CINTRAFOR NEWS
Center for International Trade in Forest Products
Spring 2014

US Douglas-fir Wood Products Receive Final Approval as a "Local Wood" Species for Use in all Types of Wooden Construction in Japan

By: Ivan Eastin (CINTRAFOR, UW) and Daisuke Sasatani (Auburn University)

U.S. Douglas-fir has been approved as a "local wood" species in 42 prefectures in Japan under the Wood Use Points Program (WUPP). Under the WUPP program, if a home owner uses more than 50% of "local wood" species (including U.S. Douglas-fir) for the structural components in a post and beam (P&B), 2x4 or a log house, the Forestry Agency (FA) will provide a subsidy of 300,000 yen in equivalent points (approximately $3,000). In addition, builders can qualify for an additional 300,000 yen subsidy if they use local wood species in at least 50% of non-structural and exterior applications. All of the "local wood" species initially included in the WUPP were Japanese domestic timber species. However, this approval makes U.S. Douglas-fir the first (and only) imported species to be approved as a "local wood" species under the WUPP scheme.

On December 17th, 2013, U.S. Douglas-fir was approved as a "local wood" species by the Corporation to Establish the Fund for the WUPP program (National Land Afforestation Promotion Organization, NLAPO). However, before U.S. Douglas-fir lumber could be accepted for use as structural components in wooden houses under the WUPP, applications had to be submitted to each prefecture requesting that they approve the addition of U.S. Douglas-fir as a "local wood" species for all wooden house construction methods within their prefecture.

The application materials for each prefecture were prepared by the American Softwoods Office (AMSO) in Japan with assistance from Dr. Ivan Eastin (Professor and Director of the University of Washington's Center for International Trade in Forest Products, CINTRAFOR) and Dr. Daisuke Sasatani (Auburn University). AMSO submitted the application materials to all 47 prefectures in Japan for their approval at the beginning of January 2014. Thirty seven prefectures initially approved AMSO's application and forwarded the approved applications for consideration during the national committee meeting which was held on March 6th (see table on page 3 and figure below). The prefectural application materials were then officially approved by the committee members and the Japan Forestry Agency and on April 1st DF was included in the database of approved "local wood" species. While 10 prefectures had not approved AMSO's applications in time for the March 6th committee meeting, several prefectures had unofficially indicated that they have approved AMSO's application in time for the next committee meeting. Subsequently, five prefectures have forwarded their approval to the national committee. It should be noted that the 42 prefectures that have now approved DF as a "local wood" species represent over 95% of total housing starts, and over 94% of total wooden housing

Japan Prefectures Map

1. Hokkaido	17. Ishikawa	33. Okayama
2. Aomori	18. Fukui	34. Hiroshima
3. Iwate	19. Yamanashi	35. Yamaguchi
4. Miyagi	20. Nagano	36. Tokushima
5. Akita	21. Gifu	37. Kagawa
6. Yamagata	22. Shizuoka	38. Ehime
7. Fukushima	23. Aichi	39. Kochi
8. Ibaraki	24. Mie	40. Fukuoka
9. Tochigi	25. Shiga	41. Saga
10. Gunma	26. Kyoto	42. Nagasaki
11. Saitama	27. Osaka	43. Kumamoto
12. Chiba	28. Hyogo	44. Ōita
13. Tokyo	29. Nara	45. Miyazaki
14. Kanagawa	30. Wakayama	46. Kagoshima
15. Niigata	31. Tottori	47. Okinawa
16. Toyama	32. Shimane	

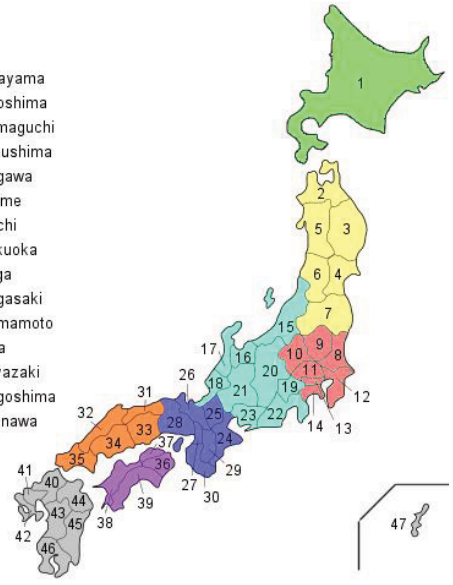

Figure 1. Prefectural map of Japan

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In This Issue:

Director's Notes

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The Center for International Trade in Forest Products addresses opportunities and problems related to the international trade of wood and fiber products. Emphasizing forest economics and policy impacts, international marketing, technology developments, and value-added forest products, CINTRAFOR's work results in a variety of publications, professional gatherings, and consultations with public policy makers, industry representatives, and community members.

Located in the Pacific Northwest, CINTRAFOR is administered through the School of Environmental & Forest Sciences at the University of Washington under the guidance of an Executive Board representing both large and small companies, agencies, and academics. It is supported by state, federal, and private grants. The Center's interdisciplinary research is carried out by university faculty and graduate students, internal staff, and through cooperative arrangements with professional groups and individuals.

The past several months have been exciting times for us here at CINTRAFOR. Working closely with both the Softwood Export Council and the US Embassy in Tokyo, CINTRAFOR led the effort to gain "local wood" status for US Douglas-fir wood products within the Wood Use Points Program in Japan. On April 1st, US Douglas-fir wood products were formally listed in the WUPP database and Japanese builders could begin to credit their use of US Douglas-fir towards the minimum 50% domestic wood use requirement in order to be able to claim the WUPP domestic wood subsidy for structural lumber, (see cover article). As of this date, US Douglas-fir remains the only foreign wood species that has been included in the WUPP database. Last month I met with four people from the US Trade Representative's Office during my visit to Washington DC to brief them on the status of the US Douglas-fir submission. In recognition of our hard work, the Minister-Counselor for Agricultural Affairs at the US Embassy in Japan sent a letter of thanks dated February 6th, 2014 that read in part:

"The research, market knowledge, and strategic focus of the CINTRAFOR team have set the U.S. efforts apart from those of other exporting nations. Over the course of more than six months, CINTRAFOR compiled and analyzed data explaining the critical importance of U.S. Douglas-fir exports to the Japanese market. And after gaining initial approval, the CINTRAFOR team then replicated its efforts and application materials for each of the forty-seven prefectures. While competitors concede that their products will not benefit from the WUPP, Japanese demand for U.S. Douglas-fir is expanding".

"In 2013, Japan remained the third largest importer of U.S. wood products globally. And in spite of an exchange rate that has made imports more than 20 percent more expensive, U.S. softwood exports have seen double digit growth over the last twelve months. As Douglas-fir products make up over 95 percent of U.S. softwood exports to Japan, the inclusion of U.S. Douglas-fir in the WUPP has ensured that this domestic subsidy does not sap the strength of U.S. forest products exports to Japan in 2014."

Gaining "local wood" status for U.S. Douglas-fir wood products will provide US exporters with a competitive advantage in this market segment where we know Japanese home builders prefer Douglas-fir lumber for beam applications in post and beam homes, However, it should also provide an opportunity for US Douglas-fir exporters to expand sales of joists into the 2x4 home building sector where Canadian SPF is the dominant market competitor. Indeed, the most recent trade statistics show that total US wood exports to Japan, over 90% of which are Douglas-fir, were up by 29.2% in the first two months of 2014 while exports of Douglas-fir dimension lumber were up by 196%.

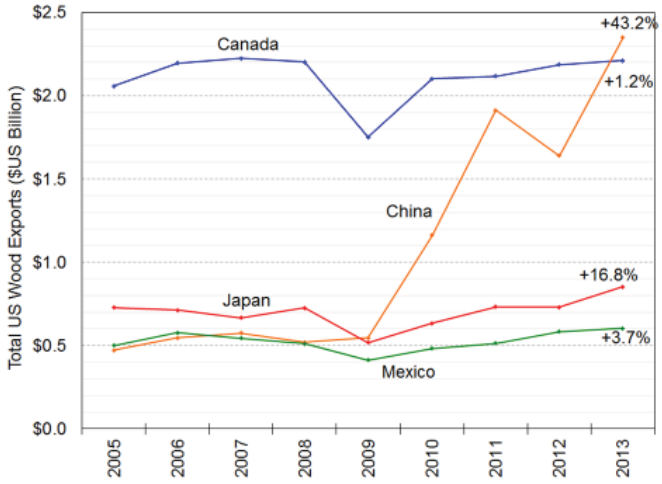


Figure 1. US total wood exports were up across all major markets in 2013. (Source, GTA 2014; Figure by Tabatha Rood)

Overview of US Wood Exports in 2013

Following a sharp drop in total US wood exports during the economic crisis in 2009, US wood exports have recovered sharply, reaching their highest level in a quarter century. Total US wood exports, which were up by 14% to $8.7 billion in 2013, were up an additional 17.2% in the first two months of 2014. US wood exports were up across all the major markets, with particularly strong growth in China, Japan, the UK and Italy, Figure 1. US exports continued increasing in most major markets during the first two months of 2014, with particularly strong growth occurring in China (+57%), Japan (+29%), the UK (+14%), Vietnam (+21%) and Italy (+23%). In contrast, exports to a few major markets have dropped this year, including to Canada (-7%), South Korea (-10%) and Australia (-17%).

US wood exports also showed strong growth across all three major product categories in 2013, including value-added wood products, Figure 2. While log and lumber exports continued to show strong growth during the first two months of 2014, with logs exports up by 31% and lumber exports up by 26%, value-added wood exports were basically flat, dropping by 0.3%. In the next edition of the CINTRAFOR News we will have a much more in-depth analysis of US wood exports.

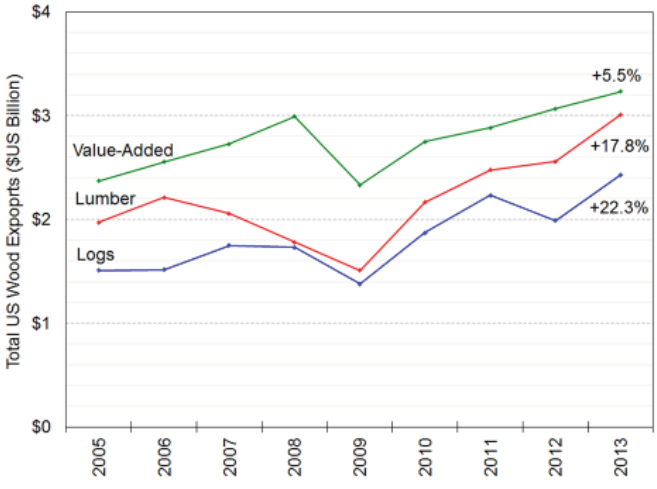


Figure 2. US total wood exports were up across all major product categories in 2013. (Source, GTA 2014; Figure by Tabatha Rood)

Japan "Local Wood" continued from page 1

starts and total wooden post and beam housing starts in Japan.

In Japan, Douglas-fir has a long tradition of being used as structural lumber, non-structural lumber, plywood, flooring, and other types of building materials in Japan. Japanese builders and carpenters favor the use of Douglas-fir lumber in horizontal structural applications in traditional post and beam homes, including as beams, girders and purlins because of the high strength, dimensional stability and beauty of Douglas-fir. Since U.S. Douglas-fir has now been approved as a "local wood" species for wooden home construction, it is expected that many more houses will qualify for subsidies under the WUPP. With respect to 2x4 homes, it should be noted that Douglas-fir dimension lumber is not as popular as SPF or hem-fir in Japan. However, since U.S. Douglas-fir has been approved as a "local wood" species for 2x4 construction, it is expected that some builders will begin to use more U.S. Douglas-fir dimension lumber for 2x4 houses in order to qualify for the WUPP subsidy. This is certainly one area where US exporters might want to explore new opportunities for DF lumber.

The Minister-Counselor for Agricultural Affairs at the US Embassy in Tokyo, in commenting on the recognition of US Douglas-fir as a "local wood" species in Japan, noted that *"The US forest products industry recently achieved an unprecedented success when the Government of Japan recognized US Douglas-fir as a "local species" qualifying for benefits under a $500 million domestic subsidy program known as the Wood Use Points Program. Though many nations, including Canada our largest competitor in the Japanese market, have attempted to qualify for WUPP benefits, the United States alone has succeeded. This accomplishment will improve the competitiveness of US softwood exports in the historically important Japanese wood products market, which was worth nearly $800 million to US producers in 2013. It is no exaggeration to say this would not have been possible without the persistence of Dr. Eastin and his team."*

Since no other imported wood species have been approved as "local wood" species at the prefectural level under WUPP, the inclusion of U.S. Douglas-fir is expected to provide US manufacturers and exporters with a competitive advantage over other imported wood products in Japan. As demand for U.S. Douglas-fir lumber increases in Japan, it is important that U.S. lumber manufacturers work to ensure that there is an adequate supply of DF lumber to meet the increased demand in the Japanese market.

Table 1. Status of prefectural approval for DF as a "local wood" species under the WUPP.

Prefecture	Yes	No Response	Total Starts	Wooden	P&B	P&B Ratio
Hokkaido	1		35,237	20,092	13,290	37.7%
Aomori	1		5,578	3,938	3,158	56.6%
Iwate	1		7,752	5,505	3,735	48.2%
Miyagi	1		20,609	12,735	8,825	42.8%
Akita	1		3,668	2,689	2,249	61.3%
Yamagata	1		4,716	3,397	2,441	51.8%
Fukushima	1		11,353	7,285	5,054	44.5%
Ibaraki	1		22,482	12,847	8,552	38.0%
Tochigi	1		14,814	9,188	6,101	41.2%
Gunma	1		12,114	8,671	6,413	52.9%
Saitama	1		59,605	34,692	28,098	47.1%
Chiba	1		46,013	26,010	18,375	39.9%
Tokyo	1		140,862	43,665	32,925	23.4%
Kannagawa	1		67,606	36,104	25,834	38.2%
Nigata	1		11,953	8,352	6,368	53.3%
Toyama	1		5,192	3,543	2,561	49.3%
Ishikawa	1		6,164	4,795	3,901	63.3%
Fukui	1		3,614	2,784	2,285	63.2%
Yamanashi	1		4,286	2,943	2,107	49.2%
Nagano	1		10,483	7,167	5,325	50.8%
Gifu	1		10,603	7,446	5,333	50.3%
Shizuoka	1		24,722	14,465	10,089	40.8%
Aichi	1		56,280	31,816	21,235	37.7%
Mie	1		9,554	6,553	4,767	49.9%
Shiga		1	9,271	6,099	4,756	51.3%
Kyoto	1		15,408	7,510	6,296	40.9%
Osaka	1		61,617	25,200	20,637	33.5%
Hyogo	1		33,695	17,188	13,414	39.8%
Nara	1		6,740	4,180	3,295	48.9%
Wakayama	1		4,961	3,190	2,654	53.5%
Tottori	1		2,101	1,509	1,087	51.7%
Shimane		1	3,037	2,160	1,407	46.3%
Okayama	1		12,500	7,505	4,780	38.2%
Hiroshima	1		16,487	8,716	6,383	38.7%
Yamaguchi	1		8,494	4,345	2,961	34.9%
Tokushima	1		3,616	2,734	2,067	57.2%
Kagawa	1		4,976	3,331	2,537	51.0%
Ehime	1		7,535	4,871	3,710	49.2%
Kochi	1		2,761	1,630	1,429	51.8%
Fukuoka	1		36,111	16,110	12,246	33.9%
Saga	1		4,524	2,624	2,015	44.5%
Nagasaki		1	6,344	3,511	2,947	46.5%
Kumamoto		1	11,521	6,260	4,784	41.5%
Oita		1	6,670	3,710	2,620	39.3%
Miyazaki		1	6,754	3,888	3,198	47.3%
Kagoshima		1	9,701	5,651	4,921	50.7%
Okinawa	1		12,713	570	534	4.2%

Note: *Green shaded boxes indicate that DF was approved as a "local wood" species by the prefecture while red shaded boxes indicate that the prefecture did not respond.*

Northwest Lumber Being Put to Good Use

By Tabatha Rood, Peace Corps Masters International Graduate Student, CINTRAFOR, UW

Mobility is something that most of us take for granted. However, for millions of people in developing countries, mobility is a daily challenge that restricts their ability to earn a living or function in society. For some people, diseases such as polio and cerebral palsy result in mobility impairment. However, for many people living in conflict-affected areas, loss of impairment related to land mine explosions is a leading cause of mobility impairment.

PET International is a non-profit organization that has been distributing hand cranked mobility devices known as PETs (Personal Energy Transporters) to mobility impaired people in developing countries since 1996. The mission of PET International is to give the "gift of mobility," something people often take for granted. The organization began distribution of PET hand powered carts to Zaire (now Democratic Republic of the Congo) and currently works with over 30 NGO'S worldwide to distribute PETs to 90 different countries, primarily in Africa, Eastern Europe, and South East Asia. In 2013, 5,682 PETs were built with the cooperation of 23 workshops nationwide at an approximate donation cost of $1,420,500.

Affiliated with PET international are many local chapters who work to coordinate the collection of raw materials, cut and paint the wooden components and perform the final assembly of each PET. They also help to facilitate the overseas shipment of PETs to those in need. Washington State has a couple chapters and manufactures the unique "Rainbow PET" (pictured below).

Based in Spokane, the Inland Northwest- WA PET chapter, managed by Dick Carpenter, relies solely on donated materials and lumber, and recently completed their 1,732nd PET cart for shipment abroad. In 2014, WA PET hopes to assemble and distribute 360 units of the Rainbow PET which will require approximately 10,000 board feet of donated lumber.

The "Rainbow PET"- A WA Original

In the Puget Sound region, a local chapter works out of the workshop of Dave Potter in Woodinville, WA. Dave coordinates this effort with a Team working in Kent, WA. Tom Waggener, Professor Emeritus with the School of Environmental and Forest Sciences at the University of Washington and the former Director of CINTRAFOR, donates his time, woodworking skills and resources to the PET cause. The local Seattle PET chapter that Tom works with manufactures the wooden components that form the framework of each PET. The lumber used to produce the wooden components is typically donated by local sawmills and represents downfall generated during the sawmilling process. Recently the main sawmill supplying lumber to the Puget Sound group has started to phase out of business, causing a gap in supply for the group. The group is now looking for potential new partners/lumber suppliers in the western Washington/Oregon region. The lumber specifications that they are looking for are as follows: lumber length should be between 3 feet and 9 feet, lumber thickness is 1 inch (nominal), the minimum lumber width is 5-6 inches, KD and surfaced one side. Western red cedar is the preferred species because of its combination of light weight and durability although they accept all wood species and lumber grades. Moderate defect and wane can be trimmed in cutting the finished components although open knots must be eliminated during the component cutting process. In order to reach their goal of producing 100 PETs in 2014, the Seattle PET chapter needs approximately 3,000 board feet of lumber in modest increments. If you are able to donate lumber materials to the WA PET chapter, please contact Tom Waggener or Dave Potter to learn more or to discuss possibilities (contact information below).

Designed to brighten the spirit of their recipients, and provide unique PET qualities for each recipient. The cost of materials required to produce each unit is estimated to be approximately $250 and is funded entirely by donations. Each PET provides the gift of mobility for the disabled recipient, enabling them to attend school, perform daily chores and supports their efforts to achieve self-sufficiency for themselves and their families.

A Rainbow PET Recipient

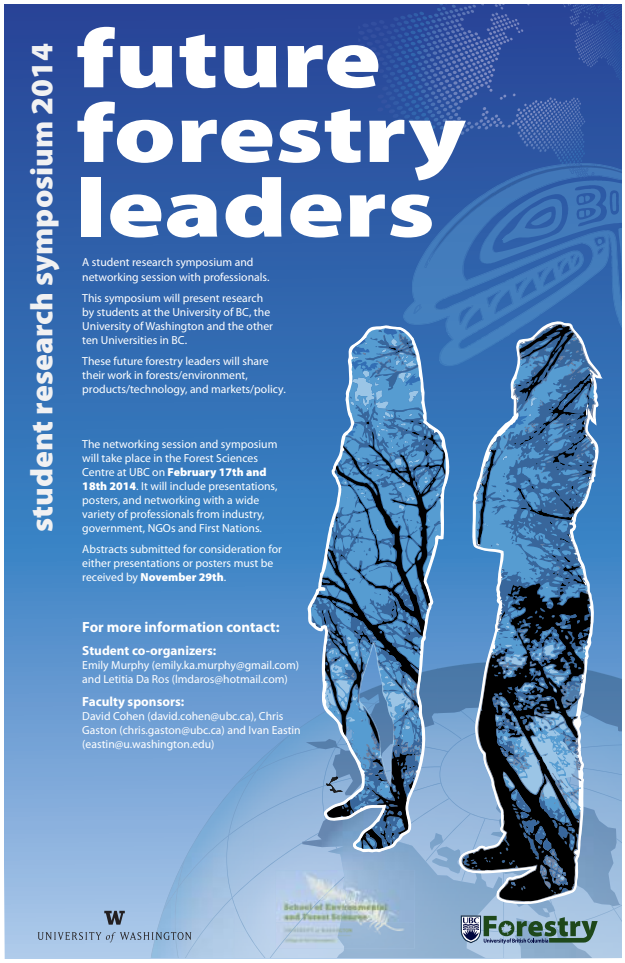
"George Bhobho, 10, from Zengeza, a high-density suburb in Chitungwiza, Zimbabwe, lost both parents to AIDS. He has arthrogryphosis, a rare congenital disorder that is characterized by multiple joint contractures and can include muscle weakness and fibrosis. It is a non-progressive disease that often results in mobility impairment. He is one of the beneficiaries of the hand powered carts, which will help him greatly in his mobility."

Photo credit: PET International

For more information about PET International and the WA PET chapter, please visit petspokane.org or petinternational.org.

To volunteer your time or materials to the WA PET efforts, please contact: Tom Waggener, tom.waggener@comcast.net or Dave Potter, david.potter@msn.com. Thank you!

Future Forestry Leaders: a graduate student research symposium



Background

To recognize and celebrate the excellent research conducted both in Canada and the United States, the 3rd Future Forestry Leaders Graduate Student Symposium was held at the University of British Columbia on February 17th and 18th, 2014. This symposium presented ongoing and recently completed research by graduate students based at the University of Washington, the University of British Columbia and the other Universities across BC. These students are not only conducting research that will have international impacts but they represent the forestry leaders of the future. Presentations and posters addressed a broad range of topics and issues reflecting the breadth of research activities at these institutions. The following summarizes the research topics that were presented by the graduate students in the School of Environmental and Forest Sciences at the University of Washington.

The Lacey Act and the EUTR: Impacts on US wood importers and business practices by sector

Presented by: ***Ben Roe****, MS student, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: Until recently, little regulatory action was taken in developed countries to address the problem of illegal logging or to stem the trade in wood products manufactured from illegally sourced wood products. In 2003, the American Forest and Paper Association commissioned a report which indicated that "illegal material depresses world prices by 7% - 16% on average, and U.S. prices by 2% - 4%, depending on the product". The results of this study made it clear to US legislators just how damaging the trade in illegal logging was to the US forest products industry and the environment. In 2008, the US Congress passed landmark legislation expanding the scope of the Lacey Act to include wood and non-wood plant materials. Since that time, both the EU and Australia have adopted legislation of their own designed to make it a crime to import illegally harvested wood into their respective region/country. This study looks at the effects of timber legality policies on US imports with a focus on the attitudes and perceptions of US wood importers. The impact of legality legislation on business practices, material sourcing decisions, and the use of Chain of Custody certified products will be addressed.

The Impact of the Lacey Act on Chinese furniture and flooring exporters

P*resented by:* ***Ziyi (Zoe) Lu****, MS student, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: The recent adoption of timber legality legislation in the US (Lacey Act 2008 Amendment) requiring timber imports be sourced from legally harvested wood provides an opportunity to expand exports of sustainably managed US value-added wood products to Asia for re-export. This study focuses on the interactions between Chinese furniture/flooring manufacturers and exporters and the US Lacey Act. The overall goal of the study is to demonstrate: (1) How perceptions associated with the Lacey Act have affected the export/raw material sourcing behavior of Chinese furniture and flooring manufacturers/exporters; (2) How the change in Chinese wood products exports to the US over the past five years can be explained by the respondents' demographic and psychographic characteristics; (3) How the Lacey Act has impacted Chinese companies' manufacturing and export costs. The results were derived from a series of structured interviews administered during two recent furniture and flooring trade shows held in Shanghai (DOMOTEX Asia/CHINAFLOOR Show in March 2013 and the Furniture Manufacturing & Supply China Show in September 2013). Quantitative statistical techniques were employed to analyze the survey data. The results obtained provide us with a better understanding of the strategies that furniture and flooring companies in China are adopting in order to ensure that illegally harvested wood is excluded from their supply chain.

Evaluation of environmental impacts of woody biomass based bioenergy: a life cycle approach

Presented by: ***Francesca Pierobon****, Doctoral Student, University of Padua, Italy and Visiting Scholar, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: The 'carbon neutrality' assumption of biomass plays an important role in the evaluation of the global warming potential (GWP) of bio-fuels relative to fossil fuels. In the case of woody bio-fuels, this assumption implies that the carbon dioxide emitted during the combustion of bio-fuels is equal to the carbon dioxide sequestered from the atmosphere within that biomass. However, the collection and conversion of woody biomass requires energy inputs in various forms. To be able to estimate the overall environmental burdens associated with converting woody biomass to biofuels, and the net reduction in green house gas (GHG) emissions to the atmosphere by avoiding the use of fossil fuel, Life Cycle Assessments (LCA) is the international method of choice. However, the carbon neutrality of woody biomass and environmental impacts associated with bio-fuels are hotly debated in national and international arenas. This study presents a comprehensive evaluation of the environmental impacts of woody biomass based bio-fuels. This paper proposes a GWP impact assessment methodology using radiative forcing for incorporating carbon sequestration in the Life Cycle Assessment of bio-energy. Different types of forest management practices have been taken into account. Forest types, species mix and silvicultural treatments have played an important role in the development of the proposed carbon sequestration methodology.

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Emissions from transportation have been considered throughout the life cycle from the transport of raw materials inside and outside the forest until the transport of the final product. Greenhouse gas emissions generated at the end of life of the product are also included in the analysis.

Eco-labeled wood products in the U.S. residential construction industry: Which characteristics of architects relate to the usage of certified wood and green building programs?

*Presented by: **Tait Bowers**, Doctoral Candidate, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: Innovations of building materials and construction designs continue to evolve as fuel costs rise and the demand for energy efficient structures increases. The development of green building programs (GBPs) in the late 1990's marked the beginning of the effort to adopt energy efficient design guidelines and eco-friendly renewable materials in residential and commercial structures. These programs were targeted at reducing environmental impacts by integrating eco-friendly materials into the design and construction of buildings, including promoting the use of environmentally certified wood products (ECWPs) derived from sustainably managed forests. This research was developed to assess which demographic characteristics and material attributes might influence architect's decisions to use environmentally certified wood products in residential construction projects and how this may influence their participation in green building programs. For this study, 509 architects who are involved in residential construction responded to an online survey. Energy efficiency, low maintenance, and long life were the most important attributes from which architects made their material selection decisions. Survey participants from large firms (based on annual revenues) were more aware of ECWPs and were more likely to have participated in GBPs than those from small firms.

Role of non-wood forest products in the household's economy and rural development; the case study in Arasbaran forests, Iran

*By: **Sajad Ghanbari,** Doctoral Candidate, University of Tehran and Visiting Scholar, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: Non-wood forest products (NWFPs) have always played a significant role in the survival and income of forest dwellers in developing countries. The data on these products are greatly lacking in the Arasbaran forests of Iran. The main goal of this study is to examine the role of NWFPs in household economies and poverty alleviation and to design a strategy to support local livelihoods through the development of rural areas. The results show that of the 13 NWFPs species collected, just three species, Cornus mas, Prunus spp, and Punica granatum, were sold in the villages of cluster 1. This cluster had higher access to markets and middlemen than other clusters. The average annual monetary value of fruits varied between 20 and 318,475 Rial per household. We found that the total percentage that NWFPs make up of household income varies between 8.02% and 0.21% among different income clusters and villages. The inclusion of NWFPs income did not lead to a major difference in total household income. In cluster 1, NWFPs income caused the Gini coefficient to be higher than other clusters. If forest income is excluded, all three of the poverty measures do not show significant differences in the three clusters. As stated in the results, these products did not significantly contribute to household income, poverty alleviation, or rural development. However, the creation of small scale processing industries and cooperatives, which focus on high abundance species, increases in market information and connections to markets would make a positive impact on rural development.

The Effects of the 2008 Lacey Act Amendments on international trade of forest products

*Presented by: **Patrick Bridegam**, MS student, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: Combating illegal logging and its associated deleterious social, ecological, and economic effects has been an international priority for over a decade. Despite these efforts, there is evidence that illegal logging continues on a scale that is of global concern. A significant amount of this illegally harvested wood and the resulting wood products enter into international trade flows. Recently, countries that consume imported forest products have begun to implement legislation prohibiting the possession and/or importation of wood and wood products that are of illegal origin. The first broad policy of this kind was the Lacey Act Amendments of 2008, enacted in the United States of America. In 2013, the EU implemented similar legislation, and in 2014 Australia will do the same. Results of economic modeling studies have shown mixed results of these policies on the international forest products trade, generally showing that these policies raise prices for wood products and cause trade flows for suspicious forest products to shift to markets that do not discriminate between forest products of legal and illegal origin. However, no studies to date have systematically investigated the effects of the 2008 Lacey Act Amendments on the international trade in forest products. Drawing on data from the Global Trade Atlas and using a quantitative, regression-based comparative case study methodology, this study evaluates the effects of the 2008 Lacey Act Amendments on the international trade in forest products. In order to establish an appropriate control for comparison, we create a synthetic control group, which assigns weights to data from comparison countries based on their similarity to the forest products trade in the U.S. If the Lacey Act policy has been effective in reducing the amount of forest products of illegal origin being imported into the U.S., we expect to see some unique differences since 2008 in the U.S. imports of wood and wood products from areas with high levels of suspicious wood in their supply. If the policy had no discernible effects on the forest products trade, it could call into question the effectiveness of these types of consumer country policies in addressing the underlying issues of illegal logging in producer countries.

Resiliency of Communities: Two case studies of villages in Wabane and Kaele, Cameroon

*Poster by: **Cynthia Harbison**, Peace Corps Masters Internal Student, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: Communities in developing countries are inherently dependent on natural resources for subsistance and income generation. Cameroon is one of the most forested among African countries, and an estimated 96 percent of the population is dependent on agriculture. The pressure of the population to feed itself puts an increased pressure on already fragile ecosystems, and households are faced with resource uncertainty, making subsistance a precarious balance. The purpose of this study is to investigate how households in Bechati, Cameroon protect themselves from environmental uncertainties. The village is experiencing a population boom, increasing pressure on important forest resources and increasing the amount of land needed for cultivation. The village borders a new forest reserve, furthering the pressure on the village. Because of the remote location of the village, sources of information are often difficult to obtain, making the communities wary of new agricultural techniques. The results suggest that traditional cultural structures were the

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most important for the resiliency of the community; the "jangi house", a village savings group, and the chief are the main traditional structures. I also found that the people were very dependent on forest products for subsistance and income; because the population is growing, those resources will continue to become even more scarce. I suggest using the existing jangi structures in order to distribute new information for development, like improved cocoa seedlings and better business skills, as one of the most important areas for development agencies to focus on, as well as building trust between conservation organizations and local groups.

Lynx CSI: Forensic identification of predators at snowshoe hare kill sites

*Poster by: **Laurel Peelle**, MS Student, School of Environmental & Forest Sciences, UW*

Abstract: The Canada lynx (Lynx canadensis) historically suffered drastic declines throughout its range as a result of trapping for its fur, particularly in the contiguous United States. Today, habitat loss from catastrophic fires and human activities threatens the few remaining southern populations of lynx. Lynx may also be experiencing competition with generalist predators that have expanded their ranges in recent decades, most notably the coyote and bobcat. These impacts are likely exacerbated by climate change: in addition to a reduction in the duration and amount of snowpack, the increasingly fluctuating temperatures associated with climate change create a compacted snow crust that allows these generalists with a high foot-load to hunt at high elevations in winter. Typically, lynx has had the competitive edge against other predators in winter because of its highly specialized morphology: with huge snowshoe-like paws and a lanky build, no other predator can hunt so effectively in deep, fluffy snow. Given the lynx's status as Endangered in the state of Washington and Threatened in the contiguous US, more research is needed on this unique felid. Since the lynx is notoriously elusive and difficult to study directly, studying a predator through its prey species can be a useful complement to hands-on predator research. For the Canada lynx, prey research is essential because lynx specialize and depend on the snowshoe hare, which comprises the majority of their diet. Snowshoe hare habitat has often been treated as a proxy for good lynx habitat by many forest managers. While creating high-quality hare habitat is essential for lynx recovery efforts, this approach ignores the fact that lynx and hares use the landscape differently. Hares tend to be most abundant in young dense forest, while lynx are more strongly associated with mature dense forest. Science has yet to determine where the lynx are actually catching the hares; it is possible that the best hare habitat is not ideal for lynx foraging success, at least not in isolation. Thus, it is essential to identify the specific forest and landscape characteristics associated with successful lynx foraging habitat. This study aims to forensically analyze snowshoe hare kill sites in order to determine the predator species responsible for the kill. Detailed vegetation plots have been collected to characterize the forest attributes at each kill site and replicate plots. Once the kill sites have been categorized by predator species, they can be analyzed to determine how lynx-attributable kill sites might differ from those of competing predators as well as the surrounding landscape. However, identifying the predator responsible for a snowshoe hare kill with certainty is challenging. This study tested multiple methods for predator identification that have never been applied to this system. Snowshoe hare carcass remains and radio-collars were swabbed for predator saliva, and the samples were sent to a collaborating lab to be genetically tested using PCR and compared to species-specific primers. Although the application of this protocol to snowshoe hare kill sites is experimental, it has thus far yielded promising results. In addition, predator hairs were collected at many of the kill sites and are currently being analyzed morphologically (microscopy) and genetically (PCR). The results of the hair analyses will be compared to the saliva DNA results, and these forensic methods can then be compared to field observations taken at the kill sites (tracks, scat, carcass-handling characteristics, etc.). This novel application of forensic methods can improve our ability to categorize kill sites by predator species, thus providing insight into the specific foraging-habitat needs of elusive predators such as the lynx.

Potential factors impacting the usage of environmentally certified wood products (ECWP) in the U.S. residential construction industry

*Poster by: **Cindy Chen**, Doctoral Student, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: Environmentally Certified Wood Products (ECWP) refer to products made from wood sourced from sustainably managed forests. The certification of wood is usually done through eco-labeling and chain of custody which track the wood from their source. Since ECWPs are not required in the construction industry in the United States, the use of such products is voluntary and is encouraged by market based incentives, including, but not limited to, factors such as consumer demand, a person's awareness of sustainable products, the area where construction occurs, and the revenue of a homebuilding company. To investigate the factors that impact the usage of ECWPs among homebuilders and remodelers in the U.S., especially the recognition of green building programs, such as LEED, web-based surveys were given to a randomly selected sample of 2,000 homebuilders and remodelers registered with the National Association of Homebuilders, and 403 completed surveys were returned. Statistical analysis and modeling of categorical data was used to illustrate the association between the potential factors that impact the use of ECWPs, and the awareness and utilization of ECWPs among homebuilders and remodelers. Additionally, this study provides an overview of the sustainability and green product awareness in the U.S. construction industry. By understanding these associations, ECWPs can be more widely promoted and utilized.

Perception of climate change impacts on forest and livelihood in the Padampokhari Village on the Parsa Wildlife Reserve buffer zone

*Poster by: **Pratibha Duwal**, MS Student, School of Environmental & Forest Sciences, UW*

Abstract: Livelihood in rural communities in Nepal is based upon natural resources. Rural communities are especially vulnerable to climate change due to ecological fragility and economic marginality where they live, thus limiting their adaptive capacity. There is a pressing need to understand the impact of climate change on adaptation practices that can help to sustain rural communities in Nepal. The Buffer Zone (BZ) of the Parsa Wildlife Reserve (PWR) was declared in 2005, covering about 198 km^2, which occupies 3.91% of the total BZ area of Nepal. The objective of this research is to study the perceptions of climate change by local people, its impacts on their livelihoods, and the current adaptation practices in the community. We interviewed a wide range of community members and representatives in 9 different communities with the objective of exploring the most effective adaptive strategies for these communities to ensure sustainable livelihoods. We prepared a seasonal and community practices calendar based on discussions with 9 focus groups and 5 key informant interviews in each community. The preliminary findings indicate that most people in the communities do not understand climate change but they have experienced it in terms of changes in temperature, rainfall, water availability and changing agricultural and forest production. This trend is corroborated by an increase in temperature and fluctuations in precipitation observed

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on data collected from Department of Hydrology and Meteorology (DHM). Out of the nine communities, six attributed the changes to a cement factory, while another two communities attributed the changes to acts of god. Local communities have started to adapt in their own ways, such as using drought resistant crops, collecting rainwater, harvesting, biogas production, traditional pest control techniques, new sourcses of drinking water and migration.

Comparison of hair and DNA-based approaches in dietary analysis of free-ranging wolves

*Poster by: **Carolyn Shores**, MS student, School of Environmental & Forest Sciences, UW*

Abstract: Dietary information of free-ranging animals is essential for understanding their ecology (trophic interactions, resource selection, prey-predator dynamics), conservation and management. Carnivore diet is most frequently estimated using morphological analysis of prey remains found in scats. However, genetic methods are becoming increasingly common and may identify prey parts that are too small to identify by morphological methods. We developed a molecular approach to assess free-living wolf diet and compared the results with analyses of prey hair in the same samples. The occurrence of DNA and hair for moose, woodland caribou, white-tailed deer, mule deer, snowshoe hare and American beaver were compared in wolf scats from northeastern Alberta, Canada. Detection of prey species was 1.34 times more likely with DNA analysis than with hair analysis. DNA analysis showed significantly higher occurrences of total prey ($p<0.001$) and for every prey species ($p<0.05$), except deer. DNA methods also allow differentiation between closely related species such as white-tailed deer and mule deer, which cannot be differentiated with hair analysis. Results from both methods suggest that deer are the primary prey of wolves in northeastern Alberta, followed by moose. These findings support substantial benefits of molecular methods over morphological approaches in prey detection and in differentiating between taxonomically similar prey species.

The effects of soil parent material and fertilization treatment on the wood quality of Douglas-fir in the Pacific Northwest

*Poster by: **Luyi Li**, MS student, School of Environmental & Forest Sciences, UW*

Abstract: The influence of soil parent materials (SPM) and nitrogen treatments on wood quality of middle age Douglas-fir has been studied in the Pacific Northwest. Wood is an inherently variable material, its properties are subject to wide variations brought about by the physiology of the tree and external factors. Douglas-fir is the predominant plantation species in the western Pacific Northwest. Nitrogen is consistently the most limiting factor to the growth of forests in the Pacific Northwest as well as the rest of the world. Fertilization practices have been developed to cope with insufficient nitrogen availabilities and stimulate tree growth. This study addresses the needs in updating wood property models for different stand conditions and environmental variables, applying cost-effective methods for wood property measurements and nitrogen fertilization. Time-of-flight Acoustic Velocity (AV) method was conducted to measure stiffness by applying Hitman and Tree Sonic devices to tree logs and standing trees separately. Tree AV is determined by wood stiffness and also affected by initial stand density conditions and thinning regimes. Disks and increment cores were obtained from plots in Washington and Oregon. Samples will be utilized to measure the proportion of juvenile/ mature wood, earlywood/ latewood. Juvenile wood usually has short cell length and low density, which has negative impacts on timber strength. Specific gravity (density) is the ratio of its dry mass to its green volume, which is one of the most important wood physical properties. Higher specific gravity is associated with higher strength and stiffness. The increased volume of wood added to a tree by fertilization may involve a trade-off with lower wood density. The results obtained through the study will give insight into the relationship of Douglas-fir wood quality to SPMs and nitrogen fertilization treatments. Wood quality models can be developed for different stand conditions and environmental variables for a better understanding of the influences of variables on each wood property.

Conversion of primary forest residue to biochar with a mobile pyrolysis kiln.

*Poster by: **BJ Birdinground**, MS Student, CINTRAFOR, School of Environmental & Forest Sciences, UW*

Abstract: A low-tech mobile pyrolysis kiln has been designed for on-site conversion of woody biomass from slash piles into bio charcoal. Slash is constantly produced as part of forest restoration efforts, and is often piled in the forest to degrade or is burned to reduce fire risk. Primary forest residues are a key amendment for soil fertilization. Slash represents a sizable and sustainable feedstock for the application of biochar as a soil amendment. The materials to build the kiln are inexpensive, and the system can be deployed and operated by forest workers. Because of the ultra-low capital and operating costs, this method can be used to dry wood prior to chipping and hauling, improving the transportation economics, or to pyrolyze the feedstock to produce high quality biochar in the forest. This project investigates a laminated kiln design that integrates multiple functionalities in order to mimic traditional biochar kilns. This unit is flexible, portable, and lightweight making it easy to work with. The functionality of this technology is to convert slash into biochar by controlling the temperature with the inlet/outlet system. Field deployment experiments involved processing 200 kg batches of alder slash. Three batches were processed at maximum temperatures of 752^{o}C, 716^{o}C, and 706^{o}C and process times ranging from 63-85 minutes.

Technical efficiency, technical progress and total factor productivity of China's paper industry

*Poster by: **Shuai Tang**, Visiting Doctoral Student, Beijing Forestry University, School of Environmental & Forest Sciences, UW*

Abstract: Since the reform and opening up in 1978, China's paper industry has developed very quickly. However, the growth of the industry is primarily dependent on the abundant availability of wood, pulp and cheap labor and the existing technology lags far behind developed countries. This study calculates the total factor productivity (TFP) of China's paper industry and tries to find out the influencing factors of TFP by data envelope analysis and Malmquist index from 2000 to 2011. It also compares the TFP of the paper industry in different provinces in China, including Shandong, Jiangsu, Guangdong, Zhejiang and Henan, to study the regional differences of China's paper industry. The results indicate that the TFP of China's paper industry shows an upward trend over this period and the mean of the Malmquist index reached 1.150 in 2011. The TFP has experienced significant fluctuations since 2000, with two peak points in 2004 and 2007 and two valley points in 2005 and 2009. Whereas technical progress in the sector is the primary reason for the increase of TFP, technical efficiency contributes marginally to the whole country and each single province indices. The study also reveals that the TFP of the paper industry differs greatly among provinces.

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