



File Code: 1950

Date: February 16, 2006

Dear Friends of the Forest:

I propose to release field-gathered Laricobious beetles (*Laricobius nigrinus* Fender) in two hemlock stands that are infested with hemlock woolly adelgid (*Adelges tsugae* Annand) or HWA. The purpose of this release is to accelerate the establishment and evaluation of this predator beetle for control of HWA. The proposed release would occur in early spring 2006 on two separate areas of the Marlinton/White Sulphur Ranger District: 1) Compartment 653, Stand 001 in Greenbrier County near Lake Sherwood Developed Recreation Area, and 2) Compartment 55, Stand 27 in Pocahontas County near Pocahontas Campground. Several hundred beetles would be attached to a few HWA-infested hemlock trees within each stand. See vicinity map.

Monitoring and evaluation efforts would continue post-release to document the establishment and dispersal of the beetle and to evaluate its effectiveness in reducing HWA population densities and protecting hemlock health on a stand level basis. Forest Health specialists from USDA Forest Service Forest Health Protection would be responsible for selecting the release sites within the aforementioned stands, conducting the releases and monitoring beetle dispersal.

PUBLIC INVOLVEMENT

I am seeking public comment on this proposal. I encourage you to read the remainder of this letter and consider this proposal. Please send concerns and comments to District Ranger, Marlinton Ranger District, P.O. Box 210, Marlinton, WV, 24954. Phone 304-799-4334. If I decide to move forward with this proposal, it will be critical that the beetles be released by early March. For this reason, **I must receive your comments no later than February 28, 2006.** Only those individuals who comment on this proposal or otherwise express an interest will receive a copy of the final decision documentation. If you have technical questions you may call or write Richard Turcotte, USDA Forest Service, Forest Health Protection, 180 Canfield Street, Morgantown, West Virginia, 26505. Phone 304-285-1544.

BACKGROUND ON HEMLOCK WOOLLY ADELGID

The HWA is native to Japan. It has two generations a year on hemlock, with each adult adelgid producing between 50-300 eggs. Despite a natural mortality rate of 30-60%, HWA reproduction potential remains exponential. Significant natural mortality is attributed to two likely causes: 1) extended period of cold temperatures when the adelgid is susceptible; and/or 2) sufficient loss in the nutritional quality of the food source which is associated with the decline in health and vigor of the host tree. The HWA feeds on plant fluids and can kill a mature hemlock tree in about five to seven years depending on other environmental stresses. It feeds on all life stages of hemlock from seedling to mature old growth tree. The wind, birds, and mammals move HWA. It has the potential to infest the entire range of eastern hemlock in the next 30 years. Existing natural enemies capable of maintaining low-level HWA populations are nonexistent in the eastern United States. Management of HWA populations will require the establishment of biological control agents if we are to succeed at reducing the impacts of HWA on hemlock in the forest environment.



HWA was first reported in the western U.S. in the 1920's. HWA on western hemlock species appears to be harmless, and these species are believed to be resistant, as little damage has ever been reported. In the east, HWA was first reported in the 1950's near Richmond, VA. Here it was considered to be more of an urban landscape pest and was controlled using a variety of insecticides using ground spraying equipment. Observations of the HWA were periodically reported in several mid-Atlantic states in the 1960's and 1970's but it wasn't until the 1980's that HWA populations began to surge and spread northward to New England at an alarming rate. By the late 1980s to early 1990s, infestations of HWA were reported to be causing extensive hemlock decline and tree mortality in hemlock forests throughout the east.

Control of the HWA on individual trees in the urban landscape can be accomplished using a number of insecticides including horticultural oils and insecticidal soaps, providing there is access to the trees for ground spraying equipment and the entire crown can be saturated. In this scenario, trees must be treated annually to protect them from damage by HWA. There are no insecticide treatment options available for controlling HWA in the forest environment. For this reason, entomologists sought out potential natural enemies of the HWA in its native habitat.

Laricobius nigrinus is a tiny (< 3 mm) beetle native to the western North America. It has been found in close association with HWA on western hemlock in British Columbia where HWA is not considered a forest pest. *L. nigrinus* was imported into Virginia from British Columbia, Canada in 1997, and has since been screened in quarantine and evaluated to determine its suitability as a bio-control agent for HWA in this country. Extensive laboratory and field tests conducted by VPISU scientists have demonstrated *L. nigrinus* to be an excellent natural enemy of HWA. In 2000, the USDA Animal and Plant Health Inspection Service (APHIS) issued Permit Number 48928 to Virginia Polytechnic Institute and State University to release *L. nigrinus* in Virginia.

HWA is a serious pest in the United States of eastern hemlock (*Tsugae canadensis*) and a threat to Carolina hemlock (*T. caroliniana*). The latter tree species found only in the southern region of the Appalachian Mountains. The range of HWA is expanding rapidly each year. HWA has established in eleven eastern states from North Carolina to Massachusetts, and tree decline and mortality has increased at an accelerated rate since the late 1980s. For example, in the Shenandoah National Park hemlocks have declined drastically over the past nine years. In 1990, greater than 90 percent of the hemlocks were in a healthy condition. Today less than 10 percent are in a healthy condition. New Jersey has estimated a loss of 9 percent of its hemlock resource and 44 percent remains moderately to severely impacted. Similar HWA-caused impacts are also affecting most districts of the Monongahela National Forest.

PURPOSE AND NEED FOR THE ACTION

If no treatment occurs, HWA populations would increase and decrease naturally, without intervention in eastern hemlock forests. Because HWA has a high reproductive capacity and has demonstrated the ability to rapidly spread in recent years, it is expected that HWA populations would continue to increase throughout the currently infested area and accelerate its spread to currently non-infested areas. Population densities would likely fluctuate periodically depending on severity of winters but this would likely be localized to the more northern climates and short in duration (1-2 years). HWA populations quickly rebound following such events and consequently, impacts to hemlock resources throughout the range of eastern hemlock would likely increase as more hemlocks succumb to this pest.

Eastern hemlocks are an important component of the forested ecosystems on the Monongahela National Forest. They contribute to high quality water and important habitat for both aquatic and terrestrial wildlife species. Loss of hemlock populations will likely cause degradation of these resources. The Monongahela Forest Land and Resource Management Plan (Forest Plan) calls for the use of integrated pest management strategies to minimize or prevent the development of pest problems (Forest Plan, p. 92).

Chemical control of HWA is not an option for hemlocks within the general forest. *L. nigrinus* may provide lasting and effective control in a cost efficient manner. If some type of control is not implemented the entire hemlock resource within eastern forests could be lost in just a few decades.

FREQUENTLY ASKED QUESTIONS

Could *L. nigrinus* impact other native predators or parasites that rely on HWA as a food source? - There are no known parasites of HWA in either this country or their country of origin. There are no other arthropod species federally or state listed as endangered or threatened that utilize HWA as a food source; hence, no such species will be affected by the release of *L. nigrinus*. Of the native or introduced beetles found in the natural hemlock habitat, none appear to be dependent on HWA and all have an alternate host preference. Beetle predators sometimes found associated with hemlock habitat include: twice-stabbed lady beetle *Chilocorus stigma* (Say) which predaes on hemlock scales; Halloween beetle *Harmonia axyridis* Pallas which primarily feeds on aphids but will opportunistically feed on adelgid; *Scymnus suturalis* Thunberg, a common predator of the *Pineus* sp. but will occasionally be found feeding on HWA; and *Laricobius rubidus* LeConte, a derodontid beetle that feeds primarily on *Pineus strobi* on white pine but will also feed on HWA. Brown lacewing, midge and syrphid larvae have also been observed in association with HWA in Connecticut but in low numbers; these larvae are sometimes associated with egg masses of the HWA at low densities but all are generalists and prey on mites, aphids and other insect larvae. None of these predators either individually or collectively have a substantial impact on HWA populations.

Could *L. nigrinus* become a nuisance to human habitations? - Behavioral studies indicate that *L. nigrinus* does not aggregate in large numbers prior to overwintering, as was the case with another non-indigenous lady beetle, *Harmonia axyridis*, which was introduced into the U.S. for biological control of aphids. *L. nigrinus* does not leave the forest to over winter and observations suggest that this species hibernates in the leaf litter. *L. nigrinus* has a narrow host range and based on the work by VPISU scientists in 2002 was only able to complete its development on HWA and is an adelgid specialist. *L. nigrinus* populations are expected to decrease as HWA densities decline. In contrast, *H. axyridis*, a generalist predator, is able to maintain high densities by switching over to other more abundant prey.

Sincerely,

/s/ Rondi L. Fischer
RONDI L. FISCHER
District Ranger