May 17, 2017

To: Sarah Mangelsdorf, Provost and Vice Chancellor for Academic Affairs
    William Karpus, Vice Chancellor for Research and Graduate Education

From: Paul Robbins, Director, Nelson Institute for Environmental Studies

Re: Final Summary of Review for: MS degree in Water Resources Management

The review committee was charged with assessing the strengths and weaknesses of the MS degree in Water Resources Management, and making recommendations for future directions. The Nelson Institute APC discussed and unanimously approved the review committee report. Based on my review of their report and the APC response, I am providing the following response to the program review:

Overview

We are pleased to see that, overall, the committee concluded that the program has served its students and the university extremely well (the program is now more than 50-years old). It has a loyal alumni base, and has benefited, over the years, from the involvement of dedicated faculty who believe in its mission. The reviewers have a long list of strengths of the program including that the program has had a “ground-breaking, science-based approach.” They cite as strengths the cohort structure and the joint summer project that have been hallmarks of the program from its inception. They note that the program has been successful in launching graduates to fill satisfying and important professional roles. In short, they credit WRM as fulfilling all the essential elements of a successful graduate program. The program is nationally competitive and, in a sense, one of a kind.

As a tribute to the rigor of the report, the review committee also identified a number of program weaknesses. Some of these arise from the cohort-team project structure, which as noted, is also seen as a strength. Because students are not working in a traditional research mode, in which a faculty advisor has a direct interest in their specific individual research, there have been challenges in finding faculty to participate on student committees. This may also be the reason that some students reported difficulties in getting timely and specific advising. The program is dependent on “good will” participation by faculty.

So too, student resources were identified as an area of weakness. Although many students are able to find employment as TAs or PAs, the group project itself does not provide assistantships.
Students may therefore be burdened with paying some, or all, costs of the program. This problem is one aspect of the perception by the review committee that the program is underfunded.

The view from the Director’s Office is that this might be viewed as a problem, but a reorientation of our perspective might also be in order. As a professional program, which launches student careers, student education might better be viewed as an investment on the part of those participating in the program. Even so, this office is simultaneously continuing to seek external funding to support WRM students (e.g. donor-funded fellowships and scholarships – see below).

A further serious issue has been raised about the degree to which the WRM program is integrated with other faculty initiatives and programs associated with water resources on this campus or in the region. For example, it is noted that the program has not connected to Sea Grant activities on the Madison campus or the Global Water Center in Milwaukee. We acknowledge that improvement is needed, but point out that the chair - Professor Thompson - is working diligently on precisely these connections. We fully expect that we will work together to foster these networks; this office will provide full support for the WRM chair in meeting campus priorities.

We finally note that the committee calls out a lack of long-term strategic planning. From the Director’s Office, we believe that this is the paramount challenge for the program, but well within its capacity. Specifically, connecting WRM to this Division’s strategic priorities (e.g. Urban Ecology and Environmental Justice; outreach to Native Nations, etc.) is essential as the program moves forward.

We note that this office has continued to work with WRM leadership for the development of resources and several actions have been taken at the director’s level to increase support for the program. For example, the terms of a Wisconsin Distinguished Graduate fellowship have been rewritten to allow support of WRM activities. In the next few years this fellowship will be dedicated to an ongoing WRM project at Green Lake. To capitalize on the heightened alumni interest around our 50th anniversary, a WRM support fund was created. This fund is providing discretionary resources for the chair of the program. In 2015 UW Nelson Institute Professorship in Water Resources was established. The holder of the professorship, the chair of the program, receives an annual allocation.

Despite these positive steps, or rather, because of them, we believe that there is a need for a strategic evaluation. Other issues identified in the report as in need of attention will provide us with guidance as we develop the agenda for strategic planning and adjust our priorities to assure the continuing success of the program.

Recommendations

The recommendations in the report can be summarized as asking for attention to 1) student
issues – diversity, funding, and advising, and the appropriate number of student for a viable program; 2) faculty issues – recruitment of new faculty to replace those retiring, improving faculty advising of students, and assuring support for faculty engaged in the summer workshop; 3) general program issues – to consider forming an outside advisory board, to reach out to engage with other research programs, government agencies, and private sector businesses; and, as discussed above, to develop a strategic plan for the next 5-10 years; and 4) to connect and integrate the strategy to be developed for WRM with that of the Nelson Institute as a whole. We concur with these recommendations.

Follow Up

The Nelson Director will call for the WRM program committee to develop a proposal for the timing and format for a strategic planning effort. Such an effort will be logistically supported by the Director’s Office and staff. Our charge will be for this planning to address the recommendations of this thorough, constructive, and useful report.

Best wishes,

Paul Robbins
Director

CC: Prof. Anita Thompson Chair, WRM
CC: Prof. Paul Zedler, Associate Director for Research and Education, Nelson Institute
CC: Dr. Ken Bradbury Chair, program review committee
CC: Jocelyn Milner, APIR
CC: Sarah Kuba, APIR
CC: Marty Gustafson, Graduate School
Ten-Year Review of the Water Resources Management Program at the University of Wisconsin-Madison

Prepared for The Nelson Institute for Environmental Studies, University of Wisconsin-Madison

April 23, 2017.

Review Committee: Dr. Kenneth Bradbury, Chair, Dr. James LaGro, Jr., Dr. Jennifer Hauxwell, Dr. Susan Babcock (Graduate Faculty Executive Committee (GFEC) representative]

Introduction

This is a report on a ten-year review of the Water Resources Management Program at the University of Wisconsin-Madison. This review was requested by Paul F. Robbins, Director, and Paul Zedler, Associate Director, of the Nelson Institute, which administratively houses the Water Resources Management Program. As stated in the charge to the review committee (appended to this report), this review focuses “…on evaluating the quality and function of the academic programs. To the extent that departmental matters (e.g., strategic planning, climate, facilities) affect academic programs, the committee should offer comment; however, the focus of your report should be on the academic programs, and the student experience.”

The Water Resources Management (WRM) program is one of three graduate degree-granting programs administered by the Nelson Institute. The other two programs are Environmental Conservation (EC) and Environment and Resources (E&R). The WRM program leads to a master of science (M.S.) degree in water resources management. Graduates typically seek employment as professionals in government, business, industry, education and the nonprofit sector. WRM students do not conduct individual research projects. Instead, they participate in a summer group practicum, or workshop, with a water resources management focus. This summer practicum is a unique feature of the program, and sets it apart from many other graduate school experiences.

The WRM program operates on a very small budget. The program’s Chair, currently Dr. Anita Thompson, receives one month of salary for chairing the program. The advisor for the workshop, who may or may not be the same person as the chair, also receives one month of summer salary. Funding for the summer practicum is usually provided by outside clients for whom the practicum is undertaken, but on occasion has been supported by other funds, such as Professorships. Other UW faculty affiliated with the program serve on a largely volunteer basis. The Nelson Institute staff provides much of the day-to-day program administration. Students in the program are about half self-supported and take courses in a variety of departments affiliated with the program.

The review was conducted between January 1 and March 31, 2017. After an initial meeting and interview with Director Thompson the committee developed a series of interview questions and scheduled interviews with the individuals and groups listed below. The committee also designed an
online survey and sent this to current WRM students. Following the interviews and survey the committee discussed the results and developed the following consensus report.

Sources of information
The review committee collected and assessed a variety of information in preparing this report. Key sources of information include:

- The Self-Study Report prepared by the WRM program, dated September, 2016
- An online survey of current WRM students
- Direct interviews with individuals or groups as follows:
  - WRM Chair (Dr. Anita Thompson)
  - Nelson Institute Director (Dr. Paul Robbins)
  - Nelson Institute Staff (Jim Miller)
  - UW Faculty members who have recently participated in the WRM program:
    - Dr. Kenneth Potter
    - Dr. Jean Bahr
    - Dr. Ken Genskow
    - Dr. Emily Stanley
    - Dr. Stephen Ventura
  - Current graduate students in the WRM program
    - Three second-year students
  - Alumni of the program
    - Three recent program alumni
  - Potential employers of program graduates
    - Three business or government leaders who have employed or might employ WRM graduates

Summary notes and responses for each of these data sources are included as appendices to this report along with the current checklist for successful graduate degree programs and a list of some competing programs at other institutions.

Summary of program strengths and challenges
Through its interviews and material review the committee concludes that the Water Resources Management (WRM) program has been very successful over the past decade, as measured by student and alumni satisfaction with the program and the broad success of program graduates in finding employment in water resources fields. The program has an overwhelmingly positive reputation, is widely respected, and has a strong, loyal, and geographically widespread alumni base. Employers find that WRM graduates are excellent employees, and many graduates have become leaders in their fields. Many interviewees commented that the program embodies the Wisconsin Idea by combining university research and knowledge with management and administrative skills.

The fundamental strength of the program is the dedication and passion that the Chair, faculty, and students bring to it. Much of this passion is focused on the summer WRM workshop practicum which was cited numerous times as offering a unique and even transformative student experience in which students are forced to work together, often outside their individual comfort zones, to achieve the group
goals. Students, faculty, and alumni are committed to the program and proud to have been a part of it. An observation heard more than once can be summarized in the statement “...this program runs on love...”; such a statement reflects the passion and loyalty of the participants but also reflects the realities that the program is underfunded and depends on goodwill and volunteerism for its continued success. This lack of long-term resources is a program weakness and a potential area of concern. Another concern is that the program appears to be operating without a long-term strategy and with only modest integration with other water-management related programming in the Nelson Institute, the larger University of Wisconsin system, or nationally. This lack of long-term plans or strategies may be leading to missed opportunities and chances to make the program even better.

Program strengths
- High-quality students, with a breadth of experiences
- Groundbreaking, science-based approach
- Small size. Faculty and students feel that the current program is about the right size (10-15 students per year/cohort). But this small size may also present challenges for program sustainability.
- Produces practitioners with a relatively broad perspective on water resource management issues (e.g., about half of WRM students earn a second degree, such as CEE, Public Affairs, URPL)
- Loved by students and faculty
- The cohort system, in which student groups participate together over a two year period; group cohesion (e.g., strengthened by the off-campus orientation/field trip)
- The current moderate size of the cohorts (10-15 students) lets individual students take personal ownership in the workshop project while also working on an interdisciplinary team
- The summer workshop, often cited as a unique group experience that takes students out of their comfort zone, often widened students’ career horizons, and embodies the Wisconsin Idea
- The mixture of science and policy
- The dedication and passion of recent program Chairs and associated faculty and staff
- A loyal and widespread alumni network
- A record of successful employment and career growth for program alumni
- Satisfied employers of program graduates

Program weaknesses
- Limited funding for both faculty and students.
- Dependence on goodwill and dedication of faculty for supervision and direction
- Danger of the workshop being “captured” by the research interests or discipline of particular Directors or faculty advisors
- Uneven and inconsistent application process for practicum projects and sponsors. Essentially a word of mouth process
- Some potential employers find graduates underprepared in technical skills
- Group practicum can make it difficult for students applying for jobs to articulate areas in which they provided leadership
- Uneven and sometimes inadequate student advising (e.g., brochure, curricula maps) and/or orientation
- Lack of a long-term strategic plan
• Lack of coordination with the strategic goals of the Nelson Institute
• Curriculum is vulnerable to the lack of regularly-offered social science courses (e.g., Water Institutions & Policies)
• Stronger linkages could be made with Public Health
• Limited coordination with other UW-Madison water programs
• Little ethnic or cultural diversity among students in the program
• Limited international water expertise on Madison campus, and lack of an international water policy course

Challenges facing the program

The committee identified several issues that it regards as challenges to the WRM program over the next decade.

Financial support for students
Currently, the program provides little or no financial support for its students. Students are often either self-supported or obtain RA, PA, or TA support in other departments, often while pursuing double/dual majors. The committee wonders if this arrangement is sustainable, and whether it is causing the best and brightest students to go elsewhere.

Financial support for faculty
The WRM program has been fortunate in recent years in having exceptional faculty members step up to direct the program and assist with the summer workshop. The financial rewards for doing this work are small – generally a month of summer salary – while the work load – running the summer workshop and advising 20 or more students – can be large. In addition, accepting the Chair position likely interrupts the research career of the faculty member. We note that the WRM Chair position now (as of this year) has a Professorship (Nelson Institute Professor of Water Resources) tied to it and with that come some discretionary funds for the Chair.

Equipment or dedicated program space
Students mentioned that much of the equipment for the field practicum must be borrowed, often from the practicum Director’s laboratory or from other cooperative faculty or institutions. Obviously, equipment needs vary from year to year but building up an inventory of common water-resources field equipment might help facilitate the practicum. In addition, except for a small room in the basement of Science Hall, there is no “common space” for WRM students to gather, work together, or store equipment.

Selection process for Practicum projects
Currently, the selection process for practicum workshop projects is unclear and uneven. There is little or no solicitation for projects; instead the opportunities depend largely on faculty members’ own contacts and interests. Faculty expressed a reluctance to advertise the workshop opportunity more broadly because it would likely mean rejecting proposals, with potential negative impacts on outside relationships. The danger with this process is that some worthy projects (and potential funding
opportunities) can be missed. The committee suggests that the Request for Applications process for practicum could be improved to make more communities aware of the opportunity while continuing to respect the interests of those directing the program. Low-stakes requests for applications (short preproposals) might be an easy way to increase exposure.

**Ongoing and appropriate faculty support and expertise**

Many of the faculty who over the last decade have directed the WRM program are now at or near retirement. It is unclear who the next cadre of faculty will be who will step up to move the program forward. In addition, the committee identified a potential gap in faculty expertise as a lack of anyone with expertise in international water policy. Finally, a professional practice course (how to write proposals, resumes, budgets, make presentations, etc.) might be a good addition to the program.

**Student advising**

One of the most common criticisms of the program given by students and alumni was a lack of clarity in student advising. The program Chair is the default advisor for all the students in the program, possibly creating an unreasonable advising workload. The program requires all students to form a 3-person advisory committee, and program staff emphasize to students the importance of this committee both to assisting with curriculum selection and to developing networking skills and mentorship opportunities. The program expects student to be proactive in forming these committees. Nevertheless, students reported difficulty and uncertainty in finding other advisors, often because they didn’t know who or how to ask. The role of, and even need for, an advisory committee in a WRM student’s program seems to be unclear to some (not all) students, and some students treat the advising as perfunctory or simply a check-off before graduation. Frequently the advisory committees do not even form or meet until the student’s program is nearly complete, and such advising can be ineffective.

**Opportunities for engaging other professionals**

Wisconsin, and the Madison area in particular, are rich in professionals working in water-resources fields. The committee suggests that student training could be strengthened by developing more intentional interactions with practicing professionals. This might initially take the form of guest lectures or panel discussions with outside professionals about career opportunities or water-management issues of the day and might eventually lead to internships or funding opportunities.

**Integration with other programming in the Nelson Institute or wider water resources community**

Although the WRM program is housed in the Nelson Institute, it appears to have only minimal links to other Nelson Institute programs and activities. For example, the two strategic priorities established by Nelson Institute Director Robbins are Urban Needs and Native Nations, but the WRM program has not been formally linked to either of these. Nor does it have many links to other important programs such as Sea Grant or Water at UW, though we note that Chair Anita Thompson currently serves on the Water at UW Steering Committee in an effort to better link these programs. There are obvious potential links with the new Master’s program in Environmental Conservation at Nelson. Improving such linkages could lead to synergy for all Nelson programs.

On the broader scale, the WRM program currently seems disconnected from important water-resources institutions or industries outside of the university. For example, the Water Council and related Global Water Center in Milwaukee is “…a globally connected epicenter for freshwater research, innovation,
education and business development” that might be a natural partner for the WRM program to expand its portfolio of opportunities for training and funding. In Madison, the Clean Lakes Alliance has developed a strong, and well-funded institution focused on the Madison lakes and involving local business leaders and industries; such an organization might present opportunities for WRM.

Lack of a strategic plan

Many of the criticisms or questions the committee heard related to the WRM program seem to relate to the absence of strategic thinking or planning for the program. This is not to say that the program has not been, or is not being, successful – it has been and it is. But, looking forward, the committee developed numerous questions, such as:

- Is the program the right size? Is its current size sustainable?
- How can the program achieve financial stability?
- Is there a pool of UW-Madison faculty members ready to step up to guide the program as currently engaged faculty retire?
- Is the program exposing students to not only contemporary but emerging urban, suburban, and rural water resource management issues, and not only in the Upper Midwest but in other parts of the U.S. and even internationally? Many of the challenges in protecting the integrity of natural hydrogeologic and ecological systems pertain to “human dimensions” issues (e.g., land use patterns, resource extraction technologies, and water infrastructure systems, driven by public policies and human behaviors). A broad range of resource management challenges pertain to water extraction, delivery, and use by people (e.g., aquifer depletion from over-pumping, rural groundwater contamination from agriculture and onsite wastewater systems; lead pipes in urban water delivery systems; combined sewer overflows in metro areas).
- Are there different models (other than the practicum) for students to get equivalent technical/management experience? What are they?
- How can the program move from the current “volunteer” model to a “service” model for funding and faculty involvement?
- The workshop/practicum format has remained almost unchanged for many years. Is this still the appropriate format for the WRM experience? What is the current standard of practice for such workshops? How could it be improved (e.g., switching the writing requirement from 1-2 credit mandatory fall semester after practicum to finalize written report; workshop on data visualization)?
- What programs at other Universities (or even at UW-Madison) does WRM compete with? How does the WRM program (e.g., curriculum, student advising & handbook, funding, governance) compare to programs offered elsewhere (e.g., Oregon State U., U. Michigan, U. Minnesota, U.C.-Davis, U. Nevada-Reno, U. Arizona, U. Vermont, U. New Mexico)? Are there “best practices” that could inform future changes to the WRM program?
- Could the program be marketed more effectively? Currently there is little or no marketing.
- How could the strong and loyal alumni group be utilized more effectively? E.g., alumni advisory council; periodic panels with working WRM professionals.
- Are there opportunities for funding that are going untapped, such as partnerships with industry, foundations, or agencies?
Recommendations

Overall, the committee believes the WRM program is functioning well, producing successful practitioners, satisfying employers, and maintaining its reputation as a unique program. Going forward, however, the committee recommends that to be sustainable and to aspire to excellence the program must take a hard look at itself in the context of changing water resource management challenges at regional, national, and international scales. The program also needs to attend to issues related to funding, competition from other programs, and student advising. Specifically, we recommend the following:

1. The WRM program should develop a comprehensive strategic plan for the next 5-10 years, with attention to the following items:
   a. How WRM compares to competing interdisciplinary water resources programs at other universities. What will continue to make WRM unique and competitive? (see Appendix 12).
   b. Student diversity
   c. Funding and funding models
   d. Faculty support. Where will the next generation of faculty come from?
   e. How WRM might be better integrated with the larger mission of the Nelson Institute and other water programs on the UW-Madison campus?
   f. Is the program the right size? Is the number of graduates produced aligned with the demand for employees with the expertise gained in WRM program?
   g. How can the summer workshop, a unique aspect of the program, best prepare students to address changing water management challenges?
2. The program should evaluate the ways that student advising takes place, and the needs and timing for appropriate student advising. Program policies and procedures should be summarized in the up-to-date program handbook that is required by the graduate school.
3. The program should consider establishing an outside board of visitors, possibly composed of alumni and employers, to annually review the program and provide guidance.
4. The program should explore opportunities for better connections with the industry and business sectors both inside and outside of Wisconsin.
5. The program should review the Check list for Successful Graduate Degree Programs, provided to them with the review request materials and included as Appendix 11, and assure that all information on it is current and easily found on the program website

Appendices

Appendices to this report summarize the information collected by the review committee.

Appendices:

1. Letter of Charge to the Review Committee
2. Notes from the initial committee meeting (1/4/17) including comments from Director Anita Thompson
3. Questions prepared for faculty, students, alumni, and employers
4. Summary of interview with Nelson Institute Director Robbins
5. Summary of interview with Jim Miller, Senior Student Services Coordinator
6. Summary of group interview with WRM Faculty members
7. Summary of group interview with current WRM students
8. Summary of Qualtrics survey responses from current students
9. Summary of group interview with WRM employers
10. Summary of group interview with WRM alumni
11. Successful Graduate Degree Program Checklist
12. Information and links from competing similar programs at other institutions
This visualization was created by the Graduate School. Questions should be directed to Peter Kinsley, peter.kinsley@wisc.edu.