position in a rural cultural space in relation to community development. It explores ways of repositioning patriarchal or gender unresponsive cultures for eliciting women's potentials in community development... Finally, it presents three main lessons that can be drawn by women (and men) in traditional communities in non-Western societies. See link
http://www.tandfonline.com/doi/full/10.1080/13668803.2014.981506#.VJPt4f8DN

The role of trees in agroecosystems and tropical agriculture

Annual Reviews of Phytopathology (2014)

Roger R.B. Leakey, International Tree Foundation, Crawley, England

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ABSTRACT

Shifting agriculture in the tropics has been replaced by sedentary smallholder farming on a few hectares of degraded land. To address low yields and low income both, the soil fertility, the agroecosystem functions, and the source of income can be restored by diversification with nitrogen-fixing trees and the cultivation of

indigenous tree species that produce nutritious and marketable products. Biodiversity conservation studies indicate that mature cash crop systems, such as cacao and coffee with shade trees, provide wildlife habitat that supports natural predators, which, in turn, reduce the numbers of herbivores and pathogens. This review offers suggestions on how to examine these agroecological processes in more detail for the most effective rehabilitation of degraded land. Evidence from agroforestry indicates that in this way productive and environmentally friendly farming systems that provide food and nutritional security, as well as poverty alleviation, can be achieved in harmony with wildlife.

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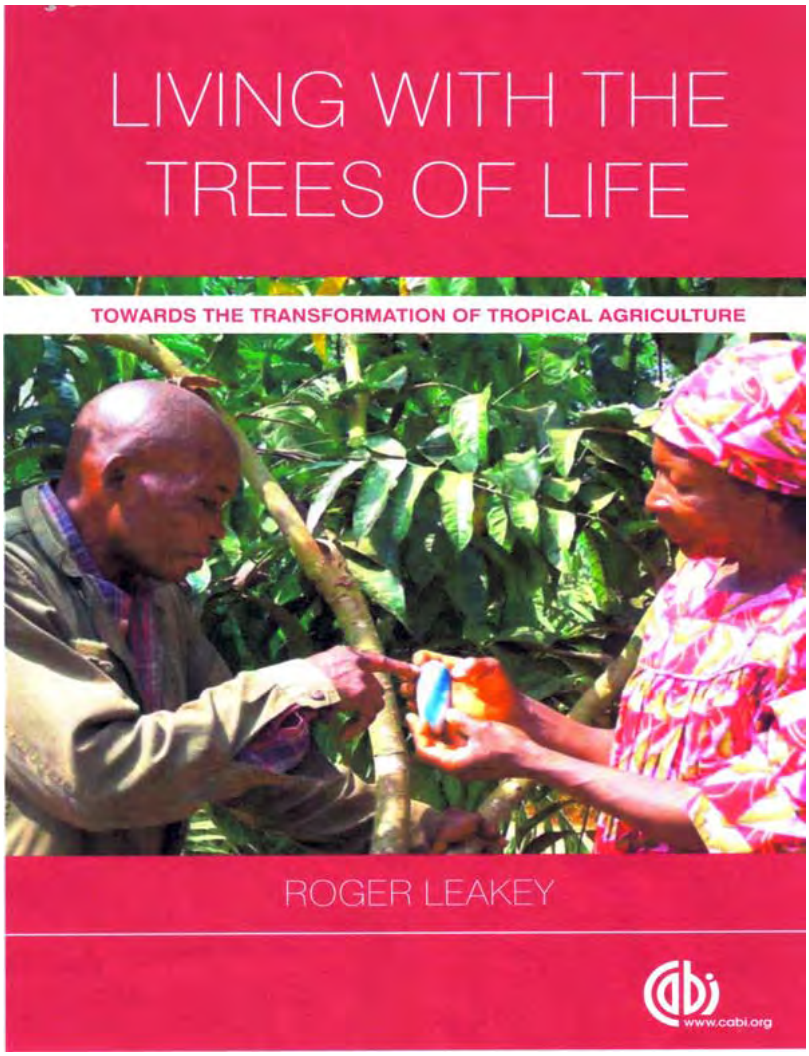

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Species Richness and Variety of Life in Arizona's Ponderosa Pine Forest Type

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Patton, David R.; Hofstetter, Richard W.; Bailey, John D.; Benoit, Mary Ann. 2014. **Species richness and variety of life in Arizona's ponderosa pine forest type.** Gen. Tech. Rep. RMRS-GTR-332. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 44 p.

Abstract

Species richness (SR) is a tool that managers can use to include diversity in planning and decision-making and is a convenient and useful way to characterize the first level of biological diversity. A richness list derived from existing inventories enhances a manager's understanding of the complexity of the plant and animal communities they manage. Without a list of species, resource management decisions may have negative or unknown effects on all species occupying a forest type. Without abundance data, a common quantitative index for species diversity cannot be determined. However, SR data can include life history information from published literature to enhance the SR value. This report provides an example of how inventory information can characterize the complexity of biological diversity in the ponderosa pine forest type in Arizona. The SR process broadly categorizes the number of plant and animal life forms to arrive at a composite species richness value. Common sense dictates that plants and animals exist in a biotic community because that community has sufficient resources to sustain life. A mixture of forest attributes maintained in time and space fundamentally supports a certain level of diversity as indicated by a richness value. As a management guideline, it is a reasonable assumption that the variety among plant communities and structures increases the potential for maintaining diverse kinds of animal habitats and resultant populations.

Keywords: ponderosa pine, animals, plants, biological diversity, species richness

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