

## Western IPM Center

# Project Report Form

**How to submit:** Please submit this completed form electronically, as an attached Microsoft Word file, to Frank Zalom at [fgzalom@ucdavis.edu](mailto:fgzalom@ucdavis.edu). **Content:** Complete each section below, and include responses to as many of the questions listed in Attachment A as are relevant to your project. *These are guidelines.* Provide your readers with enough detail that someone who is not familiar with your project can understand what you were trying to achieve, how you went about it, and what you accomplished, but please keep it concise.

### A. Report Data

**Date:** 10/05/2009

**Reporting Period:** 2008-2009

**Report Type (please check one):**

Progress Report     Final Report

### B. Grant Data

- Grant Agreement #: 2007-34103-18296
- Title: Integrated Pest Management to Reduce Vole Damage to Crops
- Grant Type: Research
- Lead investigator:
  - Name: Jennifer Gervais
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- Team members (name, title, institution): Dr. William C. Young, Professor, Department of Crop and Soil Sciences, Oregon State University
- State(s) involved: OR

**C. Nontechnical Summary.** An overview of the project, briefly outlining the problem(s), how your project addresses them, and your results, *written to a lay audience*. (500 words)

Voles can be significant crop pests. For example, in the Willamette Valley, Oregon in 2005, voles caused millions of dollars of losses to the grass seed, nursery, and wine industries. Controlling voles with pesticides can pose substantial risks to other wildlife, and control is difficult because vole populations are notoriously unstable although the causes of the rapid increases and sudden declines are still not understood. Using natural predators to help control voles and prevent or at least lessen the severity of their outbreaks has been widely promoted, but the success of recruiting owls and hawks in particular to reduce voles has never been formally tested. We installed 80 barn owl boxes in grass seed fields in the central and southern Willamette Valley in 2007-2008. We have since monitored these boxes for owl occupancy. Barn owls specialize on small rodents for food, and should be particularly effective vole predators. In addition, changes in the landscape including disappearance of old barns and large oak trees with cavities have likely reduced nest site availability. We hypothesized that barn owls would use the nest boxes provided when vole populations reached levels great enough to support a barn owl family, and that the barn owls would reduce vole densities over fields that did not contain owl boxes. Vole populations began to build in 2007 after a sudden and almost complete disappearance in 2006. Vole numbers reached great enough densities in the summer of 2008 that many growers baited their fields. Not all fields were treated, and the remaining populations appeared to crash on their own in spring 2009. Only one box was used by a nesting pair of owls in 2009, and the attempt failed when one of the birds was killed apparently by a predator. Three other owls were found roosting in boxes, but did not appear to be using them regularly. We don't know if the poor response by the owls is due to the fact that vole populations were too low generally over the winter for owls to remain in the region and breed, whether there are more nest sites available than we realize, or because there are not enough owls moving through the region to move into the nest boxes. We do know that owls outside the study area have successfully nested in the boxes, suggesting that they are suitable for barn owls.

**D. Objectives and Progress.** List your objectives and describe your progress for each objective.

Our first objective in this study was to create a network of barn owl nest boxes throughout a landscape of grass seed fields. We also originally proposed to put perches up for other raptors, but all of the fields suitable for boxes also have at least one boundary with trees at least 20 feet in height, so we did not feel that additional perches were needed. Our second objective is to measure vole populations in fields with and without the nest boxes to evaluate whether providing the habitat and recruiting the owls is sufficient to reduce vole densities. Our third objective was to follow these treatments over several years, to see if there were any differences in the dynamics of the vole populations in fields with and without the boxes.

**E. Outputs.** List your project's outputs, which might include publications, information, data, meetings held, attendance at meetings held, etc.

Twice-annual surveys of the nest boxes have revealed their value to many species of wildlife. The boxes have been used for nesting by American kestrels (which can prey upon small voles as well as many invertebrate crop pests), and for western bluebirds and possibly other songbirds who use cavities for nesting. In addition, there was some evidence that the boxes were occasionally used as perches for other raptors such as hawks. Barn owls were also flushed from a few boxes, suggesting that owls moving through the region take shelter in them even if they do not use them to nest, and likely hunt the adjacent fields. This use is very hard to measure given the discreet nature of barn owls that are not nesting, but the boxes these owls were found in did not show signs of long-term use. However, the availability of the boxes may be crucial to regional barn owl populations, by providing safe roosting sites to owls moving through the area. I have also been interviewed by Capitol Press reporters, and will be discussing the results of the research thus far in three grower meetings this fall, two in October to Washington County and Yamhill County, Oregon grass seed growers (arranged by the Washington County Cooperative Extension Service), and the other in November for wheat growers and orchardists in Wasco County (hosted by the Wasco County Soil and Water Conservation District). In addition, current status of the project was presented during a talk to wine growers during a one-day grower's meeting near Salem, OR in April.

**F. Impacts and Potential Impacts.** The “impacts” and “potential impacts” sections of your report will help the Western IPM Center highlight the value of IPM research and education by detailing the real-world impacts of Center-funded projects. We will use the information in news articles, reports, and informational brochures to showcase the impacts of projects that our program supports. *See Attachment A at end of form for questions to assist you in describing the impacts of your project.*

**1. Impacts.** Describe any impacts of your work. *Impacts* are specific changes in condition for those affected by your work. Impacts include adoption of technology, creation of jobs, reduced cost to the consumer, less pesticide exposure to farmers, access to more nutritious food, and a cleaner environment and healthier communities.

Many farmers continue to install barn owl boxes in hopes of attracting owls, and if these efforts are successful, it is certainly possible that reduced vole and mouse populations could result from the hunting activities of a breeding pair. This leads to reduced pesticide exposure to farmers and field workers, and reduced use of pesticides with the attending risks to nontarget wildlife. Although the maxim “if you build it, they will come” does not apply to wildlife, boxes are inexpensive to build and install, and if placed thoughtfully, will not incur any loss of productivity. Even without high probabilities of use, the low cost and maintenance of supplying these boxes benefit wildlife and may benefit growers economically as well as through the enjoyment of wildlife such as bluebirds.

**2. Potential impacts.** Describe your project’s potential impacts. *Potential impacts* are the ways that your project’s outputs could directly lead to changes in condition that will unfold in the future.

Although clearly putting up barn owl boxes is no guarantee of their use by owls and thus as a tool to reduce vole numbers, the boxes frequently showed use by other bird species, including nesting by western bluebirds. Because of the low cost of box installation, the lack of use hopefully will not deter growers from continuing to install them, and the knowledge that they may benefit other species of wildlife may encourage growers to provide them anyway.

## G. Appendices

1. With your report, please attach *at least two (2) photographs* that illustrate your project. Please describe the photo and indicate the name and institution of the person who took

the photo. (If you submit more than two photographs, please include those additional descriptions and photo credits under "H. Additional Information," below.)

Photo #1 description:

Flushing a roosting barn owl from a nest box. This individual did not appear to be using the box regularly.

Photo #1 credit (photographer's name and institution):

Daniel K. Rosenberg, Oregon State University and Oregon Wildlife Institute

Photo #2 description:

Exploring the inside of a nest box using an infrared probe.

Photo #2 credit (photographer's name and institution):

Jennifer Gervais, Oregon State University

2. Also attach any printed fact sheets or other publications resulting from your work that will enhance our understanding of your project and its impacts. Please provide a description of each attached publication below.

Document #1 description:

Capitol Press Agricultural Weekly article, February 29, 2009

Document #2 description:

Document #3 description:

## H. Additional Information

*Credit: Some of the language about impacts and potential impacts was adapted from a PowerPoint presentation by H. Michael Harrington, Executive Director, Western Association of Agricultural Experiment Station Directors, Colorado State University.*

## Attachment A

### Questions to Help in Reporting Impacts and Potential Impacts

Below are some questions that will guide you in assessing and then describing the impacts and potential impacts of your project. The relevance of each question may vary depending on whether yours is a research or extension project. Please answer as many as you can to the best of your ability, and feel free to describe any additional types of impacts not mentioned below. Remember to identify any potential impacts.

**1. Innovations in IPM:**

Are there new IPM practices that have been (impacts) or could be (potential impacts) adopted as a direct result of your project? What is the total number of acres (or homes, schools, greenhouses, nurseries) on which these practices could realistically be implemented?

**2. Safeguarding human health and the environment:**

- a. Has the project reduced risk (or could it potentially do so) by changing the use of pesticides on farms, in homes, in schools, etc.? For example, could it result in fewer sprays per season or a switch to lower-risk pesticides? If possible, quantify the changes in condition. (Since there is no unanimous definition of *high* and *low risk*, investigators selecting this indicator are asked to categorize the pesticides they are reporting on as *high* or *low risk* according to the particular situation [e.g., lower risk to natural enemies]).
- b. Are there any other impacts or potential impacts on human health or the environment as a result of your project?

**3. Economic benefits:**

- a. What is (or could be) the economic benefit (e.g., dollars saved) for clientele who adopt IPM strategies and systems you studied? Do you envision potential commercialization or mass production of these systems?
- b. How many clients are satisfied with IPM results (such as improved yield, improved quality of yield, reduced pest populations, more effective pest control, greater preservation of nonpest species)?
- c. Are there other financial benefits that might be realized (potential impact) as a result of your project?

**4. Implementation of IPM:**

- a. How many IPM strategies and systems have been validated through this project (e.g., through on-farm trials, large plot tests, or other methods used to confirm efficacy)?
  - b. How many educational materials were delivered? To whom? And what are the impacts or potential impacts?
  - c. What is the number of growers/personnel trained? And what are the impacts or potential impacts?
  - d. For a Web site, what volume of traffic and type of use has the site experienced? (For example, number of visitors per day or month; number of page views; number of unique user sessions; change in volume during growing season; average viewing time.) And what are the impacts or potential impacts?
  - e. How many more people adopted IPM practices as a direct result of your project, or how many people adopted new IPM practices?
  - f. Are there other ways in which your work will result in improved use or increased implementation of IPM strategies in your region or across the West?
5. Has your project or study increased collaboration among stakeholders interested in the development and implementation of improved IPM strategies and systems?