



2015-2016 Progress Report

Contents

2015 – 2016 PROJECT PROGRESS	4
Sustainable Food Group.....	4
Partnership for Ag Resource Management	5
Pesticide Risk Tool	8
Green Shield Certified	9
IPM STAR for Schools and Childcare Centers.....	10
IPM Voice.....	10
North Central School IPM Working Group	10
Northeast Eco Apple	11
Upper Midwest Specialty Crop Grower Services	12
Oneida White Corn Improvement Project	13
Potato Sustainability Project	14
Sysco Sustainable Agriculture/IPM Program	15
Eighth and Ninth International IPM Symposiums	15
Organic and IPM Working Group	15
Public Tick IPM Working Group.....	16
IPM and CCA Working Group	17
Other Activities	17
PRESENTATIONS	18
2016 Presentations	18
2015 Presentations	19
PUBLICATIONS.....	22
2016 Publications.....	22
(Non-Refereed)	22
2015 Publications.....	22
(Non-Refereed)	22
FUNDING OBTAINED	23
2016 Funding.....	23
2016 Grants.....	23

2016 Contracts.....	23
2015 Funding.....	24
2015 Grants.....	24
2015 Contracts.....	24
Non Funded Proposals Submitted	25
2016 Unsuccessful Proposals	25
2015 Unsuccessful Proposals	25
2017 Objectives	26
Appendix A. Staff.....	29
Appendix B. Reducing Pest Complaints and Costs in Your Facilities.....	36
Appendix C. The Potato Sustainability Initiative: Promoting, Tracking and Reporting Progress.....	41

2015 – 2016 PROJECT PROGRESS

Sustainable Food Group (<http://sustainablefoodgroup.org/>) - IPM Institute continues to work with Whole Foods Market on the Responsibly Grown rating system for their produce and floral supply chains.

Based on stakeholder feedback during this first year of the Responsibly Grown program, IPM Institute identified areas for improvement and proposed updates to strengthen the Prohibited Pesticide Policy. With IPM Institute's support, Whole Foods Market announced and updated Prohibited Pesticide Policy to suppliers in January 2016 that prohibits use of all organophosphates and N-methyl carbamates (known neurotoxins), as well as a handful of other high-risk pesticides on all Responsibly Grown products. The updated policy will further reduce pesticide-related risks in the Whole Foods Market produce and floral supply chains.

In 2016, IPM Institute and Whole Foods Market began work on updating Responsibly Grown to expand recognition for suppliers implementing best practices in worker welfare. This work included a stakeholder meeting with suppliers and farm worker labor experts, and there are plans to pilot the draft program updates with suppliers in 2017.

In 2015, IPM Institute contracted with National Science Laboratory to launch a pesticide residue testing program in conjunction with Responsibly Grown. The results will be used to better understand the impacts of the Prohibited Pesticide Policy on dietary risk in the Whole Foods Market supply chain compared to the national food supply. We successfully collected and analyzed data from 2016, and the program will conclude in 2017 per Whole Food's Request.

As part of the program, IPM Institute manages a three-tiered verification system that includes reviewing information submitted to the Responsibly Grown supplier website, completing remote desk audits, and providing quality assurance on-site audits conducted by third-party auditors. IPM Institute trained auditors from California Certified Organic Farmers (CCOF) and NSF International, and site audits were piloted in 2016. Desk audits were launched late in 2015, and auditors began conducting site audits in 2016, which will continue in an ongoing basis. IPM Institute will play a quality assurance role, reviewing audit reports completed by third-party auditors and shadowing selected audits.

IPM Institute continues to make improvements to the custom Pesticide Risk Tool (formerly known as ipmprime.com) provided to Whole Foods Market suppliers in the Responsibly Grown program. Five new risk indices launched in 2016, and include three potential risks to pollinators, dietary risks to consumers, and dermal and cancer risks to farm workers. Additional improvements include the ability to download risk results charts enabling suppliers to easily share risk results with growers and pest managers. Beginning in 2017, international suppliers

will also be able to use the Pesticide Risk Tool thanks to new developments that allow users to risk results for pesticides not registered with the US EPA.

IPM Institute created six new sets of IPM Elements and associated grower IPM surveys for our role in the Agriculture Food and Research Initiative (AFRI) grant for the Integrated Pest Information Platform for Extension and Education (iPiPE) in 2015. IPM Elements are concise summaries of IPM practices for a crop/region developed using extension resources, expert input and stakeholder input where necessary. The IPM Elements are used to draft grower IPM surveys, which will be used to measure change in IPM adoption in each of the crop-pest programs over the course of the iPiPE project. In 2016 IPM Institute developed an additional four sets of IPM Elements and grower IPM surveys, and plans to complete the remaining three sets of IPM Elements by early 2017. IPM Institute is working with Zedex, an iPiPE project partner, to develop an IPM Elements website to help growers learn about available IPM practices, record their practices and track progress over time. The website will also provide extension and researchers with a potential dataset of IPM implementation in their region. IPM Institute and iPiPE project staff hosted two grower meetings – one with New England blueberry growers and another with Iowa soybean growers – to solicit feedback on IPM Elements, the interactive website, and iPiPE project generally. The meetings were valuable in shaping the future direction of the IPM Elements.

IPM Institute is working with a leading data management solutions provider to develop a voluntary IPM Sustainability standard for growers and supply chains. Once accredited, the standards will be open to a variety of potential users including food companies and producers interested in sustainable crop production. The standard will work as an audit addendum to current food safety audits.

IPM Institute is in conversation with another national food company that hopes to expand the role sustainable agriculture plays in its global supply chain. The potential collaboration would be a significant opportunity for the IPM Institute to utilize its expertise and contribute to improving the impacts of agriculture on the environment and human health.

Partnership for Ag Resource Management (PARM) (www.partnershipfarm.org) - We continue to scale up the successful ag retailer pilot in the Western Lake Erie Basin (WLEB) to the Great Lakes Basin (GLB). Equipped with further funding from the Great Lakes Protection Fund in 2015, we expanded our contact list to include ag retailers, certified crop advisors, watershed organizations, press and media organizations, state agribusiness associations and independent agronomists in the Basin. We currently have over 5,000 contacts, most of which are ag retailers. With an expanded geographic scope for the project, we added four new members representing western New York, Michigan and Wisconsin to our advisory board of key scientists, policy-makers and watershed organizations.

In the past year we have publicized our expansion in the GLB through press releases and conversations with other organizations in the region; these include state agribusiness associations, the Ohio Environmental Council, Alliance for the Great Lakes, Fund for Lake Michigan, University of Michigan Water Center, C.S. Mott Foundation, the Wisconsin Department of Natural Resources Rock River TMDL team, various project teams at The Nature Conservancy, Soil and Water Conservation Districts (SWCD) in Northwest Ohio and AgGateway.

We continue to contribute to ongoing reductions in annual dissolved reactive phosphorus (DRP) and total phosphorus (TP) losses in the Basin partnership with ag retailers. Specifically, we work to achieve clean water, healthy soils and productive cropland by promoting and tracking profitable ag retail products and services that also reduce phosphorus (P) load, including cover crops, gypsum applications, variable rate fertilizer application and soil sampling.

In 2016, we worked to increase sales of beneficial products and services and activate ag retailers to become sustainability leaders. Efforts included the development and distribution of tools and resources, facilitation of webinars, distribution of the expanded ag retailer survey and coordination of a new cost-share program.

We updated and refined two important resources that help ag retailers identify and increase sales of the products and services they offer that also reduce phosphorus (P) losses. First, we updated and printed 1000s of new P-Loss Wallet Cards. These wallet cards serve as conversation starters with growers and include best practices and principles to reduce P losses from cropland. To date we have distributed 20,000 of these wallet cards in the Great Lakes Basin and beyond. Ag retailers, consultants, farmers and SWCDs most frequently order these free cards to take with them to winter grower meetings.

We also updated our [P-Loss Reduction Handbook](#) which is featured on our website and is available free for download. This handbook includes reference and marketing factsheets for products and services, the P-Loss Reduction Wallet Card order form, and an NRCS-approved sample Nutrient Management Conservation Activity Plan. This handbook is intended for ag retailers and customers to improve awareness of products and services that can reduce phosphorus, agrichemical and soil movement from fields.

Webinars facilitated by IPM Institute help increase ag retailer awareness of beneficial products and services, and teach them how to implement those for farmer clients. In 2016, we hosted three webinars, making a total of six webinars between 2015 and 2016. Each webinar featured a scientist or extension representative sharing the latest science on reducing P losses, in addition to an industry or ag retailer representative that shared practical knowledge of how they sell or implement a certain product or service with their grower clients. The webinars covered topics

such as cover crop management, soil testing, variable rate fertilizer application, gypsum applications, nitrogen management, and manure management.

The webinars were successful in drawing hundreds of registrants, live attendees and on-demand views. In total, we engaged more than 790 participants and when combined with on-demand views, we engaged more than 1,590 people with unique content about ag retailer water quality leadership. Evaluations indicated that there is an interest and need for this content in webinar format. Attendees plan to use the information to increase sales of beneficial products and services with their grower clients.

In 2015, IPM Institute developed a partnership with FoodLogiQ to use their food supply chain traceability platform as an assessment tool for ag retailers to track product and service sales data and convert it into environmentally relevant reports to demonstrate compliance with nutrient management or conservation standards. After reassessing our needs and performing usability testing on the FoodLogiQ platform for ag retailers in 2016, we opted to postpone its use. Our team is still working with FoodLogiQ to simplify the user experience in hopes of incorporating the Connect platform next fall. In the meantime, we are using a suite of online tools to enhance online interactions with ag retailers.

Building on the success of the variable rate phosphorus application cost-share program under a National Fish and Wildlife Foundation Sustaining Our Great Lakes grant, the team sought funds to expand this incentive program to other retailer partners. The team applied for and was awarded a U.S. EPA Great Lakes Restoration Initiative grant in April 2016 to expand the cost-share program into other areas in the Western Lake Erie Basin. This cost-share program, Accelerating Farmer Adoption of Variable Rate Technology, serves as another carrot for ag retailers to buy into our partnership. In our pilot program, we enrolled 93 growers that work with 13 ag retail locations. In this second cost-share program, the team will enroll 225 farmers through their retailers and service providers. Currently, there are 34 ag retailers enrolled with soil samples collected from 3300 acres and 46 growers.

In 2015, we worked with Heidelberg University researchers from the National Center for Water Quality Research via a sub-contract on a Conservation Innovation Grant. We hosted two training sessions for approximately 30 growers, SWCD staff and ag retailers to test the Nutrient Tracking Tool (NTT) that is in development for the Western Lake Erie Basin. We organized the events, helped evaluate the workshop's success, and documented the feedback provided to improve NTT. In addition, we have been planning a 'state of the science' meeting to take place at Heidelberg University March 9-10, 2017. The meeting titled, "BMPs for Reducing P Losses from Cropland: State of the Science," will focus on the current state of the science of BMPs that reduce phosphorus losses.

The team also established a sub-contract with the same organization to develop three additional phosphorus vulnerability maps over the next 2 years. Heidelberg is working to complete the Maumee River Basin (OH), Lower Fox River/Green Bay (WI) and Saginaw Bay (MI) P vulnerability maps. These maps will provide retailers with relative field vulnerability ratings to prioritize high-vulnerability fields to receive products and services.

A sub-contract with the American Farmland Trust and other partners under a Great Lakes Protection Fund planning grant was also established to work with women non-operator landowners (WNOLs) and their tenants in New York and Ohio to improve ag leases and incorporate conservation practices on their land. Our team will work to activate ag retailers in round table discussions, aid in the creation of tools and resources, and assist in the planning and implementation of several lessee workshops.

The team distributed a refined ag retail product and service survey to 380 ag retail locations across the Great Lakes Basin in 2015. We have been surveying ag retailers in the Sandusky River Watershed in Ohio since 2011, and tracking increases in ag retailer sales and services that protect and improve water quality. In 2015, we expanded our efforts to the entire Great Lakes Basin with funding from the Great Lakes Protection Fund. The team received close to 50 voluntary responses. Results reveal that most surveys (46%) were filled out by owners/general managers/location managers, which is a positive indicator that water quality is a top priority for retailers. The 2016 survey was launched in December 2016.

Pesticide Risk Tool (pesticiderisk.org) - The Pesticide Risk Tool (PRT), the new name for ipmprime.com, is a web-based software tool designed to analyze pesticide risk to human and environmental health at the farm level. The tool uses the best available science in a user-friendly interface. In the initial stages of PRT development, IPM Institute collaborated with Oregon State University (OSU) specialists and other independent scientists and pesticide researchers. In August 2013, IPM Institute and OSU decided that it was in the best interest of each to pursue independent development of the ipmprime.com tool. A separation agreement was finalized in November 2013.

IPM Institute now maintains PRT on cloud-hosted virtual machines and continues to work with a team of consultants to further develop the software. In March 2016, several indices were added to the original PRT measures. These include farmworker and consumer cancer and dermal, dietary and pollinator risk. The launch included a new website with an improved workspace and numerous bugs fixed. PRT outreach will continue through 2016 to identify potential users and to expand possibilities for PRT applications in supply chain sustainability. PRT demonstrations have been given to Christof Walter Consultants, The Cool Farm Alliance, Unilever and Mondelez to date.

IPM Institute received an initial investment from Whole Foods Market for a custom online version of PRT designed to work within Whole Foods Market's Responsibly Grown produce rating system. The programming team at IPM Institute developed an improved custom interface for enhanced usability and simplified data entry based on the maximum rates of application across comprehensive production units. In response to the policy that all conventional vendors must use PRT to earn a rating, the IPM Institute has developed a feature to allow international vendors to 'describe' pesticide products that are not registered by the US EPA. Whole Foods committed to an additional investment in PRT through May 2017 supported by the vendors who subscribe to it within the Whole Foods produce rating system. The additional investment will cover costs of user training, site maintenance and development. For more information on the Whole Foods produce rating system, please see the Sustainable Food Group project overview above.

The Equitable Food Initiative (EFI) contracted with IPM Institute in 2013 to implement ipmprime.com as part of EFI certification standards. EFI is exploring the possibility of funding PRT development for greenhouse growing operations. Good Food Purchasing Guide has also used PRT since 2012 and is considering expanding its use of the tool within the program.

PRT is also used as part of the pesticide metric for the Potato Sustainability Initiative. Results from actual spray records are compared against hypothetical schedules without the use of IPM practices. Staff at the IPM Institute developed a 'bulk uploader' allowing data from multiple farms to be uploaded into PRT at once. Over 5,000 fields were run through PRT in 2015.

PRT was also used to analyze pesticide use for EcoApple participants over the past decade. The bulk uploader allows multiple fields to be analyzed at once. The data can be presented by field or by product.

Green Shield Certified (GSC) (<http://www.greenshieldcertified.org/>) - In 2015, Green Shield Certified completed an initial evaluation for a Pest Management Provider (PMP) service in Singapore, our first international participant. Nine PMPs and two facilities were re-evaluated and four PMPs left the program, bringing the total number of Green Shield Certified participants to 41.

The IPM Institute provided structural pest management walkthrough evaluations for Northwestern University in Illinois and for a series of high-profile facilities in Ohio. The latter were conducted in partnership with Beyond Pesticides and included the Kennedy Krieger Institute, the Cleveland Institute of Art, and Case Western Reserve University, among others.

Green Shield Certified was also featured in an article in the November 2015 issue of the International Facility Management Association's Facility Management Journal (Appendix F) highlighting pest management techniques to attract further participation.

In 2015, Green Shield Certified tightened up its participant terms and conditions with special emphasis on the amount of time participants are given to address payment and open certification items.

In 2016, Green Shield Certified re-evaluated four pest management providers. The IPM Institute provided structural pest management walkthroughs for additional high-profile facilities in Ohio and Maryland in partnership with Beyond Pesticides. These included the Cleveland Clinic, the Cuyahoga County Justice Center and a Kaiser Permanente medical facility.

IPM Institute began work with the local Bayview Foundation in October 2016 to address health and safety risks in their multi-family, low-income housing units by transitioning to an IPM approach. In addition we co-hosted a training workshop at Bayview housing facility with the Stop Pests in Housing program which seeks to improve pest control in affordable housing by educating everyone who works, lives and plays in housing how to apply IPM practices.

IPM STAR for Schools and Childcare Centers (<https://ipminstitute.org/projects/ipm-star/>) - In 2015, the IPM Institute collaborated with Carrie Foss of Washington State University (WSU) to certify four new Washington public school districts: Kelso, Mukilteo, Lake Washington and Federal Way. These schools were awarded their certifications at a Washington School IPM event in Seattle on October 1, 2015. A state senator was among the attendees.

In 2015, Janet Hurley of Texas A&M AgriLife Extension Service also conducted an IPM STAR re-evaluation for Spring Independent School District, which achieved re-certification within a month.

In 2016, four new school districts were evaluated in cooperation with both Janet Hurley and Dawn Gouge of the University of Arizona. A school district in Wisconsin was also re-evaluated and became re-certified within a month of its report being submitted.

IPM Voice (www.ipmvoice.org) - IPM Voice newsletters reach an audience of approximately 2,500 pest management professionals, researchers, scientists, decision makers and extension employees. In 2015, Matt Neff took over the project administration, maintaining the website and writing monthly IPM Voice newsletters.

North Central School IPM Working Group: Increasing Adoption of IPM in Schools (www.ipminstitute.org/NC_IPMIS_Working_Group/main.htm, ipminstitute.org/projects/school-ipm-2020/) -

In 2016, the [North Central School IPM Working Group](#) focused on promoting the Stop School Pests training in the north central region and has resumed conference calls as of October 2016. The [School IPM 2020 National Steering and Advisory Committee](#) conference calls continued through 2015 and 2016. These calls included updates on regional school IPM efforts and

projects; discussion of Stop School Pests' development and promotion; and introduced likeminded organizations to the group for further collaboration and knowledge exchange. The national school IPM steering committee includes 12 regular members, seven advisory members and one national-level consultant.

The School IPM newsletter was redesigned in September 2016 and reaches 2,500 subscribers each month. The newsletter, entitled the Stop School Pests News Roundup, features relevant events and news about School IPM in the north central region and nationally. This work is funded by the North Central IPM Center through February 2017.

The development of the Stop School Pests training modules continued throughout 2015 and 2016. Project Director Dawn Gouge (University of Arizona) finalized the modules in November 2016. Eight training modules for different school staff groups are now available through the [eXtension website](#). Each training module is available as an online or in-person training, which can be downloaded on the website. Exam questions are provided for learners and the IPM Institute grades exams and issues certificates if requested.

Stop School Pests has been promoted through North Central School IPM Working Group members and the re-designed School IPM newsletter. It was further presented to several organizations that were guests on the National Steering Committee calls, who in turn promoted the training to their constituents. Trainings were also promoted through outreach to other membership organizations serving a similar audience (such as NEHA, the NEA or the AAFA). Dr. Tom Green was invited to present the training at the National Education Association's (NEA) annual meeting in Washington D.C. in October 2016 to state-level conference coordinators. This led to requests for Stop School Pests in-person trainings at three state conferences in Washington, Indiana and Michigan.

We are currently creating a new website stopschoolpests.org to bring the Stop School Pest training to additional audiences. In the future, school staff can take the training online, followed by an automated test that will result in awarding of a certificate for successful completion. A full suite of supporting documents has been developed to support in-person trainers including attendance lists, agendas, training evaluations, standard operating procedures, photo waivers, flyer templates and certificates.

Northeast Eco Apple (redtomato.org/eco-apple) - Red Tomato began the Eco Apple Project in 2005 as a certification program to distinguish New England orchards implementing advanced IPM programs from others. Certified growers may use Eco Apple and Eco Stone Fruit trademarks to differentiate their crop in the marketplace and increase access to new markets. In 2015, apple growers covering a total of 818 acres and four stone fruit growers covering 107 acres, were certified under the Red Tomato Eco trademarks. Of these four stone fruit producers, three also had acres of apple trees enrolled in the program. In 2016, 15 apple growers on 1,443 acres were certified; one new apple orchard joined the program, but no acres of peaches were

enrolled due to an early freeze across the New England states. We continue our partnership with Red Tomato on this project, providing scientific and technical expertise on IPM practices and strategic planning to help Red Tomato increase traction in the marketplace for their Eco brands.

The Core Eco Protocol was implemented in 2015 and crop-specific supplements for apples and stone fruits were adapted from previous protocols. This protocol format eliminated duplicative reporting for growers enrolled in both the apple and stone fruit programs. The protocol also included a section on pollinator protection. The protocols are updated annually to reflect advances in IPM technology, practices and restrictions on pesticides used in the program. The Core Eco Protocol is designed to accommodate all fruit crops produced in the Northeast and eventually will include protocol supplements for blueberries and other small fruits.

Red Tomato supplies several major retailers in the Northeast, including Whole Foods Market, and participates in their Responsibly Grown program. In 2015 Red Tomato Eco trademarks received a ‘Good’ rating from Whole Foods with one grower receiving a higher rating. In 2016, six Eco Apple rating units were enrolled with four receiving a ‘Good’ rating and two receiving a ‘Better’ rating.

The Whole Foods Responsibly Grown program includes several pesticide-use restrictions, which exceed current restrictions in the Red Tomato programs. The updated version of their Prohibited and Restricted Pesticides Policy (effective January 1, 2017) includes a full prohibition of 2,4-D, carbaryl, chlorpyrifos and thiophanate-methyl.

Carbaryl has been an important chemical used in thinning apples, a practice necessary to prevent over cropping and ensure proper sizing and quality of fruit. The IPM Institute has facilitated several conversations with experts on chemical-thinning alternatives and Red Tomato growers began on-farm trials with carbaryl alternatives in 2014. In 2016, five growers enrolled 517 carbaryl-free acres covering 74 percent of the total acres enrolled. Red Tomato growers will continue these trials through 2017 to meet compliance requirements for the Responsibly Grown program.

Upper Midwest Specialty Crop Grower Services (ipminstitute.org/projects/specialty-crop-grower-services) - IPM Institute continues to offer technical and other IPM assistance to apple and small-fruit growers throughout southern Wisconsin, southeastern Minnesota and northern Illinois through our pest-scouting program, NRCS Technical Service Provider services, AppleTalk conference calls and IPM certification.

The Apple IPM scouting program completed its eighth season in 2016 with 16 growers and 705 acres of apples enrolled in our season-long program. Two pest scouts based in Madison and La Crosse, Wisconsin, service the region. The program continues to provide routine scouting, IPM technical assistance and sprayer calibration, and is beginning to assist growers in the development of food-safety plans for both USDA Good Agricultural Practices and compliance with the Food Safety Modernization Act. While expanding services to blueberry, grape, hop,

raspberry and strawberry, we primarily targeted apple producers with small acres of these crops. Acreage of these fruit crops are small across the region and primarily produced as a U-Pick and direct-market crop, therefore there has been a lack of interest in more advanced technical assistance. As the wine-grape and hop industry becomes more established in the region, we hope to offer scouting and IPM technical assistance to these producers.

In 2015, the IPM Institute partnered with the University of Wisconsin Center for Integrated Agricultural Systems (UW CIAS) and the Viticulture Enology Science and Technology Alliance program to offer the Midwest School for Beginning Grape Growers. Twenty new or prospective growers participated in the three-day workshop. Course instructors included viticulture researchers, consultants and experienced growers from around the region. This course offered students an intensive classroom and field-based course on vineyard establishment, cultivar selection, pest management and cultural practices, e.g. pruning and training.

Our market-based IPM certification program, TruEarth Certified, first launched in 2010 and certified eight growers in 2015, and 10 growers in 2016. The program has 12 growers enrolled; in 2015 three did not certify due to significant crop loss from severe hail and one did not certify due to protocol violations. The protocol was developed with significant input from participating growers and is influenced by our experience with the Red Tomato Eco Apple program.

These participants sell their fruit wholesale through Wescott Agri Products' Honeybear Brands, which operates under the Mississippi River Valley Fruit Company label. The TruEarth Certified program is part of a larger effort by Wescott Agri Products to differentiate the regional crop and access new markets, including Aldi, Meyer, Wal-Mart and Whole Foods Market. An annual pollinator survey has been completed at participating orchards since 2014 to develop a baseline for assessing pollinator health and help position the program as a pollinator-friendly enterprise.

AppleTalk, a collaboration between Threshold IPM Services, UW CIAS, Wisconsin Apple Growers Association and the IPM Institute celebrated its 10th season in 2016. Originally part of the Wisconsin Eco-Apple Project and funded by the US EPA, AppleTalk has been managed as a fee-for-service program by the IPM Institute since 2013. Participation averages 40 producers a season and features a weekly discussion on orchard IPM from early season growth to harvest with consultant John Aue, Threshold IPM Services. Highlights of the program include regular guest presenters from Cornell University, Michigan State University and University of Wisconsin. Growers have the option of participating on live calls, downloading recorded calls or accessing call summaries on the AppleTalk blog, ecofruit.wisc.edu/appletalk.

Oneida White Corn Improvement Project - The Oneida White Corn Improvement Project was a two-year collaboration between the Oneida Nation of Wisconsin, North Central IPM Center and the IPM Institute, to improve the sustainability of crop production at Tsyunhehkw[^] Organic Farm, located in Oneida, Wisconsin. Tilth Agronomy provided recommendations on improvements to equipment, cover crops, planting and tillage practices, and nutrient inputs. The

primary objective was to identify crop-management practices that could improve yield, quality and profitability of organic Oneida white corn, the farm's primary cash crop. Oneida white corn is an indigenous variety and production requirements differ from conventional corn. The secondary objective was to investigate the feasibility of growing additional crops that have strong cultural value and offer increased revenue and reduced risk through diversification.

Farm managers at Tsyunhehkw[^] received on-farm support from from Tilth Agronomy and the IPM Institute during the 2014 and 2015 growing seasons. The project concluded with a detailed report to Oneida and Tsyunhehkw[^] that outlined observations and recommended practices to implement during the growing season and harvest to improve yield and profitability. Future improvements for white corn production at Tsyunhehkw[^] include strengthening the collaborative relationship with other tribal farming operations that could enable access to larger tractors and cultivators necessary to reduce labor costs and improve farm productivity. This would allow Tsyunhehkw[^] to achieve production efficiencies without purchasing additional equipment.

We also proposed forming an indigenous corn grower email list to connect a broad network of stakeholders to discuss the unique production requirements and share knowledge relating to any open pollinated and indigenous-corn variety, regionally and nationally. Lastly, we identified strawberries, raspberries and blueberries as additional crops that are culturally significant and could be profitable for the farm. However, a key barrier to berry production in the region and at Tsyunhehkw[^] is management of the spotted wing drosophila fruit fly, a pest introduced from Asia that has spread rapidly throughout the United States.

This project operated on an extended timeline from 2014 to 2016 with funding support from the North Central IPM Center. In 2016 and 2017, the Center and the IPM Institute began helping other white corn producers identify strategies to improve production and will include these recommendations and case studies in a publication that will be widely available to those interested in producing white corn.

Potato Sustainability Project (www.nationalpotatocouncil.org/events-and-programs/environmental-stewardship/ipm-survey-and-information/) - The potato sustainability project began as an IPM practice-based survey for three of McDonald's major potato processors. This effort expanded to include six processors and is now referred to as the Potato Sustainability Initiative. IPM Institute collaborates on project development and coordination with the six processors, National Potato Council (NPC), Canadian Horticultural Council (CHC) and multiple potato grower representatives.

In 2015, the team finished developing outcome-based metrics to accompany the practice-based survey of the 2015 growing year. These metrics assess grower performance on irrigation and nutrient use efficiency, worker safety, pesticide stewardship, waste and recycling management and energy and greenhouse gas production. In 2015-2016, the team also developed an audit program and trained third-party GAP auditors on it. The first audits were planned for 2016. In

addition to this work, the PSI survey was benchmarked to the Sustainable Agriculture Initiative (SAI) Platform and in 2016 the team plans to pursue the Global Social Compliance Programme (GSCP) equivalence process for third party verification of the program.

Sysco Sustainable Agriculture/IPM Program - The IPM Institute continues to support Sysco's fruit and vegetable producers in adopting IPM and other sustainable practices. The IPM Institute evaluates Sysco suppliers' written Sustainable Agriculture/IPM Programs on an ongoing basis and provides recommendations for improvement. We reviewed and updated the environmental indicator report (EIR) for the 2015 crop year and assisted Sysco in compiling the 2014 EIR results. The 2014 EIR revealed that Sysco's Sustainable Ag/IPM Initiative now includes 1,196,210 acres, a 25% increase from last year, with results from 11,674 growers of agricultural products worldwide.

Suppliers continue to show their interest in and commitment to the program. IPM Institute developed, administered and summarized results of a supplier survey that assessed the influence of the program on products beyond the Sysco brand. The survey achieved a 70% response rate, with results indicating that the impacts of the program continue to reach beyond production for Sysco. Sysco also conducted multiple auditor training sessions across the country with more scheduled for 2016.

Eighth and Ninth International IPM Symposiums (www.ipmcenters.org/ipmsymposium15) - The Eighth International IPM Symposium was held March 23-26, 2015, in Salt Lake City, Utah. More than 470 research, education, government, industry, environmental and health professionals from 28 countries attended three days of presentations, networking and organizational meetings on key IPM issues. Volunteer planning committees developed the meeting format, organized more than 85 plenary sessions and concurrent program schedules, and coordinated field-trips and professional development sessions. The IPM Institute helped orchestrate the first silent auction included in the event which raised an additional \$1,300 to contribute to the Ninth International IPM Symposium planned for 2018. The IPM Institute will continue to assist with organization of the International IPM Symposium, including incorporating a biocontrol component in 2018 through partnership with the Biopesticide Industry Alliance (BPIA) and Meister Media Worldwide, Inc. The IPM Institute will hold the Ninth International IPM Symposium at the Renaissance Baltimore Harborplace Hotel in Baltimore, Maryland. Over 600 people from various pest management fields in the U.S. and around the world are expected to attend. During this Symposium the IPM Institute will also offer interested organizations a new opportunity to sponsor a mini-symposia allowing increased visibility for contributors.

Organic and IPM Working Group (organicipmwg.wordpress.com) - The Organic and IPM working group has grown significantly over the past year, adding 32 new members from all regions of the U.S. The group's continued goal is to synergize the efforts of the organic and IPM communities by building partnerships, fostering dialogue between diverse stakeholders,

exchanging information and knowledge, and identifying and working toward shared priorities. The group was funded by the North Central IPM Center in 2015 and received \$20,000 for 2016 to continue efforts.

One of the group's most significant accomplishments in 2015 was the development and distribution of a publication titled "Organic Agriculture and Integrated Pest Management: Synergistic Partnership Needed to Improve the Sustainability of Agriculture and Food Systems." The report details the challenges we face, opportunities for collaborative pursuit of solutions and recommendations for institutional and policy reforms to accelerate progress. The white paper and press release were published in at least 26 different outlets and viewed over 3,000 times across the world. The authors were invited to present on the publication via webinar to the USDA Organic Working Group, comprised of key decision and policy makers within the agency.

In addition to the white paper, the group completed development of an educational fact sheet titled "Organic Agriculture & Integrated Pest Management (IPM): Working Together for Sustainability". The fact sheet is available for distribution and use by members and is posted on the working group website. In 2015, working group members attended four regional and national IR-4 research priority setting meetings to present on their efforts and provide support for a collaboratively developed list of top research priorities. The group continues to meet monthly via conference call with an average of 13 members per call. In 2016 we plan to write and edit a special issue of the Elsevier journal Biological Control on the connection between IPM and organic farming.

Public Tick IPM Working Group (tickipmwg.wordpress.com) - The Public Tick IPM working group formed in October 2013 to promote the adoption of IPM practices to reduce the incidence of tick-borne disease (TBD). The working group holds monthly conference calls and collaborates to disseminate accurate information, share resources, reduce duplication of effort and increase and accelerate impacts of tick IPM nationwide. Funding through 2016 was provided by the North Central IPM Center (NCIPMC) for the working group to create and maintain stakeholder-identified priorities for research, education and regulation.

The NCIPMC provided 2015 and 2016 renewal funding to the working group to continue project development. The working group assisted Dr. Thomas Mather in securing funding from the North East IPM Center (NEIPMC) to develop the TickSmart Web Portal. The portal is adapted from the TickEncounter Prevention Partner program and will be fully integrated with TickReport to provide interactive displays of aggregated data in the form of maps and tick infection query tools. The working group partnered with the Centers for Disease Control (CDC) and the Entomological Society of America (ESA) to organize the 2016 Integrated Tick Management Symposium: Solving America's Tick-Borne Disease Problem, May 16-17, 2016, in Washington, D.C. The symposium addressed the current state of IPM science for the management of ticks and prevention of TBD, identified knowledge gaps and built the business case for future management and prevention efforts. Following the conference, ESA coordinated an optional visit to Capitol

Hill to educate policymakers. The working group is currently drafting a white paper based on conference presentations.

In 2016, the working group collaborated to develop a Tick Pest Alert. The alert has been shared by the NCIPMC, CDC, Lyme Disease Association, Lyme Disease Organization and with an IPM Manager's listserv. The two-page alert will assist individuals in reducing their exposure to ticks, discuss ways to reduce disease transmission risks and incorporate existing resources for tick identification, removal and disease prevention.

IPM and CCA Working Group - The IPM Institute in collaboration with the American Society of Agronomy (ASA) formed the Certified Crop Advisor (CCA) working group in 2016 with \$10,500 in funding through the North Central IPM Center working group grants program. The primary objective of this project is to provide continuing-education articles for the ASA's Crops & Soils magazine, with the goal of improving IPM knowledge, skills and abilities of certified crop advisors (CCA) working in agronomic crops in the North Central region. The articles will provide information on IPM practices to the magazine's readership of 13,000 CCAs, as well as 3,000 additional members of ASA. These resources are intended to help improve CCA's ability to assist agricultural producers facing new and emerging pest-management challenges in the North Central region.

To date we have completed an introductory article for the project that was published in the May/June edition of Crops & Soils (Attachment). In press for the winter 2016/2017 issues are our recently completed article on the new Worker Protection Standards. We had good engagement from EPA on development of our WPS article. Staff at the EPA acknowledged the WPS requirements for crop consultants, certified or not, are not very well explained and that this article could play a valuable role in communicating these changes to CCAs. The EPA commented there are approximately 32,000 self-employed crop consultants in the United States, of which approximately 13,000 are CCAs. Our remaining three articles will be completed in winter 2017. These additional articles will cover topics such as the role of IPM in plant incorporated protectants in agronomics crops and herbicide-resistance management, as well as the role of pollinator conservation in pest management.

Other Activities

We continue to respond to unsolicited inquiries from the food supply chain, pest management professionals, facilities, retailers, parents, school administrators and media about IPM and pest-related issues. We redesigned and launched a new company website and logo in June 2016 and continue to maintain current content with IPM-related news, job listings and resource links.

In addition IPM Institute:

- Participated on the Stakeholder Committee for the Wisconsin Pollinator Protection Plan, which aims to address concerns about pollinator declines, honey bee health issues and the future of honey and crop production.
- Served on the Certified Crop Advisor Exam and Procedures Committee for the American Society of Agronomy.
- Participated on the Project Advisory Committee for Brown Marmorated Stink Bug (BMSB) Specialty Crops Research Initiative, which focuses on sustainable, long-term management of the invasive pest BMSB via education on environmental risk factors and implementation of widespread biological control.
- Under contract with NRDC, developed a white paper on risks and alternatives to neonicotinoid insecticide uses.
- Served on the board of directors for the Entomological Foundation, which seeks to engage and sustain interest of school-aged children in science and insects. The Foundation seeks to establish an Educational Fund to distribute grants which help fund new programs, projects and services, as well as to expand the reach of the Foundation's programs and services. <http://entfdn.org>

PRESENTATIONS

2016 Presentations

Organic and IPM Working Group. National IPM Coordinating Committee meeting. T. Green.

Ag Retailer Leadership to Improve Economic and Environmental Outcomes. Minnesota Crop Retailers Association Executive Director Bill Bond. Minneapolis, MN. T. Green.

Ag Retailer Leadership to Improve Economic and Environmental Outcomes. Minnesota Crop Production Retailers Board. Maple Grove, MN. T. Green.

Boost Yields and Cut Nitrogen Costs with Adapt-N. Great Lakes Basin ag retailers and independent crop consultants via Webinar. T. Green and J. Carlson.

Managing Cover Crops for Water Quality and Cash Crop Success. Great Lakes Basin ag retailers and independent crop consultants via Webinar. T. Green and K. Koralesky.

Manure: Managing This Valuable Asset with Best Practices and Policy for Water Quality in Mind. Great Lakes Basin ag retailers and independent crop consultants via Webinar. T. Green and G. Wint.

Market Outlook for Sustainable Ag and Advanced IPM. TruEarth Annual Growers Meeting, Winona, MN. P.Werts.

2015 TruEarth Pesticide Risk Analysis, Pollinator Observation and IPM/Sustainability Practice Adoption. TruEarth Annual Growers Meeting, Winona, MN. T. Green.

Potato Sustainability Initiative: A Unique Collaboration. Pepsico, Washington, DC. T. Green.

IPM Elements. United Soybean Board, Chesterfield, MO. T. Green.

IPM Plans: Sustaining Profitable IPM Programs in Schools. US EPA, National Webinar Series. T. Green.

Stop School Pests or the Why and How for IPM in Schools: Join Us! National Education Association, State Education Coordinators Annual Meeting, Washington, DC. T. Green.

IPM Elements: Defining IPM on a Crop and Region-Specific Basis. USDA National Institute for Food and Agriculture. Washington, DC. T. Green.

Responsibly Grown Stakeholder Summit: Worker Welfare. Watsonville, CA. R. Foster, M. Rogers, A. Larson.

The global marketplace is driving and documenting sustainable improvements in health and environmental outcomes through IPM and other best practices: Entomologists have opportunities to participate! International Congress of Entomology, Orlando, FL. T. Green.

(1) Symposium Goals; (2) Business Case for Greater Investment in Tick IPM. Integrated Tick Management Symposium, Washington DC. T. Green.

Developing a Practical, Credible and Reportable IPM Program for General Mills Major Crops. General Mills leadership team, Minneapolis, MN. T. Green.

Pesticide Risk Tool demonstration with Christof Walter via Webinar. P. Shannon-Hughes, T. Green and M. White.

Responsibly Grown: Meeting Criteria and Earning Ratings. Whole Foods Regional Supplier Trainings, Austin, Boulder, Charlotte; Emeryville, CA; Pompano Beach, FL; Los Angeles; Munster, IN; Rockville, MD; Seattle; Southington, CT; Vancouver. T. Green.

Responsibly Grown Supplier Update. Whole Foods Produce and Floral Supplier Summit, Asilomar, CA. T. Green.

2015 Presentations

Advanced IPM in Midwest Apple Orchards. Poster, Entomological Society of America Annual Meeting, Minneapolis, MN. T. Green and P. Werts.

The Pesticide Risk Mitigation Engine (ipmprime.com): A user-friendly online tool for field specific risk assessment and mitigation. Poster, Entomological Society of America Annual Meeting, Minneapolis, MN. T. Green.

Reducing Pest Problems and Pesticide Risks in Schools: Yes We Can! University of Washington, Seattle, WA. T. Green.

IPM Funding Update from IPM Voice. National IPM Coordinating Committee, Washington DC. T. Green.

The Business Case for IPM in Schools or How IPM Can Make Money for Your School District. School IPM Coalition Meeting, Federal Way, WA. T. Green.

IPM in Schools. EPA Shields via Webinar. T. Green.

Sustainability in the Supply Chain: What Food Buyers Need and Why. American Spice Trade Association, Charleston, SC. T. Green.

IPM Performance in Agriculture, Schools, Pest Management Service Companies, Hospitals and other Facilities. Texas IPM Association for Public Schools. Spring, TX. T. Green.

Looking Under the Hood: IPM Performance at Pest Management Service Companies, Schools, Hospitals and other Facilities. Eighth International IPM Symposium, Salt Lake City, UT. T. Green.

Stop School Pests: Standardized National School IPM Training. Poster, Eighth International IPM Symposium, Salt Lake City, UT. T. Green.

IPM in the Whole Foods Market Responsibly Grown Rating System. Poster, Eighth International IPM Symposium, Salt Lake City, UT. T. Green and E. Ciesielski.

Sysco Sustainable/IPM Initiative. Poster, Eighth International IPM Symposium, Salt Lake City, UT. T. Green.

Public Tick IPM Working Group. Poster, Eighth International IPM Symposium, Salt Lake City, UT. T. Green.

NRCS & IPM Working Group: Grower Incentives for IPM. Poster, Eighth International IPM Symposium, Salt Lake City, UT. T. Green.

IPM Voice Advocates for Progressive IPM. Poster, Eighth International IPM Symposium, Salt Lake City, UT. T. Green and C. Nelson.

Advancing IPM for Midwest Apple Production using the Pesticide Risk Mitigation Engine. Poster, Eighth International IPM Symposium, Salt Lake City, UT. T. Green and P. Werts.

(1) IPM in Corporate Sustainability Initiatives: What do Sysco, McDonald's, Whole Foods Market and Walmart have to do with IPM? (2) IPM in US schools: Reducing risks from pests and pesticides and increasing awareness and appreciation for IPM among consumers and taxpayers. (3) Pesticide Risk Mitigation Engine: A User-Friendly Online Tool for Pesticide Risk Assessment and Mitigation. Poster, PURE IPM, Poznan, Poland. T. Green.

Building Profitability and Protecting Water Quality through Gypsum. Great Lakes Basin ag retailers and independent crop consultants via Webinar. T. Green and J. Carlson.

Ag Retailer Leadership to Improve Environmental and Economic Outcomes in the Great Lakes Basin. Rock River TMDL October Quarterly Forum, Jefferson, WI. J. Carlson.

Ag Retailer Leadership to Improve Economic and Environmental Outcomes. Presentation and meeting with Chris Henney, President of the Ohio Agribusiness Association. Columbus, OH. J. Carlson.

Ag Retailer Leadership to Improve Economic and Environmental Outcomes. Presentation and meeting with Ag Retailers Association, The Fertilizer Institute and the International Plant Nutrition Institute. Washington, D.C. J. Carlson.

Increasing Cover Crop Sales for Ag Retailers: Opportunities for Revenue, Soil Health and Water Quality. Great Lakes Basin ag retailers and independent crop consultants via Webinar. T. Green and J. Carlson.

Growing Soil Testing, Variable Rate Application and Other Service Opportunities for Ag Retailers. Great Lakes Basin ag retailers and independent crop consultants via Webinar. T. Green and J. Carlson.

Partnership for Ag Resource Management Biannual Advisory Board Meeting. Advisory Board via Webinar. T. Green, J. Carlson and M. Adelsperger.

Responsibly Grown Stakeholder Meeting: Pesticides, Worker Welfare, Organics and Program Communication. Capitola, CA. T. Green, M. Rogers, E. Lamacchia.

Organic Agriculture and Integrated Pest Management: Synergistic Partnership Needed to Improve the Sustainability of Agriculture and Food Systems. USDA Organic Working Group via Webinar. B. Baker, S. Futrell, G. Gershuny and T. Green.

2014 TruEarth Risk Analysis, Pollinator Observation and IPM Practice Adoption. Wescott Growers Meeting. Winona, MN. P. Werts and T. Green.

PUBLICATIONS

2016 Publications

(Non-Refereed)

Campbell, V., Green, T., Shannon-Hughes, P. 2016. Working together to make potato farming more sustainable. *Canadian Horticultural Council Fresh Thinking* issue 8, Fall 2016.
<http://www.hortcouncil.ca/wp-content/uploads/2016/01/CHC-Fresh-Thinking-Fall-16-Final.pdf>

Kaner, N., P. Shannon-Hughes, L. Turner and T. A. Green. 2016. *Evaluating IPM Adoption and Pesticide Use and Risk in the General Mills Supply Chain*. 33 pp.

Green, T. 2016. Neonicotinoid Insecticide Uses, Risks and Alternatives. Paper submitted to NRDC. 52 pp.

Green, T., J. Carlson and M. Adelsperger, ed. *Partnership for Ag Resource Management Update*. Quarterly electronic newsletter. Circulation 4686. Since 2015.
<http://partnershipfarm.org/newsletters/>

Green, T. and M. Neff, ed. *IPM Voice*. Monthly electronic newsletter, circulation 3355. Since 2010. <http://www.ipmvoice.org/newsletter.htm>

Green, T., A. Freund and M. Neff, ed. *School IPM 2020*. Monthly electronic newsletter. Circulation 8500. 2016. <https://ipminstitute.org/projects/school-ipm-2020/newsletters/>

2015 Publications

(Non-Refereed)

Green, T. and M. Neff. 2015. Reducing pest complaints and costs in your facilities. *Facility Management Journal*. 40-43.

Baker, B.P., T. Green, D. Cooley, S. Futrell, L. Garling, G. Gershuny, J. Moyer, E.G. Rajotte, A.J. Seaman, and S.L. Young, 2015. *Organic Agriculture and Integrated Pest Management A Synergistic Partnership to Improve Sustainable Agriculture and Food Systems*. 40 pp.

Nelson, C., Shannon-Hughes, P. and Green, T. 2015. The Potato Sustainability Initiative: Promoting, tracking, and reporting progress. *Crops and Soils* 48(2): 28-29.

Matteson, P., Werts, P. and Nelson, C. 2015. Sustainability and Organic certification programs offer opportunities to growers and their consultants. *Crops and Soils* issue 48(1): 32-34.

Green, T. and M. Neff, ed. *IPM Voice*. Monthly electronic newsletter, circulation 3355. Since 2010. <http://www.ipmvoice.org/newsletter.htm>

Green, T. and M. Neff, ed. *School IPM 2015*. Monthly electronic newsletter. Circulation 8500. 2009-2015.
<https://ipminstitute.org/projects/school-ipm-2020/newsletters/>

Green. T., J. Carlson and M. Adelsperger, ed. *Partnership for Ag Resource Management Update*. Quarterly electronic newsletter. Circulation 4686. 2015. <http://partnershipfarm.org/newsletters/>

FUNDING OBTAINED

2016 Funding

2016 Grants: \$515,387

US EPA, \$408,150 to accelerate adoption of variable rate technology.

North Central IPM Center, \$20,000 renewal funding to strengthen the alliance between organic and IPM.

North Central IPM Center, \$20,000 renewal funding for the public tick IPM working group.

North Central IPM Center, \$20,000 for comprehensive IPM training for North Central region school districts.

North Central IPM Center, \$10,500 to improve the IPM capacity of certified crop advisors working group.

North Central IPM Center, \$4,639 for the Oneida white corn improvement project.

North Central IPM Center, \$8,098 renewal funding for the Oneida white corn improvement project.

Entomological Society of America, \$24,000 for the 2016 Tick IPM Symposium.

2016 Contracts: \$957,213

Whole Foods Market, \$454,000 to continue management of the Responsibly Grown Rating System for its international produce supply chain.

Whole Foods Market, \$150,000 to develop pesticiderisk.org capabilities for the Responsibly Grown Rating System for its international produce supply chain.

Red Tomato, \$19,505 for the Northeast Eco Apple Project.

General Mills, \$21,000 to draft a white paper on the state of IPM for row crops.

California Cut Flower Commission, \$10,000 to adapt pesticiderisk.org to pesticides applied on cut flowers in California.

NRDC, \$10,000 to develop white paper on NRDC food company action to reduce pesticide risk.

Sysco Corporation, \$17,000 twelfth-year renewal for management of the Sysco Sustainable Ag/IPM initiative.

Basic American, Cavendish, Lamb Weston, McCain's, Simplot, Heinz, \$139,158 sixth-year renewal of management of the Potato Sustainability Initiative.

Apple IPM Programs, \$53,000 in contracts with Wisconsin and Minnesota apple orchards for pest scouting services.

Wescott Orchard & Agri-Products, \$41,910 for the TruEarth certification program.

Green Shield Certified Program, \$32,000 in contracts with certification participants in structural pest management industry and facility management.

Agflex, Inc., \$1,000 contract for bookkeeping and grants management services provided by Kelly Adams and for the corn producer guarantee project.

University of Illinois-Champaign, \$7,640 for coordination of Ninth International IPM Symposium.

Bayview Foundation, \$1,000 to implement IPM program for Bayview housing facility.

2015 Funding

2015 Grants: \$550,537

National Fish and Wildlife Foundation, \$233,974 to increase and improve nutrient management planning in the Western Lake Erie Basin.

US EPA, \$250,000 to develop a sustainable IPM certification program for professionals working in school districts, in collaboration with the University of Arizona, Texas A&M University, Oregon State University, Washington State University and Indiana University.

North Central IPM Center, \$30,000 renewal funding to increase collaboration among NRCS and IPM professionals in the North Central region, in collaboration with Michigan State University.

North Central IPM Center, \$12,275 to convene a public/private tick IPM working group.

North Central IPM Center, \$15,458 to build an alliance between organic and IPM.

North Central IPM Center, \$8,830 for Tsyunhehkw^ farm development support.

2015 Contracts: \$1,202,947

Great Lakes Protection Fund, \$728,781 to expand ag retailer roles in resource management.

Whole Foods Market, \$150,000 to develop pesticiderisk.org capabilities for the Responsibly Grown Rating System for its international produce supply chain.

Red Tomato, \$17,609 for the Northeast Eco Apple Project.

Sysco Corporation, \$12,000 eleventh-year renewal for management of the Sysco Sustainable Ag/IPM initiative.

Basic American, Cavendish, Lamb Weston, McCain's, Simplot, Heinz, \$140,004 fifth-year renewal of management of the Potato Sustainability Initiative.

Apple IPM Programs, \$48,000 in contracts with Wisconsin and Minnesota apple orchards for pest scouting services.

Wescott Orchard & Agri-Products, \$26,795 for the TruEarth certification program.

Green Shield Certified Program, \$40,000 in contracts with certification participants in structural pest management industry and facility management.

Texas A&M University, \$23,375 to quantify the financial cost and benefits of school IPM.

American Farmland Trust, \$4,875 to pilot sustainable agricultural leases with women non-operator landowners.

Agflex, Inc., \$1,000 bookkeeping and grants management services provided by Kelly Adams for the corn producer guarantee project.

University of Illinois-Champaign, \$10,508 for coordination of Eighth International IPM Symposium.

Non Funded Proposals Submitted

2016 Unsuccessful Proposals: \$0

2015 Unsuccessful Proposals: \$731,271

USDA NRCS CIG FY 2015 (\$441,271) submitted by IPM Institute for "Ag Retailers Focused on Improving Soil Health and Water Quality Using Science-Based Tools and Technology"

US EPA (\$250,000) submitted by IPM Institute for "Increasing IPM Adoption in US Schools by Activating Educational Networks to Apply Existing Resources to Educate, Motivate and Train Network Members"

North Central IPM Center (\$20,000), submitted by IPM Institute for renewal funding to “Increase adoption of IPM in schools in the North Central region.”

North Central IPM Center (\$20,000), submitted by IPM Institute for renewal funding to “Increase collaboration among NRCS and IPM professionals in the North Central region.”

2017 Objectives

IPM Institute General

1. Achieve \$40K net contribution to reserves.

Sustainable Food Group

2. Expand work with national food companies by identifying additional partners and securing work to develop supply chain sustainability programs to meet their needs and address challenges facing agriculture.
3. Develop and implement improvements to WFM’s Responsibly Grown program to maintain it as a state-of-the-art, science-based program by expanding recognition and incentives for suppliers using good labor practices, as well as sustainability practices used by indoor production operations like greenhouses.
4. Develop seven sets of IPM Elements, including crop and region-specific check-lists of extension-recommended IPM practices for growers, and four grower IPM surveys to measure the implementation of IPM practices over the course of the iPiPE project.

Partnership for Ag Resource Management

5. Expand PARM annual ag retailer beneficial product and service survey from 50 ag retailer respondents to 120 across the basin through new email marketing campaigns using Infusionsoft as well as providing customized reports and benchmarking.
6. Assemble steering committee of ag retailers from target watersheds in the Great Lakes Basin to advocate for the PARM project, inform project direction, and provide critique on tools, resources and marketing strategy.
7. Continue to grow PARM project’s presence and credibility in the Great Lakes Basin through additional educational webinars, tools and resources distributed, communications and email campaigns with 5000+ member contact list and cost-share programs to improve water quality and soil health.
8. Contribute to successful implementation of the Great Lakes Protection Fund grant with partners led by American Farmland Trust to improve cropland sustainability in the Great Lakes Basin targeting women non-operator landowners and their ag leases and relationships with their tenant growers.
9. Complete strategic planning process finalizing vision, mission, goals and strategies for PARM project. Pending successful implementation/measurable P loss reductions,

expand strategy to include sediment, pesticide, and nitrogen impairments in the Great Lakes Basin.

Pesticide Risk Tool

10. Pursue sustainable funding for Pesticide Risk Tool through increased user subscriptions and donations, including working with existing partners to meet their requirements for the use of the Pesticide Risk Tool.
11. Continue to improve the accessibility of the Pesticide Risk Tool by developing a new summary output, redesigning the site to make the interface mobile friendly and implementing utilities to allow easy data transfer from sites such as Agrian.
12. Develop the Pesticide Risk Tool so that it can be used internationally by creating an interface that allows the tool to run by active ingredient.

Green Shield Certified & IPM STAR

13. Continue to recruit and re-certify Green Shield Certified program participants. Facilitate program growth through improvement of public-facing resources including website, structural IPM resources and marketing materials. Pursue new contracts for certification of commercial and public buildings.
14. Work with extension school IPM partners to re-certify existing IPM STAR participants and recruit new schools to the program.

IPM Voice

15. Work with IPM Voice stakeholders to overcome low levels of science literacy, increase awareness of IPM approaches and benefits, and improve adoption of and public support for IPM by pursuing opportunities to broaden outreach, including an educational campaign targeting the general public.

North Central School IPM Working Group

16. Finalize and promote Stop School Pests Training package through online and in-person versions. Identify tools and resources needed to provide the training online to a broader audience with an automatic exam and certificate for participants.

Northeast EcoApple

17. Facilitate certification and protocol development for Red Tomato and TruEarth eco-label programs; identify opportunities to overcome production challenges in advanced IPM for tree fruit, including brown marmorated stink bug and loss of carbaryl for chemical-fruit thinning.

Upper Midwest Specialty Crop Grower Services

18. Expand the IPM Institute's specialty crop program, including implementation of scouting, calibration and food-safety planning services to meet the needs of participants in Illinois, Iowa, Minnesota and Wisconsin.

Potato Sustainability Initiative

19. Continue development of the Potato Sustainability Initiative, including verification of potato grower survey responses and introduction of sustainability metrics. Increase outreach to customers and growers to expand the program, including potato markets other than processing. Pursue third-party verification of the initiative through the Global Social Compliance Programme equivalence process.

Ninth International IPM Symposium

20. Work with IPM Symposium coordinator and 2018 Steering committee to organize new planning committees for the Ninth International IPM Symposium and coordinate involvement with Biopesticide Industry Alliance and Meister Media.

Organic & IPM Working Group

21. Work collaboratively with Organic and IPM working group members to develop and publish a special issue of the journal Biological Control focused on the connection between biologically based systems, IPM and organic farming.

Public Tick IPM Working Group

22. Work with EPA and CDC to complete post-conference white paper from the 2016 Integrated Tick Management Symposium.
23. Work with the Public Tick IPM Working Group to distribute and promote the use of TickSmart and the Tick Pest Alert – two resources that will assist individuals in reducing their exposure to ticks, as well as promote ways to reduce disease transmission.

Appendix A. Staff

Staff

Kelly Adams: May 2008; Financial and grant administration, employee services management, former School IPM Project Coordinator. Kelly has a communications/research background as an Art History major from the University of Wisconsin-Madison. She also attended certificate classes at the Nelson Institute of Environmental Studies, which fueled an interest in sustainable agriculture and environmental health issues, particularly school and community-based projects.

Mark Adelsperger: July 2011; Resource Management Specialist, Great Lakes Protection Fund Project. Mark has a degree in Business Administration from Tiffin University in Tiffin, Ohio and a background in agriculture, sales and customer service. Mark's immersion in agriculture and enjoyment of the rural lifestyle reinforces his viewpoint that farming is an ever evolving way of life.

Thomas Bernard: May 2014; Project Team Member: IPM and Conservation Programs. Thomas received his B.S. in Environmental Studies with a directed study in sustainable horticulture from Northland College in Ashland, Wisconsin. After graduation he guided sea kayakers on Lake Superior, built mountain bike trails in the Chequamegon region, and found his way to a well-known orchard in Bayfield, WI. While serving on the orchard's management team for two seasons, he developed a keen interest in the complexity of tree fruit production and found a source of understanding through the application of IPM technology. He and his partner Anna currently reside in the backwaters of Trempealeau County.

Alisha Bower: October 2014-November 2015; Project Team Member: IPM Voice and School IPM. Alisha received her B.A. in Political Science and Spanish with a minor in Sustainability from the University of Minnesota. She grew up on a hobby farm in Wisconsin's beautiful Driftless Area and environmentally responsible agriculture has been her passion ever since. Working with several non-profits in sustainable agriculture education led her to continue her own studies around effective non-profit management and food systems policy while working on IPM policy and education communications with the IPM Institute. She is currently pursuing her Masters of International Public Affairs at the La Follette School of Public Affairs at UW Madison.

Jill Carlson, M.S.: November 2014-June 2016; Project Coordinator, Great Lakes Basin Projects. Jill grew up in Southeastern Ohio and received a B.S. in Chemistry from Ohio University in addition to studying Spanish and Environmental Studies. Initially interested in renewable energy systems, but not completely fulfilled in the chemistry lab, Jill moved to Michigan to pursue an interdisciplinary master's degree in Natural Resources and the Environment. While at the University of Michigan, Jill worked on an urban farm, completed the

Appendix A. Staff

City of Detroit's first greenhouse gas inventory with a team of fellow graduate students, and studied sustainable food, land, and energy systems. In all work, Jill hopes to create more ecologically-sound and just agricultural systems and is very excited to work on the Great Lakes Basin projects promoting nutrient management to protect the region's precious soil and water resources. Outside of work Jill loves cooking, watercolor painting, and soccer.

Emily Ciesielski: July 2013-October 2016; Assurance Coordinator, Supply Chain Sustainability. Emily received her B.A. in Anthropology/Sociology and Spanish from Kalamazoo College. Her interest in sustainable food systems grew out of a passion for cooking. She pursued her interest in college where she worked at an educational organic garden and conducted outreach work with the migrant farm worker community in Southwest Michigan. Her interest in sustainable agriculture led her to the IPM Institute where she currently coordinates verification programs for three projects, including a sustainability rating system for a national food retailer.

Astrid De la Cruz: August 2016; Project Team Member: Supply Chain Sustainability. Astrid received her B.S. in Conservation Biology and Environmental Studies at the University of Wisconsin-Madison. Her past experiences in landscape ecology research have taught her that separate components of biological systems are deeply interconnected, something that she has realized also applies to agriculture and the food system. She believes that changing the way consumers view and interact with food can significantly impact how other sectors of the food system operate. Her other interests include cooking, gardening, painting, yoga and brewing kombucha.

Alina Eva Freund: July 2016; Project Manager: Community IPM. Alina is responsible for the strategic direction of a suite of projects that improve health and environment in our communities and make schools healthier places for children. She also oversees certification programs for Green Shield Certified and IPM Star for schools. Before following her Midwestern husband to the U.S., Alina worked for international organizations that focus on sustainability in global food and wood products supply chains, and managed projects on market research.

William Hamel: September 2016; Audit Team Member: Supply Chain Sustainability. Will received a B.A. in English and Environmental Policy & Decision Making at the University of Puget Sound in Tacoma, WA. His interest in sustainable agriculture and its cultural contexts stem from studying environmental literature and history. After graduation he worked on a coastal island farm in Maine as part of an organic gardening apprenticeship. At the IPM Institute, Will assists in the verification of a sustainable rating system project for a national retailer. Outside of work, he enjoys biking, cooking, jazz, and creative writing.

Luke Hingtgen: October 2016; Project Coordinator: Luke has an M.A. in Rhetoric and Discourse and a B.A. in Music and Philosophy. He spent many years training and working as an organic farmer in New York state and here in Wisconsin. He joined IPM Institute with a desire to

Appendix A. Staff

put to good use his creative and analytic skills developed in school and the breadth of knowledge he acquired becoming a farmer.

Catherine Harris: October 2013-July 2015; Administrative Assistant, Catherine graduate of the University of Wisconsin Madison with majors in Community and Environmental Sociology and Music Performance, and a certificate in the Nelson Institute's Environmental Studies program. She has a diverse collection of background experiences in arts administration, social entrepreneurship, education and research, all contributing to her enthusiasm for working with nonprofit organizations.

Caitlin Henning, M.S.: June 2016 – November 2016; Project Manager: Partnership for Ag Resource Management. Caitlin focuses on PARM's program development and strategic direction. She holds a BA in English and Environmental Policy & Culture from Northwestern University. After several years working in Corporate Social Responsibility consulting and nonprofit program administration, Caitlin earned her master's in Agroecology at UW-Madison. Her graduate work focused on ag supply chain networks and retail marketing strategies whose benefits extend up the supply chain to growers and processors.

Ariel Larson, M.S.: November 2013; Project Coordinator: Supply Chain Sustainability. Ariel received her M.S. in Conservation Biology and Sustainable Development from the University of Wisconsin-Madison in December 2013, with a certificate in Business, Environment, and Social Responsibility. Her research background includes weed management in the establishment of switchgrass. Her interest in sustainable food production and socially responsible business led to her work at IPM Institute, where she will be working to implement a sustainability rating system for a national food retailer and their suppliers.

Frank Laufenberg: September 2016; Project Team Member: Supply Chain Sustainability, Public Tick Working Group. Frank received his B.S. in Environmental Sciences as well as Community and Environmental Sociology from UW-Madison. In short, Frank enjoys anything that involves ecology and humans. Working as Urban Ag Director for a student organization Frank realized the power that sustainable agriculture and food has to connect physical and social science. He further pursued the research side of organic agriculture as a field assistant in Dr. Erin Silva's lab. Outside of work Frank is an avid musician and gardener.

Justin Leatherwood: March 2015; Web Developer: Partnership for Ag Resource Management and IPM PRiME. Justin received his B.A. in Psychology and Computer Science from Kalamazoo College. He joined the IPM Institute to explore ways that technology can be implemented to benefit environmental initiatives. In his free time, you might find him at the grocery store, eating excessive amounts of hot peppers, brewing beer, playing mandolin or sleeping up in a tree (in his hammock).

Appendix A. Staff

Ali Loker: October 2016; Project Coordinator: Supply Chain Sustainability. Ali received her B.S. in Community and Environmental Sociology and a certificate in Global Health. Her interest in sustainable agriculture began after an internship on an organic vegetable farm during college. Since then, she has continued to work in food systems with an emphasis on social justice and community engagement. Outside of work, Ali enjoys trail running, experimenting with fermentation and trivia.

Natalie Kaner: June 2015- June 2016; Project Coordinator: Supply Chain Sustainability. Natalie received her B.A. in Biological Aspects of Conservation and Environmental Studies from the University of Wisconsin-Madison. She has worked in ecology and entomology research labs, interned on organic farms and conducted social science research at the Wisconsin DNR. In her free time, you can find Natalie attending and hosting potlucks, biking around town, doing yoga, or making homemade soap.

Krysta Koralesky: February 2015-August 2016; Project Team Member: Partnership for Ag Resource Management. Krysta grew up in La Crosse, Wisconsin and has always had an interest in nature and farming. She received her B.S. from the University of Wisconsin-Madison in Biological Aspects of Conservation and a certificate in Environmental Studies. Krysta has experience working in water resources, research labs and environmental education. She also has experience volunteering on organic farms in the Midwest. She is currently working on her M.S. degree in Environmental Conservation in the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison. Outside of work, Krysta enjoys cooking, gardening, camping and yoga.

Jessica Monnin: April 2016; Administrative Assistant: Jess is a recent graduate from Edgewood College, with a Bachelor's in Business Management and a certificate from the Sustainability Leadership Program. Jess has a passion for sustainable living, local farms and the environment. When she is not at work, you may find her in her hammock reading, walking around the lake, or traveling back to her home country in France.

Matthew Neff: May 2014; Project Coordinator, Green Shield Certified and IPM STAR. Matthew received his B.A. in English Literature from Arizona State University. His background is in writing and rhetoric. Diverse professional experiences led him to the world of animal rescue, which fueled his belief in the power and necessity of organized nonprofit endeavor, particularly in areas of sustainability and ecological management.

Chloe Nelson: September 2014-July 2016; Project Team Member, NRCS and IPM Working Group, Public/Private Tick IPM Working Group and IPM Symposium. Chloe received her B.A. in Geological Sciences from Carleton College in June 2014. She has a research background in structural geology, geochemistry and hydrology. Working as a cave tour guide, studying

Appendix A. Staff

permaculture abroad and assisting in research labs have furthered her interests in environmental conservation and led her to the IPM Institute. Her interests include hiking, rock climbing and coaching volleyball.

Erika Nickels: August 2015; Project Team Coordinator: Supply Chain Sustainability. Erika received her B.S. in Sociology and Environmental Studies from the University of Wisconsin-Madison. Growing up her parents owned a local restaurant which is where she developed an interest in sustainable food systems. In her free time, you can find Erika hiking, camping or eating sweet potatoes.

Matthew Doyle Olson, M.A.: August 2012-October 2016; Project Manager, Supply Chain Sustainability. Matthew coordinates the development and operation of a sustainability rating system for a national food retail partner, their suppliers and our project team. Before joining the IPM Institute, his interest in food led Matthew to professional experiences milking cows, flipping burgers, administering grants, assisting bakers and analyzing financials. He studied Cognitive and Neuroscience Studies in Minnesota and Human Ecology in Maine, culminating in a thesis on the intersection of food, business and community development.

Jane Petzoldt: July 2013 – January 2015; Project Coordinator, Public/Private Tick IPM Working Group, Organic-IPM Working Group, BMP CHALLENGE®, and Great Lakes Resource Management Initiatives. Jane received her B.A. in Biology and Environmental Studies from Wesleyan University. She has a research background in horticulture and entomology. Her interests include science outreach, environmental remediation, camping, and learning new crafts.

Patrick Shannon-Hughes: March 2014; Project Coordinator, ipmprime.com. Patrick received his BS in Environmental Sciences, with a focus on sustainable food systems from the University of East Anglia (UK). After graduation Patrick followed his interest in sustainable agriculture by working on organic farms in Argentina and Chile. He then worked in London promoting recycling in low income areas, before moving to Madison with his wife, Breana. Outside of work Patrick's interests include cooking, swimming, geography and football (soccer). **Daniel Skolnik:** December 2013; Senior Software Engineer. Daniel received a B.S. in Engineering and a Master's degree in Information Technology, both from the University of Wisconsin. Daniel has software development experience working in industry including work at a sub-contractor for NASA and working on vision software for manufacturing and quality control applications. His present focus is primarily on the software that runs the Pesticide Risk Mitigation Engine (PRIME). His interests include biking, cooking, golf and skiing.

Daniel Skolnik: December 2013; Senior Software Engineer, ipmprime.com. Daniel received a B.S. in Engineering and a Master's degree in Information Technology, both from the University of Wisconsin. Daniel has software development experience working in industry including work at a sub-contractor for NASA and working on vision software for manufacturing and quality

Appendix A. Staff

control applications. His present focus is primarily on the software that runs the Pesticide Risk Mitigation Engine (PRIME). His interests include biking, cooking, golf and skiing.

Mariel Snyder, M.S.: March 2013- March 2015; Project Assistant, School IPM and Entomological Foundation. After earning her B.S. in Agricultural Communication from the University of Illinois, Mariel spent time interning for various environmental organizations, working on an organic farm, and gaining experience as an administrative assistant. Her love for the outdoors and recreation led her to pursue a Masters degree in Parks and Recreation from Western Illinois University. Mariel's passion for environmental conservation and community development make The IPM Institute a perfect fit. Her interests also include spending time with her dog Ottis and reading.

Christian Steponitis: July 2016; Project Team Member: IPM Symposium, Supply Chain Sustainability. Christian received his B.S. in Agronomy from the University of Wisconsin-Madison and has spent time working in both the field and the lab for University funded research. In doing so he has learned that there is a lot more to farming than just planting and harvesting. His other interests include writing music, gardening and skateboarding around campus.

Terri Theisen: July 2016; M.S., Inspections Coordinator: Supply Chain Sustainability. Terri studied at UW-Madison, obtaining a B.S in Horticulture with a certificate in Environmental Studies May 2014 and M.S. in Horticulture with an emphasis in organic and sustainable agriculture May 2016. Her research background includes phenotyping a large collection of open pollinated carrots in organic systems and exploring storage methods' effects on flavor differences in carrots. In her free time, she can be found wandering her farm and vineyard with her husband, dogs, and chickens, enjoying all things food (growing, preparing, eating, and preserving) and exploring the many facets of homesteading

Peter Werts: May 2009; Project Coordinator, Apple IPM Program, NRCS-IPM Working Group: Growers' Incentives for IPM, Red Tomato Eco Apple Project and NRCS TSP services. Peter has a B.S. in Environmental Studies from Northland College in Ashland Wisconsin. Before coming to the IPM Institute he worked as one of the regional interns with the Wisconsin Eco-Apple project in the Bayfield region. His interest in IPM has been a natural progression building upon his knowledge and skills from his days working on the fruit farms in Bayfield Wisconsin while in college.

Marlena White, MSPH: October 2016; Project Development Manager. Marlena earned a Master of Science in Public Health from the Johns Hopkins Bloomberg School of Public Health focusing on the intersection of public health, the environment, and agriculture policy. She served as a member of the World Wildlife Fund's agriculture team in Washington, DC for four years, where she researched the environmental and social risks imbedded in global agricultural supply chains and supported environmental sustainability efforts in the U.S. dairy sector. As Project

Appendix A. Staff

Development Manager for the IPM Institute, she is now dedicated to developing new opportunities to expand the organization's impacts in environmental sustainability, human health, and community wellbeing.

Gayle Wint: August 2016; Outreach Manager: Partnership for Ag Resource Management. Gayle has diversified agriculture experience having grown up showing livestock and taking part in FFA and 4-H leadership opportunities which fueled her continued interest in the field. She received her B.S. from Purdue University in Animal Sciences, Animal Agribusiness and took part in various study abroad classes along with multiple agriculture internships. Following graduation, she worked in the commercial lending sector as a credit analyst before relocating to Wisconsin. Outside of work, Gayle enjoys horseback riding, watching movies, and exploring local fairs and festivals.

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[PAGE 18]

33 A SIMPLISTIC SUSTAINABILITY TRUTH

64 PROACTIVELY IMPROVING INDOOR AIR QUALITY



Reducing Pest & COSTS IN

BY THOMAS A. GREEN AND
MATTHEW NEFF

By definition, a pest is a creature we want out of our lives, so it's no wonder pest management is a subject most prefer to avoid.

However, “thinking pest” during design, construction and operation of facilities can return big dividends. These include sharp reductions in pesticide use, pest complaints, costs and health and environmental impacts, and a new success story for sustainability efforts. Facility managers can achieve these benefits inside and outside of facilities by shifting from treating symptoms to addressing underlying conditions that lead to pest problems.



A large cockroach is positioned to the left of the title, and a line of ants is positioned to the right, both framing the title text.

Complaints YOUR FACILITIES

Benefits of IPM

Integrated pest management (IPM) has been shown to reduce pest complaints by 30-89 percent and pesticide applications by 93 percent in multiple studies including in office buildings¹ and schools.² This common-sense approach is the foundation of green pest control. IPM is effective because it focuses on resolving why the pest is present, rather than applying pesticides routinely as a Band-Aid over fixable problems.

Fewer pest complaints and pesticide applications translates into reduced staff absences and improved productivity. Exposure to mice, cockroaches, dust mites and some aerosol pesticide products can aggravate asthma symptoms and trigger asthma attacks. Flies, ants, cockroaches and rodents can visit environments contaminated with pathogens, including listeria, before they arrive on food or food preparation surfaces, inviting foodborne illness. Some staff may also feel uncomfortable with pesticides and

ask for time off after an application has been made. No one wants to work in an environment where distracting pest sightings are a common occurrence.

Excluding pests by tightening up building envelopes is a key IPM strategy that also can reduce heating and cooling costs. Properly installed door sweeps on exterior doors seal the gap between the bottom of the door and the sill, keeping pests and dirt out and improving fire safety by restricting air flow. In one study, door sweeps on school buildings in Florida reduced pest complaints by 65 percent.

Each time a pest complaint is prevented, time and money are saved by avoiding the costs associated with the distraction, reporting and logging the complaint, arranging for pest control services, and accompanying the provider to investigate and resolve the complaint. Avoiding health department action due to unmanaged pest problems is priceless to an organization's brand image.

How?

The first step is a change in mindset. Pest control is not something that can simply be delegated to a pest control service provider. Everyone in the facility has a role to play in preventing pest problems. This doesn't mean more work; it means adjusting behaviors to deny pests food, water and shelter.

To integrate green pest control into existing infrastructure, think about green pest management as another element of the overall sustainability program. Incorporate the following into green program policies and training:

- Promptly report any pest or pest-friendly conditions
- Promptly resolve food and drink spills
- Store any food items in pest-proof containers
- Avoid clutter by not storing items on floors or in corners
- Keep exterior doors closed
- Maintain 6-inch cleaning and inspection aisles around equipment and furnishings
- Avoid bringing in/using any pesticides

Persuade staff to cooperate by explaining the risks and benefits, just as you would for water or energy conservation. To maximize efficiency, add these elements to existing staff training programs, and include pest reporting in the existing maintenance request system. However, several roles will need more specific policies and training.

Food service staff should be aware that accumulated organic matter in floor drains and food debris in hard-to-reach locations are two leading sources of pests in food service areas. Dirty drains provide excellent breeding grounds for pathogens and small flies, and food sources for ants, cockroaches and mice. Placing exterior waste containers as far as practical from entryways and keeping container lids closed can also make a huge difference. Removing food items from cardboard containers as they are shelved and immediately moving the cardboard to exterior

recycling containers can reduce cockroach introductions by eliminating any egg cases that might be hiding in the corrugations.

Cleaning professionals need to understand that mops and brooms can trap food particles and provide a buffet for ants and cockroaches, and so should be kept clean and hung up off the floor after use. They can also benefit from understanding that ants can leave a pheromone recruitment trail when they find a food source, and that simply cleaning up the trail as well as the food can stop additional ants from following. Many spider problems can be reduced simply by vacuuming up any webs. Emptying trash cans that may contain food items at the end of each day can greatly reduce fruit fly and ant problems. Ensuring trash can liners are strong enough to stay intact in the dumpster can reduce spills and pest attractants.

Maintenance staff will appreciate knowing that mice can squeeze through a quarter-inch gap (the diameter of a pencil). That's why proper installation of door sweeps, without gaps at the ends or in the middle with double doors, is essential. Sealing up any plumbing or electrical penetrations through walls is also critical for energy savings, fire safety and pest management.

Sealing even smaller gaps including around escutcheon plates, and wall-mounted equipment and fixtures, is especially important in food-service areas to eliminate harborage for cockroaches. American cockroaches typically enter facilities through drains with dry P-traps; maintenance staff can often completely eliminate this problem by ensuring that infrequently used drains are checked and filled regularly, or by installing one-way valve covers.

Architects and designers will benefit from Pest Prevention by Design.³ This invaluable resource was created by a collaboration led by Dr. Chris Geiger of the San Francisco Department of the Environment. The guide provides

comprehensive general principles and practical specifics for building out pests during design, construction and renovations, including setting up food-service and storage areas to minimize pest harborage and food sources.

Facility managers are the cornerstone of any green pest management effort. They need to be trained and supported as program coordinators to provide quality control over internal roles and responsibilities, and quality assurance for contractors. They must be able to interact effectively with peers and superiors to ensure cooperation up and down the chain. Working alongside a pest management professional, they need to be actively engaged in review of designs for new construction and renovation, annual preventive maintenance inspections, identifying the root cause of any pest problems that occur and implementing recommendations for resolution.

For a great training resource for the multiple roles in a facility, see the online learning modules at stopschoolpests.org. While these are specific to schools, they can be readily adapted for any facility and added to your existing training program.

Finding a competent pest management service provider

Most pest management professionals understand the importance of appearing green, so it's important to understand the difference. Hire a competent green pest management professional as a partner and train your facility team to provide oversight. Facility managers should periodically join service technicians on visits and review the technician's service record after every visit.

Dr. Albert Greene, entomologist with the U.S. General Service Agency, advises that if a facility can answer "no" to all of the following questions, it's a good sign:

- Are pests or evidence of pests frequently encountered?
- Are there obvious conducive conditions for pests?

Appendix B. Reducing Pest Complaints and Costs in Your Facilities

- Are insecticides routinely sprayed indoors?
- Are there obvious indoor rodenticide placements?
- Is pest control service limited to pesticide application, with little or no inspection of potential trouble spots?
- Are many occupants dissatisfied with the pest control service?

If yes is the answer to any of the above, an improvement in service or change in service provider may be in order.

Green pesticides?

“Going the green service route is a partnership; it is a commitment from both parties to be proactive in identifying potential pest issues and in addressing them before it is necessary to use pesticides,” says Dr. Angela Tucker, training director for Smithereen Pest Management Services based in Niles, Illinois. “However, there are times in nearly all facilities when pesticides must be used but in a targeted manner and not on a scheduled or routine basis.”

Pesticide risk is a product of exposure and toxicity. All pesticides should be used in a way that reduces potential for exposure, because there is always potential to learn more about toxicity than we know today. Thanks to manufacturers that have developed effective bait formulations for nearly all structural insect pests, there are options that can be used in minimal amounts, and in crevices, voids and other locations inaccessible to non-targets, including facility occupants.

FM teams can also take advantage of resources for identifying effective least-risk products, such as the Bio-Integral Resource Center’s IPM Practitioner’s Directory of Least Risk products⁴ and the Texas State Schools Green Category pesticide list.⁵ Work with the pest management service provider to create an approved list of least-risk products with usage guidelines on when and where these may be used.

Green landscapes

IPM for landscape care follows the same basic concepts from design through construction, maintenance and renovation by examining why pests become a problem and how this can be prevented. Here are some specific practices to incorporate in your green program:⁶

- Select native plants and place them in locations where they will experience conditions that allow them to thrive.
- Avoid placing plants that attract stinging insects adjacent to walkways and entryways.
- Use mulch or masonry mowing strips under fence lines and around paved areas and planting beds to allow mowing equipment access right up to the feature.
- Use underlayments and geotextiles under benches, tables and bike racks, and under gravel, brick and stone to reduce the need for herbicide applications.
- Mulch properly around tree trunks and plant bases.
- Water turf deeply and less frequently to encourage deep rooting.
- Promptly repair damage to existing turf and overseed in late summer to ensure thick turf that prevents weed establishment.
- Avoid soil compaction which slows turf root growth; aerate when and where needed.

If you are participating in the U.S. Green Building Council’s LEED program, LEED for Existing Buildings: Operations and Maintenance currently offers two points for indoor and outdoor IPM programs, another benefit to implementing a green approach. As an FM, your specification of green structural and landscape services helps drive greater adoption of IPM and access to its benefits. **FMJ**

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3. www.sfenvironment.org/sites/default/files/fliers/files/final_ppbd_guidelines_12-5-12.pdf.
4. www.birc.org/Directory.htm.
5. <http://citybugs.tamu.edu/factsheets/ipm/ent-4003/>.
6. Helpful presentations from expert Chip Osborne and James Sotillo on sustainable turf and landscape care: www.ipminstitute.org/Public_Agency_Commercial_Facility_IPM/Natural_Lawn_Landscape_Workshop_0409.htm.



Dr. Thomas Green is

president and co-founder of the IPM Institute of North America, a nonprofit working to leverage the power of the marketplace to

improve health, environment and economics. He has created practices, standards and evaluation tools used in agriculture, landscapes and facilities, and conducted on-site evaluations of hundreds of facilities nationally and internationally, helping numerous clients resolve persistent pest problems. Reach him at ipmworks@ipminstitute.org.



Matthew Neff coordinates Green Shield Certified, an award-winning nonprofit IPM certification program for pest management professionals, programs and

facilities (www.greenshieldcertified.org). He is a graduate of Arizona State University and his background is in writing and rhetoric. He can be reached at mneff@ipminstitute.org.

Integrated Pest Management

The Potato Sustainability Initiative:

Promoting, tracking, and reporting progress

By **Chloe Nelson, Patrick Shannon-Hughes,**
and **Thomas Green**, IPM Institute of North
America, Madison, WI

Improving sustainability, leaving the world in a better place than we found it, is becoming an expectation in the marketplace. Consumers are choosing products based on what corporations are doing to improve health and the environment. Many corporations have executive-level positions in sustainability and provide detailed annual sustainability reports to shareholders and the public.

Food companies are among the leaders, including those participating in the new industry-wide Potato Sustainability Initiative (PSI). This effort brings together potato growers, processors, distributors, and retailers under a single, comprehensive program to improve sustainability in the potato supply chain in the U.S. and Canada.

Getting started

The Initiative grew out of project started in 2010 to develop an integrated pest management (IPM) practice survey for potato growers supplying McDonald's. The goal was to promote, track, and report adoption of IPM and other best practices that help reduce pesticide use and risks. A group including growers, three potato processors—ConAgra Foods Lamb Weston, McCain's, and Simplot—McDonald's, the National Potato Council, the Canadian Horticulture Council, and the IPM Institute assembled in Chicago to develop an action plan and timetable. The group contracted with FoodLogiQ, a technology company based in North Carolina, to put the survey online.

Rich Burres, Sustainable Ag Manager for ConAgra Lamb Weston, reports, "With this project, we were able to expand upon and improve earlier work led by the National Potato Council more than a dozen years ago to survey and report on grower IPM practices. The online survey format allowed us to reach all of our growers and summarize responses efficiently."

Over four growing seasons, the group worked to develop, implement, and improve an online practice survey with more

than 400 potato growers. Each grower responded to questions addressing a variety of best practices including crop rotation to help manage Colorado potato beetle and other pests, weather monitoring for forecasting diseases, and the need for fungicide applications and scouting and trapping for insect pests.

Questions and answers were distributed among four levels—Basic, Steward, Expert, and Master—representing the group's assessment of performance. **Basic**-level responses included compliance with laws regarding pesticide use as well as farm worker and environmental protection. The **Steward** level included proven practices that can be implemented on most farms and by most growers, such as use of scouting and thresholds for common pests. The **Expert** level included advanced practices such as monitoring populations of beneficial insects and taking advantage of the pest control they provide on at least a portion of potato crop acres. For **Master**-level credit, growers had to respond in the affirmative to questions addressing practices designed to improve soil health, water quality, and conservation.

Growers could earn advanced credit by using tools to help identify reduced-risk pesticide options. Tools include the Environmental Impact Quotient,¹ which provides ratings for more than 120 pesticides; the Windows Pesticide Screening Tool,² developed by USDA Natural Resources Conservation Service, which evaluates pesticide impact on soil, groundwater, and surface water, and the Pesticide Risk Mitigation Engine,³ which estimates pesticide risks and mitigation options based on soil type, application rate and method, and other factors.

Each year, results were reported on the National Potato Council website. Trends showed a gradual, steady improve-

doi:10.2134/cs2015-48-2-6

¹ See www.nysipm.cornell.edu/publications/eiq/

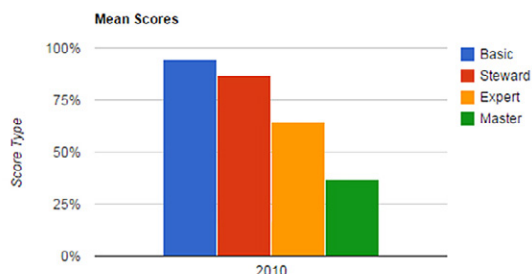
² See www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/

³ See www.ipmprime.com

⁴ See <http://nationalpotatocouncil.org/events-and-programs/environmental-stewardship/ipm-survey-and-information>

Annual IPM Survey Results

Year	2010	IPM Level	Score
Country	All	Basic	94.79%
		Steward	86.94%
		Expert	64.51%
		Master	36.69%
		Index	2.83
		# Farms	244



ment in scores (Fig. 1). Participation has increased from 244 in 2010 to 449 growers in 2013. In 2013, 97.7% of surveyed growers achieved at least a basic level of IPM stewardship, with 48.0% at the Master level of IPM practitioners. The annual overall rating index has steadily increased over four years, starting at 2.83 in 2010 and improving to 3.11 in 2013. Survey results can be found on the National Potato Council website.⁴

Expanding beyond IPM

In 2013, McDonald's asked the group to broaden the survey to include additional practices important to sustainability including waste reduction, air quality, energy and water conservation, and greenhouse gas reduction. In addition, Basic America Foods, Cavendish, Heinz, Sysco, and the Washington State Potato Commission are now represented on the team. As Monte Anderson, Agricultural Sustainability Manager at J.R. Simplot describes, "This industry-wide initiative has brought together our largest Potato Quick Service Restaurant and Foodservice customers along with raw potato suppliers and major potato processors for a single program that covers all aspects of agriculture sustainability."

The group also decided to incorporate metrics, or measures that track outcomes that can result from improved practices. For example, in 2015, growers will report worker safety performance based on the number of incidents divided by total number of hours worked. Metrics have also been developed for fertilizer and irrigation water use efficiency and greenhouse gas and pesticide risk reduction. "Where possible, we want to measure and

Annual IPM Survey Results

Year	2013	IPM Level	Score
Country	All	Basic	97.70%
		Steward	92.34%
		Expert	73.25%
		Master	48.03%
		Index	3.11
		# Farms	449

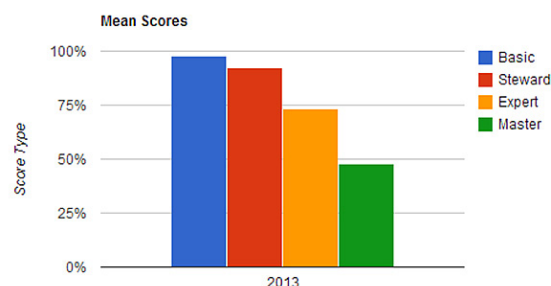


Fig. 1. IPM survey results, 2010 (left) and 2013 (right). The number of growers participating has nearly doubled. The overall performance index has increased from 2.83 to 3.11 over the same time period. In 2014, more than 500 growers participated in the new, expanded sustainability survey.

report outcomes," says Eric Ritchie, Agriculture Manager, North America, Food Safety, Sustainability, and Policy for McCain's Foods. "Best practices are important to promote and measure; outcome metrics help us track how our practices are performing in delivering the benefits we are aiming for."

In 2014, 516 potato growers across the U.S. and Canada completed the new survey. The ultimate goal is to engage all potato production to avoid duplication of effort and reduce the burden on producers and processors. As Anderson put it, "The common goal of having one comprehensive agriculture sustainability program accepted across the marketplace is a win for all."

One of the largest impacts of PSI is its streamlining of sustainability programs. Ed Schneider, Schneider Farms in Pasco, Washington says, "Growers appreciate the need for communicating the good things we are doing to consumers. This effort helps us by allowing us to report to multiple buyers at one time."

Next up for the team is developing a verification program to formalize quality control and assurance, both at the grower and processor level. To learn more, contact Patrick Shannon-Hughes at pshannon-hughes@ipminstitute.org.