

School of Soil, Water, Environment and Natural Resources

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On behalf of the College of Agriculture and Life Sciences

Team:

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- Peter Waller, Professor, Department of Agricultural and Biosystems Engineering
- Jim Chamie, Associate Research Professor, Office of Arid Land Studies
- Jane Cripps, Administrative Associate, Water Resources Research Center
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Units and Programs:

School of Natural Resources:

Conservation Biology (BS)

Fisheries Conservation & Management (BS, MS, PhD)

Landscape Assessment & Analysis (BS)

Natural Resources Studies (MS, PhD)

Rangeland Ecology & Management (BS, MS, PhD)

Watershed Management & Ecohydrology (BS, MS, PhD)

Wildlife Conservation & Management (BS, MS, PhD)

Soil, Water and Environmental Sciences

Environmental Science (BS)

Crop Production (BS)

Soil Water and Environmental Science (MS , PhD)

Office of Arid Lands Studies (non-degree granting)

Arid Lands Information Center

Arizona Remote Sensing Center

Desert Research Unit

Natural Products Center

Proposal: School of Soil, Water, Environment and Natural Resources

October 9, 2008

Summary

We propose to create a School of Soil, Water, Environment and Natural Resources by merging programs, faculty and staff from the Office of Arid Land Studies (OALS), the Department of Soil, Water and Environmental Science (SWES), and the School of Natural Resources (SNR). These units and their faculty also share appointments with other units across campus (including, for example, the Laboratory of Tree-Ring Research, Geosciences, Geography and Regional Development, Institute for Environment and Society (former ISPE), Agricultural and Resource Economics, Hydrology and Water Resources, and Ecology and Evolutionary Biology). The proposed School serves as a logical substantive center of gravity for environmental activities across the University. No other unit, or aggregation of environmental units, holds the combined breadth of subject matter expertise, research horsepower, instructional focus or extension success.

The proposed School would increase the level of collaboration and synergy among these already highly ranked units and, in doing so, would address UA's strategic priorities in three ways:

- 1) Effectively address the grand challenges in environmental sciences by integrating across the boundaries of biology, physical science, resource management, policy and international resource issues. This *horizontal integration* speaks to the urgent need to address complex issues in the environment with interdisciplinary science strategies linked to real world solutions.
- 2) Respond directly to the demands of society for solutions to environmental issues through *vertical integration* of the processes of scientific discovery, applications research, teaching, stakeholder engagement, extension, and decision support systems consistent with UA's priority to pioneer translational research at an international scale as the future of its land grant mission.
- 3) Increase efficiency in delivering distinctive and highly relevant undergraduate and graduate curricula, including distance-based options for extending the reach of our teaching, research and service programs within Arizona and abroad.

We are aware of a complimentary proposal to form a School of Geological, Atmospheric, Hydrological and Environmental Sciences and have been in close communication with its author, Dr. Karl Flessa. We see the two proposals as complimentary, with our CALS-housed School emphasizing the links between basic and applied research on biophysical aspects of environmental sciences, local through global-scale scientific challenges, and translational science. We have already begun conversations about forming a coordinating council that would address teaching and curricula, and to facilitate existing and new research collaborations.

A School of Soil, Water, Environment and Natural Resources would bring together world-class expertise to address grand challenges

The UA Strategic Plan for 2009-2013 calls for "world-class research that improves the human condition in Arizona and beyond," and identifies "Climate, Environmental, Water and Energy Sustainability" as one of the nine overarching research priorities. Elemental to our focus and success, we considered grand challenges in environmental sciences as defined by the National Academy of Sciences¹, which identified the eight highest priorities for national investment: biogeochemical cycles; biodiversity and ecosystem function; climate variability; hydrologic forecasting; infectious diseases and the environment; institutions and resource use; land-use dynamics; and reinventing the use of materials.

¹National Research Council. 2001. *Grand Challenges in Environmental Sciences*. Committee on Grand Challenges in Environmental Sciences. Oversight Commission for the Committee on Grand Challenges in Environmental Sciences. National Academy Press, Washington, D.C., 106 pp. <http://books.nap.edu/catalog/9975.html>

OALS, SWES and SNR all play leading roles in addressing each of these grand challenges, as clearly documented by major NSF funding, highly cited publications, and faculty expertise and activities. Within each area, our faculty make multiple and highly substantive contributions, strengthened by longstanding partnerships with faculty across campus. By merging these units into a single school, the UA would create one of the world's broadest, most horizontally integrated programs in environmental sciences, bridging the biological and physical sciences, environmental management, and policy. Moreover, we would be doing so at the nexus of this University's most comprehensive and explicitly relevant resource and environmental degree programs, landscape-scale science, effective and publicly supported extension programs, and substantive international and trans-border environmental and resource experience.

A School of Soil, Water, Environment and Natural Resources would do more than connect robust science with society's needs: We should take as our goal the redefinition of society's relationship to environmental science

The National Academy of Sciences performs a decadal survey intended to chart the future of Earth sciences and guide Federal agencies that generate and disseminate Earth science products (i.e., NASA, NOAA and USGS), with particular emphasis on global change.² In their most recent survey they argue for a revolutionary "new social contract for the scientific community" (p.2, emphasis added):

*The scientific community must focus on meeting the demands of society **explicitly**, in addition to satisfying its curiosity about how the Earth system works.*

The School will be critical to the University's success in taking on this challenge, in part because of our unique resource in the dedicated extension faculty engaged in research, education and service efforts. This is of critical importance because any world-class research in the dimensions of "sustainability" will be of little – if any – value if it does not extend beyond campus and connect in a fundamental and sustained way with the society we seek to serve.

Cooperative Extension reflects a unique (and uniquely supported) human, intellectual, institutional, and political infrastructure that is needed to deliver science to Arizona. Further, our reach is extended abroad through new information tools that allow connections between the campus and the rest of the world in a way that is relevant and real-time, including new information technologies (i.e., Web 2.0) and translational tools for complex science that are lumped under the rubric of decision support. Our units have particular and growing strength in both of these areas, ranging from OALS decision support capacity and electronic library resources, to SNR's extensive G.I.S. programs, playing a critical role in taking the concept of world-class relevance to a world-wide audience.

A School of Soil, Water, Environment and Natural Resources would uniquely engage students who can contribute to the state, nation, and world

The School would bring together units that currently have vibrant and internationally relevant academic programs, allowing a more efficient way for students to discover and explore the many avenues for professional preparation offered by degrees in the environmental sciences. In the spirit of "do no harm" in merging units, however, we must maintain disciplinary and programmatic integrity in arenas where this is the basis of UA's excellence. For example, we suggest that academic programs currently offered will be restructured only as faculty who own a particular curriculum identify changes that are

² National Research Council. 2007. *Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond*. Committee on Earth Science and Applications from Space: A Community Assessment and Strategy for the Future. National Academy Press. Washington. 456 pages. <http://www.nap.edu/catalog/11820.html>

good for students, improve quality of educational programs, enhance efficiency and economics of delivery, and create thoughtful options for students.

We anticipate that the School would be home to several new professional MS degree programs. We currently have proposals pending for a MS Degree in GeoSpatial Information Sciences (jointly with Geography and Regional Development) and a MS Degree in Water Science, Society and Policy (in collaboration with the Water Resources Research Center and the College of Social and Behavioral Sciences). We are currently exploring options for developing these courses for distance delivery, taking advantage of expertise already in place in the Office of Arid Lands Studies and working through the Outreach College and the Division of International Affairs.

The School would be uniquely positioned to engage with undergraduates as well as students seeking post-graduate professional training, in part due to the forward-looking extension programs described above. We have the opportunity to engage our students by allowing them to (1) access the decision support and professional training tools that are required to reach out to professional decision makers who are not on campus, and (2) actively participate in our vertically integrated enterprise – from basic research, to translational science, to problem solving on the ground (and back again) – with real people facing critical issues that will transform our society. By immersing them in a vertically integrated undertaking, they will have a far better appreciation – and education – to understand in a fundamental way what it *really* takes to achieve sustainability (i.e., some degree of societal change).

Implications for Ranking and Reputation

The proposed School of Soil, Water, Environment and Natural Resources will consolidate world class expertise into a single unit, immediately enhancing the ranking and reputation of the School. More importantly, the proposed School will be well positioned to compete for major competitive grants due to the unique combination of horizontal integration across the sciences and engineering and vertical integration of scientists with stakeholders and decision makers.

Proposal Development Process and Support

A committee appointed by Dean Sander, College of Agriculture and Life Sciences, developed the proposal. The committee met three times as a group to hone the ideas contained in the proposal. During the process, committee members consulted with department heads, faculty, staff and students from multiple units directly involved as well as other departments with interests in the area of the environment. Each unit held an open meeting for faculty, students and staff on October 1, 2008 to review a draft of the proposal. The proposal has broad support among the units proposing to merge, though a more complete vetting must occur as this process progresses. Developing a viable plan for implementation will be key in ensuring that this support remains strong.

Budget Implications

Our estimates of budget implications are based on the following assumptions:

- Merging these units could result in a savings of about \$40k/year in salary for administrative associates by combining such functions such as payroll processing between all three units.
- We do not foresee large savings on other business operations because the total grant and contract expenditures in the aggregated units is increasing, with associated increases in administrative costs.