Society of American Foresters

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Many thanks to the contributors to this issue of the International Forestry Working Group Newsletter. My hope is to produce four issues per year. I'll be relying on all of you to send in material for the newsletter. Short articles, announcements of events and recent publications are all welcome. You can send contributions to bdorr@mtu.edu

- Blair Orr, IFWG Chair

Contributed Articles

The Forestry Research Institute of Malawi (FRIM)

An Invited Article Contributed by Clement Chilima

Introduction

The Forestry Research Institute of Malawi (FRIM) is one of several sections of the Department of Forestry. The institute was established initially as a Silvicultural Research Station in Dedza in 1957 under the Agricultural Research Council of Central Africa. The initial objective for its establishment was to conduct basic research on the management of forest plantations to support afforestation programs of the government.

In the 1960s, FRIM moved its headquarters from Dedza to Zomba and established regional research centres in Dedza and at Chikangawa with sub-centres at Chisasira (Nkhatabay) and Idulusi (Mangochi). Over time, the institute's scope and mandate widened to include formal and informal forestry research on sustainable management, utilisation and conservation of individual trees, trees on farm and natural forests by local communities and a wide range of stakeholders. To address this wider scope, research programs are guided by a Strategic Plan that is developed and reviewed every three years by a National Forestry Research Committee (NFRC) comprising research officers and stakeholders. All research programs fit within one or more of the following well defined strategic areas; Trees on Farm, Plantation, Seed and Tree Improvement and Indigenous Woodland Management. Currently, the institute has sixty five (65) employees, nine

(9) of whom are professional scientists (grade PO and above in the civil service).

Mission: To conduct operational forestry research to generate usable technologies and provide information for sustainable management, conservation and utilisation of forests trees and allied natural resources in order to contribute to improving the welfare of the people of Malawi.

Vision: To become a dynamic, high performance, consultative and client focused authority that promotes, builds and ensures sustainable development, utilisation, protection and management of forests to reduce poverty.

Mandate: To provide information and improved tree germplasm and to carry out stakeholder-oriented research on the sustainable management, utilisation and conservation of trees and forests in Malawi.

Plantations (P) Strategy Area

The purpose of the Plantations Strategy Area is to optimise productivity of timber and fuelwood plantations by identifying suitable tree species and improving their propagation, management and protection.

Research under this strategy area aims at developing technologies and providing information on tree species/site matching, propagation methods, forest establishment, tree and stand management techniques, tree growth and yield modelling, resource quantification, pest and disease monitoring and management, timber valuation, harvesting and marketing.

Indigenous Woodland Management (IWM) Strategy Area

The purpose of the IWM strategy area is to secure sustainable management of Malawi's indigenous forests and woodlands, in order to meet the present and future needs of the rural people and to reduce deforestation. Research under this strategy area includes determining the ecology and dynamics of indigenous forests, management and sustainable harvesting methods for timber and non-timber forest products, protection against forest fires, invasive species and other destructive factors, resource assessments, biodiversity surveys, domestication of indigenous tree species, in-situ and ex-situ conservation of useful wild plants, identification of tree management practices, and involvement of local communities in forest management.

Trees on Farm (ToF) Strategy Area

The purpose of the ToF strategy area is to optimise the productivity and sustainability of smallholder farming systems by developing appropriate technologies that involve trees. The strategy area involves research to determine methods of propagation, establishment and regeneration of trees on farms, identification of and evaluation of suitable tree species for incorporating into farming systems, generating tree management techniques on farm and assessing the productivity of such systems. The Strategy Area also provides technical support in the protection of agroforestry systems from pests and diseases that affect the tree component and facilitating uptake of Conservation Agriculture by smallholder farmers.

Seed and Tree improvement (S&Ti)

The purpose of this strategy area is to optimise the availability of tree seeds of high quantity and to provide relevant seed information for aforestation and and agroforestry programs in Malawi. The strategy area conducts programs that involve establishment, certification and management of improved seed production areas (seed stands) for plantation tree species, research on the genetic improvement of important tree species, identification and certification of seed collection areas for indigenous species and general seed biology.

Current Focus

- **Tree improvement:** The institute is establishing seed orchards of improved cultivars of pine and eucalyptus tree species– currently more than 100ha have been established in Zomba and Viphya Plantation, using improved cultivars that have been raised from imported seeds from South Africa and Zimbabwe. FRIM is assessing performance over the years.
- **Climate Change adaptation and mitigation**– FRIM is participating in the Norwegian-funded "Lake Chilwa Basin Climate Change Adaptation Project". The institute is facilitating uptake of Conservation Agriculture by smallholder farmers, and also supporting communities in the basin, Chiradzulu district and areas surrounding Thuma Forest Reserve to plant trees and conserve forests in degraded and fragile sites in order to mitigate the impacts of climate change. Meanwhile, FRIM is carrying out resource assessments and carbon mapping in all project sites so that communities can be involved in the carbon market, in future. Meanwhile, the institute is collaborating in the development of a REDD + strategy for Malawi.
- **Resource and biomass assessments:** FRIM has recently carried out resource assessments in all Forest Reserves, Timber Plantations and selected Village Forest Areas in the country. The objective of this exercise is to determine woodland dynamics, quantify the wood, non-wood and carbon resource, determine biodiversity changes over time and ultimately determine optimum sustainable management options . The results of the assessments will also be used to link to the carbon markets. Meanwhile, FRIM has developed a management plan for Zomba Timber Plantation and is working on plans for the other timber plantations..
- **Invasive Species Management**: FRIM is coordinating FISNA, a network of scientists in Africa who are collaborating to identify and share information on the management of forest invasive species. The institute is working with the United Nation's FAO to develop and host a FISNA website in Malawi. FRIM is carrying out surveys to determine the dynamics and impact of various forest invasive species that affect eucalyptus and pine plantations.
- **Fine Hardwood Species –** A test plantation has been established in Zomba Mountain Timber plantation to assess the performance and limitations of various indigenous fine hardwood species in a plantation set up.. FRIM is monitoring growth, pest resistance and management options.
- **In-situ and ex-situ conservation of wild species.** FRIM is collaborating with international and local institutions, to collect and conserve seeds in local and international long term storage facilities. The institute is developing a program for the use of the stored seeds mainly for habitat re-storation and re-introduction in degraded sites.

- **Non-Timber Forest Products–** The institute is working with communities in the Thuma Forest area to conserve bamboo and add value to bamboo products and other non-timber forest products. A concept is being developed to conduct an inventory of baobab trees in Malawi and in the region.
- **Advisory and Support services**– The institute continues to provide support by providing quality tree seeds and seedlings, advice on general management of trees and forests, pest and disease management phytosanitary certification services and teaching at higher level academic institutions.

THE FIRST AFI INTERNATIONAL DAYS HELD IN FRANCE

Four foresters from the USA were invited to attend the first International Days of the Association Futaie Irrégulière (AFI) in Burgundy, France, in November, 2012, where more than sixty participants representing twelve different nationalities discussed the benefits of "close to nature" silviculture. Among them were SAF members Sidney E. Balch from Brooklin, Maine, G. Kirk David from Athol, Idaho, Theodore E. Howard from Durham, New Hampshire, and Theresa B. Jain from Moscow, Idaho.

(l. to r.) Kirk David, Inland Empire SAF member and Past District 1 SAF Council Representative, Theresa Jain, IESAF member and Research Forester, USDA-FS Rocky Mountain Research Station, and Phil Morgan, ProSilva Chair and AFI Vice Chair at a Douglas fir commercial thinning in the Foret de Folin, Morvan, France

CLOSE TO NATURE MANAGEMENT

The Association Futaie Irrégulière (literal translation: Irregular High Forest) is guided by two main principles known as "jardinage" (literally "gardening"). AFI Chair Roland Susse explained that two main principles guide this type of silviculture. It consists of the long term management of the whole forest ecosystem and on giving attention to individual trees. The first principle, applied at the smallest possible scale, assumes that the state of the ecosystem is constantly improved by relying on natural processes. This silviculture relies on the careful use of exotic species, avoidance of clearcutting, low impact harvesting operations, patchy regeneration under the canopy of high value trees, and retention of deadwood and cavity trees.

Selective marking is the principal tool that enhances the growing stock and *protects biodiversity*. Mr. Susse added that the method aims at diversifying production, at favouring mixtures, and at encouraging natural regeneration. He also described the requirement of a vertical structure to favour an effective light regime without large canopy gaps for better crown and root development.

In order to gain credibility these principles required scientific endorsement. The Association Futaie Irrégulière, since its foundation in 1991, set out to study and to quantify these techniques. Over the last 20 years the AFI created a network of over 100 research stands where regular monitoring and data collection is undertaken. "*These have demonstrated that close to nature silviculture is viable on almost all site types*", said Roland Susse.

Mr. Susse and Phil R. Morgan, Chair of ProSilva Europe, were responsible for organizing the first AFI International Days conference and field day to promote the silviculture of irregular high forest. This brought together more than 60 foresters from a dozen different countries at Maĉon in the heart of Burgundy. According to Mr. Morgan, "*this event has assembled silviculturalists from many parts of Europe, from the East coast and the West coast of North America, from Africa and from Brazil*".

The advocates of irregular high forest silviculture believe in the benefits of harnessing the dynamics of natural systems. Although the fact that irregular systems deliver multiple benefits is now widely accepted, one of the aims of the AFI, and of its partner organization ProSilva, is to provide scientific evidence of the advantages of irregular forest structures working in harmony with complex natural systems. "*This type of management aims to guarantee commercial returns, to favour biodiversity as well as to respect the social functions of the forest*", said Roland Susse.

THE AFI GOES INTERNATIONAL

The AFI is now opening up to new contacts across the world. *"I am intrigued by your methods and am very pleased to discover them"*, said Theresa Jain, Research Forester from the Rocky Mountain Research Station based in Moscow, ID. An Irish colleague, Padraig O'Tuama from the state forest company Coillte, pointed out that his country is now in need of alternative irregular silvicultural systems after a phase of woodland re-establishment with plantations. "*Which is why, since 2007, we have set-up a network of 7 AFI Research stands to promote irregular silviculture in Ireland,*" he added.

Other countries are convinced of the benefits of continuous cover forestry. Patrick Auquière, from the nature and forest division of the Walloon central office pointed out, "*The*

region of Wallonia in Belgium will be making an official announcement endorsing the choice of AFI/ProSilva silvicultural systems".

Other participants made presentations on the economic aspects of irregular silviculture. Andy Poore, consultant from SelectFor Ltd, experts in continuous cover forestry, is seeking to promote irregular silviculture in England. "*Our challenge is to show that this type of silviculture provides multiple benefits, in particular ecological ones, while at the same time providing a sustainable economic value to our forests.*"

This financial aspect also interested Theodore Howard, Professor of Forest Economics at the University of New Hampshire. He believes that irregular silviculture is suited to the broadleaved forests of the New England states. "*We need to find viable economic returns for forest owners within a mix of economic, ecological and social benefits.*"

Max Bruciamacchie, Research Professor at the AgroParisTech-Engref at Nancy, France, showed the economic results of 20 years of AFI studies; inquiries drawn from 45 research stands provided by 4 repeated sets of measurements. The important point of view from forest economics is that irregular silviculture concentrates production principally and progressively on the largest quality trees. The focus on quality is an aspect that adds to the irregular silviculture concept.

According to Mr. Bruciamacchie, financial returns average 214 euro/hectare/year. If costs are included, (costs are usually less than 50 euro/hectare/year), most research stands produce a net return in excess of 200 euro/hectare/year. "*These results demonstrate the economic value of irregular high forest management*", affirms the French researcher.

AFI FINDINGS PUBLISHED

AFI has published a 144-page (plus 13 minute DVD) English translation of their multi-functional forestry principles and research findings titled:

MANAGEMENT OF IRREGULAR FORESTS: DEVELOPING THE FULL POTENTIAL OF THE FOREST
ISBN 978-2-9538331-1-9
available at Amazon.com

The book covers economic, environmental and social aspects of the practice of "irregular" (uneven-aged) forest management, explaining the principles, types of entries, and characteristics of uneven-aged systems, with information sheets, glossary, bibliography, and multiple recorded results.

submitted by G. Kirk David, Inland Empire SAF
with credit to Bernard Rérat, Agence de Presse Forêt-Bois, for much of this information

Ecuador Watershed Hydrology Training Trip
January 27th-February 2nd, 2013

Phil Cannon, Barry Hill (of the US Forest Service in Region 5) and Camille McCarthy (of the USFS International Programs) completed a trip to Ecuador to work with a non-government-organization called FONAG (Fundo para la proteccion del Agua) towards getting them set up to undertake some watershed studies and land-use experiments in the Antisana watershed area. FONAG gets some financial assistance from USAID-Ecuador and USAID turns to the Forest Service for technical expertise on its forestry and natural resource projects. This is how this particular USFS team first became involved with this project.

Antisana is one of the largest peaks in Ecuador and it gets quite a bit of precipitation as it is the first peak in the Andes that the storm clouds hit as they travel from east to west across the Amazon. As such, Antisana has also become the most important watershed for the large metropolitan area of Quito, Ecuador's capital city. In previous missions to this watershed, it was determined that there was insufficient information about the hydrology of some large alpine meadows on the slopes of Antisana but it was thought that most of the water for this watershed must flow through these meadows either above or below ground. The watershed is located in what is known as a Paramo ecoregion and the soils belong to the order Andept; both of these factors contribute to the uniqueness of this watershed. Perhaps the most confounding factor of all, however, is the tremendous amount of subterranean water that appear to be moving through the layers of pyroclastic materials that lay just below these Andept soils. This latest mission was therefore set up to show the FONAG technical staff what studies they could set up and run to resolve these shortfalls in understanding the hydrology of this very significant watershed.

Barry Hill making one of many of the stream flow calculations in the Jatunguyca Watershed

Barry Hill did a thorough job of demonstrating how to set up nests of piezometers and wells throughout one of these high meadows and also showed the FONAG technical team how they can take measurements in these nests and interpret the resulting data. When this study is completed, a considerably more accurate understanding of the hydrology of these meadows will be gained.

Our joint technical team (FONAG and the USFS) also spent one full day trying to figure out how to lay out a large (500 acre) land-use experiment to determine the impact that cattle grazing is having on water yield in this watershed and began taking some of the baseline measurements that will be needed before this experiment can be started. This experiment is being designed so that it can also be used to evaluate the impact that different land use practices have on carbon sequestration, as well.

Sergio, Phil and Camille converse with Humboldt House Cowboys as they are driving cattle off the Jatunguyca watershed.

Besides these technical imputs the USFS team also met with USAID and FONAG leadership to discuss the progress of the FONAG projects and to discuss additional support in terms of training, student thesis projects at Ecuadorian Universities, and equipment purchases that would be useful to make this FONAG project as successful as possible.

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Guatemala: Place of Trees, Place of Bark Beetles

Ronald F. Billings
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I recently returned from three weeks in Guatemala, one of the most diverse and fascinating countries in Central America. Guatemala is bordered by Mexico to the north, Belize and the Caribbean to the east, Honduras and El Salvador to the south, and the Pacific Ocean to the west. The country gets its name from translation of a Mayan term, meaning "place of many trees." Indeed, this country has a greater diversity of tree species than any other Central American country, due to a terrain that extends from sea level to the tops of numerous volcanoes that top out at 3,500 to 4,200 m. Guatemala hosts over 8,000 species of plants in 19 different ecosystems ranging from the mangrove and tropical hardwood forests on both coasts to the pine forests of the mountainous interior to the cloud forests at higher altitudes. It also has a wide diversity of bark beetles that attack and kill conifers. These native pests include at least eight species of tree-killing *Dendroctonus* (including one putative new species, ***D. woodi***) and several species of *Ips* engraver beetles.

I enjoy visiting Guatemala for the Mayan culture and its biodiversity. Colorful, hand-crafted clothes, distinct for every village, are still worn by native peoples. The traditional Guatemalan life style has changed little in rural areas since my first visit in 1972 (although the population, number of tourists, and traffic have increased markedly and cell phones now abound). Some 50 Mayan languages are still spoken in various regions of Guatemala, although Spanish is considered the official language. The country has an area of 108,890 sq km (42,043 sq mi), slightly less area than the state of Tennessee. Forests cover 37 million hectares, equivalent to 34% of the country's total area. Eighty-two percent of the wooded surface is made up of broadleaf forests, 10% of conifers and 8% of mixed forests. Over 50% of the Guatemalan soil is considered apt for forestry.

Two governmental institutions take the primary role in natural resource management in Guatemala. The first is the Guatemalan National Forest Institute (INAB), responsible for forest management actions, including forest pest management, on all forest lands except those within declared parks, reserves and other protected areas. INAB also manages an aggressive and successful incentives-based reforestation program. Ownership of forests is divided among private (38%), public national (34%), municipal-communal (23%) and undetermined owners (5%).

Forest protection activities in parks and reserves fall under the jurisdiction of the National Council of Protected Areas (CONAP). Each forest branch has trained foresters and experienced technicians that deal with law enforcement, forest management, fire and pest control. The largest threats to forests in Guatemala are from deforestation (including slash-and-burn practices for crops and cattle ranching in many regions), forest pests, principally *Dendroctonus* bark beetles, and wildfires. Fire management in Guatemala is operated through the Forest Fire Prevention and Control System (SIPECIF), fashioned after the National Interagency Fire Center in Boise, Idaho.

This interagency committee, involving representatives from INAB, CONAP, the Guatemalan military, and the National Emergency and Disaster Council, provides the most effective and comprehensive wildfire program in Central America.

Guatemala boasts several biosphere reserves, the most notable being the 2.1 million hectare Maya Biosphere Reserve in the Petén Region of northeastern Guatemala. This reserve is divided into national protected areas, a buffer zone and multiple use zones. Harvesting of trees and other resources is prohibited in the protected areas, the most famous of which is Tikal National Park, which holds historic Mayan temples and ruins. The communities that lie within the 800,000 hectares designated as "multiple use" zones are able to sustainably harvest wood and other non-timber forest products. But in order to do so, these community operations are required by law to be certified, proving they are managing their forests resources to conserve biodiversity.

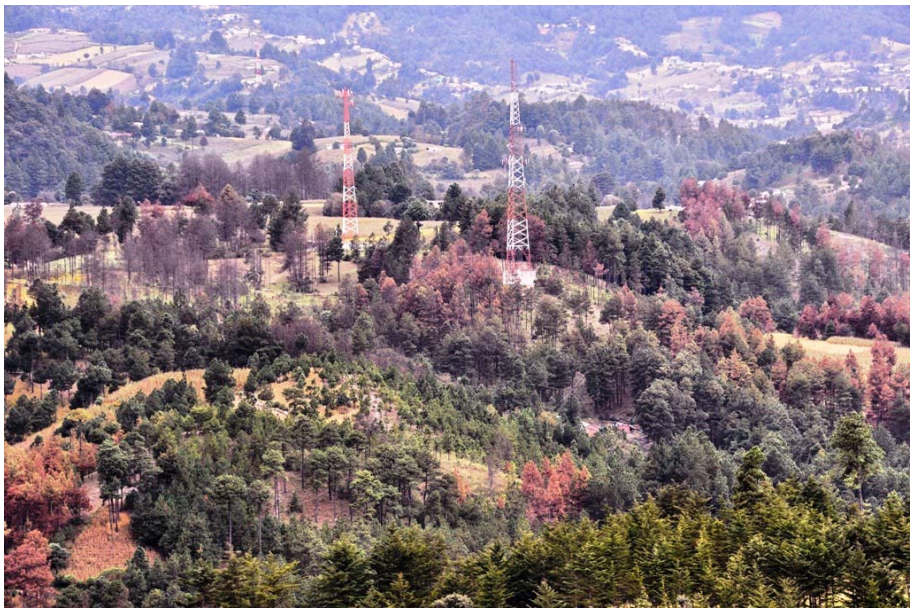
I first visited Guatemala as an Organization of Tropical Studies student in 1972, when I was just beginning my 40-year career in bark beetle management. I returned in 2001 to evaluate a southern pine beetle (*Dendroctonus frontalis*) outbreak in southern Guatemala (Sierra de Las Minas) and in 2002 to conduct a southern pine beetle/fire assessment of all Central American countries (jointly with Paul Schmidtke of the U.S. Forest Service). As a specialist in management of the southern pine beetle - a major pest throughout the southern U.S. - I have evaluated bark beetle problems and provided bark beetle training to foresters in Honduras, Nicaragua, El Salvador, and Guatemala periodically over the past 30 years. My fluency in Spanish, a language I learned as a Peace Corps Volunteer in forestry in the Dominican Republic (1967) and Chile (1968-1969) has proven invaluable for these assignments. In 1982, I introduced the mechanical control method known as “cut-and-leave” into Honduras as a practical means to control southern pine beetle infestations. This control method, which only requires a chainsaw, has been effectively expanded to other Central American counties in recent decades.

A request from the U.S. Forest Service/International programs and Guatemala for bark beetle training brought me back to the country in 2012. The short course for some 30 foresters was originally scheduled to take place in Quetzaltenango, in the Altiplano Region of central Guatemala, where an outbreak of the pine bark beetle *Dendroctonus adjunctus* was in progress. But, an earthquake of 7.4 grade magnitude on November 7 that damaged roads in the area required that the location of the course be moved to a less disturbed area in the town of Tecpan. The three days of classroom lectures and one-day field trip to a nearby bark beetle infestation was completed on schedule, once a new meeting place was arranged and participants notified.

To assist with training foresters on southern pine beetle management in Central America, I have prepared and published a series of photo-illustrated field handbooks in Spanish on detection, ground evaluation, direct control, and prevention. These handbooks have been widely distributed and used in Honduras, Nicaragua, and Guatemala. They also are available on the Internet at http://www.barkbeetles.org/publications.cfm. Now that most Central American foresters, at least in Guatemala, have computers and access to the Internet, these training aides are just a few clicks away. Nevertheless, I anticipate that the demand for on-site bark beetle training will soon bring me back to Guatemala and other Central America countries.

Photos (by author)

Colorful woven goods are still hand produced on wooden looms in Guatemala.



*Cell phone towers and infestations of bark beetles (*Dendroctonus adjunctus*) dot the pine forested landscape near San Carlos Sija, in the highlands of Guatemala.*

Guatemalan foresters in training check for bark beetles in a felled pine.

Guatemalan foresters participating in the 2012 short course on bark beetle management (author in orange vest)

COMPARISON OF BIRD DIVERSITY IN ACTIVELY AND NATURALLY RESTORED TROPICAL FORESTS IN THE ECUADORIAN AMAZON

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Raymond Danner, Smithsonian Migratory Bird Center, Washington DC

INTRODUCTION

Tropical secondary forests have reclaimed 1/6 of all primary forests clear cut during the 1990's (Wright 2005), and have enormous potential to conserve tropical diversity and prevent extinctions (Wright & Muller-Landau 2006, Chazdon 2008). Human and natural disturbance has always been present in the Amazon region (Whitmore 1991, Denevan 1992, Clark 1996), and natural re-vegetation often occurs quickly in disturbed and abandoned areas, although depends significantly on soil characteristics, intensity and duration of human activity, nearby location of remnant forest areas and availability of seed dispersal agents (Brown & Lugo, 1990, Nepstead et al. 1991, Guariguata & Ostertag 2001, Chazdon 2003).

Birds prove to be a useful bio-indicator of ecosystem health because of their relative ease of monitoring and their high diversity in the upper Amazon (Haffer 1990). Although species richness may be similar between primary and secondary forests, species composition often tells a different story; specifically in the absence of understory insectivores and large canopy frugivores (Stouffer and Bierregaard 1995, Canaday 1996, Kattan et al. 1994, Thiollay 1997, Barlow et al. 2007, Tscharntke et al. 2008).

Habitat edge in the study area.

Although the literature supports numerous studies on the recovery of species diversity in secondary forests and restored areas, little information can be found comparing them over a large time scale (Holl 2011). This study aims to compare the avian richness and composition in three

tropical secondary forest patches of comparable size, but with varying treatments: 1) manual restoration, 2) natural re-vegetation (Reforestation A), and 3) natural re-vegetation with shifting cultivation (Reforestation B).

RESULTS & DISCUSSION

Observed species richness did not vary significantly among sites (Kruskal Wallis H=0.705, d.f.=2, p=0.74), with 57 species discovered in the manually restored forest, and 55 and 67 in the two naturally reforestation plots. Species richness estimates using Chao 2 and MM mean estimate a greater richness in Reforestation B.

Among families, species composition varied slightly. Forest insectivores grouped together (Picidae (woodpeckers), Furnariidae (ovenbirds), Dendrocolaptidae (woodcreepers), and Thamnophilidae (antbirds)) were more common in Restoration (10 species) and Reforestation B (13 species) than in Reforestation A (6 species), but failed to reach statistical significance (H=0.96, d.f.=2, p=0.619). Among large frugivores (guans, parrots, trogons, toucans, and cotingas), two species were observed in the manual restoration site, two in Reforestation A, and four in Reforestation B.

Results proved inconclusive that thirty years of manual restoration activities have had a significant effect on bird diversity in comparison to natural reforestation. Species accumulation curves and richness estimates for natural reforestation plot B (with shifting cultivation) indicates greater richness than other sites, although results were statistically insignificant. Family composition at Reforestation B also shows greater similarity to primary forest, with a slightly greater makeup of insectivores, as found by Kattan et al. (1994), Stouffer and Bierregaard (1995), Canaday (1996), Thiollay (1997), Barlow et al. 2007, and Tscharntke et al. (2008).

It is likely that in reforestation site B, the greater avian richness and evenness, as well as composition more similar to a primary forest, can be attributed to the larger forest size, more continuous surrounding forest cover, and ecological resilience of shifting cultivation patterns. A similar study (Lozada et al. 2007) found that bird species richness and composition did not differ significantly between primary forest patches, abandoned coffee plantations, and coffee agro-forestry systems in coastal Ecuador. These results concur with our evidence that in small forest fragments, even among distinct management patterns, bird diversity may not vary significantly. The manual restoration site has similar tree species richness to a primary forest but a structure more similar to a secondary forest (Tello, personal communication). Various studies assume that forest structure plays a vital role in maintaining avian richness and composition with microhabitat features such as treefall gaps (Schemske & Brokaw 1981), thus, it is possible that the difference in forest structure, not richness, is a limiting factor in the bird composition.

Bird diversity in the manual restoration site is likely to be limited by its small size and isolated location. Edge effects will also have a significant impact on bird species richness and composition. Laurance et al. (2002) (and references within) find numerous edge effects that reach up to one hundred meters into a forest, moreover, many Amazonian species avoid small (<100m wide) clearings in fragmented landscapes (Stratford & Stouffer 1999). Because of the small size of the manual restoration site and distance from primary forest, it is possible that

primary forest birds will never colonize the area. Finally, it is possible that the sampling effort in this study was insufficient to accurately detect bird species present, as evident from the species accumulation curve failing to reach an asymptote. Additionally, many birds have been observed at the manual restoration site over several years, but failed to appear in point count observations or mist net surveys.

CONCLUSION

Although results failed to suggest that manual restoration activities promoted a bird assemblage close to that of a primary tropical forest, further studies of restoration techniques are necessary to guide effective conservation in secondary forests. This study finds that forest fragment size and surrounding land use may be stronger indicators of bird richness and composition than restoration management activity. Accordingly, restoration could be more effective if performed on a larger scale and in closer proximity to existing forest. Nonetheless, restoration activities will always have difficulty repopulating certain tropical birds because of their habitat specificity, and neo-tropical birds as a whole have been found to use narrow habitats (Orians 1969, Willis 1974, Remsen and Parker 1984, Karr et al. 1990, Terborgh et al. 1990), while others are picky about food sources (Holbrook & Loiselle 2009). Considering the biodiversity conservation potential of tropical secondary forests and abandoned agricultural lands, a variety of restoration techniques will continue to be practiced. Prach et al. (2007) and Holl & Aide (2010) find passive methods can sometimes be a more effective and cheaper means of restoration than active ones. Limited economic and human resources suggest that restoration activities be focused in a manner to maximize ecological benefit.

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32nd Southern Forest Tree Improvement Committee Meeting (SFTIC)

Conference Theme:Advancing the Value of Forest Plantations

Organized by Mike Cunningham: mwcunni@arborgen.com; Susan Guynn: sguynn@clemson.edu; and Patricia A. Layton playton@clemson.edu

June 10-13, 2013
Madren Continuing Education & Conference Center, Clemson University, Clemson, SC

Conference Website: http://www.clemson.edu/cafls/sftic/
Hotel Website: http://www.clemson.edu/centers-institutes/madren/conference/

13th North American Agroforesty Conference
June 19-21, University of Prince Edward Island

The 13th North American Agroforestry Conference will be held June 19-21, 2013 on behalf of the Association of Temperate Agroforestry (AFTA). This biennial conference will be hosted at the University of Prince Edward Island (http://home.upei.ca/) in Charlottetown, Prince Edward Island, Canada.

AFTA is a non-profit association that promotes the understanding of agroforestry in a North American context through the biennial NAACs that began in 1989, as well as through its website (http://aftaweb.org/), its newsletter, The Temperate Agroforester (available on the website), and by initiating or collaborating in other agroforestry-related events and activities.

The conference will consist of two days of plenary and concurrent sessions (June 19 and June 21) that will address many aspects of agroforestry. A conference field tour of agroforestry in the Charlottetown area will occur on June 20. Participants who register for the pre-conference tour on June 17-18, will also visit agroforestry sites in New Brunswick.

Website: http://2013naac.com/

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http://www.itto.int/mis_detail/

"Industry-level frameworks to improve access to REDD+ financing", G. Thoumi and J. Waugh,Asen, Alexander, Herman Savenije and Fabian Schmidt. (eds.). (2012). Good Business: Making Private Investments Work for Tropical Forest. Tropenbos International, Wageningen, The Netherlands. xx + 196 pp.
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"Risk Management Trends in Forest Carbon" Available free online at:
http://www.garp.org/risk-news-and-resources/2012/august/risk-management-trends-in-forest-carbon.aspx

US Government Investments and Policies to Facilitate Forest Carbon Finance and Markets. Available free online at:
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"Finance and Carbon Markets Lexicon" Available free online at:
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Tropical Resources: The Bulletin of the Yale Tropical Resources Institute is available free online at: http://environment.yale.edu/tri/publications/tropical-resources-bulletin/