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in the United States

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MR. CHAIRMEN AND COMMITTEE MEMBERS:

In the mid-1700's, naturalist John Bartram took a trip through Pennsylvania, observing the flora and fauna. In his diary, Mr. Bartram wrote about the different kinds of trees he saw during the journey. The most frequently encountered trees were white and black oaks, followed by eastern white pine, American chestnut, a tree that he called spruce but probably was eastern hemlock, hickory, sugar maple, American linden, pitch pine, elm, American beech, and white walnut or butternut (Table 1).

What has happened to these tree species, since that walk almost 250 years ago, is a national tragedy. Exotic pathogens and insects, sometimes referred to as alien, introduced, or non-indigenous pests, have devastated many of the species on this list. Bartram's most commonly encountered species were white and black oaks. Currently, these species are the preferred food of the European gypsy moth, an insect that was intentionally imported into this country. Eastern white pine populations have been heavily damaged by white pine blister rust, which was imported on diseased nursery stock. The American chestnut, once comprising 25 percent of the eastern hardwood forest, has been essentially removed from eastern forests by the chestnut blight fungus. Where American chestnut once grew to over 150 feet in height, only short-lived sprouts now exist, coming from the root-systems of long-dead stems. Eastern hemlocks, important to plants and animals in mountain riparian zones, are currently being eliminated by the hemlock woolly adelgid. Sugar maple and American linden are subject to severe defoliation by exotic thrips species. The American elm, that once shaded our streets and houses, was removed by Dutch elm disease, a disease brought to this country on elm logs imported from Europe. Beech bark disease complex, a combination of an imported scale insect and native and exotic fungi, has killed approximately 94 percent of the beeches in northeastern forests, reducing this once proud species to thickets of sprouts. Finally, butternut is being extirpated from eastern forests, as butternut canker disease moves from southern forests into the Lake States and New England.

Exotic pests have been damaging American forests for over 150 years. Many exotic pests have arrived in this country on shipments of diseased nursery stock or on logs that were not properly sanitized. There are other avenues of importation, however, as shown by the recent arrival of Asian gypsy moths on ships transporting grain to the Pacific Northwest and military equipment to the South. Some pests are species specific, e.g., butternut canker kills only butternut trees, while other pests attack a broad range of species. e.g., gypsy moth feeds on over 200 different plant species. Currently, there are estimated to be over 20 harmful exotic pathogens and 360 harmful exotic insects known to attack trees and shrubs in the United States.

In general, eastern forests have been more heavily impacted by exotic pests than western forests. The East was colonized by Europeans at a relatively earlier date, and a number of intercontinental trade routes were established long before western trade routes were developed. Additionally, eastern forests generally are more diverse (with the exception of California), thereby providing more opportunities for establishment of pests to feed on closely related host species. Exotic pests will likely increase in the future due to the number of importations from countries that formerly had trade restrictions with the United States, e.g., Russia and China, or in response to a need for more fiber and wood in the United States. Northern, southern, and Pacific Coasts forests all contain numerous ports-of-entry and correspondingly, have a high potential for the introduction of new pests when compared to the Inland West and Alaska.

The impact of exotic pests extend beyond their host species, to flora, fauna, and sometimes, the environment associated with the host. The true environmental and economic costs of forest damage by exotic pests is difficult to assess. Estimation of lost commodity values are easier than for non-commodity values. For example, lost timber revenues from exotic pest damage can be estimated, and are believed to be at approximately $2 billion annually. In contrast, how can a monetary figure be assigned to the loss of the aesthetic value of a mountain stream when the surrounding hemlocks die from hemlock woolly adelgid?

The management approaches in the Forest Health Panel's report to minimizing exotic pests in forest situations differ significantly in results. Timber management for financial efficiency would control exotic organisms on economically important species or when required under law, but generally would not provide for control on non-commercial species. An integrated management approach would pro-actively manage to control exotic organisms in relation to the importance of values associated with the host species or land base. Management with no commodity extraction generally would not seek to control exotic organisms. Pest epidemics on lands under this management strategy could affect surrounding properties that are managed for different values. Additionally, the lack of infrastructure on these lands would make any control effort expensive and have limited effectiveness.

Closing Statement

In closing, I offer the following opinions.

Minimizing exotic pests in our forests extends beyond the management approaches in the Forest Health Panel's report and into the realm of policy. The 1993 Office of Technology Assessment's report on harmful non-indigenous species cites the lack of a national policy on harmful introductions, antiquated Federal and State regulations, and the need for better environmental education, accountability, faster response, and adequate funding as critical deficiencies to safeguarding our national interests from exotic pests. These deficiencies must be successfully addressed in order to halt or slow the unnatural conversion of our forest ecosystems.

The public attitude toward exotic pests is somewhat unique. Currently a myriad of views exist on how forests should be managed or not managed, dependent upon the relative importance of certain values. Debates among parties with different viewpoints can be heated and frequently resolved only through litigation. However, there is a universal distaste for these non-native pests that are damaging our forest ecosystems, regardless of individual, agency, citizen's group, or corporate viewpoint. Therein lies common ground among all that are concerned with forest ecosystems and the environment in general. Where there is common ground, a cooperative planning process can begin to manage our forests wisely for the multiple values that they can provide. Hopefully, the Panel's submitted report and today's joint hearing will be the initiation of this process that will provide the foundation for properly addressing the overall health of our nation's forests.

Table 1. Frequency of species observed by naturalist John Bartram in a 1751 trip through Pennsylvania (from Hicks, 1997).

Species	Number times mentioned	Ranking
White and Black oak	25	1
White pine	12	2
Chestnut	10	3
Spruce (Hemlock)	10	3
Hickory	8	4
Sugar maple	8	4
Linden	7	5
Pitch pine	7	5
Elm	6	6
Beech	6	6
White walnut (butternut)	6	6
Birch	5	7
Poplar	4	8

Ash	4	8
Sugar birch	3	9
Great magnolia	3	9
Locust	2	10
Walnut	1	11
Hophornbeam	1	11
Plane tree (sycamore)	1	11