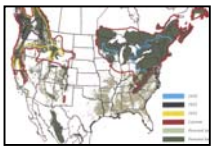
A Coalition to Abate the Threat to Native Trees from Introduced Pathogens and Insects

A Report on the Results of Over 50 Interviews












The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Prepared by
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We greatly appreciate the time of the many individuals and groups that participated in the interviews on which this report is based.

I don't know who put the poems on the trees, but they were mostly on my block so I always thought it was my neighbors. The notes were placed on the trees the night before they were to come down. The trees fell February 3, 1998. [...] I remember the days leading up to the take down when you'd come home to see if the tree on your property was marked either in green or purple paint ringed around the base. Then you knew you were going to lose that particular tree.

-Victoria Delorio, Chicago singer/songwriter

Contents

Northern hardwood forest matrix (F. Lowenstein, The Nature Conservancy).

Around the country, landowners are losing something treasured—their trees. In Illinois, government officials have cut down 1,770 trees in response to the Asian longhorned beetle infestation. Despite the losses of trees in Chicago neighborhoods, the response to the infestation is a success story. In 2003, a total of only six trees infested by the beetle were discovered in Chicago.

Cutting down trees to prevent the spread of Asian longhorned beetle in Chicago (R. Westbrooks, USDA ARS).

The response of the city of Chicago is an important victory against introduced pathogens and insects. The beetle is not limited to Chicago—New York, New Jersey, and most recently California have all sighted this aggressive bug—and other cities would do well to emulate Chicago's effective response. If the Asian longhorned beetle were to spread across the country, the costs to cities to remove and replace trees is an estimated $669 billion[1]. Declines in maple syrup production, lost timber value, and decreases in tourism revenues would cost an additional $1.1 billion annually.[2,3]

One reason Chicago responded so effectively was because the eradication of the beetle became a top priority for so many people. Scientific experts, politicians, all levels of government agencies, the public, even USFS smokejumpers, united behind a common vision and plan to contain the beetle.

The Asian longhorned beetle represents an ominous trend of introduced pathogens and insects becoming established in the United States and threatening the nations trees and all that they represent. Already, over 200 pathogens and 4,000 insects have been introduced and established in the United States, evidence of America's deficient security.[4] Of more than a dozen recently introduced pathogens and insects, the Asian longhorned beetle, sudden oak death, and emerald ash borer are among the most alarming. Without changes in policy, other harmful pathogens and insects will be introduced as globalized trade and mobile citizens make the world ever smaller.

Another not quite so successful case study is worth examining. Many young people today are unaware that the American chestnut was once the most economically important hardwood species in Eastern forests. Today it persists only as small root sprouts with no economic or ecological significance. In 1912 the standing value of chestnut trees in

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[1] Nowak, D.J., J.E. Pasek, R.A. Sequeira, D.E. Crane, V.C. Mastro. 2001. Potential Effect of *Anoplophora glabripennis* (Coleoptera: Cermabycidae) on Urban Trees in the United States. *Forest Entomology*. February 2001.

[2] USDA National Agriculture Statistics Service. 2004. Crop Values – 2003 Summary. February 2004.

[3] USDA APHIS. 1998. Solid Wood Packing Material from China Initial Pest Risk Assessment of Certain Wood-Boring Beetles Known to Be Associated with Cargo Shipments: Asian Longhorned Beetle (*Anoplophora glabripennis*), *Ceresium*, *Monochamus*, and *Hesperophanes*. August 31, 1998.

[4] U.S. APHIS and Forest Service. 2000. Pest Risk Assessment for Importation of Solid Wood Packing Materials into the United States – August 2000 Draft.

Pennsylvania, North Carolina, and West Virginia alone was an estimated $82.5 million—or about $1.6 billion today.[5] Nuts were also an important source of nutrition for forest species, and between five and ten chestnut-dependent insect species have gone extinct.[6]

Introduced pathogens and insects represent a largely irreversible threat to our native forests. No other threat uniquely targets the dominant biological structure of forests on an essentially permanent basis.

Over the last several months, staff of The Nature Conservancy have interviewed representatives of more than 50 organizations, including trade associations, businesses, environmental organizations, public agencies, and universities. From these interviews several key conclusions emerge:

The public is not sufficiently aware of and concerned about the impending devastation, and therefore is not adequately using their political and economic power to ensure that new infestations are prevented, rapid response to outbreaks enabled, and spread of existing infestations reduced. Positive actions could range from changes in global policy to personal accountability for spreading pathogens on our hiking boots and lethal larvae in our firewood.

Dying saplings with epicormic shoots as a result of emerald ash borer infestation (D. Cappaert, USDA ARS).

Minimizing damage by introduced pathogens and insects is an issue that can unify diverse segments of society, and allow them to work together toward a shared vision. People and organizations that rely on the forests for income, cities and communities around the nation, and organizations who work for the protection of natural habitat all care about the future of America's trees, and it is to the advantage of all to ensure their health.

The threat requires a coalition effort focusing on scientifically sound, non-confrontational, positive solutions. The potential for damage has swelled beyond trees' capacity to defend themselves and beyond our current means of control. There is a need for groups concerned with this issue to join together to protect the trees and all that depend on their health from the threat of introduced pathogens and insects.

The Nature Conservancy invites you to join us in articulating the need, goals, and structure for a coalition to address the critical issue of protecting our trees and forests.

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[5] U.S. APHIS and Forest Service. 2000. Pest Risk Assessment for Importation of Solid Wood Packing Materials into the United States – August 2000 Draft.

[6] U.S. Congress, Office of Technology Assessment. 1993. *Harmful Non-Indigenous Species in the United States, OTA-F-565.* Washington, DC: U.S. Government Printing Office.

Background

Addressing the threat of introduced pathogens and insects to forests is an identified priority of The Nature Conservancy. Within the United States, The Nature Conservancy considers it one of the top threats to forested ecosystems in the Northeast, Appalachians, and Northwest. There is broad agreement across Nature Conservancy chapters that by the time such invaders reach any given site it is usually too late for effective action to address them, and hence policy solutions focusing on prevention and rapid response at a national or continental scale are required.

No other threat to date has removed entire dominant species from forested ecosystems permanently, as has occurred with both the American chestnut and elm, and as is happening presently with the eastern hemlock, courtesy of hemlock wooly adelgid. Additional current invaders such as sudden oak death, Asian longhorn beetle and emerald ash borer also threaten oaks, maples, and ashes, respectively, and thus may threaten the fundamental structure of temperate mixed broadleaf forests and a variety of specialized habitats across North America.

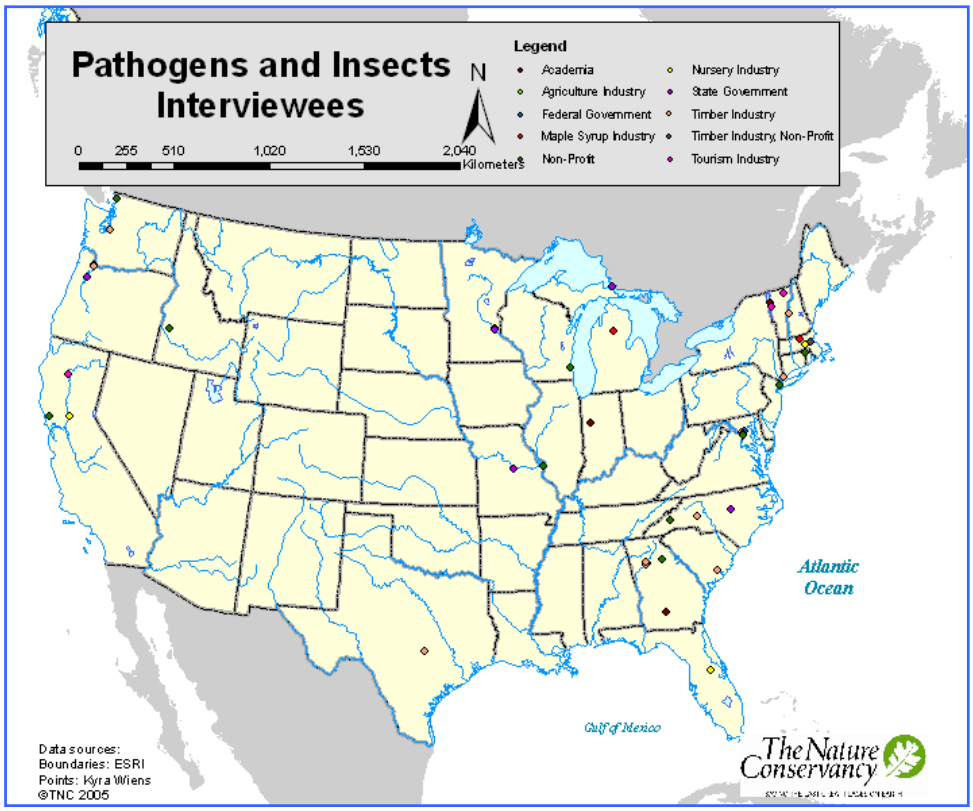

Figure 1. Interviewees represent a wide range of sectors and locations (K. Wiens, The Nature Conservancy).

The Nature Conservancy has had full time staff working to address the issue for the last two years. We believe a broader coalition is needed for success.

In December 2004, The Nature Conservancy was approached by a donor who shares the belief that the impact of introduced forest pathogens and insects is not adequately recognized by the public, and that as a result the issue does not get sufficient policy attention. The donor has indicated that he would be interested in providing substantial funding for a plan to raise awareness and support for strategies to abate this threat, and would like these efforts to be led by and on behalf of a broad-based coalition of organizations with forest interests. The Nature Conservancy has agreed to present a proposal for his consideration this fall.

To better understand the current level of awareness and concern regarding introduced pathogens and insects, The Nature Conservancy has

conducted a series of interviews—over 50 as of July 2005—with various people representing organizations with a stake in the future of our forests; the interviewees represent a wide range of sectors, perspectives, and geographic locations (Figure 1).

The interviews were meant to be conversational, and the questions did not search for one answer among a few choices, but rather generated a broad range of responses. Despite this non-specificity, however, the responses revealed an overwhelming convergence of ideas on what actions are most urgently needed to address introduced pathogens and insects (Table 1). Prevention was the most widely supported critical action, followed by the need to raise awareness (thereby building a constituency for the issue), improvement of early detection and rapid response to recent introductions, and a strengthening of policies related to pathogens and insects (including improved regulations, enforcement, and funding). The goals presented in this document are a reflection of these priorities.

Table 1: Critical Actions Needed.

The table reflects the responses for each sector of interviewees to the question of what critical actions are needed to address this threat; responses were given at differing levels of specificity so some examples are provided to show the types of actions included in each category. n=the number of interviews conducted in each sector (some interviewees represented two). Each cell contains the number of interviews during which a particular action was identified as critical to address the threat of introduced pathogens and insects. Actions mentioned by a total of three or fewer respondents (i.e. as tallied in the "Combined Responses" row) were not included in this table. (While three representatives from the tourism industry were contacted, none of them completed the full interview. These representatives expressed general concern regarding forest health, but did not feel sufficiently informed to complete the interview.)

	Prevention (e.g. close pathways, increase inspection, quarantine, phytosanitation)	**Education/Building a Constituency**	**Early Detection/Rapid Response** (e.g. control spread of new invaders)	**Increased Funding** (inc. emergency response funds)	**Research** (e.g. control methods, likely entry points, baseline data, risk assessments)	**Improved Regulations and Enforcement**
Academia (n=3)	3	2	0	0	1	0
Agriculture Industry (n=2)	0	1	0	1	0	2
Federal Government (n=3)	2	0	2	0	0	0
Maple Syrup Industry (N=n)	0	2	0	0	0	0
Non-Profit (n=18)	8	8	4	2	5	3
Nursery Industry (n=5)	2	0	1	3	0	0
State/Provincial Government (n=7)	3	2	4	2	1	1
Timber Industry (n=12)	4	5	4	0	1	1
***Combined Responses* (n=50)**	**22**	**20**	**15**	**8**	**8**	**7**

The Vision

Based on this survey, we seek your involvement in creating:

> A coalition to engage all Americans in ensuring a healthy future for our native trees and protecting their economic, aesthetic, ecological, and spiritual values from the threat of introduced pathogens and insects.

Goals: Making the Vision a Reality

Realizing this vision will require the collaboration of different stakeholders in creating an enduring partnership to identify and implement innovative solutions. An immediate goal that will underlie and support all others thus would be establishment of the coalition:

> Form by 2006 a broad-based coalition to share information, serve as an expert network, and implement (and encourage others to implement) priority actions to abate the threat of introduced pathogens and insects.

Once the coalition is formed, it will need to determine goals and develop strategic actions to accomplish those goals. Based on responses to more than 50 interviews, The Nature Conservancy believes that greatest leverage will come from actions in three broad areas:

- Advocacy for Effective Policies
- Incentives and Recognition for Voluntary Actions
- Increasing Understanding and Awareness

The following are examples of goals that address these three areas, recognizing that the coalition's actual goals must be shaped by all the members over the next year:

Inspecting crates for Asian longhorned beetle (A. Eaglin, USDA APHIS PPQ).

- **Advocacy for Effective Policies**

1. Establish a government-wide early detection/rapid response fund of $500 million by 2008, and maintain adequate annual federal appropriations to support such a fund.
2. Prevent significant new introductions of forest pathogens and insects by 2015 by closing pathways of introduction.
3. By 2017 eradicate existing infestations of emerald ash borer and Asian longhorned beetle, and by 2025 eradicate infestations of any additional significant pathogens and insects introduced prior to 2015.

- **Incentives and Recognition for Voluntary Actions**
  4. Establish a "Tree Safe" label and certification program by 2007, designed to reduce the risk of introduction and spread of introduced pathogens and insects.
  5. Create incentives that result in participation of 200 businesses in Tree Safe policies by 2009.

- **Increasing Understanding and Awareness**
  6. Provide by 2006 improved access for coalition members to information relating to policy challenges and opportunities, new introductions, successful responses and methods of control. Maintain continuously.
  7. Develop by 2007 a marketing strategy to support policy goals and encourage voluntary actions. Maintain marketing continuously.
  8. Establish by 2007 a program to gather, generate, and disseminate information on the economic impacts of introduced pathogens and insects. Maintain continuously.

To reach goals such as these would require a network of integrated actions. Examples of actions to achieve these suggested goals follow.

Maple leaves (C. Ott, The Nature Conservancy).

Forming the Coalition

The coalition will be a self-selected group of people representing organizations committed to the coalition's vision. A year-long process will begin in September in which members who have voiced their initial support will work toward developing governing rules and an action agenda.

Coalition membership

We envision that the coalition will initially be formed from many of the groups already interviewed by The Nature Conservancy. The groups interviewed to date represent a cross-section of various sectors that have an interest in forest health. These groups collectively represent a diversity of interests at various levels (local, state, regional, federal, continental), but do not include all organizations that would ideally participate in the coalition. Once formed, the coalition should commit to identifying and including additional groups that could strengthen the coalition's ability to achieve its goals, and develop a process whereby additional members might join.

After reviewing this report, interviewed groups will have the opportunity to voice their initial commitment in August 2005. Invitations to the organizational meeting will follow in the late fall of 2005, pending funding support for the work.

Sudden oak death on tanoak in Marin County, CA (Marin County Fire Department).

Representatives from the following groups[7] were interviewed to help shape this report:

- American Farm Bureau
- American Forest and Paper Association
- American Forest Resources Council
- American Forests
- American Nursery and Landscape Association
- California Association of Nurseries and Garden Centers
- Conservation Northwest
- CropLife America
- Dogwood Alliance
- Environmental Defense
- Florida Nursery, Growers, and Landscape Association
- Franklin Park Coalition
- Georgia Urban Forest Council
- Global ReLeaf
- Greening Milwaukee
- Idaho Conservation League
- International Paper
- Lowe's
- Lyme Timber
- Massachusetts Invasive Plant Advisory Group
- Massachusetts Maple Producers Association
- MeadWestvaco
- Michigan Maple Syrup Association
- Minnesota Division of Forestry
- Missouri Forest Keepers
- National Association of State Foresters
- National Plant Board
- North Carolina Department of Agriculture
- Northeast Kingdom Travel and Tourism Association
- New York State Department of Environmental Conservation
- Northeast Midwest Institute
- Northern California Travel and Tourism Information Network
- Missouri Department of Conservation
- Ontario Ministry of Natural Resources
- Oregon Department of Agriculture
- Oregon Natural Resources Council
- Pinchot Institute for Conservation
- Plum Creek
- Vermont Outdoor Guide Association
- Purdue University
- Religious Campaign for Forest Conservation
- Society of American Foresters
- Southern Forest Research Partnership
- Southern New England Forest Consortium, Inc.
- Temple-Inland
- United States Forest Service
- University of Georgia
- United States Department of Agriculture
- Union of Concerned Scientists
- University of Vermont
- Washington Invasive Species Coalition
- Weston Nurseries
- Weyerhaeuser
- World Forestry Center

[7] **Neither participation in the interview process nor depiction of logos in the background of this page is meant to imply any endorsement of the information or opinions contained in this report.**

Sunrise over Schenob Brook Wetlands (Avi Hesterman, The Nature Conservancy)

How the coalition will operate

The coalition will work closely with an independent, professional facilitator during the first 12 months to develop its governing rules and action agenda. During this time The Nature Conservancy will serve as administrative and fiscal agent for the coalition.

The independent facilitator will work with a planning committee drawn from the groups that have expressed an early commitment to prepare and establish goals for the coalition's first meeting. Invitations to this meeting will be sent out in late fall 2005.

The coalition's initial meeting, in winter 2005, will focus on clarifying the vision, goals, and preferences for operation. Based on the outcomes of this meeting, a committee formed from coalition members will draft a charter, bylaws, and operating procedures, and send the drafts out to the coalition members for review.

During a second coalition meeting in the spring of 2006, the charter, bylaws, and operating procedures will be presented for adoption, which will require a minimum two-thirds vote. This second meeting will be open only to those groups who were represented at the first meeting. After this meeting, the formation of the coalition will be formally announced.

A policy committee will follow up on the outcomes of this second meeting and will work to develop an initial policy agenda during the remainder of the spring. The policy agenda will be reviewed by the team members and presented for adoption by late summer of 2006. The commitment of resources for implementing this policy agenda will be sought in late summer or fall of 2006. This timeline is shown, below:

Table 1: Proposed timeline for coalition

August '05	*September '05*	*Fall '05*	*Winter '06*	*Spring '06*	*Summer '06*	*Fall '06*
Interviewees comment on and critique this report.	Revised report presented to donor for initial support of the coalition.	Facilitator and planning committee develop goals for first meeting.	First meeting of coalition.	Second meeting of coalition, charter and bylaws presented for adoption.	Third meeting of coalition.	Resources sought for implementing policy agenda.
Interviewees voice: 1) initial commitment, 2) if they would like to participate in the planning committee.	TNC hires independent, professional facilitator and designates staff to support coalition operations.		Committee drafts charter, bylaws, operating procedures for review by coalition.	Formal announcement of formation of coalition.	Policy agenda presented for adoption.	
				Policy committee develops policy agenda for review by coalition.		

Over time the coalition may find that staff will be necessary to support and advance the coalition's work. For example, organizing the coalition may require a full-time coordinator who would be primarily responsible for scheduling, documentation of decisions and internal communications during the first year. Other potential staffing needs may include a website manager, GIS skills, and policy and economic expertise. Coalition members may be able to provide expertise in some of these areas.

Advocacy for Effective Policies

The power of seemingly disparate organizations speaking with a united voice as a coalition could help ensure that existing policies are improved, that new policies are more effectively crafted, and that sustained funding and necessary capacity are provided to implement the directives and achieve their intended purposes.

Establishing a rapid response fund

The National Plant Board has proposed a $500 million rapid response fund for invasive species. The coalition may consider supporting this proposal if appropriate, or developing support for such a fund specifically to respond to outbreaks of introduced pathogens and insects.

Preventing new introductions

If the coalition decides to pursue a goal related to preventing introductions of as yet unknown pathogens and insects, there are several types of work in which it could engage. Those interviewed as part of this study proposed various ideas. The coalition may want to consider all or a subset of the following suggested policy actions in addition to generating its own, and act to advance them:

- improvements to USDA's regulations pertaining to import of plants for planting (Quarantine 37);
- monitoring of solid wood packaging material and reporting on the efficacy of the International Standards for Phytosanitary Measures (ISMP 15), and if efficacy is found to be insufficient campaign to adopt improvements;
- improved risk assessment of potential invaders, including research into obscure pathogens and insects in potential source countries;
- and reduced transport of pathogens and insects across North American national borders.

Sudden oak death symptoms on tan oak leaf (J. O'Brien, USDA FS).

Eradicating existing infestations

In addition to the policies suggested above, increased regulation and inspection of plants shipped interstate was suggested as a possible way of preventing the spread of already established introduced pathogens and insects.

Many interviewees also responded that more research into effective methods of control is needed. The coalition may want to consider how to promote such research.

Incentives and Recognition for Voluntary Actions

Identifying tree safe practices

Prevention was identified as one of the most important actions to abate the threat of introduced pathogens and insects. For example, the European gypsy moth, which was purposefully introduced in 1869 and accidentally spread, is a lesson in the high costs of neglecting preventative measures. Over a century later, the gypsy moth costs the U.S. Forest Service $11 million on control annually. The risks of allowing a single pest or disease to become established, for example the Asian gypsy moth—a perhaps more threatening relative of the European moth, strongly suggest that effective prevention is critical.

Historic gypsy moth mist blower (USDA FS).

The Nature Conservancy has developed the concept of a "Tree Safe" program as a potential strategy that would lessen the risk of pathogen and insect introduction and spread. The program is based on working with industries that have been pathways for introductions in the past to develop, test, apply, and publicize best management practices.

The program as envisioned would focus on the shipping and packaging and nursery industries, as both packaging (crates and pallets) and nursery plants are demonstrated pathways of introduction. The nursery industry was chosen as an especially important focus because expansion of introduced pathogens and insects could devastate large segments of that industry; they could cause widespread interruption in nursery operations when infected livestock must be recalled or if stricter regulations must be implemented. If the cost of preventative measures could be made reasonable—and the burden shared by all who benefit from closing these pathways—adopting voluntary guidelines could be a way to increase market share and reputation (see "Providing incentives" strategy below).

The first component to the program is the establishment of industry-specific guidelines intended to reduce or eliminate the risk of introducing and spreading insects and pathogens. The coalition will work with industry representatives to develop the specifications and a strategy to facilitate voluntary adoption, and to help ease the burden on participating businesses.

Once specifications have been developed, the Tree Safe program should demonstrate the practices in action by establishing pilot programs with individual companies in the relevant industry. The coalition will offer financial and technical assistance, as well as publicity of their willingness to protect America's trees.

Criteria for selecting appropriate pilot programs for implementation may include:

- biological factors, considering both which ecological systems are under greatest threat and which introduced pathogens or insects are creating that threat;
- media market size, ideally a market large enough to reach a significant population but small enough so that pathogen and insect marketing can be competitive without being prohibitively expensive;
- political factors;
- geographic representation or distribution;
- and size of the company, as participation of larger companies that have control over a significant market share would reduce a greater proportion of risk.

For example, guidelines developed by the nursery industry might be tested in the Pacific Northwest, the Great Lakes area (most likely Ohio and possibly Wisconsin or Indiana), and Georgia (specifically Athens, Augusta, or Savannah). While many areas are vulnerable to future infestation and could be selected based on biological factors, these regions are advantageous because of their mid-size media markets, the political influence of the state, and the geographic distribution.

Once the program is tested and deficiencies overcome, the coalition would work to increase its geographic scope. The coalition might also explore whether the program could serve as a model in other industries or sectors.

Again, it should be emphasized that the Tree Safe program is only one example of a strategy to aid in prevention of the introduction of pathogens and insects through industry guidelines and public marketing. The coalition will undoubtedly have its own ideas, and all possibilities should be thoroughly considered.

Emerald ash borer adult (D. Cappaert).

Providing incentives to adopt tree safe policies

The coalition should develop incentives that will encourage wider adoption of practices non-threatening to trees, as well as raise consumer awareness about the threat and the voluntary participation of businesses in solutions. As a way to raise awareness and support progressive industries, the voluntary guidelines might be developed into a certification program, similar to programs developed by the Sustainable Forest Initiative and by the Quality Assurance Institute.

An effective tool employed by both of these programs is a recognizable logo. Similarly, products sold in compliance with tree safe

regulations would display a "Tree Safe" logo, developed and trademarked by the coalition. Once this logo becomes easily recognizable, growers, builders, and other citizens would become more aware of the threat to America's trees. Public awareness would translate into reputational and market share benefits, as buyers will be able to choose products made safely, and in doing so will encourage more industries to adopt Tree Safe standards. The expansion of the Tree Safe program has the potential to exponentially swell the benefits.

Even in absence of the logo program, the efforts of participating industries could be advertised to the public. This would provide an opportunity to educate the public on the issue, modify consumer behavior, and test marketing messages in selected locations.

Recommendations on Specific Messages or Outreach Themes:

- Consistency is key; messages should draw on best available scientific findings.
- Sensationalism and hyperbole could erode credibility and lead to a "Chicken Little" perception.
- Forests and urban trees require maintenance and investment for a variety of reasons.
- Visually compelling materials will be most effective.
- Highlight economic values of potential losses, for example: forest products, replacement value of street trees, and eco-system services.
- Focus on what we stand to lose, instead of what we're combating.
- Help the public to feel responsible for their actions.
- Focus on specific audiences and tailor messages (by region and level of knowledge) that will be relevant and appropriate.

Increasing Understanding and Awareness

The goal of increasing the current level of understanding and awareness is two-fold: one, disseminating what is currently known about introduced pathogens and insects in order to raise awareness about the threat; and two, generating a demand to expand on what is currently known with additional research.

Marketing to create public support

What must be done to overcome this perceived lack of awareness? What messages will most effectively communicate the importance of proactively dealing with the introduced pathogens and insects that are already here and stemming the tide of these unwanted hitchhikers? How can improved awareness be translated into actions that will protect our nation's trees? These would be key questions that the coalition could jointly answer through developing and testing market messages and materials. Based on interviewees' responses, the following ideas could be a starting point for crafting an effective marketing campaign for a more informed, supportive public.

<u>Messages and Media</u>

Among interviewees, there is general consensus that the message should be a positive one, focusing on the importance of the resources at risk rather than using scare tactics about the threat itself. In addition, messages will be most credible if they are consistent and based in current science. Effective messages must be made relevant for each intended audience, which may mean tailoring materials to a specific pathogen or insect, knowledge level, perspective, motivating concern, and/or geographic region.

Messages would highlight the urgent necessity to protect the nation's trees in both urban and wild settings by describing the various values—economic, ecological, aesthetic, and spiritual—that we ascribe to

them, even if those values may sometimes be taken for granted. To achieve this, marketing pieces may employ poignant visual imagery that highlights the grandeur and value of trees: for example, a tree swing in someone's backyard, a family hiking through a mature hemlock forest in the Appalachians, or a pro baseball player swinging an ash bat.

Marketing messages could also remain positive by emphasizing the role individuals can play in ensuring that future generations can also enjoy healthy trees. Interviewees were concerned about a lack of individual responsibility prevalent among the public, and some hoped that the coalition might educate people about their role in preventing the spread. Outreach on specific organisms, how to recognize them, and who to contact when they are encountered could be a primary way to engage the public in assuming this responsibility. Some messages may need to be tailored to local conditions to remain credible. While localized messages may be an important starting point, such messages should be placed in a broader context so that individuals better understand the scope of the issue and may more willingly support large-scale, overarching solutions.

In addition to providing information about identifying and reporting infestations, the public could also be enlisted in other activities: cleaning hiking boots, not transporting firewood, seeking more information about introduced forest pathogens and insects, selecting products that minimize the risk of introducing or spreading forest insects and pathogens, and contacting elected officials.

Interviewees noted that dramatic case studies could be especially effective in communicating a message. USDA and the Forest Service, for example, published "A Portrait of Success: Chicago vs. the Asian Longhorned Beetle".[8] The story was dramatic because it described what it was like for hundreds of trees to be removed in just a few days, but it was also positive because it highlighted what can be accomplished with an engaged community, sufficient resources, and political will.

Ward's nursery in Great Barrington, MA.

The preferred medium may depend on selected audiences and messages appropriate to each. Trade and association journals may be excellent tools for reaching specific economic segments; television advertisements, documentaries, public radio shows, or newspaper features (either as articles or insert sections) may be required to reach a broader audience. Consumers of specific forest products may be reached through information on packaging, such as the information cards that have been distributed throughout New England with maple syrup products.

Interviewees also suggested that the coalition should have a recognizable spokesperson, someone credible who could galvanize public

[8] Judy Antipin and Thomas Dilley, "A Portrait of Success: Chicago vs. the Asian Longhorned Beetle," December 2004, USDA Forest Service, 21 June 2005 <http://www.na.fs.fed.us/spfo/pubs/misc/albsuccess/alb_success.pdf>.

support for the protection of native trees. If the coalition decides that such a person is necessary, the coalition would need to discuss whether a celebrity or an animated figure, similar to Smokey the Bear, would be more effective.

In addition to drawing on the collective outreach experience within the coalition's membership, the coalition may want to hire marketing consultants early in the planning stages. Polling data on specific language (presently "introduced forest pathogens and insects" is being used) and content could also be helpful in refining messages. The Nature Conservancy has some internal capacity that may be able to assist with these efforts. The Ad Council, who worked with the USDA Forest Service and the National Association of State Foresters in promoting Smokey the Bear's message, is another possible resource.

Audiences

Interviewees recommended a wide range of audiences; however, although the need to raise awareness is a shared priority, mass marketing to the general public may not be appropriate. Some of the recommended audiences may represent a better opportunity to inform and engage the public than an overly general campaign. Selected audiences should include those that can directly reduce the risk of introduction and spread through their behavior, or those that can indirectly reduce risk by encouraging direct action by others, particularly elected officials and other decision makers. While this broad definition could apply to everyone, the opportunity to reduce the risk posed by introduced pathogens and insects is not uniform across the population; the coalition should identify those individuals who are in the best position to affect these outcomes. The coalition may consider focusing marketing on the non-industrial, private forest landowners, who own approximately 45% of forests nationwide.[9] Some of these landowners may be reached through an association; however, the vast majority (some 95%) does not belong to such organizations and would have to be reached in other ways. Another group of high opportunity is homeowners, particularly those who live in urban and suburban areas that have lost trees and those near the wildland-urban interface and whose actions may have more immediate, lasting effects on forested landscapes. See the "Potential Audiences" text box for other key groups identified through the interview process.

Potential audiences include:

- Non-Industrial Private Forest Landowners
- Homeowners
- "Green Public" (members of environmental organizations or "friends" groups, gardeners, birders, etc.).
- Industries that have a role to play in prevention – reducing threat of intro and spread.
- Industries that have an economic stake in healthy trees
- Consumers of the industries listed above
- Recreation community (hikers, anglers, hunters)

Several interviewees cited the importance of developing a future constituency for healthy forests. While educating children—either through incorporation in K-12 curriculum or through other means—could be a valuable and necessary long-term goal, this may not be the best initial focus for the coalition. The coalition members may consider whether and how to address this need.

[9] Privateforest.org, The Nature Conservancy, 21 June 2005 <http://www.privateforest.org/>.

Some respondents indicated that marketing campaigns should be initiated in areas that had already been affected; others, however, thought it more constructive to start in regions that were significantly threatened, but were not yet affected. This may be one variable that the coalition may wish to test in specific media markets in order develop its marketing strategy. Another focus may be media markets in key congressional districts.

Marketing may be most effective if it began in places where the coalition is advancing other initiatives. For example, if the coalition decides to promote a "Tree Safe" program (as described above), marketing may begin in the same three regions selected for the pilot program. In this way, successful messages and target audiences can be determined through polling and focus groups before expanding the marketing campaign to a national level.

Integrating and funding economic research

The coalition may consider economic data as a convincing platform on which to build the case to address introduced pathogens and insects. Accurate estimates of the financial costs of enacting preventative measures and of eradicating established pathogens and insects are not available. Such an assessment may be especially helpful in convincing industries to adopt best management practices, and for securing government action and funding directed towards abating the threat—sectors less likely to be responsive to the aesthetic or spiritual case for tree preservation. Said one interviewee, "The more this can be scientific rather than emotional or anecdotal, the more successful this will be with industry."

Reliable data are needed on the economic impact on forest-product industries, as well as industries whose business may be interrupted by findings of infestation; some of these data may be even more useful if analyzed regionally. Some existing economic analyses have examined the loss of street trees (removal and compensatory damages), but estimates of the economic consequences on forests and timberlands have not been developed for most of these introduced species. One of the few existing estimates is for emerald ash borer, which could cause $1.7 billion in losses in Michigan alone and as much as $25 billion in the Eastern states.[10] Numbers like these are orders of magnitude greater than the costs of control, but this story cannot be told in many specific circumstances.

Oak firewood for sale in California (J. O'BrianUSDA FS).

Few, if any, economic studies have attempted to quantify the ecosystem services that healthy forests provide. These services are often taken for granted, but it would be harder to ignore the vast sums that would be assigned to healthy forests when considering their role in erosion

[10] USDA APHIS. Federal Register (Vol. 68, No. 198), October 14, 2003.

control, water filtration, climate moderation, and providing wildlife habitat.

Even when research into the financial cost of introduced and established pathogens and insects—both in terms of the heavy cost of eradicating them and the resources they render unusable to industries dependent on forests—has been conducted, this information is often not readily available. To make this research accessible, someone must gather existing economic research. If the coalition determines that economic research is a priority, it may want to hire an economist for this task. This information could be used in a strategic marketing plan, and as a tool for effective lobbying.

Undoubtedly, once existing economic research has been compiled, gaps will be identified where studies remain to be done. With a clear identification of the limits of existing studies and the need for more information, the coalition may pursue funding for additional research, for example through organizing matching funds.

Moving Forward: Facing Challenges and Seizing Opportunities

As described above, and as will be even more clearly articulated by the coalition in the future, there are specific strategic actions that the coalition could implement to better protect our nation's trees from the scourge of introduced pathogens and insects. Although there are challenges to addressing this threat, the formation of a coalition also opens up many opportunities.

Challenges

Engaging the American public in the issue of introduced pathogens and insects has been difficult because most people know very little about this particular threat. This may partly be because the issue has not been presented in a way that encourages a deep or personal connection. The challenge may be, then, to emphasize that trees, which people already value, are under threat, rather than offering a thorough description of introduced pathogens and insects and how they kill trees. In addition, people see pathogens and insects on a regional rather than on a national level and a landowner may want only to eradicate an insect established in his or her yard, not to prevent future introductions; people may not realize that trees across America are threatened. Said one interviewee, "Unless you live there you don't realize that a whole tree species is dying around you." Rather than appreciating the full magnitude of this problem, this tendency to focus on localized threats hinders communication, funding, and the momentum needed to implement national changes in policies. The media coverage exemplifies the public's awareness of only local pests: the *Los Angeles Times* has published only one article since 1985 that mentions

the Asian longhorned beetle but innumerable articles dealing with sudden oak death, whereas *The Chicago Tribune* has covered the Asian longhorn beetle extensively, but has published only three articles mentioning sudden oak death since 1985.

Aside from challenges in reaching a broader public, many environmental organizations interviewed have voiced hesitancy in prioritizing introduced pathogens and insects because it lies outside of the traditional scope of their mission statements. For example, an environmental group may not sign onto the coalition, even though preserving forests is a priority, because protecting oceans is more critical and there are simply not enough resources to cover both issues.

Perhaps the greatest challenge in engaging people knowledgeable about introduced pathogens and insects will be demonstrating that effective action can be taken. Because pathogens and insects already seem so widespread and because there are so many pathways, the task has seemed too daunting to address; this apparent hopelessness has hindered progress towards abating the threat in the past.

The broader political climate also poses a challenge, by emphasizing deregulation and a focus on private economic interests as opposed to strengthening regulations that would hinder some economic activities in order to protect a beneficial public resource such as healthy trees, forests, and parklands.

In pursuing the coalition's policy agenda, a lack of funding will be one of the greatest challenges to overcome. Federal and state programs have not been favored with sufficient funds, yet in the future resources will need to be redirected to address new, unforeseen pathogens and insects. In addition to lobbying for dedicated funding from congressional sources, the coalition may consider pursuing funding through alternative sources, such as user fees imposed on importers when those imports can transport forest insects and diseases.

Northern hardwoods (F. Lowenstein, The Nature Conservancy).

Without key information, making a persuasive case for measures that protect trees will be challenging. For example, available economic data are not adequate to support arguments that preventative measures now will cost less than eradication efforts later.

As in any coalition, though there may be a common vision, the details by which the coalition's goals will be achieved may cause conflict among members and between the coalition and partners with whom it is working to achieve goals. For example, spraying insecticides in order to control the gypsy moth could upset people and make them less supportive of eradication efforts. In addition to controversial control methods, some industries have expressed concern over being blamed for introducing or spreading pathogens and insects. For example, a nursery may not want to be in a coalition in which another member blames it for bringing sudden oak death into a new region.

Opportunities

The coalition is unique because it will bring together a number of groups representing disparate and often inconsistent interests. This gives the coalition an opportunity to garner extra attention in the media and among policy makers, as well as lending it stronger public credibility. Another advantage of a broad-based coalition is that these groups may find that they have a lot of issues to talk about, and whether they agree or disagree they will be able to learn from each other. In addition, this coalition may pave the way for future collaborations of a similar nature.

Although people are largely unaware of the gravity of the threat posed by introduced pathogens and insects, awareness is growing, especially among Congress, the media, influential organizations, and the public. The coalition is in a position to expand on this growing awareness, and engage more people in protecting our trees. Once people are engaged in and care about the trees, there could be a dramatic ripple effect into other environmental areas. For example, if a landowner set about protecting his or her property from the emerald ash borer, perhaps the landowner would come to realize that trees are also essential in maintaining water quality.

Industries may value the coalition as a way of publicly working toward positive environmental change. One representative from the logging industry commented that, although people are dependent on forest products, they often see loggers as the bad guys. This coalition is an opportunity for industries to change the public's perception of them, and let the public see that they do care and that the livelihoods of people in the industries depend on preserving trees into the future.

There is an opportunity in the political arena to connect politicians and members of Congress to specific areas as certain districts are damaged. For example, the Asian longhorned beetle outbreak put Ravenswood, Chicago on the map for many politicians and brought Mayor Daley close to his community. The issue lends itself to broad political support in that it has more bipartisan support than the majority of environmental issues, and members of Congress have been working together across both geographic and party lines. Greater efforts are underway to coordinate across state lines.

Increasing communications could result in improved coordination of responses to introduced pathogens and insects. For example, communication could be effective in containing sudden oak death, which people fear will spread nationally, or in prompting more rapid responses to a future, as yet unidentified, introduction.

Offering a coherent plan gives people something to subscribe to, and overcomes the prevalent sense of hopelessness surrounding so many environmental issues.

Gypsy moth defoliation
(USDA FS).

Where do we go from here?

There are clearly obstacles to overcome, but there is an urgent need to address proactively the threat of introduced pathogens and insects. As expensive as preemptive strategies may be, those costs are a small fraction of the values that stand to be irrevocably damaged by these infestations. A coalition effort will create a forum where shared goals can be realized and resources shared to achieve them. A coalition will provide a framework for understanding the overall scope of the issue, while also creating the opportunity to pool information and expertise to address the threat on an appropriate scale.

What will it take to give this issue the attention it demands, and to ensure that collective response is sufficient to eliminate the threat? This document begins to articulate the vision for some possible steps, but the first step is making a commitment to address this issue. We hope that your organization will participate in the coalition.

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