

Unit Productivity Award Application For Academic Departments, 2004-2005

**Academic Unit Name: Department of Geography and Geology
Department Head: David J. Keeling
(Key Indicators of Productivity for 2004-2005):**

SUMMARY OF APPLICATION:

- ① Majors and minors in the Department increased by 15 % over the previous year.
 - ① Faculty and students were featured 40+ times in media print and online articles.
 - ① 60 students participated in study abroad programs, field camps, and field trips during the year, with an additional 200+ students visiting Mammoth Cave National Park as a requirement for Gen. Ed. courses. Study Abroad field-camp programs are in development for the Bahamas and Tanzania for Winter term 2006, and China for Summer 2006, with over 40 students scheduled to participate.
 - ① The Department awarded 22 GIS Certificates this year; and 30 students have completed half of the requirements. A new Graduate GIS Certificate is developed.
 - ① Three students received awards at the annual Sigma Xi student conference; 4 students won awards at the annual Kentucky Academy of Science meeting.
 - ① Two students were selected for NSF Research Experience summer programs.
 - ① 45 students were actively engaged in applied research under faculty supervision through the ARTP and through externally funded research projects.
 - ① Faculty and students visited 25 overseas locations for research, professional development, conferences, study-abroad programs, expedition study tours, and collaborative activities, including three separate visits to China, two visits to Bhutan, and a rare trip to Cuba.
 - ① Four students participated in karst research expedition to Hunan Province, China.
 - ① A geoscience graduate student published a book on Sequoia and Kings Canyon National Parks.
 - ① Four undergraduate and graduate students were accepted to MS or Ph.D. programs beginning Fall 2005.
 - ① Nick Crawford received the 2005 *Award for Outstanding Contributions to Karst Science* from the national Karst Waters Institute.
 - ① 35 scientists, faculty, and students attended the inaugural Climate Services Symposium of the Kentucky Climate Center.
 - ① GIS Director partnered with DELO to offer summer GIS/GPS workshop for middle-school teachers.
 - ① Margaret Crowder recognized as Young Careerist of south-central Kentucky.
 - ① GIS director Kevin Cary earned the Certified GIS Professional (GISP) designation.
 - ① Chris Groves received UNESCO funding to head a five-year international project to study karst aquifers and water resources.
 - ① Ken Kuehn received a Distinguished Service Award from the Society for Organic Petrology, an international research organization.
 - ① Chris Groves was elected President of the national Cave Research Foundation.
 - ① David Keeling published three Op. Eds. in national newspapers and lectured on an around-the-world expedition for the American Geographical Society.
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Department of Geography and Geology Unit Productivity Award Application

I. Increasing Student Learning

The primary student-learning goal of the Department for the 2004-2005 academic year has been to take the principal elements of the QEP and weave them into the geoscience curriculum. Our goal has been to increase the number of students engaged in directed research, study-abroad programs, field camps, internships, and professional conference activities, thus preparing them for success in a global society. We achieved our goal of **100 students** engaged in these types of learning activities, which is over one-third of all students enrolled in the geoscience programs. The Department's long-term goal is to have every undergraduate major engaged in a research-related activity that leads to directed research, study abroad, internship, or conference participation experience. Faculty believe that blending classroom learning with community-centered experiences (local, regional, or international) is a key element in the intellectual and skill-based development of our students. The socio-economic development of communities in our service area (and beyond) can only be achieved if students receive both an intellectual and a practical preparation for life after university.

In October 2004, ten students and two faculty participated in a geoscience field trip to Nevada and California, studying geological, environmental, and social issues related to national park management and resource use. Students have developed a website with details of the trip that included Death Valley and the Mojave Desert (<http://geoggeol.wku.edu/awulff/475dv/index.html>). Fourteen students and two faculty participated in the regular Spring end-of-semester southeastern U.S. geology field trip, with another student enrolled in the summer geology field camp run by Dr. Wulff in Utah, part of a consortium with the University of Iowa. In May, 15 students and two faculty participated in the department's study abroad field camp in Hawaii. The program incorporated both the physical and cultural elements of Hawaii, visiting Kauai and the big island of Hawaii, with students addressing a variety of issues related to living in volcanic environments. The Department also has a study abroad field camp in northwestern Chile and Argentina departing in July with 12 students and three faculty, and Winter term programs to Tanzania, East Africa, and to the Gersace Research Center in the Bahamas are in development.

Four geoscience graduate students, led by Hoffman Institute Assistant Director Pat Kambesis, spent two weeks in China in March as part of a seven-member international team studying the karst area of Wanhua Cave in Hunan Province. The expedition mapped the cave's hydrogeology to provide important information about the region's water resources. Two geology majors were selected for National Science Foundation summer research programs, working in Notre Dame's Geological Sciences Department and at the Center for Space and Planetary Sciences at the University of Arkansas respectively. Six students from the Department's Graduate Geoscience Society and Geography Club helped to administer the annual Kentucky State championship of the National Geographic Bee in April. Working with 100 middle-grades students helped our students appreciate the depth of knowledge required to become truly geographically competent. Another four students worked with Dr. All on a community radon analysis project that included 300 volunteers.

Throughout the academic year, 45 students were actively engaged in directed research projects and other activities related to the ARTP and Programs of Distinction (Kentucky Climate Center, Hoffman Institute, Center for Cave and Karst Studies, and the Water Resources program), and eighteen other students worked on research projects directed by department faculty. Moreover, dozens of students were employed by the Lost River Cave program as guides and assistants. The Department also is a partner with the Biology Department in a contract with Mammoth Cave National Park that allows 30 students to work with the U.S. Park Service on an ecological monitoring program. Students have access to the Park's \$40,000 Polymerase Chain Reaction machine, located in EST, providing them with valuable skills not available on campus. As a result of field work conducted for his MS thesis, graduate student Joel Despain published a book on Sequoia and King's Canyon national parks titled *Hidden beneath the Mountains*, and graduate student Pat Kambesis published two encyclopedia articles and a book chapter, the latter addressing the sinkhole collapse on Dishman Lane in Bowling Green.

Although student learning skills are developed through both classroom and applied research experiences, faculty firmly believe that attendance at, and participation in, professional meetings and conferences are important aspects of the learning process for students. Faculty worked hard this year to encourage more students both to attend and to present research at conferences. A dozen geoscience students presented research at the annual WKU Sigma Xi research conference in April, with two students winning first place in their respective sections, and a graduate student earning second place in the science section. Also in April, three graduate students and one undergraduate presented research or attended workshops at the annual meeting of the Association of American Geographers convened in Denver. Four program alumni also presented research at the conference, highlighting the success of program graduates. During March, three students made presentations at the 54th annual meeting of the Geological Society of America's southeastern division in Biloxi, Mississippi. The annual Posters at the Capitol event in February featured presentations from six students, addressing issues such as karst sinkhole management, environmental mapping, and groundwater sensitivity. The department's students accounted for half of WKU's research posters on display at the state capitol event. Three students presented research at the annual southeastern regional conference of the AAG in Biloxi convened in November, and four geoscience students received first or second place awards at the annual Kentucky Academy of Science conference in Murray, with eight students overall presenting their research. In September, graduate student Pat Kambesis presented research at an international karst conference in Hanoi, Vietnam, and in the spring semester she visited Cuba and Puerto Rico as part of an invited expedition to study caves and groundwater problems in these Caribbean islands. In July 2004, graduate student Christina Henry presented her thesis research by invitation at the National Weather Service.

Another major challenge during the past year has been to engage students more successfully with the new technologies, theories, and applications that are demanded by employers and society. Part of the Department's mission is to continue developing an interdisciplinary approach to Geographic Information Sciences (GIS) that provides learning opportunities for students from all disciplines across the university. Supported by *Action Agenda funds*, the GIS program continues to grow steadily, with 56 students now having completed the full GIS Certificate Program, the only one of its kind in the Commonwealth. Another 100 students are enrolled in introductory GIS courses for the summer and Fall 2005 semesters, while a further 30 students have completed half of the requirements for the GIS Certificate. The Department provides a full-time GIS Director/instructor, funded initially by *Action Agenda money*, and employs six students as hands-on GIS lab assistants. Another eight students are engaged in GIS-related research, funded in part by a second \$10,000 grant from Institutional Technology and a \$4000 grant from the Transportation Committee to continue the complete digitization of the campus. New initiatives in the geology program (including a complete revision of the geology major effective Fall 2005) have focused on encouraging students to utilize more technology in their research, especially the Scanning Electron Microscope, equipment at the Materials Characterization Center, GIS, isotope equipment at UK's Environmental Research Lab, and other advanced equipment. Fifteen students who presented posters at the GSA, AAG, Kentucky Academy of Science, and Sigma Xi conferences demonstrated particular skill with these technologies.

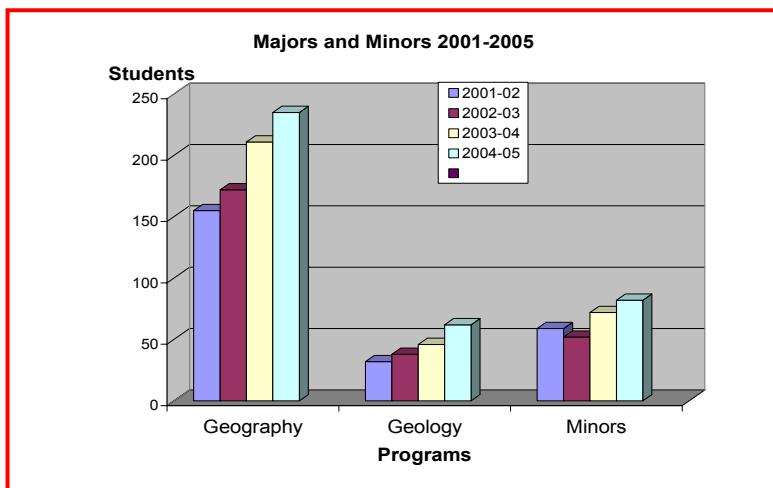
The Department's 13-hour GIS certificate program continues to attract new students from other disciplines (25 new students this year declared GIS as a major or minor, along with six new graduate students). A third GIS-trained faculty member began teaching in Fall 2004 and has strengthened the curriculum in transportation and advanced GIS modeling. The department continues to develop partnerships with the Engineering, Architectural and Manufacturing Sciences, Biology, Recreation, and Business departments to improve interdisciplinary opportunities incorporating GPS, GIS, and other land-mapping technologies. For example, a new *GIS for Engineers* course has been approved and will be offered for the first time in Spring 2006. In addition, *the Department continues to collaborate* with the Agriculture, Business, Biology, and AMS departments to develop specific data sets for these departments' majors to use in a GIS mapping environment. Increasing levels of inter-departmental collaboration are designed to enhance the learning opportunities for students and to promote a multidisciplinary approach to problem-solving strategies.

Throughout the year, the Department continued to refine its curriculum, in consultation with graduate and undergraduate students in the program (“closing the loop”), with additional changes and new courses in effect for the 2005-2006 academic year. A complete revision of the Geology curriculum has been completed with several new program options now available, new minor programs in water resource management and GIS are now offered, and several one-hour “preparation” courses in basic geoscience (tornadoes, earthquakes, orienteering, etc.) are proving attractive to undeclared students as they think more about majoring in the sciences. Coupled with the redesign three years ago of the Department’s core educational objectives, new and enhanced curricula in the geography and geology programs now *provide our students with a much higher level* of intellectual and career development. Every student majoring in the Department takes a set of foundation courses that provide them with basic GIS, statistical, scientific writing, research methodology, and critical thinking skills. This set of courses should prepare students more rigorously for the advanced courses and is designed to *improve the retention rate of students in the program and to increase the graduation rate of majors*. About 25 percent of the Department’s graduates in 2004-2005 enrolled in higher-level math, chemistry, computer science, and physics courses to support their major, especially those focusing on GIS, environmental management, geology, and climatology. The Department’s goal is to exceed 50 percent by 2007 in this area.

The Department targeted the GIS Certificate program for *academic improvement* after student assessments, course evaluations, and faculty feedback from more advanced courses suggested that dedicated lab sections be added to account for the significant time required for independent project development. Introduction to Cartography (3 hours, 300-level) has been restructured to a 4-hour, 200-level, lab-based Fundamentals of GIS course. With the addition of a new GIS-trained faculty member, the program continues to undergo significant pedagogical and technical improvement. Assessment activities also revealed opportunities for improvements in the structure of the geology program, in terms of training in spatial statistics and GIS, and a detailed review of the major designed to improve its relevance and attractiveness to undergraduates has been completed. In addition, assessment activities have revealed that students still are not engaging effectively with the scientific method and with the major theories and advancements in the geosciences. As a consequence, greater attention is being paid in the undergraduate and graduate research methods courses to address this deficiency, and a new 499-Professional Development course for senior assessment has been developed effective Fall 2005. As an example of “closing the loop” between assessment and program quality enhancement, the restructuring of these courses demonstrates how valuable regular assessment and refining of course content, pedagogy, and technology can be. The quality of the Department’s majors will be enhanced over the coming years as a consequence of this process.

II. Developing the Student Body

Most of the Department’s majors in geography and geology are recruited from freshmen in the



general education classes. Consequently, faculty expend significant effort connecting with freshmen by promoting the Department’s majors and minors, recruiting for the geology and geography clubs, encouraging freshmen to become familiar with the Programs of Distinction, and targeting freshmen for assistance by the Department’s peer tutors. Overall, based on trends for the past decade, the number of majors and minors in the Department is growing steadily – this despite a national trend of declines in science enrollment in recent years. Particularly gratifying is that new minor programs in Water Resources and GIS

have already enrolled 11 new students, and enrollment in the GIS certificate continues to grow each year, with 22 GIS Certificates earned during the 2004-05 academic year. At the end of the Spring 2005 semester, the Department recorded **235** majors in geography (211 in 2004), **62** in geology (46 in 2004), and **82** total minors (72 in 2004). *This is a 15 percent increase in declared majors and minors over the 2003-2004 academic year.* Of these, 16 majors graduated in May (along with 6 minors), with another six scheduled to graduate in August. The Department graduated 35 students from its major programs between August 2004 and May 2005. The Department has a target of at least 40 new majors each year to maintain the numerical strength of its programs, and it has generally met this target over the past few years (see graphic).

The Department continued its long-standing tradition of excellence in recruitment, teaching, learning, advising, and retention. It focused again this year on *improving retention*, particularly in the lower-division courses that satisfy both general education and major requirements, as most students entering WKU have very little preparation in the spatial sciences. Preliminary map quizzes continue to show that many students are unable to find their own state or county on a basic map, and few are able to engage competently with the basic elements of geoscience. Consequently, the drop-out or failure rate in lower-division classes continued to run over fifteen percent on average per course per semester. After introducing a *Peer Tutor Program* in 2001 designed to identify and help at-risk students, the Department again focused its Peer Tutors this year on students who failed their first exam or who showed signs of struggling with the introductory material, in concert with the 6th week assessment process introduced by WKU. The tutors provided additional academic support outside normal class hours, assisted in explaining key concepts, and offered assistance to students who failed to grasp the basic geoscience concepts. This program is now in its fourth year, and the results are encouraging. *Approximately 75 students sought assistance* during the academic year, some on a regular basis, and the tutors logged over 500 hours of student assistance.

Incoming freshmen pre-declared in the geosciences are encouraged to take GEOG175 (*Freshmen Seminar*), and this course typically enrolls 10-15 students each Fall semester. Every incoming freshman is advised by the Department Head and assigned a departmental advisor. Students are required to meet with an advisor at least once a semester, and the Department Head advises all students before they submit their degree programs. Every major is also advised during the semester of graduation, either by the principal advisor or by the Department Head. The Department offers one-page information sheets on its various programs, supplemented by glossy publications provided by the professional organizations in geography and geology, and these are distributed at every opportunity to prospective students. The Department also responds with a personal letter and a copy of its recruiting material to each potential student identified by the enrollment office, solicited via the website, or contacted by email. Over the past year, the Department has mailed material in response to *over 210 student inquiries*, resulting in at least fifteen students pre-declared as geography or geology majors for the Fall 2005 semester, and seven transfer students from other Kentucky institutions. Moreover, the Department participates in many of the WKU-sponsored *recruitment activities* held around the state, and it continues to recruit students at state and regional scientific meetings and conferences.

The Geography, Geology, and Geoscience clubs play important roles in the recruitment, retention, and development of students. These three student-led organizations provide mentoring, peer support, research opportunities, seminars, and field-trip experiences for members. For example, through the efforts of the Graduate Geoscience Society, four students traveled to Denver in April to attend the annual conference of the Association of American Geographers, accompanied by eleven faculty. Students raised money for conference and other trips by holding bake sales, by selling ice cream and sodas, by soliciting support from faculty and other students, and from travel scholarships provided by the WKU Foundation and the Department. The Geology Club students raised money and foster interest in their activities through regular rock and gem sales, seminars, and tee-shirt sales, and regularly attended annual regional and national geology meetings and conferences. Additionally, this year the Graduate Geoscience Society sponsored and helped to run the state-wide National Geographic Bee for grades 4-8, with five faculty and six students involved in administering the event. The Bee was held for the third time at WKU, with 100 students and about 175 parents and teachers in

attendance. Faculty are also active in the Kentucky Geological Society, developing statewide initiatives to introduce students to the geological sciences. The Department remains hopeful that recruitment initiatives such as these will help to attract more students to the geosciences in the future.

Finally, the Department developed a number of non-traditional courses to address the needs of graduate and non-geoscience students. A special seminar-based experimental course was offered in the Spring semester titled "Nationalism and Terrorism," attracting 28 undergraduates and six graduate students from seven different disciplines. A research-focused Climate Variability course, using the resources of the Kentucky Climate Center, attracted 6 students, a web-based Earth Science course for K-12 teachers was offered by the geology program, a new Environmental Ethics course enrolled 12 students, and the Center for Cave and Karst Studies summer program (now in its 26th year) offered ten different courses centered on Mammoth Cave. The Department also has tried to strengthen its offerings at the extended campuses, especially during the summer semester, and a complete general geography major has been introduced at the Glasgow campus effective Fall 2005 to meet growing enrollment demands there. Using a rolling five-year course sequence system, the department has structured faculty and courses so that any student can complete the geography major at Glasgow over a four-year period, without having to take courses at the main campus.

Efforts also continue to improve timely graduation rates, with a "four-year program" guarantee in effect. If the student follows the program guidelines, graduation is possible within the four-year time period, with the Department guaranteeing to offer the courses necessary for that student's program. A similar initiative is in effect for all graduate students, who are required to meet each semester with the Department Head to go over the degree program and to ensure that all program requirements are met in a timely manner. This past academic year, the Department contacted 17 students who were "at risk" of not completing their degree program, either because of a missing required course or for other reasons. This outreach program is designed to ensure that every major ultimately graduates from the program. This year, two students responded positively and are completing or have already completed their degrees. The Department aims to reduce the delinquency or drop-out rate in the program to less than 5 percent of the total number of majors over the next five years.

Evidence of success in developing the student body is provided by several representative vignettes about program graduates. This year, two graduate students (Narcisa Pricope and Shwu-Jing Jeng) have been chosen as ESRI scholarship recipients from Kentucky for the 2005 International GIS conference, following in the footsteps of Jeremy Weber (2004), Dan Taylor (2003), and Rhonda Pfaff (2002), who now works fulltime for ESRI. Travis Keeling has been accepted into the very competitive Florida State atmospheric sciences graduate program, Adam Smith received funding to attend the geology Ph.D. program at NC State, Cody Holbrook has been accepted to New Mexico State, Brandy Meredith has been accepted into the International Law program (LLM) at the Brussels School of International Studies, Patty Chalmers will attend Rensselaer Polytechnic Institute's Earth Science program, and many of our recent graduates have contacted the department to let us know they have begun meaningful careers in a variety of geoscience environments.

III. Assuring High-Quality Faculty and Staff

During the just-completed academic year, faculty submitted grant and contract applications worth over \$1 million, a significant accomplishment. Most of these grants and contracts have been submitted under Ogden College's ARTP umbrella. Faculty solicited WKU *Action Agenda funds* to support replacement of aging GIS computer facilities, to renew GIS site licenses, to support study abroad programs, to enhance several research labs, and to continue development of the MESONET, an advanced meteorological monitoring, data acquisition, and analytical system. External funds generated by the Hoffman Institute, Water Resources Program, Kentucky Climate Center, and the Center for Cave and Karst Studies from agencies such as the NSF, NASA, the Commonwealth of Kentucky, and other sources continue to help support graduate students, student-centered research, provide new equipment, and facilitate the development of research exchange programs in China, Puerto Rico, Chile, Indonesia, and within the Commonwealth. Of particular note is the selection of Chris Groves to head the international UNESCO-funded project titled "Global Study of Karst Aquifers and Water Resources."

Several faculty were recognized locally, nationally, and internationally during the academic year. Nick Crawford, who directs the Center for Cave and Karst Studies, received the 2005 *Award for Outstanding Contributions to Karst Science* from the national Karst Waters Institute. Ken Kuehn received a Distinguished Service Award from the Society for Organic Petrology, Chris Groves was awarded the 2004 USDA T.L. Mounts Lectureship and also elected President of the national Cave Research Foundation, and Margaret Crowder won the Young Careerist of Simpson County award. Kevin Cary, who directs WKU's GIS program, earned the professional designation of Certified GIS Professional (GISP). Throughout the year, faculty from the Department have been featured in a variety of WKU and regional media, including stories in *Echo* magazine, *Western Scholar*, the *Bowling Green Daily News*, and an extended feature on the Center for Cave and Karst Studies in the *Courier Journal*. David Keeling also had Op.Eds. published in the *San Francisco Chronicle*, *Lexington Herald*, and the *Anchorage Press* as a member of the American Geographical Society's Writers Circle.

One new faculty (a GIS and spatial modeling expert) was hired in August 2004 to help further develop the GIS program and to strengthen partnerships with other programs on campus. Two new faculty members have been recruited for the 2005-2006 academic year (from Arizona and Kansas) to strengthen the Department's Meteorology and Planning programs and to continue building our course offerings in urban planning and atmospheric sciences. The Department *search committees addressed diversity and gender goals* during the recruitment process, contacting qualified individuals through listservs, conferences, and special mailings, and ultimately recommended the most qualified individual for the position. In the most recent searches, a well qualified female candidate was offered the position and accepted. The Department has every expectation that the new generation of faculty will continue to strengthen the Department's accomplishments in scholarship, creative activities, and externally-sponsored research and grants.

Faculty continued to excel in scholarship, research, and professional development, convening and/or participating in myriad professional workshops and presenting approximately 40 papers at local, regional, national, and international conferences. Faculty also were significantly engaged with the local community, serving on committees, task forces, running for public office, participating in WKU-sponsored community outreach events such as the *Far Away Places* series at Barnes and Noble, sharing geoscience expertise on WKYU-FM's Midday Edition program, and giving talks at churches, community organizations, and for service groups. Four faculty also served as editor or co-editor of professional academic journals, seven faculty reviewed manuscripts for academic journals or publishers, one faculty authored a chapter in a textbook titled *Rural Change and Sustainability*, and another faculty co-authored a new physical geography textbook. Geography faculty research articles appeared in such diverse journals as the *Journal of Latin American Geography*, *Agricultural and Forest Meteorology*, *Geomorphology*, *Geocarta International*, *Southeastern Geographer*, and *Groundwater*, among others. Fifteen faculty research articles or book chapters are either currently in review, revision, or awaiting publication, and one of the Department's newest faculty published a co-authored chapter in a new book titled *Economic Impacts of Intelligent Transport Systems*.

Faculty also gave about 60 academic and community talks during the academic year, including presentations at universities and conferences across the United States, in Latin America, China, and Europe. In addition, faculty visited 25 overseas locations for research, professional development, study abroad programs, professional study tours, meetings, and collaborative activities with other institutions (including Vietnam, three trips to China, Indonesia, Cuba, Puerto Rico, Hawaii, Greece, Italy, Peru, Chile, Samoa, Australia, Papua NG, Cambodia, two trips to Bhutan, India, Tanzania, Madeira, Iceland, Greenland, Canada, Mexico, France, Belize, and Thailand). Five faculty led the Department's study abroad programs to Hawaii, Chile, and Argentina, the Department Head served as a Study Tour Lecturer on educational programs co-sponsored by the American Geographical Society to Latin America, Asia, Africa, and Europe, and six faculty led field trips for students within the U.S. Indeed, the Department has lead the university in departmental Study Abroad program development and participation over the past decade, with eight faculty leading over 150 students to a dozen destinations around the planet, and it has the most globally focused faculty in the Commonwealth; they have visited over 100 countries on research, expedition, and lecture trips!

IV. Enhancing Responsiveness to Constituents

The Kentucky State Climatologist serves the public from the Department's Kentucky Climate Center and has provided invaluable service to the community over the past year in many different arenas. In May, the KCC convened *the first-ever Climate Services Symposium*, attracting teachers, the general public, and climate professionals from around the state and region. Utilizing new GIS visual technologies and drawing on the assistance and skills of six undergraduate and graduate research assistants, the State Climatologist, along with two other faculty, provided climate-related data, expert testimony, prediction models, and other important information to myriad local and state constituents. The Kentucky Climate Center's website provides both real-time and archival weather-related data to visitors and it recorded over 10,000 visits during the year. Moreover, the WKU Weather Station hosted several dozen K-12 student visitor groups during the year. The State Climatologist also serves on the South Central Kentucky GIS Users Group and met several times with city and county agents and public officials for GIS and other planning needs. The Department's GIS faculty have taken the lead in helping to coordinate a GIS technology advisory group in the region and in promoting GIS technologies in sustainable development practices. For example, *the Department partnered with DELO* to offer the first two-day GIS/GPS workshop for middle school teachers in the state, an event it plans on repeating on a regular cycle. Indeed, the core mission of the Department is to contribute to sustainable development in our community, region, state, and beyond through good management practices using such powerful analytical technologies as GIS.

Public service, as exemplified by the Climate Center, continued to be a central pillar of the Department's contributions, with activities in 2004-2005 reaffirming the faculty's commitment to productive engagement with a wide variety of constituents. The Department, through the Center for Cave and Karst Studies, continued to pioneer interactive and demonstrative student and public learning activities at the Lost River Cave site. This valuable community resource has flourished in recent years with additional funds from the State, community, Western, and other donors, and it has become one of the premier karst and wetlands educational resources in the region. Dozens of students and community activists are employed or volunteer time at the LRC site, providing learning opportunities for area P-12 schools, visitors, and post-secondary institutions. The Center for Cave and Karst Studies' Director travels the state and surrounding region promoting both the LRC resources and the Department's educational facilities.

Another initiative in enhancing responsiveness to constituents is the ongoing development of the Department's website (www.wku.edu/geoweb). This website contains over 700 pages of information relating to the Department's educational, research, and service activities and it receives several hundred visitors each month. The Department regularly updates its site and makes every effort to ensure that all links are active and current. This has involved an investment of over 600 hours during the academic year. Students and other visitors have commented positively about the usefulness of the site's material, especially links to course syllabi, descriptions of all courses offered by the Department, detailed information about the Department's majors and minors, details about each faculty member's research activities, links to faculty websites, links to the Department research centers, online versions of the Department's alumni newsletter, and details of the Department's annual strategic planning.

Faculty have cumulatively contributed thousands of hours to the educational, social, cultural, and economic development needs of the city, county, region, state, and other countries. As noted above, several faculty have been recognized, in part, for service to the university (one faculty serves as a Faculty Associate for FaCET) and community, and the GIS faculty serve on a number of regional GIS-related committees and workgroups. Faculty also advise the city's Storm Water management committee, and others have been involved in various community projects in advisory capacities. Two faculty members continue to invest many hours in helping students at area K-12 schools develop portfolios in science, and two faculty offered a professional development workshop for pre- and in-service middle grades teachers on geological time. These activities created contacts and relationships with students and teachers that may convince students to major in the geosciences eventually.

The Department has responded to constituent needs in the area of professional training, including short courses, expert advice, and technological support. Conferences, short courses, and

special lectures on radon mitigation, GIS management, hazardous materials handling, storm-water mitigation, karst development, and water quality were offered during the year, with plans to develop more specialized programs in the future, especially in the area of water management, GIS planning, and radon mitigation.

Alumni development is an important source of funding for the Department and it also provides employment opportunities for future students. Many alumni in positions of leadership frequently contact the Department with information about job opportunities for graduating seniors. The Department circulates its annual Geogram newsletter to approximately 1,400 alumni, it hosts alumni and current students at the annual October Homecoming alumni reception, and it offers continuing education training in a variety of fields (Hazmat, Stormwater Mitigation, GIS, Karst Management, etc.). Last year, the Department received record unrestricted contributions from alumni and faculty (over \$10,000), and it hopes to break that record again this academic year. Earnings from endowments support student enrollment in field camps, help faculty and students attend more conferences and workshops, and provide significant support to the Department's programs overall.

V. Improving Institutional Effectiveness

The Department continues to run efficiently and effectively. Ad Hoc committees are assigned as needed, with a minimum of five faculty serving on each committee. Membership on important committees such as curriculum reviews, hiring, and facilities is rotated every year to expose faculty to all facets of the Department's operations. The Undergraduate Review workgroup is charged with the task of continually examining and revising the curriculum, course offerings, and program specialties in order to provide the best possible learning experience for the students. A new geology curriculum for 2005-2006 has been approved and includes several new options to maximize the resources and expertise of the program faculty. At the graduate level, the Graduate Review workgroup continues to revise the geoscience-based curriculum designed to meet the demands of 21st century employers and to provide students with the skills necessary to be successful in their Ph.D. studies or in professional careers. Revisions to the successful GIS Certificate program have been completed based on feedback from the assessment procedures in place. Two committees continue to address the physical, technological, and research needs of the Department. The Facilities and Technology committee continued to assess the efficient utilization of space, and made several recommendations to upgrade rooms and develop new labs for student research. Indeed, 20 new computers have been provided by the university to help the department improve its laboratory and research operations. Renovations to several rooms in EST are underway this summer, as a result of funding from WKU's academic quality enhancement initiative. The three departments in EST collaborated on space utilization efficiencies and have developed shared space arrangements and plans to utilize a new theatre-style auditorium for large introductory classes commencing in Spring 2006. The Research Facilities committee, comprising the POD directors and key researchers in the Department, examined research synergies, funding needs, and student research opportunities and made recommendations concerning increased productivity and efficiency in research activities, along with significant collaboration with other academic departments and with external agencies. The Department will embark on the development of its second five-year strategic plan for 2006-2011 in Fall 2005, and the geology program enhancement committee plans to submit its final report to the Department at the end of the summer.

Two other committees encompass the promotion of the Department's activities and the development of funds. Activities of the Marketing and Promotions committee last year included developing a Powerpoint presentation highlighting the strengths of the Department, promoting its educational opportunities among its constituents, and marketing the types of programs and research opportunities available to students and other constituents. Finally, the Funds Development committee continued to refine a program to identify sources of external funds, to identify funds to endow a Chair in Geoscience, to develop better relationships with alumni, and to identify creative ways to use available development funds to support student-learning activities. As a result, the Department received over \$10,000 in alumni contributions during the year, most of which went to support student research, study abroad programs, and student attendance at conferences.