**Name of Proposed Unit:** Department/Division/School of Hydrology and Water Resources

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**Proposal team:**
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Other faculty and students were consulted in the writing of this white paper.

**Current Units and Programs to be reorganized/consolidated:**
Department of Hydrology and Water Resources
BS, Environmental Hydrology
MS, PhD – Hydrology and Water Resources
MEng Engineering in Water Resources Engineering

**Notes:**
This proposal originates from the faculty of Hydrology and Water Resources. However the Department and various individuals have had a variety of discussions with individuals and units in the College of Science (ATMO, GEO, EEB), the College of Agriculture and Life Sciences (SWES,SNR) and the College of Engineering (CHEE,MGE,SIE,CEEM). Along with these units we have submitted other proposals and are willing to listen to proposals that these other units might have that involve our department specifically or the broader area of Earth, Environmental and Ecosystems Sciences.

Pertinence of Hydrology and Water Resources to University Mission and the State of Arizona

From the Focused Excellence report

“The University of Arizona is recognized as the leading university in the world of water. This reputation is based on its broad strengths in many top academic programs such as Hydrology, Geosciences, and Agriculture coupled with units such as the Tree Ring Laboratory, the Udall Center, the Institute for the Study of Planet Earth, and the International Center for Arid Lands Studies. This has resulted in national funding for four major federally funded centers of excellence related to water. There are complementary strengths related to water issues in Geography, Atmospheric Sciences, Architecture, Latin American Studies, Law and Public
Policy, Medicine and Public Health, and a major superfund remediation research effort in Toxicology. **It is the goal of the University of Arizona to build on this area of strength by expanding and coordinating water programs at the University of Arizona** so they can more efficiently and effectively address the water issues in the state of Arizona and support Arizona’s Environmental Technology Industry Cluster.”

[http://spbac.web.arizona.edu/docs/FinalStrategicPlan122204.pdf](http://spbac.web.arizona.edu/docs/FinalStrategicPlan122204.pdf)

As can be seen in the previous report on how the University should focus its efforts the area of water education, research and service is central to the identity and mission of this university. The area of Hydrology and Water Resources is in fact so important to this institution and the State that over 40 years ago a separate academic department was established to integrate teaching, research and service in the pursuit of improved hydrologic understanding of our environment under a single roof. This decision has lead to spectacularly successful scholarship within the department but also across the campus. This success is evident in the teaching conducted by the department, the cutting edge research that is pursued and the excellent outreach and service done by the department.

**Research:**
The Hydrology Water Resources Department brought in nearly $5 million in external research funds last year external to the SAHRA Science and Technology Center that would add an additional $3 million to the department total. All this with 14 state funded FTE faculty. This success at raising research dollars is mirrored in the publication records and honors received by our faculty. Among these honors are included Two regents Professors, a member of the National Academy of Engineering, a winner of the International Hydrology Prize and a professor who has testified before the Special Master of the Supreme Court of the United States. These are merely the most distinguishing honors that faculty have received numerous scientific society and public service awards have also been received by junior and senior faculty alike.

These honors are specific evidence of a more broadly relevant opinion. The Department of Hydrology and Water Resources is nationally and internationally renowned for being on the cutting edge of hydrologic science and application. Our key competitors are international and not strictly American. This competition and reputation are evidenced by the NSF Funded SAHRA STC. SAHRA is also evidence of another aspect of the Hydrology and Water Resources Department. While faculty from HWR took the lead in developing and implementing this center others departments and faculty on campus were involved as well. These connections point to a critical role that the presence of the Hydrology and Water Resources Department plays in the campuses effort to maintain its leadership role in the science and policy area of water.

**Teaching:**
In the area of teaching the Department maintains a robust graduate program at both the Masters and Doctorate level. Graduates from the department have leadership roles in firms large (Brown and Caldwell Ch2M Hill) and small (Hydrogeochem and Montgomery and Associates), locally, nationally and internationally. Doctoral graduates hold faculty positions at many universities including Oregon State University, New Mexico Institute of Mining and Technology, Colorado School of Mines, University of Florida, Florida State University, and University of California San Diego. Two doctoral graduates are highly esteemed highly in the field of Hydrology and are respectively an endowed chair at the University of Southern California and is additionally Founding Professorship and Associate Dean of Engineering at Peking University and founder
and Director of the Zuckerberg Institute for Water Research at Ben Gurion University in Israel. Additionally, graduates of the department have scientific and leadership roles at Sandia, Los Alamos, Livermore, and Pacific Northwest National Laboratories.

While often conceived of as a “boutique program” the impact of the BS program is far larger than its size. Undergraduates from the HWR program have gone on to faculty positions in the field with degrees from elsewhere; while others have gone on to start successful businesses. This program also adds emphasis to the strength of the identity of the Hydrology and Water Resources Department. As currently constructed with cross listings across departments, and with the graduate program there is little cost to the department for maintaining the undergraduate program and the costs seem worth the societal and institutional benefits. Furthermore the undergraduate program has seen recent growth (3-8 students in the last three years) and this year 23 students came to the Engineering 102 open house and 18 requested additional information a near tripling of past years attendance and interest. Of note is the United States Department of Labor considers hydrologists to be one of the top 25 careers in demand over the next 10 years. Apparently, word is getting out and students are following the market.

Challenges to the Program:
While the Hydrology and Water Resources Department continues to operate at a high level of excellence, the resource challenges of the last 20 years have taken their toll.

1) Several high-level faculty and junior level faculty have been lost. One departure was a Regents Professor.
2) Staff support is in a continuing decline. We have gone from two people in our front office to one. Two academic coordinators to one. In addition to the business manager, this is the extent of our state supported staff. All other staff positions are supported with overhead return dollars.
3) This situation is the result of 14 out of the last 17 years having budget cuts.
4) We understand all departments have dealt with the similar situations.

A Way Forward
The solution does not seem to be merging the Hydrology and Water Resources Department in entirety with other programs. Any strategy at the Campus level put forward needs to offer a way to raise student revenues, foundation funds and research dollars. The Hydrology and Water Resources Department has begun pursuing foundation support for the program. Additionally the Department could be at the center of an effort to provide a professional water management degree. Current University rules and the conflicts over who gets credit for what prevent such an approach to achieve “the goal of the University of Arizona to build on this area of strength by expanding and coordinating water programs at the University of Arizona”. This institutional problem is restraining educational curriculum creativity and preventing graduate student growth and thus revenue growth for the University. The faculty in Hydrology and Water Resources wish to convey that, of the proposals we have seen so far, we are open to various opportunities but any combination should maintain the BS-PhD identity of the program that is part and parcel of the programs prestige and by extension at least a portion of the prestige in the area of water of the University of Arizona.