University of Missouri Environmental Sustainability Report 2007

MU Environmental Affairs Committee
December 2008

INTRODUCTION

In April 2003, the Environmental Affairs Committee released its initial study, "The Impacts of Campus Activities on the Environment." This initial report was the Committee's first attempt to address resource use and environmental issues at the University of Missouri (MU) in a comprehensive manner. Each year since, questionnaires have been distributed to various campus departments in the early months of the year to collect follow up information from the initial report. Attempts have been made to collect data comparable to that collected in the initial report. In addition, survey questions have been updated to better define resource usage and impacts. In 2008 the committee decided to change the name of the report from "The Report on the Impacts of Campus Activities on the Environment," to, "University of Missouri Environmental Sustainability Report," in order to better reflect common terminology and to more accurately describe the report's purpose. This report contains the data for calendar year 2007. In some cases, data is shown for the fiscal year instead.

FINDINGS—GENERAL CAMPUS STATISTICS

There are at least two ways of interpreting environmental information. One way is to look at gross resource usage statistics. Another way is to normalize information based on statistics such as number of students, number of employees, number of buildings, budget and other factors.

General statistics for 2007 are as follows:

- Number of student (full-time equivalents): 25,852
- Number of faculty and staff (full-time equivalents): 11,940 (includes student full time employees, but excludes Hospital employees)
- Campus budget (excludes Hospital): $972,426,357
- Hospital Budget: $540,844,643
- Gross square feet of campus buildings[1] (excludes Hospital): 13,446,223
- Gross square feet of hospital[2]: 1,587,709

FINDINGS—RESOURCES

Energy

Campus Facilities, through its Energy Management department, is responsible for providing energy to campus. The service area is the Columbia campus. Steam, but not electricity is provided to the VA Hospital. Ellis Fischel Cancer Center and Columbia Regional Hospital obtain electricity from the City of Columbia and natural gas through Ameren UE and energy marketers.

[1] Campus square footage does not include the farms and research centers off campus.

[2] Hospital square footage includes all the clinics, including those in Columbia, in Boone County and in other counties. However, it does not include Columbia Regional Hospital or Ellis Fischel Cancer Center.

In FY2007, the campus consumed 238 million kilowatt hours of electricity, a 2.6% increase from the previous year. The campus consumed 2.9 billion pounds of steam, a 7% increase from the previous year. Compared with FY2000, these numbers represent increases of 21% (electricity) and 11% (steam), respectively.

In FY2007, energy was provided from the following sources: coal – 81%, natural gas – 4%, tire derived fuel – 2%, and purchased electricity – 12%. New this year, 1% was provided by biomass.

Campus Facilities has a continuing program of energy conservation projects. In FY2007, projects to convert Middlebush, Gannett, and the Agriculture Building to more efficient heating and cooling systems began. The expected annual energy savings of these projects is $300,000, and within five years will pay back the entire investment.

Energy conservation efforts since 1990 were calculated to result in a $4 million cost savings during the past year.

Campus Facilities has taken a proactive approach to conserving energy and reducing energy costs. A previous goal of providing energy by biomass was realized this year by working with several MU academic departments to develop biomass fuels for MU, including participation in MU's Center for Bio-renewable fuels. The MU power plant has burned wood waste in several of the Power Plant's boilers throughout the year. A demonstration of burning switchgrass was also completed during the past year.

No new energy conservation awards were received in 2007.

Water and Wastewater

Campus Facilities, through its Energy Management department, uses five deep wells to supply potable water for the main MU campus. Wastewater is discharge to and treated at the City of Columbia publicly owned treatment works.

In 2007, 805,319,000 gallons of water were used, a 4 percent increase over the previous year. Since 2000, there has been an eleven percent increase in water usage. Of the water consumed by campus, more than 431 million gallons were discharged to sanitary sewer in 2007.

In efforts to reduce water usage, a recent water conservation project is being implemented at the MU Power Plant to use recycled waste water from the plant's water treatment system to reduce the potable water supply for the plant's cooling water system. Reject water from the reverse osmosis equipment, which is normally sent to the sanitary sewer, is being redirected to the plant's cooling towers. This new process will reduce the volume of waste water, and lower the amount of potable used in the production of steam and electricity. In addition to reducing plant water use by 3-5%, the annual cost avoidance is expected to be approximately $30,000 - $50,000.

Food

Campus Dining Services (CDS) is the primary organization for residential and retail dining services at MU. CDS operates 10 retail locations and five all-you-care-to-eat residential locations. Examples of residential locations include Plaza 900 and Eva J's. Retail locations include Brady Food Court and T.A. Brady's in the Brady Student Commons, Wheatstone Bistro and Starbucks in Memorial Union, Catalyst Café in the Life Sciences Center, Bookmark Cafe in Ellis Library, and four convenience stores (Mizzou

Markets). CDS registered over 3.7 million transactions in the year ending June 30, 2007. The number of transactions is split between residential locations, with over 2 million transactions, and retail locations, with about 1.7 million transactions.

CDS uses a competitive bid system to locate a supplier and then purchases items as needed from the bid winner. With the bulk of purchases from that supplier, cost of goods sold (all food and non-food items) totaled over $5.9 million for the FY2007. Item selection is based on customer needs and desires and the best values available. CDS, however, has recently started to emphasize finding supplies of food that satisfy customer, economic, and environmental standards.

CDS reports that it has had very few requests for organic foods and is not specifically pursuing those items. They are not aware of any items being offered in residential dining that would be considered 100% organic; however, there are a few protein-type bars and some cereals in the Mizzou Market convenience stores that are shown to include some organic ingredients.

Local food purchases are generally considered more sustainable because they travel less distance and therefore have less of an environmental impact. In fall 2007, CDS located several sources of local produce from its distributor and purchased approximately 3,300 pounds of apples, zucchini, and peppers from Theis Farms in Creve Coeur, Missouri. Also purchased during the summer/fall season were over 3,500 pounds of tomatoes, peppers, and cucumbers from the University of Missouri's Bradford Farm. During FY2007, CDS made regular purchases from several other Missouri suppliers, for a total of 19,923 pounds of Louisa pasta products, 51,770 pounds of burgers and pork fritters from Holten Meat, Inc., 170 pounds of Breve Coffee and 3,045 dozen cage-free eggs.

CDS is working to develop its own relationships with local suppliers and manufacturers to increase the quality of offerings in its operations. Buying locally is becoming increasingly important to the department because doing so makes environmental sense and also allows CDS to purchase products of a higher quality and greater ripeness/peak of flavor than items that are shipped across the country.

CDS offers vegetarian options at all meals. In the past year, it has also continued to build on its commitment to offer at least one vegan entrée at lunch and dinner in all residential dining locations. In addition to entrees, CDS continues to offer numerous "standard" vegetarian items on a regular basis, including soy milk, vegan burgers and tofu in salad bars. Some specific vegetarian menu offerings introduced in 2007 include: Basil Polenta with Roasted Pepper Sauce, Garden Artichoke Wrap, Tofu Scramble, and Greek Grain Salad.

CDS has both continued and introduced a variety of sustainability initiatives for its operations in the past year. These include:

- The continued recycling of fluorescent light bulbs, estimated at 180 bulbs annually
- The sale of approximately 7,470 reusable drink and coffee mugs (excluding Starbucks products)
- The sale of approximately 6,600 beverage refills, resulting in no additional packaging/cups
- The use of recycled-paper napkins in all facilities
- The department-wide elimination of Styrofoam packaging
- Cardboard recycling instituted at six Campus Dining Services locations
- The purchase of several "Energy Star"-rated pieces of kitchen equipment, including a dishwasher and refrigerator
- The sale of used oil to a recycling company for re-use

- Investigating the potential for waste fryer oil to be used by University of Missouri Agriculture Department for production of biodiesel fuel
- Installation of motion sensor lighting controls in several locations
- Continued reduction of HVAC use based on building use, hours of day, academic breaks
- The use of instantaneous heating systems in several locations for elimination of hot water storage tanks
- The installation of a pulper in the Rollins dish room that creates biodegradable pulp from napkins, paper cups, and food waste. CDS is working with Campus Facilities and Sustain Mizzou to identify uses for the resulting pulp.
- The expansion of organic food selection and improved displays in convenience stores
- Continuation of farm-to-table program, supplying apples and other produce from local growers to Campus Dining Services operations
- The use of window film and blinds to decrease heat transfer through windows in summer
- Petroleum-spill containment and clean-up kits installed in all locations
- The recycling of all used office paper, telephone books and other paper waste

Several trends will shape future CDS activities. Related to health and nutrition, CDS is focusing on the elimination of trans-fats. CDS has changed the liquid frying shortening and is sampling griddle shortenings. The department has changed its daily French fry, biscuits (which accounted for a 1,800-lb reduction in trans-fats), and cookies to trans-fat free and are changing other fried items and meats as options become available. Another trend for CDS is adding to its menu of vegan options (which also incorporate more grains and legumes). CDS reports using more fresh vegetables. There has also been an increase in the offering of soy milk products both in the residential dining and retail operations. CDS intends to continue exploring more local buying options and work on the logistics of that process, as it anticipates greater demand for locally-grown and organic products.

As a whole, menu trends continue to drive toward discovering more authentic global cuisine, which is increasingly motivated by the ever more diverse student population at MU. By creating dishes from other cuisines, CDS reported a rise in healthier menu items with an emphasis on grains, legumes, and vegetables for 2007. Additionally, CDS continues to increase the use of cook-to-order stations to provide fresh and customized meals.

Working with dietetic students, the Residence Hall Association and Sustain Mizzou, CDS is incorporating educational information in the residential dining facilities to educate students about the implications of plate waste. Plans are to include the amount of plate waste that occurs on the MU campus and then focus on strategies for reducing plate waste. For example, CDS is investigating potentially eliminating food service trays that are presently used to "gather" menu items at meal times.

Solid Waste and Recycling

Solid waste and recycling services are overseen by Campus Facilities, through its Landscape Services department, for the main MU campus, University Hospital and Clinics, Ellis Fischel, and Columbia Regional Hospital. MU hired a new recycling coordinator in 2006.

A total of 7,431.6 tons of solid waste was generated in 2007. This was a 2 percent increase from 2006. The amount of material that was recycled is shown in Table 1 below.

There was a substantial increase in the amount of plastic bottles recycled (239%), up from 6,757 in 2006. The amount of newsprint recycled decreased by 59 percent of the 2006 level, there was a notable increase (8%) in cardboard recycled from 2006. Battery recycling increased by about 44%, and electronics recycling more than doubled. The amount of glass recycled decreased by 44%, the amount of steel

increased by 48%, and grass clippings showed little change. Overall, 25% of waste generated was recycled.

Table 1—Recycling Data for FY2007

Item	Pounds Recycled
Mixed Office Paper	1,979,920
Cardboard	929,680
Newsprint	128,280
Electronics	83,180
Steel	299,820
Aluminum	44,660
Plastic Bottles	22,900
Glass	68,480
Grass Clippings	153,300
Used Oil	24,380
Batteries	2,560
Total	3,737,160

Specific projects were conducted in 2007 regarding recycling, and the totals from these projects are included in the above table. For example, the Tiger Tailgate Recycling project, initiated in 2005 as a cooperative project between the Solid Waste and Recycling Coordinator, Campus Facilities, the City of Columbia, the student group Sustain Mizzou, and sponsored by Anheuser-Busch Recycling, gathered 24 tons of recyclable beverage containers at home football games, five tons more than in the previous year and twelve tons more than its inception in 2005. Each project's results are listed in Table 2.

Table 2—Recycling Totals from Special Projects

Projects (Totals Included Above)	(tons)
Tiger Tailgate Recycling	24.0
Drop Off Recycling	66.0
Sidewalk Recycling	11.1
Paper Recycling (academic, administrative, support)	513.0
Cardboard (academic, administrative, support)	455.0
Newsprint (academic, administrative, support)	64.0
Total	1,133.1

Hazardous Materials

Environmental Health and Safety coordinates the campus hazardous waste management program. The service area for these programs includes the Columbia campus, University Hospital and Clinics, Ellis Fischel Cancer Center, Columbia Regional Hospital, University Physicians clinics, off-site research facilities (including farms), and the Missouri Rehabilitation Center in Mt. Vernon.

Table 3 below shows amounts of various types of hazardous materials disposed or recycled by

campus both from 2000 to 2007. In previous years, large quantities of regulated waste were produced from remediation activities at University Garage from a leaking underground storage tank and occasional other cleanup activities. In 2006, DNR declared that Garage remediation qualified for a risk-based closure. As a result, there were no longer the significant quantities of regulated wastes being disposed from that project in 2007. Universal wastes consists of batteries and fluorescent lamps, both of which are sent to recyclers.

Table 3—Hazardous Materials Disposal

Material	2000	2003	2004	2005	2006	2007
EPA regulated Hazardous Waste	210,000	161,000	129,000	116,700	126,000	117,000
Medical/pathological waste	325,000	415,000	443,000	480,000	486,000	426,600
Low level radioactive waste	38,000	40,000	37,000	20,700	6,700	7,600
Regulated wastes (special projects)	128,000	480,000	227,000	400,000	240,000	0
Mixed wastes (radioactive/haz waste)	1,100	800	840	335	208	441
Used oil to reclamation	NR	9,900	13,800	11,500	13,700	17,600
Universal Waste to recycling	NR	15,900	33,500	33,100	26,700	28,800

Notes: All measurements are in pounds. NR=Not Reported

EHS has operated a chemical recycling program that takes unwanted excess chemicals from laboratories and returns them free of charge to other interested campus researchers. In 2007, EHS recycled 3,600 chemical containers, which had an avoided purchase cost, adjusted for MU discounts, of $199,700. EHS also recycled 960 pieces of lab equipment (mostly glassware) with an avoided purchase cost of $19,600. EHS also removed 10 kilograms of mercury devices from its facilities and replaced them with non-mercury devices at a cost of $1,400.

FINDINGS—INFRASTRUCTURE

Purchasing

Purchasing is centralized under the University System offices; MU is serviced by a campus Procurement Service Center.

Procurement reports having sold 20,068 cases of paper without recycled content. This total includes figures provided by MU General Stores, MU Printing Services, and Corporate Express. Additionally, the Procurement office reports that 3,178 cases of paper were sold with 30% recycled content and 20 cases of paper with 100% recycled content during FY 2007. An estimated 7,000 toner cartridge were recycled through MU General Stores.

Procurement also oversees the Surplus Property operation. Surplus Property serves MU as well as some local government bodies. Approximately 253 tons of material was sold through MU Surplus Property in FY2007. Surplus Property uses eBay to move items, and this has proven to be quite successful.

There are currently no policies on recycled content for copier paper; however, for rough paper (paper towels, toilet paper, etc) MU buys only products that have recycled content.

Printing Services
Printing Services reported a variety of resource usage statistics for FY2007. For inks, the breakdown was as follows: vegetable/soy – 20%, metallic – 10%, low VOC petroleum based – 70%. Paper cost was reported at $1.74 million; however, the amount of paper purchased is not available. Approximately 5% of Printing Services' business used digital processing.

In FY2007, the following amounts of materials were recycled: 669,824 pounds of printer's mix (good) paper; 53,232 pounds miscellaneous (low grade) paper; 19,182 pounds of cardboard; and 16,446 pounds of aluminum. No waste film was recycled during FY2007. Printing Services reported that they are continuing to test vegetable based inks that are now being offered by vendors.

Residential Life
Residential Life has provided normalized data for its students for the past several years (Table 4). Though these numbers are based on the best available data, the Committee is not sure that the year to year comparisons are strictly valid.

Table 4—Selected Environmental Data for Residential Life

Statistic	2004	2005	2006	2007
Capacity of Residence Halls	6026	6033	5800	5805
Gallons of Water per person per day	33	27	40	38
Kilowatt hours of electricity per person per day	5.6	5.91	8.05	8.4
Pounds of solid waste per person per day	1	1	1	1

Residential Life continued its trend of implementing numerous environmental initiatives in FY2007. In addition to providing two recycling containers per floor (1 for paper/cardboard & 1 for plastic/glass/aluminum/metal), Residential Life assigned student and professional staff to empty recycling containers weekly. At the same time, the department has sustained education for residence hall students to continue the reduction of contamination in recycling containers though signs and programming. The department encouraged students to recycle their Tiger Guides before they leave campus - bins were provided at each of the residence hall desks. There are approximately 5,600 students who live in the halls now who might recycle those Tiger Guides. Outside of the halls, Residential Life still maintains the sidewalk recycling program, which provides recycling containers next to trash bins along sidewalks near residence halls.

More specific measures were also taken to reduce waste within Residential Life. Campus roll-off recycling containers were moved to behind Hudson Hall allowing for ease of access by campus staff and students and supporting the recycling efforts described above. Moreover, the first Tiger Treasures Rummage Sale event was successfully held on campus with items being donated by students leaving campus to reduce the amount of items going into the landfills. It will be continued next year.

In addition to reducing waste, Residential Life continues to implement other energy saving initiatives. Fluorescent bulb recycling continues to work well and Residential Life almost completed a shift to entirely energy efficient bulbs. The department now uses energy efficient fluorescent/low mercury light bulbs and compact fluorescents in residence halls and apartments rather than incandescent bulbs. Many of these fixtures are combined with motion sensors and timer controlled lighting to be more energy

efficient. Residential Life is also in the process of making ballast upgrades to old fluorescent light fixtures to conserve energy. In a continued effort to reduce the use of fuel, the department's tradesmen share vehicles. Finally, Residential Life purchases flex fuel vehicles as more vehicles are added to their fleet.

In a continuing effort to improve residents' health, asbestos removal continues especially for pipe insulation and floor tiles in areas as upgrades and improvements are made. No smoking continues in the residence halls and includes areas around Pershing that have been affected by the University Hospital and Clinics going smoke free.

In FY2007, Residential Life implemented a number of new environmental initiatives. Residential Life now utilizes recycled paper for brochures and promotional materials with a post consumer waste content of anywhere from 30 to 100%. The interior pages of Tiger Guide are made with 100% post-consumer recycled content paper. Housing 201, a publication that goes to all prospective students (somewhere around 10,000) was printed on 80% recycled (60% postconsumer content) paper. The Movin' to Mizzou Guide, an academic guide and parent calendar were/will be printed with this paper as well. For these materials, chlorine is not used in the bleaching process and forest stewardship council papers are preferred. Students for fall 2008 will receive recycled aluminum bottles that can be used for water as opposed to plastic water bottles to further reduce waste. These students for fall 2008 will also receive information about compact fluorescent lamps and other energy-saving options during the summer before they move to campus in August.

Landscape Services
No new information received.

Building Planning, Design and Construction
Campus Facilities, through its Planning Design and Construction department, is responsible for master planning, new building design and construction, additions, renovations, and for overseeing construction projects. In FY2007, campus construction totaled $220.86 million, more than double the figure for FY2006.

In FY2007, the size of the main Columbia campus was 1350 acres, of which 50% is classified as green space.

Several environmental concerns are incorporated into building design specifications:

- Specific requirements for disposal of construction waste. Especially anything that is hazardous.
- Use of materials with recycled content (furniture, flooring, composite materials)
- Use of insulation materials and fresh air to reduce HVAC loads.
- Use of tinted/energy efficient glass in window replacements.
- Environmentally "happy" height adjustable tables for ADA/Bariatric workstations in our various classroom projects and for instructor stations in the General Classroom Building.
- Energy-recovery.
- Temporary Erosion Control: We use this on virtually every project that affects a site.
- Specify Low/No VOC Paint manufacturers only.
- Specifications deal with fiber content, finishes, recycled content and recyclables of product at end of useful life, Life Cycle Costs, etc.

Campus Facilities arranged for several special professional development opportunities for staff including:

- Annual training through SCUP's "Campus Sustainability Day" events, as well as vendor presentations and trade journal/on-line training.
- Lunch and Learn activities providing vendor specific environmental product presentations.

Campus Facilities reports the following environmental successes during FY2007:

- Encouraging the use of Surplus Properties for departments to send office and classroom furniture either to be resold or reassigned to others. Some metal furniture can be recycled at a local salvage yard.
- Encouraging the use of pre-owned/refurbished furniture.
- The design for Parking Structure # 7 includes a "storm water quality unit" to filter oils out of run-off water from the parking decks. A bio-swale was designed to collect and filter water runoff from the east side of the site prior to entering the storm sewer system.
- The continual renovation to reuse campus buildings employing green solutions to space needs. The recent renovations to campus housing provide many modern amenities that will allow the continued use of 1960s era facilities for another 20 years.
- The campus as a whole is moving towards a walkable community with a planning effort to develop sites within the core campus rather than sprawling whenever possible.
- The Lewis and Clark Discovery Initiative for Agriculture will utilize many 'green' approaches to building design and energy conservation. To that end we will incorporate tankless hot water heaters, environmental septic systems, heat pumps, daylighting, and on Bradford Farm, a corn stove/boiler for supplemental heating. The Graves-Chapple Farm will be a model for energy technology for the region. Plans are to file for an Energy Star rating.

Campus Facilities reports that the design world continues to progress towards becoming more "green," and that it is increasingly difficult not to design sustainable spaces. Recycled and recyclable products proliferate, and the use of recycled construction materials (e.g. drywall and metal studs) is becoming more common. Although these products are still difficult to acquire in reasonable quantities, Campus Facilities anticipates that market demand should push future changes.

FINDINGS—EDUCATION

Environmentally related education at MU is distributed across and within over a dozen disciplines, with a modest amount of tracking and integration provided by the Environmental Studies Program. Environmental Studies provides advising about careers, majors, minors and courses throughout the university, as well as supervising students in the Environmental Studies Major in the College of Arts and Science.

From a career perspective, MU has approximately 15 majors that would lead to science and technology careers: protecting air, water and soil quality; managing and protecting forests, fisheries and wildlife; reducing the amounts and mitigating the impacts of hazardous and toxic waste; developing alternative food and fuel crops, and providing and protecting natural environments for public recreation and education (see Table 5). A key step in taking this path is to integrate Environmental Courses from across disciplines into the general education requirements and electives for a given major.

Table 5—Majors Leading to Science and Technology Environmentally Related Careers

These Majors	**Lead to These Environmentally Related Occupations in Science and Technology**
Agricultural Systems Management	reduce and mitigate impacts of agricultural water use
Animal Science	manage livestock operations to reduce and mitigate waste, oversee safety and sustainability of food supply
Biochemistry	develop and engineer biological processes for creating alternative food stocks, reduce and mitigate waste production
Biological Engineering	develop and engineer biological processes for creating alternative food stocks, reduce and mitigate waste production
Biology	field station management, wildlife assessment, conserve endangered species, impacts of pollutants on living organisms
Civil and Environmental Engineering	plan and build traffic, water, waste infrastructure to minimize resource use and waste
Chemical Engineering	air, water quality inspector, develop less toxic alternatives for industrial processes
Chemistry	air, water quality inspector, develop less toxic alternatives for industrial processes
Environmental Science (SEAS)	environmental site assessment, monitor air, water soil quality
Fisheries and Wildlife	field station management, wildlife assessment, conserve endangered species, monitor fisheries practices
Forestry	urban arborist, forest manger, field station manager
Geology	mineral resource assessment, water quality assessment, watershed management, ground water protection, siting of landfills
Horticulture	urban arborist, plan and build/plant/maintain public gardens, outdoor classrooms
Plant Sciences	develop and test crops for food, fiber, fuel alternatives, reduce and mitigate use of pesticides, fertilizers
Soil Science (SEAS)	watershed management, reduce and mitigate soil erosion, protect soil fertility

There are approximately five majors that lead to careers in the social and human dimensions of environmental problems: fostering understanding of and connection with nature; developing organizational capacity and tools for rallying public support for solving problems; and providing tools for social change - laws, regulations, rules, business models, and economic analyses. As with the programs in science and technology, a key step is integrating environmental courses from across disciplines into the general education requirements and electives for a given major.

A list of environmentally related courses is provided in the appendix.

Table 6—Majors Leading to Environmentally Related Careers Involving Social and Human Dimensions

These Majors	**Lead to Environmentally Related Occupations in the Social and Human Dimensions**
Agricultural Economics	cost benefit / risk benefit analysis that incorporates externalities (the environmental impacts), sustainable development
Environmental Studies	draft, advocate for, or lobby for laws or regulations, start organizations or businesses to help the environment,
Geography	map and plan the integration of human societies with nature, do urban planning
Parks Recreation and Tourism	outdoor and environmental education
Rural Sociology	community development and planning, sustainable development in the US or internationally

FINDINGS—RESEARCH

Research Farms

The College of Agriculture, Foods, and Natural Resources (CAFNR) manages 20 Centers, Farms and Forests on 14,500 acres throughout the state for research purposes.

Each location handling hazardous materials is required to comply with the Registered User program that is overseen by Environmental Health and Safety.

Approved genetically modified organism (GMO) crops have met FDA and EPA standards for use as feed or food and therefore do not pose a risk of contamination of other strains of similar crops when handled under the conditions set forth for their proper management. Scientists work with the Institutional Biological Safety Committee to assure compliance. Non-approved GMO crops are destroyed according to protocol, in most cases long before viable pollen or grain develops. The USDA Animal and Plant Health Inspection Service (APHIS) conduct routine inspections on field and greenhouse trials involving GMOs not formally approved.

There are many research initiatives at the farms and centers with an environmental focus. These include the recycling of pesticide containers and 1,500 gallons of oil for space heating, as well as the ongoing reduction of pesticide use through increased management of scouting, timing and product selection. The Animal Science Department has almost completely eliminated antibiotic use in one of its swine operations through stringent bio-security. Many CAFNR vehicles run on either 10% ethanol blended gasoline or 2% bio-diesel fuel to decrease environmental emissions. Workshops over the conversion of field borders to filter run-off and increase wildlife populations were also hosted over the past year. In addition, the department has regularly received positive feedback on its facility inspections, and has also completed a truck scale to meet post 9/11 Food and Drug Administration requirements.

Increased fuel and fertilizer prices have started to affect farm management decisions. The College currently gives away manure to some of its locations to maintain soil nutrient levels. However, a 6,000 square foot manure storage structure has been built at the Dairy Farm that will allow the holding and potential sale of manure, as well as management options for the time of manure applications. CAFNR has also purchased a truck and spreader bed to enhance the accuracy and mobility of nutrient application. The department hopes to increasingly use manure to offset inorganic fertilizer costs.

Hay shortages have also impacted the amount of forage grown by the department, which led to the conversion from corn or soybeans cropland to hay or pasture, leading to more stable vegetation for control of erosion.

Research Reactor

Radioactive releases in 2007 to the sewer system totaled 100 millicuries of tritium and 18 millicuries of all other isotopes. These were 2% and 1%, respectively, of the allowable sewer release limits. Air releases in 2007 for Ar-41 totaled 1270 Curies; however, this was only 78% of the Technical Specification limit. Air releases of Tritium totaled 8 curies—less than 0.1% of the Technical Specification limit.

Low level radioactive waste shipped from the Research Reactor in 2007 totaled 818 cubic feet.

MURR continues to ensure that all persons with unescorted access to the research reactor have hazardous material and radiation protection training. This training is designed to meet all regulatory requirements and to provide the staff and students with the knowledge necessary to perform their responsibilities in a safe manner.

The Research Reactor continues to maintain compliance with all applicable environmental regulations.

The Research Reactor will be facing a long-term storage problem in the next few years. As of July 1, 2008, the Barnwell Radioactive Waste Disposal facility in South Carolina will be closed to waste generators from states outside the Atlantic Waste Compact. The Barnwell facility has been the only place where the reactor's Class B low level radioactive waste can be disposed of. Because of the facility's closure, the reactor will have to store that waste until another facility is developed. The reactor's Class B waste tends to be irradiated reactor hardware and detectors, which, because of dose rates, are stored in the reactor pool. Typically, a shipment of this waste is made every 3-4 years—when the reactor runs out of storage room in its pool. In an effort to reduce inventory, the Research Reactor made a shipment in early April of this year. Contaminated gloves and paper, which constitute the majority of the reactor's waste, are Class A low level waste and can still be sent to a disposal facility in Utah. It is predicted that there will not be another facility in operation before 2035.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This report is intended as a supplement to the report issued in April 2003. It is intended to provide information about the environmental impacts of MU activities and to stimulate discussion about these impacts and projected trends. The Environmental Affairs Committee notes that there are many success stories contained within this report. On the other hand, the report points toward opportunities in a number of instances. The Committee welcomes feedback about the data collected, the way the material is presented and any conclusions that are drawn.

Except for last year, the Committee has refrained from making recommendations. Last year the Committee identified the need for campus to develop a sustainability policy and a sustainability plan. In response, an administrative leadership group was given the task of developing a campus sustainability

plan. In 2007, this leadership group began deliberations, with the assistance of the Committee and many others. A draft plan is expected to be released by the end of calendar year 2008.

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Appendix A: Table of MU Environmental Education Courses

This table lists courses with environmentally related content covering the natural dimension (nature) or the human dimension (people), and courses that develop skills (skills) important in addressing environmental problems. Courses were selected from the 2008-2010 Undergraduate Catalog. The list has 261 courses from six colleges and 45 departments. They are sorted by area, then by major. Only a few courses are offered both semesters, and many upper level courses may only be offered in alternate years.

College	Department	#	Course Title	Area
CAFNR - Food Systems and Engineering	Agricultural Systems Management	1020	Introduction to Agricultural Systems Management	nature
CAFNR - Food Systems and Engineering	Agricultural Systems Management	1040	Physical Principles for Agricultural Applications	nature
CAFNR - Food Systems and Engineering	Agricultural Systems Management	4420	Surface Water Management	nature
CAFNR - Food Systems and Engineering	Agricultural Systems Management	4440	Water Quality and Pollution Control	nature
CAFNR - Food Systems and Engineering	Agricultural Systems Management	4460	Irrigation and Drainage	nature
CAFNR	Agriculture	2190	International Agriculture and Natural Resources	nature
CAFNR- Food Systems and Engineering	Animal Sciences	2110	Global Animal Agriculture	nature
Human Environmental Sciences	Architectural Studies	4320	Materials, Methods, Products	nature
CAFNR-SEAS	Atmospheric Sciences	1110	Introduction to Atmospheric Science	nature
CAFNR-SEAS	Atmospheric Sciences / Geography	3600	Climates of the World	nature
CAFNR-SEAS	Atmospheric Sciences / Geography	1050	Introductory Meteorology	nature
CAFNR-SEAS	Atmospheric Sciences / Geography	4520	Meteorology of the Biosphere	nature
CAFNR - Food Systems and Engineering	Biochemistry	2110	Living World	nature
Engineering	Biological Engineering	3050	Environmental Control for Biological Systems	nature
Engineering	Biological Engineering	4150	Soil and Water Conservation Engineering	nature
Engineering	Biological Engineering	4250	Irrigation and Drainage Engineering	nature

Engineering	Biological Engineering	4350	Watershed Modeling Using GIS	nature
Engineering	Biological Engineering	4550	Design of Livestock Waste Management Systems	nature
Arts and Science	Biological Sciences	1060	Basic Environmental Sciences	nature
Arts and Science	Biological Sciences	2100	Infectious Disease	nature
Arts and Science	Biological Sciences	3100	Community Biology	nature
Arts and Science	Biological Sciences	3210	Plant Systematics	nature
Arts and Science	Biological Sciences	3250	Parisitology (Biomed 3250)	nature
Arts and Science	Biological Sciences	3260	Invertebrate Zoology	nature
Arts and Science	Biological Sciences	3360	Herpetology	nature
Arts and Science	Biological Sciences	3650	General Ecology	nature
Arts and Science	Biological Sciences	4328	Introductory Radiation Biology	nature
Arts and Science	Biological Sciences	4660	Plant Population Biology	nature
Arts and Science	Biological Sciences	4670	Avian Ecology	nature
CAFNR - School of Natural Resources	CAFNR - School of Natural Resources	3330	Environmental Land Use Management	nature
Engineering	Chemical Engineering	2118	Introduction to Energy Technology and Sustainability	nature
Engineering	Chemical Engineering	4220	Hazardous Waste Management	nature
Engineering	Chemical Engineering	4312	Air Pollution Control	nature
Engineering	Chemical Engineering	4318	Energy Technology and Sustainability	nature
Arts and Science	Chemistry	4280	Environmental Chemistry	nature
Arts and Science	Chemistry	4290	Environmental -Toxicological Chemistry	nature
Engineering	Civil and Environmental Engineering	3100	Fundamentals of Transportation Engineering	nature
Engineering	Civil and Environmental Engineering	3200	Fundamentals of Environmental Engineering	nature
Engineering	Civil and Environmental Engineering	3220	Water and Wastewater Treatment Processes	nature
Engineering	Civil and Environmental Engineering	3720	Hydrology	nature
Engineering	Civil and Environmental Engineering	4210	Solid Waste Management	nature
Engineering	Civil and Environmental Engineering	4230	Introduction to Water Quality	nature
Engineering	Civil and Environmental Engineering	4240	Water Quality Analysis	nature
Engineering	Civil and Environmental Engineering	4270	Environmental Engineering Microbiology	nature
Engineering	Civil and Environmental Engineering	4290	Hazardous Waste and Aquatic Chemistry	nature
Engineering	Civil and Environmental Engineering	4406	Geotechnics of Landfill Design	nature

Engineering	Civil and Environmental Engineering	4703	Applied Hydrology	nature
Engineering	Civil and Environmental Engineering	4792	Analysis of Water-Resource Systems	nature
Engineering	Electrical and Computer Engineering	4020	Energy Systems and Resources	nature
CAFNR - School of Natural Resources	Environmental Science	1100	Introduction to Environmental Science	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	2500	Introduction to Genetics and Evolution for Conservation	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	3200	Aquaculture	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	3300	Wildlife Damage Management	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	3350	Wildlife Damage Management Lab	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	3400	Water Quality and Natural Resource Management	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	3660	Mammalogy	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	3800	Waterfowl Biology and Management	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	4300	Fisheries Management	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	4500	Animal Population Dynamics and Management	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	4600	Wildlife Conservation	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife	4800	Environmental Toxicology	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife / Biological Sciences	2600	Ornithology	nature
CAFNR - School of Natural Resources	Fisheries and Wildlife / Biological Sciences	2700	Ichthyology	nature
CAFNR - School of Natural	Fisheries and Wildlife / Biological Sciences	4100	Limnology	nature

Resources				
CAFNR - School of Natural Resources	Forestry	2151	Dendrology	nature
CAFNR - School of Natural Resources	Forestry	2540	Forest Hydrology Field Studies	nature
CAFNR - School of Natural Resources	Forestry	2542	Forest Measurement and Inventory	nature
CAFNR - School of Natural Resources	Forestry	2543	Forest Ecology Field Studies	nature
CAFNR - School of Natural Resources	Forestry	2544	Introduction to Silviculture and Management	nature
CAFNR - School of Natural Resources	Forestry	2545	Forest Management Planning	nature
CAFNR - School of Natural Resources	Forestry	3207	Forest Fire Control and Use	nature
CAFNR - School of Natural Resources	Forestry	3212	Forest Health and Protections	nature
CAFNR - School of Natural Resources	Forestry	4320	Forest Ecology	nature
CAFNR - School of Natural Resources	Forestry	4330	Practice of Silviculture	nature
CAFNR - School of Natural Resources	Forestry	4370	Wildland Fire Management	nature
Arts and Science	Geography	2610	Introduction to Physical Geography	nature
Arts and Science	Geography	3610	Physical Geography of the United States	nature
Arts and Science	Geography	3630	Process Geomorphology	nature
Arts and Science	Geography	4620	Biogeography	nature
Arts and Science	Geography	4630	Fluvial Geomorphology	nature
Arts and Science	Geological Sciences	1200	Environmental Geology	nature
Arts and Science	Geological Sciences	1250	World's Oceans	nature
Arts and Science	Geological Sciences	2200	Oceanography	nature
Arts and Science	Geological Sciences	2300	Earth Systems and Global Change	nature
Arts and Science	Geological Sciences	2400	Surficial Earth Processes	nature
Arts and Science	Geological Sciences	2450	Global Water Cycle	nature

Arts and Science	Geological Sciences	2600	Mineral and Energy Resources of the Earth	nature
Arts and Science	Geological Sciences	4100	Groundwater Hydrology	nature
Arts and Science	Geological Sciences	4110	Karst Hydrology	nature
Arts and Science	Geological Sciences	4120	Engineering Geology	nature
Arts and Science	Geological Sciences	4130	Groundwater Modeling	nature
Arts and Science	Geological Sciences	4220	Petroleum Geology	nature
Arts and Science	Geological Sciences	4318	Environmental Soil Chemistry (SEAS 4318)	nature
Arts and Science	Geological Sciences	4400	Geomicrobiology and Microbiological Biogeochemistry	nature
Arts and Science	Geological Sciences	4991	Capstone in Environmental Geology	nature
Arts and Science	Geological Sciences / Soil Science 2107	2110	Introduction to Soil Science	nature
Medicine	Molecular Microbiology and Immunology	4300	Microbial Pathogenesis	nature
CAFNR - School of Natural Resources	Natural Resources	4320	Hydrologic and Water Quality Modeling	nature
Human Environmental Sciences	Nutritional Sciences	1310	Basic Concepts of World Nutrition	nature
Arts and Science	Physics and Astronomy	4190	Physics and Chemistry of Materials	nature
CAFNR - Plant Sciences	Plant Sciences	2075	Horticultural Ecology	nature
CAFNR - Plant Sciences	Plant Sciences	2110	Plant Growth and Culture	nature
CAFNR - Plant Sciences	Plant Sciences	2710	Insects in the Environment	nature
CAFNR - Plant Sciences	Plant Sciences	3210	Principles of Weed Science	nature
CAFNR - Plant Sciences	Plant Sciences	3213	Genetics of Agricultural Plants and Animals	nature
CAFNR - Plant Sciences	Plant Sciences	3255	Landscape Maintenance	nature
CAFNR - Plant Sciences	Plant Sciences	4313	Soil Fertility and Plant Nutrition	nature
CAFNR - Plant Sciences	Plant Sciences	4314	Soil Fertility and Plant Nutrition Lab	nature
CAFNR - Plant Sciences	Plant Sciences	4520	Environmental Microbiology	nature
CAFNR - Plant Sciences	Plant Sciences	4720	Aquatic Entomology	nature
CAFNR - Plant Sciences	Plant Sciences	4730	Insect Pest Management for Plant Protection	nature
CAFNR - Plant Sciences	Plant Sciences	4740	Biological Control of Insects	nature

CAFNR - Plant Sciences	Plant Sciences / Biological Sciences	3150	Biology of Fungi	nature
CAFNR - Plant Sciences	Plant Sciences / Biological Sciences	3710	Introductory Entomology	nature
CAFNR - Plant Sciences	Plant Sciences / Biological Sciences	3715	Insect Diversity	nature
CAFNR - SEAS	Soil Science / Environmental Science	3290	Soils and Environment	nature
CAFNR - SEAS	Soil Science / Plant Sciences	2100	Introduction to Soils	nature
Arts and Science	Special Degree Programs - Environmental Studies	3000	Natural History of Missouri	nature
Engineering	Nuclear Engineering	4030	Introduction to Nuclear Reactor Engineering	nature
CAFNR - Applied Social Sciences	Agricultural Economics	2156	Introduction to Environmental Law	people
CAFNR - Applied Social Sciences	Agricultural Economics	3241	Ethical Issues in Agriculture	people
CAFNR - Applied Social Sciences	Agricultural Economics	3256	Agribusiness and Biotechnology Law	people
CAFNR - Applied Social Sciences	Agricultural Economics	3257	Rural and Agricultural Law	people
CAFNR - Applied Social Sciences	Agricultural Economics	3270	Conservation and Use of Protected Areas	people
CAFNR - Applied Social Sciences	Agricultural Economics	3271	International Agricultural Development	people
CAFNR - Applied Social Sciences	Agricultural Economics	3272	International Food Trade and Policy	people
CAFNR - Applied Social Sciences	Agricultural Economics	4356	Environmental Law and Policy	people
CAFNR -Applied Social Sciences	Agricultural Economics	2070	Environmental Economics	people
CAFNR - Food Systems and Bioengineering	Agricultural Systems Management	2020	Environmental Ethics in Agriculture	people
CAFNR - Food Systems and Bioengineering	Animal Science	2111	Societal Issues Facing Animal Agriculture	people
Arts and Science	Anthropology	2300	Anthropology of War/Peace Studies	people
Arts and Science	Anthropology	2340	Hunters and Gatherers	people
Arts and Science	Anthropology	3560	Plagues and Peoples	people
Arts and Science	Anthropology	3680	Plants and People in Native America	people
Arts and Science	Anthropology	4200	Environment and Archaeology	people
Arts and Science	Anthropology	4320	Ecological and Environmental Anthropology	people
Arts and Science	Anthropology	4880	Demographic Anthropology	people
Human Environmental	Architectural Studies	4323	Sustainable Technologies and Systems	people

Sciences				
Human Environmental Sciences	Architectural Studies	4660	Housing Concepts and Issues	people
Arts and Science	Art History and Archaeology	4840	American Architecture	people
Arts and Science	Art History and Archaeology	3720	Cities in the Western Imagination	people
CAFNR - Food Systems and Bioengineering	Biochemistry	2112	Biotechnology in Society	people
Arts and Science	Biological Sciences	3050	Genetics and Society	people
Engineering	Civil and Environmental Engineering	4100	Traffic Engineering	people
Engineering	Civil and Environmental Engineering	4102	Infrastructure Management	people
Engineering	Civil and Environmental Engineering	4106	Intelligent Transportation Systems	people
Engineering	Civil and Environmental Engineering	4108	Bicycle and Pedestrian Transportation	people
Engineering	Civil and Environmental Engineering	4109	Urban Development and Planning	people
Engineering	Civil and Environmental Engineering	4250	Environmental Regulation Compliance	people
Arts and Science	Economics	1013	Economic Analysis of Social Issues	people
Arts and Science	Economics	1111	Environmental Economics	people
Arts and Science	Economics	4335	Economics for Decision Making	people
Arts and Science	Economics	4360	Economic Development (Peace Studies 436)	people
CAFNR - School of Natural Resources	Fisheries and Wildlife	2400	Human Dimensions of Fish and Wildlife Conservation	people
CAFNR - School of Natural Resources	Fisheries and Wildlife	3500	Wildlife Conservation in British Cities	people
CAFNR - School of Natural Resources	Fisheries and Wildlife	3600	Introduction to Conservation Biology	people
CAFNR - School of Natural Resources	Fisheries and Wildlife	4200	Urban Wildlife Management	people
CAFNR - Food Systems and Bioengineering	Food Science/ Plant Sciences	1020	World Food and You	people
CAFNR - School of Natural Resources	Forestry	2541	Forest Utilization	people
CAFNR - School of Natural	Forestry	3217	Fire and Society	people

Resources				
CAFNR - School of Natural Resources	Forestry	3290	Urban Forestry	people
CAFNR - School of Natural Resources	Forestry	4350	Forest Economics	people
Arts and Science	Geography	2550	Introduction to the Humanized Earth	people
Arts and Science	Geography	2660	Environmental Geography	people
Arts and Science	Geography	2710	Economic Geography	people
Arts and Science	Geography	2720	Urban Geography	people
Arts and Science	Geography	3740	Geography and Planning	people
Arts and Science	Geological Sciences	4200	Economic Geology	people
Arts and Science	History	3420	America's Environmental Experience	people
Arts and Science	History	4420	American Urban History	people
Arts and Science	History	4430	The Great West in American History	people
Arts and Science	History	4440	History of the American Environment	people
Human Environmental Sciences	Human Development and Family Studies	4670	The Politics of Reproduction and Fertility Control	people
Journalism	Journalism	4260	Impact of Advertising on American Culture	people
Business	Management	3200	Business and Society	people
Business	Marketing	4380	Buying and Supply Chain Management	people
Business	Marketing	4750	Marketing, Society and Government	people
CAFNR - School of Natural Resources	Natural Resources	1060	Ecology and Conservation of Natural Resources	people
CAFNR - School of Natural Resources	Natural Resources	1070	Ecology and Renewable Resource Management	people
CAFNR - School of Natural Resources	Natural Resources	4353	Natural Resource Policy/Administration	people
Human Environmental Sciences	Nutritional Sciences	2420	Inactivity and Disease	people
CAFNR - School of Natural Resources	Parks Recreation and Tourism	3215	Program Development in Leisure Services	people
CAFNR - School of Natural	Parks Recreation and Tourism	3230	Introduction to Parks and Outdoor Recreation Services	people

Resources				
CAFNR - School of Natural Resources	Parks Recreation and Tourism	3231	Principles of Interpretive Outdoor Recreation	people
CAFNR - School of Natural Resources	Parks Recreation and Tourism	4333	Park Management	people
CAFNR - School of Natural Resources	Parks Recreation and Tourism	4340	Advanced Recreation Land Management	people
Human Environmental Sciences	Personal Financial Planning	2185	Consumer as Entrepreneur	people
Human Environmental Sciences	Personal Financial Planning	3287	Consumer and Household Economics I	people
Human Environmental Sciences	Personal Financial Planning	4380	Assessing the American Dream	people
Human Environmental Sciences	Personal Financial Planning	4388	Effective Consumer Decision-Making	people
CAFNR - Plant Sciences	Plant Sciences	2254	Landscape Design	people
Arts and Science	Political Science	4140	Congress and Legislative Policy	people
Arts and Science	Political Science	4160	Interest Groups	people
Arts and Science	Political Science	4330	Policy Analysis	people
Arts and Science	Psychology	3130	Decisions, Values and Choice	people
Arts and Science	Psychology	3820	Environmental Psychology	people
Arts and Science	Psychology	4340	Attitude Change	people
Arts and Science	Psychology	4810	Industrial/organizational Psychology	people
Arts and Science	Psychology	4890	Social Motivation	people
CAFNR - Applied Social Sciences	Rural Sociology	1000	Rural Sociology	people
CAFNR - Applied Social Sciences	Rural Sociology	1120	Population and the Environment	people
CAFNR - Applied Social Sciences	Rural Sociology	2225	Science, Technology and Society	people
CAFNR - Applied Social Sciences	Rural Sociology	3325	Sociology of Food and Nutrition	people
CAFNR - Applied Social Sciences	Rural Sociology	4310	Sociology of Agriculture and Natural Resources	people
CAFNR - Applied Social Sciences	Rural Sociology	4335	Social Change and Trends	people
CAFNR - Applied Social Sciences	Rural Sociology	4370	Environmental Sociology	people

Human Environmental Sciences	Social Work	2000	Exploration in Social and Economic Justice	people
Human Environmental Sciences	Social Work	4710	Social Justice and Social Policy	people
Arts and Science	Sociology	1120	Population and Ecology	people
Arts and Science	Sociology	3000	Urban Sociology	people
Arts and Science	Sociology	4230	Women, Development and Globalization	people
Arts and Science	Sociology	4370	Environment and Society	people
Arts and Science	Special Degree Programs - Environmental Studies	2070	Introduction to Ecological Economics	people
Arts and Science	Special Degree Programs - Environmental Studies	2110	Analysis of Environmental Issues	people
Arts and Science	Special Degree Programs - Environmental Studies	4350	Modeling Environmental Problems	people
Human Environmental Sciences	Textile and Apparel Management	3110	Textiles and Apparel in the Global Economy	people
Human Environmental Sciences	Textile and Apparel Management	4110	Global Sourcing	people
CAFNR - Applied Social Sciences	Agricultural Economics	3283	Fundamentals of Entrepreneurship	skills
CAFNR	Agricultural Education	4320	Designing Curriculum and Instruction in Agriculture	skills
CAFNR	Agricultural Journalism	3210	Fundamentals of Communications	skills
CAFNR	Agricultural Journalism	3240	Communicating on the Web	skills
CAFNR	Agricultural Education	2260	Team and Organizational Leadership	skills
CAFNR	Agricultural Journalism	1160	Introduction to Agricultural and Environmental Journalism	skills
CAFNR-SEAS	Atmospheric Sciences	4510	Remote Sensing for Meteorology and Natural Resources	skills
Engineering	Civil and Environmental Engineering	4200	Remote Sensing of the Environment	skills
Arts and Science	Communication	3460	Organizational Advocacy	skills
Arts and Science	Communication	3572	Argument and Advocacy	skills
Arts and Science	Communication	4474	Theory and Research in Persuasion	skills
CAFNR - School of Natural Resources	Forestry	4360	Forest Information Systems	skills
Arts and Science	Geography	1840	Mapping the Environment	skills
Arts and Science	Geography	2840	Introduction to Mapping Science	skills
Arts and Science	Geography	3840	Computer Assisted Cartography	skills

Arts and Science	Geography	4710	Spatial Analysis in Geography	skills
Arts and Science	Geography	4810	Landscape Ecology and GIS Analysis I	skills
Arts and Science	Geography	4815	Landscape Ecology and GIS Analysis II	skills
Arts and Science	Geography	4830	Remote Sensing	skills
Arts and Science	Geography	4840	Geographic Information Systems I	skills
Arts and Science	Geography	4940	Geographic Information Systems II	skills
CAFNR - Food Systems and Bioengineering	Hotel and Restaurant Management	3410	Conference and Meeting Management	skills
Journalism	Journalism	4200	Principles of Strategic Communication	skills
Journalism	Journalism	4206	Strategic Writing I	skills
Journalism	Journalism	4416	Science, Health and Environmental Writing	skills
Business	Management	3000	Fundamentals of Management	skills
Business	Management	4030	Organizational Behavior	skills
Business	Management	4060	Project Management Fundamentals	skills
Business	Management	4650	Entrepreneurship: Theory and Practice	skills
Business	Marketing	3000	Principles of Marketing	skills
Business	Marketing	4000	Marketing Management	skills
CAFNR - School of Natural Resources	Natural Resources	1090	Beginning GIS for Natural Resources	skills
CAFNR - School of Natural Resources	Natural Resources	3220	Public Relations for Natural Resource Managers	skills
CAFNR - School of Natural Resources	Natural Resources	4325	Introduction to Geographic Information Systems	skills
CAFNR - School of Natural Resources	Natural Resources	4365	GIS Applications	skills
CAFNR - School of Natural Resources	Natural Resources	4385	Landscape Ecology and GIS Analysis	skills
CAFNR - School of Natural Resources	Natural Resources	4395	Landscape Ecology and GIS Analysis II	skills
CAFNR - School of Natural Resources	Parks Recreation and Tourism	2140	Camp Leadership and Management	skills
CAFNR - School of Natural Resources	Parks Recreation and Tourism	4331	Administration of Outdoor Recreation- Education Programs	skills

Human Environmental Sciences	Personal Financial Planning	2180	Personal and Family Management	skills
Human Environmental Sciences	Personal Financial Planning	4188	Community Agencies and Volunteerism	skills
CAFNR - Applied Social Sciences	Rural Sociology	4341	Building Communities from the Grassroots	skills
CAFNR - Applied Social Sciences	Rural Sociology	4342	Empowering Communities for the Future	skills
CAFNR - Applied Social Sciences	Rural Sociology	4343	Creating Capacity for Dynamic Communities	skills