

# Quarterly

## Stopping a Different Spread: The Don't Move Firewood Campaign

By Leigh Greenwood  
*The Nature Conservancy*

For those used to thinking about invasive species as plants, and spread as an incremental process over many years, the Don't Move Firewood campaign may seem esoteric. But the movement of contaminated firewood spreads non-native insects and diseases hundreds and even thousands of miles in an evolutionary heartbeat. These tree-killing insects and diseases have transformed the nation's forests in the past – and they could easily do so again.

Do people really move firewood long distances? Yes. Polls conducted over the last five years by the Nature Conservancy have confirmed that a frightening 35 percent of firewood users admit to moving their firewood, and 40 percent of those people estimate that they moved it over 50 miles. That's roughly 24 million adults putting trees at risk and 24 million chances of accidentally starting a new forest pest infestation.\* This is no small issue. In response, a diverse group of partners operating through the Continental Dialogue on Non-Native Forest Insects and Diseases ([www.continentalforest-dialogue.org](http://www.continentalforest-dialogue.org)) came together to create a multifaceted campaign to reduce the spread of pests – the Don't Move Firewood campaign.

Don't Move Firewood (DMF) is the only national campaign focused on the single goal of educating the public that firewood always should be burned near where it was harvested. This campaign is unique in that it does not focus on a single pest or specific region. Instead, it is an educational campaign centered on a pathway of invasive movement -- firewood. The overarching goal of DMF is to greatly slow the human-caused spread of forest insects and diseases. Much like invasive plants and aquatic nuisance



species, forest pests and pathogens stand a far better chance of being either eradicated or effectively managed if their spread is minimized and new infestations are limited.

A unique facet of the DMF campaign is its decentralized approach to spreading its brand and message. DMF engages with state agencies, invasive species working groups, land grant universities, federal agencies, national parks, and many other partners to create customized materials that get the DMF message out through the methods chosen by that local group.

Here are a few case studies to show how collaborating with DMF works:

- The Montana Department of Natural Resources and Conservation (DNRC) first engaged with DMF in 2008 with the aim of preventing firewood from being brought in by out-of-state visitors. Their campaign with DMF is now in its third season, having ranged in efforts from ads in tourist magazines and inclusion in state tourism websites to a half page spread in the 2009 big game hunting regulation booklet. In 2010 alone, over 21,000 DMF educational postcards have been sent to out-of-state Montana hunting license recipients. Additionally, the Montana DNRC will be incorporating DMF materials into the curriculum of its new Urban and Community Forestry Forest Health Monitoring outreach program, which will travel to over 30 communities in Montana to increase urban forest pest awareness.

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- DMF's services have been used for two seasons now as part of the Northeastern Forest Pest Outreach Group, a multi-state coalition originally convened by the USDA's Animal and Plant Health Inspection Service (APHIS) in response to a 2008 discovery of the Asian longhorned beetle in Worcester, Massachusetts. DMF has provided custom design work for posters, billboards, mailing inserts, stickers, hats, bumper stickers, fake tattoos, and more, as well as distributed thousands of DVDs with Don't Move Firewood video shorts and public service announcements to members of the group.
- Oregon, Washington, and Idaho's cooperative effort showcases almost a dozen DMF materials customized to their project needs. These three states have put up multiple billboards on all the interstates and coastal routes in the region, distributed thousands of informational postcards to firewood cutting permittees, placed magazine and newspaper ads,

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# MRWC Launches Early Detection Mapping System (EDDMapS)

In late September 2010, the Missouri River Watershed Coalition (MRWC) launched an Early Detection and Distribution Mapping System (EDDMapS). The system enables invasive species reporting and mapping in the six MRWC headwater states (Colorado, Montana, Nebraska, North Dakota, South Dakota, and Wyoming). Created and hosted by the Center for Invasive Species and Ecosystem Health (CISEH), the customized EDDMapS will provide a means of reporting new sightings of select invasive species, a mechanism to alert appropriate individuals to the reports, and will generate distribution maps for reported species.

The MRWC EDDMapS will focus on species that are new or potentially new invaders to the Coalition states and these reports will form the database rather than historical or current distribution data for all invasive species within the six states. Each state has specified a list of target species, which will be updated continuously.

Free and available to anyone concerned with invasive plants in the Missouri River Watershed area, the EDDMapS system is simple and easy to use. Users complete an online reporting form to enter the location (via Google Maps or GPS coordinates), size, and other characteristics of the infestation; up to five images; and comments and contact



The MRWC EDDMapS home page allows users to view distribution maps and species information, report sightings, and includes a list of recent confirmed reports.

information. Upon submission, reports are immediately sent to the respective state weed coordinator, who will begin the verification process. Reports will appear on the Google Maps interface and MRWC EDDMapS homepage as they are confirmed. Users are able to register to receive email notifications of confirmed reports in their county or area of concern.

It is going to take all of us – land owners, land managers, recreationists, and concerned citizens – working together and sharing information as quickly as possible, to keep ahead of new weed invaders. For more information on the MRWC's EDDMapS project, including a list of initial species of concern, please visit the [MRWC website](#). To begin reporting, visit the [MRWC EDDMapS website](#).

## Playing Smart Against Invasive Species

A new documentary video, *Playing Smart Against Invasive Species: How to Enjoy and Protect the Great Outdoors*, was released this fall by the USDA Forest Service as part of the National Invasive Species Threat Campaign, with support from many organizations, including CIPM.

The video targets outdoor recreation enthusiasts, from campers and climbers to boaters and skiers, by presenting practical tips and methods for preventing the spread of invasive plants, animals,

and pathogens. Furthermore, the video frames the issue of invasive species within the context of prevention and control as achievable goals and encourages outdoorsmen and women to adhere to outdoor recreation ethics.

CIPM Outreach and Science Communication Associate, Emily Rindos, was invited to take part in the film. In January 2010, she spent two and a half days in the icy mountains of West Virginia cross-country skiing and hiking, and learning about preventing the spread of invasive species in snowy conditions.

*Playing Smart* is the third installment in a series of documentary videos that aims to educate and inspire outdoor recreationists to join the effort to protect

## Upcoming Events

[Oregon Interagency Noxious Weed Symposium](#)  
December 7–9, 2010  
Corvallis, Oregon

[Northeastern Weed Science Society Annual Meeting](#)  
January 3–6, 2011  
Baltimore, Maryland

[Montana Weed Control Association Annual Conference](#)  
January 11–13, 2011  
Great Falls, Montana

[USDA Interagency Forum on Invasive Species](#)  
January 11–14, 2011  
Annapolis, Maryland

[Invasive Plant Council of British Columbia's Invasion of the Aliens! Public Forum](#)  
January 18–19, 2011  
Richmond, British Columbia, Canada

[Weed Science Society of America Annual Meeting](#)  
February 7–10, 2011  
Portland, Oregon

[2011 Tamarisk Research Conference](#)  
February 16–17, 2011  
Tucson, Arizona

[National Invasive Species Awareness Week](#)  
February 28 – March 4, 2011  
Washington, DC

[2011 MRNRC Conference & BiOP Forum](#)  
March 9–11, 2011  
Nebraska City, Nebraska

[Western Society of Weed Science Symposium: Ecological Effects of Invasive Plants](#)  
March 10–11, 2011  
Spokane, Washington

the ecosystems they love. Previous titles include *Defending Favorite Places: How Hunters and Anglers Can Stop the Spread of Invasive Species* and *Dangerous Travelers: Controlling Invasive Plants Along America's Roadways*.

All three videos, in various lengths, are available for viewing on the [US Forest Service Invasive Species Program website](#). Check the CIPM Store soon to obtain a DVD copy.



# Beetles Offer Effective Weed Control, but Native Vegetation Hard to Re-establish

Article courtesy of Rangeland Ecology & Management  
[www.rangelands.org](http://www.rangelands.org)

With the help of the weed-eating flea beetle, researchers significantly reduced infestations of a non-native plant, leafy spurge, on Montana rangeland. The good news is that this biological method of weed control worked effectively over the course of a 9-year study. The bad news is that rather than native plants returning to flourish in the absence of leafy spurge, other non-native species became dominant in its place.

The study, presented in the current issue of the journal Rangeland Ecology & Management, sought to evaluate the responses of native vegetation once the invasive species was removed using clas-



Photo: Steve Dewey, Utah State University, Bugwood.org

sic biological control. Black and brown flea beetles have previously been used successfully as biological control agents to manage leafy spurge on a large scale.

In the current study, the weed-eating flea beetles were released in 1998 in southeastern Montana on privately owned land used for cattle grazing. About 6,000 flea beetles were introduced onto

32 plots of leafy spurge, while 20 more plots went untreated. Over time, the beetles dispersed to the untreated plots, suppressing leafy spurge there as well.

By the study's end in 2006, leafy spurge foliar cover was reduced 80% to 90% compared to 1998 assessments. While other vegetation did increase once this invader was controlled, another non-native plant, *Poa* spp., became the dominant species.

Once established, strong invaders like leafy spurge may make the native plant community more susceptible to invasion by other non-native species. Any new infestations should be treated as soon as possible to reduce long-term effects such as contributions to the seed bank, native species loss, and ecosystem modification.

## Paper by CIPM Affiliate Wins Award

A recently published paper by CIPM affiliate Kim Goodwin has been selected as the 2010 Outstanding Paper in Invasive Plant Science and Management by the Weed Science Society of America. Goodwin co-wrote [Trained Dogs Outperform Human Surveyors in the Detection of Rare Spotted Knapweed \(\*Centaurea stoebe\*\)](#) with Rick Engel and David Weaver, Montana State University, Department of Land Resources and Environmental Science faculty.

Goodwin is project coordinator for the Montana Weed Prevention Areas Program, which works to protect rangelands in eastern Montana from weed spread. Visit the newly redesigned [project website](#) which offers maps, downloadable publications, monitoring and eradication information, and links to useful resources.



## New CIPM Logo

The next time you visit the CIPM website or our new online store, you may notice something unexpected – a brand new logo! Both the logo and the new store page were designed by CIPM's in-house graphic designer, MSU student Lena Haines.

With publication and website revisions underway, it was decided that CIPM needed to update its logo, which had been in use since the Center's establishment over ten years ago. The result is a fresher, more modern image.

Throughout the redesign process, Haines sought to emphasize the Center's goal of promoting ecologically sound management of invasive plants in western North America. She incorporated mountains, a river, and a grass-like invasive plant to reflect the various pathways

in which invasive plants spread, and the landscape-wide approach that CIPM takes to management and collaboration.



Haines, a third year student in MSU's graphic design program, joined the CIPM staff in May 2010. In the months since, she has proved to be an invaluable asset to CIPM, tackling numerous design projects with enthusiasm and design expertise. A few examples of her work include: a full redesign of the [Missouri River Watershed Coalition website](#); design of the [2010 Weeds Across Borders website](#); and [North American Invasive Species Network](#) logo.

## 2011 North American Invasive Plant Ecology and Management Short Course

July 6–8, 2011. The North American Invasive Plant Ecology and Management Short Course (NAIPSC) is three days of intense instruction and learning for those interested in the basics of invasive plant ecology and management. The first annual course will be held at the University of Nebraska-Lincoln West Central Research and Extension Center in North Platte,

Nebraska. The NAIPSC will include presentations, hands-on workshops, site visits and instructor-led discussion sessions on the latest in invasive plant ecology and management. CEU and graduate student credit will be available. View the [brochure](#) or visit the [website](#) for more information and how to register.



Medusahead infestation. Photo: Steve Dewey, Utah State University, Bugwood.org

## Invading Weed Threatens Devastation to Western Rangelands

Article courtesy of Oregon State University  
Corvallis, Oregon

A new field study confirms that an invasive weed called medusahead has growth advantages over most other grass species, suggesting it will continue to spread across much of the West, disrupt native ecosystems and make millions of acres of grazing land almost worthless.

The research, by scientists from Oregon State University and the Agricultural Research Service, was one of the most comprehensive studies ever done that compared the “relative growth rate” of this invasive annual grass to that of other competing species in natural field conditions.

It found that medusahead has a faster growth rate, a longer period of growth and produced more total biomass even than cheatgrass – another invading species that is a major problem in its own right, but not as devastating as medusahead.

“Medusahead is now spreading at

about 12 percent a year over 17 western states,” said Seema Mangla, a researcher in the OSU College of Forestry. “Once established, it’s very hard to get rid of. It displaces native grasses and even other invasive species that animals can still eat. Unless we do more to stop it, medusahead will take over much of the native grassland in the West.

“This is a devil species,” she said.

Research is identifying some other grass species, including crested wheatgrass and Sandberg’s bluegrass, that may be able to compete with medusahead, reduce its spread and preserve the grazing value of lands, Mangla said. They are also studying new ways of restoring medusahead-infested areas. But so far, medusahead has received very little attention compared to other threats such as cheatgrass, even though it ultimately poses a far greater threat to ecosystems across the West.

Cheatgrass is a serious problem on more than 50 million acres, Mangla said, but grazing animals can still eat it. The

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## ipm<sup>3</sup> Announces Additional Courses

The IPM<sup>3</sup> Consortium launched its training platform in November 2009, with the *IPM Core Concepts Training Module*. IPM<sup>3</sup> is excited by our expanded course list for 2010–11. In addition to repeating the *IPM Core Course Module* twice (Nov. 1–Dec. 13, 2010 and again Jan. 18–Feb. 25, 2011), the *Invasive Species Specialty Module* (Jan. 18–Feb. 25, 2011) and *IPM for Managers and Supervisors* (Sept. 15–Nov. 18, 2010), IPM<sup>3</sup> will be offering: *Pest Biology: Arthropods* (Jan. 18–Feb. 25); *Pest Biology: Plant Pathology* (Jan. 18–Feb. 25); and *Pest Biology: Weeds* (Jan. 18–Feb. 25).

The IPM<sup>3</sup> Consortium hopes that you will consider enrolling in the modules that meet your IPM training needs and would appreciate you spreading the word to your colleagues. Course and registration information is available at [www.umn.edu/ipm3](http://www.umn.edu/ipm3).

The next IPM Core Concepts Module session will be offered Nov. 1–Dec. 13 and will be repeated Jan. 18–Feb. 25. The IPM Core Concepts Module employs multiple media learning techniques including text, videos, still photos and case studies. The text portion of each lesson is 10-15 minutes followed by an assessment. Lessons with videos and graphics are longer. A student who successfully completes the IPM Core Concepts Module will receive 1.5 CEUs and a Certificate of Completion. Course content includes the following:

### Unit 1. Introduction to IPM

Pests and pest impacts; pest management; history of pesticide use; IPM developed in response to pesticide problems.

### Unit 2. IPM Economic Concepts

Pest populations; natural control and general equilibrium position (GEP); economic thresholds (ET); economic injury level (EIL).

### Unit 3. Host Plant Resistance

Coevolution and selection pressure; resistance mechanisms: antixenosis, antibiosis, and tolerance; constitutive and induced resistance and their fitness costs; resistance genetics.

### Unit 4. IPM Tactics – Biological Control

Biological control organisms; arthropod parasites and parasitoids; arthropod

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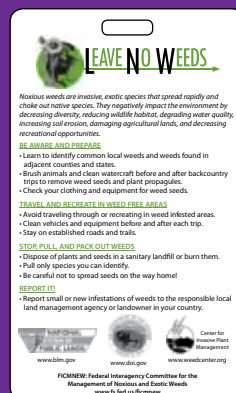
## Just Launched: New CIPM Store



In October 2010, CIPM launched a brand new [online store](#). The new site carries all of the same products as the previous store: plastic weed models, bouquets, and identification cards; books and other publications; and a variety of outreach materials, but now features larger imag-

es, more detailed product descriptions, and a simplified ordering process.

One additional product has just been added: Leave No Weeds hang tags (pictured). Available in packages of ten, these durable plastic cards offer tips for preventing the spread of invasive species in both English and Spanish and are perfect for attaching to backpacks and other outdoor gear.



## Invaders Discovered

### North Dakota

Zebra mussels (*Dreissena polymorpha*) were discovered in the Red River between Wahpeton, North Dakota and Breckendridge, Minnesota in July 2010. The report was confirmed by the North Dakota Game and Fish Department. Read the [press release](#).

### Montana

Eurasian watermilfoil (*Myriophyllum spicatum*) was discovered in the Missouri River, upstream of Toston, Montana and in the Canyon Ferry Wildlife Management Area near Townsend in August 2010. The first infestation of this plant in Montana was identified in 2007. [Read more](#).

Zebra mussels (*Dreissena polymorpha*) or quagga mussels (*Dreissena bugensis*) may have been found in

samples collected from Flathead Lake, Montana between May and August 2010. DNA testing is pending. [Read more](#).

### Nebraska

A report of Zebra mussels (*Dreissena polymorpha*) in Zorinsky Lake, southwest of Omaha, Nebraska was confirmed in November 2010. A 13-year-old Boy Scout submitted the report online after spotting mussels while collecting discarded cans in the lake. [Read more](#).

### South Dakota

Russian mallow (*Althaea armeniaca*) was found this summer in Hutchinson County, South Dakota. This is the first confirmed report of this plant in North America.

## Russian Olive Banned for Sale in Montana



Photo: Chris Evans, River to River CWMA, Bugwood.org

In September 2010, the Montana Department of Agriculture amended its list of regulated plants to include Russian olive (*Elaeagnus angustifolia*). Priority 3 regulated plants, though not listed as Montana noxious weeds, may not be legally sold or planted in the state.

Montana's Yellowstone Public Radio aired a report on the issue of Russian olive on November 29. [Click here](#) to listen to the program.

For more information on the new legislation, see [Russian Olive Regulations](#).

## Don't Move Firewood Campaign

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handed out tens of thousands of promotional items (such as Frisbees and playing cards) branded with the DMF logo, put large posters in light boxes at interstate rest stops, distributed kiosk posters to state, local, federal and private campgrounds in the area, and most uniquely, put giant banners up in the NBA affiliate Qwest Arena in Boise, Idaho.

- Most recently, DMF was invited to place a full page educational advertisement in the Missouri River Watershed Coalition's invasive species education booklets. An impressive 62,000 of these booklets will be distributed in hunter education courses in 2010 and 2011.

Don't Move Firewood is not just about billboards, booklets, and postcards. The campaign's keystone is its internet presence, led by its website and complimented with a blog, Twitter and Facebook accounts, and a variety of funny and educational YouTube videos. DMF's outreach materials are designed with the intent of educating the public while encouraging them to visit [www.dontmovefirewood.org](http://www.dontmovefirewood.org) to learn more. DMF's internet campaign brings this important message into offices, living rooms, and

mobile phones – the places where people increasingly consume media. By being at the forefront of information technology, DMF is able to change and adapt to new scientific discoveries, new quarantines, and new ways to get the word out to the people.

It is looking like 2011 is going to be an exceptionally fruitful year for DMF. More and more organizations are reaching out to DMF for free consultation on message content, our free design services and branding, and to be a part of the largest and most well regarded firewood outreach project on the continent. Recently, the National Firewood Task Force (convened by USDA-APHIS) recommended DMF as its suggested outreach source, and DMF is looking forward to hearing back on the results of at least five 10201 Farm Bill proposals that include the campaign as a cooperator, as well our integral inclusion in a Forest Service redesign grant.

If you or your organization hopes to protect trees from the threat of non-native insects and disease that move on firewood, Don't Move Firewood wants to help you. By partnering with DMF's campaign, you ensure your outreach efforts will be



Photo: Leigh Greenwood

reinforced nationwide through the use of a common brand, message, and graphics. DMF strives toward efforts that are a win-win for all parties, and in doing so, it leverages all efforts to slow the spread of these devastating invasive species.

To learn more about the campaign, check out the following links:

- Visit [dontmovefirewood.org](http://dontmovefirewood.org)
- Friend us on [Facebook](#)
- Follow us on [Twitter](#)
- Email [Leigh Greenwood](mailto:Leigh.Greenwood@dmf.org)

\*This number was generated by using US Census Bureau data that shows 228,182,000 adults in the US in 2008. TNC polling data from 2007 shows that at least 77% of Americans use firewood; 35% of those admit to moving firewood, and 40% of those say they sometimes move it 51 miles or more.

# Invading Weed

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Photo: Steve Dewey, Utah State University, Bugwood.org

new study makes it clear that cheatgrass and native grasses may all eventually be replaced by medusahead, which eliminates more than 80 percent of the grazing value of land.

Experts at the Oregon Department of Agriculture say that once land is invaded by medusahead, it becomes largely worthless, incapable of supporting native animals, birds or livestock.

The sharp and twisting points on the tips of medusahead injure the eyes and mouths of animals, and give the plant its name - based on the female monster in Greek mythology that had hair composed of writhing snakes. The plant takes up other soil resources and its deep root system soaks up limited moisture. It creates fuel for wildfires, has a high silicon content that wears away the teeth of animals, is virtually inedible, and it prevents many other plants from germinating.

"Annual grass invasion is driving one of the largest changes in vegetation structure ever documented," the researchers wrote in their new study. "This conversion has major negative impacts on ecosystem function, wildlife and fire regimes.

"We expect that medusahead will continue to invade both native perennial and less-undesirable invasive annual grasslands, because of its higher relative growth rate and extended period of growth," they reported.

Medusahead is not a new problem,

only a rapidly worsening one. Native to the Mediterranean region, it was imported to the United States in the late 1880s and has gradually established footholds since then.

It's now found on about 2.5 million acres in the US - much less than other invading species such as cheatgrass - but it's widespread in the Pacific Northwest and most of Oregon, including the Willamette Valley. Its impact on ecosystems when established is far greater than some other species, experts say, and it has evolved many traits that allow it to invade North America.

"For too long we've treated these invasive species as something you just mow, spray with herbicides, or chop out somehow, and then forget about them," Mangla said. "That just treats the symptoms but doesn't get to the underlying problem. If we're going to stop something like medusahead, we have to better understand its ecology and find ways to compete with it."

The new study - one of the first of its type - is a step toward that, she said. Researchers now have a better target to aim at, in identifying plants that have some ecological characteristics similar to medusahead, and are useful species that may be able to better compete with it once they are established.

"However, this plant is easier to keep out than it is to get rid of," Mangla said. "The time to stop it from taking over the

## About CIPM Quarterly

CIPM Quarterly is published by CIPM (Montana State University) and distributed electronically to subscribers and partners who have an active interest in invasive species management, research, education, and issues in the western United States.

We ask our readers to please continue sharing management experiences and insights, research findings, project outcomes, publications, and other important invasive plant information with us. By doing so, communications tools such as this one will be relevant and worthwhile.

### Articles, comments, and suggestions are welcome and should be sent to:

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West is now, before it becomes much more widely established. And it has not gotten the attention it deserves."

This research was just published in the Journal of Arid Environments. It was done by OSU and the Eastern Oregon Agricultural Research Center, which is a joint cooperative between the OSU Agricultural Experiment Station and the Agricultural Research Service. This project was part of an area-wide program managing annual grassland ecosystems by the USDA-ARS. It included two years of field studies in 2008 and 2009 near Burns, Oregon, in which medusahead growth in specific plots was compared to that of other species.

"Our results suggest that the continued invasion and dominance of medusahead onto native grasslands will continue to increase in severity," the researchers wrote in their report.

predators; behavior modification.

#### **Unit 5. IPM Tactics – Chemical Control**

Pesticide regulation; pesticide classification; pesticide mode of action (MOA); pesticide resistance; insecticide, fungicide, and herbicide resistance; pesticide safety, pesticide residues, and tolerances; environmental fate of pesticides.

#### **Unit 6. IPM Tactics – Physical Control**

Physical barriers; manual weeding; mulches; pneumatic control; thermal techniques.

#### **Unit 7. IPM Tactics – Cultural Control**

Sanitation; soil tillage; crop rotations; interplanting; trap crops; cover crops elimination of alternate hosts.

#### **Unit 8. IPM Tactics – Regulatory Control**

USDA Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine Program; Department of Homeland Security (DHS) Customs and Border Protection; Agricultural Inspections.

#### **Unit 9. Introduction to Invasive Species**

Definition of an invasive species; Executive Order 13112. National Invasive Species Council (NISC); impact of invasive species; APHIS prevention, monitoring, control and emergency program costs. Balancing multiple priorities.

#### **Unit 10. Intro to Restoration Ecology**

Definition of ecological restoration; multiple disturbances to ecosystems; the importance of setting goals for restoration; ecosystem restoration.

Completion of the IPM Core Module will facilitate success in other IPM<sup>3</sup> training modules, as each additional training module assumes a basic understanding of the principles of IPM.

An **Invasive Species Specialty Module** will be offered from Jan. 18–Feb. 25. This Specialty Module provides an understanding of the mechanisms that account for invasion success, reviews their role in several invasion examples, and describes their significance when selecting management options. The lessons cover: Mechanisms of Biological Invasions; Pest Risk Assessments; Emerging Invasive Threats to Plants; and Invasive Species Impacts. Post-secondary knowledge of biology and ecology is assumed. This level of knowledge can also be attained by successful completion of the IPM<sup>3</sup> Core Concepts Module. A

student who successfully completes the Invasive Species module will receive 1.0 CEUs and a Certificate of Completion. This information will be added to your personal portfolio so you will always know what you have completed.

**Arthropod Pest Management** will be one of three Pest Biology Modules available in early 2011. This module provides basic biological information about insects, ticks, mites, spiders, and crustaceans; how these organisms reproduce, function, and can be identified; how they can cause damage or harm plants, buildings, food, animals, and humans; and how to mitigate damage using various integrated pest management tactics. It is strongly recommended for students who do not have a background in entomology and who expect to encounter insects and insect relatives as part of their integrated pest management responsibilities. A number of IPM<sup>3</sup> courses expect students to have a firm grasp of the arthropod biology, structure, and function. A student who successfully completes the Pest Biology-Arthropods module will receive 1.0 CEUs and a Certificate of Completion.

**Plant Pathology** will be the second Pest Biology Module available from Jan. 18–Feb. 25. This module provides basic biological information about bacteria, viruses, nematodes and fungi; how these organisms can harm plants; and how to mitigate damage using various integrated pest management tactics. It is strongly recommended for students who do not have a background in plant pathology and who work with or are responsible for plants of all types including landscapes, turf, vegetables, trees, shrubs and green foliage plants. A number of IPM<sup>3</sup> courses expect students to have a firm grasp of the biology of plant diseases. A student who successfully completes the Pest Biology-Plant Diseases module will receive 0.6 CEUs and a Certificate of Completion.

**Weed Biology** will be the third Pest Biology Module available from Jan. 18–Feb. 25. This module will begin with a brief introduction to weeds and then will guide students through basic plant biology to the extent necessary to make management decisions. Students will then be presented with information regarding why weeds are invasive, what makes plant communities prone to invasion, how



invasions occur and how populations spread. Subsequent materials will provide an understanding of weed vulnerability through analysis of population dynamics and focusing on plant life history stages. Finally, students will learn how different control techniques can be integrated and used to target weeds in different life stages and different phases of infestation (e.g., small starting infestations versus large, well established infestations). Students successfully completing this module will: have a clear understanding of weed biology; understand how weed population dynamics affect their invasiveness; be able to identify vulnerable stages in a weed's life history; obtain a basic understanding of what tools are available for weed management; and understand how weeds are affected by management tools. Student will receive 1.0 CEUs and a Certificate of Completion.

**Facility Managers and Supervisors Course** will be offered from Sept. 15–Nov. 18, 2010. This exciting stand-alone course is specifically designed for facility managers and supervisors who are tasked with supervising the day-to-day operations of a building or set of buildings and who often assign or contract pest management activities to technicians or specialists. Managers and supervisors completing this course will gain a practical understanding of how the best IPM programs should function. This knowledge will enable students to effectively execute IPM responsibilities whether through internal staff assignments or via external contracts with professional pest management specialists. Insect, mite, rodent and bird pests are covered. A student who successfully completes the IPM for Facility Managers and Supervisors Course will receive 1.5 CEUs and a Certificate of Completion.

The major training goal of the IPM<sup>3</sup> program is to provide practical information that will help individuals, agencies and organizations utilize IPM principles in their day-to-day pest management decisions. Visit [www.umn.edu/ipm3](http://www.umn.edu/ipm3) for course details, dates, and registration information.



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