Wyoming Geographic Information Science Center
University Planning 3 Unit Plan, 2009-2014

I.   Mission and Aspirations

The mission of the Wyoming Geographic Information Science Center (WyGISC) is to advance the knowledge and application of geographic information science and technology through research, education, and service. WyGISC aspires to become a premiere interdisciplinary academic center in geographic information science research and education, while strengthening our unique leadership role in service and outreach to the university, state and region.

II.   Previous Planning Accomplishments

The 2004 Academic Plan 2 (AP2) identified geographic information science and WyGISC as University Areas of Distinction related to Science & Technology and Earth & Energy Resources. WyGISC's AP2 unit plan emphasized: (a) refining and solidifying the Center's organizational structure and staffing; (b) improving connectivity with other units across the university and with governmental entities in Wyoming; (c) formalizing the Center's geospatial data serving responsibilities both on campus and for the state; (d) increased contributions to development of geographic information science curricula; and (e) an increased leadership role in initiating and conducting interdisciplinary research. Significant progress has been achieved in all of these areas. (See Appendix for details.)

III.   Relevant Institutional Issues (UP3 Planning Motifs)

Over the last decade, WyGISC has lead the establishment of geographic information science as one of UW's *Areas of Distinction*, not only as a critical area of science and technology related to energy, earth and computational science, but also through its significant contributions to place-based planning, management, and problem-solving in the environment and natural resources arena. Given its interdisciplinary approach and the increasingly widespread application of GIScience-based methods and technologies, WyGISC is well situated to make significant contributions toward achievement of *Depth (over Breadth)* in many prominent disciplines and degree programs at the university, including ecology, energy, and environment and natural resources, as well as research and education centered on geographic information science itself.

The Center's potential to foster *Excellence* in academics extends to anticipated work on building cyberinfrastructures and science information systems through collaborations with the National Center for Atmospheric Research, UW's Berry Center for Natural History and Conservation, and the proposed Forest-Steppe and Tundra Ecotones Research (FoSTER) Observatory. Beyond academics, WyGISC has already begun to support excellence in UW's capital facilities and infrastructure via application of geographic information data and technologies in property and facilities management and in site planning and design for long-term campus building and development.

WyGISC has and will continue to support UW's commitment to promoting *Access* to higher learning. Activities include its professional short course training offerings and nascent geospatial technician certificate program, geospatial technical assistance with enrollment management, and articulation with

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community colleges offering coursework in geographic information systems and related geospatial technologies.

Finally, WyGISC continues to provide **Leadership** to the Wyoming geospatial community, advocating for coordinated development of a statewide spatial data infrastructure and supporting standards and policies for data development, sharing and stewardship. WyGISC's leadership role extends to the education and training of the State's future GIS professionals and practitioners who will be working in economic and community development, engineering, energy resource development, or natural resource management. The Center will provide long-term support to this community of practice through its ongoing knowledge transfer and outreach activities, including its data services and collaborative information clearinghouse resources.

IV. Action Items

A. Research

WyGISC-1: Develop a strategy for achieving the most appropriate balance between and within the Center's basic and applied research activities.

A need exists to better understand the opportunities and trade-offs in balancing basic and applied research within WyGISC. The Center will develop a strategy to prioritize the allocation of effort and resources that will best help us achieve our basic and applied research goals.

WyGISC-2: Strengthen and expand collaborative interdisciplinary research activities with other established and emerging Areas of Distinction.

Examples include:

- Ruckelshaus Institute of Environment and Natural Resources: continued interactions in the areas of land use, community development, and energy and water resource management, as well as new work centered on applying participatory geographic information systems in place-based collaborative processes;
- Program in Ecology: better establishment of ecological informatics as a supporting framework for collaborative research among faculty and more integrative graduate education and training;
- School of Energy Resources: integration of geographic analysis and visualization techniques into energy resource characterization and development, risk assessment, and reclamation and restoration research; geospatial support for statewide energy-related outreach.
- National Center for Atmospheric Research: explore collaborative opportunities with the NCAR GIS Program and NCAR Viz Lab.

In these and other situations, a key contribution in which WyGISC can and should take the lead responsibility is the development of (geographically-enabled) science information infrastructures. This type of "cyberinfrastructure" development will enhance collaborative research and will support better integration of other digital scientific data and information repositories on campus including the UW Libraries, the Water Resources Data System, the Wyoming Natural Diversity Database, and the Berry Center for Natural History and Conservation.

WyGISC-3: Expand international research activities.

Over the last five years, WyGISC has substantially increased its international research activities, including significant work in Australia and Central Asia. WyGISC remains committed to strengthening existing international collaborations and capitalizing on opportunities for building new linkages with our interdisciplinary GIScience expertise. Such efforts could also contribute to UW's broader commitment to international undergraduate and graduate education programs.

B.   Education

WyGISC-4: Identify opportunities for increased contributions to UW GIScience curricula.

Demand continues to increase campus-wide for coursework in geographic information systems, remote sensing, and related techniques. More than one academic department (inc. Geography and Botany) is proposing development of geospatial-related certificate programs and/or minor concentrations. WyGISC has much to offer in terms of staff expertise, data resources and existing short courses offerings, which could be leveraged to support such efforts through new CPM requests, education-based collaborative research, practicum and internship experiences, etc. Other potential leadership roles for WyGISC include development of an interdisciplinary doctoral program in geographic information science or the eventual restructuring of the Center as a "school" to support the tighter integration of GIScience research and education.

WyGISC-5: Support potential development of a focused Ph.D. program in the Department of Geography.

Nationally, the discipline of geography has experienced tremendous growth during the past decade in terms of new departments, new graduate programs and employment opportunities for their graduates. The Department of Geography will be conducting a feasibility study for a Ph.D. program centering upon the department's internal strengths and connections with other programs including WyGISC. Considerable potential exists for such an endeavor. WyGISC will be an active participant in this effort to assess the capacity for such a program and other related academic organizational structures.

C.   Service and Outreach

WyGISC-6: Determine appropriate levels of advisory and technical support for faculty and students, given available and future anticipated resources.

WyGISC has always implicitly had a significant service mission to UW faculty and staff. Unfortunately, demand often exceeds available resources and the ability to underwrite such activities using tangential contract and grant funding. Possible solutions include securing resources for a dedicated Outreach Coordinator position, creating a "help desk" program similar to the Department of Statistics' Statistical Consulting Center, and developing partnerships with the UW Libraries, Division of Information Technology and other data and technology providers to make geospatial data, hardware and software more accessible across campus and via the Internet.

WyGISC-7: Complete strategic plan for Spatial Technologies Professional Training Program.

WyGISC has offered short course classes, workshops and seminars in geospatial software and techniques since its early beginnings as the Spatial Data and Visualization Center research program in the mid-1990s.

Today, WyGISC's Spatial Technologies Professional Training Program's facility and staff instructors are recognized as meeting industry standards for content delivery, and in fall 2008 collaborated with the UW Outreach School to initiate a new non-credit geospatial technician certificate program. Nevertheless, challenges exist in making the program fiscally self-sustaining and maintaining high quality in terms of course content and delivery. This plan will address issues of staffing (including a funded Education Coordinator position), fee structures, new and expanded certificate options, and alternative delivery modes and settings.

WyGISC-8: Establishment of a Campus GIS Coordination and Support Program.

Over the last several years, WyGISC has played an increasingly important role in building geospatial capacity in non-academic units across campus, especially in its partnership with the Real Estate Operations office. As demand grows for geospatial applications in facilities management and institutional analysis, the risk also increases for creating duplication of effort and stovepipes of expertise and resources. WyGISC will seek to establish a Campus GIS Coordination and Support Program within the Center to provide coordination of campus-wide data and application policies, standards, and protocols, as well as some level of support for non-academic geographic cartography and analysis needs.

WyGISC-9: Define WyGISC's long-term role in Wyoming's statewide geospatial coordination activities and geospatial information infrastructure support.

WyGISC has long played a leadership role of various aspects of statewide geospatial coordination. Over the last decade, WyGISC has contributed both advisory expertise and technical support to governmental coordination of geospatial data and policy, while continuing to serve and provide access to Wyoming-centric geospatial data and information. Many of the most complex policy and management issues being dealt with in Wyoming today have a strong geographic component (e.g., energy development and wildlife interactions, community development, land use planning, and open space) and would benefit from better coordination of geographic information system data and technology development and stewardship. Given the mandate and sufficient accompanying resources, WyGISC is well situated to make immediate and sustainable positive impacts in these place-based decisions, both through its own Technical Services Program, and in collaboration with other planning and resource management groups at UW including the Ruckelshaus Institute, the Department of Geography's Graduate Program in Planning and the College of Agriculture's Cooperative Extension Service.

D.   Leadership and Organization

WyGISC-10: Contribute to development of a coordinated plan for UW's future high-performance computing infrastructure.

A University-wide objective, this action item will involve participation on a task force addressing cluster computing resources, interoperability with the NCAR-UW supercomputer, and curricular opportunities for both undergraduate and graduate students.

The plan will also address development of a centrally funded structure for coordinated system administration to support campus-wide research-based computing. This issue is reflected in WyGISC's difficulties with funding core system administration functions that, in many cases, are critical for maintaining infrastructures supporting programmatic research support, but are not readily funded through external contracts and grants. WyGISC will participate in university efforts to address this issue, while

continuing to explore creative mechanisms to address its related long-term research support system administration needs.

WyGISC-11: Establish a WyGISC Advisory Committee.

Identified as an action item in WyGISC's AP2 unit plan, an advisory committee was first considered in 2006. An advisory committee will provide advice and consultation in developing and reviewing long-range Center objectives and priorities. Committee members will also provide a sense of direction regarding research and knowledge transfer activities beneficial to the state and regional geospatial community, and will provide an apparatus for the Center to measure and evaluate the impact of its activities. Membership will include representation from both within and outside the University.

WyGISC-12: Develop By-Laws and Operations Plan.

By-Laws specifying governance structure and overall Center administration have never been formally established. These will be developed in accordance with the WyGISC Constitution and in cooperation with the Office of Academic Affairs.

WyGISC -13: Develop a strategic development plan for future fundraising and potential endowment establishment.

A goal for WyGISC in the new planning period is to explore new opportunities for funding certain aspects of the Center's activities including research travel, staff professional development, and student scholarships for research, internships and practicum, and short course training access.

V.   Implementation

Generally following the overall UP3 timeframe, implementation of this plan will begin in July 2009 (though some efforts may be initiated more quickly). Many of the action items identified in Section IV will be ongoing throughout the five-year planning period, while others will have more definitive starting and ending dates. The following table provides a preliminary timeline by which activities will be addressed; specific metrics for achievement will be developed as activities are initiated.

WyGISC UP3 Preliminary Implementation Timeline

Fiscal Year	Action Item												
	1	2	3	4	5	6	7	8	9	10	11	12	13
2009 -2010	■	■	■	■	*	■	■	■		**	■	■	
2010-2011	■	■	■	■		■		■	■				■
2011-2012		■	■			■							■
2012-2013		■	■			■							
2013-2014		■	■	■		■							

∗ - To be determined. (See Department of Geography unit plan.)

∗∗ - To be determined. (See UP3 university plan.)

Appendix

WyGISC AP2 Major Accomplishments, 2004-2008

- Formalized the Center's constitution, defining its mission and governance.
- Secured university funding for the Center's Technical Coordinator research scientist position, including joint academic affiliations in the Department of Geography and the Haub School of Environment and Natural Resources.
- Recruited and hired an ecoinformatics research scientist (jointly appointed in the Department of Geography) for the Center's new Ecological Informatics Program, created in collaboration with the UW's NSF-EPSCoR Ecology Project and new interdisciplinary PhD Program in Ecology.
- Established a WyGISC Academic Affiliates program, with a current membership of nine faculty both on- and off-campus.
- Doubled the Center's annual contributions to teaching geographic information science curricula across the UW campus through partnerships with the Departments of Botany and Geography and the Haub School of Environment and Natural Resources.
- Established a partnership with the UW Division of Administration to provide expertise and computing resources to non-academic programs such as Real Estate Operations and Physical Plant.
- Expanded our geographic information systems training relationship with Environmental Systems Research Institute, Inc. (ESRI; Redlands, CA) through our designation as an Authorized Partner Education Center and a new off-site training agreement to expand ESRI course offerings in Wyoming.
- Expanded support for the ESRI statewide higher education geographic information systems application software site license to include Casper College and Laramie County Community College.
- Initiated a non-credit professional GIS technician certificate program through the UW Outreach School.
- Developed a new generation of Internet-based geospatial data sharing, discovery and access applications including the WyGISC Data Server and Wyoming GeoLibrary.
- Contributed to the restructuring of Wyoming's statewide geographic information systems coordination strategy and the development of select Framework Data base layers for an eventual state spatial data infrastructure.
- Increased the Center's contract and grant funds by more than 100%, with 45 to 50 currently active projects.
- Significantly increased work with international collaborators in Australia, Germany, Kazakhstan, Mexico, Russia and Uzbekistan.