



Bio-security Task Force Peter T. Jenkins and John Fitzgerald, Co-Chairs

**December 2011
International Year of the Forest**

Recommendations for Protecting Forests From Introduced Forest Pests and Plant Pathogens

Background

Non-native insects and pathogens are seriously harming natural and human-managed forests. Invasive pests and forest diseases, in concert with other anthropogenic disturbances such as land clearing and changes in fire regimes, are dramatically altering the composition and structure of many forests in North America, the United Kingdom, continental Europe, Australia, China, Africa and elsewhere.ⁱ Further, they inflict high costs on society, including: the costs of prevention, control and eradication of the harmful organisms; costs of removing diseased trees; direct market losses (e.g., timber and nursery industries); and loss of non-market benefits, including wildlife habitat for vast numbers of species, carbon sequestration to mitigate global warming, and recreational and aesthetic benefits for humans. Examples of recent, highly damaging pests and pathogens in North American and European forests include: Asian longhorned beetle (*Anoplophora glabripennis*); emerald ash borer (*Agrilus planipennis*); pine wood nematode (*Bursaphelenchus xylophilus*); horse-chestnut leafminer (*Cameraria ohridella*); and *Phytophthora* spp. (e.g., sudden oak death, *P. ramorum*).

A number of recent reviews and reports have addressed varying facets of this forest health crisis.ⁱⁱ Key findings include:

- Damaging insects include: foliage feeders that feed externally or internally on leaf or needle tissue; sap feeders that include gall-forming adelgids, as well as scales, aphids, psyllids, and whiteflies; and the phloem- and wood-borer guild consisting of species that feed on phloem, cambium, or wood. Pathogens consist of a broad range of wilts, rusts, cankers, blights and others.



- Threats to native forests have increased dramatically with the globalization of trade. For example, in North America at least 450 non-native insects and 16 pathogens have colonized forest and urban trees since European settlement. Approximately 14% (63) of the insects and 100% of the 16 pathogens have caused noticeable damage to trees.
- The marked increase in the volume and diversity of live plants in the nursery trade constitutes a major invasion pathway for pathogens and insects. Commodity shipments packed with solid wood packaging materials (SWPM) and dunnage is another pathway. A third is the use of shipping containers, which readily harbor insects. Faster cargo ships and greater prevalence of rapid air freight are other contributing factors that are taking unprecedented numbers of novel pests and pathogens to new places around the world.
- The highest financial costs of pests and pathogens can fall on local governments, which often have little choice but to cut down and replace afflicted trees or to attempt to treat them. For example, U.S. municipal costs are estimated at US\$1.7 billion annually to respond just to wood boring insects. Homeowners lose an additional US\$1.5 billion annually in tree removal costs and reduced property values.
- Climate change impacts, such as warmer winters and changes in seasonal precipitation, fire frequency and storm patterns, and increased drought stress on trees may increase the risk of pest and pathogen establishment, spread and impact. Climate change makes prediction and prevention of invasions more complex and difficult. In addition, some damaging native forest pests, such as the mountain pine beetles (*Dendroctonus ponderosae*) that have irrupted across the vast montane pine forests in North America in response to warmer winter temperatures, are compounding the impacts of non-native pests.
- The trends indicate continuing high likelihood of plant pests and pathogens being introduced around the world unless prevention and response measures are modernized and increased in scale.
- Forest plantations or other extensive planting of trees with very limited genetic and species diversity, often in pursuit of higher timber yields or lower initial costs, can



make such trees and vast tracts of forest, much more vulnerable to pests, especially in the face of drought and heat driven by climate change.

The recent reviews and reports are vital contributions to our understanding of the impacts of pests and pathogens; however, some are more robust in their science and data analysis than in their policy recommendations aimed at mitigating the crisis.

Broad-based policies to prevent arrivals of non-native species are generally considered to be more cost-effective than attempting to control species that have already invaded. Strict approaches to regulating imports of live plants have been shown to provide net economic benefits for the regulating country.ⁱⁱⁱ

In light of the above, we offer these recommendations as SCB's additional policy contribution to the UN Year of Forests for 2011, to supplement and complement the SCB's earlier *Declaration on Sustainable Forest Management for the International Year of the Forests*.^{iv} The recommendations also serve the goals of the Convention on Biological Diversity (CBD) of 1992 and the International Plant Protection Convention of 1952, which establishes procedures for preventing the introduction of pests that are likely to harm wild or cultivated plants. The CBD in Article 8(h) requires parties to “prevent the introduction of, control, or eradicate those alien species which threaten ecosystems, habitats or species”, and in 8(g) requires parties to “...regulate, manage or control the risks associated with the use and release of modified organisms...” The CBD's globally accepted *Strategic Plan for Biodiversity 2011-2020* reaffirms the duty of parties to take preventative measures to avoid further harmful invasions by alien invasive species (Target 9).

Recommendations

With the proviso that all processes ideally should be science-based, transparent and well-informed by outside experts and stakeholders, and taking into account the need for precautionary approaches and the considerable global variation in vulnerabilities to forest pests and pathogens, SCB recommends that concerned governments and other key actors require or provide:

- 1) The increased use of precautionary approaches, in which imports of live plants are allowed only after they are shown to be free, to an acceptable degree, of pests or pathogens before shipping. Alternatively, comprehensive post-entry quarantines of



- all imported plants and cuttings can provide a high level of safety if the quarantine facilities are adequate. In cases where such precautionary approaches are not feasible, there should be increased and more proactive use of modern risk assessment methods to reduce risks of imports together with increased intensity of inspections utilizing state of the art technologies for detecting and identifying pests and pathogens.^v
- 2) More effective prevention and mitigation measures for high-risk wood-boring insects via improvements to international standards, and the implementation thereof, for Solid Wood Packing Materials (SWPM). Current SWPM standards as implemented are inadequate to prevent invasions by wood-borers, particularly in conjunction with inadequate standards for ensuring that difficult-to-inspect shipping containers do not harbor insect pests.^{vi}
 - 3) Adequate funding for public education aimed at shippers, exporters and importers, travelers, plant collectors and the nursery industry about risks from both legal and smuggled plant imports and other products capable of transporting forest pests and pathogens.
 - 4) Adequate numbers of port inspectors to ensure the average work load per inspector does not exceed levels that inhibit their effectiveness.
 - 5) Targeted import fees sufficient to generate funds for risk reduction and inspection programs and other practices to reduce introductions, and for early detection of and rapid response to new invaders; in short, to internalize the costs of the trade so that they are paid by those who benefit directly from it.^{vii}
 - 6) Adequate funding for law enforcement and related efforts, including outreach and education, to deter smuggling of risky products, which are especially a concern when a previously lax regulatory regime is tightened.
 - 7) Broad adoption of legal measures to prevent trade in illegally harvested or illegally obtained timber and plant products, which are more likely to have skirted pest and pathogen prevention measures.
 - 8) Enforceable prevention policies in free trade agreements and other trade instruments to address foreseeable risks to forests, including developing safe sourcing programs for risky products.



- 9) Biologically secure land use practices to help reduce the spread of pests, pathogens and the vectors that carry them -- from sanitizing transported logging equipment to restoring harvested or degraded forest ecosystems with biologically diverse, resilient forests.
- 10) Greater support by governments and other funders for scientific research aimed at reducing the risk of invasions and mitigating those that occur.

We note that the last ten years of focus on international terrorism has resulted in less vigilance at many borders for insect pests and pathogens. Unfortunately, some pest and pathogen incursions have had impacts comparable to scenarios of intentional “bio-terror” events.

While the steps outlined above are essential, we also caution against those who would use the threat of pests and pathogens to approve short cuts around comprehensive, science-based management of forests, such as through inadequately-assessed “emergency” or “salvage” logging projects.

We also note that in budget-cutting times some governments may be inclined to reduce agency spending in this area, rather than to increase it to meet the forest health crisis. Any program reductions in appropriated public funds should at least be counterbalanced by corresponding increases in targeted user fees charged on importers. Reductions in overall funds for those government agencies that are tasked with preventing these threats are usually counterproductive and likely to cost society in general more in the long run due to the impacts of forests pests and pathogens, in other words, such reductions are likely to be “penny-wise and pound-foolish”.

ⁱ Global review of forest pests and diseases, 2009 FAO Forestry Paper 156 Rome, Italy. (ISBN 978-92-5-106208-1); Jung, T, Hudler GW, Jensen-Tracy SL, Griffiths HM, Fleischmann F, Osswald W. 2005. Involvement of *Phytophthora* species in the decline of European beech in Europe and the USA. *Mycologist* 19:159-166; Augustin S, Guichard S, Heitland W, Freise J, Svatoš A, Gilbert M. 2009. Monitoring and dispersal of the invading *Gracillariidae* *Cameraria ohridella*. *Journal of Applied Entomology* 133:58-66; Suzuki K. 2004. PATHOLOGY - Pine Wilt and the Pine Wood Nematode. *Encyclopedia of Forest Sciences* 773-777.

ⁱⁱ Aukema JE, McCullough DG, Von Holle B, Liebhold AM, Britton K, et al. 2010. Historical accumulation of nonindigenous forest pests in the continental US *BioScience* 60: 886–897; Aukema JE, Leung B, Kovacs K,



Chivers C, Britton KO, et al. 2011. Economic impacts of non-native forest insects in the continental United States. *PLoS ONE* 6(9): e24587.doi:10.1371/journal.pone.0024587; UK Dep't for Environment Food and Rural Affairs and Forestry Commission. 2011. Action Plan for tree health and plant biosecurity. 10 pp.; Liebhold A, Brockerhoff E, Garrett L, Parke J, Britton K. In Press. Live plant imports: the major pathway for forest insect and pathogen invasions of the United States. *Frontiers in Ecology*.

ⁱⁱⁱ Keller RP, Lodge DM, Finnoff DC. 2007. Risk assessment for invasive species produces net bioeconomic benefits. *Proceedings of the National Academy of Sciences* 104: 203–207.

^{iv} Online at:

www.conbio.org/activities/policy/docs/SCB_Forest_Declaration_2011_International_Year_of_the_Forest.pdf.

^v For a recent U.S. example of a more proactive prohibited list approach, see the Final Rule - Importation of Plants for Planting; Establishing a Category of Plants for Planting Not Authorized for Importation Pending Pest Risk Analysis, *Federal Register* Vol. 76, No. 103, Friday, May 27, 2011. Pages 31172-31210. Online at: www.regulations.gov/#!documentDetail;D=APHIS-2006-0011-0267.

^{vi} According to Aukema, Leung, et al. 2010, *supra*, this pathway is the greatest single economic threat for the United States, with additional extremely damaging invaders being foreseeable in the absence of improved SWPM measures.

^{vii} See Jenkins PT. 2002. Paying for protection from invasive species. *Issues in Science and Technology*. National Academy of Sciences, Fall, pp. 67-72. Online at: www.issues.org/19.1/jenkins.htm.