NEWS from the CENTER FOR INVASIVE PLANT MANAGEMENT

August 2009

In This Issue

New Plastic Weed Models Are Here!

The long-awaited perennial pepperweed, garlic mustard, purple loosestrife, and saltcedar (tamarisk) models are on sale now. The four original models--spotted knapweed, yellow starthistle, leafy spurge, and Dalmatian toadflax--are also restocked and ready to ship. Visit the CIPM Store for information on how to order.

APHIS Proposes Changes to Noxious Weed Regulations

USDA-Animal and Plant Health Inspection Service (APHIS) has proposed various changes to the regulations governing the importation and interstate movement of noxious weeds to "improve effectiveness." Additionally, the agency has proposed adding seven taxa to the Federal list of terrestrial noxious weeds and seeds:

- Prickly acacia (*Acacia nilotica*)
- Mistflower (*Ageratina riparia*)
- Capeweed (*Arctotheca calendula*)
- False caper (*Euphorbia terracina*)
- British elecampane (*Inula britannica*)
- Stemless thistle (*Onopordum acaulon*)
- Illyrian thistle (*Onopordum Illyricum*)

The proposed changes were published in the June 10, 2009 *Federal Register* and can be viewed, along with background information, at the Federal eRulemaking Portal. Public comments will be accepted and considered through August 10, 2009.

Weigh In On Federal Strategies for Plant Pests

USDA-APHIS has been tapped to implement the *Plant Pest and Disease Management and Disaster Prevention* section of the 2008 Farm Bill which is authorized at 12 to 50 million dollars per year through fiscal year 2013. APHIS intends to engage stakeholders in designing "a risk-based approach to disburse funds" and implement the bill's provisions.

To date, the APHIS plan identifies six strategies to coordinate and fund:

- Enhance plant pest/disease analysis and survey
- Target domestic inspection activities at vulnerable points in the safeguarding continuum
- Enhance and strengthen pest identification and technology
- Safeguard nursery production
- Conduct outreach and education to increase public understanding, acceptance, and support of plant pest and disease eradication and control efforts
- Enhance mitigation capabilities"

More information about the program can be found on the USDA-APHIS Plant Health website. The program's site also enables anyone to sign up to receive notices about related documents and events and also to offer comments.

CWMAs: What's in a Name?

A Cooperative Weed Management Area (CWMA) is a partnership of federal, state, and local government agencies, tribes, individuals, and various interested groups who manage noxious weeds or invasive plants in a defined area. CWMAs have different names in different parts of the country--for example, Partnerships for Regional Invasive Species Management (PRISMs) in New York, Cooperative Invasive Species Management Areas (CISMAs) in Florida, or simply Weed Management Areas (WMAs) in Colorado and California. Weed Prevention Areas are another variation on the CWMA theme.

Check out CIPM's new CWMA web pages for more community partnership-related information, resources, and inspiration from around the country.

Woody Knotweeds

By Dr.Tim Prather

Author examining Japanese knotweed

Michael Dirr's *Manual of Woody Landscape Plants* provides a caution for the woody Polygonums; "Be leery and careful when considering the above for the garden. All are thugs." As a group the woody knotweeds are resilient, able to grow in a variety of climates and can produce a beautiful show of white flowers in late summer. Low maintenance and showy flowers made this group popular for ornamental plantings all across the United States.

There are several species of woody knotweeds including Japanese knotweed, Bohemian knotweed, Himalayan knotweed, giant knotweed and low Japanese fleeceflower. In the western United States, Bohemian knotweed (hybrid of Japanese knotweed and giant knotweed) tends to dominate while in coastal areas, Himalayan knotweed also is quite prevalent.

The knotweeds tend to dominate in wet areas. They die back to a woody base in areas that receive frost and snow but really grow fast during spring and summer. Bohemian
knotweed can grow to 12 feet tall during the growing season. During a biofuel study, researchers harvested as much as 37 tons per acre of Japanese knotweed biomass. For perspective, a good single cutting of alfalfa would be less than 2 tons per acre and corn silage in the Midwest might produce around 10 tons per acre.

Reproduction of woody knotweeds can include both vegetative and sexual methods. For example, most expansion of Japanese knotweed is through clonal growth. The clonal spread can be from rhizomes, rhizome fragments broken off during runoff events or even stems that may float downstream and root at stem nodes. Rhizomes (underground stems) can stretch to 60 feet from the parent plant. Giant knotweed, Himalayan knotweed, low Japanese fleeceflower and some Bohemian knotweed biotypes can reproduce via seed in addition to clonal growth.

Thug is a good description for how this group of plants acts both within ornamental landscapes and riparian areas. Extensive rhizome systems of these species present problems in urban where rhizomes can push through asphalt and also cause problems with sewer lines. They also tend to dominate and exclude other ornamental plants in the landscape. In riparian environments, the near monocultures reduce plant diversity. Reduced diversity of plants along side streams reduces food diversity for aquatic organisms which, in turn, reduces aquatic insect diversity. The root systems of these knotweeds are not dense so the plants don't contribute to stream bank stabilization and can result in scouring of banks during runoff events. Frogs that were caged in Japanese knotweed stands or native riparian stands lost weight in Japanese knotweed stands demonstrating reduced terrestrial animal diversity. As an avid fly fisherman, these knotweeds are also a personal concern of mine.

Control of these woody knotweeds requires persistence because of the challenges presented by the woody base, fast growth rate and long rhizomes. There are several methods available for control in the United States. Grazing with sheep or cows can reduce shoot density by 50 percent but hand pulling is not successful and may increase spread. Mowing, too, may be effective if shoots are removed as they form, but again, plan for the long haul. It will take time to exhaust the carbohydrate reserves in knotweed roots and rhizomes. While it is difficult to generalize, anecdotal evidence suggests that stems must be mowed or cut at least twice a month during the first growing season and then monthly over three years to completely kill knotweed. In fact, one anecdotal report indicated, when knotweed stems were removed only once a month from April to October for three years, stem numbers actually increased. Biological control is being researched but no biological control agents have been approved for release in the United States. Herbicides have proven the most successful method of control so far. In situations where non-target effects must be prevented, glyphosate can be either injected above a node near the ground of each stem or stems can be cut above nodes and glyphosate applied to the open, cut stems. The herbicide active ingredients triclopyr and imazapyr applied to stems and leaves are both effective. Imazapyr has greater non-target affects but these can be reduced by using a thin, invert emulsion called Thinvert, which reduces drift and herbicide dripping from leaves. In our tests of these three herbicides, all were effective with imazapyr slightly more so. Each of the three herbicide active ingredients can be purchased in products that are registered for use in or adjacent to aquatic environments. Of course, always read and follow label instructions as the label outlines the legal application of these materials.

Each of the woody knotweed colonies spreads slowly, so there is time to gain effective control once infestations appear in a river or stream drainage. One example, the Lochsa River, is still at a point where control is possible with small colonies located every 100 to 300 yards from Apgar to Three Rivers (where the Lochsa and Selway Rivers meet and become the Clearwater River). However these small patches do grow and eventually will crowd out native understory plants. Control becomes more of a challenge when downstream dispersal takes place after
runoff events. Once a patch is found, it is a good idea to look downstream and upstream by as much as a couple of miles to find either a source or new downstream infestations. Studies of seed movement of other riparian plants in flowing water have measured movement up to several miles. Predicting movement in flowing water is tricky but larger rivers would transmit viable plant fragments farther than streams.

To summarize, the knotweeds do act like thugs, reducing plant and animal diversity within riparian areas that typically are among our most diverse communities. We do have tools to deal with the woody knotweeds. Allocation of resources for control and the tenacity to maintain control efforts will keep our riparian plant communities diverse and functioning properly.

Weed Population Monitoring and Prioritizing for Management

Three publications that discuss the value of weed population monitoring and using a decision support framework for prioritizing management are summarized.

Streamlining 'search and destroy': cost-effective surveillance for invasive species management
Cindy E. Hauser and Michael A. McCarthy, Ecology Letters 12(7):683-692. 2009.

The authors develop a simple detection and management model for a low-density invasive species distributed across a heterogeneous landscape, where the species has variable probabilities of occurrence and detection as well as variable benefits for detection and eradication. They determine the resource allocation that minimizes expected management costs. For the model, the probability of a species occurring at a given site is first determined from existing information about the species. The probability of detecting the species depends on the surveillance effort, the ease of detection, and the site's terrain. As the surveillance efforts increase, the probability that an invasive species incursion remains undetected declines. Detection of the species is assumed to trigger eradication efforts. The model shows that there is an optimal investment in surveillance, with surveillance only being worthwhile where pi(ciU-ciD) is sufficiently high, where: pi

= probability of invader presence, ciU = expected cost of incursion if the invader is not detected, and ciD = expected cost of management when invader is detected. If λi is the surveillance efficacy at the site, then pi(ciU-ciD) must be greater than 1/ λi for cost effectiveness. Otherwise, the surveillance cost overwhelms the expected benefits provided. It is shown that the higher the probability of invasive species occurrence, and the more effective the surveillance method, the more effort should be invested in surveillance.

Non-indigenous species management using a population prioritization framework
Lisa J. Rew, Erik A. Lehnhoff, and Bruce D. Maxwell. Canadian Journal of Plant Science 87:1029-1036. 2009.
Based on the fact that land managers typically don't have enough resources (budget or staff) to manage all populations of noxious weeds in the areas for which they are responsible, the authors suggest a framework by which to prioritize populations for management. There are four phases that should be used to plan management: (1) define land management goals, (2) conduct weed inventory or survey, (3) monitor populations for invasiveness and impact and (4) evaluate and prioritize. The authors suggest that using such a framework can improve overall management by targeting populations that have the most potential to spread and are having the most impact on land management goals. A simulation model supported the importance of monitoring and prioritization to reduce overall metapopulation growth.

Quantifying Invasiveness of Plants: A Test Case with Yellow Toadflax (*Linaria vulgaris*)
Erik A. Lehnhoff, Lisa J. Rew, Bruce D. Maxwell, and Mark L. Taper. Invasive Plant Science and Management 1:319-325. 2009.

The authors state that because of environmental heterogeneity and variable habitat suitability for weeds, even the most invasive species vary in their degree of invasiveness. A method to quantify the invasiveness of weed populations to facilitate the prioritization of management is presented. The method uses annual changes in plant density and area occupied within a series of permanent 1-m2 plots to determine invasiveness. Tested on populations of yellow toadflax (*Linaria vulgaris*) at three different sites in different environments (steep ridge slope, flat valley floor and partially open canopy lodgepole pine (*Pinus contorta*) forest, it was shown that the populations all had different levels of invasiveness. The ridge and valley populations were determined to be slightly invasive while the forest population was found to be declining. It was suggested that the simple monitoring method could be used to gather data to determine which environments have the most invasive populations, and populations in those environments could be prioritized for management.

The Rationale for Monitoring Invasive Plant Populations as a Crucial Step for Management
Bruce D. Maxwell, Erik Lehnhoff, and Lisa J. Rew. Invasive Plant Science and Management 2:1-9. 2009.

Early detection, rapid response (EDRR) is usually assumed to be the best weed management strategy regardless of the invasion stage or differences in population invasiveness potential. The authors state that EDRR is logical and is the economic optimum if population detection and eradication probabilities are high. However, if a species is already established, the probability of detection and eradication of all populations is low, and management agencies would not have sufficient resources to locate, much less manage, 100% of populations. Thus, the authors suggest that in such cases a shift from an EDRR approach and managing on a species basis to using monitoring data to prioritize management on a population basis is merited. To test this they created a simulation model to assess the value of spending some resources to gather information on weed populations (monitoring), rather than spending all resources to manage populations. The logic is that while monitoring takes time and resources that could be used for management, it is valuable because it can distinguish which populations are sources (require management to prevent spread) and which are sinks (naturally declining because of poor habitat and don't require management). Through the simulation model, it was determined that managers could dedicate 50% of their management resources to monitoring without risk of accelerating invasions or reducing the impact of their weed management program.

Rapport with Research: Facilitation of Native and Exotic Plant Spread

Bryan Endress from the Department of Forestry Ecosystems and Society at Oregon State University received a grant from the Center for Invasive Plant Management in 2005 to study the effects of ungulate grazing on the spread of exotic and native plants. He collaborated with Anne Bartuszevige of the Eastern Oregon Agricultural Research Center and Department of Fisheries and Wildlife at Oregon State University and conducted research in the Zumwalt Prairie Preserve (The Nature Conservancy) and the Starkey Experimental Forest and Range in northeastern Oregon. The work resulted in a publication in the Journal of Arid Environments (72: 904-913, 2008).

Spraying Herbicide Doesn't Always Pay, Study Shows

According to a 16 year study by the Agricultural Research Service (ARS) and its colleagues, it may not always pay for ranchers to use herbicides to kill exotic invasive weeds such as leafy spurge. Rangeland ecologist Matt Rinella at the ARS Fort Keogh Livestock and Range Research Laboratory in Miles City, MT conducted the study with his colleagues. Data they collected 16 years after a one-time aerial spraying of herbicide showed that the invasive leafy spurge (*Euphorbia esula* L) may have ultimately increased due to spraying.

CIPM Partners with Department of Defense for Workshop

In collaboration with the Department of Defense Legacy Resource Management Program, CIPM will offer a five-day workshop on invasive species in desert ecosystems for natural resource managers on military installations. A limited number of personnel from agencies and organizations will also be invited to participate. Experts in science and management subject matter will address pressing ecological issues and highlight key components of a strategic invasive species management framework. In addition, participants will learn about local, state, and federal invasive species initiatives and regional partnership opportunities. The workshop will be held October 26-30, 2009 in Phoenix, AZ.

CIPM Online

The following briefs, resources, events, and job listings have been added to our website since the last issue of this newsletter.

UPDATES TO THE CIPM RESOURCE DIRECTORY

The online resources featured here are listed within CIPM's online resource directory. Visit our website to browse extensive resources for funding opportunities, invasive plant information, management, education, CWMAs, agencies and organizations, and more.

CWMAs, How-To and Funding Resources (from CIPM) - Explore an extensive library of how-to guides, funding resources, help, advice, inspiration, and examples of CWMAs around the United States.

Estimating the benefits of early control of all newly naturalized plants - This study was conducted in New Zealand and compares the cost-effectiveness of removing all newly naturalized plants early or delaying action until they prove to be invasive.

Great Basin Invasive Weeds Website - This website was developed at Utah State University primarily for students and teachers in grades 7-12, however, it can be used by other audiences including land managers and the general public.

Wildlife Gardener Website - Wildlife Gardeners promotes environmentally sound practices to preserve biodiversity by encouraging discussion on the preservation, restoration, and establishment of native flora and fauna, as well as sustainable gardening practices.

Invasive Species Integrated Curriculum Unit - Developed for middle school teachers, this curriculum integrates the topic of invasive *Phragmites* into six subject areas.

Effects of Climate Change on Aquatic Invasive Species - This report from the US Environmental Protection Agency, authored by the Environmental Law Institute, considers the interaction of climate change and aquatic invasive species.

Comparison of Relocatable Commercial Vehicle Washing Systems - This report from the USDA Forest Service compares a range of vehicle washing systems with respect to efficacy, economics, waste containment, waste disposal, and the viability of any propagules that were collected in the cleaning process.

ADDITIONS TO THE CALENDAR

View our CALENDAR page for more upcoming events.

Are Invasive Species Different? A workshop on the ecology and evolution of invasive species
2 August 2009 | Albuquerque, New Mexico (USA).

NEWSS Noxious & Invasive Weed Management Short Course

21-24 September 2009 | Gretna Glen Camp, Lebabon, Pennsylvania (USA) | Trainings for public and private land managers.

10th Biennial Conference for Research on the Colorado Plateau
5-8 October 2009| "Collaborative Conservation in Rapidly Changing Landscapes" | High Country Conference Center | Flagstaff, Arizona (USA).

Western Weed Coordinating Committee Annual Meeting
Check the CIPM website for more information in the future | Orleans Hotel | Las Vegas, Nevada (USA).

Save the Date! The first-ever **National Invasive Species Awareness Week**
10-14 January 2010| Washington, DC (USA) | Information about this all-taxa event will be widely circulated soon. Check the CIPM website for more information in the future.