

School of Earth and Environmental Sciences

Contact person:

Karl W. Flessa
Head, Department of Geosciences
kflessa@email.arizona.edu
621-6000

Development Team

Eric Betterton

Head, Dept Atmospheric Sciences
College of Science

Karl W. Flessa

Head, Dept. Geosciences
College of Science

Tim Jull

Director, Accelerator Mass Spectrometry
Laboratory
Professor of Geosciences
College of Science

Tom Maddock

Head, Dept. Hydrology and Water Resources
College of Science

Jeff Silvertooth

Head, Dept. Soil, Water and Environmental
Science
College of Agriculture and Life Sciences

Tom Swetnam

Director, Laboratory of Tree-Ring Research
College of Science

Units affected by reorganization:

Dept. Atmospheric Sciences (ATMO)-CoS
Dept. Geosciences (GEOS)-CoS
Dept. Hydrology and Water Resources
(HWR)-CoS
Dept. Soil, Water and Environmental Science
(SWES)-CALS
Laboratory of Tree-Ring Research (LTRR)-CoS
Accelerator Mass Spectrometry Laboratory
(AMSL)-CoS

Existing degree programs:

Dept. Atmospheric Sciences (ATMO)
M.S. and Ph.D. in Atmospheric Sciences
Dept. Geosciences (GEOS)
B.S. in Science Education (Earth
Sciences)
Professional Science Masters degree in
Economic Geology
B.S., M.S. and Ph.D. in Geosciences
Dept. Hydrology and Water Resources (HWR)
B.S. in Environmental Hydrology and
Water Resources
M.Eng. Engineering in Water Resources
Engineering
M.S. and Ph.D. in Hydrology and Water
Resources
Dept. Soil, Water and Environmental Science
(SWES)
B.S. in Environmental Science
B.S. in Crop Production
M.S. and Ph.D. in Soil, Water and
Environmental Science
Laboratory of Tree-Ring Research (LTRR)
Degree programs through contributing
departments
Accelerator Mass Spectrometry Laboratory
(AMS)
No degree programs

School of Earth and Environmental Sciences

Vision:

Formation of a School of Earth and Environmental Sciences is a rare opportunity to focus the UA's already-formidable strengths directly related to research, teaching, and outreach in atmospheric, climate, environmental, geological and hydrologic sciences. These disciplines, now arrayed across two colleges, address grand scientific challenges and the UA's Strategic Plan priority in "Climate, Environmental, Water, and Energy Sustainability." The School aligns our departments' strengths with the University's priorities.

This School will be a federation of the College of Science Departments of Atmospheric Sciences (ATMO), Geosciences (GEOS), Hydrology and Water Resources (HWR), the Laboratory of Tree-Ring Research (LTRR) and the Accelerator Mass Spectrometry Laboratory (AMSL) and the College of Agriculture and Life Sciences Department of Soil, Water and Environmental Science (SWES). This School will: 1) produce new knowledge about earth and environmental processes and human-environment interactions at all geographic and temporal scales; 2) provide the scientific basis for environmental and climate policy; 3) train the next generation of earth and environmental scientists; and 4) disseminate knowledge and solutions for the benefit of students and society. The combination of observational/instrumental and computational/modeling approaches in the earth and environmental sciences within one unit would be a major strength. The proposed alignment is natural.

The School will maintain existing disciplinary strengths while exploiting opportunities arising from interdisciplinary synergies. The School will immediately provide UA with a distinctive national profile that will enhance our capacity to compete for external and University resources. The School will be well-positioned to coordinate and expand general education offerings and to improve undergraduate programs through increased efficiencies. New synergies will emerge in our research, graduate programs, and extension and outreach efforts.

The School of Earth and Environmental Sciences includes units from two colleges (CoS and CALS). The participating departments will respect the budgetary integrity of these two units while collaborating to increase the efficiency and productivity of our research, teaching and outreach/extension missions.

We recognize that this School encompasses only a portion of the UA's research, teaching and outreach efforts in the environmental sciences. We look forward to participating with other units, both within the College of Science and from the College of Agriculture and Life Sciences (e.g., SNR) and the College of Engineering (e.g., MGE, CHEE, MSE and CEEM). The exact nature of this participation and coordination will be determined by the participating units.

Structure and responsibilities:

The School will be managed by a Director and an Executive Council. The Director shall be chosen by the Dean of the College of Science and the Dean of the College of Agriculture and Life Sciences, after consultation with School faculty. The Director will have a two-year term and be one of the participating academic units' (i.e., ATMO, GEOS, HWR, LTRR, SWES) heads. The Executive Council will consist of the heads and directors of all the participating units. The Director will inform the Executive Dean of the Colleges of Letters and Sciences and the Dean of the College of Agriculture and Life Sciences of School activities and work directly with the deans on issues pertinent to the Colleges' missions (e.g., faculty lines, staff lines, GTAs, Tier One and Two teaching).

School-level responsibilities will include Tier One and Tier Two teaching, School-level undergraduate curriculum development, new fund-raising initiatives targeted to broadly support the School, and support of cross-departmental/unit teaching, research and outreach activities.

Tier I/II teaching will be improved by coordinating the resources of the participating units. A strategic planning committee for Tier I/II teaching within the School, consisting of representatives from

all participating academic units, will coordinate Tier I/II offerings, content, distribution, and teaching allocation among the units. This committee will report to the School's director and executive council.

Efficiencies may be realized in the following ways:

- Streamlining the current range of Tier I/II offerings to ensure a core scientific curriculum while maintaining the diversity of offerings that expose students to a range of scientific approaches;
- Matching faculty that can best contribute to the teaching effort with the needs of the School's participating departments. Student credit hours will be credited to the instructor's home department;
- Identifying needs for Tier I/II GTAs throughout the School and advocating for those resources accordingly;
- Sharing teaching expertise among the participating units through the joint development of resources such as experience, technology, and preceptor programs;
- Implementing a common scheme for outcomes assessment.

At the undergraduate major level, the School will develop an interdepartmental major focusing on earth and environmental sciences. Such a degree concentration would integrate across the disciplines represented in the six units, thus expanding HWR's small undergraduate program and enabling more students to benefit from faculty in programs that do not now provide an undergraduate major (ATMO and LTRR).

We recommend that 5% of the indirect costs generated by School faculty and researchers will be returned to the School and used by the Director to support inter-departmental, research-related activities that will foster additional external research support. This incentive program should not decrease the portion of indirect costs returned to the College of Science, the College of Agriculture and Life Sciences and the participating departments. This funding model has proven effective in stimulating research in other UA initiatives. The Director will report to the Council annually on the amount of indirect funds received and how they were expended.

Departmental/unit-level responsibilities will include promotion and tenure, post-tenure review and annual faculty review, salary adjustments, discipline-specific undergraduate and graduate degree-granting programs (current programs and degrees will continue), graduate admissions, allocation of graduate student support, and allocation of space.

Each of the participating units already enjoys a national reputation for the excellence of its graduate programs. We seek a structure that maintains and enhances our individual identity, strength and international standing in our degree programs and research. The preservation of the existing departmental structures and identities is critical to the success of the proposed School

Responsibilities coordinated between the School and individual departments/units may include securing new and replacement faculty and staff lines, business functions, IT and other non-granted-funded technical support, teaching workload (i.e., with regard to Tier One and Tier Two teaching), allocation of GTAs (i.e., with regard to Tier One and Tier Two teaching).

There will be substantial benefits associated with coordinated and collaborative faculty hiring that can integrate and enhance existing core departmental strengths into the broader School context. Coordination of strategic hiring at the School level should be guided by: (i) the need to maintain essential core departmental positions that represent disciplinary strengths central to unit missions, (ii) the need for cross-cutting appointments that integrate and capitalize on the School's distributed strengths; and (iii) evolving research, teaching and outreach needs.

Three scenarios associated with strategic hiring are envisioned: **(1) faculty replacement** (tenure-denial, retirement, recruitment away from UA, etc.), **(2) new positions**, **(3) cluster hires**.

For **faculty replacement** hires, a department would follow protocols and procedures in line with CoS or CALS. For planning purposes, the department head would inform the Executive Council of the status of the hiring proposal and may choose to seek support from the Executive Council.

For **new positions** or **cluster hires**, proposals for new positions would be solicited by the Executive Council annually (for planning purposes) or as targets of opportunity arise. These proposals could originate from groups within single departments, but they are especially encouraged from groups whose composition spans the federation of departments, or some subset thereof. Should opportunities present themselves, cluster hiring within the broader School context will offer powerful opportunities for catalyzing development of programmatic areas to address grand challenges. For example, cluster hiring could create new cross-disciplinary research centers among scientists to transform the concepts and operating principles at the intersections of earth, climate, water, and environmental science.

The School Director would, at an annual faculty meeting, give an update of the status of positions under consideration and articulate the rationale behind their prioritization.

Candidates recommended for **new positions** or **cluster hires** will require approval by the both the host department and the heads of the academic units within the Executive Council.

Final decisions on the allocation of responsibilities between the School and the participating departments/units, and on particular administrative procedures will be made by faculty vote following the development of guidelines by interdepartmental committees consisting of faculty, classified staff, appointed personnel and students.

How the reorganization will raise the unit's and the University's ranking or reputation.

GEOS, HWR and SWES are already nationally ranked in the "top ten" in their fields and LTRR is renowned as the premier and global leader in many applications of dendrochronology in environmental sciences. ATMO provides many linkages among the existing units and is ranked as the second most efficient department in CoS. Re-aligning these departments into a new School would explicitly establish a coherent and more readily recognized UA program in earth, water, and atmospheric sciences, with unique capabilities.

A School of Earth and Environmental Sciences would put us in a far better position to compete for funding for the coming major initiatives in climate research, water quality and supply, and earth resources. Support from NOAA, NASA, NSF, DoE and resource industries is likely to increase because of our ability to assemble interdisciplinary teams of faculty and researchers.

Our enhanced external profile and increased funding would also increase our ability to compete for the best students in the world.

Disciplinary rankings will rise further if the school is organized in a manner that will capitalize on the different disciplinary strengths (e.g., in curriculum, research initiatives, Extension and outreach), while also maintaining the identity and integrity of the unique capacities of the units. Overall, in the coming decades of climate change and consequent impacts on earth resources, water, ecosystems and society, the University must better position itself to take scientific and educational leadership in these disciplines. The School that we envision has potential for helping achieve this distinction and will improve the University's reputation and ranking as a leader in this strategic emphasis area.

Description of the processes of consultation with deans, heads, faculty, staff, appointed personnel, and students and the extent to which this proposal has the support of those affected...

The Deans of the College of Science and the College of Agriculture and Life Science both support this proposal and the six department/laboratory heads have led the effort at formulating this document. The proposal has had strong input from committees representing the faculty, staff and students of four of the six affected departments/laboratories – ATMO, GEOS, SWES, and LTRR. The

Geosciences Alumni Advisory Board, a key element of that department's fund-raising efforts, has been consulted and has expressed its strong support for such a federation.

There is overwhelming approval amongst the faculty of all six departments/laboratories in support of a School of Earth and Environmental Sciences, with the understanding that a formal vote will be taken only after the broad concept is approved and a more detailed proposal, including management structure, is available for discussion.

Budget

The School of Earth and Environmental Sciences will include 86 state-supported faculty FTE and 37 state-supported classified staff and appointed personnel. State-supported classified staff and appointed personnel include administrative and business support staff, advising support, IT support and other technical support. We cannot, at this time indicate which particular positions will be consolidated, eliminated or shifted to non-state support.

We recommend that 5% of the indirect costs generated by School faculty and researchers will be returned to the School and used by the Director to support inter-departmental, research-related activities that will foster additional external research support. This incentive program should not decrease the portion of indirect costs returned to the College of Science, the College of Agriculture and Life Sciences and the participating departments. This funding model has proven effective in stimulating research in other UA initiatives. The Director will report to the Council annually on the amount of indirect funds received and how they were expended.

We anticipate that the federation of the CoS and CALS units within a School of Earth and Environmental Sciences will enable a savings of approximately \$490,000.

This is approximately 5% of the sum of the existing units' state budgets. Assuming state budget figures of ATMO = \$1,021,706; GEOS = \$3,177,843; HWR = \$2,313,421; LTRR = \$978,408; SWES = 2,468,837 (AMSL state support is less than \$100,000, is funded through Physics and is not included here.) Total = \$9,960,215. The projected savings are **not** in addition to those required by the anticipated budget cuts for FY 2010. We cannot promise any more than what we are already losing with the current round of budget cuts.

The exact details of how these savings will be realized remains to be worked out, but are likely to include consolidation of some business and IT functions, increased efficiencies in the deployment of temporary instructors, sharing of some teaching and IT technologies and facilities, establishment of a joint colloquium series, and decisions to not replace some faculty whose expertise may be duplicated elsewhere in the School. Some savings can be accomplished in the near-term; others will require a longer timeframe.

Among the many challenges faced in a budgetary reorganization within a School framework is the geographically-dispersed character of the existing units. From the West Stadium to Shantz, PAS and Gould-Simpson and over to Harshbarger and the Marshall Building, such a School needs both centralized facilities *and* satellite operations in order to provide the essential support services for our teaching and research missions.

And we must note, yet again, that fifteen years of budget cuts have made all units highly efficient and some reductions in services provided to faculty and students will occur.

We are confident, however, that we can capitalize on the good working relationships that already exist among the participating units, our intersecting research missions, and our common dedication to high-quality teaching and mentoring. We can achieve a savings of approximately 5% by working smarter and by working together.