Annual Report of Plan of Work

Wisconsin Agricultural Experiment Station

College of Agricultural and Life Sciences
University of Wisconsin, Madison

Federal Fiscal Year 2005
Research Activities

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Certification: Richard Straub, Interim Executive Director, Wisconsin Agricultural Experiment Station

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Foreword

Choice of reporting

The Wisconsin Agricultural Experiment Station, as an 1862 Land Grant Institution, has chosen to file a report on research activities for the Plan of Work at the University of Wisconsin (UW). University of Wisconsin-Extension will be reporting in a separate document on extension activities. Institutions involved with research work include the University of Wisconsin-Madison (College of Agricultural and Life Sciences, School of Veterinary Medicine, and School of Human Ecology) and the University of Wisconsin-Stevens Point. Programs included in this annual report of accomplishments are those funded by formula funds provided by Hatch Act, McIntire-Stennis Cooperative Forestry Research Program, and Animal Health and Disease Research Program.

Point of contact

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Additional sources of reporting

Reporting of project titles and objectives as well as human resources have been filed in the CRIS system at USDA by means of the AD-416 and AD-417s. Expenditure data and human resources have been filed with the USDA in the CRIS system by means of the AD-419s. Annual progress reports (including impacts) and final reports have been filed with the USDA-CRIS system using the AD-421s. Impact statements for FY04 have been filed by the Wisconsin Agricultural Experiment Station with the USDA-CSREES Impact database and are included here where appropriate.

Access to the CRIS system of reporting and search capabilities is available at
http://cris.csrees.usda.gov/

The original Plan of Work for Wisconsin's research activities was filed July 15, 1999 and is available in pdf format at

http://www.cals.wisc.edu/research/WAES/PlanofWork.pdf

Highlights of research, extension and education programs are available at the following websites or print copies have been included with this report

2006-2007 Science Report
Title: "Profiles of our Changing College"
Selected stories at
http://www.cals.wisc.edu/sciencereport/index.html

CALS Quarterly - 2 issues included in Appendix A

News releases and stories:
http://news.cals.wisc.edu/

Background

Structure

The Director of the Experiment Station is Interim Dean David Hogg of the College of Agricultural and Life Sciences (CALS) who has designated an Interim Executive Director, Richard Straub (Interim Associate Dean, Research Division, CALS) and Interim Associate Dean Irwin Goldman (Research Division, CALS) to be responsible for research operations. The CALS Research Division is responsible for reviewing proposals, making funding decisions and administering grants in cooperation with the University of Wisconsin-Madison School of Veterinary Medicine, the University of Wisconsin-Madison School of Human Ecology, and the University of Wisconsin-Stevens Point College of Natural Resources.

CALS is composed of 21 departments with a large number of intra-college and inter-college centers, institutes and programs. CALS' mission is to improve the quality of life by discovering; critically analyzing and sharing knowledge in food and agriculture, the life sciences, natural resources and environmental stewardship, and rural community development and to offer strong, research-based education that is responsive to public needs and social, economic and environmental concerns. Additional information on the organization and personnel of UW-CALS is available on the college website at

http://www.cals.wisc.edu/

Within the College of Agricultural and Life Sciences, the Research Advisory Committee, a faculty committee of 10 members appointed by the Associate Dean for Research with ex-officio members of the Assistant Dean for Research and the Director of the School of Natural Resources meets regularly to discuss research issues. This committee recommends research policy guiding distribution and use of formula funds and is the primary peer review committee for Hatch and McIntire-Stennis proposals. The committee recommends policies and procedures that have been implemented to distribute formula funds on a competitive process.

Operating Philosophy

The Wisconsin Experiment Station is committed to the concept of investigator-driven and peer-reviewed research activities. The general philosophy in allocating formula funds is to provide support for specific reviewed projects rather than to distribute block amounts to faculty or departments. At the University of Wisconsin, faculty appointments are funded with state appropriations thus releasing nearly all formula funding for project support. Expenditures are allowed under a series of guidelines annually reviewed by a faculty committee. Matching funds come primarily from state support of salaries for investigators and research staff.

Formula funds are distributed to approved projects with yearly budgets. Approximately 150 projects are funded with formula funds each year with budgets that include personnel (mainly graduate students) and supplies. Funding of capital equipment items, some of which may be shared by several projects, are prioritized by departments and funded in a separate exercise. Travel to multistate research meetings is provided for the official representative from a central pool of funds.

Integrated Research and Extension

Extension has its own Chancellor and is a separate "campus" within the University of Wisconsin System. CALS faculty with Extension specialist appointments are housed at the Madison campus with an annual Extension transfer of funding for portions of their appointments. These faculty are fully integrated into CALS departmental teaching and research programs and can apply for research project support under the formula-funded competitions listed above. County-based Extension faculty members are participants in research teams, but are not principal investigators for projects supported by formula funds. Thus the funding of integrated research-extension efforts is accomplished largely through salary support of Extension faculty and project support from competitive awards of research formula funds. In the following tables, the indication of integrated research/extension activities is based on projects where one or more of the principal investigators has an official extension appointment.

Multistate Research

We have adopted by reference the national Coordinated Multistate Research Framework for fulfillment of our obligations to the AREERA's multistate and multidisciplinary activities. More details are available on the WWW at

http://www.agnr.umd.edu/users/NERA/workshop/RPAFramework.html

Reporting of Station accomplishments and impacts from multi-state projects are included in federal filing of the SAES-422 reports on these projects available on the CRIS system. Listing of states cooperating on these projects have already been filed with USDA Partnership office following the peer and merit review and approval by the Regional Directors multistate committees. In the following listings under the Goal headings, these projects are designated as multi-state and their regional project designations are given. Financial statements of expenditures are directly from the Wisconsin Station reports filed as AD-419s. The National Information Management and Support System (NIMSS) is a web-based application that will allow participants of Multistate Research Projects and Activities to submit proposals and reports online. Interested parties, stakeholders and cooperators can also query the System for relevant

and timely information. More details are available on the WWW at http://nimss.umd.edu/.

Program Evolution

Programs in the Wisconsin Research Plan of Work are composed of a number of projects with individual review and reporting. Program duration may be extended for multiple years, but the contributing projects are a constantly shifting portfolio that can be quickly redirected. Projects are approved for periods of one to five years with the majority on a four-year cycle. Proposals for new projects require a discussion of the results from previous formula fund support, which is used as part of the criteria for ranking proposals and for evaluating the ability of the team to complete the research project successfully. Each year, approximately 25 percent of the research portfolio is shifted in new directions.

This process of continual re-examination of our portfolio allows us to address short-term, intermediate term and long-term issues. A small number of approved projects may be started at mid-year as new faculty members are hired or emerging problems trigger an early start at the discretion of the Associate Dean for Research. These processes ensure that projects are pertinent to the CSREES national goals and focus on current state research needs. In the project listing under the goals, projects that have been added to the portfolio are printed in bold to highlight the new additions since filing of last year's annual report. Projects that have been completed are no longer listed.

Research Activity in Support of National Goals and Themes

The five sections that follow relate a portion of the Wisconsin Agricultural Experiment Station research effort to the five national goals established by the U.S. Department of Agriculture for the national planning and reporting process. Between 500 and 600 research projects are underway in the College during the course of a year, ranging from the most basic of scientific studies to those that are highly applied. The reports that follow concentrate on those studies that are done as part of formula funded research (Hatch, McIntire-Stennis, and Animal Health). Most of these studies are of a more applied nature, and are significant sources of new science-based information for Wisconsin Cooperative Extension programs. Of the approximately $108 million in expenditures made through the College's Research Division, these formula funded research projects represent about $5 million of the total.

In using the nationally devised goals and themes as the reporting framework, it also should be noted that research projects frequently do not fit neatly and exclusively into one and only one category. In many instances, a research project relates to multiple goals and themes. These research projects are then listed in multiple goals. Research projects; like the agricultural, natural resource, and community issues they address; are frequently at the intersecting points of disciplines and interests. We view this interdisciplinary nature of our research efforts as a strength.

Of the studies selecting for reporting in this document, the largest number (84) relate to Goal 1 "An Agricultural System that is Highly Competitive in the Global Economy" ("Enhancing Economic Opportunities for Agricultural Producers "). This included 21 projects that were multistate interdisciplinary projects and 19 that were integrated research/extension projects. The concentration of projects in this goal area is expected for two reasons –1) the nature of the research funding sources being reported are directed toward such problem areas, and 2) the state's agricultural economy is large (between $5 billion and $6 billion cash farm receipts a year, with total economic impact near $20 billion a year) and dependent on new research knowledge to keep it competitive not only with international trade but with other regions of the United States producing similar food and fiber commodities. Among the research titles presented in this section are a broad array of studies that address the extreme breadth of Wisconsin and North Central U.S. agriculture. We have a highly diverse livestock and plant agriculture that stresses limited research resources to the limit.

The second largest number of research projects is reported under Goal 3 "A Safe and Secure Food and Fiber System" ("Enhance Protection and Safety of the Nation's Food Supply") with 48 projects being reported. Nine of these were multi-state interdisciplinary projects and 8 were integrated research/extension projects. Projects in this area cover a diverse range of topic including management and control of disease and insect attacks on crop and animal systems, understanding all limits microbial and related contamination of food and feed products and understanding of basic metabolic processes important in insuring a safe food supply. Food Safety related projects have seen a significant growth in our college's research portfolio. The food products and food processing industries are the largest economic sector in Wisconsin and work to protect this vital part of our State and Regent economy is very import to us. Significant private support is used to fund the College's Food Research Institute that supports significant effort not

captured in this report. NIH funding another significant source of College funding also supports work related to food safety.

The third largest number of research projects is reported under Goal 5 “Greater Harmony Between Agriculture and the Environment" (“Protect and Enhance the Nation's Natural Resource Base and Environment”). There are 46 project reported here, with 4 of them being multistate interdisciplinary studies, and 4 integrated research/extension projects. Producing agricultural commodities in ways that are sustainable and protective of the natural resource base and the broader environment is one of the largest challenges facing Wisconsin farmers. The state’s cash farm receipts derive overwhelmingly from livestock enterprises, with dairying being by far the most important. Managing livestock wastes and cycling them safely and productively through the various cropping systems is the most urgent challenge. Non-point pollution regulations are increasing from both the state and federal levels. A large number of studies in this reporting section relate to the handling of waste streams from livestock and other state industries. Beyond the waste stream challenge are many other environmental challenges relating to proper use of chemical fertilizers and reduced pesticide use. Because Wisconsin has a huge tourist industry that relies heavily upon quality land, water, air, landscapes, and fish and wildlife populations, the impacts of environmental protection through proper agricultural production practices go well beyond agriculture. Management to enhance the natural resource base has a significant impact that go well beyond traditional agricultural limits when one considers the impact of tourism and natural resource based industry in Wisconsin.

Under Goal 2 “Enhanced Economic Opportunity and Quality of Life for Americans” (“Support Increased Economic Opportunities and Improved Quality of Life in Rural America”) there are a total of 24 projects reported – the fourth largest number under a goal heading. Six of these were multistate interdisciplinary projects, and 8 were integrated research/extension projects. These projects focus on a broad array of issues that support the economic and social foundation of rural Wisconsin and rural America. The rapidly changing economic sector (agricultural, manufacturing, business) poses both economic and social impacts on farms, business, and families. Understanding these dynamics will help these entities adjust to the changes that they are experiencing.

Under Goal 4 “A Healthy, Well Nourished Population” ("Improve the Nation's Nutrition and Health ") there are 17 project reported. One of these was a multistate interdisciplinary project and 3 were integrated research/extension projects. If this report covered College research projects beyond those funded with formula research funds, there would be a much larger number of projects with relevance to human nutrition. Over half of the federal competitive grant funding coming to the College is provided by the National Institutes of Health, and a large portion of those studies relate to human nutrition and health.

Finally, this report does not attempt to sort all of the research activity into key reporting themes. Instead, examples of research impacts are offered, and relevant themes addressed by the examples are listed along with focus areas from the CSREES budget.

Goal 1. An Agricultural System that is Highly Competitive in the Global Economy.

(Enhance Economic Opportunities for Agricultural Producers.)

Executive Summary

Under this goal, there were 84 projects including 21 that were multistate interdisciplinary projects, 3 were McIntire-Stennis projects, and 19 were integrated research/extension projects. Although the largest number of projects under the goals are classified as Goal 1, many of these projects address other goals as well. For instance, one of the Hatch projects, WIS05238, "Nitrogen Cycling, Loading, and Use Efficiency in Forge-Based Livestock Production Systems (NC1021)" also has relevance to Objective 2.2, Providing Science Based Technology, Products, and Information to Facilitate Informed Decisions Affecting Quality of Life in Rural Areas, to Objective 3.2, Develop and Deliver Science Based Information and Technology to Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks, and to Objective 5.2, Provide Science Based Knowledge and Education to Improve the Management of Soil, Air, and Water to Support and Enhanced the Environment

Wisconsin is committed to continually changing its portfolio of research. Use of more sophisticated analysis and molecular techniques has allowed agricultural and natural resources issues to be approached on a more basic science level. New understanding of the molecular basis of plant and animal systems can bring new strategies to improve performance, reduce risk, improve food quality and safety and preserve the environment. Stakeholders insist on a scientific basis for change and demand testing and evaluation of new varieties, management strategies and recommendations. Twenty-two new projects have been added including those on corn grain compensation related to agronomic management, economies of insect control and resistance management, dairy marketing impacts, dynamics of the forest products industry, use of cranberry components for meat preservation, genomics of dairy cattle, metabolic research, nitrogen cycling and use in livestock based production systems. Newly-added projects indicate that faculty are responding to stakeholder needs and new technologies.

Updated project list for FY05

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
Goal 1: Enhance Economic Opportunities for Agricultural Producers								
Objective 1.1: Provide Information, Knowledge, and Education to Help Expand Markets and Reduce Trade Barriers								
WIS04717	Kloppenburg, J.	Sustaining Local Food Systems in a Globalizing Environment: Forces, Responses, Impacts (NE-1012)	X	X				
WIS04748	Kleinman, D.	Where is the Social in the Regulation of Agricultural Biotechnology?	X					
WIS04773	Fortenbery, T. R.	Measurement of Local and National Impacts Associated with an Expanded Bio-Fuels Industry: An Economics Analysis	X					
WIS04830	Gould, B.	The Optimal Trade-Off Between Treatment and R & D Strategies in the Management of Pest and Pathogen Evolution	X					
WIS04883	**Cox, T.**	**Aggregate and Interregional Impacts of Fed/State Dairy Policies and Interm. Dairy Product Usage on The US Dairy Proc. And Dairy Farm Sectors**	X					
WIS04905	**Rickenbach, M.**	**Assessing Opportunities for CrosspBoundary Forest Management Among NIPF Owners**			X		X	
WIS04948	**Bell, M.**	**Enhancing Wisconsin's Rare Local Foods: A Study of Social Networks and Meanings**	X					
		Total:	**87896**	**25875**	**13533**	**0**	**13533**	**3.40**
Objective 1.2: Support International Economic Development and Trade Capacity-Building through Research, Education, and Extension								
WIS04748	Kleinman, D.	Where is the Social in the Regulation of Agricultural Biotechnology?	X					
WIS04879	**Buongiorno, J.**	**Deynamic Feedbacks Between Exports and Growth in Forest Product Industries**			X			
		Total:	**13996**	**0**	**28632**	**0**	**0**	**1.35**
Objective 1.3:		**Provide Science-Based Knowledge and Technologies to Generate New and Improved High-Quality Products and Processes to Expand Markets for the Agricultural Sector**						
WIS01599	Hartel, R. W.	Improvement of Thermal Processes for Foods (NC-136)	X	X				
WIS04590	Sarmadi, M.	New Technologies for the Utilization of Textile Materials (S-1002)	X	X				
WIS04668	Lucey, J.	Understanding the Structure-Function Relationships That Control the Rheological and Sensory Properties of Stirred Type Yogurt	X					
WIS04775	Gunasekaran, S.	Evolution of Microstructural and Rheological Characteristics of Heat-Induced Globular Protein Gels	X					
WIS04787	Parkin, K. L.	Identifying Potentially Anticarcinogenic Components in	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
		Common Vegetables						
WIS04812	Gunasekaran, S.	Management of Grain Quality and Security for World Markets (NC-213)	X	X				
WIS04829	Connelly, R. K.	Investigation of the Effect of Mixing Intensity of Dough Development and Rheological Property Measurement	X					
WIS04883	**Cox, T.**	**Aggregate and Interregional Impacts of Fed/State Dairy Policies and Interm. Dairy Product Usage on The US Dairy Proc. And Dairy Farm Sectors**	X					
WIS04897	**Lauer, J.**	**Corn Grain Composition Response to Agronomic Management**	X				X	
WIS04904	**Richards, M.**	**Utilization of Cranberry Components for Extending Shelf Life of Muscle Foods**	X					
WIS04908	**Steele, J.**	**Identifying Energy Sources Used for Growth of Non-Starter Lactic Acid Bacteria in Ripening Cheese**	X					
WIS04948	**Bell, M.**	**Enhancing Wisconsin's Rare Local Foods: A Study of Social Networks and Meanings**	X					
		Total:	**237864**	**52174**	**0**	**0**	**14976**	**11.58**

Objective 1.4: Provide Science-Based Information, Knowledge, and Education to Facilitate Risk Management by Farmers and Ranchers

WIS01016	**Mitchell, P.**	**Economics of Corn Rootworm Control and Resistance Management**	X				X	
WIS04693	Bell, M.	Farm Family Success in Diversified Agriculture: A Comparative Study of Wisconsin Farm Families	X					
WIS04775	Gunasekaran, S.	Evolution of Microstructural and Rheological Characteristics of Heat-Induced Globular Protein Gels	X					
WIS04829	Connelly, R. K.	Investigation of the Effect of Mixing Intensity of Dough Development and Rheological Property Measurement	X					
WIS04886	**Foltz, J.**	**Impact Analysis and Decision Strategies for Agricultural Research (NC-1003)**	X	X			X	
WIS04918	Chavas, J.	Agricultural Productivity Analysis Under Risk	X					
		Total:	**81189**	**13812**	**0**	**0**	**17778**	**3.07**

Objective 1.5: Contribute Science-Based Information, Analysis, and Education to Promote the Efficiency of Agricultural Production Systems

WIS02229	Greaser, M. L.	Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation (NC-131)	X	X				
WIS02366	Kosola, K. R.	Rootstock and Interstem Effects on Pome and Stone Fruit Trees (NC-140)	X	X				
WIS03843	Roper, T. R.	Multidisciplinary Evaluation of New Apple Cultivars (NE-183)	X	X			X	
WIS03911	Bamberg, J. B.; Spooner, D. M.; Simon, P.	Introduction, Preservation, Classification, Distribution and Evaluation of Solanum Species(NRSP-6)	X	X				

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
WIS04299	Tracy, W. F.	Rust Resistance in Sweet Corn: Vegetative Phase Change and Sources of Resistance (NE-124)	X	X			X	
WIS04344	Combs, D.	Environmental and Economic Impacts of Nutrient Management on Dairy Forage Systems (NE-132)	X	X				
WIS04524	Kirkpatrick, B. W.	National Animal Genome Research (NRSP-8)	X	X				
WIS04528	Goodman, W. G.	A Genetic Analysis of a Juvenile Hormone Sensitive Mutant of Manduca Sexta	X					
WIS04658	Osborn, T.	Developing a New Hybrid Breeding System for Alfalfa	X					
WIS04662	Amasino, R.	Identification and Characterization of Dwarfing Genes	X					
WIS04664	Martin, T.	Identifying Novel Chemical Inhibitors of Synaptic Neurotransmission with Potential Applications for Pesticide/Nematicide Development	X					
WIS04665	Sheffield, L.	Leptin Involvement in Mammary Development	X					
WIS04666	Wattiaux, M.	Dairy Cattle Diet Formulation on Performance, Nitrogen Utilization, Manure Excretion, and Potential Ammonia Loss to the Environment	X					
WIS04670	Goodwin, E.	3'UTR Control of TRA-2MRNA Export as a Paradigm for Understanding Regulated Export of Specific MRNAs	X					
WIS04671	Patterson, S.	Genetic, Physiological, and Molecular Characterization of DAB4-1, A Cell Separation Mutant in Arabidopsis Thaliana	X					
WIS04673	Bent, A.	Discovery of Plant Genes that Mediate Disease Resistance	X					
WIS04702	Tracy, W.	Conservation, Management, Enhancement, and Utilization of Plant Genetic Resources (NC-007)	X	X			X	
WIS04703	Palmer, R.	Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (NC-1119)	X	X			X	
WIS04704	Armentano, L.	Metabolic Relationships in Supply of Nutrients for Lactating Cows (NC-1009)	X	X			X	
WIS04708	Lehmkuhler, J.	Nutritional Strategies to Reduce Nutrient Excretion From Beef Animals	X				X	
WIS04718	Shook, G.	Genetic Selection and Crossbreeding to Enhance Reproduction and Survival of Dairy Cattle (S-1008)	X	X				
WIS04735	Wiltbank, M., Fricke, P.	Methods to Increase Reproductive Efficiency in Cattle (NC-1006)	X	X			X	
WIS04772	Doebley, J.	Using Population Genetics to Identify Genes of Agronomic Importance in Maize	X					
WIS04774	Gianola, D.	Statistical Procedures for Genetic Evaluation of Susceptibility to Mastitis in Dairy Cattle	X					
WIS04777	Jung, G.	Mapping QTL for Dollar Spot Resistance in Bentgrass	X				X	
WIS04778	Kosola, K. R.	Plant and Soil Components of Nitrogen Cycling in Cranberry Beds - Does Dissolved Organic Nitrogen Play a Role?	X					
WIS04779	Krysan, P. J.	Genetic Analysis of Signal Transduction Pathways in Arabidopsis that Control Cytokinesis	X					
WIS04784	Masson, P. H.	Molecular Genetic Analysis of Helical Growth in Arabidopsis Thaliana	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
WIS04786	Parrish, J. J.	The Effect of Scrotal Insulation on Male Germ Cell Apoptosis	X					
WIS04788	Pelegri, F. J.	Expression and Function of the Fertility Factor Gene Deleted in Azoospermia (DAZ) in the Zebrafish	X					
WIS04791	Sussman, M. R.	Genetic Manipulation of Plasma Membrane Proteins Involved in Transport and Signal Transduction in Plants	X					
WIS04792	Reznikoff, W.	TN5 Transposase - Host Protein Interaction	X					
WIS04795	Thomas, D. L.	Effect of Feeding Level for Dairy Ewe Lambs During the Prepubertal Period on their Milk Production as Ewes	X				X	
WIS04796	Bussan, A. J.	Nutrient Trap Intercrops for Wisconsin Potato Production Systems	X				X	
WIS04797	Weigel, K.	Detecting Genes Related to Female Fertility, Maternal Calving Ease, Milk Fever, Component Percentages, and Somatic Cell Count in a Holstein	X				X	
WIS04798	Wickens, M.	MRNA Control in Arabidopsis	X					
WIS04802	Albrecht, K. A.	Improved Crop and Livestock Management for Protecting the Non-Galciated Upper Mississippi Valley	X	X				
WIS04810	Phillips, M.	Molecular Characterization of Atrazine Resistance in Hybrid Poplars of Phytoremediation			X			
WIS04837	Borges, R.	Soybean Grain Composition and Yields as Affected by Crop Rotation, Tillage, and SCN	X				X	
WIS04872	**Ane, J.**	**Characterization of a Novel Plant Protein that is Required for the Early Steps of Bacterial and Funal Symbioses**	X					
WIS04874	**Ansari, A.**	**Chemical Mimics of Cellular Proteins that Control Cellular Development**	X					
WIS04878	**Bleecker, A.**	**Characterization of Action of 1-Methycyclopropene (MCP) Analogues, Inhibitors of Ethylene Responses**	X					
WIS04882	**Coors, J.**	**Developing Corn Silage Varieties with Improved Starch Utilization**	X					
WIS04885	**Eisenstein, R.**	**Mechanisms Regulating Ferroportin Synthesis**	X					
WIS04887	**Rutledge, J.**	**Germ Cell and Embryo Development and Manipulation for the Improvement of Livestock (W-1171)**	X	X				
WIS04889	**Grummer, R.**	**Feeding Metabolically Active Fatty Acids to Reduce the Incidence and Severity of Fatty Liver in Periparturient Dairy Cows**	X				X	
WIS04892	**Jiang, J.**	**Cloning and Characterization of Centromeric DNA in Potato**	X					
WIS04893	**Kaeppler, S.**	**Role of Root Complexity in P Acquisition and Standability in Maize**	X					
WIS04894	**Karasov, W.**	**Digestive and Immune Function in the Plastic Gut of Birds**	X					
WIS04895	**Khatib, H.**	**Interpreting Cattle Genomic Data: Biology, Applications, and Outreach (NC-1010)**	X	X				
WIS04896	**Kruger, E.**	**Intrinsic Factors Mediating Effects of Altered Atmospheric Chemistry on Phosynthetic Light-Use Efficiency in Wisconsin Forests**	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
WIS04897	**Lauer, J.**	**Corn Grain Composition Response to Agronomic Management**	X				X	
WIS04909	**Sunde, R.**	**Selenium Regulation, Selenium Requirements, and Molecular Turkey Nutrition**	X					
WIS04934	**Vierstra, R.**	**Proteomic Analysis of the Arabidopsis 26S Proteasome**	X					
WIS05231	Shaver, R.	Starch Properties of Corn and Utilization by Dairy Cattle	X				X	
WIS05237	Yandell, B.; Attie, A.	Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses	X					
WIS05238	**Bell, M., Gratton, C., Jackson, R.**	**Nitrogen Cycling, Loading, and Use Efficiency in Forage-Based Livestock Production Systems (NC-1021)**	X	X				
		Total:	**1933004**	**488819**	**45167**	**0**	**675007**	**90.92**
		Total Goal 1:	**2353948**	**580680**	**87332**	**0**	**721294**	**110.32**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are reported as impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following project.

Intercrops Trap Nutrients, Protect Groundwater in Potato Fields
Key themes: Innovative Farming Techniques, Plant Production Efficiency, Nutrient Management, Water Quality
Focus areas: Sustainability of Agriculture and Farming, Water Quality

The issue: Potato and vegetable crops grown in the sandy soils of central Wisconsin are intensively managed, and require fertilizer and pesticide application to maximize production and quality. Some fields receive as much as 200 pounds of nitrogen per acre, but the crop might recover only 35 to 50 percent of applied fertilizer. This makes local groundwater vulnerable to contamination as excess nitrates and other nutrients leach through the soil. Some areas have nitrogen levels in groundwater that are two to three times the limits recommended by the Environmental Protection Agency. Planting crops with deeper roots in the furrows of a potato field helps capture some of the excess nutrients before they reach groundwater.

What's been done: Crop researchers at the University of Wisconsin-Madison are experimenting with different intercrop species to plant between potato hills. They are searching for crops that will offer minimal competition with potatoes and survive tillage and herbicide practices commonly utilized in potato production. They have found that alfalfa and winter wheat meet these criteria and do not impact potato yield or interfere with production or harvest.

Impact: Intercrops can help capture excess nutrients before they leach into groundwater, helping to protect environmental quality and human health. So far, the scientists have communicated their preliminary results to growers through approximately six workshops and meetings as well as two formal presentations. They have informally noted a great deal of interest in the new work, as well as a willingness on the part of the growers to adopt new production measures.

Funding: Hatch project #WIS04796, "Nutrient Trap Intercrops for Wisconsin Potato Production Systems"

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Goal 2. Enhanced Economic Opportunity and Quality of Life for Americans.

(Support Increased Economic Opportunities and Improved Quality of Life in Rural America)

Executive Summary

Under this goal, there were 24 projects including 6 that were multistate interdisciplinary projects, 1 was a McIntire-Stennis project, and 8 were integrated research/extension projects. Included among these, projects addressing public perceptions and consumer behavior, economic inputs of the changing dynamics of agriculture and the rural economy, community development and change, and application of statistical and spatial analysis for data gathering and policy development.

Wisconsin is committed to continually evaluating and reviewing our research portfolio and redirecting resources to meet the important and emerging needs of our rural community. New projects include a study of adaptive management strategy related to forestry, evaluation of youth participation in community planning and environmental stewardship, and a study to evaluate treatment and research of development strategies in the management of pests and pathogens.

Updated project list for FY05

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 2: Support Increased Economic Opportunities and Improved Quality of Life in Rural America								
Objective 2.1:		**Expand Economic Opportunities in Rural America by Bringing Scientific Insights into Economic and Business Decisionmaking**						
WIS04536	Voss, P. R.	Smart Growth Requires Smart Demography!	X				X	
WIS04559	Buttel, F. H.	Impact Analysis and Decision Strategies for Agricultural Research (NC-1003)	X	X				
WIS04617	Thering, S.	Developing Indicators of Community Capacity and Documenting Community Capacity Benefits of Citizen Participation	X				X	
WIS04653	Deller, S.	Rural Communities, Rural Labor Markets, and Public Policy (NE-1011)	X	X			X	
WIS04657	Gunther, A.	Mechanisms of the Hostile Media Perception in the Debate over GM Foods	X					
WIS04674	Clayton, M.	Applications of Statistics to Agriculture: Analysis of Spatially Autocorrelated Categorical Data	X					
WIS04676	Zhu, J.	Analysis of Spatial Data Using Multi-Scale Statistical Models	X					
WIS04781	Langston, N.	The History of Adaptive Management in Wisconsin Forestry			X			
WIS04830	Gould, B.	The Optimal Trade-Off Between Treatment and R & D Strategies in the Management of Pest and Pathogen Evolution	X					
WIS04886	**Foltz, J.**	**Impact Analysis and Decision Strategies for Agricultural Research (NC-1003)**	X	X			X	
WIS04888	**Green, G.**	**Rural Development, Work, and Poverty in North Central Region (NC-1100)**	X	X			X	
WIS05237	Yandell, B.; Attie, A.	Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses	X					
		Total:	**200435**	**45782**	**9198**	**0**	**81918**	**10.66**
Objective 2.2:		**Provide Science-Based Technology, Products, and Information to Facilitate Informed Decisions Affecting Qualtiy of Life in Rural Areas**						
WIS04522	Pingree, S.	Science Literacy, Science Information and the Internet	X				X	
WIS04526	Chambliss, G.	Degradation of Explosive Compounds by Bacteria	X					
WIS04527	Landick, R.	Recognition of Pause and Termination Regulatory Signals By Diverse Bacterial RNA Polymerases	X					
WIS04693	Bell, M.	Farm Family Success in Diversified Agriculture: A Comparative Study of Wisconsin Family Farms	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
WIS04875	**Barham, B**	**The Dynamics of GMO Adoption and Compliance with Insect Resistance Management Techniques Among Wisconsin and Nebraska Farmers**	**X**				**X**	
WIS04876	**Bartfeld, J.**	**Local Level Determinants of Household Food Security in Wisconsin**	**X**					
WIS04880	**Collins, J.**	**Farm Work, Off-Farm Employment and Family Care: How Wisconsin Farm Families Combine Work in Three Spheres**	**X**					
WIS04888	**Green, G.**	**Rural Development, Work, and Poverty in North Central Region (NC-1100)**	**X**	**X**			**X**	
WIS04915	Dennis, S. F., Jr.	Understanding Youth Participation in Community Planning and Environmental Stewardship	**X**					
WIS04938	**Hammer, R.**	**Community Perceptions of Social and Ecological Change: A Cross-National Comparison**	**X**					
WIS04948	**Bell, M.**	**Enhancing Wisconsin's Rare Local Foods: A Study of Social Networks and Meanings**	**X**					
WIS05238	**Bell, M., Gratton, C., Jackson, R.**	**Nitrogen Cycling, Loading, and Use Efficiency in Forage-Based Livestock Production Systems (NC-1021)**	**X**	**X**				
		Total:	**219806**	**31424**	**0**	**0**	**50937**	**14.52**
		Total Goal 2:	**420241**	**77206**	**9198**	**0**	**132855**	**25.18**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects have impacts on food processors and consumers. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Understanding Youth Participation in Community Planning and Environmental Stewardship

Key themes: Communication Skills, Community Development, Impact of Change on Rural Communities, Leadership Training and Development, Youth Development
Focus areas: Small Farm and Their Contributions to Local Economies, Sustainability of Agriculture and Forestry

The issue: Youth program coordinators understand the importance of evaluating outcomes of youth participation in their programs. Likewise, funding agencies are keen to assess the effectiveness of the programs they support. However, many of these programs measure success in easily quantifiable terms (number of participants, hours of participation, pre- and post-participation testing) that does not capture the full experience of participation. Adult coordinators know success when they see it, but find it difficult to communicate these success stories to outside evaluators. Finally, adult coordinators sense that place plays an important role in program outcomes, but are unsure how and to what extent.

What's been done: Landscape Architects at the University of Wisconsin-Madison have a long tradition of working to ensure effective citizen participation in decisions that affect the places in which they live, work and play. They are now focusing on youth participation in place-based programs and working to improve the participant experience by developing better evaluation methods that capture more fully both the experience of young people and the role of place. Initial research found that most of the "success" described by adult coordinators did not get measured or reported in any systematic or formal way and was therefore lost to program evaluators. They are currently working with focus group participants to develop techniques for systematically recording observations of program success.

Impact: Better understanding of the youth experience of place-based programs will help program coordinators and their supporters achieve the outcomes they desire. Involving young people in projects that directly affect the places where they live not only improves quality of life in their communities, but also encourages civic engagement among the participants. Improved methods of recording program success will lead to programs that better serve young people. The initial focus group has evolved into a continuing roundtable of sorts with plans to share its insights through a web-based working group. In this way, implementation and evaluation strategies will be available to other youth program coordinators in the United States and abroad.

Funding: Hatch project #WIS04915, “Understanding Youth Participation in Community Planning and Environmental Stewardship”

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Goal 3. A Safe and Secure Food and Fiber System.

(Enhance Protection and Safety of the Nation's Agriculture and Food Supply)

Executive Summary

Under this goal, there were 48 projects including 9 that were multistate interdisciplinary projects, 1 was a McIntire-Stennis project, 4 Animal Health projects, and 8 were integrated research/extension projects.

Wisconsin has a significant stake in our nation's food and fiber production and processing system. It is a leader in the livestock sector with a very strong dairy sector and a significant meat industry. The state is also among the leaders in many of the fruits and vegetables with many of the latter going into the processing industry but with increasing emphasis on fresh market uses, especially in the organic sector. Development of new products and processes to enhance marketing of the breadth of food products is a priority for Wisconsin as well as ensuring the safety of these products. We are also a leader in paper and timber production.

Example of new projects Include WIS05238, "Nitrogen Cycling, Loading, and Use Efficiency in Forage Based Livestock Systems"; WIS04906, "Comparative Genomics to Determine Mechanisms of Virulence by Brucilla"; and WIS04909, "Selenium Regulation, Selenium Requirements and Molecular Turkey Nutrition."

Updated project list for FY05

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 3: Enhance Protection and Safety of the Nation's Agriculture and Food Supply								
Objective 3.1:		**Reduce the Incidence of Foodborne Illnesses and Contaminants through Science-Based Knowledge and Education**						
WIS04530	Kaspar, C. W.	Regulation of DPS - A Key Acid Tolerance Protein in E. Coli 0157:H7	X					
WIS04660	Gourse, R.	Transcription Initiation Complexes in Diverse Bacteria	X					
WIS04667	Yu, J.	Genetic Studies of Fungal Asexual Sporulation Signaling Pathway	X					
WIS04726	Thomas, M.	Understanding the Biosynthesis of the Broad-Spectrum Antibiotic Streptothricin	X					
WIS04769	Craig, E. A.	Understanding Cellular Factors Modulating the In Vivo Propagation of the Yeast Prion [RNQ+]	X					
WIS04771	Denes, F. S.	Generation of Antifouling Layers From High Molecular Weight Liquid Phase Compounds Under Cold Plasma Condition	X					
WIS04799	Wong, A.	Characterization of Biofilm Formation by Bacillus Cereus	X					
		Total:	**185273**	**0**	**0**	**0**	**0**	**11.20**
Objective 3.2:		**Develop and Deliver Science-Based Information and Technologies to Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks**						
WIS01016	**Mitchell, P.**	**Economics of Corn Rootworm Control and Resistance Management**	X					
WIS03442	Stoltenberg, D. E.	Biological and Ecological Basis for Weed Management Decision Support Systems to Reduce Herbicide Use (NC-202)	X	X				
WIS03455	Cullen, E.	Ecology and Management of European Corn Borer and Other Stalk-Boring Lepidoptera (NC-205)	X	X			X	
WIS03897	Nienhuis, J.	Genetic Improvement of Beans (Phaseolus Vulgaris L.) for Yield, Pest Resistance and Food Value (W-150)	X	X				
WIS03910	Wedberg, J. L.; Wyman, J. A.	A National Agricultural Program to Clear Pest Control Agents for Minor Uses (NRSP-4)	X	X			X	
WIS04529	Raffa, K. F.	Potential Roles of Symbiotic Fungi in the Population Dynamics of Bark Beetles			X			
WIS04534	Handelsman, J.	Microbial Communication in the Rhizosphere Community	X					
WIS04535	Stanosz, G. R.	Sirococcus Shoot Blight of Conifers: Pathogen and Host Influences on Disease Development	X					
WIS04558	Keller, N. P.	Mycotoxins in Cereal Grains (NC-129)	X	X				

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
WIS04659	Escalante-Semerena, J.	Degradation of Trycarballyate, the Causative Agent of Grass Tetany in Ruminants	X					
WIS04660	Gourse, R.	Transcription Initiation Complexes in Diverse Bacteria	X					
WIS04661	Wasserman, K.	The Role of Ryea and Ryeb Small RNA Regulators in E. Coli	X					
WIS04663	Menon, A.	Phospholipid Flip-Flop in the Cell Membrane of Mycoplasma Bovis	X					
WIS04664	Martin, T.	Identifying Novel Chemical Inhibitors of Synaptic Neurotransmission with Potential Applications for Pesticide/Nematicide Development.	X					
WIS04673	Bent, A.	Discovery of Plant Genes that Mediate Disease Resistance	X					
WIS04726	Thomas, M.	Understanding the Biosynthesis of the Broad-Spectrum Antibiotic Streptothricin	X					
WIS04729	Shoemaker, D.	Effects of Wolbachia on Host MTDNA Evolution	X					
WIS04734	Ruegg, P.	Mastitis Resistance to Enhance Dairy Food Safety (NE-1009)	X	X			X	
WIS04765	Allen, C.	Understanding Bacterial Wilt Virulence from the Inside Out	X					
WIS04767	Charkowski, A. O.	Identification of Genes Unique to Highly Pathogenic Erwinia Carotovora Subsp. Carotovora	X					
WIS04769	Craig, E. A.	Understanding Cellular Factors Modulating the In Vivo Propagation of the Yeast Prion [RNQ+]	X					
WIS04770	Czuprynski, C. J.	Effect of Macrophage Receptors on Uptake, Phagosomal Fusion and Intracellular Fate of Mycobacterium Paratuberculosis				X		
WIS04776	Grau, C.	Eliminate Yield Loss Associated with Brown Stem Rot of Soybean	X				X	
WIS04777	Jung, G.	Mapping QTL for Dollar Spot Resistance in Bentgrass	X				X	
WIS04780	Lan, Q.	Functional Analysis of Sterol Carrier Protein-2 in Insect Model System	X					
WIS04783	Luschei, E. C.	Uncertainty and its Role in the Dynamics of Weed Populations	X					
WIS04792	Reznikoff, W.	TN5 Transposase - Host Protein Interaction	X					
WIS04793	Stoltenberg, D. E.	Early Detection of Neighbor Plants: The Role of Light Quality in Crop-Weed Interactions	X					
WIS04794	Talaat, A. M.	Genetic Analysis of the Virulence of Mycobacterium Avium Subspecies Paratuberculosis				X		
WIS04833	Gratton, C.	Ecological Linkages Between Natural and Agricultural Habitats Via Movement of Natural Enemies	X					
WIS04837	Borges, R.	Soybean Grain Composition and Yields as Affected by Crop Rotation, Tillage, and SCN	X				X	
WIS04873	**Andrews, J.**	**Microbial Colonization Patterns on Leaf Landscapes**	X					
WIS04875	**Barham, B**	**The Dynamics of GMO Adoption and Compliance with Insect Resistance Management Techniques Among**	X				X	

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
		Wisconsin and Nebraska Farmers						
WIS04884	**Czuprynski, C.**	**Role of Caspase-9 Activation and Mitochondria in Mannhemia Haemolytica Leukotoxin-Mediated Apoptosis in Bovine Leukocytes**				X		
WIS04898	**Lindroth, R.**	**Impacts of Air Pollutants on Forest Insect Communities**	X					
WIS04900	**MacGuidwin, A.**	**Impact of Changing Management Strategies on Nematode Communities**	X					
WIS04906	**Splitter, G.**	**Comparative Genomics to Determine Mechanisms of Virulence by Brucella**				X		
WIS04909	**Sunde, R.**	**Selenium Regulation, Selenium Requirements, and Molecular Turkey Nutrition**	X					
WIS04910	**Raffa, K.**	**Interactions Among Bark Beetles, Pathogens, and Conifers in North American Forests (W-187)**	X	X				
WIS05236	Grau, C.; German, T.; Hogg, D.; Borges, R.	Dynamic Soybean Pest Management for Evolving Agricultural Technologies and Cropping Systems (S-1010)	X	X			X	
WIS05238	**Bell, M., Gratton, C., Jackson, R.**	**Nitrogen Cycling, Loading, and Use Efficiency in Forage-Based Livestock Production Systems (NC-1021)**	X	X				
		Total:	**838608**	**200179**	**28965**	**137763**	**258253**	**71.44**
		Total Goal 3:	**1023881**	**200179**	**28965**	**137763**	**258253**	**82.64**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects listed under other goals have impacts on human health and nutrition. Some of the projects had funding from Hatch, McIntire-Stennis, and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Milk Quality

Key themes: Animal health, Agricultural profitability
Focus areas: Sustainability of agriculture and forestry

Issue: Milk-quality premiums allow dairy farmers to increase the marginal profit of their farms because they offer one of the few ways for farmers to increase the selling price of their milk. Many Wisconsin dairy farmers are getting premiums for quality milk.

What's been done: A UW-Madison/Extension milk quality specialist developed Milk Money, a team-based approach to improving milk quality and boosting profitability. Farmers themselves determine the goals for their operations, then choose a team of dairy experts that meets monthly to discuss the farmer's milk quality goals and how to meet them.

The team focuses on improving milk quality by reducing mastitis. Farmers can't sell milk from cows with clinical mastitis, but sub clinical mastitis also robs profits. High rates of sub clinical mastitis decrease farm income and increase the risk of antibiotic residues appearing in milk. Teams identify best management practices that will help to maximize those premiums, such as analyzing the milking system several times per year, performing bulk tank cultures, culturing and recording all cases of clinical mastitis, having and using a written milking routine, and regularly discussing milk quality with veterinarian and field representative.

Impacts: One hundred seventy-two herds have completed the Milk Money program, 376 have submitted registration forms to the program.

An analysis of the first 113 herds to complete the program increased their monthly per cow income by $6.60 per cow, resulting in an average income increase of $19,860 per farm per year. Milk quality improvements resulted in increased income of $3.24 per cow per month; saving on cost of treating clinical mastitis averaged $2.24 per cow per month; and higher milk production due to less sub clinical mastitis was $1.12 per cow per month.

More recent data (a summary of data from 172 herds that completed the Milk Money program) confirm the previously published results. The bulk tank SCC dropped an average of 87,210 cells/ml during the 4-month period of the program and the Standard plate count dropped 5,170 cfu. A conservative estimate of the per farm increase in income attributable to participation in Milk Money is approximately $1,030 per month (based on current milk prices) with about 60%

($627) due to farms receiving increased premiums. If maintained for 1 year for every 100 Wisconsin dairy farm families participating the annual return would be $1,236,000.

This project has both short and long-term impacts. Participating farms realized immediate profits from increased milk profits and decreased costs of treatment (at a time when milk prices were very low and increases particularly helpful). Extending the monthly increases to an annual basis shows an income increase of over one million dollars for these farms alone. Teams working on the farms include county extension agents as team leaders in many cases; experience with single farms are multiplied through the extension network to include whole counties. An extension website on the Milk Money program is available for producers at http://www.uwex.edu/milkquality/Programs/index.htm. The website receives almost 3000 visits per month. Long-term impacts include the education of everyone on the team – veterinarians, extension, producers, farm equipment services and farm labor with implications for all the other producers that these professionals serve.

Funding: Wisconsin Hatch project #WIS04734, "Mastitis Resistance to Enhance Dairy Food Safety (part of multistate project NE-1009), and Wisconsin Milk Marketing Board.

Using Cold Plasma to Treat Food-Processing Surfaces, Prevent Contamination

Key issues: Food Safety, Food Borne Pathogen Protection, Food Quality
Focus areas: Improved Pest Control and Food Quality and Protection Act Implementation

Issue: Food contamination can stem from various sources, including the constituent raw materials, surfaces (including containers and processing equipment), people and air. Microbial attachment to surfaces and the development of biofilm, which house bacteria, are known to occur in many environments. In food processing environments, biofilms can serve as potential sources of contamination, leading to food spoilage or transmission of food-borne diseases. It has been shown that even with acceptable cleaning systems in place bacteria can remain on equipment surfaces and survive for prolonged periods. It is known that contaminated equipment is one of several major contributing factors in microbial food-borne disease outbreaks in the United States.

What's been done: Researchers at the University of Wisconsin-Madison tested how well three different plasma-enhanced methods were able to deposit polyethylene glycol (PEG) on surfaces. PEG reduces protein and cell adsorption and might be able to prevent biofilm from forming. It was found that the plasma-modified surfaces resulting from all three approaches exhibited significant antifouling behavior.

Impacts: This research will allow the development of non-equilibrium plasma technologies for generating surfaces with antifouling properties that will significantly limit protein- and bacterial-adherence and biofilm formation. Applications of these plasma-modified materials will be in food-packaging environments and in the development of various temporary or permanent medical implants, such a catheters, artificial organs or artificial organ parts. Space-flight application might also take advantage of the results of this plasma-aided research.

Funding: Hatch project #WIS04771, “Generation of Antifouling Layers From High Molecular Weight Liquid Phase Compounds Under Cold Plasma Condition”

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Goal 4. A Healthy, Well Nourished Population.

(Improve the Nation's Nutrition and Health)

Executive Summary

Under this goal, there were 17 projects including 1 that was a multistate interdisciplinary project and 3 were integrated research/extension projects.

Projects included under this goal cover a wide range of topics including exercise and obesity, studies on the vitamin utilization and effect on development and work on promoting behavioral change leading to healthier lifestyles.

New projects added this year include WIS04888, "Mechanisms Regulating Ferroportin Synthesis" and WIS04948, "Enhancing Wisconsin's Rare Local Foods: A Study of Social Networks and Meanings".

Updated project list for FY05

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 4: Improve the Nation's Nutrition and Health								
	Objective 4.1:	**Improve the Nutritional Value of the U. S. Food Supply by Enhancing the Health-Promoting Properties of Food Products**						
WIS04525	Reed, J D.	Structure of Cranberry Proanthocyanidins That Protect Low Density Lipoproteins From CU2+ Induced Oxidation	X					
WIS04532	Goldman, I. L.	Biosynthesis fo Tocopherols (Vitamin E) and Relationship to Provitamin A Carotenoids in Carrot	X					
WIS04533	Tanumihardjo, S. A.	Development of 13C Stable Isotope Techniques to Assess Vitamin A Status and Carotenoid Bioavailability	X				X	
WIS04672	Ney, D.	Enterotrophic Effects of Insulin-Like Growth Factor-1 and Growth Hormorne During Parenternal Nutrition	X					
WIS04768	Clagett-Dame, M.	Vitamin A and Brain Development	X					
WIS04785	Ntambi, J. M.	Regulation of Stearoyl-COA Desaturase by Leptin	X					
WIS04787	Parkin, K. L.	Identifying Potentially Anticarcinogenic Components in Common Vegetables	X					
WIS04790	Schoeller, D. A.	Time Course of Adaptation to a High Fat Diet with Exercise	X					
WIS04834	Lai, H.	Assessment of Dietary Intake and Physical Activity and their Associations to the Development of Obesity and Asthma During Early Childhood	X					
WIS04885	**Eisenstein, R.**	**Mechanisms Regulating Ferroportin Synthesis**	X					
WIS04909	**Sunde, R.**	**Selenium Regulation, Selenium Requirements, and Molecular Turkey Nutrition**	X					
WIS05237	Yandell, B.; Attie, A.	Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses	X					
		Total:	**288879**	**0**	**0**	**0**	**16560**	**23.92**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
	Objective 4.2:	**Promote Healthier Food Choices and Lifestyles through Research and Education**						
WIS03967	Nitzke, S. A.	Using Stages of Change Model to Promote Consumption of Grains, Vegetables and Fruits by Young Adults (NC-219)	X	X			X	
WIS04533	Tanumihardjo, S. A.	Development of 13C Stable Isotope Techniques to Assess Vitamin A Status and Carotenoid Bioavailability	X				X	
WIS04729	Shoemaker, D.	Effects of Wolbachia on Host MTDNA Evolution	X					
WIS04780	Lan, Q.	Functional Analysis of Sterol Carrier Protein-2 in Insect Model System	X					
WIS04948	**Bell, M.**	**Enhancing Wisconsin's Rare Local Foods: A Study of Social Networks and Meanings**	X					
		Total:	**69450**	**25824**	**0**	**0**	**45895**	**8.17**
		Total Goal 4:	**358329**	**25824**	**0**	**0**	**62456**	**32.09**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are listed in other goals but have impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis, and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Using Exercise to Combat Obesity

Key themes: Human Health, Human Nutrition, Health Care
Focus areas: Modifying Food Intake Behavior, Scientific Basis for Optimal Health

The issue: One of the leading health concerns in America, obesity puts people at heightened risk for heart disease, diabetes and other ailments. Obesity also has economic consequences, in the form of increased health care costs and lost workdays because of illness. The Centers for Disease Control estimate that medical expenses attributed to obesity may have reached as much as $78.5 billion in 1998. Obesity rates in America are climbing; in Wisconsin alone, the prevalence of obesity has increased from 12.7 percent of adults in 1991 to 19.8 percent in 2000. The primary environmental factors that have been linked to obesity are a sedentary lifestyle, a high-fat diet and an abundance of energy-rich foods. Exercise is often proposed to combat obesity, but the amount of physical activity to recommend is controversial because of a lack of quantitative data.

What's been done: A University of Wisconsin-Madison nutritional scientist and his coworkers are investigating how different types and intensities of physical activity might act to prevent fat storage. They hypothesize that physically active subjects will burn fat more quickly when the fat content of their diet increases than will inactive subjects, and thus will be less likely to store excess fat during periods of over consumption (such as a vacation or holiday). The team fed their research participants diets in which fat intake was increased from 35 to 50 percent without a change in overall calories. The participants then spent five-day periods in a room equipped with devices to measure the gases used and released during respiration, which let researchers estimate the amount of energy being expended and the amount of fat being burned. During each of the three stays, participants were asked to undertake varying amounts of physical activity, ranging from no exercise to pedaling for two hours on a stationary bicycle.

Impact: The researchers found that exercise improves the ability of the body to oxidize, or burn, fat when a high-fat diet is eaten. The level of exercise necessary to achieve positive results translates to about 60 minutes of moderate activity, such as a brisk walk. The study demonstrates the important role that physical activity plays in limiting fat storage for individuals on a high-fat diet.

Funding: Hatch project #WIS04790, "Time Course of Adaptation to a High Fat Diet with Exercise"

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Biosynthesis of Tocopherols (Vitamin E) in Carrot
Key themes: Human Health, Nutricueticals
Focus areas: Modifying food intake behavior

The issue: Improving the nutritional content of common foods promises to be one of the easiest ways to insure nutritional health. Tocopherols (Vitamin E) are potent anti-oxidants that may confer a variety of health benefits. Vegetable oils and oilseeds are the most common sources of Vitamin E today. Very little research has focused on identifying Vitamin E or increasing Vitamin E content in the fleshy parts of vegetables.

What's been done: Researchers at the UW-Madison studied a mutant white carrot that had very low levels of carotenoids (Vitamin A). The Vitamin A and Vitamin E production pathways in plants are closely related; both arise from the same compound. The researchers theorized that the white carrot, which didn't produce Vitamin A, might produce Vitamin E instead. The white carrot didn't produce high levels of Vitamin E, but while studying it, the researchers developed a process to detect Vitamin E in carrot roots. The process also detects Vitamin E content in sweet potatoes and tomatoes. The researchers have an ongoing screening program, examining carrot germplasm from around the world for increased Vitamin E content.

Impact: A patent was issued for the original gene influencing color and Vitamin E content in carrot roots. Three carrot populations were selected for higher levels of Vitamin E over a period of four years, and the level of this vitamin was increased substantially. White and yellow-rooted carrots were found to contain higher levels of Vitamin E than orange types, suggesting alternative colors may be useful nutritionally. A clear positive relationship between pro-Vitamin A and Vitamin E compounds in carrot was discovered: the darker the orange color in the root, the greater the levels of Vitamin E. Development has begun on carrot hybrids with elevated levels of both vitamins. Multi-colored baby carrot products in the grocery store are beginning to appeal to consumers, who see the color array as visually appealing and the nutritional benefits as useful.

This project has both short and long-term impacts. In the short-term, a patent has been issued on a reduced pigment gene of carrot and a high pigment beet. A new cultivar of beet is ready for release. A new protocol for detecting Vitamin E in foods has been developed and is in use. A brochure on the taste-tests of carrot varieties has been prepared using young adult preferences. Long-term impacts include education on the nutriceutical value of foods and development of improved vegetable cultivars for human health.

Funding: Hatch project #WIS04532, "Biosynthesis of Tocopherols (Vitamin E) and Relationship to Provitamin A in Carrot", Phytocolorants LLC, and Midwest Food Processors Association.

Goal 5. Greater Harmony Between Agriculture and the Environment.

(Protect and Enhance the Nation's Natural Resource Base and Environment)

Executive Summary

Under this goal, there were 46 projects including 4 that were multistate interdisciplinary projects, 19 were McIntire-Stennis projects, and 4 were integrated research/extension projects. Many projects under this goal are also listed under other goals.

Wisconsin is committed to continually changing its portfolio of research. Rural areas are struggling with many land use issues including the conversion of farmland to housing and retail businesses. Stakeholder meetings have emphasized the need for research to support the decision-making of local county boards and townships particularly with respect to runoff from agricultural operations and developed land. Stakeholders are also encouraging us to look holistically at biological systems as part of management decisions and environmental impacts of policy changes. New projects include nitrogen cycling use efficiency in pasture systems, carbon sequestration issues, manure phosphorous availability, and the effect of urban sprawl in forested regions.

Updated project list for FY05

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 5: Protect and Enhance the Nation's Natural Resource Base and Environment								
	Objective 5.1:	**Provide Science-Based Knowledge and Education to Improve the Management of Forests and Rangelands**						
WIS04535	Stanosz, G. R.	Sirococcus Shoot Blight of Conifers: Pathogen and Host Influences on Disease Development	X					
WIS04683	Gower, S.	Net Primary Production and Carbon Allocation Pattern of Terrestrial Ecosystems: Global Analysis of Environmental and Land Use Change Effects			X			
WIS04684	Lorimer, C.	Dynamics and Management of Multi-Cohort Northern Hardwood Forests: A New Ecosystem-Based Approach to Maintaining Diversity and Aesthetics			X			
WIS04685	Young, R.	High Performance Wood Composite Materials Through Activation Bonding			X			
WIS04744	Bockheim, J.	Soil Dynamics in Gaps of Old-Growth Northern Hardwood Ecosystems in the Upper Great Lakes Region			X			
WIS04781	Langston, N.	The History of Adaptive Management in Wisconsin Forestry			X			
WIS04800	Young, D.	A Survey of the Checkered Beetles in Wisconsin (Coleoptera:Cleridae) with Special Emphasis on Wisconsin's Forests			X			
WIS04806	Jackson, R.	Re-Introduction of Native Prairie Grasses into Managed Pasture Ecosystems	X					
WIS04809	Russell, K.	The Influence of Forest Structure on Mortality, Survival and Dispersal of Juvenile American Marten (Martes Americana) in Forests of N. WI			X			
WIS04896	**Kruger, E.**	**Intrinsic Factors Mediating Effects of Altered Atmospheric Chemistry on Phosynthetic Light-Use Efficiency in Wisconsin Forests**	X					
WIS04901	**Mladenoff, D.**	**The Functional Role of Large Woody Debris and Canopy Gaps in Northern Hardwood Forests**			X			
WIS04903	**Radeloff, V.**	**Sprawl in Wisconsin's Forested Regions and Its Effects on Forest Bird Population**			X			
WIS04905	**Rickenbach, M.**	**Assessing Opportunities for CrosspBoundary Forest Management Among NIPF Owners**			X		X	
WIS04919	**Werner, L.**	**Urban Tree Throughfall, Stem Flow and Litter Leachate Contributions to Phosphorus Loading in Urban Landscapes**			X			
WIS04920	**Ginnett, T.**	**Comparison of Neotropical Bird Assemblages and Black-Throated Blue Warbler Nest Site Selection in 3 Northern Hardwood Silvicultural Systems**			X			
		Total:	**46842**	**0**	**244572**	**0**	**13533**	**11.32**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Objective 5.2:		**Provide Science-Based Knowledge and Education to Improve the Management of Soil, Air, and Water to Support Production and Enhance the Environment**						
WIS01015	**Laboski, C.**	**Manure Phosphorus Availability**	X				X	
WIS03879	Bundy, L. G.	Characterizing Nitrogen Mineralization and Availability in Crop Systems to Protect Water Resources (NC-218)	X	X			X	
WIS04655	Karthikeyan, K.G.	Fate of Phosphorus During Chemical Manure Treatment and Subsequent Land Disposal of Treated Solids	X					
WIS04661	Wasserman, K.	The Role of Ryea and Ryeb Small RNA Regulators in E. Coli	X					
WIS04666	Wattiaux, M.	Dairy Cattle Diet Formulation on Performance, Nitrogen Utilization, Manure Nutrient Excretion, and Potential Ammonia Loss to the Environment	X					
WIS04675	Bleam, W.	Trace Metal Interactions with Soil Organic Matter: Defining the Role of Specific Ligands	X					
WIS04681	Ribic, C.	Predator Activity and its Relationship to Grassland Bird Nesting Success in an Agricultural Landscape	X					
WIS04683	Gower, S.	Net Primary Production and Carbon Allocation Pattern of Terrestrial Ecosystems: Global Analysis of Environmental and Land Use Change Effects			X			
WIS04693	Bell, M.	Farm Family Success in Diversified Agriculture: A Comparative Study of Wisconsin Family Farms	X					
WIS04744	Bockheim, J.	Soil Dynamics in Gaps of Old-Growth Northern Hardwood Ecosystems in the Upper Great Lakes Region			X			
WIS04753	Stiles, C.	Evaluating the Influence of Slope Angle and Aspect in Soil-Landscape Development in the Driftless Area of Southwestern Wisconsin	X					
WIS04766	Balser, T. C.; Pedersen, J. A.	Role of Microbial Community Structure and Forest Management Practices in Soil Carbon Storage			X			
WIS04778	Kosola, K. R.	Plant and Soil Components of Nitrogen Cycling in Cranberry Beds - Does Dissolved Organic Nitrogen Play a Role?	X					
WIS04781	Langston, N.	The History of Adaptive Management in Wisconsin Forestry			X			
WIS04789	Provencher, W.	The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenities			X			
WIS04800	Young, D.	A Survey of the Checkered Beetles in Wisconsin (Coleoptera:Cleridae) with Special Emphasis on Wisconsin's Forests			X			
WIS04801	Thompson, A.	Quantifying the Effectiveness of Infiltration Trenches on Reducing Runoff Temperature from Impervious Surfaces	X					
WIS04802	Albrecht, K. A.	Improved Crop and Livestock Management for Protecting the Non-Galciated Upper Mississippi Valley	X	X				
WIS04805	Balster, N.	The Effect of Urban Compaction on Soil Structure and its Restoration with Prairie Vegetation	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
WIS04806	Jackson, R.	Re-Introduction of Native Prairie Grasses into Managed Pasture Ecosystems	X					
WIS04809	Russell, K.	The Influence of Forest Structure on Mortality, Survival and Dispersal of Juvenile American Marten (Martes Americana) in Forests of N. WI						
WIS04830	Gould, B.	The Optimal Trade-Off Between Treatment and R & D Strategies in the Management of Pest and Pathogen Evolution	X					
WIS04877	**Bishop, R.**	**The Economic Impacts of CWD in Wisconsin**	X					
WIS04890	**Helmke, P.**	**Geochemical Survey of Wisconsin Soils**	X					
WIS04891	**Hickey, W.**	**Molecular and Biophysical Basis of Bacterial Competence to Degrade Humic_sorbed Compounds**	X					
WIS04894	**Karasov, W.**	**Digestive and Immune Function in the Plastic Gut of Birds**	X					
WIS04899	**Lowery, B.**	**Carbon Sequestration and Distribution in Soils of Eroded Landscapes (NC-1017)**	X	X				
WIS04902	**Pedersen, J.**	**Peroxidase-Mediated Cross-Coupling of Sulfonamide Antimicrobial Agents with Humic Sustances**	X					
WIS04920	**Ginnett, T.**	**Comparison of Neotropical Bird Assemblages and Black-Throated Blue Warbler Nest Site Selection in 3 Northern Hardwood Silvicultural Systems**			X			
WIS05232	Stier, J., Kussow, W.	Vegetable Buffer Strips for Reducing Contaminated Runoff from Urban Areas	X				X	
WIS05238	**Bell, M., Gratton, C., Jackson, R.**	**Nitrogen Cycling, Loading, and Use Efficiency in Forage-Based Livestock Production Systems (NC-1021)**	X	X				
		Total:	**605016**	**101782**	**135236**	**0**	**62908**	**28.35**
		Total Goal 5:	**651858**	**101782**	**379809**	**0**	**76441**	**39.67**
		Grand Total:	**4808257**	**985670**	**505304**	**137763**	**1251299**	**289.90**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are reported as impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis, and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Vegetative Buffer Strips for Reducing Contaminated Runoff from Urban Areas

Key themes: Nutrient Management, Water Quality
Focus areas: Water Quality

The issue: Urban runoff, which contributes to nonpoint source pollution, is increasingly targeted through regulation. Impervious paved areas – such as rooftops, roads, parking lots, sidewalks and driveways – contribute significantly to runoff because they prevent storm water from seeping into the ground. When runoff enters waterways it can carry contaminants – in particular phosphorus and nitrogen, which are components of fertilizers – that affect surface water quality and may affect the environment. Bioavailable phosphorus (BAP) also causes algal blooms, which detract from recreational use of waterways. Sediment, primarily from exposed soil, is often the primary source of an ecosystem's BAP. Excessive sediment reduces oxygen availability for aquatic life and water clarity, while excessive nitrogen in drinking water is regulated by the U.S. Environmental Protection Agency. Mowed turf is commonly used around paved areas in urban areas but requires fertilization with nitrogen and sometimes phosphorus for desirable results. One mechanism that has been proposed to reduce runoff, sediment and nutrient loading is to replace turf in urban areas with native or prairie plants that don't require fertilizer.

What's been done: Scientists from horticulture, soils and biological systems engineering conducted studies comparing turf and prairie as buffer strips to reduce urban runoff pollution. Three ratios of buffer strips to pavement were compared to develop a value engineers can use when designing urban areas. Plots have been shown at five field days since 2002. Data have been presented at two state and three national conferences. One manuscript has been submitted and four are in preparation.

Impact: The project's impact will be spread over many years as urban engineers and regulatory agencies use the data to develop better urban systems to prevent surface water contamination. The Soil Water Conservation Service has invited the scientists to present at its 2006 international conference. Washington, D.C. urban planners are using the data in their work. Federal and state agencies are developing urban runoff plans and regulations to reduce surface water pollution. In Wisconsin, the Department of Natural Resources adopted nonpoint source pollution rules, known as NR151, in 2000. Data are being shared with the DNR as they develop turf fertilizer guidelines associated with NR151. The goal is to reduce sediment loading (and the commensurate nutrient loading from phosphorus and nitrogen) by 20 percent by 2008 and 40 percent by 2013.

Funding: Hatch project #WIS05232, "Vegetable Buffer Strips for Reducing Contaminated Runoff from Urban Areas"

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The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenities

Key themes: Natural Resource Management Land Use
Focus areas: Water Quality

The issue: As rural areas face increasing pressure from development, local authorities sometimes adopt strict land-use policies to protect natural amenities. However, the economic consequences of these policies are poorly understood and difficult to measure.

What's been done: Economists at the University of Wisconsin-Madison used a technique called hedonic analysis to examine the price effects of a comprehensive lakeshore ordinance in Vilas County, Wis., which restricted lakeshore development depending in part on a lake's ecological sensitivity. They found that overall the restrictions have had a positive effect on property values. The researchers also conducted an internet survey of lakefront property landowners to understand what aspects of lakes, in particular which recreational lake activities, people enjoy most, and what they expect for the future of northern Wisconsin lakes. They plan to use the survey data to determine whether people sort themselves across lakes, and if zoning mechanisms drive sorting. Additional future research will examine the impact of water clarity on property values.

Impact: The analysis of Vilas County gives lake managers and property owners information about the effect of shoreline restrictions on property values and, indirectly, information about the value people place on the environmental amenities preserved by such restrictions.

Funding: McIntire-Stennis project #WIS04789, "The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenities

More information: Bill Provencher, Professor, Department of Agricultural and Applied Economics, College of Agricultural and Life Sciences, University of Wisconsin-Madison
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Evaluation of Success of Multistate, Multi-institutional and Multidisciplinary Activities

The College of Agricultural and Life Sciences and indeed the entire UW-Madison campus place a high value upon faculty-driven, multistate, multi-institutional, and multidisciplinary activities. This traditional value has served science and the state well for many years. For the most part, UW Madison administrators take pride in breaking down barriers to multistate, multi-institutional, and multidisciplinary work so that faculty can form effective teams to address pressing problems and issues.

Interdisciplinary tradition and enthusiasm on the UW-Madison campus received recent reaffirmation in the creation of a faculty hiring strategy called "cluster hiring." This hiring strategy encourages and rewards creation of new faculty positions that are interdisciplinary, inter-college, and inter-departmental in nature. A recent example of a cluster is one where four faculty members were hired to address food safety problems, particularly those related to mycotoxin contamination. New faculty members have been hired in areas of mycotoxin biosynthesis, mycotoxin genomics, food microbiology and toxicology (surface coatings), and human medicine – all with a focus of reducing human health dangers posed by mycotoxin and other contaminants of foods. Similarly, cluster hires are underway in land use planning, structural biology, chemical biology, genomics, and a host of other areas across campus. Recent permission has been given for recruiting cluster hires in agroecology and symbiosis, which are likely to result in additional hires for College of Agricultural and Life Sciences.

Discussions under each of the goals previously presented in this report identify multistate, multi-institutional research projects, as well as those that have integrated research and extension objectives. Those data will not be cataloged again here. UW-Madison faculty members are heavily involved in North Central Regional research projects. Evaluation of multistate activities is done by the North Central Regional Experiment Station Directors at the midterm and end of each multistate project. Chairs and heads of departments are organized into fourteen North Central Administrative (NCA) committees. These committees meet annually and review proposals and midterm reports for multistate projects. Each project has an administrative advisor from the North Central region who also submits a written review at the same times. The North Central Multistate Review Committee meets three times a year to consider these reviews and make recommendations for new projects, continuing projects after midterm review, and terminating projects. Minutes of the meetings and review process are available on the NCRA website: http://www.wisc.edu/ncra/. Reviews and actions on NRSP projects are available on the NIMSS website: http://www.lgu.umd.edu/login.cfm

The UW-Madison College of Agricultural and Life Sciences participates in a UW System Consortium for Agricultural and Natural Resources Research, Extension, and Instruction. The purpose of the consortium is to conduct collaborative research among investigators at UW-Madison, UW-Platteville, UW-River Falls, and UW-Stevens Point, in addition to bringing better coordination to instructional and extension programs operated by the four Wisconsin

universities. The Midwest Poultry Science Undergraduate Center of Excellence is yet another example of multistate programming in the instructional area that has great value in offering students from a number of different institutions educational opportunities that otherwise would not be available to them. This program is organized through the UW-Madison. Multistate and multi-institutional programming in all three land grant functional areas (research, extension, and instruction) is a strategy that individual states and institutions adopt with increasing enthusiasm as budget constraints are imposed. New discussions on coordination of dairy production and Upper Mississippi watershed programs have been initiated.

User input and program response to that input is also referenced in each to the goals sections. It will not be repeated here, other than to stress that great amounts of energy are devoted to meeting with various user groups and incorporating their suggestions and needs into research and extension programming.

Serving the entire community

The Wisconsin Agricultural Experiment Station makes sincere efforts to serve the needs of consumers, minority populations, small landowners, alternative agriculture, and non-traditional clientele. Below lists a number of research projects that relate to these special client groups. Note that four of the following projects are multistate, multidisciplinary projects.

Projects serving underrepresented and minority populations:

Population	Project	Principal Investigator(s)	Title
Rural communities	WIS04653	Deller, S.	Rural Communities, Rural Labor Markets, And Public Policy (NE-1011)
Young adults	WIS03967	Nitzke, S.	Using Stages Of Change Model To Promote Consumption Of Grains, Vegetables And Fruits By Young Adults (NC-219)
Families/women/ small business owners	WIS03858	Jasper, C.; Goebel, K.	Family Businesses: Interaction In Work And Family Spheres (NE-167)
Family farms – small and medium sized	WIS04693	Bell, M.	Farm Family Success In Diversified Agriculture: A Comparative Study Of Wisconsin Farm Families
Small growers, especially minority populations such as Hmong and Hispanic	WIS04717	Kloppenburg, J.	Sustaining Local Food Systems In A Globalizing Environment: Forces, Responses, Impacts (NE-1012)
Rural communities and minority populations	WIS04536	Voss, P.	Smart Growth Requires Smart Demography
Citizens including minority populations	WIS04617	Thering, S.	Developing Indicators Of Community Capacity And Documenting Community Capacity Benefits Of Citizen Participation
Green industry producers	WIS04777	Jung, G.	Mapping QTL for Dollar Spot Resistance in Bentgrass
Alternative forestry & small holders	WIS04781	Langston, N.	The History of Adaptive Management in Wisconsin Forestry
Small livestock farms	WIS04795	Thomas, D.	Effect of Feeding Level for Dairy Ewe Lams During the Prepubertal Period on Their Milk Production as Ewes
Graziers	WIS04806	Jackson, R.	Re-Introduction of Native Prairie Grasses into Managed Pasture Ecosystems
Populations genetically susceptible	WIS05237	Yandell, B., Attie, A.	Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses
Populations genetically susceptible Poor families & children	WIS04834	Lai, H.	Assessment of Dietary Intake and Physical Activity and Their Associations to the Development of Obesity and Asthma During Early Childhood

Rural economies	WIS04789	Provencher, W.	The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenitites
Youth in communities	WIS04915	Dennis, S. Jr.	Understanding Youth Participation in Community Planning and Envirnomental Stewardship

Although formal evaluations have not been done to determine the effectiveness of these efforts, there is ample field experience and observations to support the contention that they do have significant impact on the problems and populations addressed. See earlier presented research impact statements.

Stakeholder groups include those from a wide diversity of backgrounds. For instance, members on the Board of Visitors; the College advisory committee; are recommended by chairs of departments and advisory groups for programs and centers. Current membership includes 5 women, owners of 9 family-owned businesses, and two minority representatives. Each year as members rotate, new nominations are solicited with a request to include diversity as a criteria for nomination.

Stakeholder input for the development and conduct of research relating to state needs has been accomplished in a tiered system. The College of Agricultural and Life Sciences has a central Advisory Board (CALS Board of Visitors) that meets twice a year with the Dean and Associate Deans. Members of this committee (see Appendix B for current list of members) are selected from a wide range of producer, industry, consumer, environmental groups, and state agencies. In addition to advisory groups, the Dean of CALS has been meeting with small groups of leaders representing Wisconsin organizations (see Appendix C) for roundtable discussions. These meetings include traditional and non-traditional stakeholders (invitees included in original Plan of Work).

Meeting Short, Intermediate and Long-term Needs

In the stakeholder process, it is clear that our stakeholders are concerned about immediate needs (e.g. nutrient management to meet new regulatory requirement) and longer-term issues (e.g. the sustainability of agricultural and natural resource systems). In proposals written by faculty for funding, a justification for how the project will meet the CSREES goals and the identified Wisconsin needs is required. In the review process, the reviewers are asked to specifically address how the proposal will meet the issues and needs for Wisconsin and the nation and to characterize the project as meeting short, intermediate or long-term needs. These reviews are used by the Faculty Review Panel in prioritizing projects. In fall 2005, a review of 53 projects at UW-Madison resulted in funding of 26 projects with 3 Hatch projects characterized as meeting short-term needs, 9 Hatch projects as intermediate, and 9 Hatch projects as long term. Two McIntire-Stennis projects were considered as meeting intermediate-term needs and two McIntire-Stennis projects were considered as meeting long term needs. One Animal Health project was considered as meeting long-term needs. Administrative staff were involved in determining whether proposals met short, intermediate, and long term needs when discrepancies among reviewers were noted. This review process has been successful at identifying outstanding proposals ranging from very basic (usually longer-term impacts) to very applied (often short-term impacts). Under the featured projects described under the various goals, note that both short and long-term impacts have been included.

Stakeholder Input Process

The Dean and Associate Deans attend many meetings of organizations concerned with our research priorities. Faculty regularly attend national scientific conferences and are members of national and international scientific committees. Many attend national forums for research priority setting such as the FAIR 2002 (Food Animal Integrated Research Symposium) and CROPS 99 (Coalition for Research on Plant Systems). These national conferences include stakeholders and representatives from federal agencies. Many departments, centers, and institutes maintain advisory committees that meet periodically with researchers in the units. Additionally, faculty regularly attend events with agricultural, natural resource, and community service activities.

Wisconsin Cooperative Extension has developed 15 system and issue teams (comprised of University research and Extension professionals, other agency personnel, and producers) to develop educational programs directed at both farm and industry clientele. System teams conduct applied research and educational programming that address issues and problems specific to commodities (dairy, beef, swine, sheep, grain crops, forages, vegetable crops, fruit crops, and urban agriculture/horticulture). Issue teams deal with integrated issues across the agricultural systems (marketing and risk management, farm business management, nutrient management, land use and agriculture, food safety and quality, and new and emerging farm and agricultural markets). Principal investigators with Hatch, McIntire-Stennis, and Animal Health grants are members of both system and issue teams.

Implementation of research priorities in the formula funding process is accomplished through a compilation of the departments' research priorities based on their interactions with stakeholders. Department chairs were asked to provide a small number of research topics from each unit of CALS for use in annual Hatch and McIntire-Stennis calls for proposals. The Dean and Associate Deans assembled a list of common themes from this set that is included in this year's call for proposals. In 2001, a revised list of priorities was collected and issued. This list was reviewed in May 2005 and distributed with the call for proposals for 2006.

For the Animal Health process, every two years, the Association of American Veterinary Medical Colleges (AAVMC), with numerous co-sponsors, organizes a two-day listening conference entitled "Critical Issues in Animal Health Research Conference." Representatives from major and minor commodity groups present their positions on the most critical area for research investment. The Associate Dean of the School of Veterinary Medicine (SVM) attends and helps organize this national conference. The SVM has a Board of Visitors, which meets twice a year with SVM administration and faculty to provide input on critical research issues. Faculty reviewers of proposals annually attend a meeting of a variety of stakeholder groups such as the American Veterinary Medical Association, the National Pork Producers, the Bovine Practitioners Association, and the National Turkey Growers Association.

At UW-Stevens Point, concurrent with the distribution of request for proposals, members of the UWSP Forestry Advisory Committee were contacted and asked to submit priority areas of forestry-related research needs in Wisconsin. The committee consists of 21 members who are recognized as leaders in the forestry and conservation community in the State of Wisconsin.

CALS administrative activities for planning and input:

October 2005 April 2005	CALS Board of Visitors (advisory committee, see Appendix B for current members	CALS Executive Staff and Deans, Dept. chairs of departments
May 2005	All day administrative retreat	CALS Deans and chairs of departments
January 2006	CALS budget retreat	CALS Deans

Areas of Identified Research Need for Wisconsin

Meetings with stakeholders, such as those listed above, are utilized to identify research needs specific to Wisconsin. Faculty meet regularly with a number of college and departmental advisory groups, commodity organizations, state agencies, consumer groups, and private citizens. Input from these stakeholders and from those who are performing the research is used to help highlight areas of research need. Every other year, department chairs are asked to provide a small number of research topics from each unit of CALS for use in Hatch and McIntire-Stennis calls for proposals. The Dean and Associate Deans of the College of Agricultural and Life Sciences work on these needs to identify a set of goals for use in the Hatch and McIntire-Stennis call for proposals. Reviewers are provided theses priorities as is the Research Advisory Committee that ranks the proposals for funding. The following is a compilation of common themes identified and published in the UW-Madison Call for Proposals in summer 2005.

1. Mechanisms of pest and pathogen resistance and safe and effective control, with minimal effects on environmental quality and human health.
2. Effects of change in global climate, population pressures, or public policy on agricultural production, environmental resources, ecosystem management, and future land use.
3. Identification of socioeconomic forces that shape the viability of Wisconsin industries and employment including agriculture, forestry, wildlife management, recreation, and other land uses.
4. Research on food safety, nutritional health, environmental protection, and biotechnology and on providing information on dietary choices, lifestyle, and community decisions.
5. Sustainable agricultural and forestry production and processing systems that provide improved food safety and security, environmental protection, economically viable communities, and human well being. This need requires an understanding of basic life processes in order to manage biotic systems for human use.

Program Review Process

Hatch, McIntire-Stennis, and Animal Health funds are used for specific projects solicited in an annual call for proposals. Animal Health proposals are reviewed at the School of Veterinary Medicine; Hatch and McIntire-Stennis proposals are reviewed in CALS.

CALS process:
The following is published in the call for proposals as guidance to the scientists requesting Hatch or McIntire-Stennis funding. This process occurred in December of 2005 for 52 new proposals.

The Faculty Review Panel (FRP):
The Associate Dean for Research will choose members of the FRP in consultation with the Research Advisory Committee (RAC). Each proposal will be reviewed by two members of the FRP and at least two other (ad hoc) reviewers. The CALS Research Division, in consultation with RAC members, will make the identification of the ad hoc reviewers. Where possible, ad hoc reviewers will be CALS faculty, though other reviewers both on and off campus may be appointed as necessary. The critical criteria for selection of FRP members and ad hoc reviewers will be scientific excellence, appropriate disciplinary expertise, and overall balance. No member of the FRP will have a proposal under review.

Review Criteria for Reviewers:
Reviewers are asked to critique and evaluate proposals in a constructive way, identifying both the strengths and weaknesses of the proposal(s) reviewed. Reviews should be concise and include comments addressing each of the following criteria:

- *An evaluation of the scientific significance of the objectives and appropriateness of the research approach as indicated in the original Congressional Acts and CSREES Goals.*
- *A judgment of the potential usefulness to society of the research, in the short and/or long term. Problem solving is a key feature of the formula funding guidelines.*
- *An evaluation of the ability of the research team to accomplish the stated objectives and the match between the objectives and available resources. For teams with multiple investigators, please include a plan of coordination of the work across laboratories or departments.*

Review Process:

- *Copies of the proposal will be sent to two members of the Faculty Review Panel (FRP) and at least two ad hoc reviewers. Each reviewer will prepare a written critique of the proposal and rank the proposal from excellent to unacceptable. The reviews will be submitted to the CALS Research Division and recorded anonymously upon receipt. The two FRP reviewers will receive copies of all reviews (anonymity maintained) on which they are primary or secondary reviewers prior to the FRP meeting so they may be prepared to lead the discussion on the proposals assigned to them.*
- *A meeting will be held of FRP to discuss proposals. Prior to the meeting, copies of all reviews will be provided to FRP members.*
- *At the meeting, the primary reviewer will give a short description of the proposal, the principal investigator's background, and his/her own critique. The secondary reviewer will provide his/her own critique and raise any other points that have been overlooked. Where*

the FRP has insufficient expertise in the proposal area, an ad hoc reviewer may be brought in as primary or secondary discussant. Comments from ad hoc reviewers will be provided by the primary reviewer and confusing issued clarified.

- *An approximate placement will be made with respect to proposals as discussion takes place. Obviously this placement will involve some degree of reconsideration of previously placed proposals. Because of this process, an inappropriately negative external review will not condemn a proposal. At the end of the process, FRP members will go over the list and look for any inappropriate placement. The prioritized list will be forwarded to the Associate Dean for Research.*
- *The primary reviewer of each proposal will prepare a summary of the written review comments and FRP discussion. The summary and reviews from individual reviewers will be returned to applicants.*

The Research Advisory committee of CALS (10 faculty) approves the guidelines for Hatch proposals, review, and funding. The committee has changed the wording slightly from year to year, but no substantial change in the review process has occurred from the Plan of Work description submitted in July 1999.

SVM Process

Animal Health proposals are reviewed by a faculty committee appointed by James Tracy, Associate Dean for Research, UW-Madison School of Veterinary Medicine. Proposals for research grants from Animal Health Formula Funds are reviewed by the Research Committee of the School of Veterinary Medicine (SVM) in a dual peer review process. After receiving and reading all proposals, the Research Committee first meets to select two peer reviewers, experts in the area of each proposal. These experts are asked to comment both on the scientific merit as well as the relevancy to animal health and specifically to health of livestock in Wisconsin. The Associate Dean for Research of the School of Veterinary Medicine together with the Research Committee from the SVM reviews the overall portfolio of research projects sponsored by the Animal Health Formula Funds to make sure that the portfolio of projects is representative of the livestock health issues in Wisconsin.

UW–Stevens Point Process

The McIntire-Stennis Proposal Review Panel consists of five members, three from the College of Natural Resources and two from the forestry community in Wisconsin. Each review panel member is asked to rank the proposals using the following criteria: scientific and technical merit, ability of the principal investigators to perform the research potential for publishable results, and recommended research topics by the UWSP Forestry Advisory Committee. Decisions are made by the Christine Thomas, Dean of the College of Natural Resources, UW-Stevens Point.

Integrated Research and Extension Activities

Our integrated research and extension activities are organized into projects that have been listed under the appropriate goals. Brief descriptions of activities on our Research Stations are included in Appendix D as examples of the integration.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution Wisconsin Agricultural Experiment Station, College of Agricultural & Life Sciences

State Wisconsin

Check one:
____ **Multistate Extension Activities**
_x_ **Integrated Activities (Hatch Act Funds)**
____ **Integrated Activities (Smith-Lever Act Funds)**

Actual Expenditures

Title of Planned Program/Activity	**FY 2005**
WI Integrated Research and Extension Projects Please see project lists under goals and example descriptions	26% of total Hatch spending
Total	$1,251,299

Richard Straub
Interm Executive Director **Date**

Form CSREES-REPT (2/00)

Appendices

Appendix A –CALS Quarterly

CALS Quarterly (2 issues)

(Above articles are not included in electronic version, hard copy by separate mailing)

Appendix B – CALS Advisory Committee membership

CALS Board of Visitors. January 2006

Will Allen
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Appendix C – 2005 Stakeholder Meetings with CALS Dean and/or Associate/Assistant Dean(s)

Date	Event
January 4, 2005	AgSource Board of Directors (WAC)
January 14, 2005	Meeting with Dairy Science Advising Committee/Faculty
January 19, 2005	Wisconsin Fertilizer, Aglime & Pest Management Conference
January 20, 2005	Northern Wisconsin Ext. Initiative Council - Spooner
January 21, 2005	Fertilizer Research Council
Januray 27, 2005	Wisconsin Agri Business Council
January 27, 2005	Wisconsin Corn Growers Assoc. (WCLA)
January 27, 2005	Wisconsin Pork Producers Council (WPPC)
February 3, 2005	Buffer Strip Hearing
February 3, 2005	Meeting with Pete Nowak and Wisconsin Ag Assembly
February 10, 2005	Wisconsin Potato and Vegetable Growers Assoc. Mtg. – Hancock
February 15, 2005	Wisconsin Livestock Identification Consortium (WLSC)
February 18, 2005	Grow Wisconsin Livestock Initiative
February 18, 2005	Wisconsin Cattlemen's Association (WCA)
February 23, 2005	Meeting with Wisconsin Farm Bureau Board
March 1, 2005	Wisconsin Muck Grower's Annual Meeting
March 1, 2005	Wisconsin Livestock Identification Consortium
March 1, 2005	Meeting with Dairy Business Innovation Center
March 11, 2005	Wisconsin Agriculture Stewardship Initiative (WASI)
March 16, 2005	Ag Day at the Capitol
March 30, 2005	Wisconsin Ag. Stewardship Initiative
April 4, 2005	Wisconsin Farm Technology Days
April 8, 2005	Western District Wisconsin Associated County Ext. Committees (WACEE)
April 9, 2005	Meat Product Judging Show
April 18, 2005	Round Table (Forest & Green Industry Meat & Dairy Sci,. Natural Resources
April 24, 2005	Assoc. Women in Ag. Breakfast
May 5, 2005	Beef Field Day – Lancaster & Wisconsin Livestock Identification Consortium
May 7, 2005	Dean's Club Brunch
May 12, 2005	Conference call with US Dairy Forage Research Center
May 17, 2005	Incident Management System (IMS) ; variety of agencies
May 19, 2005	Alto Dairy
May 24, 2005	Meeting with WI Cranberry Association
May 25, 2005	Ashland Area Extension, Government Admin., Citizens
May 27, 2005	WACEC State Wide Conference
May 27, 2005	Meeting with Wisconsin Fed. of Cooperatives
May 28, 2006	WACEC State Wide Conference
June 3, 2005	Marshfield Mayor's Breakfast
June 3, 2005	Attend Marshfield Dairy Breakfast
June 7, 2005	Wisconsin Farm Technology Days Media

June 8, 2005	Meeting with Wisconsin Farm Bureau
June 13, 2005	Meeting with Wisconsin Cattlemen's Association
June 15, 2005	FFA State Convention
June 23, 2005	Future of Farming & Rural Life Meeting
June 24, 2005	Tour of Arlington Research Station with Senator Kohl's Staff
July 6, 2005	Weeds Field Day – Arlington
July 10, 2005	Turfgrass Day
July 11-14, 2005	WFTD Show
July 19, 2005	Wisconsin Ag. Stewardship Initiative
July 20, 2005	Potato Storage Meeting at Hancock
July 25, 2005	Turfgrass Field Day
July 26, 2005	WTA Field Day – OJ Noer
August 3, 2005	WMAR Field Day
August 3, 2005	Wisconsin Farm Bureau Federation (WFBF) DATCP
August 4, 2005	Agronomy Field Day – Hancock
August 6, 2005	Dairy Forage Research Center Open House – Land Transfer Program: Badger Ammunition Plant
August 9, 2005	Potato Field Day – Hancock
August 12, 2005	Pasture Field Day – Lancaster
August 17, 2005	Wisconsin Turfgrass Assoc. Meeting
August 20, 2005	Horticulture Field Day – West Madison
August 20, 2005	Turfgrass Field Day – OJ Noer
August 31, 2005	Arlington Field Day
September 1, 2005	Walnut Street Green House Dedication DATCP, Ag. Organizations
September 8, 2005	Beef Field Day – Lancaster
September 9, 2005	CALS WALSAA Event
September 15, 2005	IMS
September 17, 2005	Franbrook Field Day – Local Ag. and Government
September 28-29, 2005	Ag Source, Cooperative Resources International
October 5, 2005	World Dairy Expo Dinner W. Stars
October 7, 2005	Ashland/Bayfield County Government and Ag. Agencies
October 10, 2005	Wisconsin Farm Bureau Coalition Meeting
October 13, 2005	Bioenergy Group – Madison
October 14, 2005	Wisconsin Ag. Stewardship Initiative
October 20-21, 2005	CALS Board of Visitors
October 22, 2005	CALS Dean's Club Brunch
October 25, 2005	Wisconsin Ag. Stewardship Initiative
October 25, 2005	Meeting with Pete Giacommin Ag Source Cooperative
November 2-3, 2005	Professional Dairy Producers of Wisconsin. Summit
November 3, 2005	WI National Farmer's Organization Event
November 4, 2005	Ashland/Bayfield County Government and Ag. Agencies
November 7, 2005	DATCP, Ag. Organizations
November 16, 2005	DATCP, Ag. Organizations
November 17, 2005	Wisconsin Potato and Vegetable Growers Assoc. Mtg. – Madison
November 23, 2005	Professional Dairy Producers of Wisconsin Meeting

November 29, 2005	Wisconsin Cranberry Board – Warrens, WI
November 30, 2005	Dairy Business Assoc. Meeting
December 1, 2005	Organic Growers and Processors
December 5, 2005	Wisconsin Farm Bureau Federation Annual Meeting
December 6, 2005	Northern Wisconsin Extension Initiative Council – Spooner
December 7, 2005	Arlington Dairy Day
December 12, 2005	Meeting with WI Cranberry Growers Association
December 13, 2005	Wisconsin Potato and Vegetable Growers Assoc. Research Council – Stevens Point

Appendix D - Agricultural Research Stations 2005 Schedule of Events

Date	Title	Location
April 7, 2005	Grape Pruning Seminar	Hancock
April 7, 2005	N.E.W. Fruit School	Peninsular
April 24, 2005	Association of Women in Agriculture-Breakfast on the Farm	West Madison
April 30, 2005	Family Horticultural Day	West Madison
May 3, 2005	"All About Potatoes"	Ashland
May 5, 2005	School to Work Beef Field Day	Lancaster
May 12, 2005	WI Rural Youth Safety Day	Hancock
June 3, 2005	Marshfield Dairyfest Breakfast	Marshfield
June 22, 2005	Apple IPM Field Day	Peninsular
July 6, 2005	Pest Management Field Day	Arlington
July 7, 2005	Summer Field Day	Ashland
July 7, 2005	4-H Plant Sciences Contest	Hancock
July 26, 2005	Crop and Pest Management Workshop	Lancaster
July 26, 2005	WTA Summer Field Day	OJ Noer Turfgrass Facility
July 29, 2005	LCD Association Tour	Hancock
August 4, 2005	Agronomy Crops Field Day	Hancock
August 9, 2005	Central Wisconsin Potato Field Day	Hancock
August 12, 2005	Profitable Pastures for Southwest Wisconsin	Lancaster
August 18, 2005	Spooner Potato Grower Field Day	Spooner
August 20, 2005	Horticultural Field Day	West Madison
August 22, 2005	Fall Field Day	Ashland
August 23, 2005	Spooner Twilight Garden Tour	Spooner
August 24, 2005	Summer Horticulture Field Day	Marshfield
August 27, 2005	Spooner Dairy Sheep Day	Spooner
August 31, 2005	Agronomy Field Day	Arlington
September 8, 2005	Lancaster ARS Beef Field Day	Lancaster
September 11, 2005	International Students Picnic	Arlington
September 25, 2005	Prairies Jubilee	Arlington
October 25, 2005	Potato, Vegetable, Corn Rotation Seminar & Field Day	Hancock
December 7, 2005	Arlington Dairy Day	Arlington

Additional information on Research Station activities:
http://www.cals.wisc.edu/research/stations/index.html