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Statement of Professional Contributions and Scholarship

I served as the Crops and Soils Educator in Chippewa County with UW-Extension in an academic staff capacity from 1998 to 2014. My appointment changed from 2009-2014. I served as the Agronomy Educator for Eau Claire County from December 2009 to July 2013 in a thirty percent position. I continued my position in Chippewa County as the Crops and Soils Educator in a seventy percent role during this time. I conducted a needs assessment in 2011 ([Exhibit 1](#)) of the agricultural community to determine the educational needs in both counties.

Chippewa and Eau Claire Counties have a combined farmland total of 588,326 acres with 3,070 farms. Market value of agricultural products sold for both counties is \$366,491,000. Dairy is the largest agricultural industry in both counties with \$140,510,000 in milk market sales. In 2013, 137,700 acres were planted into corn for grain, 91,900 in alfalfa and other hay forage, 29,200 in corn for silage, and 55,800 in soybeans. Apple acreage in both counties totals 338 acres and production contributes over \$1,000,000 in sales (2012 Census of Agriculture).

This information, along with results of the needs assessment I conducted, was used to establish the following educational programming priorities: 1) Forage Production and Practices, 2) Manure and Nutrient Management, and 3) Commercial Apple Production.

Nutrient and Manure Management

Chippewa and Eau Claire counties have strong dairy and livestock industries. The two counties have over 40,000 dairy cows and 109,000 cattle and calves according to the 2013 NASS. The two counties have combined cropland acreage of highly erodible soils of 339,777 acres. Nutrient and manure management were both rated high in the 2011 Chippewa/Eau Claire Agricultural Needs Assessment. Custom application of manure has increased as larger dairy and livestock farms are using for-hire businesses to handle and apply manure. Custom manure applicators continue to seek training opportunities from UW-Extension's Nutrient Management Team to help keep them up to date on changes in nutrient management regulations, manure handling techniques, and public road operation.

Nutrient Management Farmer Education Program

I taught the Nutrient Management Farmer Education Program (NMFEP) in Chippewa and Eau Claire counties from 2009-2014. Forty-six farmers participated in the program which included classroom training and on-farm research. The objective of the program was to increase each participant's knowledge and management of nutrients for both economic and environmental benefit. I adapted the NMFEP curriculum to include local on-farm research results from Maximum Return to Nitrogen (MRTN) and soil nitrate monitoring projects. An evaluation ([Exhibit 2](#)) of participants (n=16) using a five-point Likert scale (with one being low and five being very high) showed eleven participants rated their knowledge high to very high in the area of crop nutrient needs following the training whereas three participants rated themselves high to very high prior to the training. The evaluation revealed twelve participants rated themselves high to very high in knowledge regarding manure crediting following training whereas two rated themselves high to very high before the training.

I collaborated with Jill Hietpas, UW-Extension Broadband Outreach Educator to provide Soil Nutrient Application Planner-Plus (SNAP-Plus) software training. We used laptops provided by the Building Community Capacity through Broadband grant to deliver the training. The training program consisted of two group sessions. The first session was designed to help participants become familiar with SNAP-Plus and navigate through the program. Participants used SNAP-Plus during the second session to enter their farm data and generate a nutrient management plan. Twenty-four farmers used a hand-written format to develop their nutrient management plan prior to the training. Thirteen of these farmers adopted SNAP-Plus to develop their plan which allowed them to update and change components of their plan more efficiently.

Results from those twenty-four farm participants indicated they increased their use of nutrient credits from manure ([Exhibit 3](#)). Eighteen participants indicated they increased use of nitrogen credits from legumes. One farmer stated he no longer purchases potassium fertilizer since he began applying liquid manure to existing alfalfa fields. The twenty-four farms involved in the NMFEP impacted a total of 10,080 acres. Eighteen farmers estimated an average annual crop nutrient cost savings of \$13.18 per acre. Using the participants indicated savings of \$13.18 per acre, these savings amounted to an estimated \$132,854 per year for a total amount of \$797,126 for the six years participants were involved in the program.

**Statement of Professional Contributions and Scholarship:
Nutrient and Manure Management (cont.)**

On-farm research in Chippewa County included the validation of the University of Wisconsin's Maximum Return to Nitrogen (MRTN) rate guidelines led by Dr. Carrie Laboski, UW-Extension Soil Scientist. The purpose of the research project was to evaluate and validate MRTN nitrogen rate guidelines over a range of Wisconsin soils and cropping systems. I implemented two on-farm MRTN plots in Chippewa County in 2010 and 2013. The results of the research confirmed nitrogen rate recommendations for the soil type and location. The research was shared with participating NMFEP farmers. Results of the research added to Dr. Laboski's statewide dataset ([Exhibit 4](#)). I presented results at local Chippewa Valley Forage Council and agronomy update meetings reaching sixty-five farmers.

A dry growing season in 2012 led farmers to raise questions about potential nitrate accumulation and carryover in soil to the next growing season. I participated in the Soil Nitrate Monitoring Network (SNMN) in 2012 and 2013. The SNMN was designed to track soil nitrate in the fall of 2012 and spring of 2013 to determine nitrate carryover. I collaborated with Dr. Carrie Laboski and sampled six corn fields in Chippewa and Eau Claire counties for submission to the network. Soil nitrate levels at the one-foot sample depth at five of six locations had lower levels during spring sampling compared to fall. A sample from Eau Claire County had reduced soil nitrate levels from sixty-five pounds per acre in the fall to ten pounds per acre in spring. Two samples were above the background nitrate level of fifty pounds to indicate nitrate carryover. Sample data were compiled into the SNMN database ([Exhibit 5](#)) and included on the SNMN website <http://uwlab.soils.wisc.edu/soilnitratemonitoring/>. I shared results of the project during 2013 and 2014 NMFEP workshops which reached twenty-four farmers. This project provided information for future programming addressing drought-related forage crop and nitrogen management issues.

Custom Manure Applicator Training

A survey in 2012 was sent to known custom manure applicators in Wisconsin (N=125). Sixty-eight custom manure applicators replied to the survey which estimated the volume of liquid manure handled by custom applicators at 96,354,000 gallons per year. I have been a co-leader of the UW-Extension Nutrient Management Team's Custom Manure Applicator Workgroup since its inception in 1999. I facilitated and provided leadership for the workgroup to help custom applicators form the Professional Nutrient Applicators Association of Wisconsin (PNAAW). I initiated the development and implementation of the PNAAW Voluntary Certification Program in 2002. The certification program consists of three levels of certification. Level One certification was designed for all employees of custom manure application businesses. This level included training on nutrient management regulations, manure handling and road safety, common sense application, and manure spill response. Level Two certification was designed to deliver advanced training for crew supervisors and business owners. Eight Level Two sessions have been offered each year since 2002 to custom applicators to achieve Level Two certification. Thirty-two custom manure application businesses required their employees to attend Level Two programs which resulted in their entire operation being Level Two certified. Level Three certification requires the business to develop an Environmental Management System which can result in reduced liability insurance premiums. Ten businesses completed Level Three Certification. Dave Anderson, Insurance Specialist, Urban, Walker, and Associates said "the total liability premiums reduced by the Level Three program were \$422,338. This amount would be a uniform twenty percent higher or \$506,805 annually without certification, a real dollar savings of \$84,467."

As part of the Custom Manure Applicator Workgroup, I co-authored the PNAAW Level One Training Manual ([Exhibit 6](#)). The training manual was developed in 2010 and updated in 2013 to complement Level One training and be used as a resource guide for all custom manure applicators and business owners. I co-lead workgroup members in development of the presentation materials which are updated each year. I developed the nutrient management section of the training presentation ([Exhibit 7](#)) and reviewed and edited other sections developed by workgroup members. Participants complete a quiz to assess comprehension of learning. Level One training sessions are held locally, regionally, and statewide. Four hundred thirty-seven custom manure applicators completed Level One certification in 2014. My local delivery of Level One training has resulted in an average of thirty-seven applicators being certified each year. A pre-post evaluation ([Exhibit 8](#)) of a local training using a five-point Likert scale (with one being very low to five being very high) indicated twelve participants rated themselves high to very high in knowledge of manure gas safety following training. Thirteen participants rated themselves high to very high in knowledge of nutrient management regulations following training. Twelve participants rated themselves high to very high in knowledge of spill response following training.

**Statement of Professional Contributions and Scholarship:
Nutrient and Manure Management (cont.)**

I wrote and received a grant funded by the USDA National Institute for Food and Agriculture (NIFA) through the Building Environmental Leaders in Animal Agriculture (BELAA) project. I used the grant to develop a learning module "Manure Management to Protect the Environment and You". The learning module consists of videos, fact sheets, worksheets, and question and answer games. The learning module was included as part of the BELAA learning materials on the eXtension website <http://www.extension.org/pages/65573/managing-manure-nutrients-curriculum-materials> (Exhibit 9). In 2013, each video was viewed between forty-six and two hundred-two times. Presentations received one thousand-eighteen downloads. Upon completion of the module, learners can print off a certificate of completion. The learning module was used statewide for PNAAW Level One training in 2013 and portions of it were used in 2014. Four hundred-sixteen custom manure applicators and farmers were trained and certified in 2013 and 2014 through use of the curriculum materials.

I collaborated with the PNAAW Board of Directors and the UW-Extension Custom Manure Applicator Workgroup to coordinate the annual PNAAW Symposium each year from 2009 to 2014. The symposium consistently reached over two-hundred custom manure applicators each year. I taught six of the Level Two workshops at the symposium and facilitated three sessions related to application equipment, farmer expectations, and manure application rates.

The North American Manure Expo (NAME) component of the PNAAW Level Two Certification program is held every five years in Wisconsin and was last held here in 2012. UW-Extension and PNAAW hosted the NAME which provides a forum for custom manure applicators and farmers to learn about the latest research, technology, and equipment in the manure handling industry. I recruited manure application equipment manufacturers to participate and coordinated the field demonstration activities. I promoted the event through statewide agricultural media, websites, and personal contacts. My efforts resulted in nine solid spreaders, seven hose-drag systems, three manure tankers, four manure pumps, and one hose bridge being demonstrated. Nine hundred fifty-nine applicators, farmers, and agency personnel attended the event.

Manure spill response training is a component of PNAAW Level Two training and was offered as a field meeting to local farmers and custom manure applicators. I provided Manure Spill Response Field Training in Eau Claire County in response to manure spill and runoff events in Chippewa and Eau Claire counties. I presented information and demonstrated techniques on how to contain and control a manure spill. Seventeen participants attended the field event which included farmers, custom manure applicators, and agency personnel (Exhibit 10). I taught manure spill response training in Buffalo County in partnership with Carl Duley, UW-Extension Agriculture Agent, and the Department of Natural Resources (DNR). This training was recorded via video by the DNR and available on their website <http://dnr.wi.gov/topic/agbusiness/manurespills.html> as training material for their staff.

One custom application business owner commented on the following changes based on participation of these PNAAW voluntary certification programs.

- Employees are more knowledgeable about manure application regulations, safety, and manure spill response
- Created an employee policy and safety manual based on UW-Extension's Level One curriculum
- Indicated employees are better prepared to react to a manure spill if one should occur. The owner stated, "Since all employees have had at least five years of training, the business has not had a manure spill event."
- Added Global Positioning Systems to their dragline units after seeing them demonstrated at the NAME in 2012
- Changed their agitation boat design as a result of attending the Agitation Boat Demonstration
- Involvement in the PNAAW certification program reduced their liability insurance by thirty percent saving \$10,000 per year

Custom manure handling businesses were interested in use of agitation boats to agitate manure storage units. I collaborated with Kevin Erb, UW-Extension Environmental Resources Center Conservation Professional Training Coordinator, to host a statewide Manure Agitation Boat Demonstration for custom manure applicators to learn about new technology for manure lagoon agitation. I coordinated the event by contacting manufacturing companies to demonstrate their equipment at the event. I facilitated the presentations and equipment demonstrations. The event was attended by one hundred thirty-four custom applicators and agency personnel. Six manufacturing companies demonstrated agitation boats.

Statement of Professional Contributions and Scholarship: Manure and Nutrient Management (cont.)

Owners of custom manure application businesses (n=15) who participated in all levels of certification were evaluated ([Exhibit 11](#)). The evaluation revealed Level One training raised knowledge of manure gas safety from four businesses employees having high or very high knowledge before the training to thirteen following the training. Business owners felt their employees were better prepared to identify prohibited and restricted application areas. Nine owners indicated their employees were prepared at a high or very high level after the training compared to two businesses before the training. Six businesses changed or plan to change to use of agitation boats as a result of attending the agitation boat demonstration.

Manure handling and nutrient management methods and practices continue to change. Technology adoption by farmers and custom manure applicators will continue to drive my programming to address these needs and changes. A future educational objective will be to continue to provide programs which attempt to reduce environmental impact, keep employees safe, and help farmers and applicators run their businesses more efficiently as technology changes.

Forage Production and Practices

The respondents to the 2011 needs assessment selected forage production and practices as their first priority for UW-Extension educational programming. This included topics on forage production, alternative forages, pest management, harvest management, and irrigation. Increasing costs to produce forages resulted in a priority to closely monitor pest management and fertility costs. Dry weather patterns led to an increase in irrigation systems being installed in Chippewa and Eau Claire counties. Forage inventory has been an issue due to recent dry weather conditions and led to increasing interest in alternative forage crops and management systems.

Alfalfa

Production and management for high quality forage remains one of the most important facets for the dairy industries in Chippewa and Eau Claire counties. Forage production and management educational programming was developed to meet the needs of farmers in both counties. I collaborated with Dr. Dan Undersander, UW-Extension Forage Specialist, with alfalfa variety trials from 2009-2013. My role was to select and prepare the planting site, scout for pests, and take winter survival ratings each year. Results are published each year in UW-Extension bulletin A1525 ([Exhibit 12](#)).

Farmers used Predictive Equations for Alfalfa Quality (PEAQ) and scissor clipping data to decide when to harvest first cutting alfalfa. I selected farms based on geographic location and soil type. Results of the testing program were posted to the Wisconsin Team Forage website and announced twice weekly on regional radio station WAXX 104.5 FM which reaches twenty-one counties and over 3,000 farms. Eleven farmers used this information to help them decide when to harvest first-cut alfalfa based on a survey of alfalfa producers (n=23) ([Exhibit 13](#)). The survey indicated these farmers increased their Relative Feed Value (RFV) by ten points following the PEAQ result information.

Local farmers and field agronomists were reporting suspected sulfur deficiency in alfalfa fields. I collaborated with Dr. Carrie Laboski, UW-Extension Soil Scientist, to author a Midwest Forage Association research grant to survey the status of alfalfa plant nutrient content and evaluate the effectiveness of the Sulfur Availability Index (SAI). The \$3,000 grant was used for soil and forage sample analysis for the statewide project. The analysis of samples resulted in twenty-eight percent testing low for potassium and sulfur. I presented results ([Exhibit 14](#)) of the 2010 survey at the Midwest Forage Association Risk-Reduction Research Summit in St. Cloud, MN and at the Midwest Forage Association (MFA) Annual Meeting in Wisconsin Dells, WI. My teaching evaluation of participants (n=38) showed ninety percent found the information useful, ninety-three percent indicated I presented information clearly, and one hundred percent indicated I was knowledgeable about the topic ([Exhibit 15](#)). I exhibited a poster of the results at the MFA Risk-Reduction and Research Summit in Rochester, MN ([Exhibit 16](#)). Locally, I presented results to thirty-five farmers at Chippewa Valley Forage Council Seminars and agronomy field days.

Alfalfa producers indicated they do not scout for insect pests in alfalfa prior to applying an insecticide and often sprayed insecticide immediately after harvest. I coordinated a series of "Cut, Bale, Scout" alfalfa pest scouting and management clinics. Sixteen alfalfa producers attended three clinics and were provided sweep nets. I taught participants proper

Statement of Professional Contributions and Scholarship: Forage Production and Practices (cont.)

scouting techniques and thresholds. A pre-post survey ([Exhibit 17](#)) was used to evaluate change in confidence identifying alfalfa insects and damage. The post-survey revealed all participants (n=16) were confident in their ability to identify potato leaf hopper following the clinic. The survey indicated more participants adopted UW-Extension recommendations. Twenty-five percent of participants based their insect management decisions on UW thresholds prior to the workshop. The post-survey revealed eighty-seven percent of participants agreed to base their insect management decisions on UW recommendations. The pre-clinic workshop survey indicated six participants swept alfalfa fields for potato leaf hopper, pea aphid, and tarnished plant bug. The post survey revealed thirteen participants strongly agreed to scout for these insects.

Corn Silage

I offered Corn Silage Whole-Plant Moisture Testing to assist farmers with harvest timing. Testing was offered at multiple locations in both counties. One hundred-eleven samples were tested for moisture content from 39 different farms.

Farmers made corn silage harvest decisions based on use of whole-plant moisture testing. Fifteen farmers changed their corn silage harvest management by harvesting their corn silage earlier than they used to due to whole plant moisture testing. These farmers indicated they increased moisture content of their corn silage by five percent ([Exhibit 13](#)).

Foliar application of fungicide to corn gained momentum as a corn production management practice since industry research was indicating a yield increase to corn and corn silage yields. The University of Wisconsin database on foliar fungicide application to corn is limited. I collaborated with Dr. Paul Esker, former UW-Extension Field Crop Plant Pathologist, and Bryan Jensen, UW-Extension Integrated Pest Management Coordinator to implement on-farm small and large plot corn foliar fungicide research trials to assist in gathering data for statewide recommendations. I implemented trials in 2009, 2011, and 2013 in Chippewa County and in Eau Claire County in 2012. Results of the project indicated no significant difference to yield when applying a foliar fungicide to corn at the V5 or R1 stage of corn development ([Exhibit 18](#)). Results were included in the Wisconsin Crop Management Conference Proceedings in January 2012 which were distributed to over 1,500 agronomy professionals. I developed a presentation ([Exhibit 19](#)) and presented results of the study to 103 participants who attended local agronomy meetings and the regional Wisconsin Corn Growers Conference in Menomonie, WI.

Alternative and Energy Forages and Inventory

Farmers whose forage inventory was low were looking for alternative forages or practices to increase overall forage yield. I collaborated with Sweetwater Energy, Ace Ethanol LLC., and the Chippewa County Land Conservation Department to develop a research project to investigate the yield potential of high-sugar sorghum as an alternative livestock feed and potential cellulosic energy feedstock. Field experiments were used to determine yield of three high-sugar sorghum varieties. I wrote a summary paper of the results for 2013 ([Exhibit 20](#)). I presented the results to thirty-eight farmers at agronomy update meetings and variety trial field days. I plan to continue to provide research and information for this evolving industry in Chippewa County. Programming to address alternative forages for use as cellulosic feedstock and use of industry by-products will be a future focus.

Feed and forage inventory can be issues during dry growing seasons and as a result of winter injury to alfalfa fields. These issues can increase the need for dairy and livestock farmers to estimate feed and forage inventory. I addressed the need to take feed inventory in an article for the Midwest Forage Association's electronic newsletter "Clippings" ([Exhibit 21](#)). This newsletter reached 790 members in 23 states.

Irrigation and Water Management

Existing irrigation system owners and farmers new to irrigation management were in need of information to maximize efficiency of irrigation systems crop management. I developed a series of irrigation meetings which addressed the mechanics, agronomics, and economics of irrigation systems.

I collaborated with Dr. John Panuska, UW-Extension Natural Resources Extension Specialist and Scott Sanford, UW-Madison Senior Outreach Specialist to provide a series of field events which addressed mechanics of irrigation related to soil moisture monitoring, irrigation scheduling, and uniformity testing. An irrigation uniformity test kit was provided by the UW-Madison Department of Biological Systems Engineering to enable testing of irrigation systems for uniform application

Statement of Professional Contributions and Scholarship: Forage Production and Practices (cont.)

of water. Three on-farm field events were held and fifty-seven participants attended these events. I used the uniformity test kit to perform water distribution tests on six farms and tested ten irrigation systems in four counties. Farmers indicated they benefited most from uniformity testing by identifying and replacing worn nozzles to achieve proper water distribution.

I collaborated and taught with UW-Extension specialists Dr. Joe Lauer, Corn Agronomist, and Dr. Carrie Laboski, Soil Scientist, and Dr. Paul Esker, former Field Crop Plant Pathologist, to provide two meetings on the agronomic changes which can occur with crops under irrigation systems. Soil fertility, corn management, and plant health were topics addressed at these meetings. The meetings included a topic on quantity and availability of groundwater to irrigation systems as there was an increase in high-capacity wells for irrigation and the silica sand industry in Chippewa and Eau Claire Counties. I collaborated and taught with Mike Parsen, UW-Extension Hydrogeologist, with the WI Geological and Natural History Survey to deliver an "Irrigation and Water Management Program". Thirty-five irrigation owners attended these meetings.

I collaborated with Dr. Paul Mitchell, UW-Extension Agricultural and Applied Economics Specialist, to develop and teach use of Cost of Center Pivot System and Net Benefit of Irrigation Analysis spreadsheets to new and potential irrigation owners. These spreadsheets were developed to assist farmers in analyzing the impact of purchasing and installing an irrigation system. A post-meeting evaluation of participants (n=14) using a five-point Likert scale (with one = "very low" and five = "very high") indicated a one point increase in knowledge of the Net Benefit Irrigation analysis spreadsheet from 2.85 to 3.85. The evaluation also indicated 1.14 point increase in knowledge of the Cost of Center Pivot System analysis spreadsheet from 2.57 to 3.71 ([Exhibit 22](#)).

A Chippewa/Eau Claire County Irrigation Education Program evaluation ([Exhibit 23](#)) (n=11) of irrigation owners indicated an overall increase in knowledge in uniformity testing using a five-point Likert scale. Six participants indicated "high" or "very high" knowledge regarding uniformity testing after involvement in the program compared to two participants before involvement. Irrigation owners increased knowledge in soil moisture monitoring and irrigation scheduling. One participant indicated they reduced their overall energy use by one-third. Six owners installed soil moisture monitoring equipment as a result of attending irrigation programs.

Expansion of irrigation systems in Chippewa County continues as farms look for ways to reduce vulnerability to drought conditions and increase yields, feed, and forage inventory. Irrigation systems and the expanding silica sand mining industry continue to put pressure on groundwater use in the county. My future programming in irrigation and water management will hopefully supply valuable and useful information to farmers, communities, and families with interests in our valuable water resource.

Infusing Mobile Technology in the Field

I collaborated with Jill Hietpas, Broadband Outreach Educator, to deliver five educational programs related to mobile technology. A broadband outreach grant provided funding for a mobile electronic device lab including laptops and electronic tablets. I designed forage crop clinics and crop scouting schools to provide an environment for participants to learn about emerging crop management issues and scouting techniques while learning to use mobile technology. I created a presentation which incorporated pest management topics and use of electronic devices ([Exhibit 24](#)). Forty-eight farmers and agribusiness personnel attended the workshops. An evaluation of ten participants who attended all five programs revealed nine participants with a moderate to high increase in knowledge of using technology in crop systems. All ten participants indicated the programs increased their awareness of UW publications and resources. Seven participants indicated they changed how they do their work using mobile technology ([Exhibit 25](#)). I presented the impact of the program at the UW-Extension Technology Conference with my presentation "Infusing Technology in the Field" ([Exhibit 26](#)). As a result of this program, I presented information on using electronic devices in the agricultural industry to the WI Association of Professional Agricultural Consultants in Portage, WI and at the Farm Management Update for Ag Professionals in Kimberly, WI. Ninety-two agricultural professionals participated in these sessions. I presented a poster related to this work at the 2012 Agriculture and Natural Resources Extension (ANRE) Program Area Annual Conference ([Exhibit 27](#)).

**Statement of Professional Contributions and Scholarship:
Forage Production and Practices (cont.)**

Agriculture has been an industry full of technological advancements. Mobile technology through use of tablets, smartphones, and apps has provided farmers with instant information. I plan to continue to look for innovative ways to provide farmers exposure and training of information related to technology. Interest and adoption on farms is growing in the use of Unmanned Aerial Vehicles, guidance systems on farm equipment, and precision agriculture. As technology advances with crop scouting, irrigation, and access to information it is my hope is to continue to learn about new technologies and deliver programs to help farmers implement these technologies.

Commercial Apple Production

Chippewa and Eau Claire Counties have fruit and apple sales over \$1,000,000 annually (National Agricultural Statistics Service). Pest management costs for apple growers are large variable inputs. Chippewa County apple growers located in the Paint Creek watershed where housing development was occurring were receiving an increasing number of complaints about pesticide use and pest management practices.

Eco-Apple Project

In 2009, I collaborated with the UW-Madison Center for Integrated Agriculture Systems to secure an Environmental Protection Agency grant to help apple growers learn to scout and monitor for pests and potentially reduce pesticide use. The \$17,000 Eco-Apple grant provided participating growers insect trapping and weather monitoring equipment and access to apple consultants and professionals. The Integrated Pest Management (IPM) focus was on common insects and diseases affecting apples in northwestern Wisconsin. Codling moth, apple maggot, red and oblique banded leafrollers, oriental fruit moth, and apple scab were pests being monitored.

The Eco-Apple grant provided access to weekly teleconferences during the growing season so growers could discuss their pest management experiences. Prior to 2009, none of the participating growers had used insect trapping or weather monitoring equipment. I collaborated with UW-Extension specialists Dr. Patty McMannus, Fruit Crop Pathologist, Dr. Christelle Guedot, Fruit Crop Entomologist, and Dr. Dan Mahr, former Fruit Crop Entomologist, to provide expertise and informational updates at winter meetings. The grant provided funds to hire summer interns in 2010 and 2011. I hired, supervised, and evaluated the interns and worked with them to monitor pest counts, crop damage, and injury. Ten apple growers from Chippewa and Eau Claire counties participated in the Eco-Apple project. The project consisted of two face-to-face meetings per year and one-on-one consultations. I provided instruction on use of insect trapping and monitoring equipment, proper trap placement, calculation of growing degree days, and use of weather monitoring equipment. Growers recorded insect counts and scab infection periods throughout the growing season.

I evaluated participants (n=10) in the program in 2014 ([Exhibit 28](#)) to measure change in knowledge and practices. Changes indicated on the survey included:

- All growers indicated they were using insect trapping equipment
- Eight growers indicated an increased use of disease monitoring equipment
- All participants reduced their use of high-risk pesticides
- All participants changed their pesticide spray program from a calendar-based program to an IPM-based program
- On average, participants reduced the number of pesticide applications by three applications
- Six growers indicated an average reduction of time spraying of 13.8 hours
- Four growers reduced their time applying pesticides by an average of thirty-six percent
- Seven growers indicated an average annual savings of pesticide inputs of \$2085. Three growers reported their reduction of pesticide inputs as an average of seventeen percent

A case study of an orchard that was involved in the Eco-Apple project from 2009 to 2014 revealed an average yearly savings of \$9,000 through adoption of IPM strategies. The grower changed their pest management strategies from one dictated by the calendar to one guided by IPM using insect and weather monitoring equipment and scouting practices. The grower eliminated an average of four and one-half pesticide applications per year. They indicated their average spray costs were \$2,000 per spray. The grower implemented codling moth mating disruption practices in 2014 to determine if they could further reduce foliar pesticide applications for codling moth control. In 2014, the grower went twenty-six days without an

**Statement of Professional Contributions and Scholarship:
Commercial Apple Production (cont.)**

application of pesticide which they indicated was the longest the orchard had experienced. The grower changed their weed control program from a glyphosate-based program to a one-time pre-emergence program eliminating the need for reapplications of glyphosate. The grower has implemented alternate row mowing to increase the habitat for beneficial insects and pollinators. The grower indicated they now use pest and weather monitoring data and information before making pesticide applications and rely less on a calendar spray program.

The ten orchards involved in the Eco-Apple project did not have Integrated Pest Management plans prior to 2009. I presented information about the components and development of an IPM plan. I facilitated meetings with local Natural Resource Conservation Service (NRCS) district conservationists from Chippewa and Eau Claire Counties to provide information about IPM cost-sharing incentives at local winter meetings. Eight growers developed an IPM plan as a result of their involvement with the Eco-Apple Project and involvement with NRCS cost-sharing programs. As a result of the Eco-Apple program, participants enrolled one hundred fifty-two acres in IPM-related NRCS cost-sharing programs.

Commercial apple growers continue to seek information to reduce pesticide use. My future objectives with these growers are to move them along the IPM continuum. Helping growers to continue to lower pesticide use and adopt advanced IPM practices remains an educational goal. My work with commercial apple growers has led to expansion of my programming to other types of fruit crop growers. Grape production has increased in Chippewa County recently which led me to begin to provide programming to this expanding industry. My goal for future programming for these and potential fruit crop growers is to begin to work on cost of production, financial management, and marketing.

Management Assessment Center for Labor Intensive Crop Owners/Managers

I collaborated with several UW-Extension county agricultural agents to secure funding through a USDA Risk Management Education grant to develop and deliver management assessment centers for commercial apple growers and other growers of labor intensive crops ([Exhibit 29](#)). An assessment center features individual and group simulations and activities that an owner/manager of a farm may encounter. The center assesses individual behaviors in nine critical farm business management attributes. The assessments are used to provide personalized feedback designed to improve participants' management abilities and initiate the development of personal action strategies. I co-led a focus group discussion with four fruit crop growers to develop the activities and simulations. I developed the Group Discussion Non-Assigned Role activity from the information and data provided by the growers. Development of the activity involved creating a crop-related issue with which all participants could identify.

Twelve growers from Wisconsin, Minnesota, and Michigan participated in two management assessment centers. I was instrumental in recruiting commercial apple growers to participate and assessed four of the participants involved in the centers. As an assessor, I assessed individual behaviors of participants in nine critical farm business management skills and provided suggestions for development of personal action and improvement. I conducted one-on-one follow-up visits with participants for which I served as the lead assessor. One participant stated, "I increased my awareness of how I spend my workday. I never thought much about prioritizing my time until I participated in the In-basket activity."

An evaluation of participants (n=6) indicated all participants enhanced their awareness of individual management skills ([Exhibit 30](#)). All participants indicated they changed their managerial behavior as a result of participating in the center. Five participants changed how they use their strengths that were identified as a result of their participation. A participant stated, "As the owner and manager of the orchard, I delegate more tasks now. I trust employees to do tasks correctly." Three participants have increased or changed their responsibilities since participating in the center. The Management Assessment Center for Labor Intensive Crop Owner/Managers grant helped expand the suite of assessment center curricula to fruit crop growers. Development of additional curriculum for specialty crop growers is needed as more labor intensive crops are grown. Future management assessment centers will attempt to reach other fruit and potentially vegetable growers throughout Wisconsin and other states.

My programming and accomplishments with UW-Extension has been driven by my involvement with teams and workgroups. Through teams, I plan to address issues impacting environmental, financial, and social aspects of agriculture. It is through UW-Extension teamwork that I hope to continue to deliver programs to help the farmers, businesses, and families of Chippewa County and Wisconsin improve their lives, lifestyle, and communities.