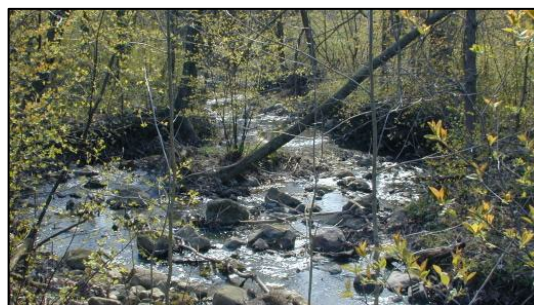
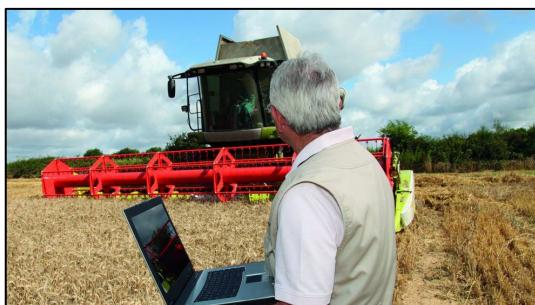


Ohio State University Extension Agriculture and Natural Resources Internal Self-Study



March 2020



THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

extension.osu.edu

CFAES provides research and related educational programs to clientele on a nondiscriminatory basis. For more information, visit cfaesdiversity.osu.edu. For an accessible format of this publication, visit cfaes.osu.edu/accessibility.

Preface

Purpose

The purpose of a program review is to guide program development on a continual basis. A program review is a process that evaluates the status, effectiveness, and progress of programs and helps identify future direction and priorities. Program reviews are a standard practice in higher education (Barak, 1082; Barak & Berdahl, 1978; Berrett, D., 2011). The Ohio State University agriculture and natural resources (ANR) program review is a voluntary practice for self-study and external review.

The Review Includes Five Elements

- The State of Agriculture and Natural Resources in Ohio
- Ohio State University Extension Agriculture and Natural Resource Internal Self-Study
- Ohio State University Extension Crowdsourcing Insight Summary: Agriculture and Natural Resources
- External committee visits and final report
- Key stakeholder communication throughout the process

Context

Ohio State University Extension embarked upon a multi-year effort to build the Extension organization of the future. That journey began with the *Vice President's Conversation on the Future of Extension*. The overall goal of that effort was to ensure that OSU Extension remains relevant and responsive to the needs of Ohioans well into the future.

Data gathered through the *Vice President's Conversation* was used as a foundation for a designEXT effort to put ideas into action. One of the designEXT steps includes partnering with individuals and communities to co-create multi-faceted solutions for current and emerging issues.

The *OSU Extension Agriculture and Natural Resources Review* is the third in a series of OSU Extension program reviews. The first two reviews included 4-H youth development and community development. Family and consumer sciences and agricultural and natural resources program reviews are being conducted simultaneously to complete the series. This project timing coincides with a national search for a new associate dean and director of Extension.

Our land-grant mission –

OSU Extension delivers knowledge from Ohio State to every county in Ohio, and we work **WITH** people right where they live to strengthen their own lives and communities.

(Excerpt from OSU Extension Interim Director update,
Jackie Kirby Wilkins – August 2019)

Contact

Ohio State University Extension program reviews are conducted on behalf of Dr. Jackie Wilkins, director of OSU Extension and associate dean, College of Food, Agricultural, and Environmental Sciences. Program reviews are led by Dr. Greg Davis, with support from Terri Fisher.

<https://extension.osu.edu/strategic-initiatives/ohio-agriculture-and-natural-resources-anr-program-review>

Table of Contents

Executive Summary	4
Introduction	4
Organizational Context.....	5
Purpose and Function of the State ANR office	8
Agriculture and Natural Resources Programming	21
Agriculture Crisis Task Force.....	21
Farm Science Review.....	22
Ohio State University Income Tax School Program	24
OSU Agricultural and Resource Law Program.....	26
Collaborative Forest Management in Southeast Ohio: the Ohio Interagency Forestry Team	29
Ohio Woodland Stewards Program	31
Manure Management Research and Outreach at Ohio State University Extension	33
OSU Extension Ag Weather and Climate Program Assessment.....	33
Aquaculture	37
Integrated Pest Management and Pesticide Safety Education.....	38
Statewide Newsletters.....	43
Crop Observation and Recommendation (CORN) Newsletter	43
The Buckeye Yard and Garden Line (BYGL).....	45
Ohio Beef Cattle Newsletter	47
Volunteer Programs	48
Ohio Master Gardener Volunteer (MGV)	48
Ohio Certified Volunteer Naturalists.....	51
Conclusions for Ohio State University Extension Agriculture and Natural Resources.....	54

Contributors

Andy Londo, former assistant director; Samuel Custer, interim assistant director;
ANR faculty and staff

Executive Summary

Ohio State University Extension is administratively housed within the College of Food, Agricultural, and Environmental Sciences (CFAES) on the Columbus campus. The OSU Extension agriculture and natural resources program began in 1905, predating the passage of the Smith-Lever Act. While agriculture and natural resources programs necessarily encompass a diverse range of subject matter areas, OSU Extension ANR is focusing on:

1. Water quality
2. Quality assurance training for livestock producers and youth
3. Farm business management
4. Building farm operation resiliency in light of a changing climate
5. Invasive species control
6. Precision agriculture
7. Consumer and commercial horticulture

The research, curriculum development and program delivery activities OSU Extension ANR personnel are involved in falls under the six OSU Extension priority areas:

1. Health and Wellness
2. Workforce Development
3. Thriving Across the Lifespan
4. Sustainable Food Systems
5. Engage Ohioans, Vibrant Communities
6. Environmental Quality

Extension ANR professionals including faculty and staff from county Extension offices, academic departments in the CFAES, College of Veterinary Medicine (CVM) and College of Arts and Sciences. These Extension professionals in turn partner with local, state, regional, and national organizations and agencies to determine educational needs and to conduct educational programs and applied research. Ohio State is part of the North Central Region yet our proximity to Kentucky (southern region) and West Virginia and Pennsylvania (NE Region) allow for national level programs and activities.

Extension ANR professionals serve our communities, the university, and profession in a number ways including through professional associations such as the National Association of County Agricultural Agents (NACAA), the North Central Region Aquaculture Center (NCRAC-housed at Iowa State), and by serving on the boards of directors for commodity based organizations in Ohio.

The goal of this document is to provide you with a snapshot of the breadth and depth of programming conducted by OSU Extension ANR professionals. In return, we look forward to your suggestions and recommendations for future directors or improvements in operations.

Introduction

There are four OSU Extension program areas: community development, 4-H youth development, family and consumer sciences, and agriculture and natural resources. The faculty, staff, and administration of these four program areas are engaged locally, statewide, and nationally to review needs, and adapt programs and activities to best meet the needs of Ohio growing and ever diversifying population. The activities in each program area depends on the coordination of public funds (county, state, federal), private funds (grants, contracts, philanthropic gifts) and other cash sources for financial support.

OSU Extension began on July 1, 1905, when A.B. Graham was employed as superintendent of OSU Extension. The Ohio legislature passed the Alsdorf Bill in 1909 which provided \$20,000 for Extension schools that were no more than one week in length and limited to one per county. From 1905, through 1913, agricultural trains served as the Extension schools on wheels. The College of Agriculture paid the expenses and salaries of instructors and provided the exhibits. These trains took The Ohio State University College of Agriculture to the people.

The OSU Extension agriculture and natural resources program area has proudly served the people of Ohio for 115 years and counting. ANR today comprises many subject matter fields ranging from agronomic crops and animal science to wildlife and fisheries. ANR has worked in many of these subjects since our beginning in 1905; other subjects are newer and are in response to Ohio's growing and changing population and their diverse needs.

The first goal of OSU Extension agriculture and natural resources programs is to provide our clientele with the tools, knowledge, and processes required to maximize the benefits from their agriculture or natural resources enterprises. The second goal is to provide all Ohioans with an understanding of the value and importance of agricultural production and natural resources management in Ohio.

Organizational Context

College of Food, Agricultural, and Environmental Sciences (CFAES)

The College of Food, Agricultural, and Environmental Sciences (CFAES) is the cornerstone college of The Ohio State University and has carried forward the land-grant mission for 150 years. The college has world-class teaching, research, and Extension with impacts in our communities, state, nation, and world.

The college has three distinct campuses including the main campus in Columbus, the Wooster campus which includes the Ohio Agricultural Research and Development Center (OARDC) and the Agricultural Technical Institute (ATI). ATI offers associate degree programs in many discipline areas with department homes on the main Columbus Campus. ATI serves a need for the industry providing highly trained technicians, and also funnels students to the four year programs in Columbus. The statewide campus encompasses our remote OARDC field stations and county Extension offices in all 88 counties.

Grand Challenges

To address the needs of a growing and changing state, nation, and world, CFAES has adopted the following Grand Challenges:

1. Sustainability-Supporting and enhancing the economic viability of agriculture, while protection and remediating the environment and ecosystems in which we live. There is a focus on food security and environmental sustainability simultaneously through production, precision agriculture, controlled environments, food systems and distribution, food waste, valued added components and water quality.
2. One Health-Integration of human, animal, and environmental health
3. Rural-Urban Interface-Focus on policy, economic issues, and consumer communications and education.
4. Preparing the next generation of scientists and leaders.

CFAES is one college ensuring and building student success, focusing on discovery and scholarship, engaging our stakeholders and partners, and enhancing efficiencies and resources. We Sustain Life. (adapted from: www.cfaes.osu.edu/news/we-sustain-life)

OSU Extension

Priority Areas

OSU Extension priority areas include:*

1. Health and Wellness: Helps people make healthy choices and catalyzing the creation of healthy homes, schools, workplaces, and communities.
2. Workforce Development: Helps individuals not only acquire the skills they need in their current jobs, but those they will need in the future positions to which they aspire.

3. Thriving Across The Lifespan: Helps Ohioans flourish within families and the various social structures in which they live. Extension ANR utilizes the Master Gardener Volunteer and Ohio Volunteer Conservation Naturalist programs to enhance participant understanding of the natural world around them, and to enable them to help others reach that same level of understanding.
4. Sustainable Food Systems: Brings science-based information to the process of making decision about food and the way in with is it produced, processed, distributed, stored, prepared, and consumed.
5. Engaged Ohioans, Vibrant Communities: Mobilizes people in ways that produce shared benefits and helping community residents gain the knowledge and skills they need to engage in meaningful dialogue focused on positive change and collective impact that meets local needs.
6. Environmental Quality: Helps Ohioans make informed choices and lead local efforts aimed at maintaining or improving environmental quality for future generations.

*Adapted from www.extension.osu.edu/about/mission-vision/values/OSU-extension-impact-areas

OSU Extension Agriculture and Natural Resources

Ohio ANR is currently focusing on:

1. Enhancing water quality and agricultural production with special emphasis on the Western Lake Erie Basin (WLEB).
2. Conducting quality assurance training for livestock producers and youth to ensure proper treatment of animals and market access.
3. Farm business management to help keep farms financially viable for generations to come.
4. Making agricultural and natural resources operations more resilient in light of a changing climate.
5. Invasive species control and management, to ensure the long term agricultural and natural production and environmental health.
6. Precision agriculture to enhance agricultural production and farm operation efficiency while protecting environmental health and water quality,

OSU Extension Administrative Structure

At Ohio State, ANR is one of four program areas falling under the OSU Extension administrative umbrella. OSU Extension in turn is part of the College of Food, Agricultural, and Environmental Sciences (CFAES). Dr. Cathann Kress is the vice president for Agricultural Administration and dean of CFAES. Dr. Jackie Kirby-Wilkins is the interim Extension director.

Leadership for each of the four program areas is provided by an assistant director (AD). These four programs and their leaders are:

Community Development — David Civitollo (interim)

Family and Consumer Sciences—Pat Bebo. She also holds the title of assistant dean for Outreach and Engagement in the College of Education and Human Ecology (EHE).

4-H Youth Development—Dr. Kirk Bloir

Agriculture and Natural Resources—Samuel Custer (interim)

In addition to the four program leaders, OSU Extension has four other administrative areas each with their respective director:

Operations – Jackie Kirby-Wilkins and Dr. Jeff McCutcheon (director and assistant director respectively) Handles all issues relating to county functions, funding, and supervision.

Learning and Organizational Development – Dr. Teresa McCoy

Strategic Initiatives and Urban Engagement – Dr. Julie Fox.

Extension Publishing – Jane Wright, interim assistant director

OSU Extension also has a non-degree granting, tenure initiating departmental unit. The chair of the Department of Extension also serves the dual role of the associate Extension director for programs. Dr. Greg Davis holds this position.

Academic Units within CFAES

Subject area expertise and programming support is provided by faculty and staff in other CFAES academic units. These units include:

- Agriculture and Technical Institute (two-year program on Wooster Campus)

- Agricultural Communication, Education, and Leadership

- Agricultural, Environmental and Development Economics

- Animal Sciences

- Entomology

- Food Science and Technology

- Food, Agricultural, and Biological Engineering

- Horticulture and Crop Science

- Plant Pathology

- School of Environment and Natural Resources

Centralized CFAES Support Units

Several CFAES units provide support to OSU Extension, and ANR programming in particular, both on campus and statewide.

- Business Operations

- Communications and Marketing

- Diversity and Inclusion

- Advancement

- Grant Development

- Legislative Affairs

Centralized Ohio State Units

A couple of units in recent years have moved from CFAES to university-level support. These units include:

- Information Technology and Phones

- Human Resources

Academic Units Within Other Colleges

Content-area expertise and programming support is provided by faculty and staff in other colleges across the university. Examples include Public Health, Social Work, Pharmacy, and Education and Human Ecology. Those units supporting ANR across campus include the Department of Veterinary Medicine (College of Veterinary Medicine) and the Department of Geosciences (College of Arts and Sciences).

Relationship with Central State University

Central State University became an 1890 land-grant university with the signing of the 2014 Farm Bill. OSU Extension and Central State University Extension established an operating principles memorandum of understanding (MOU) in 2015. This initial MOU covered the time frame 2016-2017. The agreement provided detail around the cooperative prioritization, development, and delivery of programming focused in the following counties in which CSU Extension and OSU Extension would be co-located: Cuyahoga, Franklin, Lucas, Butler/Hamilton, Montgomery, and Greene. A new MOU is currently being developed.

Cooperation between OSU Extension ANR and CSU ANR is expanding. The location of a CSU Extension Forester on the Wayne National Forest in SE Ohio has led to co-programming with an OSU Extension forester in the area, and has helped to strengthen partnerships with state and federal agencies and other partners. Other examples of partnership include work with Hemp, as CSU has a faculty member who specializes in hemp production. The partnership with CSU is nascent, but growing

Purpose and Function of the State ANR office

The State ANR office provides statewide leadership and direction to Ohio's agriculture and natural resources program development and delivery with approximately 200 Extension personnel statewide. The ANR program leader works with internal partners such as other OSU Extension leadership team members, academic unit chairs in the Colleges of Food, Agriculture, and Environmental Sciences (CFAES) and Veterinary Medicine (CVM) and county Extension educators to ensure that Extension program expertise and needs are being met. The program leader also works external partners such as commodity groups, state and federal agencies, and other interested parties to ensure their educational needs are met.

The current interim assistant director for ANR is Samuel Custer. . He has been in this role since March 2020.

State ANR Office Budget

For FY 2020, the state ANR office expense total from base funds was \$1,771,868 (\$1,735,868 for personnel and \$35,000 operating). In addition to these base funds are a number of cash accounts totaling nearly \$3,000,000. These cash accounts have developed over time and are generated by salary release, F&A recovery on grants and contracts, publication sales, program revenues, and other sources. A significant amount of the cash funds resides in the Pesticide Safety Education Program.

There is also one endowment of \$75,000. This endowment was created with residual funds from the 2006 NACAA national meeting hosted in Cincinnati. The proceeds of this endowment support the annual Steve Ruhl award for the top county ANR educator. Any annual residual funds from the endowment are used to support educator training.

ANR Personnel

There is a diverse group of Extension professionals administratively housed in the state ANR office. These individuals are listed in Table 1.

Table 1: Faculty and staff assigned to the state ANR office

Name	Position Title	Specialty/Responsibility	Location
Teresa Funk	Admin. Assis.	ANR Office Coordination, Farm Science Review	OSU Campus
Julie Strawser	Admin Assis.	OSU Tax Schools, ANR financial transactions, web design	OSU Campus

Table 1: Faculty and staff assigned to the State ANR Office (Cont.)

Name	Title	Speciality/Responsibility	Location
Elizabeth Hawkins	Assis.Professor Field Specialist	Precision Agriculture, E-fields, Agronomic Crops,	Clinton Co. Extension Office
Greg Labarge	Professor and Field Specialist	Agronomic Crops, Water Quality	Madison Co. Extension Office
Harold Watters	Assoc.Prof. & Field Specialist	Agronomic Crops	Logan Co. Extension Office
Glen Arnold	Assoc. Prof. & Field Specialist	Manure Management	Putnam Co. Extension Office
Dianne Shoemaker	Assoc. Prof. & Field Specialist	Farm Business Management	Mahoning Co. Extension Office
Peggy Hall	Assoc. Prof. & Field Specialist	Ag. Law	Union Co. Extension Office
Barry Ward	Assis. Prof (tenured)	OSU Tax Schools Leader and Farm Business Management	OSU Campus
Jim Jasinski	Assoc. Prof & Extension Educator	IPM Program Coordinator, vegetable production, entomology	Champaign Co. Extension Office
Jim Chatfield*	Associate Professor	Extension Specialist-Plant Pathology, Landscape Horticulture	OSU Wooster OARDC
David Apsley	Associate Professor	Extension Specialist-Natural Resources	Jackson Ag. Research Station, Jackson OH
Mathew Smith	Program Director	Aquaculture	Madison Co. Extension Office
Mimi Rose	Program Director	Pesticide Safety Education	OSU Campus
Aaron Wilson**	Research Scientist and Extension Associate	Climate	OSU Campus-Byrd Polar Res. Center
Gary Graham#	County Educator	County Educator and Maple Specialist	Holmes Co. Extension Office
Chrissy Kaminski	Program Manager	Pesticide Safety Education	OSU Campus
Jennifer Andon	Program Manager	Master Gardener Volunteer Prog.	OSU Campus
Adam Ziadeh	Program Assistant	Pesticide Safety Education	OSU Campus
Haley Shoemaker	Program Coordinator	Ohio Farm Business Analysis Prog.	Mahoning Co. Ext. Office
Christina Benton	Farm Bus. Analysis Tech.	Ohio Farm Business Analysis Prog.	Mahoning Co. Ext. Office
David Jenner	Farm Bus. Analysis Tech	Ohio Farm Business Analysis Prog.	Clark Co. Ext. Office
Trish Levering	Farm Bus. Analysis Tech	Ohio Farm Business Analysis Prog.	Pickaway Co. Ext. Office
Mary Wilhelm	Farm Bus. Analysis Tech	Ohio Farm Business Analysis Prog.	Defiance, Co. Ext. Office
Marylin Camm	Farm Bus. Analysis Tech	Ohio Farm Business Analysis Prog.	Huron Co. Ext. Office
Ellen Essman	Law Research Fellow	Ohio Ag. Law Program	Pickaway Co. Ext. Office
Kevin Hivich	Law Research Fellow	Ohio Ag. Law Program	Washington DC
Beef Prog. Director##	TBD	Beef Production	Eastern Ag. Res. Station, Caldwell OH
6 Water Quality Extension Associates	Extension Associate	Water Quality	6 Locations across the WLEB, March 2020

*0.5 FTE, split with Dept of Horticulture and Crop Science

** 0.5 FTE split with Dept of Geosciences, College of Arts and Sciences

0.5 FTE split with Holmes County Extension

0.75 FTE split with Dept of Animal Sciences

ANR Faculty and Staff in Academic Departments

In addition to those in the state ANR office, there is a large and diverse group of Extension ANR professionals administratively housed within the academic departments in CFAES and the College of Veterinary Medicine. These individuals are listed in Table 2.

Table 2: ANR Faculty and staff expertise and FTEs in Ohio State Academic Departments

Department	Name	Expertise	Extension FTE
Agricultural, Environmental, and Developmental Economics (AEDE)	Leah Bevis	Human welfare and biophysical systems in poor countries	0.15
	Ben Brown	Farm Management and grain marketing	1.0
	Jon Flatnes	Developmental Economics and rural finance	0.15
	Tim Haab	Env. & Consumer Econ. Dept. Chair	0.26
	Wuyang Hu	Marketing & Consumer Economics	0.10
	Elena Irwin	Environmental Economics	0.50
	Ani Katchkova	Farm Income Enhancement	0.18
	Mario Miranda	Ag. Risk Management	0.125
	Daniela Miteva	Env. Economics in Developing Countries	0.15
	Mark Partridge	Community and Region Economics	0.25
	Zoe Plakias	Food Systems	0.25
	Brian Roe	Food Waste, Behavior Economics (Dept. Ext. Leader)	0.30
	Ian Sheldon	International Trade and Policy	0.125
	Brent Sohngen	Natural Resources and Env. Economics	0.32
AEDE Totals	14 Specialists		3.86 FTE
Animal Sciences			
	Steve Boyles	Beef Cattle	0.80
	Kimberly Cole	Equine	0.80
	Maurice Eastridge	Dairy, (Dept. Extension Leader)	0.80
	John Foltz	Dept. Chair	0.26
	Lyda Garcia	Meat Science	0.20
	Steve Moeller	Swine	0.62
	Dale Ricker	Swine	1.00
	Bill Weiss	Forages/Dairy Nutrition	0.30
	Open Positions	Four open positions TBD	TBD
Animal Sciences Totals	8 Specialists		4.78 FTE
Agriculture Technical Institute (ATI)	John Nangle	Turf Grass	0.25
ATI Total	1 Specialist		0.25 FTE
Entomology			
	Luis Canas	Vegetable IPM	0.40
	Mary Gardiner	Urban Entomology	0.10
	Casey Hoy	Agroecosystem Health and Management	0.15
	Andy Michel	Genetics, General Entomology (Dept Ext. Leader)	0.30
	Kelly Tilmon	Agronomic Crop Entomology	0.60
	Celeste Welty	Vegetable and Fruit Entomology	0.70
	Open Positions	4-6 Open Positions TBD	TBD
Entomology Total	6 Specialists		2.25 FTE
Food Science and Technology (FST)			
	Valente Alvarez	Director of the Food Industry Center (Dept Ext. Leader)	0.54
	Bala Balsubramaniam	Food Manufacturing Technology	0.25
	Sheryl Barringer	Fruit and Veg. Proccessing, Dept. Chair	0.26
	Rafael Jimenez-Flores	Dairy	0.25
	Lynn Knipe	Meat Processing and Inspection	0.75
	Ken Lee	Food Innovation	0.21
	Devin Peterson	Flavor Chemistry	0.125
FST Total	8 Specialists		2.385 FTE

Table 2: ANR Faculty and staff expertise and FTEs in Ohio State Academic Departments (Cont.)

Department	Name	Expertise	Extension FTE
Food, Ag. & Biological Engineering (FABE)			
	Larry Brown	Agricultural Drainage Management	0.50
	John Fulton	Precision Agriculture	0.65
	Dee Jepsen	Ag. Safety, Dept. Ext. Leader	0.80
	Gonul Kaletunc	Nutrient Management and Fresh Food Safety	0.25
	Karen Mancl	Water Quality, Rural Septic Systems	0.25
	Fred Michel	Bioproducts	0.25
	Erdal Ozkan	Weed Sprayer Technology	0.80
	Judit Puskas	Bioproducts	0.075
	Ajay Shah	Biomass Supply and Logistics	0.15
	Scott Shearer	Precision Ag., Dept. Chair	0.26
	Lingying Zhao	Air Quality from Agricultural Operation	0.80
FABE Totals	11 Specialists		4.785 FTE
Horticulture and Crop Science (HCS)			
	John Cardina	Ecology of Managed Systems	0.15
	Imed Dami	Grape Production	0.30
	Douglas Doohan	Risk Analysis of Ag. Systems	0.75
	Jonathan Fresnedo	Grape Breeding	0.15
	Michelle Jones	Floriculture	0.15
	Matt Kleinhenz,	Vegetable Production	0.60
	Chieri Kubota	Controlled Environment Production	0.15
	Laura Lindsey	Soybeans	0.75
	Mark Loux	Weed Science, Ext. Leader	0.75
	Jim Metzger	Plant Physiology, Dept. Chair	0.26
	Diane Miller	Tree Fruit Production	0.75
	Mark Sulk	Forages	0.70
	9 open positions	TBD	TBD
HCS Total	11 Specialists		5.46 FTE
Plant Pathology			
	Anne Dorrance	Soybean Pathology	0.40
	Francesca Hand	Ornamental Pathology	0.30
	Melanie Ivey	Fruit Pathology and Food Safety	0.50
	Sally Miller	Fruit and Vegetable Pathology	0.40
	Thomas Mitchell	Fungal Dynamics, Dept. Chair	0.33
	Pierce Paul	Wheat and Corn Pathology, Dept. Ext. Leader	0.40
Plant Pathology Total	6 Specialists		2.33 FTE
School of Environment and Nat. Res. (SENR)			
	Eugene Braig	Natural Aquatic Systems	1.00
	Steve Culman	Soil Fertility	0.50
	Michael Demyan	Soil Science	0.10
	Stan Ghert	Wildlife	0.35
	Jeff Hattey	Soil Fertility	0.25
	Doug Jackson-Smith	Rural Sociology, Water Security	0.20
	Shoshanah Inwood	Rural Sociology, Health Care	0.35
	Kristi, Lekies	Community and Natural Env. Sociology	0.33
	Alexis Londo	Remote Sensing	0.33
	Sayeed Mehmood	Forest Economics	0.65
	Jeff Sharp	Sociology of Rural Areas and Food Systems, SENR Director	0.26
	Kathy Smith	Forestry	1.00
	Brian Slater	Soil Science, Ext. Leader	0.20
	Marne Titchenell	Wildlife	1.00
SENR Totals	14 Specialists		6.52 FTE

Table 2: ANR Faculty and staff expertise and FTEs in Ohio State Academic Departments (Cont.)

Department	Name	Expertise	Extension FTE
Veterinary Preventative Medicine			
	Katy Proudfoot	Animal Welfare	0.35
	Gustavo Schuenemann	Dairy Veterinarian	0.65
	Wittum, Tom	Epidemiology, Dept. chair	0.20
	Jeff Workman	General Vet. Medicine, Dept. Ext. Leader	1.00
Vet. Med. Totals	4 Specialists		2.20 FTE
GRAND TOTALS	91 Specialists		34.80 FTEs

As seen in Table 2, there is a broad depth of experience in 91 state Extension specialists across all academic units in CFAES and the College of Veterinary Medicine with an average of 0.38 Extension FTEs each. At face value this looks pretty good. However, the Extension production of these specialists varies by individual and by department. For some departments, the lack of Extension productivity is an issue that's been festering for decades.

At the direction of CFAES Dean Kress, the associate deans for Extension, research, and academic programs are developing accountability guidelines for each of their respective areas. It is my hope that these guidelines will be taken seriously, with justified changes in budget to those departments which continue to underperform.

County ANR Staffing

OSU Extension as a two-track system for county educators: Administrative and professional (A&P) staff and tenure track faculty. County educators are hired at the A&P track and progress through the levels appropriate performance measures are met. These educators' levels are:

Educator 1: Bachelors degree in an ANR or related field

Educator 2: Masters degree (earned or at time of hire), and three years of appropriate performance as an Educator 1.

Educator 3: Masters degree and 10 years of direct experience (at time of hire), and consistently appropriate performance as an educator 2.

Educator 4: Masters degree and 10+ years of direct experience (at time of hire), and consistently appropriate performance as an educator 3.

Once Educator 4 is achieved, and there is a consistent pattern of exemplary performance, county educators can request a transfer to tenure track faculty without meeting the university requirements of being the successful candidates from a national faculty search. They then have seven years to meet OSU Extension, CFAES, and Ohio State standards for promotion and tenure. Current faculty ranks are assistant, associate and full professor (tenure at the rank of instructor was granted for some county faculty who were hired before January 1993).

ANR educators can be supported in their programming efforts by:

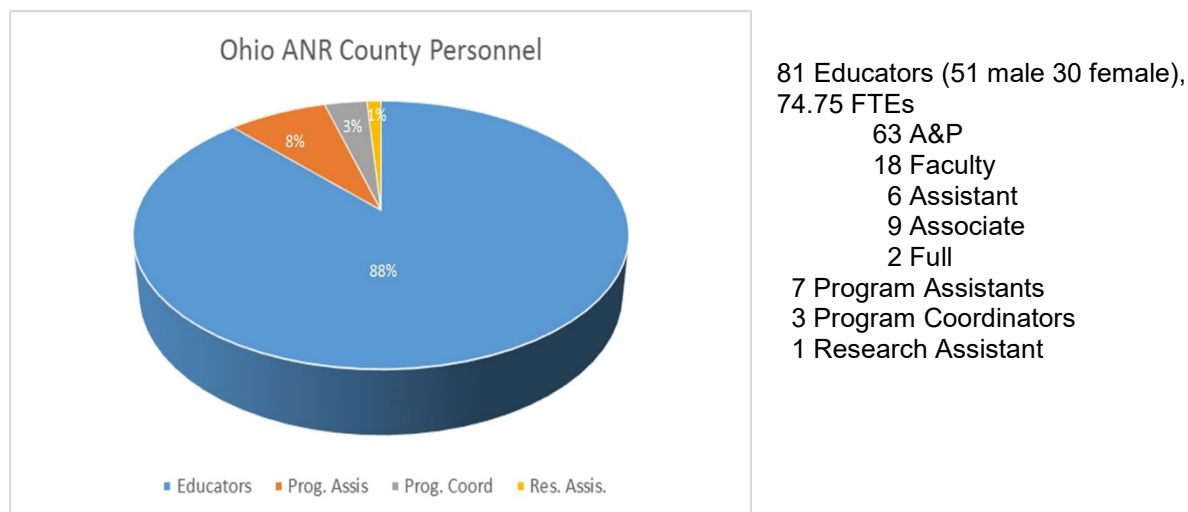
Program Assistant: Supports and delivers programs under guidance of the county ANR educator. A high School diploma is required. Hourly A&P staff.

Program Coordinator: Coordinates, supports, and delivers programs under the guidance of the county ANR educator. Minimum education – Bachelor's degree or equivalent, hourly A&P staff. As of 2-5-2020, there were three in ANR, associated with the Master Gardener Volunteer program and the Tri State Green industry Conference held in Cincinnati annually.

Research Assistant: Same job duties as assigned to a program assistant. The difference in title is based upon the individual responsibilities, source of funding and funding agency guidelines in terms to personnel hires.

As of 2-5-2020, OSU Extension employed 92 county-based ANR professionals

These 92 professionals are broken down into the following categories:



Funding of ANR County Positions

County educator positions are paid in part by a “cost share” from the county, with the remaining costs (salary and fringe benefits) are covered by state or federal funds. For CY 2020, the cost paid by the county for the first educator is \$31,000 per FTE. Every educator after that costs the county \$41,000 per FTE. Office staff, program assistants, and other personnel are paid from 100 percent county funds. These county funds can be commissioner funds or other funds in the office (salary release, program earnings, etc.) There is an annual MOU between each county and Ohio State specifying funding levels and personnel. All Extension personnel in county Extension offices are Ohio State employees.

Requirements to be an ANR Educator

The original intent of the county agriculture agent was to extend the knowledge developed at the land-grant universities to the individual farmer (Baker 1939). Historically, the county agent was considered to be the local agricultural teacher, recognized as an expert agronomist whose advice increased farm profits and standards of living (Smith and Wilson, 1930). Today, the job duties for the county agriculture agent have expanded to include supplying information on agricultural and natural resources for farmers, landowners, gardeners, and businesses in rural and urban areas. The incorporation of natural resources into the job duties and position title is significant in that it better reflects the changing nature of Extension education combined with the evolving needs of an increasingly diverse clientele base (West et al., 2009).

Just as the role of the county agriculture and natural resources agent has changed, so too has the requirements for the position. Traditionally, the county agent was a young man with an agricultural degree from a respected institution having at least two years of on the farm agricultural experience. Often times they were former high school agricultural teachers and were never to be hired to work in the county in which they grew up (Smith and Wilson 1930, Baker 1939).

ANR County Positions Hiring Process

The process for posting a county educator position begins with the OSU Extension Operations Office in concert with the area leader. The position description (PD) is written by the area leader and sent to the ANR assistant director (AD) for approval. The goal of this part of the process is to ensure the PD is written to accurately reflect the PD follows the standard ANR PD, while ensuring that county needs are included. Once approved, it is posted on the Ohio State HR system for a minimum of 30 days.

Once the position closes, a representative from OSU Extension Operations performs an initial screening of all applicants. During this process, those applicants which do not meet the minimum qualifications are removed from consideration. For example, since county educator positions require a minimum of a bachelors' degree in an ANR field, those without that at least that degree are removed from the applicant pool.

The applicants are sent forward to the first review committee. This committee consists of a representative from Ohio State HR, the appropriate RD and AD, the county Extension director, and one or two additional personnel. This initial screening by the committee determines which of the candidates are offered a state-level interview.

The state-level interview committee consists of a representative from HR, the appropriate AD, and usually a county educator to assist with the screening. The goal of the state screening is to determine if the applicant has the appropriate background, experience, and intangible qualities to be successful at the county level. Those which move on to the county are then interviewed by the RD, county Extension director, and a mix of clientele from the county including landowners, farmers, commissioners, etc. If there is a successful candidate, the assistant director of Operations extends the employment offer to that individual. Due to the recent centralization of HR at the university level, this process will be undergoing some changes.

Supervision of ANR County Professionals

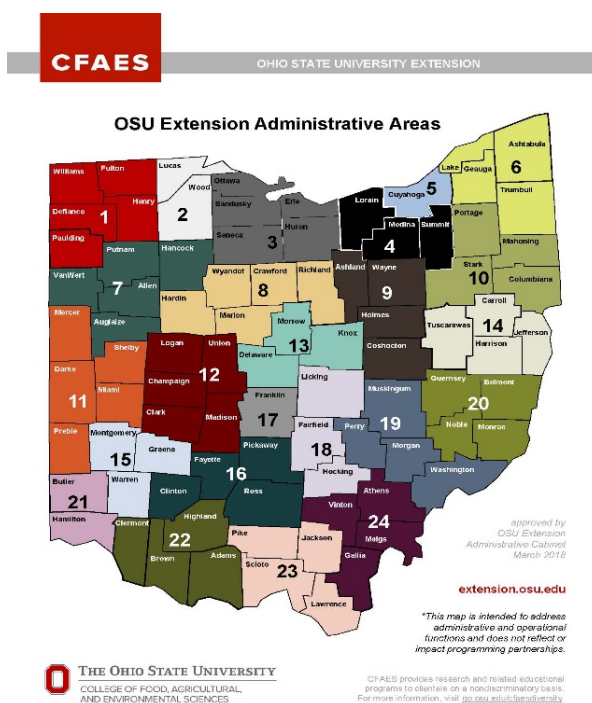
Supervision of county Extension professionals, including ANR, is vested in 24 area leaders, (see OSU Extension Administrative areas map). With the exception of four urban counties/areas (Columbus, Cleveland, Cincinnati and Butler County, Toledo and Wood County) the remaining 20 area leaders (at a 50 percent FTE administrative appointment) provide administrative oversight over groupings of three to five counties. They also provide local programming in their assigned program area for the other half of their time. Seven of the area leaders have ANR program assignments. The four area leaders in the urban counties/areas are 100 percent administrative appointments.

The ANR assistant director provides input for the annual performance review of county ANR educators. Available ratings include Consistently Exceeds Expectations, Occasionally Exceeds Expectations, Meets Expectations, or Does not meet Expectations. Qualitative comments are also provided for clarity. Performance review input for positions other than county ANR educators is provided as needed or requested.

The ANR assistant director also provides an assessment of field specialists and other faculty and staff administratively housed in the ANR state office. These faculty and staff reviews are provided to the associate Extension director for programs and chair of the Department of Extension to aid in his development of formal faculty reviews. Feedback on Extension faculty in academic departments is provided at the request of the department chair or the individual faculty member.

County ANR Educator Needs from the Academic Departments

A needs assessment was conducted of county Extension ANR educators in the spring of 2019. The educators were asked to provide general needs from the academic departments, and for specific needs of each particular department. The final report was provided to all departments in the summer of 2019.



Expertise, partnerships, and training were the main Extension needs from academic departments identified by Extension educators and field specialists. The information was compiled from Zoom meetings and internet-document comments. Those themes were identified through the comments regarding interaction with the departments along with needed specialists, research, and knowledge sharing to meet the needs of clientele. The needs converged into three themes:

- **Expertise** –Extension and research positions in departments based on needs of Ohio clientele
- **Partnership** – More effort from departments to develop relationships with county educators through improved communication and stronger collaboration
- **Training** – Need in-servicing with state specialists to increase the competence of county educators to stay current for their local clientele

Expertise

Expertise from the different departments was identified as a need. The educators need state specialists whose research area is directly applicable to the clientele's problems. The state specialist was also described as a person who could train educators through in-servicing situations, teach at local or regional programs, and be well-received by the clientele. The specialists would also provide needed deliverables such as budgets, management advice, and information the educators could use within their counties.

Transition plans for retiring state specialists was identified as a need to ensure areas are covered with new positions, but reduce potential duplication. Also educators identified needing more departmental program coordinator positions to help with county programming and deliverables. However, educators recognized the program positions could not be considered a replacement for state specialist.

Partnerships

Partnerships were described as the effort from departments to include Extension personnel in planning and decision-making. Two elements of the partnership were improved communication and stronger collaboration.

Improved communication

Communication and information exchange with the departments was a needed area for Extension educators. Some examples of communication that needed improved were:

- Extension personnel described frustration when trying to identify research and Extension areas for departmental faculty to ask them for help with a client's problems. Expertise and research areas are not well-identified in a central location such as a website and not shared on a regular basis with local personnel.
- Encourage more state specialist participation in Extension team meetings to provide updates on research and activities
- Encourage specialists to be responsive to educator questions
- Educators also wanted to know what research is currently being done and share results when completed and published.
- Educators requested a courtesy call from state specialists when they are in a county conducting research or visiting farmers so educators could respond to client questions about these activities. Educators also described the benefits they receive from specialist who include them on research/farm visits as both an in-servicing opportunity and solidifying the cooperation of the university and local county offices.

Stronger collaboration

Some of the areas that needed stronger collaboration were grants, educator expertise development, and recognition.

Educators described difficulty in working with departments in the grant process. Some examples of the difficulty in the grant process:

- Educators not aware of grant proposals in which they possess expertise that could enhance the product, especially in local projects
- Adding educators as an after-thought to a grant proposal without consulting with them to provide input on practicality, costs, and effectiveness
- Including educators in the outreach, but not allocating funds to support these efforts

More seasoned educators identified collaboration with departmental faculty as developing their expertise in a discipline and also contributing to their promotional process. Some of the descriptions of collaborations include:

- Recognition of Extension's contributions to issues such as water quality
- Opportunities to become involved with research projects and co-author journal articles
- P&T and performance review recognition for participating in research activities
- Participation in departmental advisory/planning functions
- Ability to provide feedback to department annually about Extension activities
- Adjunct/courtesy positions or opportunity to increase expertise in a chosen discipline
- Travel and other support for educators providing statewide teaching for expertise such as farm management, specialty crops, etc.

Training

Educators identified in-service training with state specialists as a need from departments. The in-service training helps increase the competence of county educators to provide training for their local clientele. The training also helps refresh the local programming with new information, research findings, and concepts. In-service training is especially needed for new educators.

Other general needs

The percentage of an Extension appointment for departmental faculty was a concern. A 10 percent appointment dilutes the time the faculty member has for Extension activities. Larger appointments are needed, but the faculty member may be not recognized for Extension activities through some of the departmental tenure process. This affects the faculty member's incentive to fulfill the Extension appointment.

How the departments define Extension was identified by educators as a concern. Ideas were for CFAES to identify what activities and programming define Extension, or be more clear on where CFAES and Extension intersect. Also, to clarify the difference between Extension and outreach and engagement.

Marketing of Extension deliverables such as fact sheets, publications, and videos was identified by educators as a general need. Also, moving to more video-based publications was suggested by more than one commenter.

OSU Extension Needs from Specific Academic Units

Agricultural, Environmental, and Developmental Economics (AEDE)

1. Risk management programs for our producers which goes beyond crop insurance
2. More farm management support was identified multiple times in the comments

3. Farm management: Ben Brown was a great hire, but he's only one person and we don't want to burn him out
4. Support in production economics—especially areas requested by educators and commodities
5. Commodity specific information such as livestock, soy, corn, wheat, specialty crops
6. Enterprise budgets (current link on AEDE page goes to the Univ. Illinois website)
7. Specialty crop budgets
8. Research on the impacts of vertical integration of operations on small and mid-size farmers
9. For farms in trouble, what can be done to mitigate their issues (Ani Katchkova does research on farm financial troubles)
10. Who is willing to do Extension work, regardless of their appointment

Animal Science

1. Transition plans for positions as dairy specialists retire
2. Need a sheep/small ruminant specialist
3. Transition plan for beef expertise as specialists leave and/or retire
4. Replacement/transition plan for Dale Ricker, swine specialist
5. Livestock facility changes at Waterman and elsewhere
 - a. Updates to facilities should provide opportunities to extension
 - b. Important to keep up with technology and equipment so we have state of the art facilities to show producers
 - c. Facilitate workforce development of students
6. Animal research approvals and protocols need to be streamlined.
7. Available of non-Extension faculty interested in Extension teaching
8. Needs for information in small animal agriculture especially in urban areas

Entomology

1. Replace Dave Shetlar's former position with someone working in ornamental and turf entomology
2. Replace Dan Herms position with a forest/natural ecosystem entomologist
3. Update entomology fact sheets, bulletins, and other materials, ensuring they are branded with current branding and on Ohio State publications page and Ohioline.
4. Update on diagnostic clinic (with plant pathology)

Plant Pathology

1. GAPS training and food safety team—team leadership and working structure needs to be more effective
 - a. Team members have been added as matching funds on grants without their knowledge
2. Update on plant diagnostic clinic (with entomology)

Horticulture and Crop Science (HCS)

1. Urban forestry/tree care/arboriculture specialist, materials, and programs (with SENR?)
2. Specialty crop specialists (have lost about 20 positions with retirements in HCS and other departments)
3. Ornamental horticulture and nursery specialist
4. Additional forage crop specialist
5. Horticulture specialist in aquaponics to answer and research plant-related portion of aquaponic systems
6. More help with how to manage cover crop in no-till and low-till situations
7. Identify the HCS role with soil health and collaboration with SENR
8. Christmas tree specialist
9. Industrial vegetation/non-crop control specialist
10. Identify who is overseeing the organic program for OSU. Educators are getting conflicting messages about who's in charge of the program.

School of Environment and Natural Resources (SENR)

1. Urban forestry/tree care/arboriculture programs and materials (with HCS?)
2. More help with soils fertility and nutrient management issues in the WLEB
3. Identify soil health collaboration with HCS including leadership for soil health
4. Need a stream ecologist
5. Need a hydrologist
6. More effort in forest management, especially in the heavily forested SE part of the state. For example: there is too much work and not enough Extension personnel.
7. Programs and materials on invasive species management for small woodlot owners
8. Programs and materials on urban soils, especially as it relates to remediation and urban agriculture
9. More information on rural health care (i.e.: the work Shoshana Inwood is conducting)

Food Science and Technology

1. Programs and materials on cottage foods, food safety and handling, value added products
2. Work with alternative dairy products and marketing
3. Need educational materials and programs on lab grown meats, GMOs, and alternative food products

Agricultural Communications, Education, and Leadership

1. In-service trainings to help educators become better teachers
2. Help with science communication such as GMOs, climate change, etc.

3. Extension teaching -- for those in Agriculture Education to teach in high school, there is student teaching. What is Extension's equivalent for Extension teaching?
 - a. What does the 80-hour Extension experience mean? How much teaching does that mean?
 - b. Can these students be interns for the summer?
4. Training on effective program evaluations
5. Research on how Extension educators can more effectively reach clientele, such as forms of communication/media, online learning methodologies, outreach through social media vs. email

Food, Agricultural, and Biological Engineering (FABE)

1. FABE is very responsive, comes out to teach, provides information,
 - a. Appreciate their willingness to come speak to producer groups wherever they are and whenever asked.
2. Communication on how Extension educators can stay ahead of technology shifts and changes

Veterinary Medicine

1. Small ruminant and beef specialists
2. Provide the results on irrigation and E.coli projects
3. Department is very responsive to requests for assistance

Professional Development

New Hire Onboarding

As of February 5, 2020, new county professional participate in and on-campus Day 1 orientation conducted every other Monday (twice monthly). Area leaders will assign mentors to newly hired county educators. A more thorough orientation for all educators (similar to the OSU Extension 4-H 101 program) begins later this spring. The state ANR office plans to develop their own program for orienting new educators

During the Year In-Service Training Opportunities

During the year, formal in-service training opportunities are offered and conducted by the state ANR office. These opportunities include:

Summer ANR Retreat: Held annually in June in different locations across Ohio, the retreat combines field trips and indoor sessions on a wide range of ANR topics. Planning begins in July of the preceding year, and is led by the Ohio NACAA vice president. The vice president is then president during the retreat. The VP will select a steering committee, and will put together an agenda for the retreat. Final approval of the agenda and location selection lies with the assistant director for ANR. While the retreat is mostly for county educators, specialists are typically included on the planning committee and are encouraged to attend.

Farm Management: The annual farm management in-service lasts two days and is typically held in October. The agenda is put together by the Ohio Ag Manager (OAM) team and may include outside speakers from farm credit agencies, banks, attorneys, and others with experience in farm management issues.

Pesticide Safety Education: The two-day pesticide safety in-service is the most comprehensive of all ANR in-service trainings. It is organized by the pesticide safety education office, which is part of the state ANR office. Specialists from many of the academic departments will present on the latest insect and disease issues, along with presentations on core subject matter areas. The night of the first day of the in-service is typically reserved for an ANR update from the assistant director.

Departmental In-Services: While not held on a regular basis, department specialists will conduct in-service trainings. Often times these come from requests from county educators, or pressing needs coming from stakeholders. Examples of Departmental in-service trainings include beef quality assurance (BQA), Palmer Amaranth identification and management, and precision U among others. With declining numbers of specialists and a decrease in Extension activity from some departments, in-service trainings in particular have been difficult. CFAES leadership is developing accountability guidelines for the three main funding lines (teaching, research, extension) for each department. The state ANR office is hopeful that this will stimulate more in-service and general Extension production out of the departments.

Program Development

OSU Extension ANR program development is largely driven by the efforts of the ANR programmatic teams. Team members include county educators, program assistants, program coordinators, departmental specialists, state office personnel and non-university partners. Each educator is expected to be an active member of at least one team. Team leadership is typically comprised of both a specialist and educator. Team leadership is changed as needed to bring in new ideas and to help spread the work.

Teams meet at least semi-annually to program plan, develop strategies for delivering programs (ie pesticide safety education), and to develop curricula.

A listing of ANR Teams is provided below:

Beef Team	Precision Agriculture Team
Dairy Working Group	Produce Safety Team
Direct Marketing Team	Shale Energy Team
Floriculture Team	Sheep Team
Grape/Wine Team	Small Farms Team
Integrated Forage Management Team	Swine Team
Local Foods Team	Urban Agriculture Team
Nursery and Landscape Team	Vegetable and Fruit Team
Ohio Woodland Stewards	Veterinary Medicine
Pesticide Safety Team	Women in Agriculture
Poultry Team	

Educator Specializations

The purpose of educator specialization is to improve Extension programs by:

1. Providing expertise to clientele
2. Increase efficiency since educators will not need to devote teaching preparation time to all specialty areas
3. Strengthen teams' ability to address pressing issues statewide.

Extension ANR educators specializing in a certain area are expected to seek extra training, teach, contribute to team efforts and develop creative and scholarly works in their specialty. Educators are encouraged to link with appropriate faculty both in and out of state who work in the same or similar specialization. Educators are expected to dedicate 25 percent of their time to their chosen area of specialization. At this time, there is no standardized set of specializations for the educators to choose from.

Specialization provides an opportunity for educators to share their expertise in their area and statewide within their teams and with multidisciplinary teams. Several ways an individuals' expertise can be shared include:

1. Information: Ohio peers call or contact the educator seeking help in answer questions or developing teaching materials.
2. Teaching materials and curriculum: Educators often share teaching materials, copies of peer reviewed materials, visual aids, etc. with other educators. Newsletter items or news releases can be used by other with credit given to the original author. Curricula developed by one educator, and subsequently used by others is beneficial during the annual performance appraisal process.
3. Teaching assistance: Educators often teach in other counties, states, national meetings and other countries on their area of expertise.
4. Applied research: Faculty educators participate in applied research projects within their area of specialty.
5. Program and interdisciplinary teams: Educators' expertise is used to enhance educational efforts of an Extension team(s) in addressing a critical issue or theme.

Agriculture and Natural Resources Programming

CFAES Task Forces

Task forces have been utilized in recent years to bring together the breadth of expertise across the college to address specific problems of immediate concern. These task forces have been formed by Dean Kress and given a clear directive on what is expected. Three Task forces have been created, and these are Water Quality, Farm and Rural Stress, and Agricultural Crisis.

Task Forces are one of the ways CFAES and OSU Extension will address statewide of immediate importance moving forward. The goal is that the task force will complete their assigned charge from the dean, report back to her and disband once the work is completed. Below is a more detailed explanation of the Ag. Crisis Task Force: why it was created, what it accomplished, and its future.

Agriculture Crisis Task Force

Historic precipitation from autumn 2018 through summer 2019 created Ohio's worst planting year on record and contributed to a near-record low level of hay to feed livestock in the state and across the Midwest. Coupled with low commodity and feed prices, and uncertainty with international tariffs on American agricultural goods, many Ohio farmers and producers are struggling.

Out of this tremendous need and at the direction of Dean Kress, the Agriculture Crisis Task Force (www.go.osu.edu/agcrisis) was created. It consists of CFAES experts who can connect farmers, producers, and their families with Ohio State University Extension specialists or specialists within the community to offer the best science-based recommendations for solutions to current issues. The assistant director for agriculture and natural resources and the associate dean of the Wooster campus were made co-chairs.

The Agriculture Crisis Task Force developed a webpage (www.go.osu.edu/agcrisis) as a one-stop resource that links all CFAES team websites into one portal where farmers and producers can quickly find answers to their emerging questions. At the page, resources are available for:

- grain and forage production.
- livestock and dairy production.
- grape, fruit, and vegetable production.
- digital agriculture.
- farm stress.

The task force also:

- provided tools that farmers could use to make decisions on the economics of prevented plantings. (By summer 2019, Ohio had 1,563,240 acres of prevented plantings of all crops)

- identified alternative forages and feed supplements, identified cultural and agronomic practices for emergency forages, provided spreadsheet tools to assist in pricing forages standing in the fields, and provided guidance on how to handle seed that was not planted.
- provided information on how to manage dairy farms' limited forage supplies.
- explained the federal changes that allowed farmers who were prevented from planting a cash crop due to rain, to be able to plant a cover crop and still be eligible to receive some federal trade assistance through the Market Facilitation Program. (This aid was in addition to crop insurance payments on those acres.)
- provided information on how farmers can use cover crops for feed, and identified cover crops such as oats, buckwheat, or cereal rye, which can hold in place valuable topsoil, reduce weeds in a field, and add crucial organic matter to a field.
- provided farmers access to enterprise budgets (www.farmoffice.osu.edu/farm-mgt-tools/farm-budget) to aid in their decision making.
- offered "Income Tax Schools" classes, with a portion of the classes dedicated to income tax issues related to the unusual conditions in Ohio from autumn 2018 through spring 2019.
- offered information at the 2019 Farm Science Review. For example, the majority of the FSR "Ask the Expert" workshops featured the following topics aimed at helping farmers and producers deal with the 2019 agriculture crisis: Tax Strategies Under the New Tax Law, Crop Inputs and Cash Rent Outlook for 2020, Farm Income Forecasts, 2018 Ohio Corn and Soybean Production Costs, Where We Are on U.S. Trade Policy, Commodity Markets—Finding Silence in the noise.

A slogan used in marketing the Task Force, and Ohio State in general was #LeanOnYourLandGrant. We wanted to make sure our farmers knew that Ohio State was there to help through this crisis.

A new task force effort underway is to determine the effects of the planting season on agricultural suppliers. The economic conditions created by the planting season are showing ripple effects through many of our farm communities. With 1.5 million acres not planted, there were many ag businesses which experienced decreases in sales. These included seed and fertilizer retailers, pesticide applicators, equipment retailers, and a myriad of other related businesses. The task force has created a survey which will be distributed in cooperation with the Ohio Agri-Business Association to determine the 2019 planting season effects on these suppliers. With this information in hand, we can then determine how Extension can help them through these difficult times.

It is our hope that planting conditions in the spring of 2020 will return to 30 year normal conditions and the Task Force can disband. However, the forecast for the coming spring planting season is much the same as last year, with extensive rainfall. If this forecast comes to fruition, then the Task Force will be poised to help our farmers and agribusinesses through the crisis.

Some Programs Unique to Ohio State ANR

The ANR program area has many programs which are unique to our diverse expertise and clientele. Some of these programs are fairly common nationwide, other are unique to OSU. Described below are several of the more unique programs conducted by OSU Extension ANR.

Farm Science Review

Roy M. Kottman, a former dean of Ohio State's College of Food, Agricultural, and Environmental Sciences (known as the College of Agriculture at the time) is credited for launching Farm Science Review. At the time, the college was looking for a replacement to "Farm and Home Week," a 46-year-old program that came to its end in 1959. In 1961, Kottman was approached by M.R. Maxon, regional branch sales manager for International Harvester Corporation. Maxon wanted to know if Ohio State was interested in sponsoring a farm machinery show that would include field demonstrations and educational displays.

Meetings between Kottman and Maxon soon involved Ray Mattson of the Columbus Tractor Club, Thomas Wonderling of OSU Extension, and Robert P. Worral from the College of Agriculture. In March 1962, the group finalized a "Memorandum of Agreement" among the Ohio Expositions Commission, The Ohio State University and the Ohio Agricultural Research and Development Center. Later that year, Ohio State President Novice G. Fawcett signed the memorandum. Dean Kottman signed for the College of

Agriculture and Rowland Bishop signed for the Ohio Expositions Commission. Farm Science Review was officially born.

The first show was held in 1963 at The Ohio State University Don Scott Airport in northwest Columbus, Ohio. That first year, more than 18,000 visitors paid 50 cents a ticket to view 116 commercial exhibits and be the first to witness no-till corn demonstrations. For the next decade, visitors were treated to such programs as research on 20-inch (510 mm) and 30-inch (760 mm) corn rows, the introduction of big farm equipment, solid-row soybean planting, conservation exhibits, fertilizer application by airplane, and research to fight corn blight.

In August 1982, The Ohio State University purchased the Upper Gwynne South farm of Mrs. Marie (Molly) Brown Caren. The intent of the farm was to serve as the home for the annual Farm Science Review and as a new home for the experimental agricultural fields now near Don Scott Airport. The area around the Don Scott Airport in N. Columbus was rapidly urbanizing and it was felt that agricultural operations will become more difficult there. (To this day, Ohio State has beef cattle research at the Don Scott Field, surrounded by businesses and neighborhoods which provides some interesting situations and learning opportunities). Since this first land purchase, an additional 1,200 acres have been purchased to bring the Molly Caren Agricultural Center (MCAC) to approximately 2,200 acres.

The MCAC near London, Ohio (approximately 25 miles west of Columbus on Interstate 70) is home to the Farm Science Review which attracts more than 100,000 visitors from all over the United States and Canada. These guests come for the three days to peruse 4,000 product lines from more than 600 commercial exhibitors, and learn the latest in agricultural production. The educational programs feature Ohio State and Purdue county agents/educators and specialists and are second to none in the agricultural exhibition world.

The 100-acre exhibit area allows visitors and exhibitors to experience all aspects of agriculture production. Inside the exhibit area are the static displays, but the FSR dedicates more than 600 acres of land for field demonstrations such as corn and soybean combines, tillage, nutrient and lime applications, drone demonstrations, and drainage installations.

Unique to the Farm Science Review among all other agricultural trade shows is the Gwynne Conservation Area (GCA). The GCA is a 67-acre demonstration and education area for agriculture and natural resources management practices. The Gwynne is home to a natural stream, wetlands, ponds, windbreak plantings, crop tree plantings, wildlife food plots, soil pit, riparian forests, dry hydrant, pollinator studies and much more. The GCA also has an all-season log cabin where educational sessions and classes are taught.

Extension ANR plays a large role in the annual FSR. The assistant director for ANR serves as chair of the Educational Programs, Program and Policy, and Gwynne committees. Each of these committees play a role in developing programs, guidelines, and policies for the FSR. Membership on these committees comprises county Extension educators, state specialists, OARDC personnel, and non-university partners. The assistant director for ANR also serves on the FSR Executive Committee and FSR Finance Committee. Administratively, FSR is jointly supervised by OSU Extension and OARDC. There is a show manager supervised by the Extension director. The director of farm operations for FSR is supervised by the OARDC farms supervisor. This structure went into place in 2016 and, on the face, seems cumbersome. However both the show manager and farm manager have been part of FSR for many years. Both sides work together closely to ensure that the annual FSR is as good as possible. All FSR staff, the state ANR office staff, and many county educators work tirelessly to ensure all is ready for the show.

Planning for FSR educational programs begins in March and continues on through September. More than 100 hours of educational opportunities are provided during the three day review on a wide range of topics including small farms, farm business management, natural resources, and agronomic crops. There is also an "Ask an Expert" session which provides 42, 20-minutes sessions with experts in a wide range of fields and from within and outside the university.

FSR is the single largest Extension event for OSU Extension and comprises some 15 percent of annual time for the state ANR office. Funds supporting FSR activities supported by the state ANR office have traditionally come from the CFAES dean. More recently, a gift from Becks Seeds has been used to cover expenses.

Ohio State University Income Tax School Program

The Ohio State University Income Tax School Program began 56 years ago as an effort to provide education for rural tax professionals, farmers and others affected by tax law. Continuing educational credits are offered for the majority of the programs and designed to meet requirements of clientele throughout Ohio with continuing education needs.

Two-day income tax schools were offered in nine locations throughout Ohio in 2019. An option to attend one day only was also offered. In addition to registering for the tax school, participants can order reference books that generate additional department income.

The Agricultural and Natural Resources Income Tax Webinar is a six-hour live webinar geared for farm tax preparers and large farms preparing their own returns. This, too, offers continuing educational credits. Our Farmer and Farmland Owner Webinar is a two-hour webinar targeting farmers and farmland owners who prepare their own returns or want to know more about farm tax law. These webinars are recorded and available for playback to participants throughout the tax filing season.

Tax professionals need continuing education credits in the field of Ethics, which is provided with our live Ethics webinars.

In 2019, a Summer Income Tax Update was added to the program. In its inaugural year, 62 attendees participated in the event held at the Nationwide and Ohio Farm Bureau 4-H Center. This year also marked the first year we charged a separate fee for our Ethics training, which previously was included with a tax school registration.

Our audience:

- Attorneys
- CPAs
- IRS Enrolled Agents
- Certified Financial Planners
- Professional Tax Preparers
- Farmers and Farmland Owners

Our programs:

- 10 two-day income tax schools offered late October through early December
- Summer Income Tax Update
- Ethics webinar
- Agricultural and Natural Resources Webinar
- Farmer and Farmland Owner Webinar
- Various articles and news media citations related to tax issues

Primary Partners:

- Land Grant University Tax Education Foundation (LGUTEF)
- Internal Revenue Service
- IRS/ National Farm Income Tax Extension Committee

Our continuing education partners:

- Ohio Board of Accountancy (CPAs)
- Ohio Supreme Court
- Internal Revenue Service
- Certified Financial Planner Board

Other partners:

- Ohio Department of Taxation (CPAs)
- Enrolled Agents Association

Our personnel:

Tax School director: 50 percent appointment (Current LGUTEF Board director)

- Directs program to ensure mission is met and program is sustainable
- Assists in writing the national tax publications
- Ensures curriculum meets continuing education provider requirements
- Seeks and contracts qualified instructors
- Develops and teaches agricultural and natural resource tax law programs
- Evaluates program and develops/implements enhancements

Tax School Program Assistant: 50 percent appointment

- Contracts venues and coordinates school logistics
- Develops marketing materials and markets program
- Develops registration website and serves as primary registration contact
- Proctors schools and webinars tracking attendance hours in-person and via webinar participation reports
- Reports continuing education credits and issues certificates of completion

Land Grant University Tax Education Foundation (LGUTEF)

Our primary partner in delivering our educational programming throughout the year is LGUTEF. The Land Grant University Tax Education Foundation Inc. (LGUTEF), is a non-profit corporation organized by representatives of land-grant universities that teach tax education programs for professional tax practitioners. The Ohio State University has been a member since LGUTEF was organized in 2001. Prior to this, Ohio State was a member of the organizational predecessor which was a group of Universities dedicated to developing top educational materials in the area of tax law.

Publications

Annually LGUTEF plans, writes, develops and publishes the “National Income Tax Workbook” which is used to teach workshops, institutes, seminars, and forums in more than 30 states for more than 29,000 tax professionals. The writing/development process includes a planning meeting in February of each year where all Workbook users are invited to evaluate the prior year’s material and suggest topics for the next year. After consensus, LGUTEF develops the topics – from 12-20 – that will be in the approximate 700-page Workbook for the year.

An Ag Tax Issues Workbook is also developed, authored and made available to member institutions. This workbook is used in our Ag Tax Issues Webinar.

In addition to the National Income Tax Workbook, the group is working on auxiliary publications to supplement the curriculum. A “Small Farm/Urban Ag Tax Issues Workbook” is in development and will be produced in 2020.

Planning

In addition to curriculum development meetings, the annual planning meeting is attended by most state coordinators and a select few of their key instructors. Ideas are shared for publicity – what works and what doesn’t work. The group shares brochures and web site ideas, discuss the financial issues that our programs face and share administrative successes. Collaboratively we register our courses for accreditation by national organizations where possible.

LGUTEF Mission Statement

Coordinate the development of educational materials to support the tax educational programs of Land Grant Universities, and provide a vehicle to share educational materials. Also provide a method for giving

professional recognition to faculty and staff who have developed tax education material, and support members in acquiring teaching material and skills and other professional development activities.

Participating States:

Alabama	Michigan	Oklahoma
Arkansas	Minnesota	Pennsylvania
Delaware	Missouri	South Carolina
Florida	Mississippi	Tennessee
Georgia	Nebraska	Texas
Illinois	Nevada	Utah
Indiana	New Hampshire	Vermont
Iowa	New York	Virginia
Kentucky	New Jersey	West Virginia
Louisiana	North Carolina	Wisconsin
Massachusetts	Ohio	

OSU Extension Income Tax Schools: 2019 results:

2-day attendees	726	Ethics webinar attendees	277
1-day attendees	24	Ag Tax Issues Webinar	163
Farm and Farmland Owner Webinar	67	Summer Income Tax Update	61

Our future:

With the success of the Summer Income Tax Update, another will be presented in 2020. We are also looking to develop more topic-related programs. Some of this will come from our LGUTEF partnership as they explore more auxiliary publications. A 10th tax school location will also be added in the Cincinnati area for 2020.

OSU Agricultural and Resource Law Program

History of the Program

The current Agricultural and Resource Law Program in Ohio State University Extension traces back to Paul Wright, who served as a district farm management specialist for OSU Extension in the 1970s. Upon recognizing the legal issues farmers in Ohio were encountering, Paul obtained a law degree from the University of Toledo and persuaded OSU Extension and Ohio State's Agricultural Economics Department (now AEDE) to move him into an Agricultural Law specialist position. The move was timely, and allowed Paul to provide critical resources on bankruptcy law to Ohio's farm community in the midst of the financial crisis of the 1980s. Paul continued in this position for 20 years before retiring and opening a private law firm.

Several years after Paul's retirement, OSU Extension contracted with Paul's law firm for the services of Peggy Kirk Hall, an attorney with the firm. Peggy provided agricultural law education services to OSU Extension on a part-time basis while continuing in private practice. The Agricultural, Environmental and Development Economics Department (AEDE) also contracted with Peggy to teach its Agricultural Law course for undergraduate students in the College of Food, Agricultural, and Environmental Sciences. In 2000, OSU Extension hired Peggy into a full-time position as a Sr. Extension associate to direct the OSU Agricultural and Resource Law Program. OSU Extension later created a field specialist faculty position in Agricultural and Resource Law and appointed Peggy to the position. AEDE continues to contract with Peggy to teach its Agricultural Law course.

Program Staff

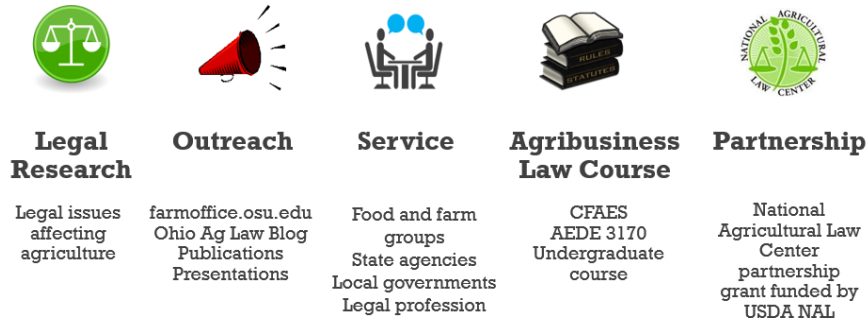
- Peggy Kirk Hall, Associate Professor in Agricultural and Resource Law, director
- Ellen Essman, J.D., Sr. Research Associate
- Kevin Hivich, Law Research Fellow

- Jonathan Cottingim and Abby Wood, Student Interns
- Evin Bachelor and Robert Moore, Wright & Moore Law Co. LPA, Consulting Attorney

Program Mission

"Informing Ohioans and Ohio's agricultural community through legal research and outreach."

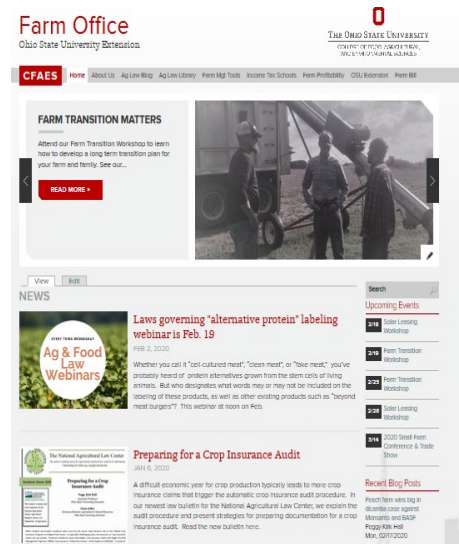
What We Do and How We Do It



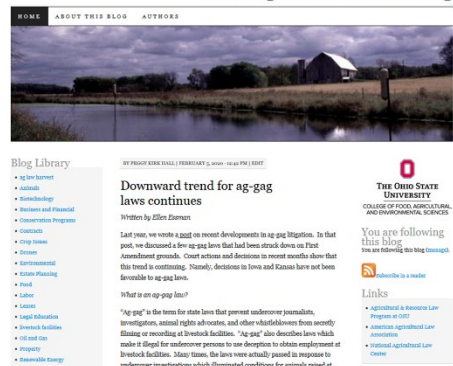
Legal Research: Internet Resources

The "Farm Office" website at <https://farmoffice.osu.edu> houses our internet resources along with resources from Ohio State's Farm Management and Income Tax Schools programs. In 2019, 63,532 visitors to the website viewed 117,327 website pages. The four components of agricultural law information on Farm Office are:

- Ohio Ag Law Blog. We author several blog posts per week on agricultural law issues of importance to Ohio. Our blog posts range from case updates and legislative news to topic-oriented feature articles. Users can subscribe to receive the blog free via e-mail. We currently have 790 blog subscribers.
- Ag Law Library. Our library houses legal resources in 23 different areas of agricultural law. The resources include our publications, relevant court cases, statutes and regulations, and links to other resources.
- News. We utilize the news portion of our website to inform users of new publications and upcoming webinars with the National Agricultural Law Center.
- Events. Our event calendar provides information about meetings, workshops and other presentations that we engage in across Ohio and the country.



Ohio Agricultural Law Blog



Legal Research: Publications

Publications are an important program output. Over the years, we have focused on the production of fact sheets or “Law Bulletins.” In the past year, we have added more in-depth guides and reports to our publication portfolio.

- Our Law Bulletins present “law you need to know” topics to Ohioans. The bulletins are freely available on the Farm Office website. We currently have 45 bulletins available and 11 bulletins in process.
- Our guides and reports are also available on our Farm Office website. Examples of recent products include “State Legal Approaches to Reducing Water Quality Impacts from the Application of Agricultural Nutrients,” “The Farmland Owner’s Guide to Solar Energy Leasing,” “The Lake Erie Bill of Rights,” and the upcoming “Selling Farm Grown and Homemade Food Guide” and “Farm Neighbor Law Handbook.”

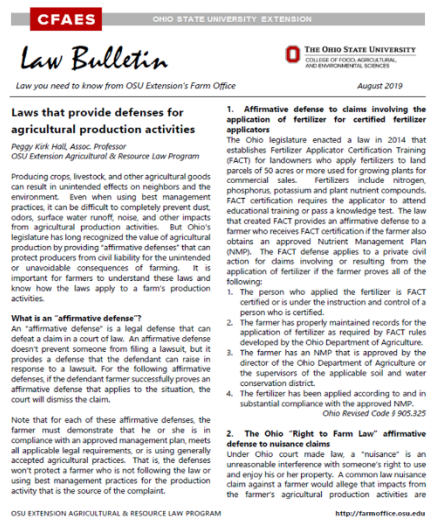
Outreach: Direct Contacts

The Agricultural and Resource Law Program regularly interacts with thousands of individuals annually in the following ways:

- Presentations and workshops. We work closely with OSU Extension educators to present for ongoing programs and conferences such as New and Small Farm College, Women in Agriculture, Conservation Technology Conference, Farm Science Review Ask-an-Expert, and Agricultural Outlook. We also collaborate with other Extension professionals to conduct focused workshops such as Solar Leasing 101, Planning for the Future of Your Farm and Ohio Farm Leasing Workshop. Invited presentations are common also, and have recently included Ohio Township Association Annual Conference, Soil and Water Conservation District Annual Meeting, West Virginia Land Use Academy, Western Lake Erie Basin Conference, OEFFA Annual Conference and Ohio Hemp Summit.
- Farm Science Review. A second source of direct contact with Ohioans is our annual Farm Office booth at the Farm Science Review, where we distribute hundreds of our law bulletins and are available for questions.
- Regional and National Conferences. We present beyond Ohio’s borders to conferences such as the American Agricultural Law Association Conference, National Association of County Agricultural Agents, Extension Risk Management Conference, and Universities Council on Water Resources.
- Phone and e-mail contacts. Every year, we answer hundreds of questions via phone and e-mail from farmers, community residents, local officials, Extension educators, and the media.

Service to Stakeholders

The program frequently assists stakeholders with needs for agricultural law information. Recent examples include: serving as the secretary for the County Commissioner Association of Ohio’s Drainage Task Force, which culminated in drafting a legislative proposal to revise drainage laws; meeting with OEFFA’s program staff and Begin Farming coordinator to discuss agricultural issues and familiarize them with our resources; meeting with the Ohio Dairy Producers Association to discuss impact of Lake Erie Bill of Rights; conferring with Ohio Department of Agriculture’s Legal Counsel on road weight laws; helping Ohio State Fire Marshall understand agricultural zoning laws and aiding the Ohio Township Association with disputes over agritourism legal issues.



Agribusiness Law Course

Peggy Kirk Hall contracts with Ohio State's AEDE Department to teach its AEDE 3170 Agribusiness Law course. Each year, the course teaches 70—140 undergraduate students in the College of Food, Agriculture and Environmental Sciences about core areas of law that impact agricultural businesses and professionals.

Partnership with the National Agricultural Law Center

The National Agricultural Law Center at the University of Arkansas (NALC) selected Ohio State's Agricultural and Resource Law Program as one of its partners in a five-year grant with the National Agricultural Library of the U.S. Department of Agriculture. We began the partnership in 2016 and have received \$500,000 in funding to date, allowing us to add several staff positions to the program. Many of the research publications noted above are the result of this ongoing partnership.

Collaborative Forest Management in Southeast Ohio: the Ohio Interagency Forestry Team

About 60 percent of Ohio's 8 million acres of woodland is dominated by oaks. Typically, the regeneration under these oak canopies are shade loving species, most often red maple. Once the large canopy oaks die or are harvested, they are often replaced by species other than oak. As a result, the long-term sustainability of these oak-dominated forests are in jeopardy. The goal of the Ohio Interagency Forestry Team (Forestry Team) is working to "tip" these ecosystems back to healthy, regenerating oak forests with diverse age classes. The priority focus area of the team is a 17-county area in southeastern Ohio. This area contains 43 percent of Ohio's forest resources, 17 of 21 state forests and the state's only national forest (Wayne National Forest).

The Forestry Team has developed gradually over the years under a shared vision among forestry agency leaders. In 2008, the USDA NRCS, USDA Forest Service, and the Ohio Department of Natural Resources Division of Forestry signed a Memorandum of Understanding to establish a Joint Forestry Team in Ohio. This team was chosen as one of the National Landscape Restoration Partnerships by the Chiefs of both the Forest Service and Natural Resources Conservation Service.

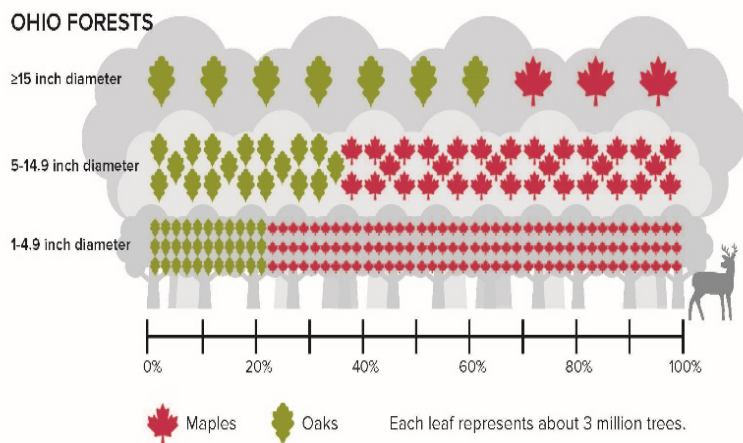
In 2015, Ohio received funding through an incentive allocated over three years to facilitate collaborative oak management in southeast Ohio.

As part of an agreement with the Division of Forestry, Ohio State University Extension joined the team and provided the services of a natural resources specialist to lead the team's outreach efforts. In 2017, Central State University added a Forestry Extension position to strengthen the team's outreach capacity. These Cooperative Extension forestry specialists actively participate as the middle-managers level on the team.

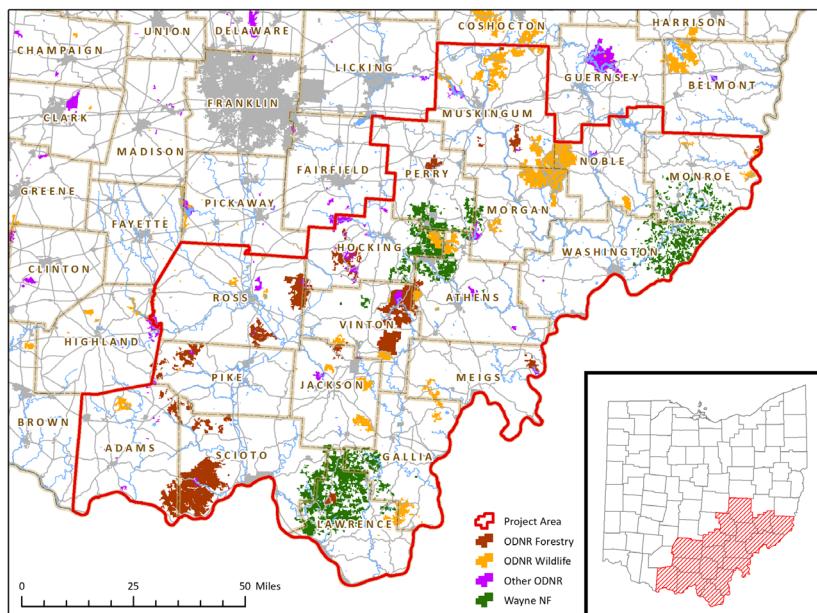
Team Outreach efforts

Southeast Ohio Woods serves as the umbrella for woodland owner outreach efforts in the area. Educational programs conducted under this umbrella include A DAY in the WOODS, Tree Talk on YouTube, Women Owning Woodlands (coordinated by CSU Extension) and the Call Before You Cut program. Southeast Ohio woods also uses social media (a website: www.u.osu.edu/seohiowoods, Facebook, and Twitter) and a list-serve to market the programming. This website reached 5,458 users in 8,393 sessions in 2019.

This graph represents the relationship between oak and maple populations in 17 counties in southeastern Ohio, the focus area our collaborative oak efforts. For every one canopy tree (>15 inches), there are approximately five mid-story trees (5-14.9 inches) and 15 understory trees (1-4.9 inches). Each leaf represents about 3 million oak trees.



Source: Thomas Albright, 2018. U.S.D.A., Forest Sciences, Northern Research Station, Forest Inventory and Analysis. From 2017 FIA Ohio Data.



OSU Extension has partnered with ODNR-Division of Forestry and others on Call Before You Cut (callb4ucut.com) since it became a statewide effort in 2006. Since that time, it has expanded to nine mid-western and eastern states. OSU Extension responds to all requests for information received from www.callb4ucut.com.

A DAY in the WOODS, our flagship program in Southeastern Ohio was developed in 2012 as a collaborative effort between OSU Extension and ODNR to enhance participation of Ohio's Appalachian woodland owners in forestry and natural resources

educational efforts. A DAY in the WOODS is coordinated by OSU and CSU Extension.

A DAY in the WOODS holds monthly workshops (May - November) covering a wide variety of topics include tree identification, wildlife management, forest management, prescribed burning, etc. It utilizes grassroots marketing, a list-serve, and a blog site to successfully reach woodland owners in the region. Each year a committee consisting of representatives from collaborating agencies and organizations works together to develop a calendar of events for the upcoming season based on suggestions of previous attendees, with focus areas from partnering agencies. Much of the programming occurs at the Vinton Furnace State Forest, which has been utilized as a US Forest Service Experimental Forest since 1952.

Partners provide support in many ways including marketing, logistics, instruction, planning, and funding. Partner benefits include strong, mutually beneficial relationships with each other and with participants, as well as numerous continuing education opportunities. To date more than 100 natural resources professionals from 25+ organizations have taught at A DAY in the WOODS programs. A small registration fee of \$12 per session is used to defray the cost of lunches

In addition to A DAY in the WOODS, our natural resources specialist leads or assists with a wide variety of forestry and natural resources programs and events in Southeastern Ohio and throughout the state. In 2019, more than 4,500 direct contacts were reached at nearly 80 programs and events.

Our audiences:

- Appalachian Woodland Owners
- Woodland Enthusiasts
 - General public
 - Future woodland owners
- Natural Resources professionals

A DAY in the WOODS Program Participation

Year	# Programs	Attendees	Acres Owned
2012	8	248	10,222
2013	8	264	8,084
2014	7	254	17,955
2015	8	385	16,858
2016	10	458	29,383
2017	11	472	16,798
2018	8	413	11,902
2019	9	419	11,696
	69	2,913	122,898

- Foresters
- Wildlife biologists
- Loggers
- Students enrolled in forestry and natural resources programs
- Others
 - Youth
 - Educators
 - OSU Extension Educators
 - Agriculture and Natural Resources
 - 4-H

Our principal partners:

- United States Department of Agriculture
 - Forest Service
 - Wayne National Forest
 - State and Private
 - Northern Research Station
- Ohio Department of Natural Resources
 - Division of Forestry
 - Division of Wildlife
- Universities and Colleges
 - Central State University
 - Hocking College
 - OSU- School of Environment and Natural Resources
- Local Soil and Water Conservation Districts

Ohio Woodland Stewards Program

There are more than 7 million acres of non-industrial, privately owned forests in Ohio. This resource provides habitat for game and non-game wildlife and grows timber for an industry which employs more than 130,000 Ohioans. The resource purifies water, stabilizes soils, improves the quality of the air that we all breathe and contributes \$27.2 billion in economic activity to the state. Even though the total acreage of this resource has steadily increased since the 1940's, poor harvesting practices, insects, disease, and other forest health threats jeopardize this valuable resource.

In order to help landowners make informed decisions about the management of their woodlands, Ohio State University Extension and ODNR Division of Forestry initiated the Ohio Woodland Stewards program in the late 1980's. A multiple-day Woodland Stewards Program was the result of their efforts. From 1990 through 2001, a total of approximately 700 landowners completed the workshop. As a result, these woodland owners are better equipped to make decisions about the management of their forests.

In 2002, a 'new' version of the Ohio Woodland Stewards program was launched with the intent to broaden the course offerings so that more topics were covered, some with more depth than was given in the three-day Woodland Owners Workshop, and some geared more towards new forest landowners. Things like tree identification and tree planting and herbicides can easily fill a day when going into the depth that some landowners are looking for. To this effort additional natural resource focused Extension staff were added to the system with a coordinator for the program.

In 2001, a team of resource personnel were pulled together to be the driving force behind this new program structure. This team consists of multiple agency members (Extension, Ohio Department of Natural Resources, Divisions of Forestry and Soil and Water Conservation and Ohio Forestry Association) all with a focus on private non-industrial woodland owner education. This team meets multiple times a year in order to discuss and address issues Ohio's forests are facing.

With the movement to expand and focus on programming for woodland owners there was a concerted effort to pull the University's RREA funds (Renewable Resource Extension Act) into one location as a means of support for the program moving forward. Prior to 2001, the funds were scattered around the state spent mostly on personnel but not specifically on woodland owner programming. Once

accomplished, these funds became an integral part of the program's future within the School of Environment and Natural Resources and allowed the School to be the hub for woodland owner education in the state Extension program. These funds are used to support the program through support staff, equipment (forestry tools, color printers, lcd projectors etc.), educational materials for workshops and a newsletter just to name a few.

In a state where there are around 330,000 private non-industrial woodland owners what these individuals do or don't do on their forestland has many impacts on Ohio's valuable resources now and in the future. The *Ohio Woodlands Watersheds and Wildlife* newsletter is an important part of the Ohio Woodland Stewards Program. While the primary focus of this newsletter is woodland owners and their needs, the newsletter is also distributed to Ohio House and Senate Agriculture and Natural Resource committee members, a variety of natural resource-based groups (such as Audubon chapters, Izaak Walton League, and The Nature Conservancy) and regional woodland owner interest groups. The intent in such a broad distribution is to keep closely related groups informed on what is going on within the state and hopefully pulling in woodland owners that have not been reached in the past. There is always a need to reach those woodland owners across the state who are looking for information and not sure of where to go for it.

The intent of the articles is to offer woodland owners the latest information and give them the opportunity to broaden their knowledge base. The newsletter also helps to advertise the classes being offered. In its first full year of publication the newsletter circulation went from around 700 to over 2,000. Anyone who attends a Woodland Stewards class is added to the mailing list, but those visiting the web site (<http://woodlandstewards.osu.edu>) can sign up to receive the newsletter whether they have attended a class or not. It is offered in both print and online formats and everyone may choose which format they want to receive it in.

One area of support for the RREA funds is producing educational materials that help educate landowners about the invasive species that are impacting Ohio's forest resources. What started with EAB (emerald ash borer) now includes, hemlock woolly adelgid, spotted lanternfly, viburnum leaf beetle, gypsy moth, Asian longhorned beetle and thousand canker disease. These funds have allowed us to create and maintain an invasive species reporting app – *Great Lakes Early Detection Network (GLEDN)*. There have been tabletop banner stands and small ID cards created to help detail the invasive species that are impacting Ohio's woodlands. These are critical pieces of our programming efforts on invasive species and allow us to partner with other agencies to help get the word out.

The Woodland Stewards Program has also expanded its impact into offering natural resource professionals continuing education programming. Programs offered for professionals may include education credits for the Society of American Foresters Certified Forester program, International Society of Arborists and Ohio Department of Agriculture's pesticide certification program. These professionals are constantly looking for ways to keep their skills and knowledge base up to date along with needing continuing education credits to keep their certifications current. Many of these are professionals that work with woodland owners to help them manage their resource. Keeping them up to date on the critical issues impacting Ohio's forest resources is a key component of today's Woodland Stewards Program.

One of the successful programs for professionals is the annual *Ohio Woodland Water and Wildlife Conference*. In its 14 years, it has grown from approximately 100 attendees to about 280 (as of 2020). The woodland acreages covered by the attendees easily exceeds 70,000 acres that are scattered around the state. Various continuing education credits are offered depending on the talks of the day.

The professionals also wanted more programming to help them diagnose what is going on with various trees throughout the year. To that end an annual *Tree Diagnostics* workshop has been added to the programming list focused on helping both professionals and landowners sharpen their skills when it comes to diagnosing tree health issues. As our invasive species (plants, insects, diseases) lists continue to grow, these are the individuals who are on the front lines of finding new infestations. Our goal is to keep them as up to date as possible for early detection of any of these issues. Training them to use our invasive species app GLEDN helps us identify what is on the landscape and adds to the states mapping efforts for various invasive species.

There has also been programming offered to help various attendees (both professionals and landowners) sharpen their mapping skills. A laptop lab is part of the equipment that has been purchased and allows the classes to travel around the state to meet those needs. Maps are an integral part of management plans and many of today's programs require a management plan before a landowner can participate.

In 2020, the Woodland Stewards Program has a mailing list of about 8,000 for the newsletter and an online listserv that contains another 2000 individuals. The program has expanded into offering chainsaw safety classes by partnering with the Ohio Forestry Association and their CSAW program. There will also be some targeted programming for woodland owners who are looking for annual income streams from their property. Working with the Ohio Maple Producers and with additional support from an USDA ACER grant some hands-on programming for maple syrup production will be offered.

Another aspect of the program is participating in a tri-state woodland owners' workshop. The Ohio River Valley Woodland and Wildlife Workshop is in its 12th year and rotates around the states of Ohio, Indiana and Kentucky. This successful venture has pulled in more than 150 landowners annually. They are exposed to natural resource professionals from Ohio State University Extension, Purdue Extension and University of Kentucky Extension.

Manure Management Research and Outreach at Ohio State University Extension

Given the number of livestock in Ohio, the management of manure, especially in the Western Lake Erie Basin is critical. Ohio State University Extension has conducted liquid manure research on growing crops for more than 15 years to make better use of the available nutrients. Incorporating manure into growing corn can boost crop yields, reduce nutrient losses, and give livestock producers or commercial manure applicators another window of time to apply manure to farm fields. This additional window means more days of the year for applying manure to farm fields.

On-farm manure side-dress plot results can be obtained by clicking on the On-farm Research link on the OSU Extension Agronomics Crops team website at <http://agcrops.osu.edu/> or follow OSU Extension's manure research on Facebook at: Ohio State University Extension Environmental and Manure Management.

Journal articles developed from this research can be found in the *Journal of the National Association of County Extension Agents* starting in 2015:

Impact of a Drag Hose on Grain Yield of Corn
Sidedressing Emerged Corn with Liquid Swine Manure Using a Drag Hose
On-Farm Plot Results from Sidedressing Corn with Liquid Livestock Manure Using a Tanker
Wheat Yield Results from Top-dressing with Liquid Swine Manure
Corn Yield Results from Sidedressing with Liquid Livestock Manure

Since 2008, Ohio State University Extension has published more than 50 technical reports of on-farm collaborative research with manure on growing crops involving livestock producers in western and northwest Ohio. More than 15 county Extension educators have been involved in conducting these on-farm research and demonstration plots.

Drag-hose manure application videos can be found at OSU Extension's Nutrient Stewardship YouTube site: <https://www.youtube.com/channel/UC7jUsQNGM8fCHjbZUdT9pKw>

Thanks to Ag Credit, Farm Credit Services, the Ohio Pork Producers Council, the Ohio Dairy Research Fund, and the Ohio Corn Marketing Program for financially supporting manure research projects. Additional sponsorship for demonstration plots has come from the Great Lakes Sediment and Nutrient Reduction grant and the Ohio Environmental Education Fund.

OSU Extension Ag Weather and Climate Program Assessment

Position Overview

Aaron B. Wilson, Ph.D. is an atmospheric scientist with The Ohio State University (Ohio State), holding a joint appointment as a research scientist at the Byrd Polar and Climate Research Center (BPCRC) and OSU Extension. He is also a member of the State Climate Office of Ohio. Dr. Wilson's unique cross-college connections between the College of Food, Agricultural, and Environmental Sciences (CFAES-Extension), the Office of Research (BPCRC), and the College of Arts and Sciences (Department of Geography) provide ample opportunities to connect university-driven weather and climate research to communities throughout the state.

Engagement

Dr. Wilson's primary OSU Extension duties include engaging the Agricultural and Natural Resource (ANR) county educators throughout Ohio. These educators routinely invite Dr. Wilson to county-level programs to provide the most up-to-date weather and climate information for farmers and Ag-related clientele within the counties. Dr. Wilson also supports state specialists through engaged multidisciplinary research.

Dr. Wilson's engagements focus on the following deliverables:

- Our changing climate directly impacts our economic and environmental sustainability.
- Scientific evidence strongly supports that not only is our climate warming, but extreme weather events (e.g., floods, droughts, and heatwaves) are increasing in Ohio and the U.S.
- Scientific evidence demonstrates long-term changes in Ohio's climate including warmer temperatures (especially in winter/spring and at night), higher humidity, more annual precipitation, heavier spring/fall precipitation, increased frequency of intense rainfall events, and intensified hydrological cycle (short intense droughts within a wet year).
- These local climate changes increase risks to agriculture through additional heat stress on humans and livestock, unpredictable growing seasons, thriving environments for weeds and invasive species, disruptions between pollinators and crops, increased wetness duration and crop susceptibility to diseases and pests, weakened soil structure and decreased soil organic matter, increased potential for erosion, soil and nutrient losses contributing to degraded water quality, and threatened specialty crops due to extreme weather.
- Understanding these threats can move Ohio's agriculture community to build resilience, examples include increasing cooling capacity and improving feedlot conditions for livestock, improving soil and water quality and increasing water storage capacity through the use of cover crops and decreased tillage, and implementing additional water storage, tiling, and controlled drainage structures to maintain water for crops during the height of the growing season.

Since beginning his collaboration with OSU Extension in 2017, Dr. Wilson has engaged 119 programs throughout Ohio, directly reaching more than 6500

Table 1: Ag Weather and Climate Engagements

PROGRAM TYPE	# OF EVENTS
In Support of Extension Educators	60
County Meetings (e.g., Ag Days/Nights, Lenders, Outlook)	44
Farm Science Review	4
Master Gardener Volunteers	4
Turfgrass	3
ODA/Pesticide	5
Commodities (Corn & Wheat, Soybean, Pork, Poultry, Farm Bureau, Kiwanis, and Rotary)	16
County/State Soil and Water Conservation Districts, State Agency, Ohio Sea Grant	20
Others (e.g., Audubon, Ohio Food Policy Network, Ag Consultants)	8
Extension Engaged Conferences (e.g., Annual Meeting, Conservation Tillage, Climate Smart, OEFFA, OPGMA)	9
University Student Groups	6
TOTAL Engagements	119

participants (Table 1). Dr. Wilson has provided testimony to the Ag Subcommittee of the Ohio House of Representatives and county commissioners on the topics of climate change and water quality in the state. In addition to the county and state-centric events, Dr. Wilson's engages university groups and students, particularly in CFAES. He has taught guest lectures in agronomy, horticulture, and crop science courses.

The Ag Weather and Climate program organized and launched the inaugural *CLIMATE SMART Conference: Farming with Weather Extremes* in July 2019. Approximately 130 farmers, lenders, insurance agents, and Extension educators gathered to evaluate the challenging weather season of 2019 in the context of our changing climate and to think about building a strong foundation to withstand similar impacts in the future. For a full summary of the event, speakers, bios, presentations, and sponsors, please visit <https://u.osu.edu/climatesmart/july18/>. The planning committee will reconvene this spring to plan our 2020 event, as previous funders (e.g., Corn and Wheat) have already expressed interest in continuing their support.

Research

The program is building a research foundation linking researchers from across the college with weather and climate information. The goal is to positively impact farmers' decisions so that they can maintain economic profitability and environmental sustainability despite the challenges of a changing climate. These projects target diverse agricultural audiences including traditional row crop and specialty crop farmers, commodity groups, and rural communities.

Building a sustainable and resilient agroecosystem through an understanding of climate and farmer behavioral variability

This USDA-NIFA-AFRI grant (\$1.2 million) was awarded during 2018. The project aims to elevate the capacity of decision makers in the Eastern Corn Belt Region (ECBR) to adapt to a variable climate. Working with Robyn Wilson (SENR) and Elena Irwin (AEDE), Dr. Wilson leads the climate change modeling objective and Co-leads with Greg LaBarge (Agronomic Systems Field Specialist for Extension) and Jason Cervenec (BPCRC Education and Outreach director) on outreach and engagement with farmers throughout the region. This work integrates climate modeling with ecosystem services and economic modeling to project outcomes for farmers in the future under changing climate conditions.

Agronomy Integrated Pest Management Program

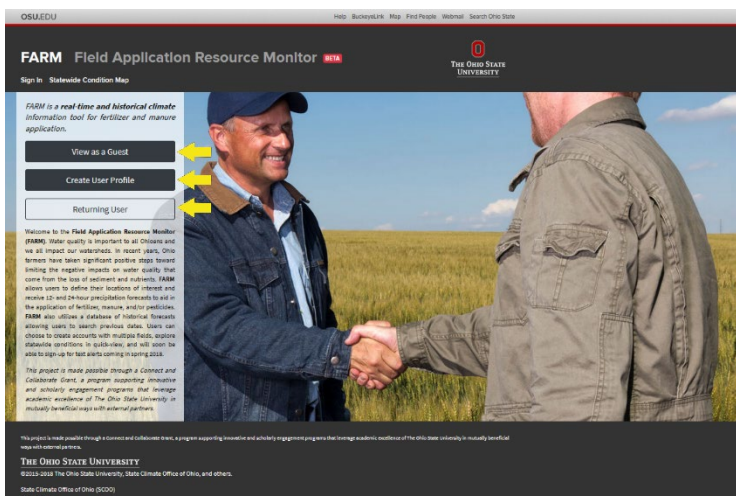
This endeavor seeks to understand the potential impacts and adaptations to a changing climate with regard to pest management. This work is in its infancy.

Other Pending Projects:

- *Developing Weather and Crop Production Data Collection Strategies for Future Improvements in Field Nitrogen Management (CFAES SEEDS, NIFA, or SARE)*
- *Addressing Crop Resilience to Cold Damage Using Prediction Modeling: A Grape Case Study (CFAES SEEDS)*
- *Coping with Drought in the Ohio River Basin: Linking Drought Indicators and Impacts in an Energy-Constrained, Water Rich Climate with Complex Landscapes and Water Systems (NOAA)*
- *Field to Lake – Critical Zone Data Integration for Human-Impacted Lake Basins (NSF)*

Innovation

Connect and Collaborate with the State Climate Office of Ohio: Connecting Climate and People to Improve Outcomes for Ohio and Beyond:



Part of this grant was utilized for the Field Application Resource Monitor (FARM: <https://farm.bpcrc.osu.edu>). FARM is a web application, designed and tested with farmers, that allows users to define their locations of interest and receive 12- and 24-hour precipitation forecasts to aid in the application of fertilizer, manure, and/or pesticides. FARM utilizes a database of historical forecasts allowing users to search previous dates. Users can choose to create an account to track multiple fields (up to five fields), explore statewide conditions in a quick-view, and sign-up to receive email alerts (text alerts coming soon). To date, FARM has more than 300 unique users from across the state and a few outside of Ohio. Though, original funding has ended, this project continues through engagement with educators for feedback, conversations with the Ohio Department of Agriculture (ODA) and combining water quality tools, and maintenance of the historical precipitation database.

Service

Dr. Wilson and the Ag Weather and Climate program actively participate in many service activities for Extension, for which direct participant numbers are difficult to quantify.

- Responds to on-going extreme weather challenges, tariffs, and low commodity prices by joining the CFAES Ag Task Force to address concerns and offer the best science-based recommendations toward solutions. The Ag Weather and Climate Program was responsible for routine weather updates and climate outlooks, a process that is continuing in 2020.
- Participates in podcasts and engages news media to keep farmers and the public aware of the changing conditions and outlooks including: the OSU Extension Agronomy and Farm Management w/ Amanda Douridas and Elizabeth Hawkins, local news media (WOSU-All Sides with Ann Fisher, WHIO-TV Dayton, NBC4i – Columbus), CFAES News, and Field Day with Jordan Hoewischer of Ohio Farm Bureau.
- Writes for media publications including the Agronomic Crops Network C.O.R.N. Newsletter and e-Fields, the on-farm research publication through CFAES and the Food, Agricultural, and Biological Engineering Department. Dr. Wilson also publishes a quarterly climate assessment for the state of Ohio.
- Records and broadcasts a weekly (monthly during winter) hydrologic and climate assessment for the state of Ohio (available at <http://bpcrc.osu.edu/hydro> and Apple Podcasts, Google Play, and Soundcloud).
- Coordinates the Ohio Drought Team consisting of regional National Weather Service Hydrologists, Ohio Emergency Management Agency, Ohio Division of Natural Resources, ODA, and Extension educators to provide local information to the US Drought Monitor (available at <http://droughtmonitor.unl.edu/>).
- Served as a Mid-Ohio Planning Commission Sustaining Scioto sub-committee member working toward implementing the Sustaining Scioto plan to ensure sufficient drinking water for Central Ohio. Dr. Wilson will be on the Sustaining Scioto Board beginning in June 2020 and responsible for providing weather and climate expertise and building stronger connections between urban and rural lands across the Scioto basin.

Regional and Federal Collaboration

North Central Climate Collaborative (NC3; Ohio-Lead): This project is a cooperative venture among Extension professional across the North Central Region actively engaged in climate change research and engagement at the intersection of agriculture. NC3 is working to increase the flow and usability of climate information for Extension, farmers, natural resource managers, and communities. The goals of NC3 are to increase the adoption of climate-smart practices and improve water management while maintaining profitability. The Ag Weather and Climate program serves as the Ohio lead in this endeavor.

USDA Midwest Climate Hub

The Ag Weather and Climate group participates in weekly to monthly conversations convened by the Midwest Climate Hub, made up of participants from Ohio, Indiana, Illinois, Missouri, Iowa, Minnesota, Wisconsin, and Michigan. The goal of these MAC-T conversations is to provide information that helps producers cope with in-season weather and climate challenges as well as provide linkages between research, education, and Extension. Local information provided by Extension ANR educators is frequently shared among members of this group to provide regional context to changing conditions across the Midwest.

NOAA Central Region Climate Services

Dr. Wilson contributes to monthly conversations and provides local information for the North Central Region Drought and Climate Webinars. These are produced monthly for the entire North Central Region of the U.S. Dr. Wilson delivers one to two of these webinars per year. These webinars are shared with the public and U.S. agencies and routinely garner more than 500 participants each month.

Aquaculture

Aquaculture Fast Facts:

- 1 in 7 people on Earth rely on seafood as their main protein source.
- Aquaculture is the FASTEST growing segment of agriculture.
- Over 50 percent of ALL seafood consumed on Earth is farm-raised.
- Ohio Soybean Council, Soy-Aquaculture Alliance, and the U.S. Soybean Export Council are large supporters of aquaculture research and education
- A few trending research topics in aquaculture: Controlled Environmental Agriculture refinements (e.g. engineering, water reuse/remediation, and alternative energy); understanding and quantifying the regulatory environment in the United States on U.S. farmers; advanced aquatic animal health

The Ohio State University supports 1.0 FTE in Aquaculture Extension. This position has been a current staple for Midwest aquaculture Extension and education for approximately 30 years. The current specialist has been with Ohio State for four years, and he represents Ohio at several state levels including: an ex officio board member for the Ohio Aquaculture Association; member of the Ohio Fish Health Group, and advisory member for Hocking College's fisheries and aquaculture program. Regionally, he serves on the Board of Directors and he is the chair of the Technical Committee for Extension for the North Central Regional Aquaculture Center. Nationally, Matt is on the Board of Directors for the U.S. Aquaculture Society and on the Aquatic Nuisance Species committee for the National Aquaculture Association. Finally, he is a finalist for a newly created Board position in the World Aquaculture Society.

Within Ohio, He runs an Extension newsletter entitled *Buckeye Aquafarming* where he writes and solicits articles of importance for his producers. His programming regarding workshops is usually ever changing as the needs of the producers change. e.g. in recent years, farmers have asked for more workshops on water quality and fish health. In coordination with the Ohio Aqua Association and the CVM, these workshops were deployed. Like all specialists, Matt also frequently makes farm visits to assist when the farmers need him. As an example, Matt was just in eastern Ohio to make a farm visit to a producer who is losing fish in the exact same way for the second year in a row. Unfortunately, last year the producer lost 40 percent of his crop and never was given a solution to his problem. This year, Ohio State University Extension is involved and in coordination with Ohio Department of Ag and six veterinarian contacts around the country, we are well on our way to helping this farmer understand the reasons for his fish loss – and more importantly, what we can do to keep this from happening again.

Principal Accomplishments

- 1) Assisted Ohio's fish and shrimp producers in establishing the successful Ohio Aquaculture Cooperative – university effort led by Ohio Cooperative Development Center
- 2) Worked with two producers to secure funding for on-farm Extension demonstration projects, which were extremely successful, and these operations have adopted the practices and lowered their costs of production. We are in discussion about expanding this work.
- 3) Smith was named a "Top 10 Exceptional Extension Specialist" by *Successful Farming Magazine* in 2017.

As important as his in-state contributions are, he is half funded by NCRAC; whereas he is contributing to region-wide Extension efforts as the effort has dropped dramatically in the Midwest in the last 10 years. Smith has conducted at six farm visits to farms in other Midwest states in the last one year; eight workshops in other Midwest states; and he is assisting Minnesota with the revitalization of their Aquaculture Association. Additionally, Smith is creating opportunities for more Extension FTEs to learn

the basics of aquaculture by developing professional development in-service trainings at Land Grants in the Midwest. Upon completion of this grant, Smith will continue to seek NCRAC funding but he also intends on engaging more with the Ohio Sea Grant, as there is an untapped education opportunity in CTC's and high schools throughout Ohio regarding STEM and aquaculture/aquaponics and he would like to develop a partnership to co-fund a position focused on these stakeholders with Ohio Sea Grant.

Integrated Pest Management and Pesticide Safety Education

Integrated Pest Management Program Overview

Introduction

The Ohio State University Extension Integrated Pest Management Program (IPM) is a broad-based program serving many stakeholders; farmers, growers, industry, home owners, renters, governmental agencies, non-governmental agencies and all other citizens of Ohio. Our mission is to promote adoption of practices that protect the environment and people while considering economic costs.

Historical Perspective

The IPM Program has existed at Ohio State since at least the early 1980s, where it was housed in the Department of Entomology. Funding for the program at that time was based on a federal formula derived from the amount of soil insecticide used in the state; since Ohio had 3-4 million acres of corn, most of which were treated with soil insecticide, our allocation was relatively high compared to other states at approximately \$245K per year. Funding was used to pay salaries and support three to five IPM program-dedicated staff plus their field activities and a mini-grants program during the 1990's. Through attrition due to retirement, internal transfers and finding other job opportunities, the program team has been reduced to only one full-time person, the coordinator. Portions of state specialists, their technicians, evaluation specialist's, Extension educators, and summer student employees currently contribute to the overall program FTE.

In 2009, the federal formula (block grant) was replaced with a nationally competitive grant program, USDA NIFA Crop Protection and Pest Management Extension Implementation Program. In 2013, the coordinator retired and the IPM Program was placed within the Department of Extension, the TIU of the newly named coordinator. Since the focus of the new grant program was Extension and not research, this move was seen as a logical choice.

Current Status

In 2009, the first national competition for funding IPM programs was held (for 2009 only), followed by competitions in 2010 (for years 2010-2012), 2013 (for 2013 only), 2014 (for years 2014-2016), and 2017 (for years 2017-2019). The Ohio IPM program fared well during these competitions, being ranked as high as number one and as low as number 20 in the nation. Our annual budget has ranged from ca. \$230K - \$260K per year. The funding is spent in two ways; on people who conduct the actual programs such as department state specialist's, technicians, evaluation specialists, Extension educators and summer student employees plus the coordinator's salary (ca. 70%), who is responsible for financial oversight, program delivery, program evaluation, and report writing. In the last USDA NIFA REEport, there were 2.5 FTEs being paid from the grant. The remaining funds are spent on operating costs such as travel, materials, and supplies needed to help conduct the program activities.

Current Key Collaborators

The IPM Program funds in the neighborhood of 2.5 to 4.2 FTEs per year in allocations of 0.1 to 0.7 FTE per person. The following is a breakdown of key collaborators who conduct programs on behalf of the IPM Program. Please note all specialists do not receive salary funds from the IPM Program, most have elected to receive funds for technicians or summer help as requested in the original proposal.

Department of Entomology

Kelley Tilmon, Andy Michel, Celeste Welty, Mary Gardiner, Elizabeth Long*, Susan Jones**

*took position with Purdue University, July 2019

**retired August 2019

Department of Extension

Jim Jasinski, Brad Bergefurd, Cindy Folck*

*took position with Central State University, March 2019

Department of Plant Pathology

Anne Dorrance, Pierce Paul, Joy Pierzynski, Sally Miller*, Nancy Taylor**

*participated 2009-2016

**retired December 2016

Department of Horticulture and Crop Science

Laura Lindsay, Doug Doohan*

*participated 2009-2016

School of Environmental and Natural Resources

Steve Cullman*

*participated 2014-2016

Byrd Polar and Climate Research Center

Aaron Wilson*

*joined 2018

Stakeholder Input

The ability to document stakeholder input to guide the direction of the IPM Program is a requirement of the new funding model. To that end, Ohio State has approached stakeholder input in two ways; one, through a formal process of inviting 10-20 stakeholders of each focus area to a meeting to receive input on what they perceive as the needs and priorities and two, informally gathering feedback through discussions at meetings, field days, workshops, etc. Both of these processes guide the projects that are outlined in our three year proposal.

Current Programs

In each USDA NIFA CPPM EIP RFA, there are about 12-15 IPM focus areas that each state program can decide to participate in for the next three years. Based on the strengths of our department specialists and the needs of our grower and citizen base, we have chosen to strategically focus our efforts in the areas of Agronomic IPM, Specialty Crop IPM, Housing IPM, Pollinator Health, and support the Plant and Pest Diagnostic Clinic. Within the Agronomic IPM group, projects like corn, soybean and small grain conferences, grower and educator centric workshops and inservices, webinars, field days, etc. are conducted. Within the Specialty Crop IPM group, pumpkin and hops pest management field days, invasive pest monitoring, presentations and webinars, urban agriculture, etc. are conducted. Within the Housing IPM group, information about biology, identification, treatment efficacy and overall pest management concepts are conducted through workshops, webinars, videos, etc. Within the Pollinator Health group, speakers are recruited to all-day conferences and workshops about pollinator identification and conservation topics, including a focus on creating pollinator habitat demonstration plots throughout the state and citizen science projects. The last focus area is the Plant and Pest Diagnostic Clinic, where samples are sent for identification and recommendations of treatment and management are dispensed to clientele in the homeowner, green industry, and agricultural communities.

For almost every program conducted by members of the IPM Program team, end of meeting evaluations or other forms of evaluation are designed for each educational activity to be handed out and collected to document program impact. These impacts are aggregated and reported for each focus area in the annual NIFA REEport document.

Communications

In addition to our mandated annual NIFA REEport, we have several strategies to communicate the activities and outcomes of the IPM Program. Perhaps the flagship output would be our annual IPM Program Highlight Booklet (<https://ipm.osu.edu/annual-reports>) that provides a quick overview of each funded project in the IPM portfolio. We update our website (IPM.OSU.EDU) with new accomplishments achieved by each focus area several times a year as needed. We also have a Twitter account

(@OSU_IPM) that we use to mention programs and highlights that are going on throughout each focus area which helps bring a greater awareness of our programs to people outside of our immediate sphere of influence. Lastly, we have the OSU IPM YouTube website (<https://go.osu.edu/osuipm>) that houses our educational and “DIY” videos in the areas of specialty crops, agronomic crops, invasive pests, bed bugs, and the diagnostic clinic. Currently, there are 52 videos posted to the site which have been viewed more than 26,000 times.

Summary

The OSU Extension IPM Program is a broad-based multi-faceted program that utilizes the skills and expertise of many departmental specialists to carry out the mission of IPM adoption to a multitude of stakeholders throughout Ohio. We have successfully transitioned to a new nationally competitive funding model and remain a crucial link in the extending of information from our campuses to the masses. While our traditional focus areas of agronomic and specialty crops will continue to be served, we can be nimble enough to address emerging issues such as invasive pests, pollinator health or even how climate change impacts pest management.

Pesticide Safety Education Program

History

A 1972 amendment to the Federal Insecticide, Fungicide and Rodenticide Act established a program under EPA for controlling the sales, distribution, and application of pesticides through an administrative registration process. The amendments also provided for classifying pesticides for “general” or “restricted” use, the latter only to be applied by trained, certified applicators. State pesticide safety education programs, including Ohio’s program, were established within several years of this act.

Since the mid-1970s the Ohio Pesticide Safety Education Program (PSEP) has worked closely with the Ohio Department of Agriculture (ODA) and U.S. EPA in the certification and training of Ohio’s pesticide applicators. Initially, PSEP and OSU Extension were the sole provider of pesticide applicator training. There is no longer an exclusive relationship, but according to ODA, PSEP and OSU Extension continue to provide most of the pesticide recertification training in the state.

In recent years, PSEP has developed new educational opportunities to help growers comply with other legislative and regulatory actions, including the following:

- Ohio Agricultural Nutrients Law, 2014
ODA provided PSEP with funds to administer the agricultural nutrient training program over a three-year period. PSEP in turn worked with agricultural educators and field specialists in the execution of the program. Between Sept 2014 and Sept 2017, approximately 17,000 fertilizer applicators were certified at OSU Extension meetings.
- Federal Worker Protection Standard Revision 2015
PSEP held workshops throughout the state and participated in industry programs over a several year period to help ~ 500 growers comply with the new regulations.

PSEP Stakeholders

PSEP’s primary constituency are the ~26,000 licensed pesticide applicators in Ohio. Roughly half of these are commercial pesticide applicators. These applicators apply pesticides for hire or work for a public entity. Commercial applicators obtain their license by taking a test and must recertify the license every three years by retesting or attending five hours of continuing education.

Surveys from 2019 recertification meetings indicate that the largest group of commercial applicators are associated with the turf and landscape industry (39%); the next largest group are involved in structural pest control (27%), followed by industrial vegetation control (20%) and field crops (14%). Surveys from the new commercial pesticide applicator workshops revealed that approximately two-thirds of those attending the programs worked for public entities such as ODOT, school systems, municipalities, etc.

Private pesticide applicators apply pesticides in the production of an agricultural commodity on their property, or employer's property. Private applicators obtain their license by taking a test and must recertify the license every three years by retesting or attending three hours of continuing education. Programs for private applicators are taught by agricultural and natural resource (ANR) educators in the counties.

A second important stakeholder group includes the >16,000 *certified fertilizer applicators* who apply fertilizer to more than 50 acres of agricultural production. The certification requirement for application of agricultural fertilizer came about with legislation passed in Ohio in 2014. Fertilizer applicators obtain their license by taking a test or attending a three-hour training taught by OSU Extension; they must recertify the license every three years by retesting or attending one hour of continuing education. PSEP and OSU Extension offer fertilizer recertification at both regional and county level.

Other stakeholders include industry groups, master gardeners and consumers.

Partnerships.

PSEP is a training partner to the Ohio Department of Agriculture (ODA) and works closely with staff in the Pesticide and Fertilizer Division. U.S. EPA has an agreement with the ODA to enforce pesticide laws and administer certification and training of pesticide applicators in Ohio. ODA has an agreement with PSEP to provide the training and training materials. PSEP also interacts with EPA region V, attending meetings and serving as a key contact for EPA relative to pesticide safety and training in Ohio.

PSEP also partners with other state agencies including ODNR, ODH, ODOT, and OEPA. State agency partners contribute to the program as speakers and expert reviewers /contributors. PSEP staff also speak for agency programs. PSEP interacts in a similar manner with industry groups, including the Ohio Pest Management Association, Ohio Turfgrass Association, Ohio Lawn care Association, International Society of Arboriculture – Ohio Chapter, Ohio Mosquito Control Association, Ohio Nursery and Landscape Association, Ohio Produce Growers and Marketing Association, and Ohio Agricultural Business Association.

PSEP works closely with ANR educators, providing in-service training and teaching resources for use in county meetings. PSEP is a statewide program, with ANR educators being vital boots on the ground. The training we provide has the goal of helping educators grow toward mastery of a set of complex and highly varied subjects. At the 2020 program, 93 percent of educators agreed that pesticide in-service delivered essential content for teaching their county programs (n= 44).

Newly hired educators are provided with an orientation to pesticide applicator training. PSEP staff regularly visit county meetings to assess needs. PSEP's statewide marketing efforts include flyers, brochures, and website resources to help our clientele choose among the >200 regional and county pesticide and fertilizer meetings offered through the state. Recently PSEP has provided resources for groups of counties to purchase sprayer demonstration tables and In-service training to help educator incorporate live demonstrations and interactive teaching into their programs.

State specialists are vital partners in the PSEP mission, ensuring the continued delivery of research-based, unbiased information to our stakeholders. In 2019, approximately 12 state specialists routinely spoke on PSEP programs. PSEP relies on and is enriched by the wealth of expertise throughout the OSU Extension system.

The PSEP Advisory Committee meets twice a year to discuss issues and make recommendations. The group includes PSEP staff, state agencies (ODA, ODOT) state specialists, ANR educators from nine regions of Ohio, and the OSU Extension assistant director for ANR.

Programs, products, and service

PSEP's programs and services make a vital contribution to job skills and careers, an important OSU Extension impact area. PSEP hosts 12-14 programs each year that directly serve the commercial audience. In the last three years (the length of the pesticide recertification cycle), more than 11,000 individuals have attended PSEP recertification and new applicator programs.

In 2019, more than 700 new commercial applicators were trained in safe, legal, and effective pesticide use in seven, full-day workshops. Those surveyed agreed that they would apply the information from the training to their work (96%) and that the workshop improved their skills (96%, n= 224).

During the 2018-2019 season, PSEP's regional programs provided accessible, cost-effective opportunities for 3,775 licensed commercial applicators to recertify and receive program updates from state Extension specialists. These programs emphasized personal safety, with 88 percent agreeing they were better informed how to apply pesticides safely, as well as integrated pest management and sustainable production practices, with 90 percent indicating they had improved practices that protected the environment and 88 percent agreeing they had learned how to control pests more effectively (n=2250). Each person in attendance received a publication that included a summary of the commercial meeting presentations.

In 2018-2019, there were 113 private pesticide applicator recertification meetings throughout Ohio, with approximately 4,000 growers in attendance. PSEP provided each county meeting attendee with a publication that included a summary of the private meeting presentations, Extension recommendations and regulatory updates (this was a different publication from the one the commercial attendees received). Private applicators agreed they were better informed how to apply pesticides safely (92%); had improved practices that protected the environment (93%) and had learned how to control pests more effectively (93%, n=790).

For the fertilizer applicators, PSEP provided three opportunities for 395 commercial fertilizer applicators to recertify in 2019. Programs in the counties provided opportunities for another 4000 applicators.

In addition to live programming, PSEP works with ODA to develop pesticide exams and study materials. PSEP publications are frequently among the top-selling Extension bulletins, with approximately 6000 sold annually through OSU Extension publications. Average sales figures for the last four years appear below. PSEP also offers free online modules to assist private and commercial pesticide applicators study for their exams (Table 3).

Table 3: OSU Extension Pesticide Safety Education publication sales, 2016-2019

Publication Title	Average no. sold per year, 2016- 2019
Applying Pesticides Correctly	2542
Pesticide Applicator Training Core – Student Workbook	679
Pesticide Applicator Training Field Crops– Student Workbook	437
A Study Guide for Commercial Agronomic Pest Control Applicators	180
A Study Guide for Commercial Industrial Vegetation Control Applicators	600
A Study Guide for Commercial Ornamental Pest Control Applicators	412
A Study Guide for Commercial Ornamental Weed Control Applicators	388
A Study Guide for Commercial Turfgrass Applicators	741
Average total PSEP publications sold annually	5979

For consumers and master gardener volunteers, PSEP developed a pesticide safety curriculum in 2018, and distributed it to all ANR educators. Three new pollinator factsheets were also developed in 2018.

PSEP is also a resource to pesticide applicators and the public at large who call the office or utilize the extensive resources at pested.osu.edu.

Program Personnel

PSEP has three full-time teaching staff. Mary Ann Rose directs the program; she has a Ph.D. in horticulture and expertise in ornamental production, weed control, soil fertility, and pesticide safety. Program Manager Jen Andon oversees the website and private applicator resource development; she has an M.S. in entomology and expertise in turfgrass science and pesticide safety. Program Manager Chrissy Kaminsky oversees the commercial applicator programs and resource development; she has an M.S. in environmental biology and expertise in ecology and technical writing. The program managers have key areas of oversight (private/commercial) but in practice, PSEP's staff work together on all key programs. Adam Ziadeh is the program assistant (non-teaching staff). Four M.S. students in the Plant Health Management Program have been advised by Rose in the past five years (three have graduated) and have contributed greatly to the program through their work on factsheets, curriculum and study guides.

Statewide Newsletters

There are a number of newsletters which are produced by ANR teams with statewide distribution. Here are some of the most prominent such letters produced by OSU Extension.

Crop Observation and Recommendation (CORN) Newsletter

The Crop Observation and Recommendation Network (CORN) newsletter is the primary mechanism for the Agronomic Crops Team to disseminate information (<http://corn.osu.edu>). The newsletter is released weekly during the growing season (April through October) and every other week November through March. The newsletter is a collaborative effort among Extension state specialists, field specialists, and county Extension educators.

Prior to each newsletter, Extension personnel hold a conference call about 30 to 40 minutes in length. At the beginning of each call, county Extension educators are asked to give an update of issues relevant to their county and stakeholders. Field specialists and state specialists are also asked to give an update. This conversation is extremely useful to all Extension personnel as it gives an opportunity for county-based Extension to ask questions to field and state specialists. In turn, specialists get a better understanding on what is happening around the entire state. The conference call helps shape each newsletter. For example, extremely cold weather conditions in January and February 2019 resulted in significant damage to alfalfa fields. An Extension educator asked about how to convert alfalfa fields to soybean production. Specifically, would the soybean seed need to be inoculated with *Rhizobia*. This question was originally posed to a county Extension educator by a farmer. This question was then relayed to state specialists during the conference call and included as a CORN newsletter article (<https://agcrops.osu.edu/newsletter/corn-newsletter/2019-11/switching-alfalfa-soybean%E2%80%A6should-i-inoculate>).

The majority of articles in the CORN newsletter are relevant to management practices (planting date, seeding rate, insect scouting, disease management, etc). However, information on field days, winter Extension meetings, and other events are also included as articles. Most newsletter issues also include the weather forecast from Jim Noel of the National Weather Service or Aaron Wilson of the Byrd Polar Research Center and state ANR office, both of whom also participate in the conference call.

The CORN conference call and newsletter is coordinated by Amanda Douridas (Extension educator, ANR, Champaign County). Newsletter editors (all county Extension educators) rotate on a monthly basis. Editors are responsible for moderating the CORN conference call, soliciting newsletter articles, and posting them to the website.

In 2019, there were 41 issues of the CORN newsletter and 264 individual newsletter articles. There was an average of six articles per issue (minimum = one article; maximum = 11 articles). Newsletter article topics are summarized in Table 4.

Table 4. Summary of CORN newsletter articles in 2019.

Topic	Number of articles
Meeting information (field days, trainings, etc)	52
Corn management	36
Weather updates	28
Forage management	21
Insect management	18
Information on resources (Fact Sheets, guides, podcasts, etc)	17
Weed management	16
Disease management	16
Soybean management	13
Trial information (variety testing program results)	9
Manure management	8
Wheat management	6
Soil health	6
Other	18
Total	264

The CORN newsletter is web-based with the number of users tracked through Google analytics (Table 5). In 2019, the number of page views and number of unique page views reached a high of 261,792 and 224,216, respectively. In 2019, there were extremely unfavorable weather conditions in Ohio (polar vortex weather followed by excessive precipitation). Many newsletter articles were generated to address crop management in response to these unfavorable weather conditions. The number of page views indicates that stakeholders found the CORN newsletter to be a useful source of information. Although the CORN newsletter is targeted for stakeholders in Ohio, there is international impact. Users are primarily from the United States, but also include several countries across the globe (Table 6).

Table 5. Number of pageviews (total number of times content was viewed) and number of unique pageviews (number of unique users that viewed content) of the CORN newsletter over the past five years (tracked by Google analytics).

Year	Page views	Unique page views
2019	261,792	224,216
2018	213,634	180,962
2017	188,720	156,482
2016	177,168	142,267
2015	250,916	192,583
Totals:	1,092,230	896,510

Table 6. Number of users of the CORN newsletter by country over the past five years (tracked by Google analytics).

Year	United States	Canada	India	United Kingdom	Australia	Philippines	Brazil	China
2019	86,930	3,972	2,790	1,397	1,031	979	284	310
2018	81,405	2,991	2,136	735	753	785	292	223
2017	60,088	2,087	1,446	510	432	470	345	120
2016	35,068	1,320	722	253	244	252	475	312
2015	76,639	3,952	2,830	990	1,007	1,065	799	202
Totals:	340,130	14,322	9,924	3,885	3,467	3,551	2,195	1,167

In February 2018, the Ag Crops Team conducted a survey to determine impacts and usefulness of the newsletter. Of the 915 respondents, 75 percent were either farmers or crop consultants which are the two target audiences of the newsletter. Respondents to the survey were from 27 states and 12 countries. Nearly all of the respondents found the newsletter to be useful. Five million acres of corn and soybean were either farmed or scouted by the respondents. Consultants responding from Ohio scouted 1.6 million corn acres and 3.2 million soybean acres.

Respondents were asked to put a dollar value on the information provided in the CORN newsletter. Dollar value (per acre) for farmers and consultants are shown in Table 7. Dollar value was multiplied by total acreage farmed or consulted in order to estimate total value. We estimate the CORN newsletter provided \$17 million dollars in value for corn production and \$18.6 million dollars in value for soybean production.

Table 7. Average dollar value (\$/acre) for newsletter content multiplied by total acreage farmed or consulted for to estimate total value of the newsletter.

Crop	Farmer	Consultant	Total Value
Corn	\$7.38	\$5.58	\$17 million
Soybean	\$7.36	\$5.27	\$18.6 million

Buckeye Yard and Garden Line (BYGL)

The BYGL (pronounced "beagle") first appeared in 1990 as a periodic electronic newsletter aimed at providing timely information to county Extension offices on nursery, landscape, and turfgrass problems in Ohio. It was a response to a common diagnostic dilemma: information about a new problem trickled into a county office just about the time that it no longer mattered – about two weeks late. Greater timeliness was required.

The BYGL immediately met this need; however, it has not remained static. Since 1990, the BYGL has continued to evolve to reach new audiences and to adopt more effective methods to deliver time-sensitive information. Of equal importance, our collection of hundreds of past BYGLs serves as an important historical record of the occurrences of pests, diseases, environmental issues and other points of interest to Extension and its clientele.

Expanding Audiences

Ohio county Extension offices remain an important audience. However, by popular demand, the BYGL was quickly made available to individuals who were not working for OSU Extension. This included horticulture professionals (green Industry), especially garden center managers, landscapers, arborists, and turfgrass managers. The BYGL also became a significant tool for informing OSU Master Gardener Volunteers which was important in light of the development of eXtension's "Ask a Master Gardener." The following quotes captures the impact of the BYGL across audiences.

The Rise of Team

Another important step in the evolution of the BYGL was the expansion in the number of writers/posters from J.A. Chatfield and D.J. Shetlar (Chatfield et al. 1996) to include multiple members of the OSU Extension Nursery, Landscape, and Turf Team (ENLTT). Indeed, the BYGL became a primary educational outreach tool for the Team.

The ENLTT formed in 1993 in response to a critical loss of departmental Extension specialists through an early retirement buy-out. The ENLTT gathered together 24 OSU Extension educators, state specialists, researchers, and teachers. They came from counties across the state, as well as a number of CFAES departments including Horticulture and Crop Science (HCS), Entomology, and Plant Pathology.

The goal was, and still is, to harness the collective expertise found within the Team to provide an organized, effective, and sustained outreach effort. This not only reduces the impacts of occasional retirements, but also affords a more focused and rapid approach to meeting clientele needs particularly in response to newly developing issues such as non-native invasive species.

The immediate and sustained impact is captured by the following quote from 1997 "The ENLTT has provided a new emphasis and approach from Extension, communicating with all facets of the green industry, for the first time crossing traditional county lines and communicating in a coordinated way between county agents and state specialists in all relevant departments. This has opened up better communication and education on many issues, from IPM to worker protection standards, from business management to better communication *between industries*." - Bill Hendricks, Klyn Nursery, Inc., Painesville, Ohio

Adopting New Delivery Technology

The BYGL has always been an "electronic" publication: it has never been produced by the writers as a mailed newsletter. This is keeping with need to provide timely information. Early on, the BYGL was distributed using a fax subscription list. By the mid-1990s, the fax list gradually began to be replaced by an e-mail subscription list. Faxing was completely phased out by the early 2000s.

Another significant technological leap was the development by Tim Rhodus (HCS, Professor Emeritus) and Bud Witney (HCS) of a dedicated BYGL website (<http://bygl.osu.edu>). The entire BYGL was posted each week on the website allowing not only for multi-state access, but also multi-national.

The impact was significant. In 2009, there were more than 2 million (2,100,727) successful requests for BYGL information with an average of 5,739 requests per day. The source of a portion of the requests could be tracked using domains and it was found that 155,515 requests for BYGL information were from USA domains, and 44,563 requests were from users in 99 foreign countries. Around half (53%) of the international requests came from European Union countries (23,514 requests).

Survey Evaluations

BYGL e-mail subscribers were surveyed annually until 2014. Plans are underway to generate a new survey tool for the latest version of the BYGL. The 2014 survey revealed that the BYGL readers were almost equally split between for-profits (53%) and non-profits (47%). Among the non-profits, 31 percent identified themselves as "Extension." Among the non-professionals, 58 percent identified themselves as "OSU Master Gardener Volunteers."

The survey also revealed that the BYGL had a significant impact on its readers. Among the professionals, 96 percent "Strongly Agreed" or "Agreed" with the statement, "*BYGL information is useful to my job, business, organization, or personal interest.*" 93 percent of the professionals "Strongly Agreed" or "Agreed" with the statement, "*I have improved my general horticultural skills through knowledge gained from the BYGL.*" 87 percent of the professionals "Strongly Agreed" or "Agreed" with the statement, "*I have improved my plant problem diagnostic skills through knowledge gained from the BYGL.*" Clearly, the BYGL had achieved its primary mission of providing timely information in support of plant problem diagnostics.

Prior to 2016, weekly BYGLs were posted on Thursday afternoons from April through October. The information was gathered during Tuesday morning conference calls and posted under section headings such as "Hort Shorts," "Bug Bytes," and "Disease Digest".

In 2016, the BYGL was transformed from a weekly electronic newsletter comprised of multiple reports to *individual blog-style reports* called *BYGL Alerts* which include pictures imbedded within the report. The weblogs take full advantage of the rapid information delivery technology supported through the BYGL website.

The BYGL "Alert" name comes from the method used to alert subscribers to a new posting. E-mail subscribers receive a short message that includes the title of the report, a brief description, and a hotlink that opens the report. The 24/7 delivery of information is the ultimate solution to the "timeliness" issue. Of equal importance is the ability for end users to use web search engines to effectively acquire BYGL information.

The impact is captured with the BYGL Alert titled, "*Poison Hemlock and Wild Parsnip are going to Seed in Southern Ohio*," posted on June 21, 2019. The report was accessed by several media outlets and generated television interviews with the following news outlets: Channel 4 NBC, Columbus, OH (6/27/2019); Channel 5 ABC, Cleveland, OH (6/27/2019); and WXIX FOX19, Cincinnati, OH (6/27/2019).

Curriculum Development

Although BYGL Alerts are no longer generated from Tuesday morning conference calls, we continue to hold weekly Tuesday morning gatherings of ENLTT members in the form of BYGL Zoom in-service trainings. It was long recognized that the BYGL conference calls not only generated information for the BYGL newsletter, the calls also served as important opportunities to share information and observations; they were in fact weekly in-service trainings. Their value remains with the Zoom platform allowing participants to share images, PowerPoints, scientific publications, etc. They are just as valuable today as they were in the early 1990s.

So-called "BYGLive" diagnostic walk-about series are another ENLTT product developed to provide information published in the BYGL. These outdoor, hands-on training opportunities for Green Industry professionals have been offered around the state and continue to generate information reported in BYGL Alerts. The Greater Cincinnati BYGL Diagnostic Walk-About series involves six monthly sessions and has been offered for 23 consecutive years.

Indeed, the BYGL has had a significant impact on curriculum development as well as the professional development of the BYGL writers as shown through the following interconnected activities:

1. *Site visits* to monitor for plant pests, diseases, physiological problems, and other points of interest to horticulture and Extension professionals as well as Master Gardener Volunteers.
2. *Photo-documenting* these issues to develop a comprehensive library of images with a known provenance. The images do not require permission for their use.
3. *Sharing photos and observations on BYGL Zoom Inservices* to inform Extension colleagues and to seek input from shared expertise.
4. *Publishing* information in BYGL Alerts as well as other publications such as magazine articles, Ohio State fact sheets, etc.
5. *Professional enhancement of PowerPoint (PPT) presentations and other outreach* activities through the above BYGL activities. Extension is all about teaching. The knowledge gained and images taken during site visits coupled with new knowledge gained through Zoom in-services and "packaged" in the form of BYGL Alerts elevates professional expertise to be used to develop curricula presented with PPTs and for sharing information through newspaper articles, radio or television interviews.

Ohio Beef Cattle Newsletter

The Ohio BEEF Cattle letter is a weekly electronic publication that was begun in September of 1996 to serve as a portal supplying timely and relevant beef cattle information to Ohio's 15,000 cattlemen and women. Contributors include members of the Ohio State University Extension Beef Team and beef cattle specialists and economists from across the U.S.

The BEEF Cattle letter is housed and archived on the OSU Extension Beef Team website at www.beef.osu.edu with a weekly distribution of current articles being accomplished through email to 4500+ direct subscribers, plus re-publication through a variety of other on-line and print publications such

as Drovers on-line, thebeefblog.com from Purdue, Ohio's Country Journal, The Ohio Farmer and the Ohio Cattleman magazines. Over the past year the publication has attracted more than 135,000 page views to the Beef Team's site.

After nearly 24 years of publication, the commitment of the Ohio BEEF Cattle letter remains to provide Ohio cattle producers research-based information and educational materials that will aid them in making the management decisions that will maintain an efficient and profitable beef cattle enterprise.

Volunteer Programs

OSU Extension ANR has two programs which utilize volunteers. These programs are the Master Gardener Volunteer program and the Ohio Certified Volunteer Naturalists.

Ohio Master Gardener Volunteer (MGV)

The Ohio Master Gardener Volunteer (MGV) program started in Cuyahoga, Franklin, and Hamilton Counties in 1974. Today, the program encompasses more than 65 counties with nearly 2,900 volunteers. Potential volunteers follow Ohio State requirements necessary to volunteer in addition to 50 hours of horticulture training. The training is based on the local counties needs as we remain county-centric and focused on meeting the needs of individual county residents. After completing the training, they give 50 hours of service to OSU Extension horticulture programming to become certified OSU Extension MGVS.

County MGV coordinators are responsible for the program at the local level. These coordinators are either agriculture and natural resources educators, horticulture program assistants or program managers, office assistants or associates; in counties without ANR educators, dedicated volunteers have taken leadership for the program, under the guidance of an FCS or 4-H youth development educator. The ANR educator is ultimately responsible for the program and if there is not an ANR educator, another educator in the office assumes the responsibility.

The Ohio MGV Program is vital yet fluid and ever-changing. Planning and continuous quality improvement are at the top of the list in order to meet the changing needs of Ohio residents. Many of our volunteers are connected in their community and serve as stakeholders for OSU Extension. We rely on them in times of budget issues in the county as well as the state level.

Counties determine the type of programs and projects that MGVS complete. These projects are in line with OSU Extension's impact areas. Following are the impact areas and a sample of county projects:

Miami County MGVS have a partnership with Piqua Central Intermediate School where they have a large school garden. The MGVS deliver two sessions each year, once in the fall and then again in the spring, consisting of four educational lessons centered around food webs, growing vegetables, and decomposers consistent with the fifth-grade curriculum standards. Getting youth to try new vegetables has been a breeze through the program and as one MGV put it, "They were like grasshoppers eating the lettuce as fast as we could wash it!"

MGV State Specializations

These are advanced training programs created to meet a current or evolving need and to encourage the MGV to remain engaged in lifelong learning. Requirements include 50 hours of specialized training, volunteering 10 additional hours annually in the area of study, and obtaining a minimum of 10 continuing education in the area of specialization.

Past MGV Specializations include Protecting Pollinators, Community Gardens, Gypsy Moths, Emerald Ash Borers, Soil, Herbs, Invasive Species, Insects and more.

Planned for 2020 is GardenAbility. This specialization focuses on teaching MGVS to understand a variety of disabilities and how to adapt gardening to these disabilities in order to allow gardening as we age. Following the training, MGVS will be capable of helping Ohioans adapt their gardening habits and tools and presenting programs in their communities about gardening with disabilities.

MGV State Activities

We have statewide projects for all interested MGVS. These include:

Ask a Master Gardener Volunteers (AaMGV): Ohio MGVS answer more than 75 percent of all of the questions coming in through Ohio State websites and those assigned through the eXtension Ask an Expert program. Ohio was one of the first few states to implement this program through eXtension with their MGVS. Volunteers receive training and support from the MGV program manager.

Smart Gardening Fact Sheets: A cooperative effort with Michigan State University as part of an IPM grant. Ohio prepared two Smart Gardening Tip Sheets - *Preparing the smart vegetable garden* and *Choosing a smart site for your vegetable garden*.

Ohio Governor's Residence and Heritage Garden: Started in 2006 with former First Lady Hope Taft, the Heritage Garden is located at the Governor's residence in Columbus, Ohio and is representative of Ohio's five physiographic regions. MGVS from around the state donated native plants from their county and participated in planting the meadow garden at the residence. MGV continue to serve as Ohio Heritage Garden Ambassadors as well as Garden Volunteers.

International Outreach and Service Learning: As a result of the relationship with Hope Taft, we partnered with the Tandana Foundation in 2013 and started an annual trip to Otavalo, Ecuador. The purpose of this outreach was to assist indigenous communities with reforestation, water erosion and quality issues, as well as help with community horticulture projects. We have filled this trip every year since and will continue to go as long as there is interest from our MGVS.

Impacts

In 2019, MGVS around the state donated nearly 170,000 volunteer hours with a value of more than \$4.3 million (based on the 2019 value of a volunteer hour of \$25.43). They worked with more than 243,000 adults and youth in a variety of programming efforts. The work of MGVS is equivalent to adding approximately 68 Extension educators in a year. In the last five years, Ohio MGVS have given 234,549 hours of service to OSU Extension. County MGV coordinators do an outstanding job of ensuring that these programs and projects are in line with our mission - *Ohio State University Extension trained volunteers empowered to educate others with timely research-based gardening information*.

While our volunteers give an incredible amount of time and resources to OSU Extension, they also receive an opportunity for lifelong learning and community engagement. In order to continue to increase the skill level and knowledge and to maintain their status as a certified MGV, they are required to obtain 10 hours of continuing education credits per year. In 2019, MGVS accumulated more than 49,000 hours of continuing education credits. Many of these educational programs are offered at the county, regional and state level, utilizing our outstanding Extension and Ohio State educators.

Financial Support for the MGV Program

An annual state support fee of \$10 is charged per MGV per year in order to provide funds for state recognition awards, state website management and maintenance, travel and administrative assistance, resources to assist the county programs, and more. We ensure that at minimum, seven out of the \$10.00 is going directly back to the MGVS and counties. We have no other funds for state program support other than the .5 FTE state program director* and 1.0 FTE program manager*.

Resources provided for the MGV program include:

Volunteer Management System (VMS, an online system for record keeping, communication, annual MGV Recertification and tracking continuing education hours).

Master Gardener Volunteer Training Manual (used for the 50 hours of training required for new interns).

Monthly MGV County Coordinator Zoom Meetings (inform and update on policy and procedure, disseminate new information, discuss volunteer management skills, generate program ideas, problem-solving and more.)

State Advisory Committee (MGVs, educators, program assistants/managers represent the regions of the state, provide guidance and advocacy for the MGV program).

An awards program is held annually as part of the State MGV Conference. Individual volunteers, staff and projects are recognized.

Annual State MGV Conference for continuing education credits and professional development for staff.

Annual Volunteer Management Workshop to provide sessions to assist county MGV coordinators in developing volunteer management skills required for a successful county program.

Annual State County MGV Coordinators Conference to provide sessions on policy and procedural updates, addressing successes and, and provide information and resources needed to prepare county MGV coordinators for a new program year.

Connection to the National Extension Master Gardener Committee allowing our county MGV coordinators to connect with peers from other states and tap into national resources such as webinars, information on volunteer management, International Master Gardener Conference, excellence awards, and more.

Funds for Grow Ohio scholarships.

Funds for hosting continuing education programs for the region.

Funds for marketing materials, resources necessary for diagnostics at the county level, and more (based on current county needs).

Impact to Extension

The program has impact on our communities around the state, but Extension educators are also affected by the work of the MGVs. Anecdotal comments from Extension ANR educators include:

“The MGV program is the largest and most diverse outreach program which OSU Extension has in Ohio’s capital city. We have 297 MGVs who reach tens of thousands of individuals throughout Franklin County each year. Through dozens of community gardens and other brick and mortar projects spread throughout the county, MGVs help gardeners and homeowners grow more food, improve the value of their property, improve habitat for pollinators and wildlife, and help reduce cost of community services by helping homeowners select the right plant for the right place. MGVs also conduct horticulture therapy programs for several audiences including military veterans with PTSD, seniors, developmentally disadvantaged adults, and others. The quality of life is improved in Franklin County by the MGV program.” Mike

“For me there is no clear separation between how my Master Gardener Volunteers have impacted me professionally and personally. My MGVs have encouraged me, tested my abilities and taught me more than I could ever learn in a classroom. Through the years of volunteer work these MGVs have become more than just a volunteer. They are a mentor, champion and even a friend! Without their continued support of the program and of me neither would be as outstanding as they are today.” Sabrina

Impact to Volunteers

There is a great deal of evidence regarding the positive connection with seniors and volunteering and their quality of life. The MGV program also impacts individual volunteers in many ways. Following are a few anecdotal comments from individual MGVs.

“I am 76 years old and a retired attorney. I have learned more about plants and horticulture in the last four weeks [intern training] than I have in my entire life.” Charlie Ricketts, telling the MGV coordinator about his certification training experiences

"I am thankful for the Master Gardener Volunteer program for adding to my quality of life. Finding new friends, losing 20 pounds, and keeping my joints limber!"

"I am thankful for being able to work on the Victory Garden project. I'm able to help plant, weed, and harvest several different vegetables which I had not even seen growing before. All the produce went to Second Harvest Food Bank, which also gives me a sense of accomplishment, and doing something positive for the less advantaged."

"I am thankful for all the great friendships I have found [in the MGV program]. These friendships got me through my husband's death and breast cancer. Thankful for purpose in life."

MGV Staff

Assistant Professor Pamela Bennett is the 0.5 FTE state program director (0.5 FTE ANR educator in Clark County)

1.0 FTE Program Manager Denise Johnson oversees the administration of the program including assisting county MGV coordinators, organizing and implementing training for county coordinators, oversee the <http://mastergardener.osu.edu> website and Volunteer Management System, and trains and coordinates the Ask a Master Gardener Volunteer online home horticulture question service.

Ohio Certified Volunteer Naturalists

Ohio Certified Volunteer Naturalists contribute to Environmental Education, Citizen Science, and Land Stewardship <https://ocvn.osu.edu/>.

Relevance

Americans interest in nature is growing and individuals need opportunities to be involved in caring for and exploring nature in their local communities. Ohio is an ecologically diverse state with critical migratory pathways for many threatened species including the monarch butterfly and several migratory song and water birds. Volunteers with an understanding of Ohio's environment and natural resources and the skills to participate effectively in environmental education, habitat protection and monitoring have a critical role to play in helping to conserve our natural heritage.

Response

The Ohio Certified Volunteer Naturalist (OCVN) program address these needs by giving Ohioans the chance to learn about our diverse eco-regions, flora and fauna, and conservation from The Ohio State University College of Food, Agriculture and Environmental Sciences (CFAES) staff and faculty as well as professional naturalists and natural resources experts in their community. The Ohio Certified Volunteer Naturalist (OCVN) program includes a 40-hour education course on Ohio's environment and natural resources, annual certification, and on-going continuing education. The mission of the program is to raise awareness of Ohio's environment through science-based education and citizen stewardship.

We take a collaborative approach to curriculum design and program delivery of the 40-hour course that brings global experts from CFAES alongside regional and local expertise to help prepare participants for their critical role as citizen scientists, educators, and land stewards in their communities. This approach extends the capacity of both CFAES, park districts, and environmental centers who offer the course to achieve their mission in new ways, engage new audiences, and help Ohio citizens become more informed about environmental and natural resources conservation.

Course sessions are taught locally by OSU Extension educators and state specialists, CFAES researchers, and state park and nature center professional staff in locations showcasing Ohio's unique natural areas. Our course locations include Old Woman Creek National Estuarine Research Reserve, state nature preserves in the Hocking Hills and Oak Openings regions, and popular environmental centers including The Wilderness Center, Cincinnati Nature Center, and Stratford Ecological Center. After the education course participants volunteer at more than 500 environmental and natural resources organizations with a compatible program mission including city, state, and federal parks, Universities, schools and camps, and environmental organizations.

Program Leadership

Leadership for the OCVN state program include OSU Extension staff with the School of Environment and Natural Resources (SENR) who are responsible for the curriculum, marketing materials, certification, and continuing education. This includes a .8 FTE program director and .2 FTE program coordinator. Administrative leadership and support are from SENR, ANR, and CFAES. Several OSU Extension program directors, educators, specialists, and SENR faculty serve as instructors for the course at the host locations.

Partnerships

We partner with 22 host locations throughout Ohio including OSU Extension county offices (nine), environmental centers (three), and county, state, or federal parks (seven) and arboretum (one) (<https://ocvn.osu.edu/find-course>) to offer the 40-hour OCVN course. Most course locations collaborate locally to promote and offer the course (typically a county Extension office and park district).

All course hosts attend an orientation to the program held by OCVN state staff, they gain access to the education manual, Ohio State branded marketing materials, information on potential instructors with OSU Extension and CFAES, and the certification app. Organizations like the Ohio Division of Natural Resources that need volunteers or want to market their education programs will contact state staff and we promote their opportunities to OCVNs via our state list serv and website.

Each year we offer a workshop series of conference and we partner with host locations to create the learning objectives and agenda. In 2018, we held a state conference in partnership with The Holden Arboretum on protection and restoration of Ohio's unique natural areas which had keynote speakers both from the Cleveland Museum of Natural History and the School of Environment and Natural Resources.

The program is guided by a state steering committee with membership from local park districts, environmental centers, program participants, and Extension educators. The steering committee helps to guide policy, suggest improvements, and plan continuing education events and curriculum updates.

History

A state advisory group was convened by CFAES Extension staff in 2006 to develop the program and education manual. The group included state and local park districts and non-profits. In 2007, the course was piloted in three counties with local Extension ANR leadership. A chapter-based delivery model was followed where all participants became OSU Extension volunteers helped to manage the course delivery and certification.

In 2014, a state-level program coordinator was hired and through a strategic planning effort found the chapter model was an impediment for OSU Extension educators to offer the program since they were already managing Master Gardener volunteers. She also found that participants wanted flexibility in the type and location of volunteer service. We then adopted a train the trainer model that separated the 40-hour course from the volunteer service requirement. After participants complete the 40-hour course, they can select where to volunteer after learning about service needs during the course. We found this model has several benefits. It allows Extension educators to focus on course delivery and teaching, participants can choose where to volunteer, and participating park partners can gain access to a pool of volunteers with advanced knowledge and skills. We also purchased a certification app to ensure all participants were receiving their annual certification and the updated database allows us to examine service categories to identify educational needs.

Requirements

To become an OCVN participants must successfully complete a 40-hour field and classroom course on a variety of topics including Ohio's geology, soils, ecology, birds, mammals, insects, forests, water resources, stewardship, and education. Certain course locations like The Wilderness Center and Hocking Hills Region have added additional sessions in topics including astronomy and archeology of the region. Participants then select an organization(s) to volunteer with for 40 hours. After that they enter the volunteer service into our certification app and receive their certification. Re-certification requires 20 hours of volunteer service and eight hours of continuing education. Often participants volunteer with one or more of the organization partners offering the course.

2019 Impacts

There are 1,000 active Ohio Certified Volunteer Naturalists who provided 51,816 hours of service to more than 500 natural resources and environmental organizations in Ohio. The service included contributions in education and outreach, citizen science, stewardship, and program support that amounted to more than \$1.3 million to the state of Ohio (based on the 2019 Independent Sector values). There has been a growing demand for the program as reflected in a steady increase in requests to participate and offer the course. Some course locations are now offering more than one course per year (e.g., Cincinnati Nature Center).

In 2019, OCVNs made more than 500,000 contacts in education and outreach events that totaled more than 12,000 hours of service. These programs included hikes, presentations at local community clubs, day camp and after school programs, and activities at numerous special events such as “The Biggest Week in American Birding.” In just one example an OCVN in Northwest Ohio led an event for The Toledo Metroparks where participants could use a telescope to observe deep sky objects such as the Orion Nebula, the double star cluster in Perseus, and the Andromeda Galaxy.

OCVNs contributed more than 912 hours to improve environmental and natural resource conditions through land stewardship activities including trail maintenance and establishment, monitoring and removal of invasive species, habitat restoration, cleaning, preserving and replanting native seeds and clean up events. An OCVN describes her impact on land stewardship as a board member below:

“As a new Board Member of Friends of Hudson Parks and an Ambassador for Darrow Road Park, I was able to bring to the attention of the Hudson Park Board, the need to control invasive species in their parks before these species create mono-cultures and to inform them about the precipitous decline of native insects and how to begin to support these insects and pollinators by rehabilitation and restoration of our park lands.”

OCVNs contributed 1,195 hours to citizen science studies where they identified and documented insects, birds, stream health, reptiles and amphibians, bats, and more. OCVNs were involved in many bird projects of varying degrees of difficulty including Project Feeder Watch, Great Backyard Bird Count, Lights Out, the Christmas Bird Count, NestWatch and Climate Watch. Over 5000 scientific publications have been generated using data from eBird the online platform citizen scientists use to document species in their community (Table 8).

Table 8. OCVN impacts, 2017-2019

	2017	2018	2019
New Course Graduates	179	213	193
Ohio Certified Volunteer Naturalists	297	368	599
Service Hours: Education and Outreach	12,679	15,845	12,083
Educational Contacts	329,000	481,000	558,000
Service Hours: Citizen Science	658	926	1195
Service Hours: Land Stewardship	441	686	912
Service Hours: Program Support	3877	15,334	19, 241
Total Service Hours	35,701	45,403	51,816
Monetary Value of Service	\$881,457	\$1,154,598	\$1,317,680

Future

CFAES staff, faculty, and graduate students are leading curriculum revisions including a Junior OCVN curriculum. In preparation for updating our curriculum in 2019, CFAES specialists in pollinators, birds, and reptiles each led six-hour citizen science workshops to help participants understand the science behind citizen science, learn new field skills, and how to use websites and apps used for recording species in the field. We are continuing the curriculum development with a statewide conference titled “Taking Flight with Citizen Science” for Spring of 2020.

As part of our curriculum updates we are adding online course option to prepare participants for their field classes and incorporate additional knowledge and skills on emerging issues such as climate change. Another future goal is to integrate the OCVN program into the CFAES outreach efforts such as the Environmental Professionals Network and collaborate with faculty to offer students opportunities for service learning, certification, and professional networking through the OCVN program.

Conclusions for Ohio State University Extension Agriculture and Natural Resources

The OSU Extension agriculture and natural resources program in Ohio has been working with Ohio farmers and natural resource managers since 1905. From the early Extension schools conducted by train across Ohio, to publications, internet, and Zoom broadcast programs, OSU Extension ANR has adapted to changing technology and needs of our clientele.

OSU Extension ANR professionals have been and continue to be of the highest caliber, hard-working, and recognized by their peers both in state and nationwide. For the excellence. The challenges facing agriculture and natural resources in Ohio are become more complex as we deal with international markets, a changing climate, and other wholesale changes in the industry. We continue to work with our clientele to address these issues through the application of non-biased, science-based knowledge.