

Academic Program Review:

Response to Panel Report

Water Resources Program

University of New Mexico

January 2011

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Introduction

Academic Program Review (APR) provides an opportunity for all academic programs at the University of New Mexico to examine their achievements and goals. The APR process begins by having the academic unit, in this case the Water Resources Program, prepare a Self Evaluation Report which summarizes the program and its successes and challenges. The Self Evaluation Report for the WRP was completed in early fall, 2010. It involved over six months of evaluation and assessment that incorporated input from UNM faculty, administrators and students, with particularly valuable guidance and input from the WRP Program Committee.

An external Academic Program Review Team visited the WRP from October 10-13, 2010 to conduct an on-site review of the program. The team consisted of:

Ron Kaiser, Texas A & M University;
Sudhakar Prasad, University of New Mexico;
Mary Santelmann (Panel Chair), Oregon State University
Soroosh Sorooshian, University of California, Irvine

The Review Team submitted its report on November 2, 2010 and is included as an appendix to this document.

This document is a formal response to the findings and recommendations delivered by the Review Team. The response was developed by the Director and Associate Director of the WRP and approved by the WRP Program Committee. As part of our post-review discussion, the WRP has performed an analysis of the strengths, weaknesses, opportunities, and threats (SWOT). This is included as an appendix to this response.

Questions Posed in the Self Evaluation Report

The APR Self Evaluation Report listed five specific questions regarding the status and future direction of the WRP:

- 1) Should the WRP expand its mission to include sustainability, environmental science, or develop a doctoral program?
- 2) What is the proper administrative home for the WRP?
- 3) Should the WRP retain the separate concentrations of Hydrologic Science and Policy and Management?
- 4) Can the externally funded research program of the WRP be increased?
- 5) Can the WRP be modified to accommodate past and future budget cuts?

In addition, the WRP requested specific guidance from the Review Team to address concerns such as:

- 1) How to handle students who enroll in courses without course pre-requisites
- 2) How to manage issues such as student tendency to lose connections with the program after the first year and failure to file appropriate forms on time

- 3) What should be the UNM WRP response to a proposal from New Mexico State University to initiate a new interdisciplinary MS and PhD in Water Resources.

The recommendations by the Academic Program Review Team fall into three broad categories: program mission and curriculum (questions 1 and 3), program administration (questions 2 and 5), and research (question 4). The responses in this document are organized into these broad categories.

Program Mission and Curriculum

Question No. 1: - *Should the WRP expand its mission to include sustainability, environmental science, or develop a doctoral program?*

Summary of Review Panel's Recommendations & WRP Response

Recommendation: Development of a Ph.D. or professional Doctorate in Water Resources degree is not appropriate at present.

Response: The WRP agrees that a Ph.D. or professional Doctorate in Water Resources is not appropriate at this time. The reasons include:

It is not clear that there is a market for students with this degree. The WRP faculty have had extensive discussions about the value of an interdisciplinary degree. There is general agreement that with few exceptions, most academic programs prefer to hire new faculty with Ph.D. degrees in their own discipline (i.e. engineering, economics, biology). Further, it is not clear that there is significant demand for Ph.D. level employees in the water resources profession

The WRP does not have the faculty, staff, budget or facilities to support a Ph.D. degree.

New graduate degrees must be approved by the New Mexico Department of Higher Education. This agency has expressed strong concerns about the proliferation of expensive graduate degree programs and is not likely to approve a new Ph.D. without evidence of strong demand for its graduates and significant funding opportunities to support the program.

Recommendation: If a Ph.D. degree is found to be desirable consider collaboration with other universities in its development

Response: The NM Council of Graduate Deans has reviewed a proposal by New Mexico State University for new MS and Ph.D. degrees in Water Resources Management and recommended that the proposal be revised to include collaboration in course offerings and research program among the three research universities in NM (UNM, NMSU, and NM Tech). A dialog has been initiated with the newly appointed Director of the NMSU WRRI (Prof. Sam Fernald) regarding collaboration in course offerings as well as exploration of ways of enhancing research cooperation.

Recommendation: Consider development of a research oriented MS degree in Water Resources with a thesis requirement to strengthen the research component of the WRP

Response: The WRP agrees that a research oriented MS degree in Water Resources would strengthen the research component of the program. However, there are several factors that may limit the viability of this proposal. These include:

- The program and the students in it are strongly oriented towards applied work rather than academic research. Over half of the WRP students are returning to graduate school after at least five years since receiving their baccalaureate degree. They are principally interested in the program as a path towards a profession rather than its research component. It is not clear that many students would be interested in pursuing an MS thesis.
- It is not clear that a new MS degree would be approved by the New Mexico Department of Higher Education (see comments above), although it is also not clear whether an MS degree option to an MWR graduate program would be considered a new degree. The program will explore this interpretation.

Consideration of development of an MS thesis-based degree to supplement the MWR degree will be undertaken by the Program Committee.

Recommendation: Maintain the current focus of the program on water resource issues. New concentrations in environmental science and sustainability are not needed.

Response: The WRP agrees that the current focus should remain on water resources issues and professional practice.

Recommendation: Consider offering a Certificate Program for students who are interested primarily in receiving additional training and qualifications in water resources management but are not interested in completing a 39 credit degree.

Response: The WRP agrees that a Certificate Program would have significant appeal for many students. Further, it would reduce the advising load for faculty by reducing the number of students attempting to complete a Professional Project. The WRP will begin development of a transcribed Certificate Program in Spring 2011.

Question No. 3: *Should the WRP retain the separate concentrations of Hydrologic Science and Policy and Management?*

Recommendation: The panel recommends retaining the two separate tracks in Hydrosience and Policy and Management.

Response: The WRP agrees that maintaining separate tracks (referred to as Concentrations at UNM) in Hydrosience (HS) and Policy and Management (PM) represents the best strategy for delivering an interdisciplinary degree with such a wide variety of disciplines, student interests, and diverse backgrounds for our students.

Recommendation: The panel recommends establishing a curriculum committee for periodic review and updating of curriculum

Response: While a periodic review of both the HS and PM curricula is a good idea, it is not clear that there is a sufficient need to constitute a separate curriculum committee. Instead, a proposal will be submitted to the WRP Program Committee that it be charged with providing an annual review of the curriculum. One of the fundamental components of this review will be evaluation of the elective courses in the Hydroscience, Policy & Management, and Utilities categories to maintain an up-to-date list of classes in each. This list of classes will be published in the WRP Program Guidelines annually.

Recommendation: Explore and comment on other opportunities such as offering Certificate Programs, online and summer courses.

Response 1: Development of a transcribed Certificate Program in Water Resources will begin in Spring 2011.

Response 2: The WRP only has faculty resources and budget to offer 3 courses each year; WR 571 (Contemporary Issues) in the fall, WR 572 (Models) in the spring, and WR 573 (Field Methods) in the summer. Faculty who teach these courses and the Program Committee do not believe that any of these classes could be offered on line. All three classes involve extensive amounts of group work that could not be done by an individual at a remote site. For example, WR 571 requires three collaborative multi-week projects that involve both written and oral reports which constitute roughly 75% of the student's grade. WR 572 is a modeling class that uses expensive commercial software (PowerSim) that is installed on UNM computers; student versions of the software are good for only 60 days. Students work in teams to prepare surface, ground water, and economic models. WR 573 is a field methods class that involves three weeks of intensive laboratory and field work that cannot be performed by students at remote sites.

However, the WRP recognizes that distance education is an important and growing component of both undergraduate and graduate education. This is especially true in a state as sparsely populated as NM. Furthermore, the WRP recognizes that there is considerable water related expertise at the other research universities in NM (NMSU and NM Tech). The Director and Assistant Director of the WRP actively participate in distance education course delivery and will encourage UNM water faculty to consider offering internet based courses. Further, the WRP will work with faculty at NMSU and NM Tech to identify opportunities for collaboration in course delivery.

Recommendation: The panel recommends enforcement of the prerequisites and other admission requirements.

Response: The WRP agrees with this recommendation and will more rigorously enforce admission requirements and course prerequisites for all students admitted to the program.

Program Administration

Question No. 2: *What is the proper administrative home for the WRP?*

Recommendation: The Review Team agreed that the University College is not the appropriate home for the WRP. The panel suggested the following criteria be considered when evaluating a new administrative home for the WRP:

- The administrative unit should be an academic home that is perceived as discipline-, college- and department-neutral
- Resources to support the program must accompany the WRP move to any unit, and should not be perceived as depriving other units of resources
- The academic home for the WRP should reside above the college level and should have a champion at the level of Dean.

The panel recommended that the Office of Graduate Studies meets the largest number of these criteria.

Response: The Associate Provost for Academic Affairs (Dr. Richard Holder) has asked the WRP to prepare a formal proposal to relocate the WRP to the Office of Graduate Studies. The WRP administration is working on this proposal at present.

Question No. 5: *Can the WRP be modified to accommodate past and future budget cuts?*

Recommendation: The panel recommended looking beyond the current structures for new sources of revenue. Options mentioned included:

1. Certificate programs
2. Distance education
3. Scholarships and fellowships for students
4. Endowed chairs, named professorships
5. Small student grants for computers, equipment
6. Other creative ideas from the UNM faculty and students???

Response: Each of these ideas is briefly discussed below.

Certificate Programs: Development of certificate programs may be a way of increasing enrollments and the WRP is committed to exploring this strategy. However, program funding at UNM is not directly related to enrollment, hence a certificate program will not generate any additional revenue for the program.

Distance Education: The WRP only teaches three courses, none of which lend themselves to offering by distance education methods.

Scholarships and fellowships for students: There are at least three different types of scholarship and fellowship opportunities for graduate students: 1) national competitive programs funded by federal agencies (NSF, EPA, etc) and professional societies (AWRA, AWWA, WEA, etc.), 2) state & UNM funded programs (tuition waivers, teaching assistantships, etc.), and 3) privately funded scholarships with funds generated by development efforts.

The WRP has made a continuing commitment to informing its students of the availability of national, state, and UNM scholarship and fellowship opportunities. Because the program does not offer a Ph.D., few students choose to apply for national competitions. Each year, however, many of our students do apply for state and UNM awards, and our students have achieved reasonable success at obtaining this type of support. Examples include small grants from the UNM Graduate Research Allocation Committee, local professional societies for research support, research support from the NM Water Resources Research Institute (WRRRI), and tuition waivers offered by UNM to in-state graduate students.

University College and the WRP do not have a Development Officer assigned to it to help with fund raising for privately funded scholarships and fellowships. However, the Director has had several meetings with the UNM Foundation over the past three years, and there is recognition that the program would benefit from this type of support and that due to the public recognition of the importance of water to the state, there may be opportunities for generating support. This dialog is continuing and it is hoped that if a move by the WRP to another administrative unit will result in additional development support by the UNM Foundation.

Endowed chairs, named professorships: As with student scholarships and fellowships, development efforts for the WRP have not been supported by the UNM Foundation.

Small Student grants for computers and equipment: Small grants (<\$1,000) are often available to grad students from UNM, state, and local sources. These grants are almost always used to support student research. It is not clear that the WRP has any mechanism of increasing the amount of money available for this type of support.

Other ideas from faculty & students: Alternative sources of funding have been and will continue to be a subject of discussion for the WRP faculty and the Program Committee.

Recommendation: The program needs to develop a long-range strategic plan that incorporates its own wishes, desires, and mission into specific development needs.

Response: While the WRP faculty has had two all day strategic planning meetings in the past five years, the panel has correctly recognized that the program does not have a well-articulated strategic plan. Development of a strategic plan will be an agenda item for the Program Committee during the spring semester, 2011.

Research Productivity

Question No. 4: *Can the externally funded research program of the WRP be increased?*

Recommendation: Research at UNM is college- and department-centric. If the university desires to cultivate interdisciplinary research it needs to develop mechanisms and incentives toward development of collaborative interdisciplinary research clusters.

Response: At present there is little or no incentive for faculty affiliated with the WRP to conduct research under the auspices of the program, and in fact there are several disincentives. The most prominent disincentive is that faculty members' home departments and colleges receive overhead return from funded research; Deans and Department Chairs are reluctant to relinquish this revenue stream. A second factor is that one measure of faculty and department performance is graduate degree production. A professor who supports and graduates a WR student does not receive the same credit by his Department Chair and Dean as he would if the student graduated from his home department.

Both the VPR and the Dean of Graduate Studies have recognized the value of interdisciplinary research and are working to develop policies and incentives that will encourage work among faculty in different administrative units. The WRP will continue to work with the UNM administration to seek methods for facilitating interdisciplinary research.

Additional Observations, Issues and Concerns

Other issues and concerns facing the WRP were presented in the Self Evaluation Report and/or were discussed with the Panel during their visit to UNM. The Panel commented on several of these items. This section summarizes the Panel's comments and provides a response and/or comment from the WRP.

Issue No. 1: *Proposal by NMSU to offer graduate degrees in Water Resources*

Recommendation: Initiate a conversation with other schools about collaborating to deliver graduate degrees in Water Resources

Response: The NMSU proposal was considered by the NM Council of Graduate Deans in the fall semester, 2011. The Council decided that the proposal did not provide enough information in a number of areas and requested that it be revised for subsequent reconsideration. In particular it was felt that: 1) there was insufficient information provided regarding demand for MS and PhD graduates, 2) there was insufficient discussion of collaborative opportunities with existing programs, and 3) the curricula for the proposed degree programs were vague and lacked specificity.

The Director of the UNM WRP has subsequently resumed a dialog with the NMSU proponents regarding the proposal that has included phone calls, e-mail correspondence, and meetings. Representatives of the three research universities have agreed on the benefits of a

collaborative program, and though details remain to be resolved, it appears likely that a proposal for the new degrees that addresses UNM concerns will be developed.

Issue No. 2: *Administrative structure of the WRP. Advising and mentoring of students.*

Recommendation: The administrative structure within the program needs to be improved to reduce the load on the Program Director. It was recommended that Associate Directors be identified to supervise the Hydrosience and Policy and Management tracks. Funding could be provided for the Associate Directors by reducing the current Administrative Assistant's position to half time.

Response: The Program Director does not believe that his current work load is excessive except at the beginning of each semester when a large number of students seek curriculum advice. Beginning with the spring 2011 semester, additional effort is being made to encourage students to select faculty mentors sooner with the expectation that they can relieve the advising burden on the Program Director and can provide earlier assistance in selecting and completing the Professional Project.

Student concerns about lack of familiarity with faculty affiliated with the WRP seems inconsistent with their experience in the core classes and elective courses. For example, during the Fall 2011 semester, six presentations were given in WR 571 by faculty affiliated with the program. Further, only three of 11 classes in the curriculum are taught in the WRP; all other classes are selected from those taught in existing programs. If students aren't familiar with water faculty at UNM, it's because they're not paying attention.

Recommendation: The WRP should considering offering seminars and possibly a career day.

Response: This is a good suggestion, though there are many water-related seminars offered at UNM each semester that are publicized by the WRP. The student organization, the Association of Water Professionals, has funds for such activities and has developed a monthly seminar series for the spring semester. The speakers are all water resource practitioners, not academics. This reflects the students' desire for additional exposure to the profession.

Issue No. 3: *Computing facilities*

Recommendation: Transfer old computers to students.

Response: The WRP has only purchased one computer in four years, and that was for the students' computer pod. Nearly all of the students have their own laptop computers, thus it is not clear that students are limited by computer hardware.

During the site visit there was considerable discussion about computer limitations associated with the WR 572, Models class. The limitation was that commercial software, PowerSim dynamic simulation software, was used in the class. Previously, UNM's Computer & Information Resources & Technology center (CIRT) would not allow the software to be

installed on any of their machines. This problem has been resolved and for the Spring 2011 semester the software has been installed on at least 11 machines across campus, including three new seats in the Economics computer pod located down the hall from the WRP offices.

Conclusions

The APR process has been extremely valuable to the WRP. The opportunity to meet with and discuss the program with the Review Panel, as well as their subsequent analysis and recommendations were enlightening and very helpful. However, perhaps the greatest value was associated with the generation of the Self Evaluation Report. This document, developed in collaboration with the WRP Program Committee and selected key faculty affiliated with the program required much analysis, interpretation and discussion. It represents a fairly complete assessment of the status of the program as of fall semester, 2010.

The WRP administration, Program Committee and faculty believe that the WRP is a strong program that has made and will continue to make important contributions to UNM, the state, and the region. Our students graduate with good preparation for entry to the profession, and many of our alumni have achieved notable professional success.

Nevertheless, it is clear from the Self Evaluation Report and the findings of the Academic Program Review Panel that there are opportunities for improvement. Many of these can be implemented almost immediately, others are probably not feasible, and still other recommendations will require deliberation and considerable effort to implement. The WRP is pleased with the findings of the Panel and is committed to full consideration of all of the included recommendations.

Appendix I: Academic Program Review Panel Report

Academic Program Review

Panel Report

Prepared for the Water Resources Program
University of New Mexico

November 2, 2010

Panelists: R. Kaiser, Texas A & M University; S. Prasad, University of New Mexico; M. Santelmann (Panel Chair), Oregon State University; S. Sorooshian, University of California, Irvine

Executive Summary

An Academic Review Panel consisting of three external reviewers (R. Kaiser, Texas A & M University; M. Santelmann, Oregon State University; and S. Sorooshian, U.C. Irvine) and one internal reviewer (S. Prasad) met in Albuquerque from October 10-13, 2010 for an on-site review of the Water Resources Program at the University of New Mexico. Panel members received a self study report prepared by the WRP prior to the site visit, and were asked to comment and advise the UNM concerning five specific questions regarding the status and future directions of the program:

- 6) Should the WRP expand its mission to include sustainability, environmental science, or develop a doctoral program?
- 7) What is the proper administrative home for the WRP?
- 8) Should the WRP retain the separate concentrations of Hydrologic Science and Policy and Management?
- 9) Can the externally funded research program of the WRP be increased?
- 10) Can the WRP be modified to accommodate past and future budget cuts?

In addition, the program self-study requested specific guidance to inform concerns such as students who enroll without course pre-requisites, how to manage students who tend to lose connections with the program after the first year and fail to file appropriate forms on time, and the appropriate response from UNM to a proposal from New Mexico State University for new interdisciplinary MS and PhD in Water Resources.

The panel reviewed the mission and current status and trends in the program, resources available in support of research, the nature of the degree program, the level of student support, existing curriculum and involvement of students in various environmentally-relevant professional projects. Based on the information available from the materials provided as well as interviews with faculty, students, alumni and administrators, the panel made the following recommendations:

Expansion of mission

Begin the process of expansion by initiating a thesis-based Master of Science degree before adding a PhD. The program should also maintain the professional track, which is vitally important and attracts students with a different career objective to UNM.

Maintain the current focus of the program on water resources since the existing curriculum already contains substantial opportunity for coursework in sustainability and environmental science. Consider adding a certificate program.

Administrative Home

The process of finding an administrative home for interdisciplinary programs such as the WRP is an opportunity for the University of New Mexico to develop a successful model for the administration of all interdisciplinary graduate programs in a purposeful and consistent manner. Investment in such programs is expected to bring a return to the university through increased collaboration and collegiality among faculty, improved efficiency in delivery of courses and use of resources, and enhancement of the stature of the University of New Mexico among its peer institutions. General criteria identified for the new administrative home for the WRP were that it be an academic home perceived as discipline-, college- and department-neutral. Resources to

support the program must accompany its move to any unit, and should not be perceived as depriving other units of resources. The academic home for the WRP should reside above the college level and should have a champion at the level of Dean. Specific recommendations were that the WRP should not remain in the University College or be housed in a single college or department. Of existing units, the Office of Graduate Studies (if developed into a Graduate School that could confer degrees) best fits the general criteria, though other options are possible. Institutional support at the provost level for the unit in charge of interdisciplinary programs will be critical to the success of interdisciplinary programs.

Maintaining two separate tracks

The panel recommends retaining the two separate tracks in hydrologic sciences and policy and management. Separate concentrations are preferred by students and most faculty members, are congruent with what is done at other institutions with similar Water Resources programs, and align well with the job market.

Increasing Externally Funded Research

Panelists observed a strong culture of college- and department-centric research at UNM. In order to increase externally-funded, interdisciplinary research, there is a need to foster collaborative interdisciplinary research. The panel noted that interdisciplinary research initiatives are likely to be more successful if there is a research-oriented track (MS degree in addition to the professional track) within the program, if there is institutional support for interdisciplinary research proposals (assistance with budget preparation, and PI identified needs), and if these initiatives target the unique strengths of UNM (connections between water, energy, and law; the association with and cooperation among UNM and the national labs, the tribes, the Utton Center, and regional LTERs). Such projects could build on the long history of Hispanic and Pueblo water management institutions, and broader impacts would be strengthened by highlighting the diversity of the campus and faculty. Interdisciplinary research initiatives are less likely to be successful if they rely solely on the energy of already overloaded faculty to lead proposal development.

Resources and Budget Concerns

Panelists recognized that there are and will be continued financial constraints to the program. In the opinion of the panel, further budget cuts would compromise the integrity of the program. There may be entrepreneurial or innovative ways to make the best use of existing resources and leverage additional resources, but the first step at the university level is to get rid of the zero sum mentality and begin to look beyond current structures for new sources of revenue. Many specific options exist, but the WRP must make the choices that will influence the direction of future growth in the program.

Summary

The Water Resources Program and other interdisciplinary programs at UNM are the product of faculty innovation and highlight the value of the University to the state, the tribes, and the local and regional community. The Water Resources Program fosters collaboration and collegiality across multiple colleges and departments which is a critically important role during times of adversity.

Review Panel Report

Introduction

The Academic Review Panel met in Albuquerque from October 10-13, 2010 for an on-site review of the Water Resources Program at the University of New Mexico. Panel members received and read a self study report prepared by the WRP prior to the site visit. During the three days the panel met with the Director and Associate Director of the WRP, a



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of 20 students enrolled in the program, 12 alumni, and more than 30 faculty members. In addition, panelists met with Provost Suzanne Ortega, Vice Provosts Wynn Goering and Richard Holder, Deans and Associate Deans of the Colleges of Architecture and Planning, Arts and Sciences, Engineering, School of Law, the Graduate School, Vice President for Research, and the Directors of University College and the Utton Center. Findings were presented at an exit meeting attended by many of these administrators, as well as the Dean of the Office of Graduate Studies, Amy Wohlert, representatives from the Research Office, Distance Education, and Curriculum and Accreditation units, and several faculty members of participating colleges. The review panel was asked to evaluate the program, to address five specific questions posed in the self study, to identify any additional issues of concern, and to provide guidance for the program and University administration for the future of the WRP.

The five questions the panel was asked to address were:

- 1) Should the WRP expand its mission to include sustainability, environmental science, or develop a doctoral program?
- 2) What is the proper administrative home for the WRP?
- 3) Should the WRP retain the separate concentrations of Hydrologic Science and Policy and Management?
- 4) Can the externally funded research program of the WRP be increased?
- 5) Can the WRP be modified to accommodate past and future budget cuts?

In addition, the program requested specific guidance to inform concerns such as:

- 3) How to handle students who enroll in courses without course pre-requisites
- 4) How to manage issues such as student tendency to lose connections with the program after the first year and failure to file appropriate forms on time
- 5) What should be the UNM WRP response to a proposal from New Mexico State University to initiate a new interdisciplinary MS and PhD in Water Resources.

Panel findings are presented and discussed below. The report first outlines the origins, mission, condition of and trends in the program, then presents panel recommendations organized in reference to the questions and issues of concern presented in the self study. The findings also reflect our observations of issues that emerged during the site visit.

Background: Program origin, mission, condition and status

The Water Resources Program (WRP) at University of New Mexico was developed by faculty in 1991, and brings together faculty members and students from many different disciplinary perspectives and experiences. The mission of the WRP is to be “an interdisciplinary professional degree designed to prepare students for careers in water resources management and related fields.”

The program is directed and delivered by a dedicated, productive set of core faculty who teach and advise students in the program, as well as a set of loosely-affiliated faculty members who teach related courses used by students in their degree programs and occasionally advise students in their professional projects. The students in the program tend to be relatively mature (average age 33), experienced, and to have a passion for water resources management. Many work either full time or part time while they are in the program. Some are supported by their current employer. The program has a relatively high level of diversity, with several Native American students, Hispanic students, and some international resident students.

The panel was impressed at the relatively strong program level of commitment and dedication of the faculty to the WRP and students in the program, especially from the faculty leading the program. However, panelists also noted that greater faculty involvement and shared responsibility (an Associate Director for each track, a curriculum committee, a half-time professional advisor on staff) would strengthen the program. Budget cuts and lack of institutional support for students in the program have left the WRP starved for resources (inadequate space for students, computers, software licenses, equipment for research, and decreased support for instruction). The panel felt that institutional support for and investment in increased faculty involvement must come from the central administration of both the University and the colleges in order to remove perceived barriers to faculty participation. An institutional vision for the role of interdisciplinary programs at UNM is needed to guide program development.

The panel also noted the strong student involvement in applied research, engagement of the program with the community through student research and alumni, commitment to and passion for water resources management in the students and alumni, and the diversity of the students in the program. Recruitment of students into the program seems to be largely by word of mouth and efforts to broaden the avenues for student recruitment should be explored. The web site of both the OGS and the WRP contain broken links, and several pages on the WRP website need to be updated.

The response of the panelists to the specific issues and concerns raised by the WRP in the self-study are addressed in the following sections.

Expansion of mission: *Should the WRP expand its mission to include sustainability, environmental science, or develop a doctoral program?*

To address this question, the panel reviewed the mission and current status of the program, resources available in support of research, the nature of the degree program, level of student support, existing curriculum and involvement of students in various environmentally-relevant professional projects. Based on this information as well as interviews with faculty, students, alumni and administrators, the panel recommends that the program should not attempt to develop a PhD at this time. The panel also was not convinced of the value of a Doctorate in Water Resources (a new type of graduate degree proposed for development here that would be a professional doctorate similar to other professional doctorates such as a D Ed or D of Pharmacy etc.). Panel members do not see a market for or student demand for such a degree, and some expressed the concern that a professional Doctorate of Water Resources might be perceived as a lowering of academic standards in the program and at UNM in general, which would go counter to the desire of the program to develop interdisciplinary, externally-funded research.

With respect to the future development of a PhD for the WRP, a likely trajectory towards the development of a PhD would include the development of an MS degree with a thesis requirement, increasing research effort in interdisciplinary Water Resources research in order to provide Graduate Assistantships to support these students. To eventually be able to deliver a PhD program and recruit top quality students, there would need to be research assistantships so students could be supported through research generated on inter-disciplinary projects. A thesis-based MS degree would attract research-oriented students to the program as a stepping stone to the development of the PhD. Additional course offerings, office space and computer capabilities would be required for research-oriented, full-time students in MS and PhD programs.

A potential opportunity exists to collaborate on delivering a PhD with other universities in future – especially since one of the sister institutions in the state is interested in developing an MS and PhD in Water Resources. Perhaps this is time to begin discussions towards building a consortium of universities to deliver interdisciplinary programs.

The panel also recommends maintaining the current focus of the program on water resource issues. The existing curriculum includes options for courses in sustainability and environmental science. In addition, sustainability and environmental science issues are infused into other courses and the professional project. Panelists did not see a need to formalize a track in Environmental Science and Sustainability or add curricular requirements for such courses.

One area in which there may be potential for immediate expansion is the area of Certificate Programs (12 semester credits of focused coursework with an internship or practicum as a capstone experience). Some students who do not finish the existing program (especially the professional project) might be better served by such a program, which they could complete in a shorter time and might be all they need for their career.

Administrative Home: *What is the proper administrative home for the WRP?*

The panel emphasized that the process of finding an administrative home for interdisciplinary programs such as the WRP is an opportunity for the University of New Mexico to develop a successful model for the administration of interdisciplinary graduate programs in a purposeful and consistent manner. Investment in such programs was expected to bring a return to the university through increased collaboration and collegiality among faculty, improved efficiency in delivery of courses and use of resources, and enhancement of the stature of the University of New Mexico among its peer institutions.

General criteria identified for the new administrative home for the WRP were that

- it be an academic home that is perceived as discipline-, college- and department-neutral;
- resources to support the program must accompany its move to any unit, and should not be perceived as depriving other units of resources; and
- the academic home for the WRP should reside above the college level and should have a champion at the level of Dean.

Specific recommendations were that the WRP should not remain in University College or be housed in a single college or department. The panel noted that of existing units, the Office of Graduate Studies (if developed into a Graduate School that could confer degrees) best fits the general criteria, although other new units might be possible (such as a School of Interdisciplinary Studies). Institutional support at the provost level for the unit in charge of interdisciplinary programs will be critical to their success.

Panelists agreed that the University College is not the appropriate home for the WRP, and of the other options presented or suggested, the OGS meets the largest number of criteria. If the Office of Graduate Studies can be transformed into a Graduate School that houses interdisciplinary programs and can confer graduate degrees, that might be the best solution. This sentiment was also expressed by the School of Engineering Dean's office. Whatever the final home selected for the WRP, this unit must invest time and effort into establishing metrics for evaluating performance of the interdisciplinary programs in ways that accurately reflect their contribution to the stature of the University and contribution to the State of New Mexico.

The panel viewed the faculty involved with the interdisciplinary programs as innovators who have provided an opportunity for the university to develop a model for how they want to administrate multiple interdisciplinary programs. It is our strong belief that the UNM needs to confront this issue, to consider establishing an administrative structure to handle interdisciplinary programs, particularly programs such as Water Resources that cut across so many disciplinary boundaries (participants from multiple colleges and departments).

Maintaining two separate tracks: Should the WRP retain the separate concentrations of Hydrologic Science and Policy and Management?

The panel recommends retaining the two separate tracks in Hydrologic Sciences and Policy and Management. During the review, panelists noted that separate concentrations were preferred by students. Several faculty members expressed the opinion that the current separation of the tracks is working well, that it helps students enroll in courses where they can succeed, and leads to career self-selection that is responsive to both the job market and cognizant of the skills sets and abilities of the students. Alumni expressed the opinion that in the course selection available to students there is the opportunity to incorporate interdisciplinarity. Separate tracks are congruent with what is done at other institutions with similar Water Resources programs, and align well with the job market.



The panel recommends establishing a curriculum committee for periodic review and updating of curriculum. An external advisory board of professionals could assist in identifying curricular needs and important elements of professional training for students. Departmental course offerings change over time, and a critical review of the program curriculum from time to time given the resources of program at that time

is an important element of a successful program. The committee could also explore and comment on other opportunities such as offering Certificate Programs, online and summer courses.

The panel also recommends enforcement of the prerequisites and other admission requirements. Providing online options for students who need these courses may help ease the transition. In addition, the curriculum committee should examine the tracks to consider whether pre-requisites for the different tracks should be modified.

Increasing Externally Funded Research: Can the externally funded research program of the WRP be increased?

Panelists observed a strong culture for college- and department-centric research at UNM. There is not a culture of support for interdisciplinary research. If the university desires to cultivate interdisciplinary research they need to rethink the reward system for inter-disciplinary research, and ways to foster efforts toward development of collaborative interdisciplinary research clusters.

A thesis oriented degree at the Master's level could be a first step toward the development of an interdisciplinary research program and a mechanism for moving towards an eventual doctoral program.

Some of the faculty members mentioned the potential for developing a program-level proposal; a collaborative proposal with a number of participants from the Water Resources community to bring in resources in support of interdisciplinary research in water. The Office of Research and even the Provost's office could foster collaboration and provide institutional support to help leverage opportunities for collaborative projects, large collaborative proposals, and help in seeking out new, perhaps unconventional sources of funds (Private Foundations etc.).

The panel noted that interdisciplinary research initiatives are likely to be more successful if there is a research oriented track (MS degree rather than a professional track alone) within the program, if there is institutional support for interdisciplinary research proposals (assistance with budget preparation, etc. PI identified needs), and if these initiatives target the unique strengths of UNM (connections between water, energy, and law; the association with and cooperation among UNM and the national labs, the tribes, the Utton Center, and regional LTERs). Such projects could build on the long history of Hispanic and Pueblo water management institutions, and broader impacts would be strengthened by a focus on the diversity of the campus and faculty. Interdisciplinary research initiatives are likely to be less successful if they rely solely on the energy of already overloaded faculty to lead proposal development.

Resources and Budget Concerns: Can the WRP be modified to accommodate past and future budget cuts?

Panelists recognized that there are and will be continued financial constraints to the program. In the opinion of the panel, further budget cuts would severely compromise the integrity of the program. There may be entrepreneurial or innovative ways to make the best use of existing resources and leverage additional resources, but the first step at the university level is to get rid of the zero sum mentality and begin to look beyond current structures for new sources of revenue. Some options for increasing the revenue stream into the program or to fund students suggested by panelists include:

1. Certificate programs
2. Distance education
3. Scholarships and fellowships for students
4. Endowed chairs, named professorships
5. Small student grants for computers, equipment
6. Other creative ideas from the UNM faculty and students???

Many specific options exist for academic programs to generate revenue or support for students, but the WRP must make the choices that will influence the direction of their growth. Assigning the WRP to a specific development staff person is an important first step in this direction.

The program needs to develop a long-range strategic plan that incorporates its own wishes, desires, and mission into specific development needs (endowed chairs, professorships, sponsored scholarships etc.)

In the short term, loss of an instructor in the writing and communication section of the core courses is a severe blow to the curriculum. The budget for this must be restored since writing in the profession is a universally important skill.

To address other strains on the program in the short term, panel members suggest that that the program consider redirecting some existing resources (such as converting the position of full-time administrative assistant to half-time) in order to fund a half time person to assist in professional advising with students and help program director in a more professional advising capacity, identifying potential internships, tracking student progress, and maintaining connections with students in program when not enrolled.

Additional Observations or Issues of Concern

Proposal by NMSU to offer graduate degrees in Water Resources

In the self-study document (p. 10) it was mentioned that NMSU had proposed to initiate an interdisciplinary graduate program offering an MS and PhD in Water Resources, and guidance as to an appropriate response from the UNM WRP was requested. While we have no detailed information about the proposed program, a potential response to NMSU might be that offering an MS and PhD in Water Resources is an issue for the public universities of New Mexico to explore together, and perhaps consider collaborating to deliver a stronger program than any one institution could deliver separately. There are unique elements of strong water programs at all these institutions (NMSU, NM Tech, and UNM), and this may be an opportunity that could benefit all. Panelists encouraged the WRP at UNM to have a conversation with other schools about collaborating to deliver graduate degrees in Water Resources. In addition, it was noted that it would be a big loss for this university not to appreciate and maintain the successful program they already have while their sister institution seems to see an MS and PhD in Water Resources as a priority.

Within-program Administration

Administrative structure within the program needs to be improved. Most of the day to day duties of program administration have largely been shouldered by the current director. Some of these tasks could be shared by other staff or faculty. It might help to have an Associate Director for each track who is familiar with the program requirements and career opportunities most relevant to graduates of that track.

As noted above, panel members suggested that that the program consider redirecting some existing resources (such as converting the position of full-time administrative assistant to half-time) in order to fund a half time person to assist in professional advising with students and help program director in a professional advising capacity, identifying potential internships, tracking student progress, and maintaining connections with students in program when not enrolled.

Advising and Mentoring

Some alumni felt there was a need for strengthening admission criteria, a clearer definition of various tracks and options, and a more consistent advisement process. This is very much in line with the view of the panelists.

Students expressed a need to become more familiar with the faculty members who participate in the program as advisors. Introducing faculty to students earlier in the program would help relieve some of the advising load of the Director, especially senior faculty in program who would be good potential advisors of professional project. Possible ways to do this include a seminar series, retreats, and guest lectures in the core courses. Students also expressed an interest in seeing more connection to professional mentors (possibilities range from a career day or panel to formal assignment of students to a professional mentor). Students also noted that the program lacks dedicated space for students:

“ We don’t have a home, dedicated space. For our modeling-intensive core course (WRP 572) we have 20 students on only 4 computers crammed into a janitor closet.”



Panel members noted that if faculty members upgrade computers every two years; each student could receive a computer only 2 yrs old if these are transferred to students instead of being sent to surplus.

Value added by interdisciplinary programs

Panelists felt that it was important to identify the additional value that is brought to the University of New Mexico by the interdisciplinary programs such as the WRP. Points that were identified by the panel included the fact that the WRP:

- Highlights an area of strength at UNM
- Provides a pipeline of professionals to address New Mexico’s water management needs
- Brings together faculty to collaborate in teaching and delivering the degree
- Brings students into a graduate program who might not otherwise come to UNM
- Brings in students with energy and passion; faculty find it rewarding to work with these WRP students
- Fosters community engagement

The institution might consider ways in which these and other benefits of the interdisciplinary programs should be measured, since resources and opportunities often follow such metrics of success.

Summary

The Water Resources Program and other interdisciplinary programs at UNM are the product of faculty innovation, and highlight the value of the University to the state, the tribes, and the local and regional community. The Water Resources Program fosters collaboration and collegiality across multiple colleges and departments which is a critically important role during times of

adversity and economic hardships. It has the potential to serve as the flagship interdisciplinary graduate program at UNM, with broad national and international appeal.

Specific recommendations of the panel:

- Do not add a PhD program at this time, consider collaborating with other NM institutions to develop a PhD program in Water Resources
- Begin any expansion of degree program and WRP research efforts by adding a thesis-based Master of Science degree
- Maintain the current focus on Water Resources rather than expanding in the areas of environmental science and sustainability.
- The WRP should be housed either in the Graduate School or in a unit that is created for the administration of interdisciplinary degree programs
- Keep the two distinct tracks with the program, and consider revising the pre-requisites by degree program in order to tailor the pre-requisites to the degree program track
- Externally funded research of the WRP can be increased but will require a change in the institutional culture of department-centric and college-centric research, and institutional investment in efforts to foster interdisciplinary research initiatives.
- The current budget is already too lean for maintaining a strong program. Funds to keep the team-taught communication and writing portion of the course sequence should be restored, the program should consider adding a part time professional advisor to guide students in the first year, and might be able to decrease the FTE allotted to the administrative assistant to help find funds for such a person.
- Investigate new sources of revenue for the program and change the “zero-sum” mentality that is an obstacle to program growth

**Appendix II: WRP Analysis of Strengths, Weaknesses,
Opportunities and Threats**

(SWOT)

Water Resources Program APR SWOT Analysis

Strengths

“The program is directed and delivered by a dedicated, productive set of core faculty who teach and advise students in the program” p. 5

“The program has a relatively high level of diversity, with several Native American students, Hispanic students, and some international resident students.” p. 5

“...the strong student involvement in applied research, engagement of the program with the community through student research and alumni, commitment to and passion for water resources management in the students and alumni...” p. 5

“The Water Resources Program fosters collaboration and collegiality across multiple colleges and departments which is a critically important role during times of adversity and economic hardships. It has the potential to serve as the flagship interdisciplinary graduate program at UNM, with broad national and international appeal.” P. 12

Weaknesses

“In the short term, loss of an instructor in the writing and communication section of the core courses is a severe blow to the curriculum.” P. 10

“Administrative structure within the program needs to be improved.” P. 10

“... a need for strengthening admission criteria, a clearer definition of various tracks and options, and a more consistent advisement process...” P. 11

“Students also noted that the program lacks dedicated space for students...” P. 11

“The current budget is already too lean for maintaining a strong program.” P. 12

Opportunities

“An institutional vision for the role of interdisciplinary programs at UNM is needed to guide program development.” P. 5

“A potential opportunity exists to collaborate on delivering a PhD with other universities in future ... to begin discussions towards building a consortium of universities to deliver interdisciplinary programs.” P. 6

“One area in which there may be potential for immediate expansion is the area of Certificate Programs...” P. 6

“The program needs to develop a long-range strategic plan that incorporates its own wishes, desires, and mission into specific development needs (endowed chairs, professorships, sponsored scholarships etc.)” P. 10

“Externally funded research of the WRP can be increased but will require a change in the institutional culture of department-centric and college-centric research, and institutional investment in efforts to foster interdisciplinary research initiatives.” P. 12

Threats

“... the WRP should not remain in the University College or be housed in a single college or department.” P. 3

“... it would be a big loss for this university not to appreciate and maintain the successful program they already have while their sister institution seems to see an MS and PhD in Water Resources as a priority.” P. 10

“...further budget cuts would compromise the integrity of the program.” P. 3

