

Agricultural Research Stations

Annual Report

For Calendar Year 2015

March 2, 2016

Ag Research Stations
Executive Summary
Calendar Year 2015
March 7, 2016

In March of 2015, the ARS Priorities and Planning Committee completed its work and released its report- “University of Wisconsin-Madison, Agricultural Research Stations Strategic Planning and Priorities, Final Report”. The project focus of the committee was to develop principals and guidelines consistent with the CALS Strategic Plan for decision making regarding the form and function of ARS. The committee also compiled a draft set of performance metrics to describe the value of ARS in research, outreach and extension. As a follow-up, an ARS sub-committee worked to refine these performance metrics into those that are easily collected in a year-end format.

The ARS Priorities and Planning committee also worked on revisions to the ARS mission statement and crafted the following revised **ARS mission statement**:

To provide facilities and support of CALS faculty and academic staff-led research programs and associated education and outreach programs.

➤ **Research:**

Advance discovery in UW CALS areas of priority scholarship.

Create and enhance economic development

Discovery through partnerships (UW member campuses, private partners, stakeholders)

Interdisciplinary approaches to problem resolution

➤ **Education**

Student preparation and learning enhancement

Science literacy

➤ **Outreach/Extension**

Outreach and stakeholder engagement

Results demonstration and integration into land use management and stewardship

Results and discovery translation

The work of the committee in crafting the guiding principles, revised mission statement, and performance metrics provided guidance in putting together the ARS annual report. The station managers were asked to highlight activity in the following areas with an eye to how it fits in with the mission of ARS:

- Notable station achievement
- Outreach/Instruction Activities
- Research Activity
- Change
- Goals for the Coming Year:
- Areas of Concern and Challenges:

In the 2015 report, the station managers were asked to highlight research results coming out of their station. This report is an improvement on 2014 but managers often find it difficult to obtain these results. Some of the more notable highlights include:

Hancock: In 2015, UW scientists and collaborators contributed eight multi-year peer reviewed scientific publications that were carried out at the Hancock Station. UW-Madison researchers also contributed 28 reports of research projects conducted at the Hancock Station to the Midwest Food Processors Association Annual Meeting, and professional associations including the Potato Association of America, American Society of Horticultural Science and the American Phytopathological Society.

Kemp Station supported 7,000 user days of diverse station activity and 3,800 person nights of lodging, *the second consecutive year of a 1-0+% annual increase*. The Station also supported 12 field classes, representing 5 UW-Madison departments and 4 UW System universities. Overall, the station supported 63 research projects – up 34% over previous years.

Lancaster: The Long Term Crop Rotation Study (on station for almost 50 years) is now part of a “Cropping Systems Coordinated Agricultural Project Field Research Network” and has multiple fact sheets and presentations on their website www.sustainablecorn.org

Peninsular: The Peninsular Station was recognized with the “2015 Experiment Station Section Excellence in Multistate Research Award” for its work in the NC140 Fruit Tree Research Project. After four years of northern wine grape cultivar fungicide sensitivity trials, data collected from 11 trials at Peninsular and West Madison are yielding data that will help Extension and other grape industry consultants make more confident recommendations regarding the use of fungicides in northern wine grape production systems.

Rhineland: Two UW potato breeding lines, developed and maintained at the Rhineland ARS, were among the top selections in a national trial designed to find new French fry varieties with lower acrylamide (a suspected carcinogen). Red Endeavor and Oneida Gold, two fresh market varieties released in 2014 continue to gain market share, standing out for nice appearance as well as disease and internal defect tolerances. Over the past two years the station has changed their method of testing tubers for the presence of potato virus Y and has seen a dramatic reduction in the levels of this disease at the station.

ARS continues to better document the research activity (number of projects and campus based PI's) and the outreach and instruction activity. These are summarized in the tables below.

As might be expected, concerns over the budget reductions and its impact on station activity were reported by a number of the station managers. They are concerned with the impact it is having on their ability to carry out the mission of their station, and employee morale. In addition a number of station managers commented it is more difficult to attract more qualified candidates because we are not able to offer as competitive a wage as they are earning in industry.

Just about all the stations reported on upgrades to facilities including roofing and siding, concrete work to walkways, and approaches, and gravel for our roadways and parking lots. A major reason ARS has been able to address these improvements, is the funding received from the state that is funneled through campus Facility, Planning, and Maintenance (FPM). Recently, ARS received word that no funding would be available from campus to address these upgrades. This is a serious concern and would be a major blow to ARS if this funding was not available.

As has been reported, a number of stations are interested in expanding their land base. At Arlington, the station does not have a large enough land base to support the research projects, raise crops for feed, and apply animal manure. Manure application agreements have been established with neighboring farmers, and AARS cash rents or has crop purchase agreements on approximately 400 acres. This is now costing over \$150,000 per year. Competition for land is intense because of several large dairy and grain

operations in the immediate area. At Marshfield, this station cash rents approximately 550 acres and they are interested in acquiring land near the North Farm campus to accommodate and secure crop production and nutrient management needs going into the future. At Lancaster, researchers continue to show interest in larger agronomic plot areas. With Lancaster's steep slopes and contour strip farming, it makes it difficult to accommodate all of the researcher requests. Some research such as the corn and soybean variety trials have moved off station to other private locations where it is easier to design research plot layout and manage those research plots.

Late in the fall of 2015, a bunker containing haylage was opened and part way through feeding this haylage, Dairy Science ran into major spoilage issues. Approximately, the bottom one-half of the silage had formed Butyric acid due to high moisture levels in the silage. This was very troublesome and the Arlington staff began a process to examine what went wrong. They met with Bryan Holmes and John Panuska and they recommended a number of changes. They included lowering the target harvested moisture range, change how the bunker is sloped, include tile drainage along the wall, and change how we cover the bunker. These changes were incorporated into a draft of a Forage Harvest Policy along with suggestions from Dairy Science. This continues to be an on-going process into seeking a resolution to this issue. Consideration is being given to custom harvesting 1st crop on a trial basis.

It can be a challenge to harvest adequate quantities of high quality forage for Blaine Dairy. The station maintains an inventory of the necessary equipment so that we can pinpoint optimum timing and don't have to rely on the schedules of outside parties. In 2015, we were challenged by having a reduced staff, , and very uncooperative drying weather. Permanent challenges include trying to harvest consistent quality and moisture forage on many small fields that have been "carved up" for research over the years and inadequate storage structures. Existing bunkers can only hold three of the four alfalfa cuttings and there is not enough space to place the needed number of feed bags. The bunkers were placed in a wet area and tile drainage for leachate was incorrectly constructed. It was also noted by the DNR that bag sites must be rotated and rested so a site can only be used every third year. There will be some relief when space is recovered after manure pit abandonments, but a permanent solution of more bunkers or a concrete feed pad with runoff collection is needed.

Research Projects and PI's using Ag Research Stations
Cropping Year 2015
Compiled by Dwight Mueller
3/2/16

Station	Field Crop Research	Fruit Crop Research	Animal Research	Natural Resources/ Turfgrass	Campus PI's	Total PI's
ARLINGTON	325		14		43	45
HANCOCK	153				36	39
USDFRC	13		11			
KEMP				63**	11	25
LANCASTER	19		7		18	18
MARSHFIELD	70		9		15	18
OJ NOER				52	5	6
PENINSULAR	2	15			5	7
RHINELANDER	3				3	3
SPOONER	18	3	4		8	11
WEST MADISON	55	9	20		30	30
GREENHOUSES*	250 - 450				230	230
TOTALS	908 - 1108	27	65	129		

* It is estimated that 250-450 projects occur in the Greenhouses each year.

**Projects: DNR = 10, UW Non-CALS = 16, UW CALS = 22, Federal = 2, Other UW System = 2,
Other = 11

2015 TOURS/SEMINARS ON AG RESEARCH STATIONS

Compiled by Jane Cahoon

2/23/16

<u>Station</u>	<u>Field Days</u>	<u>Tours</u>	<u>Instruction</u>	<u>Seminars/ Meetings</u>	<u># of People attending</u>
ARLINGTON	4	87	7	52	7750
HANCOCK	6	11		55	1610
USDFRC		8			2500
KEMP		10	10	43	5070
LANCASTER	1	10	1	6	600
MARSHFIELD	1	34		125	6450
OJ NOER	3	4		3	425
PENINSULAR	1	13	1	1	1740
RHINELANDER	1	5	1	5	500
SPOONER	2	4		3	475
WEST MADISON	5	10	3	40	3000
GREENHOUSES		2	2	4	400
TOTALS	24	198	25	337	30520

Arlington ARS Annual Report Calendar Year 2015

1. **Notable station achievements:** Highlight noteworthy activities as they relate to the station mission/purpose

We had a good spring with favorable weather conditions. This led to timely planting and yields that were “normal” for the first time in four years. This was the first time since 2010 that we have enough corn on hand that we will not have to be concerned about running out before fall.

We were able to continue to upgrade some equipment. This included: a field sprayer, new grain truck, 65 hp tractor, DR mower, chipper shredder, more digital radios, and two computers. The Big Red Case and Mid-State John Deere equipment deals continued to benefit the station and researchers with brand new equipment to carry out operations.

Facilities improvements included: finishing the shop exterior repainting, paving by the agronomy shop, gate removal at Bookhout, Soils all-season restroom, and Plant pathology electrical and irrigation well upgrade. The feed mill removed an old scale, installing a new grain cleaner to improve corn quality and purchased a pellet durability tester. The soils waterway reconstruction was also finally completed.

Due to additional retirements in 2015 and a hiring freeze, we were understaffed the majority of the year. The crew stepped up and worked many overtime hours, including nights and weekends which allowed us to meet the majority of the station requests.

2. **Number of research projects:** Estimate as best you can the number of crop and animal projects on your station

325 Crop-related research projects and 14 animal projects.

The feed mill also provided feed for trials on campus and Vet Medicine.

The feed mill passed the AAALAC inspection with no concerns.

3. **Change:** Highlight significant trends or changes from previous years that are creating opportunities or challenges

Several key research technicians and professors have left or retired in the past several years. Many of these positions have not been refilled. This is starting to lead to increased assistance needed from the Headquarters crew. Assistance needed at the animal units has also dramatically increased.

The station does not have a large enough land base to support the research projects, raise crops for feed, and apply animal manure. We have manure application agreements with several neighboring farmers. We also cash rent or have crop purchase agreements on approximately 400 acres. This is now costing over \$150,000 per year. Competition for land is intense because of several large dairy and grain operations in the immediate area.

4. **Station goals for the coming year**

Completion of the Blaine Dairy manure project and pit abandonments. After this, the DNR can reissue the WPDES Permit for the station which has been expired since 2013.

Integration of additional technology: RTK, SMS AgLeader software, boundary mapping capabilities, and advanced sprayer technology.

Continue to improve safety training, including monthly trainings conducted by Safety Committee members.

Fill the current open positions so we can meet research requests and provide a high level of timely service to researchers.

Complete a tree cutting educational event which will remove many of the completed forestry studies to reclaim cropland.

Reduce feed mill costs and increase revenue to decrease handling fees again next year.

5. **Areas of concern and challenges**

Low wages for most of the University Staff positions make it difficult to recruit the most qualified candidates. Current employees are also upset about no recent wage increases.

The quantity of animal manure produced exceeds the current land capacity for sustainable application while supporting research. Soil test phosphorus levels on many fields are increasing into a range where applications will be limited.

It can be a challenge to harvest adequate quantities of high quality forage for Blaine Dairy. The station maintains an inventory of the necessary equipment so that we can pinpoint optimum timing and don't have to rely on the schedules of outside parties. In 2015 we were challenged by having a reduced staff, which is noted above, and very uncooperative drying weather. This resulted in some excellent quality feed spoiling because it was harvested too wet. Permanent challenges include trying to harvest consistent quality and moisture forage on many small fields that have been "carved up" for research over the years and inadequate storage structures. Existing bunkers can only hold three of the four alfalfa cuttings and there is not enough space to place the needed number of feed bags. The bunkers were placed in a wet area and tile drainage for leachate was incorrectly constructed. It was also noted by the DNR that bag sites must be rotated and rested so a site can only be used every third year. There will be some relief when space is recovered after manure pit abandonments, but a permanent solution of more bunkers or a concrete feed pad with runoff collection is needed.

New state laws for heavy equipment use on roads give protections for agricultural uses, but cannot be followed by our current equipment/practices. Different methods/equipment will have to be used to apply manure. Most manure is currently spread using tankers. The process to obtain and maintain permits from the state, two counties, and four townships is cumbersome and takes many hours of extra work.

It is a challenge to keep safety programs and training up to date, especially with personnel from academic departments. Safety is not a top priority for the departments and often falls back onto ARS for compliance.

The feed mill was built in the late 1960s. While still functioning, it is showing its age. The pneumatic feed transfer system has caused two customers to purchase commercial feed due to excess fines in the diet. A solution will have to be found about how feasible it will be to replace the current structure.

We will be adjusting to the Food Safety Modernization Act and Veterinary Feed Directive requirements for Feed Mills that start going into effect in late 2016.

US Dairy Forage Research Center 2015 Annual Report

DFRC's mission statement is:

Providing dairy industry solutions for food security, environmental sustainability and economic viability. We build uniquely valuable, science based research initiatives focused on dairy production systems; soil ecology; forage production; forage quality; nutrient management and ecosystem services.

DFRC's Vision Statement is:

Leading the world in integrated dairy forage systems research

In 2015 DFRC hosted the Sauk County June Dairy Breakfast which fed 2,300 guests despite a rainy Saturday morning. The Scientists from USDFRC on campus provided educational booths for the guests to interact with.

In addition to the Dairy Breakfast we hosted 17 other tours totaling another 389 guests.

In 2015 DFRC installed 24 Growsafe Feed Weigh tubs to monitor intakes and eating habits of lactating animals. In addition 24 water meters were installed to provide water usage of the same animals in the Growsafe stalls

Number of Research Projects:

In the past year we supported nine researchers in 13 protocols in which 550 animals were utilized. In addition we assisted plant breeders and physiologists in some of the larger scale harvests that require larger equipment.

A continuing theme in recent years has been to look at forage crops that allow for double cropping. In 2014 fall forage oats were raised after 4th cutting of alfalfa was harvested. In 2015 a BMR Sudan grass was planted in mid-June. Sudan Grass would allow for an early spring harvest crop such as rye to be planted the previous fall.

Change:

Financially, milk prices have dropped dramatically from recent years. This will require careful budgeting as well as increased support from the USDA. In addition to the reduced income the 5% campus assessment in addition to the 2% CALS assessment will total \$203,000 for FY2015. This charge will be taken in early 2016 and amounts to over 50% of DFRC's 136 fund balance.

Genomics is becoming a more widely used technology in dairy. At DFRC much of the work is related to tracking feed efficiency traits in cattle. U.S. DFRC has budgeted to include an animal geneticist at DFRC to study genomic traits and feed efficiency.

From a management perspective DFRC has begun collecting genomic information on the herd to use as an additional tool in selecting animals to keep in the herd for production.

Goals for the Coming Year:

Goals for the coming year include continuing some important heat abatement projects for the dairy facility as well as improving transition animal housing.

2016 starts with a new management agronomist on staff at DFRC, this is a USDA position located at the farm facility in Prairie Du Sac. Mike Stanek will take over the duties of Richard Walgenbach who retired in January after 25 years as management agronomist. In addition the USDA Automotive mechanic position has been filled with Gary Flock starting on February 8th.

These two new hires will require some adaptation for the AREO's at DFRC, as they interact the most with these two positions.

Areas of Concerns and Challenges:

An ongoing concern at DFRC is maintaining the level of employees needed to support the herd. As the local economy remains strong many of the local companies are offering more attractive pay packages than the current pay scale at DFRC.

Walnut Street Greenhouses 2015 Annual Report

Encompasses:

- Walnut Street Greenhouse
- King Hall (Soil Science) greenhouse
- 2 greenhouses at West Madison station
- Eagle Heights research field

Staffed by:

- 2 full-time managers
- 1 part-time horticultural technician
- 1-2 LTE's
- 0-2 students

Serves:

- **Campus-wide facility**
- **~80 UW faculty, ~50 active at a given time**
- **~230 users and ~150 projects at any given time**
(Federal and campus researchers, emeritus faculty, visiting scientists, technicians, post docs, graduate and undergraduate students.)
- ≥ 12 departments
- ≥ 5 additional organizations/groups
(Lakeshore nature preserve, GLBRC, WI Energy Institute, etc.)

1. Notable Station Achievements:

The Walnut Street Greenhouses have relentlessly improved the facilities in both large and small ways.

Major Improvements:

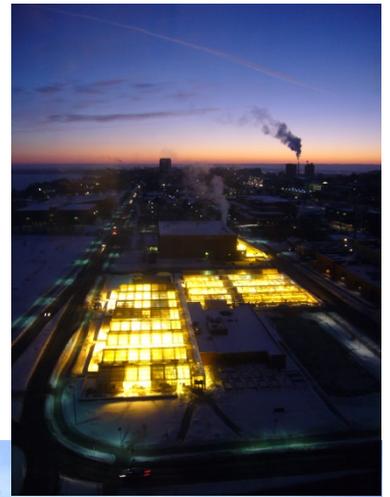
- Planning for the Greenhouse Phase II Renovation. This was the #2 project sent to the Board of Regents from the Madison campus.
- Tested and sourced new media types for decreased cost and increased plant growth, also prevented supply reliability problems before they could impact researchers. (40-50 K\$ media purchased each year)

Smaller Projects:

- Investigation of new LED lighting versus traditional HID lights.
- Growth chamber 3 online and functioning perfectly.
- Several investigations of media type, watering and fertilizing regimes, to optimize plant growth.
- Reorganization and cleaning of storage areas – stock pavilion, dairy barn.
- Relabeled all West Madison outlets, timers, & breaker boxes. Increased electrical safety.
- Remodeled ridge vents in GH 38.
- Replaced all evaporative cooling pads at West Madison facility.
- Removed asbestos panels, exterior of old section.

2. Outreach/Instruction Activities:

Madison College students (Kimberly Wou, Kevin Brown) – taught greenhouse management.



Hort 120 students (5) – 20 hours of service & instruction on greenhouse management.
Deferred prosecution – worked with several individuals (50-100 hours each)
K-tour, College for Kids greenhouse tour
Tours for Eileen Nelson’s short-course
Half-day tour for Swarthmore College group
Presented at annual Plant Care Workshop, 40 attendees
Facilitated campus blood drives in Microbiology building (153 units collected, CALS had third highest total for UW Madison groups)

3. Research Activity:

Currently, there are over 125 projects at Walnut Street, with another 19 at the West Madison greenhouses, and 6 at King Hall. In the spring, we anticipate at least another 10 projects at the Eagle Heights research field. However, it must be noted that while we have as many as 150 projects utilizing our space at one time, projects may last a matter of a few weeks, months, or years. We estimate that somewhere between 250 and 450 projects utilize space at our station each year.

See the attached excel grid for more information on the depth, breadth and impact of these research projects.

4. Change Over Time:

The research greenhouses no longer have the capacity to satisfy the demands of the users. Often, researchers have to wait to be able to obtain greenhouse space and sometimes the quality of space is not the quality that researchers desire.

5. Goals for Coming Year:

Work with the greenhouse renovation committee to produce a design for a greenhouse that will meet the needs of plant researchers for the next 50 years. Other lesser goals include addressing safety concerns with light attachment apparatus, sealing the remaining floors at the King Hall greenhouse, and investigating plant light requirements.

6. Areas of Concern and Challenges:

As mentioned above in the change section, we struggle to provide enough space and the quality of space that researchers need. We are also challenged by having to maintain a large number of air-conditioners, fans, motors, maintenance machines and vehicles with a very small budget. It would be ideal to be able to hire a trained electrician/mechanic to handle electrical and mechanical repairs in-house. Our current staff maintains and repairs what they are able to, but some items need more technical expertise, and Physical Plant tradesmen are often very expensive when called. This position would not need to be a full-time position.

Hancock Agricultural Research Station 2015 Annual Report

Staff: Felix Navarro- Superintendent, Troy Fishler- Storage Research Manager, Paul Sytsma, Ag Project Supervisor, Sue Reinert, Office Manager, Amber Gotch- Research Specialist.
Farm Equipment Operators: Douglas Klabunde, David Peterson, Jeffrey Weyenberg, Steven Grimmenga and Sam Perez. **Gardeners:** Janice Dukelow and Nancy Gilberts-Keegan. **Research Gardener** (Navarro): Sonia Castillo, **Summer Students:** Macy Klabunde (Cucumber), Katie Chipman and Benjamin Dorshort (Navarro), Tyler Burrows (irrigation).

Notable station achievements: In 2015 was the first year since 2009 that HARS operated with full technical and office management staff (Research Manager, Ag Supervisor Paul Sytsma and US2 Sue Reinert hired in 2013, Storage Research Facility (SRF) Manager hired in 2014). We also hired Sam Pérez as a Farm Equipment Operator/SRF Assistant. We consolidated efforts to make our Hancock ARS operations more effective and efficient. Hancock ARS continues to fulfill the mission of effectively supporting faculty and staff led research. Here are some statements from our UW-Madison researchers:

- “HARS is a living lab to continue the water - quantity and quality - research and discussion that will continue to dominate the area for years to come” Jed Colquhoun-Horticulture.
- “While soils at HARS can be quite productive when crops are irrigated they are ideal for studying marginal land productivity when not irrigated and can therefore help answer some of the long term questions facing sustainable development of a bioenergy landscape” –Gregg Sandford-Great Lakes Bioenergy Research Center.
- “HARS is critical to the success of the potato breeding program. The quality of the data we generate at HARS is very good, which contributes to making the variety selection process more effective” Jeff Endelman-Horticulture.
- “As a new Professor, HARS provides me with the possibility to do my white mold research in permanent plots, a possibility my colleagues at other university don’t have that is key to success” Damon Smith, Plant Pathology.

A quick google scholar survey revealed that in 2015 UW scientists and collaborators contributed **eight multi-year peer reviewed scientific publications** that were carried out at the Hancock ARS: potato breeding and genetics (3), potato fertility (2), potato storage physiology (1), snap bean breeding and genetics (1) and cucumber genetics-climate change (1).

As a sample, UW-Madison researchers also contributed 28 reports of research projects conducted at the Hancock ARS at the 2015 Wisconsin Annual Potato Meeting. UW- Madison researchers also presented research reports to the Midwest Food Processors Association Annual Meeting, and professional associations including the Potato Association of America, American Society of Horticultural Science, American Phytopathological Society.

The role of the research developed at our station has been recognized by our allied industry organization, for more details, see: <http://wisconsinpotatoes.com/growing/research/> and <https://thenewfamilyfarm.wordpress.com/tag/hancock-agricultural-research-station/>

- HARS supported field and storage crop projects for 36 research groups who conducted 153 field research projects in 109 acres. This includes 20 projects that were directly linked to the industry. The total income generated by field research project was \$69,249.63 and 34.7% of this was generated by projects directly related to our industry partners.

- HARS was directly responsible for six field potato variety development projects (Navarro and Fishler-PI). These projects generated a research income of \$89,000. This was an increase from three projects and \$38,000 respectively in 2014. These grants supported 0.5 FTE of a staff (Sam Perez), two students (Benjamin Dorshorst and Katie Chipman) and LTE (Sonia Castillo).
- In 2015, researchers continue to develop proximal and remote sensing including hyperspectral applications to improve throughput in trait evaluations on soybeans and potato.
- HARS secured \$20,000 in funding from the WPVGA for the SRF, to replace five corroded refrigeration units and install six CO₂ sensors in the lockers that needed them.
- With the help of Steve Dierks (Coloma Farms), the SRF coordinated to have Big Iron Equipment (Plover, WI) modify the bin piler's stinger to include a star wheel dirt eliminator. This modification greatly reduced the amount of dirt we are introducing into bins at loading which aids in air flow to the potatoes to help extend their storage longevity. Big Iron donated the equipment and we paid for a portion of the labor involved.
- Sourced \$3,500 from Paul Bethke's program to purchase a high resolution photo light box and software to take pictures of our post-fry samples or tubers. This instrument has been a popular addition to the lab with several UW Faculty using it to support their research projects as well.
- A WPVGA Associate Division grant and research grants from Navarro and Bethke pooled resources to acquire 24 macro bins to initiate a mid-scale potato storage research option including pressure bruise assessment. Several research projects are already ongoing and planned for 2016 using these macro-bins.
- C-linear irrigation system expansion for \$15,661. Amanda Gevens (Plant Pathology) contributed \$5,000.
- HARS received donations from industry partners for \$111,800. These include CASE IH Machinery Program: \$74,760, Amvac: \$11,236, BASF, Big Iron, Certified Potato Seed Growers, CPS, Dupont, FMC, Gowan, Granny's Grennery, Nelson Vegetable Systems, NuFarm, Syngenta, UPI and Valent-USA accounting for the rest.
- Contributions from researchers (Bethke, Gevens and Navarro) to HARS development projects totaled \$8,416.

Outreach/instruction activities:

- **Six Field Days/Open Houses:** Tri-County Elementary School 3rd Grade Planting Field Day (June 3, 55 people), Potato Field Day (July 23, 160 people), Midwest Food Processors: snap beans and sweet corn variety (100 people), Garden Tour and Twilight Field Day (August 4), Tri-County Elementary School 4th Graders Harvest Field Day (October 9, 55 people) Potato Variety Harvest Expo Nov. 4-5 (60 farm and industry representatives).
- **[NBC15](#) and [Fox News](#) reports of the 2015 Potato Field Day** (click links to see videos).
- **Eleven Field and SRF Tours** were given to groups, including: UW-Seed Certification Staff (Keith Heizen, George Neuber and Rick Hafner, February 19), J.R. Simplot Company (4 people, March 10), Pierce County Extension Education (15 people, May 1), the Piette family (June 18), potato scientist Jeff Vick from AIS Consulting (July 9), Ethiopian scientist Dr. Henok Kurabachew and Dr. Amy Charkowski (August 12), Adams County Leadership Program (15 people, August 27), USPB Peter Joyce and Brazilian delegation (5 people, August 27), Congressman Sean Duffy and WWPVGA delegation (6 people, October 5), Janet Hedtke and Nancy Esser (October 30), Colorado State University Scientists and farmers studying our model to set up a storage research facility at CSU (6 people, November 5).
- **55 Meetings conducted at the Gavin G. Weis Public Events Facility (729 people)**
- **Professional Committees and Grant and Scientific Article Peer Reviews**
 - Felix Navarro participated served as academic advisor and member of Wautoma teacher Drew Heller's Montana State University graduate committee exam (July 6). Mr. Heller got his Master of Science on Science Education with an A score.

- Felix Navarro served as reviewer to the Canadian Journal of Plant Science (1)
- Felix Navarro served as reviewer American Journal of Potato Research (2)
- Felix Navarro served as reviewer Journal of American Society of Horticultural Sciences (1).
- Felix Navarro, Troy Fishler and Amber Gotch served as members of the WPVGA and Storage Research Facility Committee.

Research Activity:

Field

Projects: 41% of the Hancock ARS research acres were devoted to potato, 13% snap beans, 10% soybeans, 9% corn for grain and silage, 8% sweet corn, 7% cucumbers, 6% bioenergy crops, 3% sunflowers and 1% or less for each of carrots, sweet potatoes, small trees and other vegetables. The number of field projects for these crops were 153; these were carried out 133 by UW Faculty and Staff and 20 were directly related to industry partners.

Storage Research Facility Research Projects: 23 potato projects were initiated in the nine lockers and 9 projects were initiated in bins; three of these projects were initiated in macro bins; these included 23 faculty/staff lead projects and 9 directly related to the potato industry. **Storage Research Facility Fee for Service:** Individual growers and industry submitted 1,069 samples for evaluation to make storage decisions. These included 87 blind samples contracted by insurance companies. Total SRF income was \$95,410.43, 32.3% generated from research and 67.7% from service. The number of storage research projects for which our Station Staff (PI-Navarro and Fishler) was directly responsible was 7 (Snack Food Association Trial, Wisconsin Variety Trial, four in bins and macro bins).

Changes:

- Changes in response to UW budget cuts such as 136 tax, increase in fee for service that does not come back to the Station represent a real challenge for HARS.
- An increase in research projects for which Station Staff are principal investigators represent an opportunity and allowed in 2015 to support staff.
- Senior AREO-Irrigator Jeff Weyenberg resigned his position in December of 2015.
- Development of high throughput phenotyping for field traits included hyperspectral evaluations of traits represented important additions to field evaluation.
- SRF equipment: light box, 24 macro bins and YSI 2900 have increased research capacity.

Station goals for the coming year

- Replace the AREO- Irrigator position with a suitable candidate for a smooth transition.
- Maintain or increase the performance level observed in 2015, satisfy as much as possible researchers' requests and have a healthy and safe (accident free) year for the staff.
- Insulate grading shed to protect new grader, extend grading capacity beyond October or November, temporarily store research projects, store revenue generating potatoes and seeds.
- Install pressure safety tools to safeguard fields from flooding in case of irrigation malfunction.
- Modify an irrigation system to provide precision irrigation zones within subfields as Reinke is scheduled to make this technology available this spring. This is a research game changer.
- Maintain or increase support received from the industry, research grants and researchers.
- Continue to optimize the SRF's laboratory protocols in order to increase throughput and minimize data errors. New equipment, including the YSI 2900 are expected to help this goal.
- Celebrate the 100th Anniversary of HARS: The main event will be a Field Day on July 28 and circulation of 100th Anniversary book on the developments of agriculture in Central WI and the role of the Hancock Ag Research Station. This book is being written and edited by a committee including Justin and Lynn Isherwood on rural life and agricultural developments, Jeff Wyman and contributors representing 1970-2000, Russ Groves and contributors 2000-2016 and outlook to the future and Navarro and Isherwood Pre-1916 through 1970. Senior CALS Editor Mimi Broeske is helping with

diagram and editing the whole book. This book and the Centennial events will be partially supported by the WPVGA.

Areas of concern and challenges

- Budget reduction and repercussion on Station developments.
- Financial challenges in terms of having enough help to process the large trials (ex. Wisconsin Variety/Spud Pro and Snack Food Association Trials) as well as new storage program offerings (ex. box bin storage & pressure bruise screening) as the UW's Storage Research Program grows and demand increases.

Appendix: Incomplete List of 2015 Peer Reviewed Publication in Scientific Journals

Hagerty, C. H., A. Cuesta-Marcos, P. B. Cregan, Q. Song, P. McClean, S. Noffsinger, and J.R. Myers. 2015. Mapping and Root Rot Resistance and Root Architecture Quantitative Trait Loci in Common Bean. *Crop Science* 55: 1969-1977.

Kelling, Keith A., Francisco J. Arriaga, and Birl Lowery, Marian O. Jordan, Phillip E. Speth. 2015. Use of Hill Shape with Various Nitrogen Timing Splits to Improve Fertilizer Use Efficiency. *American Journal of Potato Research* 92: 71-78.

Kelling, Keith A., Ronald F. Hensler, and Phillip E. Speth. 2015. Importance of Early-Season Nitrogen Rate and Placement to Russet Burbank Potatoes. *American Journal of Potato Research* 92: 502-510.

Meier, Austin, Shelley Jansky, and Dennis Halterman. 2015. Germplasm Release: Three Potato Clones Incorporating Combined Resistances to Early Blight from *S. palustre* and Late Blight from *S. bulbocastanum* into a *S. tuberosum* Background. *American Journal of Potato Research* 92: 410-416.

Navarro, Félix M, Kyle T. Rak, Eugenia Banks, Bryan D. Bowen, Charlie Higgins, Jiwan P. Palta. 2015. Strategies for Selecting Stable Common Scab Resistant Clones in a Potato Breeding Program. *American Journal of Potato Research* 92.3 (2015): 326-338.

Rak, Kyle, and Jiwan P. Palta. 2015. Influence of Mating Structure on Agronomic Performance, Chip Fry Color, and Genetic Distance Among Biparental Tetraploid Families." *American Journal of Potato Research* 92: 518-535.

Staub, Jack E., V Gordon, P Simon, T Wehner. 2015 Chilling-tolerant US-processing Cucumber (*Cucumis sativus* L.): Three Advanced Backcross and Ten Inbred Backcross Lines. *HortScience* 50: 1252-1254.

Zhu, Xiaobiao, Huiling Gong, Qunyan He, Zixian Zeng, James S. Busse, Weiwei Jin, Paul C. Bethke, Jiming Jiang. "Silencing of vacuolar invertase and asparagine synthetase genes and its impact on acrylamide formation of fried potato products. *Plant biotechnology journal* (2015).

Kemp Natural Resources Station 2015 Annual Report

1. Notable Station Achievements

- Supported 7,000 user-days of diverse station activity and provided 3,800 person-nights of lodging, *the second consecutive year of a 10+% annual increase*;
- Generated over \$780 thousand in donations and pledges, including:
 - a \$750k pledge from the Connor Family to build a new 4,500 square foot Education & Outreach Center as a turnkey donation to Kemp Station;
 - a \$10k donation to implement the Hamilton Roddis Memorial Lecture Series; and
 - an additional \$27 thousand in undesignated donations to support general station infrastructure improvements and programming.
- Completed several station improvement projects, including:
 - Replaced the Lodge roof;
 - Re-engineered the Kemp tower, replacing all anchors and guy lines and increasing the height from 95 to 125 feet to improve broadband speed and wireless coverage;
 - Installed a new furnace, woodstove, electrical panel and flooring in the Cabin;
 - Renovated HVAC, sprinkler and fire alarm systems in Mead due to faulty design;
 - Replaced Lodge furniture;
 - Repaired stone stairs to Kitchen & Dining Hall;
 - Completed over \$5k in improvements to station roads and parking areas; and
 - Purchased an AED for the station using gift funds.

2. Outreach & Instructional Activities, Including Hosted Conferences/Workshops

- ***Outreach***
 - Conducted 13 outreach events as part of the *Kemp Summer Outreach Series*, attracting 179 participants;
 - Prepared 2 issues of *Kemp's Point*, the semi-annual station newsletter that is distributed to over 800 households;
 - Co-organized and implemented the third year of the *Science on Tap* outreach series (10 events), attracting more than 1,400 people. Held a very successful Forestry Field Day;
 - Hosted 2 separate environmental field days for 160 local grade school children;
 - Organized the 2015 Hamilton Roddis Memorial Lecture, attracting 600 people;
 - Hosted 8 external outreach programs organized and conducted by 8 different agencies/groups, providing 478 person-nights of outreach lodging; and
 - Developed and implemented a monthly radio program called *Field Notes* that airs on local public radio station WXPB.
- ***Instruction***
 - Supported 12 field classes, representing 5 UW-Madison departments and 4 UW System universities. Provided 908 person-nights of instructional lodging;
- ***Conferences/Workshops***
 - Hosted 20 conferences & workshops, providing 452 person-nights of lodging (a 15% increase).

3. Research

- Supported 63 research projects, involving 60 principal investigators from 11 UW-Madison academic departments and 14 extramural universities/ agencies;
- Provided 2,253 person-nights of research lodging, up an amazing 40% from 2014;
- Expanded Kemp Station's user base, attracting 13 new researchers to the station;

- Facilitated an incredibly diverse range of projects representing 5 of the 6 CALS Priority Themes: *Bioenergy & Bioproducts, Changing Climate, Economic & Community Development, Health & Wellness, and Healthy Ecosystems.*

4. Change

- Saw the retirement of Kemp Station's long-time Facilities Maintenance Specialist - Advanced after 21 years of exceptional service;
- Began the superintendent transition with the arrival of Scott Bowe;
- Began picking up 50% of Lynne Dalka's (Custodian) salary on station 136 funds;
- Increased station lodging fees by 16% in March 2015.

5. Goals for the Coming Year

- Maintain record-high levels of research, instruction, outreach and conference/ workshop activity;
- Complete construction of the station's new Education & Outreach Center;
- Increase the station's internet bandwidth to 100Mb/sec (currently at 1.5Mb/sec) and establish a station-wide wireless cloud, including a distributed sensor network.
- Hire a talented and hardworking Facilities Maintenance Specialist-Advanced, filling the vice-Kellner position in a timely and more permanent fashion; and
- Implement the station's succession plan.

6. Areas of Concern & Challenges

- *Replacing Kemp Station's FMS-A.* Currently, the position is filled via a Temporary Employment appointment whose quota of hours will be met in early-April. This is a mission-critical position at Kemp that needs to be filled in a more permanent manner before the start of the busy field season;
- *Avoiding the field station death spiral.* Kemp substantially increased its lodging fees in March 2015 and again in January 2016. Researchers have told us we have now hit the tipping point, where they are considering no-cost alternatives such as nearby UW Trout Lake. Another proposed fee increase could drive away Kemp users;
- *Completing the station's new Education & Outreach Center* as a turnkey donation outside the complex and expensive state building process. Realization of this goal will require extensive and intensive coordination among all parties;
- *Managing the benefits costs associated with the Kemp Custodian position.* Instead of paying the pooled benefits rate of 50% of wages, Kemp is paying 160%. The station can completely eliminate the benefits costs it pays by hiring a targeted, and talented, FMS-A; and
- *Addressing \$150k in station maintenance projects,* including replacing roofs, replacing decayed structural logs, painting buildings, and replacing sliding patio doors.

Lancaster Agricultural Research Station 2015 Annual Report

1. Notable Station Achievements –

- a. Providing unbiased research and results in an University setting for producers of the Driftless Region along the Mississippi River including Wisconsin, Illinois, Iowa, and Minnesota. (LARS is the only University research station located in the Driftless Region.) In 2015, Matt Ruark presented data at UWEX agronomy update meetings around the state from his cover crop research that included Lancaster as one of his sites. He showed producers the different effects of various cover crops on corn yields and how they influenced soil nitrate levels. John Grabber of the USDFRC published a fact sheet on research with alfalfa and corn interseeding for a dual cropping system that also includes Lancaster as one of his research sites. As the project completes and produces more data, further publications will result.
- b. Management of the Long Term Crop Rotation Study area on station for almost 50 years. This is the 2nd oldest crop rotation study in the US. It has included many different research projects and has provided a resource to crop researchers to perform a variety of projects and collaborations within and outside of the UW. Additionally, the crop rotation study is now part of a “Cropping Systems Coordinated Agricultural Project Field Research Network” and has multiple fact sheets and presentations available on their website.
(www.sustainablecorn.org)
- c. Providing continued grazing and commercial beef cow/calf research for the Wisconsin Beef Industry. The commercial beef herd and management intensive grazing activities allows researchers and extension staff to utilize the resources of the station for research and outreach functions. Dan Schaefer and grad student, Mitch Schaefer, partnered with UWEX Beef Team member Bill Halfman to evaluate different growth implant strategies on Holstein Finishing Steers. They were able to show increased gains with an advanced growth implant program on heavier weight Holstein Steers. Results were shared at NCCC 308 regional beef research meeting, Driftless Beef Conference (producer conference in Dubuque, IA) and multiple UWEX beef meetings across the state. That research along with three other beef research trials was included in Mitch Schaefer’s doctoral thesis that was defended in 2015. Besides research UWEX County Agents Katie Pfiesser and Lyssa Seefeldt utilized the LARS cow herd to take pictures for the creation of a producer guide to properly assess body condition of beef cows. The guide was also used as a topic for a series of UWEX cow calf field days (including at LARS) sharing it with beef producers across the state.

2. Outreach/Instruction Activities Hosted –

- a. WI Farm Bureau District 3 luncheon with station presentation – 25 people
- b. UW Platteville Crop Production and Beef Production class tours – 75 people
- c. UWEX Regional Beef Cow Calf Field Day – 45 people
- d. NRCS Training for WI staff on grazing – 25 people

3. Number of Research Projects – (See attached page for project list)

- a. Agronomic Crop Projects - 19 total projects including areas of corn, soybeans, forages, small grains, cover crops, soil conservation, and fertility.)
- b. Beef Cattle and Grazing Projects – 7 total projects including cow/calf genetics, cow/calf reproduction, feedlot animal performance, grazing animal performance, grazing plant species performance, and weed management in pastures.

4. Changes:

- a. Continued interest in larger agronomic plot areas. 2015 saw more inquiries from agronomic researchers for larger plot areas. With our steep slopes and contour strip farming, it makes it difficult to accommodate all of the researcher requests. Some research such as the corn and soybean variety trials have moved off station to other private locations where it is easier to design research plot layout and manage those research plots.
- b. Interest in alternative plant species and management systems. We continue on a trend with more interest in alternative crops and management systems. Cover crops research is still active and we have new interest in a researcher working with intermediate wheatgrass. Intermediate wheatgrass is a perennial species that the researcher would like to both graze and harvest in the same year. This will require added management to successfully carry out the diversified production goals. The silvopasture grazing project that includes wooded and pasture areas is another example of a research project with management requirements outside of normal conditions. These type projects require more effort as they are new and non-traditional experiences.

5. Goals for the coming year –

- a. Support existing research and facilitate new research for the future. Interact with new Agronomy researchers to incorporate Lancaster ARS as they build their programs.
- b. Continue to act as liaisons with the local agriculture community to share their educational needs with UW staff. Work with UW staff to find out what opportunities we can assist them with to carry out their research and outreach activities.
- c. Work with local and state UW Extension staff as they transition through their budget cuts and new staffing plan. We have always maintained close working relationships with many of the state specialists and the surrounding county agriculture agents. The current plans will drastically change our working relationship and cooperative arrangements for carrying out station outreach through our programs and serving our local agriculture community.
- d. Utilize our website, social media, and in person events to efficiently share the story of the station and UW with our local communities and related industries.

6. Areas of concern and challenges –

- a. Continuing operations with reduced budgets. Similar to all UW units we need to figure out how to carry out all needed responsibilities with reduced staff and resources. It is important for Lancaster ARS maintain our budget, but also keep our site as an affordable and desirable location to do research. Our distance to campus is already a disadvantage as compared to other closer locations.
- b. Maintaining research interest with decreased number of research faculty. Faculty numbers continue to decrease and eventually that will limit the amount of interest and ability in performing research at all of the ag research stations. The lack of hiring of new faculty and especially those interested in applied research is a concern for multiple departments that we work with.
- c. Maintaining staff morale. We have had consecutive years of budget cuts and limited opportunities for wage increases, etc. We are lucky that our staff believe in the UW and like what they do, but eventually it wears on everybody and that can make it difficult to be a successful work unit.

Research activity in 2015 (26 Research Projects, 18 Researchers)

- **Ken Albrecht**

- Kura clover establishment
- Kura living mulch experiments w/ drought resistant corn and lines of sorghum
- White clover nursery establishment

- **Francisco Arriaga**
 - Use of cover crops to alleviate soil compaction after corn silage
 - Interaction of N rates, gypsum and tillage for corn grain
 - Corn stover harvest levels and nitrogen application rates
- **Chris Baxter**
 - Effects of carbon based fertilizer on alfalfa yield and quality
- **John Grabber**
 - Effects of using various rates of prohexadione on alfalfa interseeded in corn silage
- **David Huset**
 - Effects of aphanomyces on select alfalfa varieties
- **Carrie Laboski**
 - N – timing study
 - Low fertility field
 - Rotation study
- **John Mochon**
 - Oat variety trial
 - Barley variety trial
- **Mark Renz**
 - Volunteer wheat effects on fall seeded alfalfa
 - Ultrahigh density grazing (Mob) grazing effects on Canada Thistle management in pastures
- **Mark Rickenbach, Eric Kruger, Dan Schaefer, and Rhonda Gildersleeve(Diane Mayerfeld)**
 - Silvo-pasture project
- **Heathcliffe Riday**
 - Red clover nursery
- **Matt Ruark**
 - Cover crop study
- **Dan Undersander**
 - Alfalfa variety trials
 - Variable thickness of line wrapping plastic on alfalfa baleage feed quality
- **Bill Meyer**
 - Yield comparison between two winter wheat varieties
- **Brian Kirkpatrick**
 - Estrus Synchronization and reproductive techniques with beef cows
 - Production and rearing of replacement breeding animals for reproductive performance
- **Dan Schaefer**
 - Growth implant strategies on Holstein feedlot steers
 - Consumption level of Rumensin in free choice low moisture molasses blocks

Marshfield Agricultural Research Station 2015 Annual Report

1. Notable Achievements

- Sixty-three percent of the total dairy herd participated in research trials and studies. This equates to over 650 head of cattle.
- Received the Superior Quality Award for milk from Foremost Farms USA for calendar year 2015.
- MARS north farm campus hosted 34 unique tours and events which brought in 2450 visitors to the facility.
- MARS south farm auditorium was used by 4000 people with 80% of the meetings and activities taking place participating in UW and UW Extension related events.
- Supported eight student interns through work-academic related opportunities
- Transition to no-till planting – planted 80% of acres with no-till
 - i. Cut fuel usage by 50%
 - ii. Successful crop performance – above average yields despite transition to no-till
 - iii. Benefits observed – was able to harvest no-tilled corn after rainfalls when conventionally planted fields were still impassible
- Triticale as a cover crop – study funded by Midwest Forage Association
 - i. Triticale offers all the benefits of a winter cover, but also provides exceptional forage quality when harvested in the spring
 - ii. Forage adds significant value to production system
 - iii. Does not impede growth of subsequent crop (no-till soybeans)
 - iv. Provides unique opportunity to double-crop in northern climate
- Excelled in the animal program inspection during the AAALAC reaccreditation effort

2. Outreach activities

- Central Wisconsin No-tillers – farmer led conservation group focused on the successful implementation of no-till and cover crop practices in Central Wisconsin
 - i. MARS is the hub of this group – the group is farmer-led, but MARS serves as the facilitator
 - ii. Two meetings on-station
 - iii. Two “field walks” on other farms
- Central Wisconsin No-till Project – lineup of simple, practical, and observational field trials that have been inspired by the Central WI No-tillers
 - i. Soil temperature monitoring
 - ii. No-till corn planter study
 - iii. Triticale cover crop study
 - iv. No-till alfalfa study
 - v. Cover crop demonstration area
- NRCS Soil Health Workshop – in-field demonstrations
- NRCS Tech Training – two day training course including classroom seminars and in-field training
- Mid-State Tech classes – station tours, soil and forage training classes; ruminant nutrition and condition scoring classes, genomics training
- Ag In the Classroom Tour – ruminant nutrition demo and in-field demonstration of soil health indicators
- Hosted three area school tours and two technical college tours and instructional activities
- Hosted Marshfield FFA Alumni Dairy Breakfast – 1800 visitors from the Central WI community including state and local government

3. Research

- Over 70 field research trials in 2015. Worked with 15 PI's on crop trials.
- Nine active animal protocols, supporting the research and educational goals for six PI's.

4. Change

- Water quality and soil conservation are getting more attention in Central Wisconsin than ever before. This makes the station's work with no-till and cover crops very relevant. As a result, we are viewed by many in the region as an "authority" on the topic. This gives us opportunities to serve the industry, but also heightens our responsibility to lead by example. Our goal is to continue exploring and modeling the best soil and water conservation practices; including but not limited to: no-till planting, cover crops, organic production methods, perennial forages, and grass-based (grazing) agriculture.
 - i. Examples: no-till planting into rolled cover crops to minimize dependence on herbicides, grazing fall cover crops to extend grazing season, demonstrating the usefulness of pasture and grazing practices as a tool for high producing dairies
- USDA-ARS has hired a Marshfield-based research agricultural engineer and will hire a heifer growth physiologist and research soil scientist. These additions to the research program at Marshfield will diversify our station potential and create stronger partnerships at MARS

5. Station goals

- Continue to serve as the hub of the Central WI No-tillers
- Continue to fine-tune no-till planting practices
- Expand use of cover crops
- Explore ways to minimize input costs in crop production while maintaining productivity
 - i. Cover crops and no-till play a role in this
- Expand grazing/pasture management research program
- Provide summer internship programs with external funding for two students, summer 2016
- Acquire land near the North Farm campus to accommodate and secure crop production and nutrient management needs going into the future

6. Areas of concern

- Aging plot equipment
 - i. Forage plot equipment (seeder, harvester) are getting old and worn. We need to have a replacement plan for the near future. Options are to purchase new, rebuild old, or build new from scratch. The forage equipment is the foundation of the MARS field research program, and it is necessary to have trustworthy equipment. Any changes will require investment, but are necessary to the continued success of the program.
- Lack of a professional administrative office space including meeting space that would suffice the needs of the MARS program
- Lack of adequate storage space for equipment, commodities, and no place onsite at the North Farm campus to safely store and mix chemicals
- Uncertainty regarding budgeting to keep station finances solvent. Concern over less 101 inputs, taxes on 136 expenditures, and possibility of higher receipt requirements may have negative impact on the station operational budget.

O.J. Noer Turfgrass Research Station 2015 Annual Report

1. Notable station achievements:

Soil scientists have been able to fine tune potassium fertilizer recommendations for golf course managers based on a long-term research trial. In fact, large reductions in potassium applications are being made across the U.S. based partly on this work.

In addition, soil scientists collected data in 2015 that demonstrated polymer coated fertilizers can be used at lower rates to achieve similar results as traditional fertilizers.

Several long-term evaluations of grass cultivars and low-input management systems were evaluated by the Soils Department. These long-term studies will lead to improved seed and sod recommendations, and information about how to best maintain healthy turf using fewer inputs of water, fertilizers, and chemicals.

The majority of research from the department of Plant Pathology focused on developing sustainable turfgrass management programs for use both in golf course and home lawn settings that limit the risk posed by traditional pesticide usage. The research has developed disease-management programs that golf courses can use to reduce environmental impact by decreasing the overall amount of product used by over 75% compared to a conventional program.

In addition, Plant Pathology has tested reduced-risk weed management programs for lawns that use only reduced-risk or low-toxicity products to help improve the sustainability of Wisconsin lawn care while still maintaining their attractiveness and functionality.

Plant Pathology just finished a three year rust study confirming that rust previously thought to only attack perennial ryegrass is now infecting Kentucky bluegrass, which explains why some rust resistant Kentucky bluegrass varieties are no longer resistant.

Plant Pathology also discovered new options to control tough to manage nutsedge.

ARS renovated or are in process of renovating 42 old research plots (25% of station) into new or future research plots. Those included:

- Demolished 3 old runoff studies involving removal of tons of concrete, to establish a new 'Operation Pollinator' demonstration (seeded in October 2015)
- Disassembled 2 old greenhouses
- Removed many large lysimeters from another old study to prepare that plot for future research
- Renovated and planted 4 plots to a new tall fescue study
- Renovated and planted 7 plots to bentgrass fairway investigations
- Started renovating another 25 old research plots for future departmental studies which will be planted this summer

2. Outreach/instruction activities:

- WTA Summer Field Day – 260 attendees
- Grandparents University – 50 attendees
- Kiwanis Club Tour – 40 attendees
- National Phytopathology group tour – 50 attendees
- Reinders Turf and Irrigation tour – 25

3. Research Activity:
Listed Below
4. Change:
Plant Pathology maintains a diagnostic lab at OJ Noer, with a lab manager who is extremely helpful in assisting to acquire supplies and equipment needed to run the facility. The station superintendent used to be tasked with procuring all donations of equipment, seed, fertilizer, pesticides and other supplies that are used by the departments and the farm in general. It's nice to have more help procuring these donations.
5. Station goals for the coming year
 - Reinstall the facility's front lawn irrigation system
 - Grow in a new 'Operation Pollinator' demonstration
 - Reestablish 25 plots from old unusable plots with donated seed, fertilizer, and other inputs needed to establish them
 - Continue to procure donations of seed, fertilizer, pesticide and as many additional supplies as possible
 - Pursue acquisition of new or better research and maintenance equipment, including a roller, plot sprayer, verticut heads, and topdressing brush
 - Persist in asking researchers to contribute more towards supplies and expenses, including irrigation supplies, hand tools, fuel, equipment maintenance, etc.
 - Reinforce and expand our pesticide safety policies and safety data sheet compliance
 - Continue to assist researchers to install as many new projects as possible
 - Upgrade the irrigation control program to the latest version of "Sitepro"
 - Investigate mapping the facility with GPS and integrate this information into the irrigation control program to make operating the irrigation system more user-friendly for students
6. Areas of concern and challenges
 - Researchers used to financially contribute more towards operations and needed equipment at the facility, but with budget cuts, they are less able than earlier years to do so. A historical Noer spreadsheet showing this trend is available.

Title of Project	Project Leader	Plot #s	Hatch?
\$ Spot (Fairway)	Koch	B-26,32	
Nitrogen Ron	Koch	B-9	
Preventative control of Pythium blight	Koch	C-23,24	
Ron	Koch	C-29	
Anthraco nose	Koch	B-30, Yahara	
Bayer Seasonal - fairway	Koch	A-45	
Seasonal disease control - putting green	Koch	B-16	
Early Season \$ spot	Koch	B-23,24	
Syngenta private	Koch	B-13	
Syngenta Control of Dollar spot	Koch	B-22	
Dollar Spot Curative	Koch	B-29	
Brown patch	Koch	B-7	
Kentucky bluegrass rust study	Koch	A-36,37,38,42,43	
\$ Spot Green	Koch	B-8	
Reduced Risk Disease Control	Koch	A-54	
\$ Spot Probability	Koch	A-55	
Lisa	Koch	C-30	
Potassium Snowmold	Koch	C-31	
Sedge	Koch	C-15,25	
Ecogel	Koch	C-16	

Defender Herbicide Trial	Soldat	A10	
Defender Herbicide Trial	Soldat	A11	
Biological Product Trial	Soldat	B17	
Dormant Milorganite Evaluation	Soldat	D12	
Evaluation of biostimulants	Soldat	B19	
Biosolids Root Strength	Soldat	C26	
Low Input Turf	Soldat	A11	
Growth regulator evaluation	Soldat	B5	
Potassium Soil Test Calibration	Soldat	B6	
Home lawn species and management trial	Soldat	A6,7	
Rain Shelter Drought Management	Soldat	X16,17,18,19,20,21	Yes
Spring Valley Fertilizer Trial	Soldat	D7	
Organic Fertilizer Trial	Soldat	D11	
NTEP Kentucky Bluegrass	Soldat	D22,23,24,26,27	
NTEP Fine Fescue	Soldat	A12,18	
NTEP Bentgrass	Soldat	B-21	
Herbicide Evaluation	Soldat	A31	
Sports Turf Grass Selection	Soldat	B18	
Zoysia Buffalograss seed timing	Soldat	D-21	
Doug Future	Soldat	D-25,28	
Fert study	Soldat	D-10	
crabgrass study	Soldat	east of D-18	
Wetting Agents	Soldat	B-4	

Compaction	Soldat/Renz	C-25	
Ants	Williamson	B-4	
Williamson	Williamson	B-28	
Heritage Seed Demo 2014	Schwab	A-5	
Species Demo 2005	Schwab	A-3	
Meadow Mix	Schwab	A-4	
Regal Elm Shade	Schwab	X-2,3,6,7	
Pollinator Demo	Schwab	A-15,16,17	
Carbon Sequestration	Jackson	D17,20	

Peninsular Agricultural Research Station 2015 Annual Report

Notable station achievements

As one of 30 institutional participants involved in *NC140 Fruit Tree Research Project* the University of WI-Madison was recognized in the *2015 Experiment Station Section Excellence in Multistate Research Award*. The Peninsular Station has been a site for over ten of the project rootstock evaluation trials over the last 30 years and currently has three on site.

First year observations in unsprayed northern wine grape trials at Peninsular have begun to help determine susceptibility of eight cultivars to various diseases. Preliminary data is showing a wide range of susceptibility. Some of the findings confirm observations from commercial vineyards, but others are different from previously held assumptions. Plant Pathology graduate research project.

After four years of northern wine grape cultivar fungicide sensitivity trails data collected from 11 trials at PARS and WMARS has shown that, in general, the 15 cultivars tested were not highly sensitive to copper, sulfur, and difenoconazole applications. Notable exceptions, however, for copper sensitivity and sulfur were seen with three of the varieties. This will help extension and other grape industry consultants make more confident recommendations regarding the use of these fungicides in northern wine grape production system. Plant Pathology research project.

The station brought in over \$50,000 to support research and outreach programs. Sources for these funds included Door and Kewaunee Extension, grower support for commercial fruit information programs, WDTCAP Cider Trial grant, private research service funding of pesticide residue trials, and researcher grant funds for seasonal labor.

Research projects

- 6 Tart cherry: 2 entomology, 3 PARS/horticulture, 1 plant pathology
- 5 Apple: 5 PARS/horticulture
- 4 Grape: 1 horticulture, 3 plant pathology
- 1 Potato: NRSP-6: United States Potato Genebank
- 1 Small grain: 1 agronomy

Outreach/Extension projects

- Responded to over 150 fruit crop information requests (phone calls, email, etc.) from outside of Door & Kewaunee.
- Provided 20 weekly seasonal PARS webpage *Commercial Fruit Pest Updates* for apple, cherry & grape producers.
- Industry field day & conference presentations
 - Two presentations at *WI Fresh Fruit & Vegetable Conference* (200 participants)
 - Organized the *Northeast WI Spring Fruit School* and presented along with 4 UW Madison presenters (50 participants)
 - Organized *Fall Cherry Season Review Meeting* for area commercial producers (20 participants)
- Coordinated commercial apple and cherry scouting program
 - 240 cherry & 180 apple acres covered (eight producers involved)
 - Produced over 100 seasonal reports
- Maintained & reported catches at 20 trapping sites for statewide SWD program.
- Provided site for *WI DATCP Grape Pest Survey Project* trapping
- Hosted DNR Forest Pest Group Tour (12 participants)
- UW/EXT Master Gardener Open House (500 participants)
- UW/EXT Master Gardener Taste of Door County (390 participants)

- UW/EXT Master Gardener Spring Plant Sale (250 participants)
- UW/EXT Master Gardener Spring & Fall Youth Programs (250 participants)
- USDA PIP Committee Meeting (15 participants)
- USDA PIP station tour (25 participants)

Change

A number of projects that, in the past, were campus faculty PI projects have been continued by station academic staff. Some have not, like processing vegetable, raspberry, and alternative crop trials. Others, such as, the NC140 Regional Rootstock trials have been continued and required the superintendent to assume the role of *state coordinator* status. Looking forward we have made progress in developing interest from new faculty in both Horticulture and Food Science to support new projects here.

Goals for the coming year

We hope to increase support and implementation of applied fruit production projects in areas including pest management, mechanization, profitable new crops, varieties and productivity increases.

- Partner with new Food Science faculty hire Nick Smith to support apple hard cider research and outreach in the state. We intend to collaborate with him on future grant funding opportunities for support of recently established apple hard cider variety trials and laboratory quality evaluations.
- Continue support of plant pathology graduate research on grape disease susceptibility research trials. Would like to encourage future collaboration of interdepartmental (Horticulture & Plant Path.) research looking at how disease incidence and management influence vine and crop quality.
- Continue efforts with entomology faculty on studies involving efficacy testing of reduced risk and organic pesticides for management of Spotted Wing Drosophila, a new introduced pest that is capable of economically devastating cherry and other perennial fruit industries. We will also continue to provide support for outreach efforts related to this pest.
- Encourage Horticulture faculty PI/coPI involvement in future rootstock research and grant funding.

Areas of concern and challenges

We continue to coordinate agronomic, tree and small fruit research projects and outreach programs with UW-Madison CALS departments including Agronomy, Entomology, Food Science, Horticulture, and Plant Pathology. Unfortunately, budget reductions and loss of faculty positions on campus have resulted in fewer projects from these departments. In the last few years the station itself has experienced loss in staffing due to budget reductions leading to a diminished ability to support existing projects and programs. Unfortunately this trend looks as if it will continue, as once again a reduction in state funding for the station is being proposed by CALS administration.

Rhineland Agricultural Research Station 2015 Annual Report

Notable station achievements:

- 1) The research impacts of RARS are best quantified through the seed that is produced on the farm, rather than through the trials conducted there. Seed potatoes from RARS contributed to the following 2015–2016 publications and presentations by the research group of Assistant Professor Jeffrey Endelman, from the Dept. of Horticulture:

Wang, Y, PC Bethke, AJ Bussan, MT Glynn, DG Holm, FM Navarro, RG Novy, JP Palta, MJ Pavek, GA Porter, VR Sathuvalli, AL Thompson, PJ Voglewede, JL Whitworth, DI Parish, JB Endelman. Acrylamide-forming potential and agronomic properties of elite U.S. potato germplasm from the National Fry Processing Trial. *Crop Science* 56:30–39 (published online ahead-of-print 23 Oct. 2015).

- Two UW potato breeding lines (W6234-4rus and W8152-1rus), which were developed and maintained at RARS, were among the top selections in a national trial designed to find new French fry varieties with lower acrylamide (a suspected carcinogen).

Snodgrass, L, M Drillias, M Copas, A Gevens, S Jansky, J Endelman. Agronomic and Culinary Evaluation of Elite Fresh Market Potato Germplasm. 5th Annual Meeting, National Association of Plant Breeders, July 28–30, 2015, Pullman, WA.

- This research has allowed us to quantify how effective the UW research farms are as selection environments when the goal is to identify the best varieties for commercial farms.

Endelman, J. Ensuring clean seed for variety development. UW Extension and WPVGA Grower Education Conference, Feb. 2–4, 2016.

- Over the past two years, we have changed our method of testing tubers for the presence of potato virus Y and seen a dramatic reduction in the levels of this disease at RARS.

- 2) Two fresh market varieties released in 2014 continue to gain market share: Red Endeavor (W6002-1R) and Oneida Gold (W6703-1Y), standing out for nice appearance as well as disease and internal defect tolerances.
- 3) The SPUDPRO industry advisory committee approved to advance several WI breeding lines through the certified seed program: W9576-11Y (yellow market category), W8893-1R and W8890-1R (red market category), and W9133-1rus and W9433-1rus (russet market category).

Outreach/instruction activities:

- 1) The UW-Madison Potato Breeding Program was featured on UW-Madison's Wednesday Night at the Lab series. The target audience was the Rhineland community and WI Public Television viewers.
- 2) RARS hosted two high school groups with 8-15 participants.
- 3) On Sept. 24, RARS hosted "A Night on the Farm – Helping Fight Local Hunger" event, in cooperation with the Wisconsin Potato and Vegetable Growers Association (WPVGA) and Area Food Pantries. The event drew over 150 volunteers, who picked 8 tons of potatoes and donated 110 lbs. of additional non-perishable food items. Two local TV stations (WJFW and WAOW) covered the event.

RARS secured a \$5,500 Certified Crop Advisor Internship through the American Registry of Certified Professionals in Agronomy, Crops and Soils (ARCPACS). **hange:**

There were several position changes in 2015. Scott Woodford was promoted to Agricultural Supervisor, Becky Eddy was hired as an Associate Researcher, Glen Herman was hired as an Equipment Operator and Kim Goodin hired as a Research Gardener. All adapted to their new roles well, making significant contributions to improvements at RARS, specifically to the RARS fields and greenhouses. These people brought new perspectives to entrenched protocols and implemented several new ideas to reduce waste, simplify procedures or save time. The following activities improved the quality of the research conducted at RARS:

1. We significantly reduced the incidence of common scab disease in our greenhouse seedling tubers by buying new soilless potting mix.
2. In several greenhouses where the seedling tubers are raised in 4" pots, absorbent capillary mats and black plastic were installed to improve water retention and reduce water stress for the plants.
3. The following infrastructural improvements were made to the greenhouses: (i) added pea gravel around the perimeter, (ii) fixed/patched all holes in the plastic roofs, (iii) replaced poly panels and insect netting where needed to exclude disease-carrying pests (i.e. aphids) and pathogens (i.e. late blight), (iv) purchased appropriate shade clothes for GH 1, 5 & 8 (important for proper plant growth) and (v) replaced the cooling pad pump in GH 4. Electrical improvements were made to the ventilation control system in GH 5 (dual thermostat control to alleviate stress on back louvers) as well as new thermostats in GH 2 & 3. Additional fans were installed to improve ventilation and temperature control in GH 6. Fan speeds in GH 1, 2, 3 were able to be slightly increased.
4. Implemented IPM strategies by hiring a weekly crop scouting agency to monitor insect/weed/disease pressure throughout the season. By concentrating our efforts on the target organisms, we sprayed based on recommendation.
5. Executed IPM strategies in all greenhouses (i.e. sticky traps) to monitor insect pressure throughout the season.
6. Employed weekly field and greenhouse roguing where the use of PVY test kits were used to test "suspected" plants to maintain disease-free integrity. The implementation of PVY test kits in addition to PVY indexing of all seed planted on-site in 2015, led to an increase in our seed base.
7. Implemented a 3 year crop rotation comprising of potatoes/oats (with a clover under seed)/clover/back to potato. We hope this new rotation will enhance the soil microbiology, improve the soil structure, increase infiltration, minimize soil erosion, suppress weeds and disease, control nematodes and cycle nutrients resulting in "healthier soils" and long term sustainability.

Goals for the Upcoming Year:

- 1) Efficaciously complete breeding goals set by PI and CALS to continue to strive for the creation of a world-class breeding program.
- 2) Increase awareness of the Rhinelander Research station and the role it plays in potato variety development and the WI Potato Industry.
 - Host a successful Rhinelander Agricultural Research Field Day promoting our role in WI potato variety development drawing growers and researchers, industry as well as the public.
 - Host another well attended and highly promoted "A Night on the Farm – Helping Fight Local Hunger" event. Plan is to increase planted acres to draw more participants and to provide for additional area pantries.
 - Provide support of numerous research projects outside of the potato breeding program that are conducted on the Rhinelander station. Collaborators include other UW-Madison Departments and system Universities as well as the Department of Natural Resources.
 - Continue to promote facility tours and seminars.
 - Be resourceful in finding avenues to encourage the facility grounds as an ideal public gathering place for local events.
- 3) Continue to make safety a priority (maintaining a safe work environment) by assuring 100% audit compliance and a leading example amongst ARS stations.
- 4) Complete six Plant Variety Protection applications.

Areas of Challenges and Concern

- 1) Keeping the station performing at an efficient and successful level while continuing to deal with the challenges of old facilities, outdated technologies, and less resources.
 - Since the 1990's, the breeding program has been expanded beyond the round white category to include russet and red types. Yellow and specialty varieties have been actively developed for the last ten years as well, so the workload continues to be significant. RARS continues to utilize LTE and temporary assistance when necessary to facilitate the breeding program moving forward.

**Spooner Agricultural Research Station
2015 Annual Report**

1. Notable Station Achievements:

Conduct short season variety trials and evaluate species (cops0 for winter survival and yield ability in far Northern Wisconsin. Evaluate soil fertility limitations of soil pH on soybeans yield and boron topdress product on alfalfa yield. Evaluate soybean growth and development of different planting dates and maturity group soybeans during the year and the relationship with soybean yield. Determine the effect of feeding sodium bicarb as a buffer with high producing dairy ewes and also feeding hay supplementation during the grazing season. Ewe lamb response to natural egg based product for parasite control on grazing ewe lambs.

2. Outreach/instruction activities:

SARS hosts many groups and individual visitors. I lead some groups and frequently present information about SARS and SARS research to groups off station (#participants).

- SARS tour and lunch host for UW-Madison Wisconsin Idea Tour (60)
- SARS lambing visits by over 200 local students (4K, kindergarteners, and 1st graders)
- SARS overview, update and welcome at Spooner Dairy Sheep Day (50)
- SARS host for UWEX Twilight Garden Meeting (100)
- SARS host site and tour for UWEX Leadership Washburn County (10)
- Overview of SARS Pesticide Safety Equipment for local PAT class (10)
- Host site for area tractor safety training utilizing SARS tractors and implements (12)
- SARS Host and help explain SARS irrigation management for Scott Sanford's UWEX irrigation training session (15)
- Articles for UWEX quarterly newsletter
- Location of area UWEX office for 2 Ag Agents for Burnett, Washburn and Sawyer Counties
- Location of area UWEX Natural Resources agent serving parts of many counties
- Over 1000 UWEX contact in the station throughout the year.

3. Research Activity:

<u>Project Title</u>	<u>Project Leader</u>
Alfalfa/Forage	
Switchgrass selection for morphological traits	M. Casler
Switch grass, indiagrass, & Big bluestem grass trial	M. Casler
2013 Meadow Fescue variety trial	M. Casler
Organic forage grass evaluation	E. Silva
Forage crabgrass seeding demonstration/trial	Wiegand
Grains	
Wisconsin corn hybrid performance trial-grain (Dryland, Irrigated, & Silt loam)	J. Lauer
Wisconsin corn hybrid performance trial-silage (Silt Loam & Lirrigated)	J. Lauer

Research Activity Continued:

Project Title

Project Leader

Monsanto early season corn variety strip trial
Soybean variety evaluation (Silt loam & Irrigated)
Date of planting and variety maturity impact on soybean
growth and yield
Small Grains breeding and testing

M. Deaton
S. Conley
A. Gaspar/S. Conley
J. Mochon/S. Conley

Soils

Soybean yield response to pH level

C. Laboski

Garden/Poplars

Monitoring onset and appearance of spotted wing drosophila
Wine grape evaluation - Removed fall 2015
High tunnel season extension for fall raspberry production
All America flower & Vegetable display garden
Willow & Poplar replant in hybrid poplar harvest area
Establishment and evaluation of wine grape varieties
(Demo Garden Planting)

C. Guedot
K. Schoessow
J. Fischbach
K> Schoessow/T. Rehbein

Sheep

Genetic Development of dairy breed of sheep

D. Thomas

4. Change

5. Station goals for the coming year

6. Areas of concern and challenges

All depends on the budget reduction, closing of the dairy sheep program, staff losing jobs and if UW will maintain any support of the station. 2017 Will be able to focus on Agronomic and Horticulture research but this year will have too many distractions with the dairy sheep closing to be able to do too much.

West Madison Agricultural Research Station 2015 Annual Report

1. Notable station achievements

Maintaining organic certified land has led to increased research projects and doubling of the certified organic land to 30 ac in 2016. Plant breeding to improve germination under organic management is being done for sweet corn, carrots, and yellow beets. Season-extending technology has been gaining momentum with organic tomato variety trials and a successful relocation of the mobile hoop house for a succeeding winter carrot trial. Researchers noted 50% more production of marketable tomatoes, higher sugar levels, and up to 7x less disease from growing in the hoop house vs. outside. Vegetable agronomic/flavor trials were successful for growers and chefs to hone in on varieties adapted to organic management. Wine grape cultivars were found to generally not be harmed by copper, sulfur, and difenoconazole fungicides, but notable exceptions were that 'Brianna' was highly sensitive to copper, and 'Leon Millot' and 'Maréchal Foch' were highly sensitive to sulfur. A publication on abscission in grapes was accepted by Frontiers of Plant Science and molecular extractions of grapes has begun to evaluate genes involved with early berry drop.

A plethora of vegetable varieties were grown and 15 tons of excess produce was donated to local food banks. Nearly 600 established grapevines are now in production benefiting researchers from several departments from Food Science, Horticulture, Plant Pathology and Entomology. The one-year old fruit/vegetable handling area was greatly utilized by researchers for washing, grading, sorting, and storing perishable foods. Agronomic yields were good for grain crops while several alfalfa fields were renovated to meet higher demand from the Dairy Cattle Center (DCC). Conservation upgrades were made to our 6-row planter and 95 acres of corn and soybean were planted no-till.

The new manure separator/press was installed at the DCC and it has made hauling safer and more efficient. After being squeezed, the remaining solids are much drier and can be heaped on the truck and 35% less trips are needed. The drier material is also more convenient for handling/spreading and composting. Unfortunately the system has to be shut down in freezing temperatures.

2. Outreach Instruction/Activities

Many activities were held throughout the year to promote research and demonstration plots. Five key **field days**, which reached over 500 visitors, including the annual Urban Horticultural Day and the Wisconsin Historical Society's book launch with Jerry Apps as the keynote speaker; as well as vineyard walks, organic vegetables/season extending technology, and the Commercial Flower Grower's field day showcasing 1200 coleus plants. **Workshops** using the grounds and facilities added up to over 1600 people including the Midwest School for Beginning Grape Growers; Student Organic Seed Symposium, Xerces Society soil conservation short course; and Women Caring for the Land. New fruit connections were established with UW staff, students, local growers, and wineries via one-on-one interactions, field days, and station visits and fruit acquisition. Table grapes dissemination of our data reached nearly 900 people this season. The gardens hosted numerous **tours and walks** for hundreds of horticultural enthusiasts. The public gardens maintain thousands of plants including annual and perennial ornamental collections and nurseries for various plant and flower groups in the state (Daylily Society, WI Peony Society, All-American Selections), industry (Ball Horticulture, Proven Winners), as well as passersby interested in what they can grow in their own backyards.

3. Number of research projects

There was an estimated 55 field trials and another approximately 20 unreported (PIRF-less) animal related projects/needs for the station that included 24 faculty/Pis. Research included several vegetable breeding and variety trials (i.e. potatoes, sweet corn, carrots, onions, tomatoes and many other veggies) on both organic and conventional ground. Plant breeding/research nurseries utilized 74 acres and was primarily on corn, small grains, but also some vegetables. Plant Pathology research covered an array of crops including soybeans, grapes, and potatoes. Fruit research is focused on local production of wine and

table grapes to showcase cold-hardy cultivars. West Madison maintains pollinator habitat for bumble bee tracking via nano-technology/radio collars, and honey bee research, as well as, maintaining raspberries for trapping a newly discovered invasive pest, spotted wing drosophila. Indirectly, we provide various services such as growing, storing, hauling, handling feed (forage) to several livestock research projects on campus including the DCC and the Livestock Lab, as well as livestock hauling for classes. Other projects include support of the Eagle Heights garden (per L. Hummel's request).

4. Change

Recent trends have seen an expansion of housing and commercial development around the station. Our location is well suited for the community to visit and learn practices for producing one's own food as well as observing field crop production. Maintaining the horticultural display gardens becomes ever more important as that is the front door to the station. Urban sprawl and development pressures continue, but are being dealt with by using innovative management practices. Safety training on new Implement of Husbandry rules and general safety for staff continues.

Though the leaf compost operation continues, prices will probably increase to cover input costs which is difficult to justify without it being a certified product. But, to be certifiable compost, it would require maintaining temperature and turning logs which just isn't feasible. Similarly, a renewed effort should be considered regarding the campus food waste program because far too many contaminants from metal, plastic bags, and paper waste, are imported to the station. Screening has shown some results in removing waste but needs more time to evaluate it. More effort/education on campus needs to be taken to prevent the non-degradable waste from entering the stream and contributing to an unsightly composting site at WMARS.

5. Goals for the coming year

- Successful production and research outcomes with good communication
- Encourage a collegial environment for researchers/staff/students
- Try to maintain respect for and provide good communication with researchers
- Keep promoting station with field days/outreach activities
- Engaging new researchers and embrace their out-of-the box, unusual or unique ideas
- Connect with unique partners to promote the station's presence and activities
- Demonstrate solutions to challenges that exist in society (recycling, food/feed production, safety)

6. Areas of concern and challenges

Finding the labor necessary for the intensive urban agriculture projects becomes challenging. Our labor is spread thin among the wide diversity of projects which visitors/users of the station often don't understand. Researchers don't realize or remember that we are still providing feed and manure for over 100 campus livestock and that takes most of our manpower during harvest, on-site storage, and campus silo-filling events.

Providing space for storing/curing perishables and equipment for each researcher is increasingly difficult. Likewise, handling the flurry of new, inexperienced student workers during the season becomes challenging in regards to traffic/parking, and a non-stop stream of people in and out of the office building.

Higher organic input costs on vegetable land without any revenue attained require us to pass the costs along to the researchers. Hay or straw mulch costs alone has ranged from \$355 to \$2100 over the past 4 yrs. (well above the land-use fee in each case). Our budget cannot sustain this model of no revenue as well as lost opportunities from selling mulch yet researchers expect our budget to cover these costs. Further, small-scale, intensive mixed vegetable plots call for a sundry of very specific implements, most are old relics from the 1930's that cost us time and money to maintain. We need to find ways to share the cost of maintenance or purchase of more modern and safer equipment.