

Oregon Department of Agriculture Plant Division Annual Report 2010



Dedication

This issue of the Plant Division Annual Report is dedicated to our coworker and friend Dr. Bennett Huffman who took his own life for reasons we don't understand. We'll never forget your 20 years of service and your smile.

April 2011

Oregon Department of Agriculture

Plant Division

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Oregon
Department
of Agriculture



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Section 1—Administration

Administrator's view

Plant Division had a great year in 2010! It wasn't easy, but the results were impressive. As always, we faced major challenges both new and familiar. This annual report is filled with interesting projects from cleaning up a failed phytomining experiment to protecting forests from invasive wood borers.

Many of our projects involve partnerships where our staff are part of a team. We work with other agencies at all levels of government, industry groups, landowners, universities, and neighboring states. This is the wave of the future. State support for agriculture programs continues to shrink so partnering with others is the only way we are going to be able to continue to fulfill our mission.

Here are a five examples of successful partnerships Plant Division was involved in this year.

1. **Spotted wing drosophila.** This non-native fruit pest moved into Oregon in 2009 and threatened many fruit crops. ODA worked with OSU and Peerbolt Crop Management to implement a coordinated education, monitoring, identification, and technical assistance program. None of the partners could have pulled this off alone, but together we helped the fruit industry avoid losses. Oregon fruit last year was high quality and delicious—I personally sampled a lot of it and enjoyed every bite!
2. **Alyssum.** Extracting nickel from soil with a crop of Alyssum seemed like a good idea to a Texas based company. They planted several fields on high-mineral soils in Josephine County. Smelting out the copper wasn't cost effective, even though the Alyssum grew like a weed. Then Alyssum began showing up well outside the fields. ODA did a pest risk assessment and Alyssum was added to our noxious weed list. ODA has led the clean up effort, but the support and assistance from other agencies and landowners has been critical to the overall success of the program.

3. **Christmas tree exports to Mexico.** Nearly 2,000 truckloads of Oregon Christmas trees are shipped to Mexico each year. A small percentage of these loads fail an inspection at the border. Mexico revised their regulations in 2010 and changed the standards so we were expecting a difficult shipping season. Working with USDA and the PNW Christmas Tree Association we coordinated on an outreach program to shippers making them aware of the new regulations. Our inspectors partnered with growers to identify qualifying trees and the shipping season proceeded smoothly much to everyone's relief.

4. **Native Plant Conservation Program review.** The NPCP is one of the smallest programs in ODA. It has a tiny budget that barely amounts to one FTE. The program strives to protect the 60 species of threatened and endangered plants in Oregon. Partnering with other agencies, hustling for grants, and working with unflagging passion has allowed this little program to make a difference to rare plant populations all over the state. The historical map of their projects in this report is an eye-opener. This year we brought in a panel of stakeholders to review the NPCP. Their recommendation was to keep it going and they are working with us to make it even better and find a way to put it on a sound financial footing.

5. **Local firewood.** The Oregon Invasive Species Council initiated a public education campaign to encourage people to buy and burn local firewood. Firewood transported by campers and commercial dealers has become a major pathway for spreading non-native wood boring pests. Idaho and Washington joined the campaign so billboards, posters, and electronic messages were consistent across the region. Our staff participated directly through the OISC and also sifted samples, identified wood borers, and produced incredibly clear photographs of insects used in a variety of

Section 1—Administration

outreach materials. An OSU graduate student spent the summer interviewing campers and documented that a high percentage of them had seen the outreach materials and were content to enjoy their marshmallows browned over local firewood.

2011 is shaping up to be another busy year. Brown marmorated stink bug, another invader, is poised to become a dominant problem for fruit and vegetable growers in the next few years. It is going to take a concerted effort to develop management tools and get growers ready to meet this new challenge. Working together with partners will be key. We've already made a good start.

Budget issues will continue to be a challenge for managers of all our state and federally-funded projects. In addition, the economic downturn has direct impacts on sales of nursery products and because we have graduated nursery license fees, our nursery program revenue is linked to economic health. Hopefully the economy will recover soon. I'm confident we'll get

through this challenging budget period. The following summary documents the excellent work our staff does protecting Oregon's agriculture and natural resources. People, including legislators, notice that. I think you'll be impressed by this report of Plant Division activities in 2010.



Dan Hilburn
Administrator, Plant Division

Section 1—Administration

Plant Division staff

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Office Support

Tristen Berg, Office Manager

Program Assistants

Sue Nash, Nursery/Christmas Tree

Jo Davis, Noxious Weed & IPPM

Insect Pest Prevention & Management

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Entomologists 4

Barry Bai

Jim LaBonte

Entomologists 2

Bennett Huffman

Diana Kimberling

Kerri Schwarz

Josh Vlach

Richard Worth

Entomologists 1

Todd Adams

Bill Giacomazzi

Pat Mitchell

Steve Valley

Curatorial Support Technician

Tom Valente

Volunteers

Alan Mudge

Rick Wescott

Native Plant Conservation

Bob Meinke, Supervisor

Conservation Biologists

Kelly Amsberry

Rebecca Currin

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Biological Control Entomologist

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Alex Park

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Lead Horticulturist

Jan Hedberg

Horticulturists

Beverly Clark

Debbie Driesner

John Ekberg

Gary Garth

Dan Hawks

Sherree Lewis

Dennis Magnello

Karl Puls

Lisa Rehms

Eric Reusche

Scott Rose

Susan Schouten

Data Entry Specialist

Kim Lawson

Section 2—Nursery & Christmas Tree Program

Nursery 2010

Goals and objectives

The Nursery & Christmas Tree Program assists the nursery and Christmas tree industries in the production, marketing, and protection of Oregon nursery stock and Christmas trees. We accomplish this by

- assisting nurseries in providing nursery stock that is free of dangerous pests and diseases.
- providing pest and disease management information to the Christmas tree and nursery industries.
- providing inspection and certification of nursery stock and Christmas trees grown and shipped from Oregon.
- preventing the spread of injurious pests, plant diseases and noxious weeds within the state of Oregon.
- helping to prevent the introduction and spread of pests and diseases that could threaten Oregon's Christmas tree and nursery industries by inspecting incoming shipments of plant material for compliance with Oregon and US quarantines.
- making information available to all licensed Christmas tree growers and nurseries relative to importation requirements of other states and countries.



A Clackamas County nursery

Nursery & Christmas Tree Program highlights

- Horticulturist John Ekberg, retired after over 30 years working in the plant protection business.
- The Nursery Information Management System (NIMS) saw extensive use in documenting staff's daily activities and as a tool for managing the *Phytophthora ramorum* certification program.
- Program staff performed inspection and export certification services for Oregon's \$110 million Christmas tree and \$600 million nursery industries.
- Four Oregon nurseries participated in the United States Nursery Certification Program (USNCP).
- Oregon nursery stock and Christmas trees were exported to over 45 foreign countries.
- ODA horticulturists issued 7,607 state and federal phytosanitary certificates. Almost all of these certificates were issued using the USDA's Phytosanitary Certificate Issuance and Tracking (PCIT) system.
- The Nursery Research Assessment Fund collected and made available \$209,662 for nursery-related research grants.
- Nursery & Christmas Tree Program personnel staffed a booth at the Far-West Show, Oregon's largest nursery trade show.
- Three hundred eighteen Christmas tree and nursery stock growers participated in this year's European Pine Shoot Moth (EPSM) trapping program. EPSM traps were placed at 375 separate growing grounds.
- In order to meet the requirements of the federal *Phytophthora ramorum* order, 657 host nurseries and 500 non-host nurseries were surveyed for *P. ramorum*. Additional high-risk surveys were conducted at 247 nurseries that grow Rhododendron and/or Camellia.

Section 2—Nursery & Christmas Tree Program

- Nine Oregon nurseries were confirmed positive for *P. ramorum*.
- Staff received notification of 2,770 shipments of nursery stock imported into the state. Of these, 330 high-risk shipments were inspected for dangerous pests and diseases.
- Sixteen Oregon nurseries participated in the Grower Assisted Inspection Program (GAIP).

John Ekberg retires

John Ekberg, senior horticulturist aka nursery and Christmas tree inspector, retired on October 31, 2010 after 30 years of service with Oregon Department of Agriculture (ODA). Originally from southern California, John graduated from California State Polytechnic University, Pomona in 1972 with a Bachelor of Science degree in Agricultural Biology with an emphasis in Economic Entomology. He was employed as an Agricultural Biologist with the San Bernardino County Department of Agriculture for eight and a half years with many varied duties. John began working for ODA Nursery & Christmas Tree Inspection Program as a horticulturist in November, 1980. His primary responsibilities were inspecting and certifying grower and retail nurseries in portions of Clackamas and Multnomah County's and also in other northern and eastern Oregon areas. Through the years, John developed a good working relationship with many of the industries' major growers. His expertise has nurtured a reputation of thoroughness and fairness with the businesses with whom he has consulted for these 30 years.

In 2007, John was awarded the Carl E. Carlson Award for Regulatory Excellence by the National Plant Board. He is an avid gardener and recently assisted in teaching a weed ID class through "SOLV" in Multnomah County. John also has musical talent, playing his banjo and dobro in a local bluegrass band, "The Why Nots." He will be greatly missed by the ODA, his fellow Horticulturists and many members of the nursery and Christmas tree industries to which he provided outstanding service. We wish John and his wife Irene well in his retirement years in Corbett.

Nursery Program general information

The nursery industry continues to be one of the largest segments of Oregon agriculture. ODA's nursery inspection program is funded almost entirely from nursery license and certification fees. Three different nursery license types are issued depending on the nature of the nursery business. A dealer's license is required for businesses that buy and re-sell nursery stock. Garden centers, retail stores, florists and landscapers are required to have dealer licenses. Dealer license fees are based on



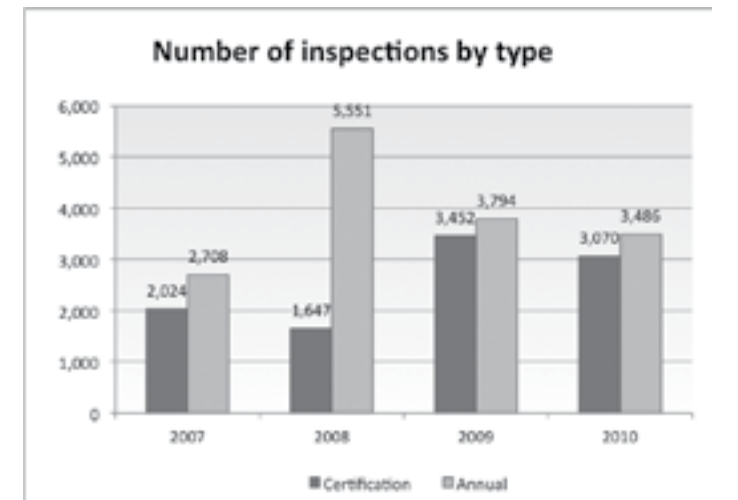
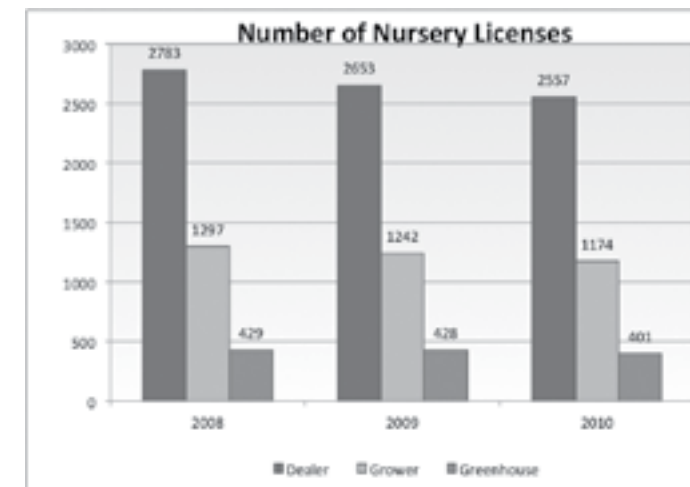
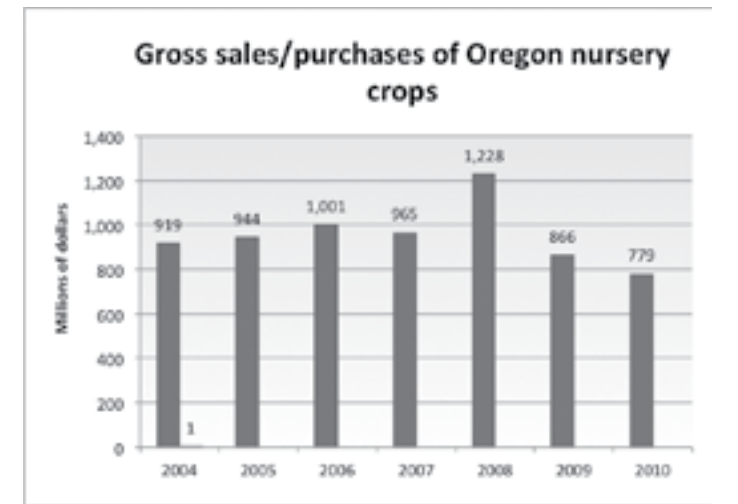
ODA Horticulturist John Ekberg retires after thirty years of service

Section 2—Nursery & Christmas Tree Program

the purchase price (wholesale cost) of nursery stock. Cut flowers are exempt from the licensing program. Two types of nursery grower licenses are available through the department. One is a license specific for growers of greenhouse grown herbaceous plants, and the other is a license for all other nursery crops as well as collectors of native plants. The license for both of these types of licenses is based on the wholesale value of nursery stock sold.

During the past calendar year, the Oregon Department of Agriculture (ODA) issued 2,557 dealer licenses (\$140.6 million reported purchases); 401 licenses were issued to greenhouse growers of herbaceous plants (\$99.6 million reported sales), and 1,174 licenses were issued to nursery stock growers and collectors of native plants (\$538.8 million reported sales). The total value of nursery stock purchases and sales reported to the ODA in 2010 was \$779 million. During the 2010 calendar year, the nursery program conducted 6,556 inspections. Inspections are divided into two general categories: routine and requested inspections, 3,486; and certification inspections, 3,070.

The Nursery & Christmas Tree Program field staff issued 3,968 state and federal phytosanitary certificates for consignment of nursery stock to foreign countries. In addition, 1,155 federal phytosanitary certificates were issued for shipments of lumber destined to foreign countries.



Section 2—Nursery & Christmas Tree Program

Nursery research assessment fund

The ODA received 24 nursery research proposals for the 2010 grant year. These requests were competing for approximately \$229,000, which was collected through nursery research assessment fees. The Nursery Research and Advisory Committee, in cooperation with the Oregon Association of Nurseries Research Committee, selected 12 research projects for funding. Several research projects not funded, or only partially funded by ODA grant dollars, were recommended to receive funding from independent private sources. Nursery research project final reports for years 2004-2010 are now online at: <http://oregon.gov/ODA/PLANT/NURSERY>.

2010 Nursery Research Projects

Project #	Title	Investigator	Total
2010-02	Development of Tetraploid Hydrangea macrophylla Cultivars	Contreras	\$21,500.00
2010-04	Development of New Antitranspirant and Protective Barriers Against Insect and Micro-organisms for Plants	Fuchigami	\$15,000.00
2010-05	Assessing the Threat of Exotic Relative to Endemic Phytophthora spp.	Grunwald	\$25,000.00
2010-06	Testing Plant Health Evaluation Tools	Landgren	\$9,530.00
2010-07	Nursery Internship at NWREC	Owen	\$19,890.00
2010-08	Screening Alternative Soilless Substrate Components for Containerized Crop Production in the Pacific Northwest	Owen	\$26,531.00
2010-10	Non-chemical Options for Decontamination for Greenhouse Substates	Parke	\$20,000.00
2010-14	Investigation of the use of Predatory Mites, Hyoaspis mite, Against Toot Weevil Larvae Liner Production Systems	Rosetta	\$7,880.00
2010-16	Evaluation of Amber Snail Management Treatments in Nursery Production Facilities	Rosetta	\$13,758.00
2010-19	Sprout Floating Wetlands Loan and Research Program	Stoops	\$18,573.00
2010-23	Improved Mineral Nutrition for Micropropagation of Woody Nursery Crops	Reed	\$22,000.00
2010-24	Horticulture Research Institute Endowment	Bear	\$10,000.00

Plant importation notification rule

In 2004, the ODA adopted Oregon Administrative Rule 603-054-0027 also known as the Plant Importation Notification Rule. The rule requires recipients of imported nursery stock to provide the ODA notification of the arriving shipment within two business days by email, phone or fax. This allows inspectors the opportunity to inspect shipments of high-risk nursery stock shortly after their arrival. The notification must include the species, source, copies of certifications for the plant material, and the shippers contact information. Upon notification of the incoming plant material the ODA will contact any nursery where an inspection is needed and asks the nursery to set aside the plant material in question. Inspections are performed because of one or more of the following reasons: proper certification is not received, plant material is prohibited or restricted, or the material is high risk and should receive an inspection to ensure the safety of the nursery and industry. Once inspected, plant material may be sampled and turned into the ODA Plant Pathology Lab for further analysis. Plant material may also be released upon visual inspection, accepted but only with treatment, or rejected resulting in either a return of the material to the shipper or destruction. During 2010 ODA received notification of 2,770 shipments of out-of-state nursery stock received by Oregon nurseries. Of those shipments 330 were determined to be high-risk and inspected by ODA horticulturists.

Phytophthora ramorum 2010 highlights

The *P. ramorum* certification program continued in 2010. Changes to the program included new program staffing and a reduction in the number of high-risk surveys. The 2010 season began in mid-February and extended until mid-October. The survey season progressed smoothly with few incidents.

All interstate shippers of *P. ramorum* hosts were surveyed. Of these 657 nurseries, 247 were classified as high-risk. The remaining nurseries were surveyed as part of the nursery program's annual survey. The horticultural inspection staff completed non-host inspections at 500 nurseries between January and December.

Section 2—Nursery & Christmas Tree Program

Grower Assisted Inspection Program (GAIP)

The Grower Assisted Inspection Program (GAIP) will enter its fourth year in 2011. The GAIP was designed to use a "systems approach" to help nurseries prevent the introduction and spread of foliar Phytophthoras in the Oregon nursery industry. Nurseries in the program are required to look at four critical control points (CCPs) in their operation where Phytophthora can be introduced. The CCPs include plant buy-ins, water management, soil/potting media, and used containers. The nurseries are required to adopt best management practices (BMPs) for each CCP in their nursery. Each BMP is documented and proper usage of the BMPs verified throughout the year by nursery audits. The program currently has 16 participants. Any nursery growing *Phytophthora ramorum* host plants is encouraged to join the GAIP. Participation is voluntary.

Education

As part of the education and outreach effort associated with the GAIP, the ODA contracted with Dr. Luisa Santamaria (Oregon State University Extension) to present a series of bilingual workshops in 2010. The workshops were modeled after the OSU Phytophthora Online Course: Training for Nursery Growers <http://oregonstate.edu/instruct/dce/phytophthora> a mandatory class for GAIP participants. The topics covered were:

1. Biology and Seasonal Activity of Phytophthora
2. Cultural Control for Pest Prevention—Sanitation
3. Cultural Control for Pest Prevention—Scouting
4. Water Management
5. Media, Substrate, Used Containers, and BMP Summary

All of the workshops included hands-on activities at the end of the training. Activities for the participants included a lab tour, using ELISA diagnostic kits, terminology review, quiz activities, and potting media experiments. Feedback from nurseries who sent participants has been good. The nurseries reported employees who attended brought their knowledge back to the nursery and are now applying the concepts on the job. We are considering holding the workshop series

Nine nurseries were found positive for *P. ramorum* in 2010. Five of these as a result of the Federal Order Survey and four as a result of the high-risk survey. The delimitation, destruction and follow-up monitoring has been completed at seven of the nine positive nurseries.

Year	Postive nurseries
2004	19
2005	18
2006	12
2007	5
2008	5
2009	6
2010	9

Number of nurseries found positive for *P. ramorum* 2004-2010



P. ramorum surveyor, Aaron French, inspects for symptoms of sudden oak death

There will be a couple of major changes for the 2010 *P. ramorum* survey program. Jan Hedberg and Sherree Lewis will split many of the duties formerly done by Melissa Boschee. In addition, most of the *P. ramorum* databases will be integrated into the Nursery Information Management System (NIMS). This will allow the program management in Salem greater flexibility in assigning duties to our permanent and seasonal field staff. It will also allow the field staff to readily access inspection history of nurseries in the certification program.

Section 2—Nursery & Christmas Tree Program

again if there is enough interest and are exploring other means of sharing this information with nurseries. You do not need to be a GAIP participant to receive the training and pesticide recertification credits will be available. If your nursery is interested in this training please contact Dr. Luisa Santamaria at 503-678-1264 ext. 112 or Melissa Lujan at 503-510-5529.

APHIS/National Plant Board regulatory working group visit

The last week of October the ODA hosted seven groups who have been reviewing the federal *Phytophthora ramorum* program. Topics discussed included protocols, regulations, BMPs and CCPs to name a few. Once the reviews have been finalized their recommendation will be given to APHIS.

Nursery visits were included as a part of the meeting. Oregon Pride Nursery participated as the GAIP nursery for the tour. The group was able to see first hand how the nursery has adapted its growing operations to meet program requirements. The staff members also explained how they have increased employee training, bio-security, challenges they have faced, and overall improvements they have noticed since joining the GAIP. The visit was a great opportunity to demonstrate how each nursery can uniquely adapt BMPs.

Research projects

In 2010, the ODA started two research projects that involve the GAIP nurseries. While the protocols used in the two studies are similar, the goals are quite different. The first research project was funded by USDA APHIS through the Farm Bill and is referred to as the Farm Bill Study (FBS). The goal of the FBS is to compare the effectiveness of three different certification schemes at mitigating the risk of pest spread through the movement

of nursery stock. Six nurseries are involved in the FBS; two are in the GAIP, two are in the United States Nursery Certification Program (US NCP), and two are in neither program and are referred to as shipping point inspection (SPI) nurseries. The SPI is the current, standard certification method for shipping nursery stock while the GAIP and US NCP each practice systems approach methods. Each nursery will be randomly surveyed for five target pests (Phytophthora root rot, Phytophthora foliar blight, bittercress, snails and slugs, and root weevils) and the pest incidence for the target pests determined. Each participating nursery will be provided with a comprehensive report about the status of the five target pests within their nursery. Results between the six nurseries will be analyzed and a final report comparing the different certification schemes prepared. We plan to continue this project for at least two more years.

The second research project focuses on the remaining 14 GAIP nurseries. This project was funded through the USDA Specialty Crop Grant administered by the department. The purpose of this study is to determine the presence or absence of Phytophthora at three of the four CCP within GAIP nurseries. The goal is to provide the nurseries with feedback on how well their BMPs are working for their water management, used containers, and soil/potting media. Funding for this project is one year.

If you would like to learn more about GAIP, please contact Melissa Lujan, GAIP coordinator 503-510-5529; Gary McAninch, Nursery & Christmas Tree supervisor, 503-986-4644; or Dr. Nancy Osterbauer, Plant Health Program manager, 503-986-4666. Additional information about the GAIP can also be found at <http://oregon.gov/ODA/PLANT/NURSERY/gaip.shtml>.

Section 2—Nursery & Christmas Tree Program

Nursery Information Management System (NIMS)

NIMS was originally developed as database for use by the program's field staff to document their daily activities. Since then it has become much more. The goal is for NIMS to house most of the program's activities and information in one database. Programs such as European Pine Shoot Moth Certification, *P. ramorum* certification, and Post Entry Quarantine use NIMS to collect inspection/trapping information, document test results, and archive certification status. NIMS is currently operational with the following functions:

- Accessible to all of the Nursery & Christmas Tree Program staff.
- Provides real-time license status for Christmas tree growers and nurseries.
- Documents daily staff activities including nurseries visited, time spent at each nursery, type of inspection or service offered, and travel time between stops.
- Allows staff to track progress in meeting inspection goals and objectives.
- Provides customized reports such as lists of delinquent licensees and grower inspection history.
- Allows the inspector or Salem staff to schedule inspections. Alerts inspectors by e-mail or text message when an inspection is due.
- Is the primary tool for managing the division's *P. ramorum* certification program.

Future development plans include

- development of NIMS, including an electronic inspection report, for use on mobile digital devices such as iPhone/iPad.
- making NIMS inspection scheduling functions available to the Plant Division's office manager and Weeds/IPPM administrative specialist.



Melissa Lujan collects samples for the GAIP Farm Bill Study



Dr. Luisa Santamaria and her assistant at a GAIP sanitation workshop

Section 2—Nursery & Christmas Tree Program

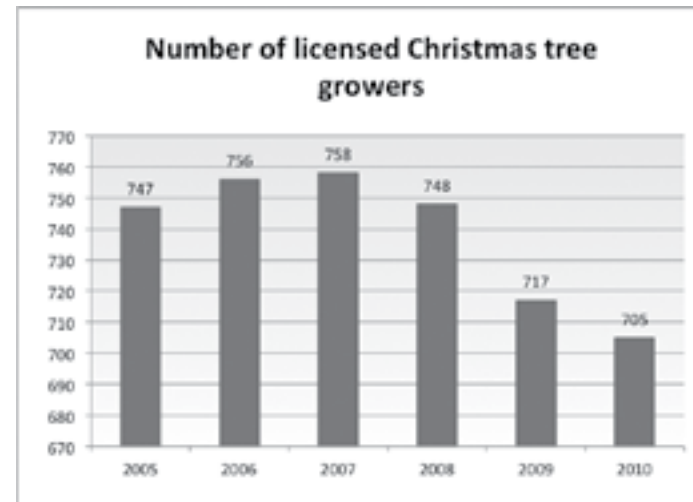
Phytosanitary Certificate Issuance and Tracking System (PCIT)

PCIT is a web-based system developed by USDA to track the inspection of agricultural products and certify compliance with plant health standards of importing countries. Under this system, the exporter completes and submits electronic copies of federal phytosanitary certificates to the ODA Nursery & Christmas Tree Program office in Salem. ODA nursery staff review the submitted electronic document, confirm an inspection has taken place, and issue an official certificate. The

ODA benefits from PCIT by not being responsible for “filling out” phytosanitary certificates for the exporter. Completing a federal phytosanitary certificate is a time consuming process with many opportunities for errors. A growing number of lumber exporters, nurseries, and Christmas tree growers are using PCIT. A total of 7,132 PCIT certificates were issued by the ODA during the past year, which represents approximately 95 percent of all federal phytosanitary certificates issued. The ultimate goal of the Nursery & Christmas Tree Program is to have all phytosanitary certificates issued using PCIT.

Christmas tree general information

In 2010, the department issued 705 Christmas tree grower licenses. License fees were used to fund 1.5 FTE (field staff) and two 0.14 FTE (program supervisor and program assistant). ODA provides inspection services to assist growers in the production of high quality Christmas trees. Because 90 percent of Oregon’s Christmas trees are sold out of state, the main activity of the program is to certify trees destined for foreign and domestic markets.



Christmas tree growers harvest approximately eight million trees annually from about 41,000 acres. During the year, approximately 900,000 trees were certified and shipped to foreign countries. The table below shows the number of phytosanitary certificates issued over the past four years for Christmas trees going to foreign destinations and to the state of Hawaii.



Christmas tree shipping

Mexico

We received a report of only one shipment of Oregon Christmas trees rejected at border for pest infestation during 2010. The shipping season went remarkably well, considering 1,912 trucks crossed the border without phytosanitary issues. The changes were put into effect during the middle of the 2010 shipping season. Major changes:

- A pesticide treatment is now required three to six weeks prior to shipping. Mexico’s list of approved insecticides includes three pyrethroids: permethrin 36.8 percent active ingredient, esfenvalerate 8.4 percent active ingredient, or bifenthrin 7.9 percent active ingredient.

Section 2—Nursery & Christmas Tree Program

- All tolerance levels for pests and diseases were eliminated. All quarantined pests now have a zero tolerance. The list of quarantined pests, diseases, under Mexico’s new regulation includes:

Insects

1. *Rhyacionia bouliana* (European Pine Shoot Moth)
2. *Cylindrocopturus furnissi* (Douglas-fir Twig Weevil)
3. *Tomicus piniperda* (common pine shoot beetle)
4. *Lymantria dispar* (gypsy Moth)
5. *Pissodes strobi* (white pine weevil)
6. *Contarinia constricta* (Douglas-fir needle midge)
7. *Choristoneura fumiferana*—(spruce budworm)
8. *Choristoneura occidentalis*—(western spruce budworm)
9. *Diprion similes* (pine sawfly)
10. *Orgyia pseudotsugata* (Douglas-fir tussock moth)
11. *Paradiplosis tumifex* (balsam gall midge)
12. *Vespula germanica* (German or European wasp)

Mites

13. *Nalepella ednae*
14. *Ephitremerus pseudotsugae*

Fungi

15. *Cronartium ribicola* (white pine blister rust)
16. *Phytophthora ramorum* (sudden oak death)
17. *Cronartium quercum* var. *fusiforme* (pine stem rust)
18. *Grovesiella abieticola* (Scleroderris canker)
19. *Diaporthe lokoyae* (Phomopsis lokoyae)
20. *Rhabdocline weirii*

21. *Rhabdocline pseudotsugae*
 22. *Lophodermium seditiosum* (Swiss needle cast)
- Molluscs
23. *Arion* sp (various garden slugs)

- A minimum shaking time of 15 seconds will be required for each tree shipped.



Oregon Christmas trees ready for harvest

Japan

Japanese officials rejected a single container of holiday greens due to the presence of strawberry root weevil (*Otiorhynchus ovatus*). This container was returned to Oregon at great expense to the shipper and the consignee.

Hawaii

Sixteen containers of Christmas trees were rejected by the Hawaii Department of Agriculture due to the presence of slugs, yellowjackets, Pacific tree frogs, and salamanders. Ten of these containers were treated and allowed to stay in Hawaii. Six were returned to Oregon at considerable expense to the shipper.

Section 3—Insect Pest Prevention and Management Program

Introduction

The Insect Pest Prevention and Management Program (IPPM) objectives are to protect Oregon's agriculture and environment from damaging invertebrate pests and to maintain or enhance the value of Oregon's agricultural products. IPPM achieves these objectives through regulatory enforcement, vigilant detection, and rapid response treatment or control programs.

Our professional staff also performs identification services, pest risk assessments, and inspections for several state and federal permit programs. Pest surveys

of Oregon's agricultural crops often meet the entry requirements of national and international customers. Sharing information about the potential threats of invasive species to Oregon with industry groups and the public remains an increasingly important goal in order to fulfill our objectives. IPPM documents survey results in the IPPM databases, the federal Integrated Survey Information System (ISIS), GIS maps, the National Agricultural Pest Information System (NAPIS) database, and on the program's website <http://oregon.gov/ODA/PLANT/IPPM>.

2010 highlights

- IPPM field staff trapped one European gypsy moth (GM) at a new site in Beaverton, Washington County, the lowest number since the start of the Oregon GM survey program in 1979. For the second year in a row, IPPM is not proposing any GM treatments.
- The 2009 eradication program for the GM population in southeast Eugene was declared successful after delimitation trapping yielded no GM catches for the second field season.
- IPPM conducted two Japanese beetle (JB, *Popillia japonica*) eradication projects at two sites: the Airtrans Center of Portland International Airport (PDX) (47 acres) and Cave Junction, Josephine County (33 acres).
- IPPM personnel placed 4,457 JB traps statewide and trapped a total of six JB: one at the Airtrans Center at PDX and five at a new site in Cave Junction.
- The 2010 grasshopper season was the worst since the late 1980s with almost 2 million acres of rangeland reported as infested with economic levels of over eight grasshoppers per square yard.
- IPPM and Animal and Plant Health Inspection Service (APHIS) conducted aerial treatments against economic grasshopper populations with Dimilin and Sevin on over 17,000 acres of public land in Umatilla and Harney counties. In addition, IPPM and APHIS assisted in private aerial and ground applications on several thousand acres in Harney and Baker counties.
- IPPM field technicians caught three apple maggot flies (AM, *Rhagoletis pomonella*) at the Blue Mountain apartment complex eradication site in Pendleton and three in a 0.5 mi buffer zone, compared to 135, five, three, and three AM in 2006, 2007, 2008, and 2009 respectively.
- Surveys for the nun moth (NM, *Lymantria monacha*), rosy Gypsy moth (RGM, *Lymantria mathura*), and the Siberian moth (SM, *Dendrolimus superans*) were negative in 2010.
- IPPM personnel caught a single male specimen of the light brown apple moth (LBAM, *Epiphyas postvittana*) at a nursery in Polk County.
- IPPM staff detected cereal leaf beetle (CLB, *Oulema melanopus*) for the first time in Jackson, Morrow, and Sherman counties. CLB is now found in 24 Oregon counties. CLB populations are generally kept in check by larval parasitoids introduced and released by IPPM and APHIS.

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- The spotted wing Drosophila (SWD, *Drosophila suzukii*), a new invasive species reported for the first time in 2009, was monitored by Tom Peerbolt Inc. and Oregon State University (OSU) with funds from Oregon Department of Agriculture (ODA). This early detection survey helped to keep growers informed and allowed them to implement successful management programs.
- Although detected in Oregon in 2004, the exotic brown marmorated stink bug (BMSB, *Halyomorpha halys*) was essentially restricted to the Portland and Salem metro areas. However, 2010 surveys indicated that the BMSB is moving closer to production areas in Oregon.
- A survey for the granulate ambrosia beetle (*Xylosandrus crassiusculus*), identified in early 2009 from a specimen caught in 2007, in Forest Park, Portland, yielded no new catches.
- The exotic terrestrial plant pest survey focused on 15 high-risk sites, including ports and other transportation hubs. Several exotic invertebrates new to North America and Oregon have been found in samples processed to date, including a European katydid, the tessalated shieldback (*Patycleis tessalata*), and a European ant previously known from Washington state (*Myrmeca speciosa*). Several records of insects new to Oregon were reported, including

the drumming katydid (*Meconema thalassium*), the green alder sawfly (*Monosoma pulveratum*), and the bullhorned dung beetle (*Onthophagus taurus*).

- IPPM's Visionary Digital imaging system was used for various projects, including a grasshopper field identification manual (to be completed in 2011).

The tragic loss of Dr. Bennett Huffman, the head of our Portland field office, this last fall has had a very emotional impact on our IPPM personnel. Even so, all of our staff came together and took on additional responsibilities to fill in the sudden gap he left behind.

In January of 2010, IPPM welcomed Dr. Paul Blom to the team, who started his job as the eastern Oregon entomologist in La Grande, with a huge grasshopper outbreak challenge. We also welcomed Pat Mitchell as the new Portland field office head.

Our IPPM program continues to go through a transitional phase in response to the challenges of financial constraints. I am extremely thankful for all of the hard work and energy our IPPM staff invested to fulfill our program's mandate despite all of these limitations. Their encouragement, commitment, and diligence have made this past year a great success.

Dr. Helmuth W. Rogg
IPPM program manager



IPPM Program staff: Back row (left to right): Rick Westcott (retired), Josh Vlach, Dr. Paul Blom; Front row: Steve Valley, Jim LaBonte, Richard Worth, Dr. Diana Kimberling, Karen Larsen, Todd Adams, Dr. Barry Bai, Kerri Schwarz, Dr. Helmuth Rogg, Pat Mitchell

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Gypsy Moth Program

This was the year with the lowest number of gypsy moths (GM, *Lymantria dispar*) trapped since the beginning of our GM program in 1979. Only one GM was caught in a nun moth trap in Beaverton, Washington County, at a new site.

In total, IPPM personnel placed 12,559 GM and Asian Gypsy Moth (AGM) traps throughout Oregon in 2010. No moths were found at four sites where GM were caught in 2008, including two sites in southeast Eugene, Lane County; northeast Portland, Multnomah County; and northwest Portland, Washington County. These sites are now declared free of GM. No moths were found at five sites where GM were caught in 2009. These sites were in Aurora, Clackamas County, where single moths were detected at three sites; and in Portland, where two moths were trapped at one site and a single moth was trapped at another. One more year of negative delimitation trapping is required before these sites can be declared free of GM. Delimitation trapping will be conducted in 2011 around all 2009 and 2010 positive sites.

We do not anticipate a GM or AGM eradication spray program for 2011 because we did not detect any breeding populations of GM or AGM this year.



The 2010 trapped Gypsy moth from Beaverton, Washington County

Japanese Beetle Program

The Japanese beetle is established in the eastern US and is a major pest of crops, ornamentals, and turf. ODA places a high priority on detection and eradication of the Japanese beetle to protect Oregon's nursery, fruit production, grass seed, and other industries potentially affected by the Japanese beetle. ODA has implemented a quarantine rule and conducts regular inspections to prevent new introductions from infested states, via aircraft and nursery stock. IPPM Program have trapped 285 JB and conducted four successful JB eradication programs since 1988.

Trapping

In 2010, IPPM staff placed 4,457 JB traps in 35 of 36 Oregon counties. About 2,369 traps were part of the delimitation program in the Portland metro area and in McMinnville, Yamhill County, where JB's were previously caught. We responded to a few positive JB

catches in Cave Junction, Josephine County by placing about 40 add-on delimitation traps later in the field season. The remaining 2,088 traps were detection traps deployed at high-risk sites in cities, towns, and rural areas throughout the state.

IPPM staff caught six Japanese beetles statewide, one at the Portland International Airport (PDX) and five in a residential neighborhood in Cave Junction. We did not catch any JB at the 2008 single JB detection site in McMinnville. This site can now be declared free of JB. We did not catch any JB in Swan Island where single specimens were trapped in 2008 and 2009, respectively. We also did not catch any JB at the two 2009 eradication sites at the Air National Guard Base (ANG) and the Colwood Golf Course. These sites will require one more year of negative trapping before they can be declared free of JB.

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Eradication

IPPM personnel conducted two JB eradication programs, one at PDX (47 acres) and one in Cave Junction (33 acres), totaling 80 acres. Treatments at PDX included an application in June, using granular Arena 0.25G, that targeted soil-born larvae. This treatment was followed by three treatments (applied every other week) of foliar Tempo SC Ultra, in July and August, that targeted adults. For the third year, IPPM worked closely with Port of Portland authorities in the cost sharing of the JB eradication efforts at PDX. The Port of Portland and ODA signed a memorandum of understanding for the financial support of the eradication cost at PDX. The Port of Portland also helped with outreach efforts by distributing maps, posters, signs, pesticide information, and treatment schedules to the Airtrans business tenants.

The Cave Junction catch was at a new site. A family who moved from Cedar Rapids, IA, brought potted plants that were infested with Japanese beetles. In October, IPPM staff treated irrigated lawns in the residential neighborhood around the positive catch site with Arena 0.25G, targeting any larvae that may have entered the soil. Foliage treatments that target adults were not conducted in 2010 because of the late-season detection.

Airplane inspection

APHIS monitors JB populations at eastern airports each year because of the risk of Japanese beetles hitchhiking on aircrafts. As soon as population levels pose a risk of live beetles entering aircrafts, the airport becomes regulated, requiring the implementation of JB exclusion methods or the chemical treatment of airplanes. A biweekly national conference call was set up to share JB information among all stakeholders. In 2010, eight airports in seven states were regulated by PPQ for JB. IPPM personnel conducted 58 cargo airplane inspections and found six dead and two moribund JB on UPS cargo planes. Inspected cargo carriers included FedEx from Indianapolis, IN, and UPS from Louisville, KY. These two carriers have direct flights from infested states to Oregon.



Potted plants from Iowa with Japanese beetles were found in Cave Junction

Grasshopper and Mormon Cricket Program

The 2010 Oregon grasshopper survey season, conducted by IPPM in cooperation with APHIS, was Oregon's greatest grasshopper challenge since the major outbreaks of the late 1980s. Initially, grasshopper numbers were slow in developing, delayed by unseasonably cool and wet weather in May and June, but erupted in great numbers late in the season as the weather finally warmed up. Most of the rangeland in the eastern third of Oregon

was generally infested with economic populations by season's end. Malheur, Harney, Umatilla, Baker, and Morrow counties were especially hard hit. Based on the 2009 adult survey results, we predicted that northern Harney County would have economic populations. We also expected to see areas with problem populations in Baker County, where an outbreak has been going on for three years, but should be waning, as well as

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some building numbers in Umatilla and northern Malheur counties. However we did not expect to see the widespread outbreak that materialized throughout the eastern third of the state.

Surveying began on May 24 and ended on September 1. The adult survey (July 6-September 1) is used to

make predictions for 2011, and estimated economic levels of eight or more grasshoppers per square yard on 1,907,938 acres in 12 counties of eastern Oregon. Eight of the 12 counties had greater than 10,000 economically infested acres.

Table 1. Grasshopper survey statistics

Year	Number counties infested	Acres of econ. infest.	Sites surveyed					Mean GH/yd ²	Number of GH surveyors
			Total	Nymph	Adult	Treatment	With economic		
2010	12	1,910,222	1,905	795	750	360	488	21	6
2009	11	151,974	998	491	507		108	18	4
2008	12	1,129,820	2,722	1,116	1,606		360	29	6
2007	13	798,358	1,585	706	870		298	18	6 (+2)
2006	14	97,399	1,368	750	618		100	16	6
2005	9	64,751	859	306	423		115	15	5

* Mean of economically infested samples

Grasshopper infestation levels in Oregon (2005-2010)

The cool and wet May through June period delayed emergence, which complicated our surveying efforts. Normally in outbreak years most grasshoppers are adults by early July, since outbreaks are usually associated with hot, dry conditions. This year we observed a unique situation where large populations of early instars mixed in with a significant number of late instars to adult in mid to late July. Some grasshoppers hatched normally during the few warm periods we had this spring, however when the bulk of the population hatched in late summer, control recommendations were complicated by the mix of young and older grasshoppers found together. Our preferred control product Dimilin, a growth regulator, is less effective on adult or late instar grasshoppers.

In preparation for the expected outbreak in Harney County, a grasshopper integrated pest management (IPM) workshop was held on April 8, at the Eastern Oregon Agricultural Research Center in Burns, to provide land-managers with tools to deal with

grasshopper outbreaks. The workshop was presented and organized by APHIS, IPPM, and OSU Extension Service. In total, 10 participants attended the workshop, including public and private land-managers, ranchers, and growers.



2010 Oregon grasshopper and Mormon cricket survey map

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Application of Sevin on BLM land in the Steens, Malheur County

acre. There was no reduced agent area treatment strategy (RAATs) skip due to the advanced age of the grasshopper population. Even though a percentage of the population was adult at the time of treatment, post treatment counts showed an average of three grasshoppers per yard for an 85 percent reduction.

At the request of the Bureau of Land Management (BLM), APHIS conducted a treatment program July 24-25 on three separate blocks of BLM rangeland on the east side of the Steens Mountain in southern Harney County. The terrain was very remote and rugged. Because of the mixed age of the grasshopper population, Sevin XLR Plus was aerially applied at a rate of 12 ounces a.i. per acre to 13,088 acres. A RAATs skip of 100 feet between swaths resulted in 18,323 acres protected. A large portion that needed treatment could not be treated because the terrain turned out to be too dangerous to fly. Pre- and post-treatment counts showed a reduction from an average of 33/yard² to 8/yard² (73 percent).



Aerial application of Sevin in Steens Mountain area, Harney County

After successfully treating a problematic grasshopper population at the Portland International Airport (PDX) with Dimilin in 2009, the Port of Portland geared up to repeat treatment again in 2010. However, our survey throughout the season detected very few grasshoppers, indicating the benefits of a timely Dimilin application.

Grasshopper treatment projects

In response to early season concerns, an afternoon seminar on Mormon cricket biology and control was presented to private landowners in Enterprise, Wallowa County, on April 28. One rancher used this information to treat some of his land in response to a subsequent cricket migration in May. Mormon crickets are not as big a problem in Oregon as they are in our neighboring states, and we encountered very few in our survey this year.

The northern border of the Malheur National Wildlife Refuge was intensely monitored this spring because of economic populations that impacted adjacent private rangeland in 2009. Private ranchers near the Refuge applied two treatments using recommendations from IPPM and APHIS. However, no control was needed within the refuge boundaries.

At the request of the Department of Defense Umatilla Army Chemical Depot, APHIS treated 4,242 acres to prevent grasshoppers from migrating from the depot to surrounding high value cropland. A similar but smaller outbreak in 2005, was not treated and resulted in heavy crop damage to fields bordering the depot. Grasshopper populations in the treated area averaged over 20 per square yard. The treatment took place July 7, with Dimilin applied by air at a rate of one ounce a.i. per

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We continue to watch the area in and around the Klamath Marsh National Wildlife Refuge very closely because of the repeated clear winged grasshopper, *Camnula pellucida*, outbreaks. From early through mid-season 2010 we found few areas of concern. However, during the adult survey one isolated parcel of refuge property, the "Buck Pasture," and several areas in the northeast region of the refuge, known as the "Lane Ranch," had high densities of *C. pellucida* mating and laying eggs.

In Harney County, we assisted two private ranches that applied Dimilin to control high *Camnula* populations with pre- and post-treatment surveys. Several private landowners in the Keating area of Baker County utilized loaned IPPM ground application equipment, under a cooperative equipment use agreement, to make Dimilin

applications to infestations on their holdings. The Fort Klamath area experienced some areas of economically significant grasshopper densities. With delimitation and control recommendations from IPPM, two private landowners successfully treated ~2,000 acres with Dimilin during July. In Union County, one landowner reported targeting a small population with Dimilin. We received many reports of high grasshopper populations, for which we could only provide advice and sometimes limited survey due to limited time and resources.

Based on the results of the 2010 adult grasshopper survey, we recommend landowners and land managers be prepared for a much worse outbreak in Oregon in 2011, especially those areas that saw significant increases in 2010.

Apple Maggot Program

The capture of apple maggot flies (AM, *Rhagoletis pomonella*) in traps at the Pendleton Blue Mountain Apartments complex, Umatilla County, has been continuously dropping since the start of our eradication program in 2006: 135 in 2006, five in 2007, and three in 2008 and in 2009. Unfortunately, our catch in 2010 is up slightly to six flies caught in four different traps. Three of these traps were at the apartment complex and three flies came from a single trap in the surrounding residential area within the buffer zone. We used 34 traps around, and in the vicinity of, the apartment complex. In addition to the trapping, foliar insecticides were

applied to the host trees at the apartment complex at 10 to 14 day intervals through the fly season. We also made two applications to the soil below host canopies. The Blue Mountain Horticultural Society funded the chemical treatment.

We continued our intensive AM trapping program along the state line with Washington and near the apple production areas of Milton-Freewater, Umatilla County, with 57 traps, and in and around the cities of Adams (12), Athena (18), Weston (10). In addition, we placed 25 AM traps in the Ontario area of Malheur County. No AM were found in any of these traps.

Asian Defoliating Moths Program

In 2010, IPPM staff placed a total of 2,298 traps for three species of moths native to Asia that are among the most destructive of forest defoliators: the Siberian moth (SM, *Dendrolimus superans sibericus*), the rosy Gypsy moth (RGM, *Lymantria mathura*), and the nun moth (NM, *Lymantria monacha*). These pests could be introduced into Oregon via the same pathways as the Asian gypsy moth, particularly in or near port areas receiving shipments from Asia. Therefore, traps were deployed within five miles of the ports and waterways

receiving ships and other high-risk sites, such as campsites and transportation hubs. This included the ports of Coos Bay and Portland and along the Columbia River waterway from Astoria to Portland.

Nun moth (*Lymantria monacha*), is native to Europe and Asia. The nun moth poses one of the most serious exotic pest threats to western and northern US forests that have spruce, pine, and Douglas fir. A total of 2,053 nun moth delta traps with PheroTech NM lures were set by

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mid-July and removed at the end of September. No nun moths were detected.

Recent literature indicates that the Siberian moth (*Dendrolimus superans sibericus*), is probably not an important threat to many parts of Oregon because of the limited pathways for introduction and adverse climatic factors. Unlike the GM, the SM deposits its eggmasses only on host material. In addition, to complete its life cycle the SM, being a boreal species, requires cold temperatures, which may only be found in higher elevations in Oregon. However, a limited survey of about 53 traps was conducted in 15 counties for this defoliating pest. The APHIS office in Portland

implemented this survey and no Siberian moths were detected.

Rosy gypsy moth (*L. mathura*), occurs naturally from Japan to China and west to India and Pakistan. This species is a serious potential threat to the Pacific Northwest and, if it were to establish in Oregon, would threaten forest ecosystems, the sustainability of forest industries, and the nursery trade. Additionally, evidence from the Far East suggests that *L. mathura* can enhance *L. dispar* outbreaks. IPPM staff placed 192 clamshell traps with RGM lures (provided by USDA Otis Pest Survey, Detection, and Exclusion Laboratory) by mid-July and removed them at the end of September. No RGM were detected.

Light Brown Apple Moth Program

The light brown apple moth (LBAM, *Epiphyas postvittana*) is a destructive pest feeding on a wide range of fruits and many other plants. It is native to Australia and has been introduced into New Zealand and Hawaii. The first detection of LBAM in the continental US was in California in 2007, where it is now confirmed from more than 12 counties.

In response to the continuous spread of the light brown apple moth in California, a total of 994 delta-style traps baited with LBAM sex pheromone lures were placed

statewide from June through September 2010, and serviced once a month. A single LBAM was trapped at a nursery in Independence, Polk County. The Systematic Entomology Lab, USDA, confirmed the suspect as LBAM. The moth is a single male specimen trapped in one of two traps set at the nursery, which had negative detection traps in 2008 and 2009. The single moth was trapped sometime between June 3 and July 13. No other LBAMs were trapped in Oregon in 2010, but several non-target and LBAM look-alike moths were found in the traps.

Cereal Leaf Beetle Program

The cereal leaf beetle (CLB, *Oulema melanopus*), a serious invasive wheat and barley pest from Europe, continues to expand its range in Oregon. IPPM surveys detected CLB for the first time in Jackson, Morrow, and Sherman counties, bringing the total number of infested Oregon counties to 24. Parasitized CLB larvae were collected in Multnomah County and released in an infested field in Jackson County as part of the cooperative CLB biocontrol program.

Since 1999, APHIS, IPPM, and OSU Extension Service have been cooperating in the release of parasitic wasps as natural enemies of CLB. The CLB larval parasitoid *Tetrastichus julis* is now present in most Oregon counties where CLB is established, achieving parasitism rates of up to 100 percent in northeastern Oregon and the northern Willamette Valley. The Western CLB Biological Control Team received several achievement awards from APHIS and OSU.

Section 3—Insect Pest Prevention and Management Program**Spotted Wing Drosophila Program**

The newly recorded invasive vinegar fly, the spotted wing Drosophila (SWD, *Drosophila suzukii*), continues to spread in Oregon. Legislative emergency funds were used to conduct an early detection and monitoring program implemented by Tom Peerbolt Inc., a private agricultural consultant company, and OSU. ODA set up weekly conference calls to coordinate researchers and growers from Oregon, Washington, and California in SWD management efforts.

This new exotic fruit pest was reported from California in late June 2009. Potentially infested fruit from various

points in Oregon (including some originating from California) were maintained in IPPM's rearing chambers to check for emergence of potential SWD. Many new county and host records resulted. At the beginning of the season, SWD numbers were generally low, but significantly increased to damaging levels at the end of the growing season. An image-based identification aid was designed by IPPM that has since been used by scouting teams and made available on the IPPM website. OSU received a large grant to continue working on a SWD IPM program.

Brown Marmorated Stink Bug Program

The first Oregon detection of the brown marmorated stink bug (BMSB, *Halyomorpha halys*), occurred in Portland in 2004. Although evaluated as a serious crop pest as a result of a pest risk analysis, BMSB is still mainly a nuisance pest in the Portland and Salem metro areas. However, the development of this summer in some eastern US states where the BMSB became a very serious fruit and vegetable pest, causing up to 60 percent losses in peaches in Pennsylvania, despite repeated chemical treatments, confirmed our initial evaluation of the seriousness of the BMSB pest status. As a response, IPPM staff surveyed for BMSB in the Willamette Valley and in production areas of Hood River and The Dalles. BMSB was found to be established from Salem

north to Portland, west to McMinnville, and east to Sandy, including the agricultural production areas east of Portland. Verified specimens were also found in Arlington, Corvallis, and Sunriver, although it is not known whether these are evidence of established populations. BMSB was also found to be established in Camas and Vancouver, WA. IPPM staff received many reports of BMSB damaging residential crops and ornamental plants. In addition, IPPM staff tested a commercial aggregation pheromone lure in combination with various trap designs. However, the preliminary experiments were inconclusive. We held a meeting in Salem to alert the industry of the potential threat of BMSB to fruit and vegetable production in Oregon.

Exotic Wood Boring Insects Program**Granulate ambrosia beetle: The Dalles eradication project**

After the successful eradication of the exotic granulated ambrosia beetle, (*Xylosandrus crassiusculus*), at the railroad tie plant in The Dalles, IPPM staff continued a monitoring survey at and in the vicinity of the plant in 2010. Twenty 12-funnel Lindgren traps, each baited with four ultra-high release ethanol lures, were placed in and around the railroad tie plant from November 26, 2009 through November 15, 2010. Ten additional traps were placed in areas with diverse hosts south of

The Dalles to determine whether eastern US species such as *Monarthrum fasciatum* and *Monarthrum mali* trapped in that area in previous years were established. Samples were taken every two weeks. All 2009 samples and approximately half of the 2010 samples have been processed and identified. No *X. crassiusculus* or other target exotic wood boring insects were found. Surveillance trapping is anticipated to continue through mid-November, 2011.

In late May, a 2007 specimen collected by Mark Hitchcox (APHIS) from Forest Park in Portland was

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confirmed by IPPM to be *X. crassiusculus*. About 75 funnel traps were placed around the location in 2009, and 20 in 2010. To date, no further *X. crassiusculus* have been detected in Portland since 2007.

Exotic ambrosia beetle survey

Ambrosia beetles (*Curculionidae*: Platypodini and Xyleborina) are among the most readily transported wood-infesting insects. They are easily introduced via raw wood products, solid wood packing materials, and infested plants. Many species are extremely polyphagous, attacking any woody plant that can serve as a host for their fungal symbionts and also attacking and degrading raw lumber. Ambrosia beetles pose major threats to nursery, ornamental, and pulp plantation plantings, as well as to orchards and native tree stands.

IPPM trapped for exotic ambrosia beetles at about 75 sites in 14 counties, predominantly high-risk seaports, mills, and other hot zones in western Oregon as well as in central and eastern Oregon, that may be introduced through commerce. Exotic ambrosia beetles, such as the granulate ambrosia beetle, (*Xylosandrus crassiusculus*), and *Platypus mutatus* are considered significant pests in nursery, ornamental, and pulp plantation plantings. The red bay ambrosia beetle, (*Xyleborus glabratus*) is well on its way to causing the extinction of red bay in the US and may be a threat to the avocado industry as well as to the already stressed forests of western California and southwestern Oregon.

All of the 2010 raw samples (approximately 1,125) have been processed for target taxa. Screening, preliminary identification, and final identification have been performed on about 75 percent of the samples. At this time, no targets or other taxa of regulatory significance have been found.

Early detection and rapid response (for exotic bark and ambrosia beetles)

Since its inception in 2001, Oregon has been part of the national EDRR (Early Detection of and Rapid Response to Exotic Bark and Ambrosia Beetles) program. IPPM's participation has included protocol development, Oregon surveys, and taxonomic support

to other states. No Oregon EDRR survey was conducted in 2010. However, IPPM staff provided taxonomic support to California and Washington state with their 2010 EDRR surveys. Approximately 3,080 specimens from 512 samples were identified, yielding 122 species of wood boring beetles in the families of Buprestidae, Cerambycidae, and Scolytidae and four species of wood wasps in the family of Siricidae. All specimens were native or exotic species already known from these states and none were of regulatory significance.

Regional Identification Center for exotic bark beetles and wood boring insects

This year's activities as part of the "Regional Identification Center for Exotic Bark Beetles and Wood Boring Insects" cooperative agreement included enhancing analysis and surveys for exotic wood boring insects through development and dissemination of identification aids, especially those for exotic Curculionidae (including ambrosia and bark beetles), but including other wood boring taxa as appropriate. Here are the highlights:

- Approximately 10,000 specimens were received from Arkansas, Idaho, Nebraska, Oregon, and Utah. About 5,448 have been identified to date. Most specimens represented native species or exotic species previously documented from these states, although several new state records were included. The only identification of regulatory significance was from Utah. Four specimens of a national target species, the Chinese longhorned beetle, (*Trichoferus campestris*), were identified by IPPM. Although this species has been found in several other states in the last two years, Utah is the only western state to have trapped it to date. This insect can attack a wide range of woody hosts and is known to infest seasoned wood as well. A species of bark beetle previously unknown from North America, but of no regulatory significance, which attacks palm seeds was found in samples submitted from California.
- Final draft of an image based screening aid for the walnut twig beetle, (*Pityophthorus juglandis*) was completed and provided to interested parties.

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- Design of an image-based identification aid for all exotic *Curculionidae*, including bark and Ambrosia beetles, in North America is progressing. A species list has been developed, a species treatment format has been determined, and work is progressing on acquisition of the necessary diagnostic images.
- An image based screening aid for metallic wood boring beetles (Buprestidae) of the West was completed. A similar screening aid for longhorned beetles (Cerambycidae) for the same region is nearing completion.
- A workshop on bark beetle identification in the western region was conducted at Oregon State University, Corvallis.
- IPPM staff were invited to provide diagnostic support for the first annual Bark Beetle Workshop

August 10-14 in Flagstaff, AZ. The first image-based keys for the identification of native and exotic species in the genera *Dendroctonus* and *Ips* were developed for the workshop and tested by the participants, as was the screening aid for the walnut twig beetle, (*Pityophthorus juglandis*).

- Updated versions of the screening aids for western *Buprestidae* and eastern and western Scolytinae were presented at the National CAPS meeting in Kansas City, as well as a preview of the western *Cerambycidae* screening aid. A draft of a screening aid for the walnut twig beetle was provided. Initial drafts of the first image-supported keys for the important scolytine genera, *Dendroctonus* and *Ips*, were also presented.

Exotic Terrestrial Plant Pest Survey Program

This was the third and last year of the important exotic terrestrial plant pest (ETPP) survey that has detected several new records for Oregon, the western US, the US, and North America. In 2010, PDX and 20 high-risk transportation hub sites (container yards, ports, rail depots and yards, and truck stops) in 10 counties of western and eastern Oregon were selected for sampling. Pitfall trapping, sweeping, beating, UV-light trapping, general searching, and visual encounter surveys (for exotic mollusks) were conducted at all sites. The tessalated shieldback, (*Platycleis tessalata*), a European katydid previously known from California, was found in ETPP samples from Medford to Portland. A European ant, (*Myrmica speciosa*), formerly known from Washington was detected in a sample from a Portland truck yard. At the same site, an ant exotic to Oregon in the genus *Ponera* has also been found (identification to species is pending examination by taxonomic experts). Tentative identifications have been made of several European thrips (Thysanoptera) new to Oregon: *Aelothrips albicinctus* and *Rhipidothrips brunneus*. A European jumping louse (Triozidae), (*Paratrioza maculipennis*), new to Oregon has also been tentatively identified. None of these species are of regulatory significance or known to be pests. ETPP samples have

also provided many new county records for several previously detected exotic species.



Survey Technician Dan Stoner digging for pitfall trap

Section 3—Insect Pest Prevention and Management Program

Grape Pest Survey Program

This survey is a joint effort between IPPM and the Plant Health Program. The Plant Health portion of the survey focused on the detection of two pathogens of national concern. The IPPM portion of the survey was focused on pests of federal concern, namely the light brown apple moth (*Epiphyas postvittana*), the European grapevine moth (EGVM, *Lobesia botrana*), the black maize beetle (BMB, *Heteronychus arator*), the *Copitarsia* moths (CM), the grape berry moth (GBM, *Paralobesia viteana*), the European grapeberry moth (EGBM,

Eupoecilia ambiguella), exotic ant species, and the glassy-winged sharpshooter (GWSS, *Homalodisca vitripennis*). No targets or other taxa of regulatory significance were found. However, many samples are still in the process of being sorted and identified. A thread-legged assassin bug (Reduviidae), tentatively identified as *Barce fraterna*, was found in a vineyard in Yamhill County. Members of this genus are unknown from the West, other than some records from California.

European Grape Vine Moth Survey Program

This was a detection survey for a pest of national concern, the European grape vine moth (EGVM, *Lobesia botrana*), in Oregon grape scion and rootstock cultivars. In 2009, EGVM was detected in California where intensive delimitation and control efforts are currently underway. Several shipments of grapes from California into Oregon from the infested County

warranted an intensive survey of Oregon vineyards for the absence of this new invasive pest. This pest is of regulatory significance for international and interstate trade of grapevine nursery stock, as well as posing threats to the vineyard and grape industries of Oregon. A total of 270 EGVM traps were placed in 65 vineyards across Oregon. No EGVM was detected.

Corn Seed Field Survey and Exotic Vegetable Pest Survey Program

This survey is a joint effort between IPPM and Plant Health targeting three pathogens of national concern. The IPPM portion of this survey put out about 100 traps for each target species, the false codling moth

(FCM, *Thaumatotibia leucotreta*), the old world bollworm (OWB, *Helicoverpa armigera*), and the tomato leafminer (TLM, *Tuta absoluta*). No target species were caught.

Miscellaneous insect identification and new records

IPPM taxonomists responded to over 600 submissions of insects and other invertebrates or contacts via telephone, e-mail, or walk-ins. In general, these did not originate from specific IPPM programs but instead were from ODA horticultural and commodity inspection programs, federal and other state government agencies, university and museum collections, commercial sources, the general public, and professional colleagues. Included in these contacts were presentations made to the public and colleagues as well as media interviews. Queries about the brown marmorated stink bug, (*Halyomorpha halys*), accounted for about 150, or 25 percent, of all contacts. There were also many submissions or contacts regarding

spotted wing drosophila, (*Drosophila suzukii*), and several involving bed bugs. Among the most interesting submissions were carpet beetles (Dermestidae) attacking the bows of violins (which are made of horsehair) and an exotic slug that preys on earthworms. A European species of katydid formerly known only from a small area in the northeastern US, the drumming katydid, (*Meconema thalassinum*), was found to be widespread in the Portland area via public reports and as by-catch in gypsy moth traps. The bullhorned dung beetle, (*Onthophagus taurus*), a European species imported into some areas of the US to help control livestock waste, was found as by-catch during a study of long-horned beetle

Section 3—Insect Pest Prevention and Management Program

Identification of Oregon State University Plant Clinic insect samples

Following the departure of the OSU Plant Clinic insect identification specialist in September 2009, IPPM and the Plant Clinic entered into an interim agreement, whereby IPPM entomologists provide identification and relevant information for insect and invertebrate samples submitted to the clinic. There were 356 queries or specimens submitted in 2010, many of which had to do with medical issues, including ticks and what were apparent cases of delusory parasitosis.

lure efficacy near Brookings, the first Oregon record. Examination of material in the Entomology Museum collected in 1959 by a former ODA entomologist, Ken Goeden, yielded a new state record for a native species of jumping louse (Triozidae), (*Triozia inversa*). As part of his volunteer contributions, IPPM's retired taxonomist, Rick Westcott, determined 1,057 specimens from the foregoing sources, mostly of flatheaded wood boring beetles (family *Buprestidae*). He is also the collaborating scientist identifying *Buprestidae* for the Systematic Entomology Lab, USDA, for which he identified 113 specimens, most of which were intercepted at US ports of entry. He also identified 53 flies from the apple maggot program in Pendleton, Umatilla County.

Visionary Digital Imaging System

We expanded our digital imaging system developed by Visionary Digital, which was extensively used to acquire very high quality and detailed images used for various endeavors such as the development of screening and identification aids for wood boring beetles, identification of specimens by non-IPPM taxonomists, grasshopper field identification manual, and support of a carabid ground beetle workshop at OSU. These images are integral to IPPM's outreach program (production of pest alerts and web materials), staff training (recognition of key characters of target species), and ability to acquire funding for additional projects.



The new Visionary Digital Imaging System

Section 4 —Noxious Weed Control Program

Introduction

Our mission is to protect Oregon’s natural resources from the invasion and proliferation of exotic and invasive noxious weeds. The Noxious Weed Control Program does this by

- providing leadership and coordinating noxious weed management.
- serving as a technical resource for noxious weed issues.
- providing public outreach, education, and awareness.

- conducting weed risk assessments.
- implementing early detection and rapid response projects for new invaders.
- coordinating and implementing biological control of weeds.
- administering the State Weed Board Grant Program.

The program has 12 technical staff located in Salem, Eugene, Canyonville, Klamath Falls, Redmond, Burns, and Union. The program employs seasonal staff during the field season to help implement projects statewide.



*From left to right rear: Ken French, Dan Sharratt, Alex Park, Tom Forney, Bob Barrett, Eric Coombs
From left to right front: Shannon Brubaker, Dave Langland, Glenn Miller, Tim Butler, Jo Davis, Bonnie Rasmussen*

Section 4 —Noxious Weed Control Program

Staff work with private landowners, state and federal land managers, and other cooperators to implement integrated weed management projects throughout Oregon. The program focus is on early detection and rapid response for new invading noxious weeds, implementation of biological control, completion of statewide weed inventory and surveys, technology transfer and noxious weed education, noxious weed data maintenance, weed risk assessment, and maintenance of the State Noxious Weed List.

Oregon State Weed Board (OSWB) is a seven-member board appointed by the ODA director. The primary mission of the OSWB is to provide oversight for the listing of noxious weeds, guide statewide noxious weed control priorities, and award noxious weed control

grants. The Weed Control Program works closely with the OSWB to host meetings, to provide updates and technical support, and to administer the OSWB grants.

Weeds do not respect boundaries and spread from one ownership to another. To implement an effective weed program, ODA must foster relationships and work with private, federal, county and local interests. Developing and maintaining partnerships are critical to accomplish our mission and working across boundaries. The program works closely with federal partners and has MOUs, cooperative agreements, and contracts to facilitate control projects and financially assist the program. About 50 percent of the program budget is from federal cooperators. The following is a short summary of activities completed in 2010.

2010 Weed Program highlights

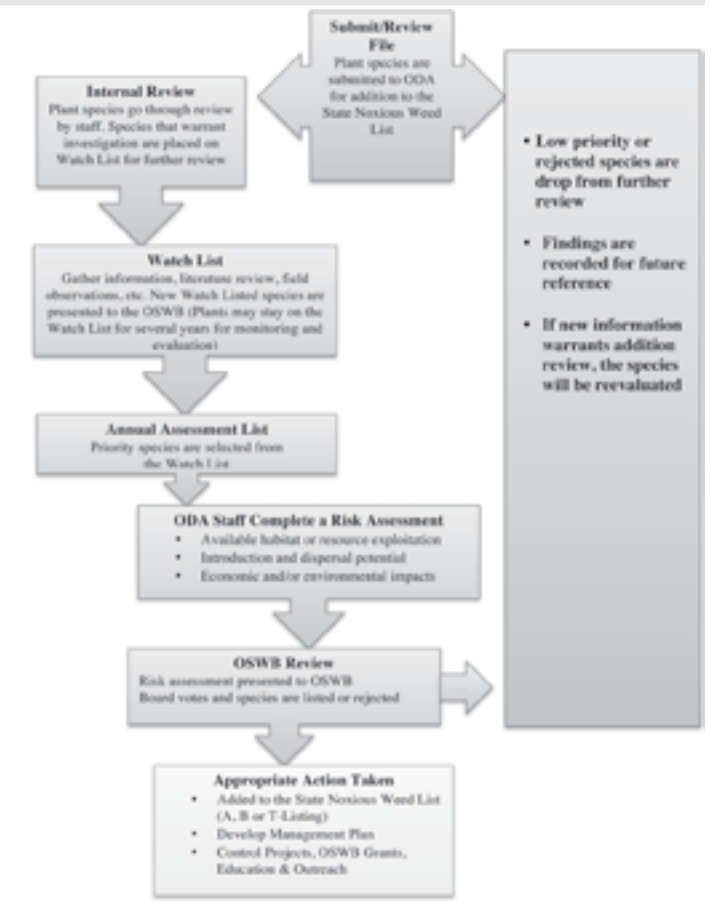
- The program implemented 173 weed control projects. There were 646 noxious weed treatments made by staff using integrated control methods. Pretreatment and post-treatment monitoring was completed at 178 sites.
- Biological agents were released by ODA staff and cooperators at more than 153 sites. Over 114 biocontrol sites were monitored to determine establishment and impact. ODA provided 31 releases of biocontrol agents to cooperators.
- The OSWB received 89 grant proposals and awarded 66 grants totaling more than \$1.5 million.
- Giant reed, *Arundo donax* was evaluated in 2007 and placed on the ODA Watch List. ODA and OSWB are reevaluating arundo for addition to the State Weed List because of the current interest in using it as a biomass energy crop and production in Oregon.
- The program completed 11 new publications for distribution to the public and cooperators, providing information about priority noxious weeds. The

- publications help with identification and early detection efforts.
- The 2010 Inter-Agency Noxious Weed Symposium was held at LaSells Stewart Center in Corvallis; 250 individuals attended the three-day conference.
- During the 2009 legislative session, the noxious weed statutes were consolidated and updated in ORS 569. Included in this rewrite is new authority to address noxious weeds as a public nuisance in administrative rule. The process of drafting and developing rules started in the fall of 2010.
- Kudzu (*Pueraria lobata*) re-growth was found in August of 2010, at two Portland sites. A single plant was found and treated at each location. Kudzu was first identified and treated in Oregon in 2000, and has required periodic treatment.
- New infestations of orange hawkweed (*Hieracium aurantiacum*) were detected in 2010 in Central and Northeastern Oregon. Some of these infestations are stemming from ornamental plantings.

Section 4 —Noxious Weed Control Program

2010 Noxious Weed List update

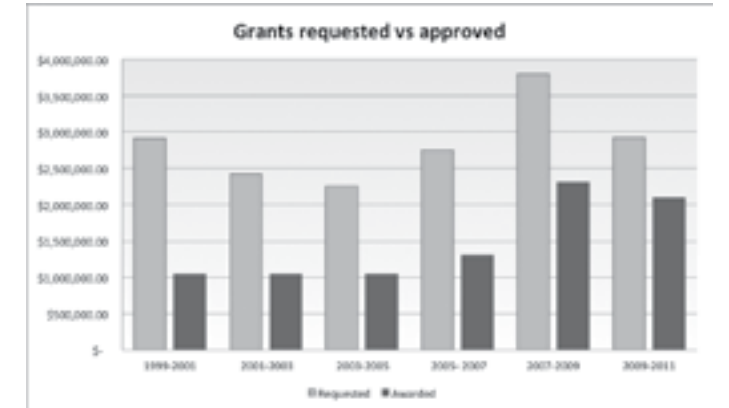
The Noxious Weed Control Program develops risk assessments and gathers information to help OSWB maintain and update the State Noxious Weed List. A risk assessment process is used to help identify which species are of high risk and should be listed. No new species were added to the “A” or “B” list for 2010. Yellow tuft, *Alyssum murale* and *A. corsicum*, field bindweed, *Convolvulus arvensis*, and perennial pepperweed, *Lepidium latifolium* were added to the target list. In 2010, staff and the OSWB developed and adopted a new policy for listing noxious weeds and updated the risk assessment process.



Weed Listing diagram

Noxious weed control grants

OSWB received approximately \$2.5 million of Measure 66 Lottery funds for noxious weed control grants, during the 2009-2011 biennium. Priority projects are those that restore, enhance, or protect fish and wildlife habitat and watershed function. Substantial staff time is allocated to review, administer, and monitor OSWB grants. The second and third cycles for the 2009-2011 biennium were awarded in 2010, and the final cycle for this biennium will be awarded in February 2011. OSWB awarded 66 grants totaling more than \$1.5 million.



OSWB funds requested vs. approved represents total funds requested vs. funds approved since 2000. Historically 46 percent of funds requested are approved.

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Projects in Douglas, Lane, Lincoln, Marion, Multnomah, Sherman and Wasco counties were monitored during the 2010 field season. Meetings and field tours with grantees took place. In general, grantees have complied with the purpose of these funds and are controlling noxious weeds at the majority of sites visited. Where problems were found, ODA staff worked with grantees to correct problems for future projects. Demand for OSWB funds has increased and it remains clear that additional funds are necessary to continue to gain momentum toward the successful control of noxious weeds.



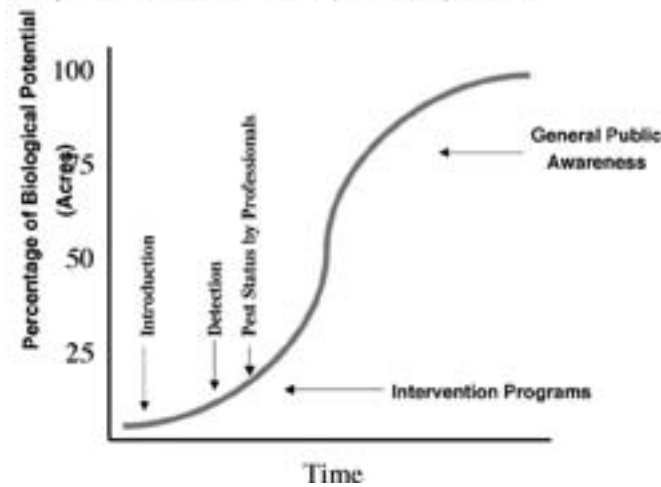
Dave Langland and cooperators discuss treatment and restoration efforts in wild sheep habitat near the Deschutes River in Wasco and Sherman counties

Early detection and treatment activities

Early Detection and Rapid Response (EDRR) are primary activities of the Weed Control Program. Weeds are listed and targeted for early detection and rapid response activities. The goal is to prevent introduction or find them through early detection efforts and implement control measures to prevent widespread occurrence in Oregon. ODA accomplishes this through its noxious weed quarantine and by implementing EDRR projects. A principal activity is using a weed risk assessment process with the OSWB to list species on the State Noxious Weed List. Priority listed species, “A” and “T” designated weeds of limited distribution in the state are the primary EDRR targets for ODA. Priority species are incorporated into presentation and outreach activities to increase awareness. Pest alerts and educational materials are distributed in an effort to find new infestations. Survey for early detection is conducted and when EDRR targets are found rapid response projects are implemented for eradication or containment. ODA staff works with state and federal cooperators, county weed programs, CWMAs, and private landowners to implement EDRR projects or provides assistance through OSWB grants.

An economic analysis reveals a 33:1 benefit to cost ratio for EDRR projects. Annual treatments for the control of “A” (highest priority) and “T” (target) designated weeds have reduced the net acreage of many large infestations of weeds. For example, annual intensive control efforts for distaff thistle (*Carthamus lanatus*), and purple starthistle (*Centaurea calcitrapa*), have achieved 99 percent control.

Early Detection and Rapid Response



EDRR diagram

Section 4 —Noxious Weed Control Program

area for two consecutive years starting in 2009. In 2010, 103.39 net acres were treated over 805.5 gross acres.



Alyssum in Illinois Valley

ODA continues to meet program goals to limit or reduce acreages of all “A” rated weeds and implement projects for “A” and “T” listed species. Statewide management plans for “T” weeds are updated annually to identify priorities for staff. Weed awareness continues to increase with the general public. The following are a few highlights of “A” and “T” weed projects for 2010.

Alyssum

Yellow tuft, *Alyssum murale* and *A. corsicum*, were introduced to the Illinois Valley of southwest Oregon in the 1990s as a crop to extract nickel from serpentine soils. Alyssum has since spread from planted fields and become an invasive weed. The intent of this project is to protect serpentine soil habitat of southwest Oregon from the invasion of this non-native alyssum species. Partners include the USFS, BLM, TNC, and private landowners.

The Illinois Valley contains the largest concentration of serpentine soils in Oregon and supports a diverse and unique flora. Fifteen plant taxa have conservation status in the area. *Alyssum murale* and *A. corsicum* are perennials native to Eastern Europe that inhabit serpentine soils. They belong to a group of plants that hyper-accumulate and store heavy metals. The species were studied by USDA and promoted as an environmentally conscious method of cleaning mine spoils for remediation. In the 1990s, studies changed from remediation interests to growing alyssum on naturally occurring nickel rich soils to accumulate and harvest nickel. In the late 1990s Viridian Co., with the assistance of USDA and OSU researchers, planted alyssum fields in Illinois Valley to evaluate its commercial use.

By 2005, alyssum plants were found far from cultivated fields. Federal agencies, TNC, and plant conservationists became skeptical of early assertions of the inability to invade Josephine County’s botanically rich serpentine areas. An interagency task force began documenting escaped populations in 2005. Populations were found on state, USFS, BLM, TNC, and private ownerships in the area. Populations were also found on the floodplain of the West Fork of the Illinois River. After negotiating with Viridian, ODA started implementing a control project in 2009. ODA has surveyed and treated the

Spartina survey and treatment

In 2008, the third infestation of *Spartina alterniflora* in Oregon was found in Youngs Bay, a part of the Columbia River estuary. The state has maintained an excellent track record of finding and treating new infestations when they are small and manageable. The Youngs Bay infestation was chemically treated in September 2008, and again in 2009, with Glyphosate and Impzapyr. The original patch was 800 square feet in size. Site monitoring in 2009, showed only six stems. No plants were found in 2010.

OSWB funded a survey for *Spartina patens*, to be completed by Portland State University Center for Lakes and Reservoirs (PSU) on the Siuslaw estuary in Lane County. Saltmeadow cordgrass, *Spartina patens*, is an introduced invasive perennial that out-competes native species in salt marsh habitat. An infestation in Siuslaw estuary is located on Cox Island and has been managed by The Nature Conservancy over the last decade. Plants have been spreading from the island. PSU completed the survey and found two small patches of cordgrass west of Cox Island near Florence. ODA staff treated the patches.

Oblong spurge

An oblong spurge (*Euphorbia oblongata*) infestation on Mill Creek in Salem near the Hawthorne Facility and on the grounds of the Oregon State Penitentiary was treated for the third summer in 2010. ODA and the Marion

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County Weed Program partnered to survey and treat the infestation. In 2010, only a fraction of the population remained.

A 2008 survey determined that most of the population was confined to a half-mile section of Mill Creek extending from the ODA facility to the bridge on State Street near the Oregon State Forestry Building. Plants were treated around the Hawthorne Facility pond and on Mill Creek. Only a few remaining plants were treated in 2010.

Purple and Iberian starthistle

Purple and Iberian starthistle (*Centaurea calcitrapa* and *C. iberica*), are two species of limited distribution in Oregon. The species have the potential to invade 1.5 million acres in Oregon with an economic impact of \$12 million per year. Prior to the 2009 field season only a single active purple starthistle site was confirmed from Oregon in Clackamas County. Five small historic sites have occurred and all have been eradicated.

The Clackamas County site has been under intensive treatment since 1993, and only an occasional plant is found at the site. In late June of 2009, the Gilliam County weed supervisor found a nine-acre infestation just south of Spray, in Wheeler County. The infestation was treated within days and follow-up survey and treatment were completed in 2010.

The Clackamas County infestation was estimated at 2 net acres over 80 gross acres. No plants were found in 2008, and again in 2010. The last several years of treatment have shown significant drops in plant numbers, indicating that the dormant seed bank may be nearing depletion. Monitored 80 acres, no plants were found.

Distaff thistle

In 1987, woolly distaff thistle (*Carthamus lanatus*) was discovered in Oregon. The potential danger to Oregon's native plant communities, forage production, and watershed health was made evident by California and Australia's experiences where huge acreages were dominated by the thistle. Control was first initiated in Oregon in 1987. Four new sites were found in 2004,

two in 2005, and one in 2006. Now, 37 land ownerships are known to be infested in 21 locations in Oregon. These include 19 sites in Douglas County, one in Josephine County, and one in Curry County. Contract crews started work in June and continued until August.

This project involves the control, survey, and monitoring of all known infestations. All distaff sites are intensively treated, with eradication as the goal. Each site is treated two to three times each season, with crews applying herbicides with backpack sprayers and using manual control. Hard seed germinating each fall is the source of each season's infestation. Plant counts show reductions of well over 90 percent from historic levels. It is important to continue to protect riparian areas and watershed health from further invasion by this non-native thistle. Treatment: A total of 3.1 net acres was treated over 3,755 gross acres.

Paterson's curse

Paterson's curse, *Echium plantagineum*, was first detected in August of 2003, in Linn County. In 2004, a second larger infestation was confirmed southeast of Dillard on a hillside pasture in Douglas County, 100 net acres over 300 gross acres. Originally from the Mediterranean region of Western Europe, Paterson's curse is known as a widespread weed in temperate zones around the world. In Australia, it has become a serious weed of grazed pastures, grain production, and natural areas.

The infestations at both sites have been reduced by 95 percent. The Linn County infestation is limited to four locations along field borders north of the town of Lebanon. In 2010, herbicide and manual treatment were used; only a few plants remain following years of treatment. The Douglas County infestation requires four to five treatments each year for complete control and to prevent seed set. In 2010, ODA staff treated the heaviest areas using a Polaris RTV. Follow-up treatments were conducted using backpack sprayers. Roseburg Forest Products and the Cow Creek Band of Umpqua Tribe of Indians contributed funds for the project. Douglas County SWCD provided contracted labor and ODA supervised the project. This season 4.5 net acres were treated over the 300 gross acre site.

Orange and yellow hawkweeds

Orange and yellow hawkweeds (*Hieracium aurantiacum* and *H. pratense*) are very invasive members of the aster family. Once established, hawkweed can quickly develop patches that expand until they cover an area and form a solid mat of rosettes that exclude all other vegetation. Hawkweeds displace natives, posing a serious threat to native plant communities. They can dominate pastures, lawns, and roadsides, crowding out desirable species.

Hawkweeds are invading native meadows on the Mt. Hood National Forest (NF). Additional populations occur in Wallowa, Union, Deschutes, and Harney counties. Overall, orange and yellow hawkweeds continue to be found at new locations in central and eastern Oregon. Most of the new finds are small and manageable. The concern is the increasing number of new orange hawkweed sites. Awareness and outreach activities have helped to increase the reporting of new sites. The following are highlights for each treatment area.

Western Oregon: The Mt. Hood NF infestation covers over 1,000 gross acres of Lolo Pass on the Zig Zag and Hood River Ranger Districts. The majority of the infestation is found on Bonneville Power Administration (BPA) managed rights-of-way and additional outlier sites are found in the Mt. Hood Wilderness, along county roads, and on private timberland. The cooperative project includes the USFS, BPA, BLM, Clackamas County, and private landowners. Treatments have achieved 90 percent reduction since 2003, when the estimated acreage was 150 net acres over 1,500 gross acres. In 2010, the population rebounded following several years of low plant numbers. Monitored: 100 net acres over 1,500 gross acres, Survey: 100 gross acres, Treatment: 5 net acres over 1,500 gross acres.

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Central Oregon: Central Oregon has seen a sharp increase in reported acres of orange hawkweed. In June of 2009, the USFS botanist, Char Powers, located several residential properties in west Bend that had orange hawkweed. Following a press release, nearly 50 additional sites were discovered from Bend, LaPine, Powell Butte, and Crooked River Ranch. Most of the sites were ornamental plantings around homes with the exception of five near the Deschutes NF and two on the Deschutes River.

In 2010, eight new sites were found in Bend and six in Redmond. All of the Redmond sites are in a single neighborhood on the same street. Three of the Bend sites are in the vicinity of the 2009 finds. The remaining Bend sites were scattered throughout the city. Most of the sites were just a few square feet, but the largest of the locations was about a third of an acre. All the landowners were contacted and the plants were controlled. The number of infestations increased to 80 properties or locations in 2010.

South Central: In 2009, the first two small sites of orange hawkweed were found in Klamath County. One site of 30 plants was found in northern Klamath County on the USFS near Crescent Lake, and the other site was in a residential yard in Klamath Falls. The Forest Service site was pulled and bagged by USFS crews. ODA staff chemically treated the residential yard. In 2010, the Klamath County Weed Department found several additional orange hawkweed sites in Chemult and the town of Crescent. The hawkweed in Crescent was planted by the residents from plants purchased from a nursery in Bend about 10 years earlier. Hawkweed was also discovered in LaPine. The new orange hawkweed sites were surveyed and chemically treated by the Klamath County Weed Department. ODA followed with more surveys of the whole northern Klamath County area.

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Orange hawkweed

known area. Overall 2010 treatments yielded a net 104 acres, up from the 78 acres treated in 2009. The increase represents newly discovered infestations on Canal and Chesnismus creeks.

Harney County: Orange hawkweed was brought to the attention of the Harney County Weed Program in 2006. Infestations in lawns were reported from the city of Hines. ODA staff started treatments at three residences in 2007. These sites were monitored in 2009 and 2010.

Barbed goatgrass

Barbed goatgrass (*Aegilops triuncialis*), an “A” rated weed, was detected along Hwy 199 near Rough and Ready Creek, south of Cave Junction in June of 2003. The area was slated for bridge construction in 2005, so the site was intensively treated. By 2006, plant numbers were greatly reduced, with the only active infestation found outside the construction zone. The site has received annual treatment of spraying and or hand pulling. Treatment: 234 plants were pulled and bagged in 2010.

Yellow floating heart

The first infestation of yellow floating heart (*Nymphoides peltata*), an ornamental aquatic plant, was reported in 2004, in Washington County. Treatments started in 2005, when the OSWB listed the plant as an “A” rated weed. The majority of the population was covered with landscape fabric in 2007. The covering provided good control and required little herbicide treatment. The landscape fabric was vandalized and removed in the spring of 2010, and a 10x10 foot population required herbicide treatment. A second site was detected in 2005, in Lane County. The first herbicide treatment in 2006, resulted in an 85 percent reduction of the population. The site continues to require some annual maintenance to maintain control. Though rare throughout western Oregon, it continues to persist despite repeated applications. New sites continue to be reported, including a confirmed infestation in Little Squaw Lake on the Rogue River-Siskiyou National Forest. ODA treated 0.1 net acres over 3 gross acres in 2010. The Forest Service is reviewing options for treating Little Squaw Lake.

Northeast Oregon: A concerted effort among cooperators was made again in 2010, to find and treat all of the meadow hawkweed in northeast Oregon. ODA, county, CWMA, and partnership crews treated all of the known infestations in the northeast corner of the state. Two OSWB grants were funded for treatment of outlying locations in Wallowa and Union counties. The Wallowa-Whitman NF and Wallowa Resources through the Wallowa Canyon Lands Partnership treated everything they could find using crews, contractors, and partners. A big effort was directed at the Canal Fire site in 2010.

An ODA crew combined with Wallowa Resources, TriCounty CWMA, and USFS, spent several days treating the Canal Fire infestation that was not treated in 2009. This effort allowed contract crews to focus effort on smaller and higher priority areas. In Union County, the TriCounty CWMA employed aerial sketch mapping to survey a large new area found in 2009. A few additional small sites were found by sketch mapping, but nothing new was detected outside of the

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Giant hogweed

Giant hogweed (*Heracleum mantegazzianum*) an Oregon “A” rated noxious weed was first detected in 2001. Since the initial detection more than 80 sites have been identified, most from the Portland area. The majority of the infestations occur in residential landscapes. Public support for hogweed eradication has been very positive, due to an effective outreach effort. Treatment of the majority of the sites has been ongoing for several years and few new sites continue to be found. Two large riparian infestations occur in the Tualatin River watershed on Fanno and Vermont Creeks. ODA has focused most efforts on the riparian infestations and has partnered with the City of Portland to work with homeowner treatments within their jurisdiction.

The Fanno and Vermon Creek infestation occur over several miles of streamside. Yearly flooding and disturbance has deposited hogweed seeds throughout much of the flood plain. The area is heavily brushed and accessibility to each plant is difficult due to water, blackberries, stinging nettles, and steep banks. The area is methodically explored to locate small pockets of rosettes or tall flowering plants. Annually over 500 plants have been located and treated with herbicides. In residential areas, homeowners are encouraged to treat hogweed. ODA and the City of Portland monitor progress or help with a combination of herbicide and manual removal for control.

Kudzu

In July 2000, kudzu (*Pueraria lobata*) was detected on a road bank in Clackamas County. This was the first infestation detected west of Texas. Kudzu is an aggressive climbing vine that trails over and smothers surrounding trees and plants. It is native to China and Japan and is a major problem in the southeastern US where an estimated 7 million acres are infested. A second Oregon site was detected in Multnomah County in 2000, and another in 2001. The sites were treated with a selective herbicide and have required periodic follow-up treatments for control of re-growth. Survey and detection efforts have been conducted throughout western Oregon and no additional sites have been

detected. The three known sites were monitored and two required treatment in 2010.



Kudzu flower photo

Plumeless thistle

The Klamath County weed supervisor first discovered plumeless thistle near Klamath Falls in 2007, at the Miller Island Waterfowl Refuge. Plumeless thistle was previously known to be found in Oregon at one site in Grant County. In 2008, the Klamath County weed supervisor found another small site of plumeless thistle in a new subdivision being built just west of Klamath Falls. The Miller Island site was about one acre scattered over five acres and the subdivision site contained about 24 plants. ODA and Klamath County staff treated the thistle sites. In 2010, only a few plumeless thistle seedlings were found at the Miller Island site and none at the subdivision site. These sites will be monitored for several years.

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Taurian thistle

Taurian thistle (*Onopordum tauricum*) is a sister plant to Scotch thistle (*Onopordum acanthium*) and has the same potential to be invasive. In Europe, it is a more aggressive than Scotch thistle. Taurian thistle is lime green with large baseball sized terminal flower heads that resemble an artichoke. The leaves feel sticky to the touch, like glue, but leave no residue on the fingers.

The first and only Oregon population was discovered in Klamath County in 2007. California has had several historical sites from Modoc County, Monterey, and a few scattered locations in the southern Sierra Mountains. The only other report in the US is from Pueblo County in Colorado. In 2007, there were 250 large plants and seedlings scattered over 4 gross acres at the Klamath County location. All the plants in the infestation were treated by ODA in 2007, 2008, 2009, and again in 2010. This year ODA only found 17 bolting plants and seven seedlings and rosettes at the site, which were treated.

Cutleaf teasel

The first infestation of cutleaf teasel (*Dipsacus laciniatus*) in Oregon was discovered near White City in Jackson County. Additional locations have been found in Klamath, and most recently Lake counties. The Klamath County weed supervisor discovered and treated a cutleaf teasel infestation on the Miller Island Waterfowl Refuge in 2007. In late summer of 2009, a large site of cutleaf teasel was discovered by the Lake County CWMA at the northern edge of Lakeview on a railroad line and lumber mill owned by Collins Timber. ODA confirmed the identification and surveyed the surrounding area and railroad line to the California border. No additional sites were found.

In 2010, the railroad and Collins Timber treated the cutleaf teasel on their properties under the guidance of the Lake County CWMA and ODA. Surveys were again made in the area to make sure all of the teasel was found and treated. The Klamath County sites were surveyed in 2009 and 2010 and no plants were found.

Squarrose knapweed

Squarrose knapweed, *Centaurea virgate*, is a state listed “A” weed. Presently, one site is under treatment in Grant County and a second in Jefferson. A historic site continues to be monitored in Malheur County.

The Malheur County location continues to be clean. A number of people are checking this site annually. There have been no plants found since 2003. The Grant County site has been under treatment since its discovery in the early 1980s. Grant County weed supervisor, Mike Martin, supervised the summer survey and treatment, under ODA direction and with a Weed Board grant, treating plants as they were found. ODA continues to monitor the efficacy of the treatments to ensure effective control. The Jefferson County infestation was found by Floyd Paye, Jefferson County Weed Control, in 2003. The infestation covered a 20-acre area.



Squarrose knapweed flowers

Two immature plants were found and controlled in spring of 2009. Three flowering plants were controlled in 2010. All the flowers were cut and bagged and the remaining plants were treated.

Matgrass

Matgrass (*Nardus stricta*) is a low growing perennial bunch grass that is unpalatable to livestock. Seedlings are small, ranging in size from a dime to a quarter. Finding them among pasture grasses is hard and makes control difficult. Seedlings can grow to form circular colonies up to 3 feet in diameter in just a single year.

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Matgrass was first noticed about 35 years ago in a peat pasture near Fort Klamath. This is the only known infestation in Oregon. Previous farming practices of dragging the pastures to break up clumps of cattle manure and flood irrigating have spread matgrass over 180 acres of pasture. Control efforts have had mixed success over the past 30 years. Eradication is unlikely unless the entire pasture is sprayed out and taken out of production for several years to eliminate and destroy the seedbank. At this time, the landowner is reluctant to take these measures. Treated 3.95 net acres over 147 gross acres.

African rue

African rue (*Peganum harmala*) is native to North Africa and Asiatic deserts and was first reported in North America in 1928 near Deming, New Mexico. Oregon’s first infestation was a mystery. An OSU herbarium specimen was recorded in the mid 1960s from Crook County, but did not mention a specific location. A member of the native plant society located the site in 1991. The site has been treated as an “A” rated weed by ODA and Crook County since the re-discovery. A second infestation was found in Harney County in 2008.

The Crook County infestation is along Highway 27 and occurs on both public and private lands. The main portion of the infestation is on BLM land and provides most of the funding for control. Crook County and ODA are working together to treat the site; in 2010, plants continue to be found in the known control area. The roadways leading into and out of the control area and the surrounding rangeland are surveyed yearly. No new plants were found outside of the historic treatment area. Less than 10 plants were found over the 500 gross acre site.



African rue plant

In 2008, an African rue infestation was found on tribal allotments located in the Harney Basin southeast of Burns. The initial response was to treat outlier sites, roadsides, barnyards, and pivots for containment and to prevent further spread. In 2008, ODA staff spent several weeks doing the initial site delimitation, which revealed a project area of 2,700 gross acres and 19 landowners including Department of State Lands, private, and tribal lands. An African Rue Cooperative Weed Management Plan was completed in 2009. There were 200 net acres treated in 2009.

In 2010, the project began with an assessment of the efficacy of last year’s herbicide applications including a review of preliminary research results from OSU. After looking at multiple sites and comparing photo point information, it was decided that last year’s application of Milestone + Escort XP was not providing adequate control in a broadcast situation. Areas that were treated by handgun with the Milestone + Escort XP mix had 100 percent control with no re-growth. After discussing the results with cooperators and reviewing published research, it was decided to change the herbicide products and mixes for the 2010 broadcast applications. A total of 128 acres were treated in 2010 with no new sites found.

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Special projects for 2010

Giant reed

Arundo donax, is considered a serious weed in California the Southwest. Due to the proximity of weedy populations in California and an increased use as an ornamental in the late 1990s, it was evaluated in a 2007 risk assessment by ODA and placed on the ODA Watch List. The feasibility of scale production and using arundo as an alternative energy is now being reviewed by Portland General Electric (PGE) to fuel the Boardman coal-fired power plant. PGE would like to plant 400 acres as a trial for large-scale production and test burn. PGE estimates it will require as much as 90,000 acres to run the facility. This has renewed concerns for evaluating giant reed's invasiveness in Oregon.

The OSWB and Oregon Invasive Species Counsel are working with the issue and plan to have a joint meeting and panel discussion in February of 2011. The Noxious Weed Control Program has completed a new risk assessment for arundo and recommends that it stay on the watch list, allowing for a limited test planting of 400 acres in Morrow and Umatilla counties. The OSWB voted to keep arundo on the watch list, allow test plantings, and will revisit the issue before PGE goes to full production.



Climatically suitable areas for the growth of *A. donax* in the United States, 2011

2010 Inter-Agency Noxious Weed Symposium

Staff prepared for and held the 2010 Inter-Agency Noxious Weed Symposium in Corvallis at LaSells Stewart Center on December 7-9. The symposium was hosted by ODA and sponsored by BLM and USFS. Attendance exceeded 250 individuals from Oregon, Washington, California, Nevada, Idaho, and Maryland. This gathering provides an opportunity for state, federal, local, and non-government entities to hear presentations and share information regarding invasive noxious weeds. This meeting provides a forum for networking, information exchange, project planning, and organizing outreach and education activities.

Recipients of the 2010 INW awards are: Alice Smith, USFS and Todd Thompson, BLM for Distinguished Service Award. Greg Winans, TriCounty CWMA, Dan Sherwin, Deschutes County and Grace Haskins, Harney County CWMA received Special Recognitions. The Noxious Weed Find of the Year went to Don Farrar, Gilliam County, Vanessa Howard, PSU and Dave Ambrose, Columbia SWCD.

Weed free forage

Weed Free Forage Certification is a joint effort between the Weed Control Program and the ODA Commodity Inspection Division. Fields are inspected prior to harvest to insure that there are not propagative parts of designated weeds at time of harvest. During 2010, 40 growers participated for a total of 3,952 certified acres. This includes 2,258 acres of straw and 1,694 acres of hay. The program is supported in part by the USDA Forest Service and it provides a product that helps prevent the spread of noxious weeds.

Education and outreach

The WeedMapper website provides distribution maps and information on identification and impacts for state listed noxious weeds. It is accessible by land managers and the public to provide distribution information and to help make informed weed management decisions. Weed data is collected and used to develop state and

Section 4 —Noxious Weed Control Program

county level distribution maps. The project is a joint effort of ODA and OSU with support from BLM, USFS and many other data contributors.

The Oregon State Fair has become an annual opportunity to engage and inform the public about invasive species. This year was another successful year reaching thousands of people in a one-day outreach

2010 biological control highlights

Classical biological control is the purposeful introduction of selected natural enemies for the purpose of reducing the population of targeted noxious weeds. Since 1947, 74 species of classical biological control agents have been introduced against 27 species of noxious weeds in Oregon. Several of these biocontrol agents have become re-associated with five additional species of weeds for which they were not originally introduced (for a total of 32 weeds). The Oregon Department of Agriculture (ODA) manages over 113 biocontrol projects (weed/agent combinations). The ODA biocontrol database contains more than 12,000 records of biocontrol agent releases, nearly 90 percent of releases made in Oregon.

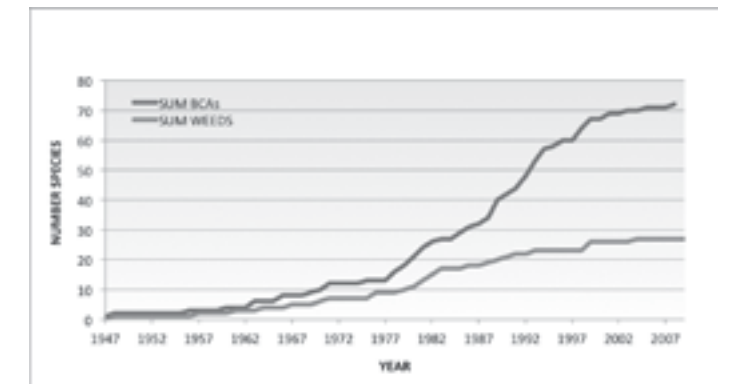
Several biocontrol projects in Oregon have successfully controlled targeted weeds, including: tansy ragwort, St. Johnswort, musk thistle, Mediterranean sage, purple loosestrife, yellow starthistle, and diffuse knapweed; especially at sites that are managed to improve competitive vegetation. ODA strives to adhere to the International Code of Best Practices for Classical Biological Control of Weeds in order to implement a safer and more effective biocontrol program. Our goal is to protect our natural resources by managing approved biocontrol agents, redistribute them to major infestations, and monitoring their impacts on the target weeds. There are 1,437 weed/agent/county combinations. This means that for each infested county, the total number of weeds targeted for biological control plus the number of biocontrol agents. Keeping track of all this information is a daunting task. Our goal is to get every approved biocontrol agent as widely distributed in as short of a time as possible. At the end of 2010, the percentage of established biocontrol agents that are

effort by ODA, USDA-FS, USDA-PPQ, OISC, and OCWCA. Weed professionals volunteered their time to answer questions and engage the public with interactive games to catch the interest of attendees. Educational materials, "Get a grip on Noxious Weeds" gardening gloves, playing cards, shirts and other prizes were distributed to increase the general awareness of invasive weeds.

widespread on their target weeds by county is 40.01 percent.

Significant accomplishments in biocontrol

Biological agents were released at more than 150 sites in Oregon during 2010, for a treatment total of more than 1,300 acres. Over 140 biocontrol sites were monitored to determine establishment and impact of biocontrol agents. Entomologist Eric Coombs was invited as a plenary speaker at the Rocky Mountain Invasive Plant Council, in Coeur d'Alene, ID; gave 10 invited talks at various symposia and training sessions; and coordinated a record poster session at the Oregon Interagency Noxious Weed Symposium in Corvallis.



Cumulative number of weeds targeted (dark gray) and cumulative number of classical biological control agents [BCAs] (light gray) released in Oregon by year

The United States Department of Agriculture Animal Plant Health Inspection Service Plant Protection and Quarantine branch (USDA-APHIS-PPQ) biocontrol program, under the direction of Gary Brown, remains a very important partner in implementing biocontrol in

Section 4 —Noxious Weed Control Program

Oregon. ODA and APHIS provide surplus biocontrol agents to many local agencies and other states. In 2010, ODA and APHIS staff and other cooperators provided over 153,000 biocontrol agents (more than 150 releases) to county weed programs, other agencies, and states. ODA continues cooperative research projects with Drs. Peter McEvoy, Fritzi Grevstad, Ed Peachy, Jeff Miller, and their staff at Oregon State University (OSU). ODA is also a partner with Dr. Fritzi Grevstad, at the OSU Forestry Sciences Quarantine Laboratory, where we have been working on cooperative projects on the biological control of knotweeds and gorse. ODA also serves as the national data repository center for the status of weed biological control agents by state.

Canada thistle: In the past several years, additional resources have been placed on collection and redistribution of the crown-root weevil *Ceutorhynchus litura*, particularly in central Oregon. At older sites with the weevil and gall fly *Urophora cardui*, thistle density has declined.

Dalmatian toadflax: The toadflax stem weevil *Mecinus janthinus* has been recovered at many locations in central and eastern Oregon, where weevil populations are demonstrating excellent control of the weed. More than 4,400 weevils were released in 2010. In Harney County, weevils are spreading to new sites on their own and control is being observed at numerous older release sites.

Eurasian water milfoil: The aquatic stem-mining weevil *Eubrychiopsis lecontei* was released (1,200 adults) near Troutdale at Blue Lake in Aug 2010. The weevil is suspected to occur in Oregon, this is the first recorded introduction of the insect as a biological control agent.

Field bindweed: The field bindweed gall mite *Aceria malherbae* was found established in Oregon in 2006. Mites at the Tygh Valley site in Wasco County reduced the biomass of field bindweed by more than 90 percent and have spread onto nearby infestations. A 2010 survey throughout the north central Oregon area, found the mites were present at 80 percent of the bindweed sites checked. Over 98,000 mites were released in 2010. A cooperative research project is underway in conjunction with Dr. Ed Peachy (OSU) and his staff to establish the gall mite in western Oregon. The field bindweed moth

Tyta luctuosa was recovered for the first time in Oregon in 2009, about 10 miles south of the Baskett Slough National Wildlife Refuge area in Polk County. It had been released several times in the area from 1998-2000. Light trapping in the area revealed a healthy population of the moth. Collection and redistribution is planned for 2011, especially in eastern Oregon. A total of 1,400 larvae were released in eastern Oregon in 2010.



Todd Adams, ODA, collecting field bindweed infested with gall mites for redistribution

Garlic mustard: In 2006, ODA began pre-release monitoring studies in conjunction with Dr. Bernd Blossey, Cornell University, NY. Host specificity testing has been completed and a petition for introduction submitted to TAG. Releases of biocontrol agents could be made in 2011.

Gorse: In 2008, testing of the gorse shoot moth *Agonopterix uliciteella* and the gorse thrips *Sericothrips staphylinus* began at the OSU Quarantine. Insects were collected near Hilo, HI and brought to Oregon. The project is being coordinated by Dr. Fritzi Grevstad, University of Washington (UW) and primarily funded by USDA Forest Service (USFS). A petition for field release of the gorse thrips will be submitted in 2011.

Knotweeds: Prerelease studies on Japanese knotweed and its allies have been conducted at several sites in Oregon. The quarantine facility at OSU, Forestry Sciences, is being used to conduct host specificity studies for several prospective biocontrol agents (*Ostrinia*, *Galerucida*, and *Aphalara*). The project is being coordinated by Dr. Fritzi Grevstad and primarily funded

Section 4 —Noxious Weed Control Program

by USFS. A petition for field release of knotweed psyllid *Aphalara itadori* is planned during 2011.

Russian knapweed: A cooperative project in conjunction with Gary Brown and Richard Hansen, USDA APHIS to introduce two new biocontrol agents in 2011. Permit applications have been submitted for the gall wasp *Aulacida acroptilonica* and the gall midge *Jaapiella ivannikovi*, and releases are planned for north central Oregon.

Rush skeletonweed: The root-boring moth *Bradyrrhoa gilveolella* was released in 2008, near Canyon Pass in Douglas County (350 eggs were transferred to plants). A cooperative release study using cages in the Port of Portland area in Multnomah County was conducted by the staff of Dr. Mark Schwarzländer (U of ID) and Gary Brown (Oregon USDA-APHIS). A survey in 2010 recovered some moths in and out of the enclosure. Additional population sources from Europe are being sought that are more adapted to southwest Oregon conditions.

Saltcedar: The leaf beetle *Diorhabda elongata* has established well in southwest Oregon, especially at several sites in Malheur County. In 2009, beetle damage was detected over 4.5 miles from the Owyhee Reservoir release site, indicating that the beetles are moving throughout the Owyhee drainage on their own. Summer flooding appears to have a major detrimental impact on beetle numbers and spread. USDA-APHIS revoked the interstate permits for saltcedar beetles in 2009; therefore our efforts have been primarily monitoring established populations.

Scotch broom: The Scotch broom seed beetle *Bruchidius villosus* has become widely established throughout the entire Willamette Valley, at several coastal sites, and at elevations up to 2,700 feet. Redistribution will now be done on an as needed basis. The broom gall mite *Aceria genistae* has become more abundant in the Columbia River area, and has spread on its own as far south as the Sutherlin area. ODA is cooperating with Jennifer Andreas, WSU, to get the mite approved for redistribution as a biocontrol agent. Heavily infested plants and plant parts often die by the end of the

growing season, making this a promising natural enemy of Scotch broom.

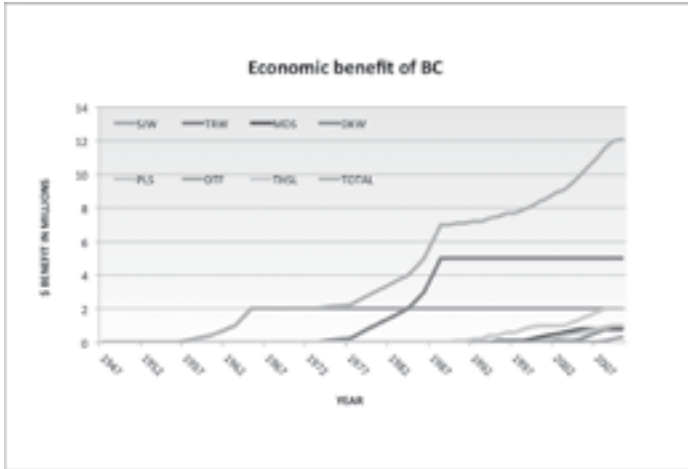
Tansy ragwort: A cooperative study with Dr. Mark Schwarzländer and staff (U of ID) was conducted to test the Swiss biotype of the flea beetle at various elevations in Oregon and Idaho. Releases of the Swiss biotype were made in eastern Oregon in 2007 in Umatilla County and in 2008 in Umatilla and Union counties. No recovery of the beetle has yet been made in eastern Oregon. Monitoring of numerous outbreak infestations of tansy ragwort in parts of southwestern Oregon have shown that the biocontrol agents are present in large enough numbers to control the weed when coupled with sound land management practices. Also, studies with Dr. Peter McEvoy (OSU) and his staff are continuing to determine the effects of parasitism on the host specificity on the cinnabar moth at high elevations where the moth attacks several native plants.

Yellow starthistle: The rust fungus *Puccinia jacea* var. *solsitialis* was released in 2008, on yellow starthistle in various regions of the state. No recovery of the pathogen was made at these sites in 2009 or 2010. Because of poor results using this pathogen, efforts will be suspended until the project becomes more successful in California.

Economic benefits of biological control

Classical biological control of weeds has a good safety record, but a somewhat scanty track record of documented economic benefits. Most of the funding for biocontrol projects is used during the foreign exploration, host specificity testing, and introduction phases, with little appropriated for long-term efficacy studies. Reported benefits cost ratios from around the world vary from 112:1 to 2:1. Biocontrol of tansy ragwort in Oregon yielded an 85 percent internal rate of return and a 15:1 benefit-cost ratio. On successful long-term projects, benefits can occur as steady stream returns, i.e., \$5 million per year for the ragwort project in Oregon, where annual agency expenditure on this weed is now less than \$20,000 per year. An estimate of the net economic benefit of biocontrol agents in Oregon is valued at \$12 million per year.

Section 4 —Noxious Weed Control Program



Annual economic benefit of biological control of weeds in Oregon. (SJW=St. Johnswort, DKW= diffuse knapweed, THSL= thistles, TRW=tansy ragwort, PLS= purple loosestrife, MDS= Mediterranean sage, DTF= Dalmatian toadflax). Totals have not been discounted for inflation.

Where feasible, it is economically advantageous to implement biocontrol in order to reduce annual losses. By actively redistributing ragwort biocontrol agents, ODA accomplished a successful regional project five to 10 years earlier than by the natural spread of the insects, thus averting \$25 million to \$50 million in losses to agriculture.

A partially successful biocontrol project, i.e., one that reduces weed infestations by variable percentages over large areas, can provide a positive benefit-cost ratio, even though the degree of weed control may be less than desired. If biocontrol in Oregon reduced the top 12 weeds by 30 percent, annual losses could decrease by \$20 million. A 10 percent reduction of Scotch broom alone by biocontrol agents would yield \$1.5 million in annual benefits.

Section 5—Native Plant Conservation Program

Developed in 1987, the Native Plant Conservation Program (NPCP) was created in response to citizen concerns, and charged with (1) producing conservation plans for protected plant species; (2) regulating research and commercial activities associated with listed species on state lands; (3) supporting state and local agencies and the general public in dealing with management and protection issues associated with protected plants; and (4) advising the federal government on the implications of listing or not listing Oregon plant species under the federal Endangered Species Act (ESA). The program focuses on assisting public agencies and Oregon’s citizens with management issues involving native plant species on state-managed lands. ODA and federal native plant regulations only affect public lands, and are not applicable or enforceable on private property.



Howell's mariposa lily (Calochortus howellii—Josephine County), one of Oregon's rarest species

2010 program highlights

Habitat conservation planning

The first full year of ODA’s development of a Habitat Conservation Plan (HCP) for ODOT road maintenance activities was completed in 2010. Twenty-seven new roadside sites with threatened or endangered plants were discovered, and surveys for remaining ODOT right-of-ways will be completed by the summer of 2011. Implementation of the HCP is expected in 2012, after coordination between ODA, ODOT, and US Fish and Wildlife Service. The state-federal HCP will make it easier for ODOT to complete routine and necessary safety-related maintenance along state highways, without fear of unexpected repercussions from endangered species regulations. This has been a unique use of the HCP process to ensure that statewide highway safety is not compromised, even as ODOT meets its obligations under state and federal environmental regulations.



ODA field crew assesses ODOT right-of-way vegetation along Highway 20 west of Vale, in Malheur County

Specifically, the HCP will shield ODOT from ESA “take” liability, as state employees and contractors perform roadside maintenance activities necessary for public safety. The work will facilitate protection and mitigation plans that will enhance the existing habitat

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Section 5—Native Plant Conservation Program**

and function of listed species in right-of-way areas, thereby promoting the protection of sensitive sites while permitting needed maintenance and construction actions.

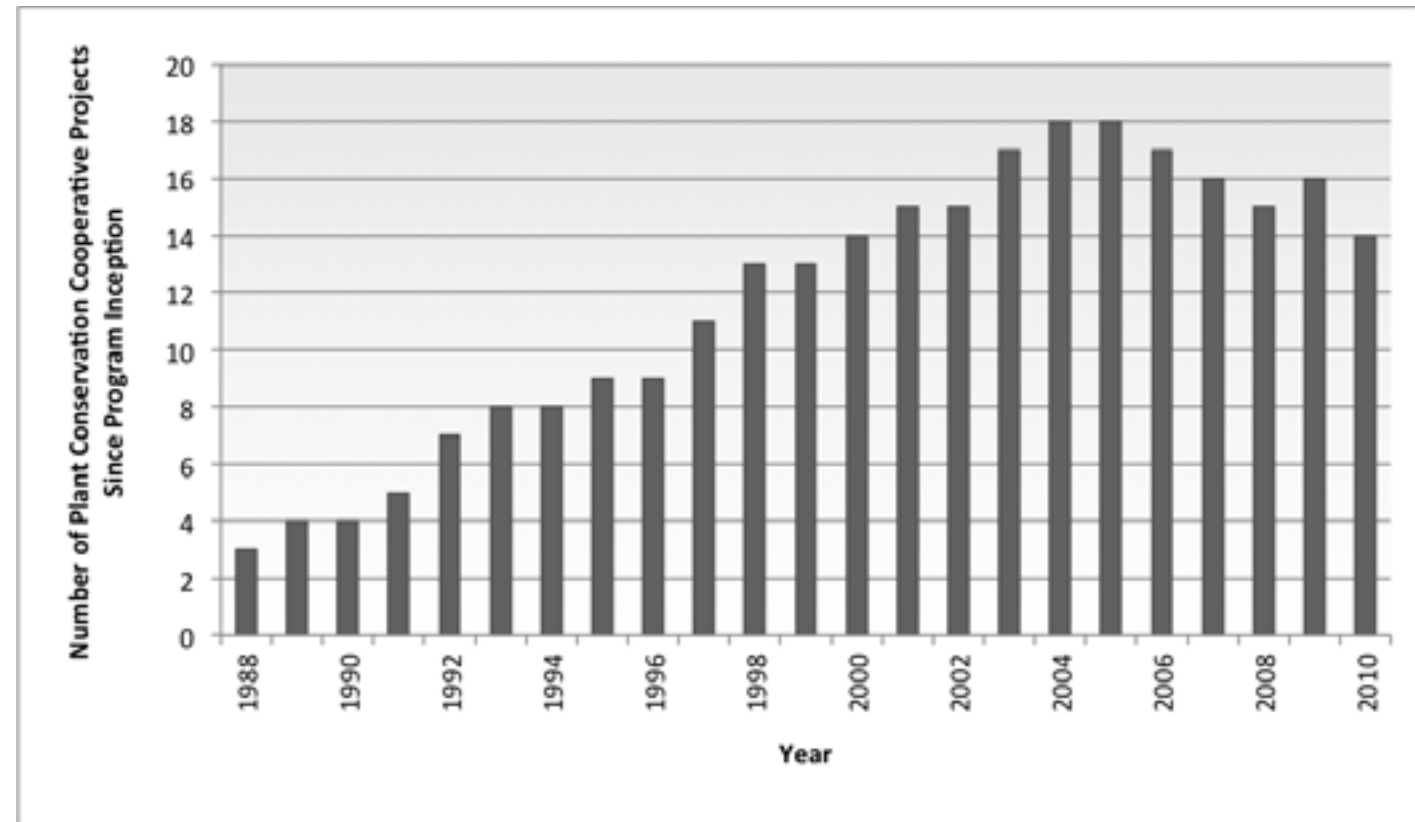
Additional agencies have also benefited from consulting with ODA on plant conservation matters in 2010, including the Division of State Lands, the Oregon Parks and Recreation Department, and the Oregon Departments of Energy, Forestry, and Fish and Wildlife, among others. As in past years, the NPCP has also worked closely with many local government offices, including counties and cities throughout Oregon.

Program review

ODA's Native Plant Conservation Program (NPCP) was reviewed by an outside panel in 2010. The panel, consisting of State Board of Agriculture and Weed Board members, professional natural resource managers, Oregon business owners, and members of the conservation community, recommended a new approach, which stressed greater partnering with cooperators to augment the scientific, regulatory, and

conservation requirements and activities of the NPCP already specified under statute.

The recommended approach would mirror the ODA Noxious Weed Grant Program, which has utilized OWEB-disbursed lottery funding to create a successful and popular program that annually distributes dozens of grants to Oregonians to combat weed infestations. The goal here was to similarly request lottery funds, in this case to support an effort emphasizing habitat rehabilitation and native plant conservation through a grant-based assistance program managed by ODA staff. It was felt that collaboration between ODA and a broad array of outside experts and landowners would enhance the efficiency and stability of the program, make better use of state funding through leveraged partnerships, and facilitate a significant increase in natural resource conservation efforts in Oregon. Budgetary issues ultimately precluded moving forward with this recommendation during the 2011 legislative session. However, the advisory panel and ODA administration will continue to search for options to improve the program and address funding challenges.



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Cooperative conservation efforts

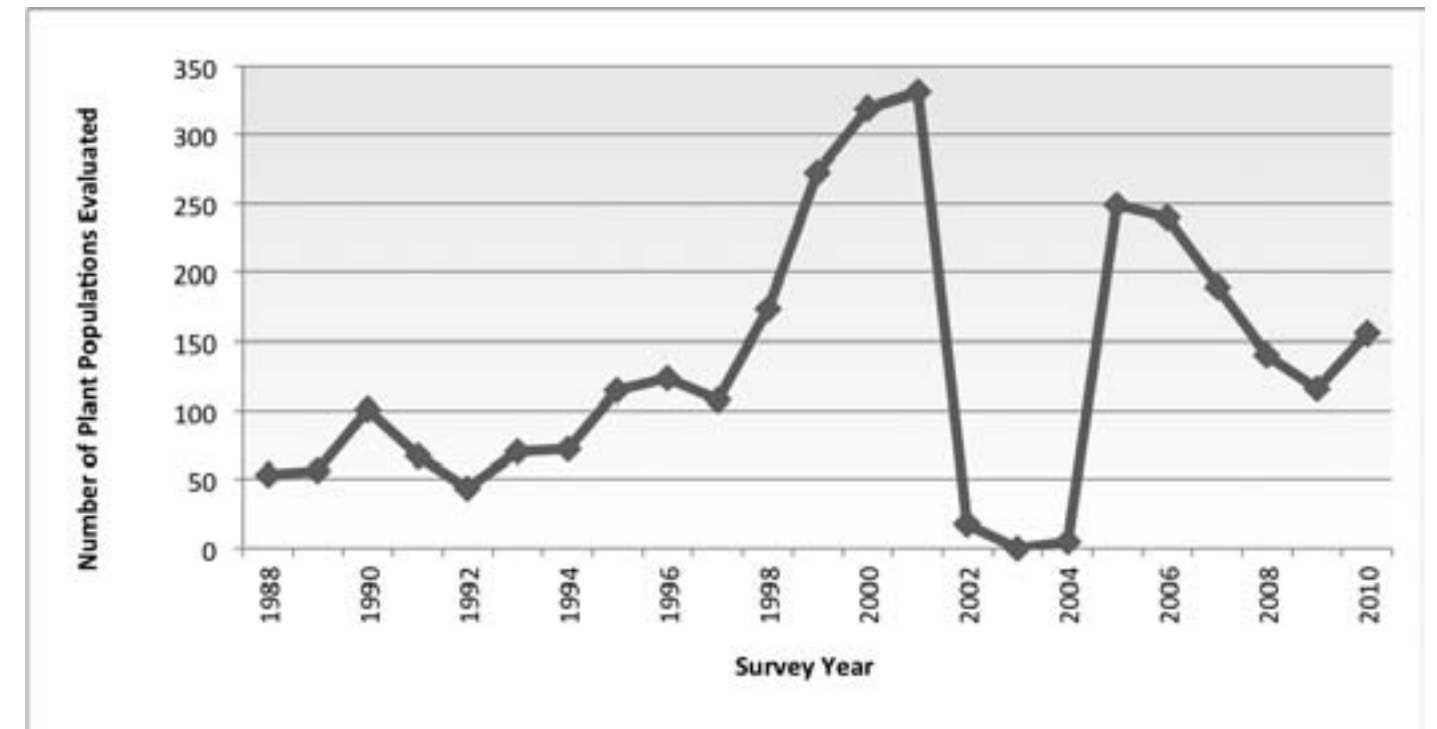
Program staff continued to work on a wide array of cooperative projects in 2010, with a total of over 250 significant plant conservation initiatives and projects now completed or in progress since the inception of the program in 1988. Projects have been completed on both sides of the Cascades, covering 32 Oregon counties. In 2010, NPCP staff worked directly with both federal and state agencies, universities, and private organizations on 14 field-oriented and other conservation ventures.



Bulbs and plants of Gentner's fritillary (Fritillaria gentneri) in propagation at OSU, for use in eventual outplanting and recovery work in southern Oregon

The number of projects has declined somewhat since 2005, partly due to a reduction in available budget, but also because the program has focused in recent years on a fewer number of larger, more complex projects. These projects, largely supported through external grants, provide important opportunities to improve state plant conservation efforts in many areas, and allow ODA to provide management input for endangered species management on federal and state lands. Notable was the renewal of the Section 6 agreement between ODA and the federal government, which greatly facilitates (under provisions of the Endangered Species Act) recovery actions and status evaluations of federally-protected species in Oregon by ODA staff. Projects of note that were initiated in 2010 include

- continuation of the on-going cultivation and outplanting project focusing on *Pleuropogon oregonus* (Oregon semaphore grass), a declining native aquatic species, in riparian restoration work in Grant and southern Lake counties (in cooperation with the Burns Paiute Tribe).
- expansion of a cooperative project with OSU to collect and cultivate seed and bulbs of several native species for revegetation work in Curry, Coos, Jackson, Douglas, Baker, Wasco, Josephine, Deschutes, Grant, and Klamath counties.



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- work with USFWS and Oregon State Parks to create a western lily (*Lilium occidentale*) recovery program aimed at restoring this species and its habitat in selected parks on the southern Oregon coast.

Five-year status review

State law requires ODA to reassess the protective status of species listed as endangered or threatened at least every five years. A key component of this process is an annual field survey program, where known populations of the various protected plant species in Oregon are revisited and measured to determine their relative health and vigor, as well as their need for continued listing. After a brief hiatus due to budget reductions several years ago, population reviews were renewed in 2005, with 156 visits to listed or other vulnerable species populations conducted in 2010. This is below the recent peak of 249 visits in 2005, with assessments in 2010 focusing on species that were also being studied as part of cooperative conservation efforts conducted with other agencies. Since 1988, the NPCP has conducted 3,017 on-site monitoring evaluations of listed plant species populations in Oregon. Since 2005 (the designated year for the last status update review), 841 population visits have been logged. This information will be used to evaluate species lists for potential status changes in 2011.



*Evaluating habitat and population status of Greenman's desert parsley (*Lomatium greenmanii*) on the summit of Mount Howard, Willowa Mountains, northeast Oregon*



Experimental revegetation work in Columbia River riparian areas in Wasco County

Watershed health issues

Capital lottery funds were used in 2010 to directly implement a wide range of habitat rehabilitation and native plant restoration projects, while also providing important matching dollars critical to attracting federal funds to further support watershed health and related planning efforts within Oregon communities. Relevant program activities continued or initiated in 2010 included

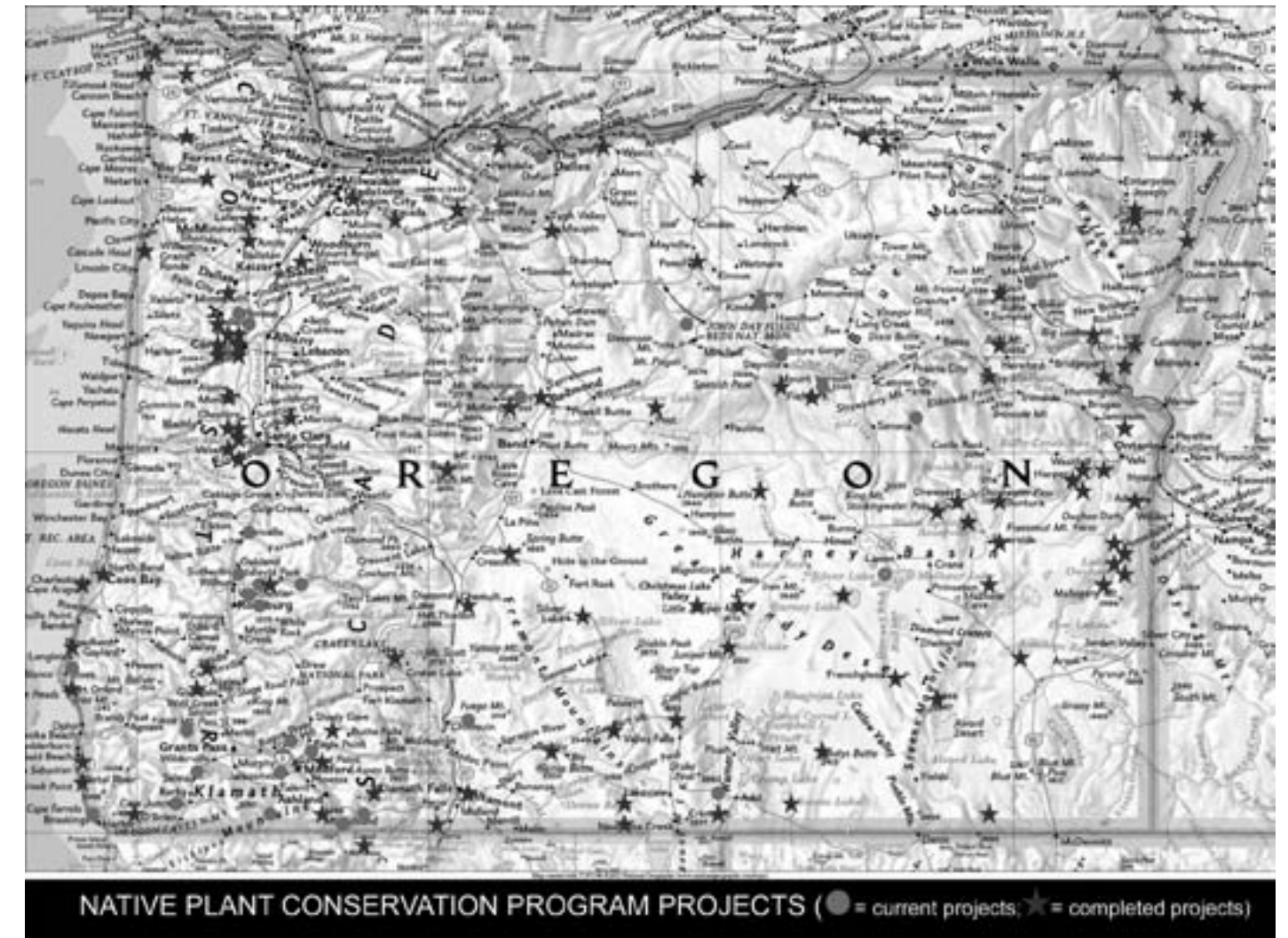
- cooperation with ODOT to survey and improve habitat (through noxious weed and on-the-ground habitat assessments) along state highway right-of-ways in a wide range of upland and wetland sites—this work will improve native habitats by providing demonstration survey protocols for improving right-of-way maintenance activities.
- additional survey and control work near Cave Junction (Josephine County) for *Alyssum murale*, an experimental crop species now naturalized in indigenous habitats within the Illinois Valley watershed—efforts are needed to identify and remove wild populations of this potentially invasive species before it becomes fully established.
- continued partnership between the City of Jacksonville, BLM, OSU, and ODA to further enhance on-going upland rehabilitation projects in the Jackson Creek drainage aimed at reducing

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- or eliminating extensive weed populations (and replacing them with native shrubs and grasses), in order to improve the overall condition of selected slopes in the area.
- further transplantation of riparian species of *Artemisia* (sage) in selected habitats along the Columbia River, for use in re-vegetation projects (involving state park properties) near the mouths of the Deschutes and John Day Rivers.

- work with BLM and the Malheur Wildlife Refuge to improve the quality of upland areas near Malheur Lake, by reducing exotic grasses and re-introducing native species.
- work with the US Fish & Wildlife Service, BLM, and local agencies to reduce noxious vegetation and improve habitat for protected species in various wetland areas in the northern Umpqua Valley.



Stars indicate the locations of projects completed by the Native Plant Conservation Program since 1988. Current projects (including long-term work, as well as projects new in 2010) are designated by the circles.

Section 6—Miscellaneous

Employee training

Employees participated in a variety of training opportunities such as advanced driving course, first aid, CPR, export certification, advanced Incident Command System (ICS) training, and pesticide applicator and consultant licensing. In addition, employees attended professional society meetings including the Oregon Vegetation Management Association, Cooperative Agriculture Pest Survey

(CAPS), Entomological Society of America, Western Horticultural Inspectors Society, and Western Plant Board. All staff members participated in defensive driving training at our annual all-division meeting in January. Employee training, continuing education, and career development remain high priorities of the Plant Division.

Oregon Invasive Species Council

Plant Division Administrator Dan Hillburn has served on the Oregon Invasive Species Council (OISC) since it was created in 2002. Tristen Berg, Plant Division's office manager, provides administrative support for the council, and serves as the OISC web publisher. Lisa DeBruyckere was hired as the Invasive Species Council coordinator in 2007.

Reporting invasive species

OISC manages oregoninvasiveshotline.org, a website where people can report suspected invasive species. In 2010, there were 119 reports to the website hotline, which included the first discovery of the invasive marine tunicate, *Didemnum vexillum* in Oregon by a citizen diver. In addition, the ODA maintains a 1-866-INVADER phone line for the public to report suspected invasives.

The council concluded an 18-month survey of Oregonians using invasive species databases, and signed agreements that provide Oregonians access to iMapInvasives in 2011. Significant strides were made in 2010, developing regional early detection and rapid response networks by coordinating with local watershed councils, community groups, land managers, and others.

Outreach and education

The council implemented a tri-state outreach campaign with Idaho and Washington to improve awareness of firewood as a pathway for the introduction of invasive pests and diseases. The campaign included pre- and post-awareness surveys, billboards, posters, backlit displays at all but one Oregon highway rest stop, giveaways at state parks, and other activities. The council also hosted a statewide invasive species summit in 2010, to share understanding of the threat of invasive species to Oregon's economy and environment, and to introduce legislative concepts for the 2011 Oregon Legislative Session.

The Oregon State Marine Board and the Oregon Department of Fish and Wildlife (ODFW) implemented the first year of the Aquatic Invasive Species Permit Program, which included roaming watercraft inspection stations and decontamination washes in locations throughout Oregon. Billboards and signs along Oregon highways helped increase awareness of aquatic invasive species.

The council spearheaded an effort to raise funds for a second printing of GardenSmart Oregon. A total of \$30,000 was raised, and 67,000 booklets were printed and distributed.

Section 6—Miscellaneous

Top 10 list of 2010 invasive species activities

The Council has chosen the following 10 accomplishments to highlight the diversity and depth of activity in Oregon's invasive species arena in 2010:

1. Firewood Outreach Campaign—The Oregon Invasive Species Council launched a tri-state awareness campaign about firewood as a pathway for the introduction of invasive species to the Pacific Northwest. Pre- and post-awareness campaign surveys, billboards, posters, flyers to firewood cutters, giveaways at campgrounds, a 30-second video remake, messages on campground reservation sites, and numerous other activities helped improve awareness and understanding of firewood as a pathway.
2. Invasive tunicates discovered near the southern Oregon coast—The invasive tunicate, *Didemnum vexillum*, was discovered in Winchester and Coos bays in 2010. OISC created a tunicate committee. ODFW and Oregon Sea Grant work with local communities and assess control and eradication options.
3. PDX exhibits—The Port of Portland convened a number of partners to develop key messages regarding invasive species. They developed a series of backlit panels to display the messages throughout the Portland International Airport.
4. iMapInvasives—After an 18-month process with numerous partners and contributors a decision was made to bring iMapInvasives to the state of Oregon as a database to track invasive species. This program, along with United States Geological Survey Nonindigenous Aquatic Species (USGS-NAS), will provide a robust platform for invasive species database users.
5. Aquatic Invasive Species permit and boat inspection stations—The Oregon State Marine Board and ODFW implemented their first year of aquatic invasive species boat permit distribution and voluntary roaming boat inspection stations. Two-person watercraft inspection teams conducted 1,898 boat ramp inspections, 690 roadside inspections, four hot-wash decontaminations, 11 Level 1 trainings, and 47 presentations. They also attended 19 public events. A total of 198,536 AIS

permits were sold in 2010, generating more than \$1 million in revenue.

6. Japanese beetle—Three years of eradication treatments have eliminated a Japanese beetle infestation at Portland International Airport. However, a new infestation was found in Cave Junction. Outdoor plants brought by new residents moving from Iowa were identified as the source.
7. Brown marmorated stink bug—This Asian pest appeared first in the mid-Atlantic states in 1996. It was discovered in southeast Portland in 2004, and has spread throughout the northern Willamette Valley. Until this year, this stink bug was considered primarily a nuisance pest in this country because it enters houses in the winter. This year damage to crops was serious in the eastern US; fruit and vegetable crops in Oregon could be next.
8. Alyssum eradication—An unsuccessful Jackson County phytomining operation was abandoned a few years ago. The project was designed to extract nickel from soil by planting *Alyssum murale* and *A. corsicum*. The operation wasn't profitable and the plants became invasive. Oregon Department of Agriculture staff and cooperators treated or hand-pulled at all the known sites in an attempt to eradicate these new weeds.
9. Economic assessment of zebra and quagga mussels in the Columbia River Basin—The Northwest Power Planning Council's Independent Economic Analysis Board conducted an assessment of zebra and quagga mussels in the Columbia River Basin. The report (<http://www.nwcouncil.org/library/ieab/ieab2010-1.pdf>) documented the economic risk associated with the establishment of these invasive mussels in the Columbia River Basin.
10. Statewide Invasive Species Summit—OISC hosted a statewide invasive species summit in November of 2010. A total of 165 people attended the summit. Participants were able to interact with a panel of legislators as well as identify priorities and ideas to inform the development of a statewide invasive species strategic plan for Oregon.

Information about the council is available online at <http://oregon.gov/OISC>.

Section 6—Miscellaneous

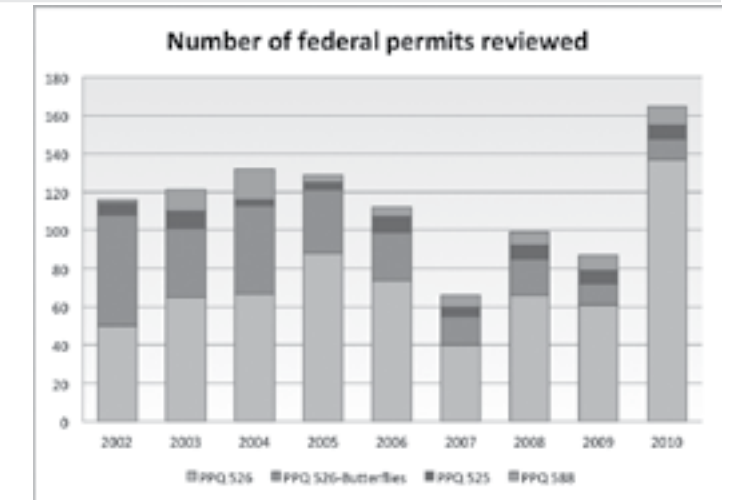
ODA Plant Division web pages

Plant Division web pages were maintained and updated by a team of staff members; Tristen Berg, Shannon Brubaker, Bonnie Rasmussen, Lisa Rehms, Kerri

Schwarz, and Rebecca Currin. We continue to add new pages and look for new ways to broadcast our programs to the public. <http://oregon.gov/ODA/PLANT>

Federal permits and compliance agreements

In 2010, Plant Division staff reviewed 137 federal permit applications. Eighty-five of those permits were Plant Pest Quarantine (PPQ) 526 applications to import live plant pests or noxious weeds and 11 were to import butterflies. There were also 52 other permits reviewed: seven PPQ 525 permits to import soil, 10 PPQ 588 permits (permits to import plants or plant products for experimental purposes), and 35 Biotech Regulatory Services (BRS) permits for trials of genetically modified plants.



Oregon Revised Statute and Administrative Rule changes

In 2010, Plant Division adopted or amended the following rules and statutes:

AMEND: 603-052-0850, 603-052-0860, 603-052-0870, 603-052-0880

The proposed rule collapsed the boundaries of the Willamette Valley Canola Protected District from county lines to a rectangle covering the historical footprint of the specialty seed and vegetable industries. Special permits for growing canola within protected districts are limited to research including involvement of an accredited university. An application fee of \$2.00/acre is imposed on applications for special permits. Rule final 1/22/2010

AMEND: 603-052-0051

The proposed amendments listed specific harmful organisms recognized as a threat to the state's wine-grape and nursery industries, updated the list of commodities covered by the quarantine, and specified measures that must be taken if a harmful organism is found in Oregon. Specifies precautions that must be taken with table grapes and wine grapes for pressing to mitigate the risk of introducing the harmful organism vine mealybug. Rule final 1/28/2010

Section 6—Miscellaneous

ADOPT: 603-052-1236

The proposed rule established a system for a coordinated joint review of any federal permit applications for growing biopharmaceutical crops in Oregon. The intent was not to duplicate the federal permit review process, rather to allow the state to provide input on Oregon specific issues and requirements. The applicant would be billed \$100/hour, up to \$10,000, for state services related to permit review and oversight of the biopharmaceutical crop production. Rule final 2/4/10

AMEND: 603-052-1200

The proposed amendment to the noxious weed quarantine updated the list of prohibited plants. Added the following weeds: common reed (*Phragmites australis*), flowering rush (*Butomus umbellatus*), Japanese dodder (*Cuscuta japonica*), taurian thistle (*Onopordum tauricum*), yellowtuft (*Alyssum murale* & *A. corsicum*), Herb Robert (*Geranium robertianum*), shiny leaf geranium (*Geranium lucidum*), lesser celandine (*Ranunculus ficaria*), spurge laurel (*Daphne laureola*) oblong spurge (*Euphorbia oblongata*), and white bryonia (*Bryonia alba*) were added to the list. Restrictions were modified for English ivy (*Hedera helix/ hibernica*) and butterflybush (*Buddleia davidii*

varabilis). English ivy was prohibited, including indoor and topiary uses. Seedless varieties of butterflybush were allowed if they are tested and produce less than 2 percent viable seed. These changes brought the noxious weed quarantine in line with the State Noxious Weed List maintained by the State Weed Board. Rule final 2/4/10

AMEND: 603-052-0127, and 603-054-0024

The proposed amendment to OAR 603-054-0024 updated USDA administrative fees collected by the ODA for issuance of federal phytosanitary certificates. Beginning October 1, 2010, the USDA administrative charge became \$6 for federal phytosanitary certificates completed by ODA personnel or \$3 for federal phytosanitary certificates issued through the Phytosanitary Issuance and Tracking System (PCIT). Beginning October 1, 2010, the USDA administrative charge for federal phytosanitary certificates became \$12 for federal phytosanitary certificates completed by ODA personnel or \$6 for federal phytosanitary certificates issued through PCIT. The proposed amendment to OAR 603-052-0127 (f) changes the email address for the Oregon Department of Agriculture to quarantine@oda.state.or.us. Rule final 2/3/10

Publications

Andreas, J., Coombs, E. M., G. L. Piper, M. Schwarzländer, and J. Milan. 2010. Biological Control. Pages 4-7 in: R. D. William, D. Ball, T. L. Miller, R. Parker, J. P. Yenish, T. W. Miller, D. W. Morishita and P. J. S. Hutchinson (eds.). Pacific Northwest Weed Management Handbook. Extension Services, Oregon State University, Corvallis.

LaBonte, J.R. 2010. The banded elm bark beetle, *Scolytus schevyrewi* Semenov (Coleoptera, Curculionidae, Scolytinae) in North America: a taxonomic review and modifications to the Wood (1982) key to the species of *Scolytus* Geoffroy in North and Central America. *ZooKeys* 56: 207-218.

Landolt, P. J., **R. A. Worth**, and R. S. Zack. 2010. First report of *Hecatera dysodea* (DENIS AND SCHIFFERMÜLLER) (NOCTUIDAE) in the Pacific Northwest of the United States. *Journal of the Lepidopterists' Society*. 64(4): 192-196.