



**USDA FOREST SERVICE
NORTHERN RESEARCH STATION,
NORTHEASTERN AREA, REGION 8**



**2008 REQUEST FOR RESEARCH AND TECHNOLOGY DEVELOPMENT PROPOSALS
TO IMPROVE MANAGEMENT OF HEMLOCK WOOLLY ADELGID**

The hemlock woolly adelgid (*Adelges tsugae*) is a non-native insect that is a threat to hemlocks (*Tsuga canadensis* and *T. caroliniana*) in the eastern United States. First observed in 1951 in Virginia, hemlock woolly adelgid (HWA) is now present in 17 states (Maine to Georgia and west to Kentucky), causing decline and mortality of hemlocks. Without effective controls, HWA will continue to spread and threaten the sustainability of hemlock as a forest resource throughout eastern North America. The native range of the hemlock woolly adelgid includes eastern Asia and western North America. In these areas, adelgid populations rarely cause damage, probably because of co-evolved host resistance and a complex of natural enemies. The absence of these natural control mechanisms in eastern forests will result not only in the loss of hemlocks, but it also threatens to produce cascading ecological effects unless something is done to mitigate this invasive pest. Additional information on HWA can be found at the website <http://na.fs.fed.us/fhp/hwa/index.shtm>.

The goal of the USDA Forest Service is to provide information and methods which can be used to reduce impacts of HWA. The tools include biological control, silviculture, host resistance, chemical control, quantifying and scaling environmental and socio-economic impacts, regulatory efforts, and increasing public awareness. In 2001, the USDA Forest Service in cooperation with the National Association of State Foresters and the National Plant Board proposed a 5-year program that would accelerate development and implementation of management options to reduce the spread and impact of hemlock woolly adelgid. From 2003-2007, this "Hemlock Woolly Adelgid Initiative" has involved researchers and resource managers from 4 federal agencies, 20 state agencies, 24 universities, 7 institutions in China and Japan, and more than 9 private industries. Accelerated research and technology development during the 5-year initiative resulted in a significant increase in our knowledge of hemlock woolly adelgid and its impact on hemlock resources. New management strategies have improved short-term control and provide opportunities for a long-term solution for this devastating pest. The most important accomplishments during this initiative were:

- Two new predatory beetles (*Laricobius nigrinus* and *Scymnus sinuanodulus*) for HWA biological control have been established and the range of *Sasajiscymnus tsugae* has been expanded to 15 states.
- A systemic insecticide (imidicloprid) is registered for use in the forest environment and methods that increase its effectiveness have been developed.

- Resistant hemlock genotypes either of putative susceptible species identified from devastated landscapes or through breeding with resistant species are under evaluation and development.
- Molecular genetics has been used to pinpoint the origin of HWA and hypothesize that several distinct populations of HWA occur worldwide.
- Improved assessments of impact have been developed through classical economics and remote spectral sensing.
- Several survey methods were developed which can be tailored to objective.
- Silvicultural studies were initiated on public lands to determine whether thinning hemlock-hardwood stands to improve tree vigor in advance of HWA will minimize hemlock mortality once infested.
- Information transfer has greatly improved access to available information: a website dedicated to HWA is in place that provides both the public and researchers with up to date information; three symposia were held that provided a forum for managers and researchers to discover what is being done over the full range of topics; and proceedings from the symposia were published that serve as quick references.

The USDA Forest Service Northern Research Station and Northeastern Area and Region 8 State and Private Forestry are jointly requesting proposals for innovative projects to advance the management of the hemlock woolly adelgid in the eastern United States. Projects can relate directly to biological control, chemical control, host resistance, silviculture, socio-economic analysis, or address aspects of biology and ecology of HWA, its hosts or its natural enemies that influence the successful application of these management tactics. Priority will be given to HWA management solutions that have immediate application potential. Multi-year projects that are currently being funded by the FS can NOT be funded by this request for proposals unless a written statement is provided supporting the need for supplemental funding. Requests for proposals made in previous years were funded as follows: 2005--seven proposals on host plant resistance totaling \$375,000, 2006-- six proposals focusing on biological control totaling \$413,000, and 2007-- five proposals in several areas totaling \$252,000. In 2008, it is anticipated that \$250,000 will be available to fund selected projects.

Priority research and technology development topics for 2008 include:

- ❖ Identification of *T. canadensis* genotypes from throughout its range which should be conserved and the means to conserve them
- ❖ Information on the genetics, phylogeography, life history, host associations and interactions of *Laricobius* species which will promote their safety and establishment as biological controls
- ❖ Alternative insecticides and application methods suitable for landscape scale forest uses
- ❖ Identification and socio-economic valuation of the forest resources (hemlock trees, ecosystem structure and functions) at risk in the eastern United States due to HWA infestation and continued spread
- ❖ Value of HWA treatment options, including no treatment on HWA control, in terms of ecosystem response, public acceptance, and economic cost/benefit

- ❖ Improved methods to identify host plant resistance to HWA, including efficacy of silvicultural or other environmental treatments

Examples of other potential research and technology development topics include but are not limited to:

- Improving the establishment and spread of HWA natural enemies
- Assessing field efficacy of biocontrol agents in reducing HWA populations
- Role of *Leucopis* species in regulation of HWA in western States and their suitability as biological controls for eastern States
- Elucidating the role of environmental (i.e., site factors) and biological (i.e., host plant chemistry, genetics, physiology, morphology) factors in host plant resistance
- Improving dosage, timing, and methodology for use of systemic insecticides to control HWA
- Procedures for treatment in environmentally sensitive areas (e. g., near water) and eradication of isolated HWA populations
- Linking pesticide residue analysis to effectiveness against HWA and safe pesticide application

Proposals Due: **March 17, 2008**



Proposals will be reviewed for scientific merit, relevance to the USDA Forest Service's Hemlock Woolly Adelgid Management Initiative goals (see http://na.fs.fed.us/fhp/hwa/pub/hwa_mgt_plan.pdf), and probability of timely success. Original innovative pilot studies, as well as proposals to support the expansion of existing research and technology development programs, are strongly encouraged.

Duration of projects may extend more than 1 year, but total funds requested should not exceed \$75,000 per proposal. Yearly progress reports will be required for multi-year projects.

Projects will be funded as Research Joint Venture Agreements or Cooperative Agreements. In accordance with USDA Forest Service guidelines, indirect charges will not be provided for state cooperative institutions. Indirect charges for all other institutions will be limited to 10%. A minimum contribution equaling at least 20% of total project costs (that is, a contribution equaling at least 25% of the Forest Service contribution) must be provided by the institution.

You are encouraged to include Forest Health Protection staff on technology development proposals and scientists in NRS-3 on the research proposals as cooperating scientists. A current list of NRS-3 scientists can be found at: <http://www.nrs.fs.fed.us/units/invasivesecology/people/> Other NRS scientists can be cooperators jointly with NRS-3 scientists on these proposals.

Proposals should be submitted electronically in Microsoft Word or PDF format **by 5:00 pm EST on Monday, March 17, 2008 and should be submitted via email to mkeena@fs.fed.us – late submissions will not be accepted.** Receipt of all submittals will be acknowledged as quickly as possible.

Notification of acceptance or rejection of proposals will be made by April 4, 2008. Proposals will be submitted for processing by the Forest Service by April 15, 2008 with funding availability dependent upon Cooperator and Forest Service processing time (probably 2-5 months).

For additional information, contact:

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Proposal Format

Proposals can be of any length up to a maximum of 5 pages, 8½ x 11 inch format with 1 inch margins, typed on one side only, using 12-point font with no more than 6 lines per inch – standard spacing for 12-point font – and must include:

1. **PROJECT TITLE**
2. **PRINCIPAL INVESTIGATOR** (name, institution, address, phone, FAX, email)
3. **COOPERATORS AND OTHER PARTICIPATING INSTITUTIONS**
4. **AMOUNT REQUESTED** (yearly and total)
5. **PROJECT GOALS AND SUPPORTING OBJECTIVES**
6. **PROJECT JUSTIFICATION** (relevance and significance)
7. **RESEARCH APPROACH** (description of activities, methods, length of project, analyses)
8. **EXPECTED PRODUCTS AND OUTCOMES** (products and how they will be used)

Additional items requested but not included in the 5-page limit:

1. **A SHORT (NO MORE THAN ONE-PAGE) CURRICULUM VITAE** for each principal investigator
2. **BUDGET** using the Agreements Financial Plan formatted Excel file titled 'Agreements Financial Worksheet.xls' at http://www.nrs.fs.fed.us/units/invasivesecology/local-resources/downloads/Financial_Worksheet_for_Agreements.xls. The budget should show both requested and matching (at least 20% of total project costs) funds for the following expense categories:
 - SALARIES** (principal investigator, post-doctoral fellows, students, and technicians)
 - BENEFITS** (tuition costs are not allowable)
 - SUPPLIES**
 - EQUIPMENT** (all items; non-expendable equipment costs above \$5,000 are strongly discouraged)
 - TRAVEL**

Budgets should include **all year costs, as agreements will be funded in their entirety**. Please have your budgets checked by your grants and agreements office before submission, as the proposal and financial plan will be used directly when Research Joint Venture Agreements are set up. A minimum 20 percent cost sharing is required. Indirect charges can be used to meet the cost sharing requirement but one recent change requires some in-kind funding other than indirect charges – this can be PI salary, travel, supplies, etc.

The spreadsheet has been changed from previous years and includes several new items. First, the budget narrative (justification/explanation of budget items) is entered directly on the spreadsheet in the color coded remarks area (the color-coding relates to the column of budget data). Secondly, there are 3 columns of budget data that need to be completed for a Research Joint Venture Agreement: columns (a), (c), and (d). Column (a) is where the non-cash expenses of the FS cooperator are entered and

include any FS Co-PI salary, technical support salary, FS travel, supplies, etc. that we spend as part of our joint research. Column (c) is where the expenses that will be reimbursed to your organization by the FS are entered (e.g., the budget for the proposal). Column (d) is where your organization's non-cash expenses to obtain the 20% minimum match are entered and **must include more than just indirect charges to qualify as joint research**. Thirdly, the new column on FS non-cash expenses are required in order to classify the agreement as a Research Joint Venture Agreement; they are included in the calculations of the agreement's total expenses and increases the 20% level of cost sharing accordingly. If you have any questions about these new requirements, please feel free to contact us.

3. TIMETABLE

4. LITERATURE CITED

