

**Geographic Information Systems  
Education and Research Center**

University of Wisconsin-Stevens Point

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## **Introduction and GIS Center Overview**

Unlike other program reviews that the National Institute of Food & Agriculture (NIFA) conducts, this review was not initiated by the host institution. Rather, the Geographic Information Systems Education & Research Center (GIS Center) at the University of Wisconsin-Stevens Point (UWSP) grew out of a Congressionally directed line item in the 2008 NIFA appropriation. The Current Research Information System data base description of this project, maintained at NIFA, appears on page 19. As part of the agency's increased emphasis on post-award management of grant funds, program reviews, site visits, and project director workshops are becoming more commonplace. Consequently, at the time of the \$1.725M award to UWSP, the project director was asked by NIFA to budget for a program review of the GIS Center within the five-year duration of the award. Such reviews, when conducted relatively early in the project period, can help an institution fine tune their programmatic direction and help ensure that the project will achieve long-term success and have the intended impacts. This on-site review was conducted approximately two years from project initiation.

### ***Overview***

Coursework and teaching of geographic information system principles, technologies, and applications for UWSP students began in 1987 in the Department of Geography & Geology. Geography & Geology is housed in the College of Letters and Science at UWSP. In the mid-1990's, the Department's GIS courses became part of the GIS-Cartography Geography degree option (requires 40 credit hours). Eventually the GIS course sequence was expanded and a GIS and Spatial Analysis minor was added in 2000 (requires 22 credit hours). This major option and minor have provided traditional students the skills and knowledge in GIS that helped start their professional careers in the field of geospatial data and analysis. GIS courses presently being taught in the required base sequence for the major option and minor include Geography 279 (Fundamentals of GIS), Geography 476/676 (GIS I) and Geography 479/679 (GIS II). Several GIS-related technique courses are also required in the major option and the minor (e.g., Introductory Cartography, Dynamic Cartography, Remote Sensing I & II). A GIS internship program was also created in the early 1990's that has provided government agencies and private businesses with hundreds of student interns either during the academic year or the summer months. While the GIS and Spatial Analysis minor provides a valuable academic addition for many students, it tends to be heavy on technique courses. Whereas, many students are now favoring application courses that will help them better utilize GIS in their chosen major field. For those students, another credentialed academic option is desirable.

It is estimated that, in Wisconsin alone, there are thousands of GIS users in local and state government and in the private sector. Inventory, analysis, and decision making in natural resources, infrastructure, supply chains, retail trade, transportation, and health services could all benefit from the use of geospatial data and information systems. However, there are many GIS users, potential users, and decision makers that have limited familiarity with GIS concepts and technologies. Furthermore, many of the State's current GIS users either received their training many years ago or have little formal GIS training. Some sort of GIS certificate program could fill an important need for workforce

professionals, as well as provide another academic GIS option for UWSP's traditional student population.

A recent analysis of GIS certificate programs by UWSP found that there are 33 programs offered by universities and community/technical colleges across Wisconsin and its border states. Those programs vary greatly in cost, eligibility, type of certificate, and target audience. With the needs of both traditional and non-traditional students in mind and an understanding of existing GIS certificate programs across the U.S. and the Lake States region, the Department of Geography & Geology proposed creation of a GIS Education and Research Center with a GIS certificate program at its core. Funds from a Federal Administration Research grant were targeted to provide the resources necessary to initiate this Center and the certificate program. The 2008 award provided support for five years with the UWSP expectation that the program would be self-supporting at the end of the award period. As noted by the Department of Geography & Geology, this GIS proposal fits in well with stated institutional and administrative strategic plans:

*The GIS Center and the creation of the GIS Certificate program builds on the Central Wisconsin Idea initiative, started in 2001-03, in which UWSP committed to increasing community involvement and professional training. Moreover, the request falls within the campus's long-range plan as approved in 2001 which combines themes of partnerships, student-centered excellence, and technology-enhanced learning; and is consistent with the former Chancellor's 2015 vision statement to connect the university with the nine-county region of Central Wisconsin in an effort to help create a vibrant area economy and prepare students to be global citizens.*

Besides the GIS coursework offered to UWSP students, the Department of Geography & Geology has used GIS technology to aid government, business, and private citizens. It has helped solve community problems, provided consultation, and conducted applied research in a wide variety of need areas, for example:

- GIS and precision farming techniques were introduced to potato farmers to help them assess the health of their potato fields (biomass measurements), as well as the spread of crop diseases.
- GIS expertise was provided to Portage County in the creation and formulation of their GIS data base and infrastructure.
- U.S. Trailmaps (Wausau WI), a recreational mapping company, requested consultation aid and interns to help design their GIS geo-database in order to create a viable set of ATV and snowmobile trails that could be downloaded into recreational receivers.
- Cranberry growers were instructed on GIS data base development and Global Positioning System (GPS) data acquisition to aid in the maintenance of their cranberry bogs.
- The Department has worked extensively with, and provided assistance to, the WI DNR on GIS land management activities. This includes work for the DNR Sandhill and Meadow Valley areas in Wood County.

- GIS Center faculty and students assisted citizens with an inventory of ecological and aesthetic shoreline characteristics for Grindstone and Moose Lake conservation efforts.
- In cooperation with a local health care provider (Ministry Health Care), the Center investigated the geospatial correlation between stage of breast cancer at initial diagnosis and patient location.

The new GIS Center anticipates continuing grants and contracts work for applied research and technology projects, both to support salaries, equipment, and other Center resources, and to increase the relevancy of coursework.

The recently established GIS Center has identified three activity foci: a GIS certificate program, more specialized GIS application courses, and outside consultation and grant projects. The Center describes these as:

1. Initiate a multi-faceted GIS certificate program to strengthen and expand the current UWSP GIS program offerings. It will be open to undergraduate, graduate, and continuing education students;
2. Develop a sequence of UWSP courses for intermediate and advanced GIS instruction to aid in the development of new GIS specialists as well as provide opportunities for current GIS professionals in central and northern Wisconsin to update their skills; and
3. Provide technological and logistical guidance and support for applied GIS research projects that aid in the solution of both government and business problems within northern and central Wisconsin.

Two types of academic credit GIS certificate programs are being offered—the professional certificate and the focal certificate. Both require 18 credits and have the same core course requirements (Fundamentals of GIS, GIS I, and GIS II: Geography 279, 476, and 479), plus one credit of practicum/internship and nine credits of elective courses. Elective courses for the two certificate options are listed on page 24. In addition to these two, academic credit applicable certificates, the Center plans to offer its courses for continuing education (CE) credit to non-traditional students. In exchange for logistical, registration, marketing, and advertising support, the UWSP Continuing Education Office shares fees 30-70 with any campus entity offering CE courses.

To support GIS Center programs, 2.5 FTEs have been funded by the Center at the present time (two teaching/research positions and one, half-time administrative assistant)—one additional FTE slot for the Center director position has been proposed as part of a budget request to the University of Wisconsin System Board of Regents. The two Center teaching positions have been filled: one GIS education specialist and one visiting assistant professor. Both will eventually be certified as ESRI instructors, so the Center will offer ESRI software training courses in addition to its academic and CE courses. ESRI shares course fees 50-50 with delivery institutions. While the 2.5 FTEs are initially supported by NIFA grant funds, it is anticipated that academic tuition credits and continuing education tuition will provide the funding base long term.

## ***The Review***

The NIFA Review Team consisted of six members: five external participants (one of those from NIFA) and one internal UWSP participant (see page 26). The Department provided the Review Team with a variety of documents that helped the Team prepare in advance for the on-site portion of the review. These documents included: the NIFA grant proposal narrative, the certificate program proposal, a GIS Center brochure, new GIS course descriptions, student teaching evaluation scores, and a GIS Center course timeline through 2012. The scope of this review was limited to the GIS Center and its current and planned activities, so the Review Team focused primarily on those. However, because the Center is part of the larger context of the College and the University, the Team discussed additional issues that appear to directly or indirectly impinge on the Center and its programs. All Team members participated fully in the review process, including generating recommendations, on-site reporting to administration and faculty, and report authoring. Review sessions commenced on Monday evening and ended Tuesday afternoon. Exit interviews were provided to faculty and administration separately on Wednesday (see page 27 for the review agenda).

Due to the constraints of time, it was not possible for the Review Team to thoroughly grasp all the unique characteristics (e.g., cultural, political, policy) that are present on the UWSP campus and in the State, and that impact the College and the GIS Center and their programs. Moreover, very few of the Center's clientele (students or continuing education professionals) were available for interviews. Consequently, this final report reflects the Team's best understanding of the GIS Center's situation based on the information presented in the pre-review documents and what the Team was able to learn and comprehend during the limited on-site visit. Team deliberations and recommendations are provided with an understanding of those limitations, and should therefore be used as one of many sources of input to subsequent decision making by the institution.

## Executive Summary

Through the grant awarded to UW-Stevens Point in 2008, the UWSP Department of Geography & Geology and the recently established GIS Education and Research Center are poised to enhance the technological capacity of the workforce in Wisconsin and the region. Instruction in GIS concepts and technologies will continue to add value to teaching of other disciplines across campus, particularly in the College of Natural Resources, while the GIS capacity of the Center promises to enhance the research capabilities of many other campus programs and entities. University administration's support for the GIS Center is strong, both in the College of Letters & Science and the College of Natural Resources. There appears to be a firm commitment at all levels of the institution to take the steps necessary to help this new center be successful.

This National Institute of Food & Agriculture review is intended to meet the needs of grant post-award management and to help ensure that taxpayer dollars have a good return on their investment. In addition to pre-review reading of documents, the Team spent a full day on the UWSP campus, meeting with faculty, students, and administration (see review agenda on page 27). We found those discussions to be helpful and they served as critical adjuncts to the documents. After conducting exit interviews with Center faculty and college administration during our on-site visit, we have prepared this final written report as a more complete record of Review Team findings and recommendations.

In addition to numerous observations, the Team's final report contains recommendations that span strategic/tactical directions for the Center that may take years to realize, as well as very specific, targeted recommendations that can be considered in the near future. During deliberations, the Team addressed issues across four broad areas: (1) the balance among Center efforts across teaching, research, and outreach; (2) key partnership opportunities; (3) long-term support and Center continuity; and (4) important components for "institutionalizing" the Center. Because of the highly inter-related nature of these different elements, it was not possible to entirely decouple recommendations emanating from these several focus areas. Throughout the report there are many instances of overlap; in many cases, recommendations in one area are similar to, or have collateral impact on, recommendations in other areas. This degree of cross-referencing, we feel, adds credence to the importance of the issues addressed and to the Teams' viewpoint on those issues. The following bullets summarize the Review Team's findings and recommendations for the GIS Center. Additional recommendations and more detailed action items can be found in the body of the report. As noted above, the Review Team offers this report's recommendations in the spirit of constructive suggestions to be considered within the broader context of institution, college, and department needs and plans.

- There was consensus concern expressed regarding appropriate balance among teaching, research, and outreach activities of the Center, which we sense is currently imbalanced and threatening to become more so. A substantial portion of Center staff time is occupied by teaching introductory GIS courses. The review team felt these teaching efforts are more appropriately supported by department and college resources. Such imbalance is counterproductive to long-term Center sustainability and to pursuit of other goals, so several specific recommendations are

offered to provide for improved alignment of those functions. Additionally, most sections of the report offer related suggestions that directly or indirectly further the interests of balance.

- As with any center, partnerships are crucial. The GIS Center needs to continue and enhance off-campus partnerships, while at the same time developing essential on-campus collaborations, in particular, with the Division of Continuing Education and with other UWSP research centers.
- The Team provides a number of specific recommendations to help advance long-term support, both financial and otherwise, for the Center. Based on what has already been initiated jointly by the colleges, it is clear that everyone feels that base funding for a Center Director position is needed. The Team fully supports that position and argues that there are many ancillary benefits aside from funding, e.g., Center continuity, that make this FTE key to Center success.
- The “center” concept has been applied quite successfully at UWSP. Because of the great applicability of GIS to other disciplines and centers across campus, this new GIS Center is a unique entity and needs to be crafted carefully and deliberately. The Team offers a number of suggestions to help the Center “establish” itself in a way that maximizes its value to the institution.



## **Balancing Center Activities**

It is universally accepted by UWSP students, faculty, and administration that the GIS Center provides considerable value by teaching service and core courses within the College of Natural Resources (CNR) and Geography/Geology. These include: Geog 279 (Fundamentals of GIS), Geog 476 and 479 (GIS I & II), and Geog 377 and 379 (Remote Sensing I & II). In particular, Geog 279 is a required course for most of the CNR majors, while the popularity of this course across campus is expected to experience continued growth. Currently, eight sections of this course are offered annually, and just recently the course has been offered in an on-line format—though, the latter still requires considerable instructor involvement. Further, the Center provides quality GIS expertise for student capstone projects, for contracts with local governments, and for other Centers within UWSP. These combined activities currently appear to dominate much of the energy expended by the GIS Center faculty.

The Review Team believes that the GIS Center would be well-served by establishing, and explicitly defining, a measured balance between teaching efforts, outreach programs, and applied research. The Team stopped short of saying what that balance should be, but felt that an imbalance currently exists and that it is likely to increase. It was the sense of the Team—and a course of serious concern—that Center staff is already stretched to time and effort limits in meeting current teaching commitments. Anticipated expansion into outreach and applied research activities will only strain Center faculty and staff further. Consequently, the longevity of the Center may not be sustainable after grant monies expire if the teaching of service, core, and certificate courses dominates at the expense of the other balancing legs of long-term Center funding. For the future fiscal well-being of the Center, energy is needed, at the present stage of Center development, to nurture and expand outreach programs and applied research, while maintaining the quality and content of the course offerings.

On-line and classroom teaching of certificate program courses will remain a fundamental element of the Center. Core courses should continue to serve both the certificate programs and required courses within the College of Letters and Science and CNR. While the move to provide the Geog 279 service course on-line is commendable, it does not really solve the problem of over-extended Center faculty. Furthermore, the Review Team noted that many CNR students arrive at their summer camp experience without having taken Geog 279. This dramatically limits how well instructors can integrate GIS into students' summer camp curriculum, and often requires that those instructors cover GIS material that students should have already learned. Additional sections of Geog 279 will most likely be needed to accommodate such timing issues for CNR students—further straining Center staff resources. Therefore, additional GIS teaching resources, allocated appropriately, would help alleviate burdensome teaching loads, and allow key Center faculty to pursue outreach and research activities.

In the context of this report, the term “outreach” includes any Center training and educational activities targeted to non-traditional students. This includes continuing education courses, ESRI-authorized courses, and customized workshops. Based on several discussions that occurred during the on-site visit, the Review Team sensed that, in the longer term evolution of the GIS Center, its outreach activities may turn out to be its most

noteworthy accomplishment. Such an outcome would be entirely consistent with much of the rationale originally offered for Center establishment, which promotes the importance of a better skilled, and more technologically competent, workforce fostering long-term economic prosperity for the region and the State. The public and private sector need for GIS certificate and continuing education training appears to be great. The Team heard confirmation of this from several sources during the on-site visit, and Team membership representing public and private sector interests confirmed this projection. Financial accruals to the Center from these outreach efforts could be substantial and, in the long term, a very important piece of its financial sustainability.

The GIS Center is complimented for already offering and providing valuable expertise to the Centers of Expertise at UWSP and elsewhere within the State. Applied research programs build support for the Center (see Institutionalizing the Center) and provide students internships and real-life experiences that gels their education into sustainable careers. Applied Center research could provide an excellent complement to the new courses needed within the various focal certificate programs. If the Review Team recommendation for teaching load reduction is adopted, time should become available to further mature applied research partnerships, apply for grants, and pursue innovation. However, because the pursuit of research funding can become a major time drain, the Team suggests an approach for the Center's near-term research agenda (see recommendations below) that is less aggressive and that heavily leverages established partnerships. *As a companion activity to complement the recommendations in this section, the Team strongly encourages the development of Center staff position descriptions that specify, as precisely as is reasonably possible, expected levels of effort for teaching, research, and outreach activities.*

### Recommendations

- Other mechanisms should be explored to provide instruction for Geog 279, and thereby relieve GIS Center faculty from most, or all, teaching responsibility for this service course.

One option might be for the principal colleges, Letters & Sciences and Natural Resource, to collaboratively commit a position to specifically teach this essential course. By dedicating a single individual to this teaching responsibility, additional sessions of Geog 279 could be offered to meet the growing UWSP demand and address timing issues for many CNR students. It may also be desirable to target several sessions specifically for pre-summer camp CNR students so that they are better prepared for their summer camp experience, and therefore able to fully appreciate the valuable integration of GIS and natural resources management. A second possible option would be for the Center to hire adjunct faculty or instructors to teach Geog 279. With the current economic climate, it should not be too difficult to find highly qualified GIS instructors to fill this role, either on a temporary basis or more long term. There may also be other potential options to consider that involve instruction by other Geography & Geology faculty or faculty from across campus, and that would redirect some of the Geog 279 workload away from Center faculty. Regardless of which option is chosen, care should be exercised to ensure that the Center would still be able to accrue the tuition credits that are important for short-term Center funding sustainability. Failure to deal appropriately with this service course in the near

term could severely restrict the Center's effectiveness in the other two important program areas.

- For financial stability, it is recommended that the development of outreach programs be accelerated as soon as is reasonable. Marketing of the outreach program will probably take some time to be fully realized and successful, so further delay should be avoided. The UWSP CE Office is poised and ready to bring its resources to the task. The 70/30 fee-revenue split with that office seems reasonable given the value that their staff, resources, and connections could add to the Center's outreach agenda.
- The Team encourages the Center to initially spend less time as lead grant chasers, but rather use partnerships (e.g., CNR Centers and other connections) to provide collaborative opportunities in grant proposals. This will dramatically reduce the time investment in securing research funding. Furthermore, in many instances, GIS technologies are viewed more favorably as valuable complements to more science- or management-based project objectives, rather than as principal objectives of a grant proposal itself. So, it may be the case that partner-led grantsmanship might not only mean less work for Center staff, but might also result in higher success rates and consequently greater overall research grant funding. An ancillary benefit of this approach would be strengthened partnerships, which could translate into a stronger support base.

### **GIS Center Partnerships**

The Review Team is encouraged by the many important partnerships the GIS Center has developed over the past two years. Center staff has devoted great energy to seeking out partners, keeping department and campus leadership abreast of Center developments, and building connections to other campus programs. The ongoing relationship with the College of Natural Resources is particularly critical, and we are encouraged by the many connections already in place. Working relationships across campus seem to be outstanding, rather than merely functional. It appears to the Review Team that cross-college barriers are limited or non-existent, which by itself is very encouraging.

We received many very positive comments from faculty, staff, and students on the critical importance of the Center as a point of synergy for geospatial activities on campus. In a relatively short time, the Center has become a vital component to the ongoing success of geospatial education at UWSP. The following recommendations are offered in the spirit of broadening and deepening the many partnerships that will be absolutely critical to the ongoing success of the Center.

The GIS Center grant received by UWSP is both exciting and important news not just for the region, but for the entire state of Wisconsin. Center staff has already made progress in connecting with off campus groups, most notably the UW-Madison Land Information and Computer Graphics Facility, the Moose Lake Legacy Initiative, and the Targeting Working Lands project (Calumet and La Crosse Counties). Presumably, other such connections will develop in the near future.

Review Team members recognize the focus of the Center to this point has largely been on undergraduate education, and that Center staff simply has not had time to further develop continuing education components for non-traditional students. However, one of the most unique aspects of the UWSP GIS Certificate program is the option for working GIS professionals to further develop their skills, either through a formal GIS certificate, or through “a la carte” courses and CE units. The Center has a unique opportunity to fill the unmet needs of professionals throughout the state of Wisconsin, and possibly beyond.

Because the Center’s ESRI software training certification and software course offerings form a partnership, of sorts, with ESRI, we have included that discussion here. The review team agrees there is an unmet need for ongoing ESRI software training in the region. One Center staff member already has the experience and certifications needed to begin teaching several ESRI-related software courses, and we encourage him to begin offering these courses as soon as practical. Center plans call for both of its permanent staff to fulfill this role in the near future.

### Recommendations

- The Center should take a more proactive approach to marketing and public relations, and broaden partnerships beyond the UWSP campus.

As with any new initiative, staff must prioritize their efforts (see Balance, above). Center staff clearly needs to develop strong relationships on their own campus before devoting significant energy to off-campus partnerships. The Review Team recognizes this fact, but we do encourage the Center to accelerate work on developing off-campus connections. The purpose of this marketing, ultimately, is not in the spirit of self-promotion, but to draw out other potential partners through improved awareness of Center activities. The Team expects that a positive outcome from improved marketing would be more partnership opportunities, as well as more rapid growth of its outreach program.

- As noted elsewhere in this report, collaboration with the UWSP Continuing Education Office is critically important and should be accelerated.

The partnership with CE is critical to the ongoing success of the Center’s continuing education component, with the latter being an important piece of long-term Center sustainability. The marketing and logistical assistance available through CE will reduce the workload on Center staff, as well as facilitate access to a statewide network of continuing education professionals on other campuses and in UW Extension. The Review Team feels the proposed “70/30” funding split between the Center and CE is a good investment. The review team does caution Center staff, however, to recognize that CE will need assistance in identifying target audiences, as they have little to no experience working in the geospatial community. With basic guidance, CE will prove to be perhaps one of the most important campus relationships for the Center to maintain.

- The Center should develop ESRI course offerings as planned, but also consider the needs of campus faculty and staff for such training. Also, the Center should be careful to not lose sight of broadly used or emerging non-ESRI technology opportunities.

In addition to serving the needs of working GIS professionals, the team received feedback from CNR staff suggesting they need help in staying abreast in rapidly changing developments in GIS software and technology. The Center may wish to consider marketing their ESRI training courses to campus faculty and staff, perhaps at reduced rates, or offering short, “feature-change highlight” seminars. And, whether practical or not, we cannot judge, Center staff might discuss and seek input on offering abbreviated, more customized short-courses to help faculty and staff stay current on their knowledge.

Team members did note, however, an almost exclusive focus on ESRI software during the course of the review. While it is certainly true that ESRI maintains a significant market share in the industry, both traditional and continuing education students could benefit from exposure to other new and emerging technologies. In brief discussions regarding a server-based GIS course, for example, we did not observe any mention of other significant trends to “web-enable” geospatial information with mapping mashups derived from Google and/or Bing Maps Application Programming Interfaces. Nor did we observe any connections to open source tools such as Mapserver, PostGIS, and others. The Team encourages Center staff to carefully evaluate whether an exclusive focus on ESRI is appropriate given other new and emerging opportunities.

## **Long Term Support and Continuity**

Everyone the Team spoke with during the course of the review expressed interest in the longevity of the GIS Center beyond the duration of the USDA grant. The Center is seen as a valuable asset at all levels of the University, working in an area of student demand and with potential for future growth in instruction, outreach, and research. The need for stable funding, particularly for Center staff, beyond the current grant is also recognized. Center personnel are developing a business plan to provide a stable base of funding; components of this are currently in negotiation stages within the University. Below, we discuss these components and provide some recommendations.

The base for on-going Center support is premised on a combination of revenue from tuition, continuing education, and workshops, supplemented by gifts, grants, and contracts. If configured as expected, tuition revenue generated from GIS Certificate students by dedicated Center staff would be returned to the Center. The Continuing Education Office would retain 30% of tuition and fees for their services and provide the balance to the Center. Base funding (state GPR) is being sought for a Center director position in a Decision Item Narrative supported by both colleges of Letters & Sciences and Natural Resources. Grants and contracts would provide opportunities for course “buyouts” and hiring additional staff, but would not be relied upon for core staff

As currently configured, Center staff are providing all of the instructional support for introductory GIS courses while still saddled with numerous other expectations (develop new courses in several specialty areas, build a continuing education program, conduct applied research, etc.). As discussed in more detail in the “Balance” section, this puts an unreasonable burden on limited staff and leads to unrealistic expectations. The Review Team feels strongly that it is inappropriate to burden the Center with support for Geog 279. This is a campus-wide service course taken by 100s of students throughout the University

every year. The time and energy necessary to teach this course detracts from the ability of Center staff to engage in innovative activities and develop new revenue streams such as the continuing education program.

The Continuing Education Office notes that the Center has very good potential to build a self-supporting program. In particular, for at least some kinds of offerings, there are no seat-in-the-classroom constraints on program size. The market for returning adult education has not been fully characterized though, and this would hopefully be part of the services provided by this unit.

At the present time, the Center director is leading the organization as part of his ordinary faculty responsibilities. The time demand for this position could grow substantially in the near term, particularly with growth in outreach and research in the Center. Without either course release or base funding for the director position, this could constrain growth and maturation of the center, lead to staff burnout, and make transition to new leadership very difficult.

Center staff continues to pursue extramural funding for GIS-related activities. One large proposal was mentioned, and several small grants have been pursued. It is clear that interest and need for GIS is growing throughout the campus. Rather than pursuing grants on their own (and needing to develop domain expertise to be successful), it appears that there are currently ample opportunities to collaborate with other units, and undoubtedly new opportunities will arise. The Center can position itself as providing “value-added” to others’ efforts, obviating the need for getting bogged down in the more tedious parts of grantsmanship. Although not discussed in detail during this review, it seems likely that there may be internal consulting opportunities as well, providing advice, data processing and analysis services, cartographic services, etc. for other campus units.

In general, very few people get rich in the GIS world. Foundations and gifts are unlikely sources for significant revenue strictly for Center activities, though again in collaboration with other units, particular domains may help provide support (e.g., public health services, land-use planning, environmental protection, and resource management, etc.). Information technology and GIS companies may be amenable to donating or steeply discounting hardware and software products and support, particularly if the Center achieves a degree of recognized success.

### Recommendations

- Center staff should be encouraged to pursue collaborative research with campus colleagues. In addition, it will be helpful to establish consulting fees (and corresponding internal fund transfer mechanisms) for providing various GIS-related services on campus, particularly for minor but time-consuming activities that don’t rise to the level of formal co-investigator status on grants and contracts.
- Market analysis should be completed for the full range of continuing education currently contemplated (e.g., participation of non-traditional students in standard classroom activities, enrollment of non-traditional students in certificate programs, likely enrollment in inter-session courses, likely enrollment in specialized short courses and workshops, likely enrollment in ESRI training courses, fees for custom courses such as introduction to GIS for foresters, etc.). Center staff can identify

potential audiences while Continuing Education could conduct the analysis as part of their collaboration.

- At least in the short term, and until a self-sustaining revenue stream is assured, the Center should aggressively pursue Center compensation for any and all uses of Center time and resources. If Geog 279 is included in the tuition-sharing formula for course support, the revenue should be used to hire dedicated instructors specifically for this course. The current Center staff needs time to develop revenue streams related to outreach and research to complement instruction-based revenue. As noted in the first recommendation bullet, above, a campus-based consulting fee structure should be established to cover significant advisory efforts that are not compensated by other means. Other instruction-based revenue should be calculated from *all* students taking Center staff taught courses, not just GIS Certificate students. Center faculty involvement in internships should be recognized and credited, as these are a valuable contribution to students in many programs.
- The Review Team fully supports the current proposal to the Board of Regents that would provide base funding for a Center Director position. Such a funded position is important to free up time for the faculty member currently charged with directorship responsibilities and provide him more time for: new course development, grantsmanship and development, outreach program development and management, and administrative duties. A dedicated Center Director position is an investment in a growth center within the University and will return substantial dividends in terms of services to the University, new opportunities for students, and new research initiatives. It will also provide impetus for “institutionalizing” the Center and including an administrative transition process in their strategic plan.

### **Institutionalizing the GIS Center**

Good progress has been made by the GIS Center to establish itself as a recognized campus entity. Ostensibly, the core courses already offered by Center staff are a component of that awareness. New niche course offerings introduced over the next several semesters will further highlight the Center’s unique contributions to campus-wide instruction. Elsewhere, this report has talked about marketing, both generally and in the context of continuing education, and developing key partnerships. Such marketing and partnering activities will gradually build a support base, both on- and off-campus, that identifies itself with the Center and its programs. All these activities address important functional aspects of the Center, and the report has covered numerous issues related to them. In this section, the Team considers other aspects of Center operations that have less direct involvement in program operations and results, but that are nonetheless crucial to long-term Center success.

The Center’s course development and delivery schedule is complete and well executed. But other than an initial funding model, the complete path forward for the Center seems less clear. Lacking a well-articulated and explicit plan, the risk is that the Center will be used to solve immediate problems, such as the Geog 279 course bottleneck, and potentially not realize its full potential.

A key driver of any academic center's long-term viability is demand. Demand for a center's products and programs is closely tied to the value that end-users (or stakeholders or beneficiaries) ascribe to a center's offerings. Such a support base, not only helps assure continued revenue, but can also help ensure that a center's offerings closely match the needs of the stakeholder community. The Review Team does not feel that there will be any near-term problems associated with demand for the GIS academic, training, and consulting services offered by the Center. Over time, however, it will likely be necessary to add, remove, expand, reduce, or otherwise modify the Center's offerings, or make significant new investments in Center resources, staff, or programs, or expand its clientele base. Under those circumstances, Center staff may not have sufficient internal resources or knowledge to make the best decision or to fully implement chosen alternatives. In those instances, a readily available, well-informed group of advisors/advocates/partners can be invaluable.

Nimble and flexible centers are able to adjust as needs arise and to weather significant changes in resources, policies, technologies, and clientele demand. To maintain resourcefulness in the face of shifting circumstances means that a center must be unafraid of introspection, periodic assessments, and external feedback. While such efforts fall outside the normal, day-to-day operations of programs, when performed thoughtfully, they create a climate of progressive development and resiliency that can have a dramatic impact on long-term effectiveness and success.

### Recommendations

- The Team suggests developing a strategic plan that covers non-funding, in addition to funding, elements, including at a minimum the following items. Furthermore, whether or not it is required, the Center should vet the completed plan through administrative channels (within the limits and policies of UWSP) to create an explicit buy-in trail for the Center's intentions.
  1. A vision and mission statement
  2. A transition plan for GIS Center management.  
Too often, successful centers decline when the initial staff leaves. The Review Team anticipates that FTE funding for a director, discussed elsewhere, will help with this.
  3. Definition of an internal review process  
The Review Team suggests a review mid-way through the remaining grant period to assess progress toward goals identified in the strategic plan.
  4. A development plan.  
The Center should work with the Development offices in the Colleges of Letters and Science and Natural Resources to identify potential partners for future growth, including private foundations, companies, and the Legislature, among others.
  5. A definition of clear roles for faculty and staff to ensure a balance of teaching, research, and outreach activities.
- As soon as is practical, the Center should create an advisory board consisting of members, who will be active, and charge them with guiding implementation of the



strategic plan. Among other things, a committed and active advisory board should be engaged in the following:

1. **Advocacy:** The GIS Center is already very successful. The Review Team is concerned that existing staff will be overwhelmed by increased demand. An advisory board could ensure that the Center is not used in a way that stunts its potential or diverts its focus.
  2. **Program Guidance:** Using tools such as the evaluation process suggested below and market information developed with Continuing Education, seek out new avenues of course delivery.
  3. **Networking:** Campus administration is already very interested in the success of the GIS center. The Center should partner with administration and other stakeholders to cement a place for the Center in the campus culture. A diverse advisory board will help in finding new partners and unexpected opportunities.
  4. **Fund-Raising:** The board could help by finding additional grant and project leads for Center staff.
- The Team recommends that, as a companion to a strategic plan and an advisory board, the Center should also consider some form of periodic comprehensive evaluation of the overall program. The evaluation should include a process to add or remove course components, covering both academic and outreach offerings. For example, the students we interviewed wanted additional work with GPS technologies beyond what is currently offered. A review could also include some sort of benchmarking against other successful campus Centers—not in any sense of competition, but rather to identify best practices and good models. The Community Research Center was mentioned specifically as a particularly successful campus entity.

## Conclusions

All the ingredients for success—ideas, resources, demand/need—appear to be present for the GIS Center at UWSP. First, the need for training in, and application of, geospatial technologies is great, both in the academic arena of UWSP and in the public and private sectors beyond campus. Second, the UWSP Department of Geography & Geology has an established GIS program that is highly valued on campus, and has a growing reputation in the region and the State. And, finally, a one-time infusion of start-up funding has provided the necessary resources to jump-start Center activities. Two years into the five-year grant funding substantial progress has been made, particularly in curriculum development. However, for the Center to achieve long-term success, it needs to think more strategically. This review has highlighted some of those critical strategic elements: balance within its programmatic portfolio, on- and off-campus partnerships, long-term support and continuity, and developing a more formal “center” entity. The Review Team has made a number of specific recommendations in each of those areas. In most cases, the Team has not said what decisions should be made, but only that something needs to be done to deal with an issue or to take advantage of an opportunity. Ultimately, those decisions need to be made more locally and with more complete information than is available to this Review Team. The tremendously valuable and broadly applicable nature of geospatial technologies offered by the GIS Center is both its great strength and a potential danger as it grows and develops. The potential popularity of the Center and demands on its personnel and resources could strain its capacity and create time and resource allocation issues. Center evolution and program development need to be measured and carefully orchestrated so that Center capacity and stakeholder expectations achieve realistic harmony.

## Appendices

### *GIS Center -- Current Research Information System*

**ACCESSION NO:** 0214911 **SUBFILE:** CRIS  
**PROJ NO:** WISW-2008-03500 **AGENCY:** NIFA WISW  
**PROJ TYPE:** OTHER GRANTS **PROJ STATUS:** NEW  
**CONTRACT/GRANT/AGREEMENT NO:** 2008-38926-19378 **PROPOSAL NO:** 2008-03500  
**START:** 15 AUG 2008 **TERM:** 14 OCT 2012 **FY:** 2009 **GRANT YR:** 2008  
**GRANT AMT:** \$1,725,056

**INVESTIGATOR:** Rice, K. W.

**PERFORMING INSTITUTION:**  
UNIVERSITY OF WISCONSIN  
STEVEN POINT, WISCONSIN 54481

### **UNIVERSITY OF WISCONSIN STEVENS POINT GEOGRAPHIC INFORMATION SYSTEMS EDUCATION & RESEARCH CENTER**

CLASSIFICATION			
KA	Subject	Science	Pct
903	7210	2060	50
903	7410	2060	50

**CLASSIFICATION HEADINGS:** **R903** . Communication, Education, and Information Delivery; **S7210** . Remote sensing equipment and technology; **F2060** . Geography; **S7410** . General technology

**BASIC** 000% **APPLIED** 30% **DEVELOPMENTAL** 70%

**NON-TECHNICAL SUMMARY:** Nationally there is a pressing need for professionals educated in the use of Geographic Information Systems (GIS) and spatial analysis techniques. The US Department of Labor has identified GIS as one of the more important evolving technology fields in the nation. In response to that demand, the University of Wisconsin-Stevens Point (UWSP) will establish a new GIS Education & Research Center, which will provide a certificate-track program, intermediate and advanced GIS education, and support for applied GIS research. The Center initially has three distinct objectives: (1) Initiate a multi-faceted GIS certificate program to strengthen and expand the current UWSP GIS program, (2) Develop a sequence of UWSP courses for intermediate and advanced GIS instruction to aid in the development of new GIS specialists as well as provide opportunities for updating skills of current GIS professionals, (3) Provide technological and logistical guidance and support for applied GIS and GIT (Geospatial Information Technology) research projects that aid northern and central Wisconsin government and commerce. Each of the program objectives will be met through a series of curriculum activities: (1) development and establishment of several GIS certificate programs, (2) further develop the UWSP GIS curriculum to introduce traditional students to intermediate and advanced GIS training and to give central and northern Wisconsin professionals the opportunity to update and advance their previous GIS training, (3) have two faculty members enhance their GIS skills through ESRI software user training classes, (4) promote UWSP GIS program by implementing GIS Center web site and digital newsletter, (5) create GIS research and education alliances with local government agencies, businesses and private organizations in central and northern Wisconsin in order to

develop spatial databases, share GIS expertise, and solve geospatial-related problems, (6) provide undergraduate research assistantship and expanded internship opportunities. The UWSP GIS Education & Research Center program with its suite of undergraduate GIS courses and certificate programs will significantly increase the technological foundation and knowledge base within central and northern Wisconsin and beyond. It will embrace the UW System need to expand the use of technology in Wisconsin as well as attract non-traditional students to the University. The Center will conduct applied research projects when requested by government and business to provide potential solutions to geographic-related problems. GIS is a technology that will help us build stronger ties to both state and local communities due to its innovative applications that help to solve rural-urban interface problems such as enhancing rural healthcare provision, determining optimal highway corridors, providing growers with precision farming capabilities, mitigating disastrous natural events (e.g., wildfire, tornadoes), and urban planning with an emphasis on sustainable development, to name just a few. The Center will become established as a conduit for geo-spatial technological advancement and innovation for central and northern Wisconsin.

**OBJECTIVES:** Project Initiative and Objectives The University of Wisconsin-Stevens Point (UWSP) will use a one-time, allocation of \$1,725,056, to be expended over five fiscal years, to establish and maintain a new Geographic Information Systems (GIS) Education Center (hereafter called the Center), which will provide a certificate-track program, intermediate & advanced GIS education, and support for applied GIS and Geospatial Information Technology (GIT) research. The main goal will be to establish the Center and implement its program objectives: (1) Initiate a multi-faceted GIS certificate program to strengthen and expand the current UWSP GIS program. It will be open to undergraduate, graduate and continuing education students; (2) Develop a sequence of UWSP courses for intermediate and advanced GIS training to aid in the development of new GIS specialists as well as provide opportunities for current GIS professionals in central and northern Wisconsin to update their skills; (3) Provide technological and logistical guidance and support for applied GIS & GIT research projects that aid in the solution of both government and business problems within northern and central Wisconsin. Expected Outputs/Products Over the course of the five-year project period the Center will accomplish or achieve: (1) the offering of at least six different GIS certificate programs to both traditional and non-traditional students, (2) registration of at least 50 students in the GIS certificate program by the end of the third year of the project, (3) at least five new or revised intermediate or advanced GIS courses will have been taught at least one time, (4) at least two Geography/Geology faculty or staff will have completed a sequence of five different ESRI courses in order to augment their GIS knowledge and software skills, (5) the development and implementation of an informative UWSP GIS Center web site with associated digital newsletter, (6) sponsorship of at least two GIS guest speakers a year (one local, one national) (7) the formulation of at least eight GIS research and education alliances or partnerships with government agencies and/or businesses and private organizations, (8) sponsorship of two undergraduate GIS research assistantships per year, and promotion of numerous government and business student internships, (9) successful acquisition of at least one applied research grant (state or national level) per year (starting in the second year of the grant).

**APPROACH:** In order to accomplish the noted objectives the following six steps will be implemented: (1) Development and Establishment of GIS Certificate Programs Over the course of the five-year project period at least six different GIS certificate programs will be initiated and offered to both traditional and non-traditional students. After the courses and structure of each certificate program is developed, each one must pass through normal curricula review and scrutiny at UWSP. The certificate program will be initially evaluated by UWSP Curriculum Committee for its structure, organization and academic vigor. Students will also evaluate their respective certificate programs after each class component is completed. (2) Further develop the UWSP GIS curriculum to introduce traditional students to intermediate and advanced GIS training and to give central and northern Wisconsin professionals the opportunity to update and advance previous GIS training. At least five revised or new intermediate or advanced GIS courses will be taught at least one time (if not more) within the five-year grant period. Initial evaluation of each course will be completed by two different UWSP curriculum commitments as well as normal periodic evaluation by students. (3)

Enhance UWSP Faculty GIS Skills through Environmental Systems Research Institute (ESRI) user training classes. In order to improve the ability of UWSP to provide GIS training to its students, it will be necessary to update and augment the skills of some of its faculty. At least two UWSP faculty members will complete five different ESRI courses within the first three years of the project. The completion of all of the required ESRI courses will indicate success of this portion of the project agenda. (4) Promote UWSP GIS program by implementing a GIS Center web site and digital newsletter. An informative web site will be created that will provide appropriate links to the UWSP Department of Geography as well as detailed information about the available GIS courses, teaching faculty, certificate program, and research agenda. The utility and function of the web site will be evaluated through on-line survey data. (5) Create GIS research and education alliances with local government agencies, businesses, and private organizations in central and northern Wisconsin in order to develop spatial databases, share GIS expertise, and solve geospatial-related problems. Planned research projects will focus on developing practical, applied solutions to community-centered problems. The intention is to be involved in at least two research grant projects in any given year, with at least one successful awarded (state or national) grant per year (starting in the 2nd yr. of the project). (6) Provide undergraduate research assistantships and internships. Two undergraduate research assistantships will be awarded each year so that students can work directly with faculty in developing GIS projects. Internships will also be sought for qualified undergraduate students with partnered commercial and government organizations. Evaluation of the assistantships and internships will follow normal UWSP assessment procedures

**KEYWORDS:** geographic information systems (gis); gis center; geospatial information technology (git); gis certificate program; research alliances; gis education specialist; geospatial data; technology advancement; university of wisconsin stevens point (uwsp); gis course curriculum; undergraduate education; research assistantship

**PROGRESS:** 2008/08 TO 2009/08

**OUTPUTS:** The three fundamental objectives of the grant were advanced through the following activities, events, services, and products: (1) Established and formally opened the GIS Center at the University of Wisconsin-Stevens Point (UWSP); (2) Hired two critical GIS Center staff: a GIS Educational Specialist and a Visiting Assistant GIS Professor; (3) Hired a half-time GIS student intern; (4) Investigated the design and structure of all major Geographic Information Systems or Science (GIS) certificate programs existing in the United States (comparative Access database was developed for all upper Midwest states) and based upon the results and target audiences customized the UWSP GIS Center Certificate program; (5) Initiated the development and implementation of a six-tiered GIS Certificate program; (6) Educational Specialist began curriculum redesign training for preparing hybrid and on-line GIS certificate courses; (7) The GIS Educational Specialist and the Project P.I. taught four different GIS courses (eight sections) that are part of the GIS Certificate curriculum program; (8) The P.I. taught a new advanced course in GIS programming and customization; (9) The Education Specialist revamped and delivered the foundational GIS Certificate course (i.e. Fundamentals of GIS); (10) Delivered six professional GIS conference papers to both state and national organizations; (11) Initiated production of the GIS Center's website in conjunction with UWSP Web Media Design Services; (12) Provided GIS educational and technological assistance to several local government agencies (e.g. Wisconsin airport administrators, City of Stevens Point Fire Department, Portage County Planning & Zoning Department); (13) Provided GIS technological assistance to state non-profit organizations, that included a study on the cultural arts economy of Madison, WI; (14) Instructed local citizens and prospective college students on the use of GIS and GPS (Global Positioning Systems) technology through various on and off campus activities (e.g. geo-caching exercise); (15) Delivered six customized educational GIS presentations to government and citizen groups across the state of Wisconsin. Several involved instruction for citizen groups and state government officials in the use of GIS for solving land issue problems (e.g. Targeting Working Lands and Operations Pilot Project, Moose Lake (WI) Legacy Initiative); (16) Presented three specialized GIS workshops to traditional students, community members, and state GIS professionals, which included instruction to Native American students at Lac Courte Oreilles Ojibwa Community College. **PARTICIPANTS:** The

following individuals provided service to the GIS Center. Dr. Keith Rice (Project PI) is Director of the GIS Center and Professor of Geography. He is developing and implementing the initial certificate programs, conducting GIS education-based research, developing GIS training materials and new UWSP GIS-related coursework. Mr. Douglas Miskowiak (GIS Education Specialist) started work at the GIS Center in January 2009. His responsibilities include: (1) the development, implementation, and maintenance of the new GIS Professional Certificate program, (2) teaching the introductory GIS Center certificate course and professional workshops, (3) providing GIS Center program coordination, scheduling and administration, and (4) providing research expertise to solving GIS applied research problems. Mr. Gene Martin (Visiting Assistant GIS Professor) was hired in the Spring, 2009 and started work in late August, 2009. His responsibilities include helping with the certificate programs and administrative functions of the GIS Center, as well as teaching a sequence of GIS courses to both conventional and non-traditional UWSP students. He is also involved in applied GIS research activities. Ms. Corinna Neeb (GIS Student Intern) has worked as an intern since Spring term, 2009. Her responsibilities include assisting Mr. Miskowiak as an educational assistant during seminars and workshops, and conducting GIS analytical research for professionals and community citizen groups. The following partner organizations worked in collaboration with the GIS Center during the project period. (1) The Couderay Waters Regional Land Trust received educational and technical GIS services from the GIS Center in regard to the Moose Lake Legacy Initiative. (2) Calumet County (Board, Land and Water Conservation Department, and Planning, Zoning and Land Information Department) partnered with the Center on the Targeting Working Lands Pilot Project using GIS to evaluate agricultural working lands. (3) La Crosse County (Board and Planning, Zoning, and Land Information Department) partnered with the Center on the Targeting Working Lands Pilot Project using GIS evaluate agricultural working lands. (4) The University of Wisconsin Extension partnered with the Center on the Targeting Working Lands Pilot Project to develop educational protocols for using GIS to evaluate agricultural working lands. (5) The Lac Courte Oreilles Ojibwe Community College engaged with the Center to provide training facilities for conducting GIS Center workshops. In regard to training and professional development, the following venues were provided or attended. The GIS Center has provided training and professional development through UWSP GIS coursework (i.e. Geography 279, 377/577, 379/579, 476/676, 479/679, 482/682). Additionally, the GIS Center has provided educational workshops and presentations to various audiences statewide and nationally. GIS Center staff have participated in the ESRI Authorized Training Program. After completing ESRI coursework, Douglas Miskowiak will be authorized to teach specified ESRI software courses from the GIS Center. **TARGET AUDIENCES:** The following target audiences had a change in knowledge, actions, or conditions as a result of interaction with the UWSP, GIS Center. (1) UWSP Undergraduates. During the first project year, GIS coursework at the University has been delivered to over 150 UWSP undergraduate students and dozens of graduate students interested in applying GIS. (2) GIS Professionals. A workshop was delivered to GIS professionals at the Wisconsin Land Information Association (WLIA) that desired continuing education in a particular subject. The WLIA workshop served as litmus test for offering workshops to this target audience. Paper presentations have been used, not only to distribute research findings, but to develop recognition between this target audience and the GIS Center. Participation on the Wisconsin Land Information Association Board of Directors has also helped to develop recognition of the GIS Center and GIS professionals in Wisconsin. (3) Community Members. A variety of paper presentations and open house events have been employed to develop awareness of the GIS Center by this target audience. **PROJECT MODIFICATIONS:** Although the objectives and intent of the project have not changed, there were capital equipment (GPS receivers) and supplies (student workstation computers) that were originally budgeted for the first project year but were not purchased until the second budget year. This delay in equipment purchasing was due to logistical and scheduling problems that were eventually resolved.

**IMPACT: 2008/08 TO 2009/08**

The establishment of the UWSP GIS Center has provided new educational opportunities to traditional students, GIS professionals and interested citizens within the state of Wisconsin. These include the introduction of new intermediate and advanced GIS courses into the normal university curriculum, the opportunity to partake in specialized GIS workshops, and the ability to take GIS

courses that will lead to a GIS professional certificate. During the first year of the project, over 150 UWSP students took GIS related courses, at least 50 children and teenagers were involved in a GIS-GPS workshop and two hundred community professionals and citizens developed GIS land management skills through GIS Center sponsored seminars and workshops. For instance, Calumet and LaCrosse (WI) planners have now acquired the knowledge and technical skills to evaluate and target "working lands," while citizens of Moose Lake (WI) were empowered to engage in scientific inventory of shorelines using GIS technology. These advancements have been implemented through the hiring of GIS Center personnel, specialized GIS training of GIS Center staff, curriculum modernization, new course development, certificate development and initiation, and providing educational assistance to multiple private and government organizations. Furthermore, the use of multiple public ventures (i.e. workshops and presentations) has fostered awareness of the GIS Center's Certificate program and its instructional services. As a result, both public and private entities are attentive of the capabilities of the GIS Center. Employers and potential clients, such as Aero-Metric, Applied Data Consultants and St. Michael's Hospital have been in contact to employ GIS Center students and graduates and investigate educational collaborative ventures.

**PUBLICATIONS (not previously reported): 2008/08 TO 2009/08**

1. Miskowiak, Douglas A. (2009). Targeting Working Lands and Operations Pilot Project: Findings and Recommendations Report for Calumet County, Wisconsin. University of Wisconsin, Stevens Point, GIS Center. (Accepted).
2. Miskowiak, Douglas A. (2009). Targeting Working Lands and Operations Pilot Project: Findings and Recommendations Report for La Crosse County, Wisconsin. University of Wisconsin, Stevens Point, GIS Center. (Accepted).
3. Miskowiak, Douglas A. (2009). Moose Lake Legacy Initiative: Final Report. University of Wisconsin, Stevens Point, GIS Center. (Pending).

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## *GIS Certificate Program Elective Courses*

### **Professional GIS Certificate**

#### ***ELECTIVE COURSES (9 credits)***

Geography 276. Introduction to Cartography. 3cr.  
Geography 376. Statistical and Multimedia Cartography. 3cr.  
Geography 481/681. GIS Database Design and Modeling. 3cr.  
Geography 377. Remote Sensing I. 3cr.  
Geography 379. Remote Sensing II. 3 cr.  
Geography 382. Dynamic Cartography. 3 cr.  
Geography 386. Map Design and Production. 3 cr.  
Geography 471/671. GIS Applications in Sustainability. 3 cr.  
Geography 472/672. GIS Environmental Modeling and Management. 3 cr.  
Geography 477/677. GIS Applications in Local Government. 3 cr.  
Geography 481/681. GIS Database Design and Modeling. 3 cr.  
Geography 482/682. GIS Programming and Customization. 3 cr.  
Geography 483/683. GIS Applications in Emergency Management. 3 cr.  
Geography 484/684. GIS Applications in Urban and Regional Planning. 3cr.  
Geography 485/685. GIS Applications for Working Lands and Operations. 3cr.  
Geography 486/686. GIS and GPS Applications in Forestry Management. 3cr.  
Geography 487/687. GIS Web Server Applications and Administration. 3 cr.  
Geography 488/688. Mobile GIS Techniques. 3 cr.

### **Focal GIS Certificate**

#### ***ELECTIVE COURSES (9 credits)***

##### **GIS Certificate in Cartography**

Geography 276. Introduction to Cartography. 3cr.  
Geography 376. Statistical and Multimedia Cartography. 3cr.  
Geography 382/582. Dynamic Cartography. 3 cr.  
Geography 386. Map Design and Production. 3 cr.

##### **GIS Certificate in Forestry**

Geography 377/577. Remote Sensing I. 3cr.  
Geography 379/579. Remote Sensing II. 3 cr.  
Geography 486/686. GIS and GPS Applications in Forestry Management. 3cr.

##### **GIS Certificate in Urban and Regional Planning**

Geography 377/577. Remote Sensing I. 3cr.  
Geography 477/677. GIS Applications in Local Government. 3cr.  
Geography 484/684. GIS Applications in Urban and Regional Planning. 3cr.

##### **GIS Certificate in Programming and Web Development**

Geography 481. GIS Database Design and Modeling.  
Geography 482. GIS Programming and Customization. 3cr.  
Geography 487/687. GIS Web Server Applications and Administration. 3cr.

##### **GIS Certificate in Environmental Management**

Geography 377/577. Remote Sensing I. 3cr.



Geography 471/671. GIS Applications in Sustainability. 3 cr.

Geography 472/672. GIS Environmental Modeling & Management Techniques. 3cr.

**GIS Certificate in Emergency Management**

Geography 377/577. Remote Sensing I. 3cr.

Geography 487/687. GIS Web Server Applications and Administration. 3cr.

Geography 488/688. Mobile GIS Techniques. 3 cr.

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## *On-Site Review Agenda*

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**Monday  
July 19**

<b>Time</b>	<b>Function</b>
6:00 PM	Review Team dinner with GIS Center faculty and staff
8:00 PM	Review Team meeting

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**Tuesday  
July 20**

<b>Time</b>	<b>Function</b>
8:30 AM	Meet with GIS Center faculty and staff (UWSP Science Building) <ul style="list-style-type: none"><li>• Tour of GIS Center and Department of Geography/Geology facilities</li><li>• Brief overview of Geography/Geology and CNR degree programs and usage of GIS since the late 1980's at UWSP</li><li>• Student demand and UWSP GIS educational initiatives</li><li>• Synopsis of USDA GIS Center grant</li><li>• Description of accomplishments achieved since 2008</li><li>• Question/answer session with GIS Center faculty and staff</li></ul>
10:30 AM	Break
10:45 AM	Meet with UWSP Continuing Education, 032 Main Building <ul style="list-style-type: none"><li>• Julie Helweg, Program Manager</li></ul>
11:30 AM	Lunch meeting with UWSP traditional students, catered on-campus <ul style="list-style-type: none"><li>• Geography Major (GIS emphasis)</li><li>• College of Natural Resources students</li></ul>
1:00 PM	Meet with College of Letters and Science faculty and staff (with GIS interest), B 347 Science. <ul style="list-style-type: none"><li>• Al Bond, Senior Support Specialist &amp; Technology Coordinator.</li><li>• Dr. Anthony Ellertson, Assistant Professor of Web and Media Development.</li><li>• Dr. Neil Heywood, Professor of Geography, Geography &amp; Geology Department Chair.</li><li>• Dr. Tim Krause, Assistant Professor of Web and Media Development.</li><li>• Dr. Karen Lemke, Professor of Geography &amp; Geology.</li></ul>
1:45 PM	Meet with College of Letters and Science Dean, Chris Cirimo and Associate Dean, Charles Clark, 130 Collins Classroom Center.
2:30 PM	Meet with College of Natural Resources Dean, Christine Thomas and Associate Dean, John Houghton, 111 Trainer Natural Resources Building.
3:15 PM	Meet with College of Natural Resources faculty and staff (with GIS interest), 122 Trainer Natural Resources Building. <ul style="list-style-type: none"><li>• Dan McFarlane, GIS Research Analyst, Center for Land Use Education.</li><li>• Linda Stoll, Outreach Specialist, Center for Land Use Education.</li><li>• Nancy Turyk, Water Resource Scientist, Center for Watershed Science and Education.</li><li>• Dr. George Kraft, Director, Center for Watershed Science and</li></ul>

Education.

- Sue Kissinger, Coordinator of Advising and Recruitment, College of Natural Resources.
- Patrick Goggin, Lake Specialist, UWEX Lakes Program.
- Kevin Burns, CF, Vallier Treehaven Forest Ecologist.

4:30 PM Summary and reflection of day's activities.

5:00 PM Review Team.

- Discuss initial recommendations
- Dinner break
- Assign and begin report-writing responsibilities

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**Wednesday  
July 21**

<b>Time</b>	<b>Function</b>
8:00 AM	Review Team completes recommendations report drafting.
10:00 AM	Break
10:30 AM	Conduct exit interview with GIS Center faculty and staff.
11:30 AM	Conduct exit interview with Dean, Chris Cirimo and Associate Dean, Charles Clark.
1:00 PM	Depart Stevens Point

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