1. Program Overview

Water Resources Sciences (WRS) is a science-based, interdisciplinary, inter-collegiate (University of Minnesota – Twin Cities and University of Minnesota – Duluth) graduate program. The program draws on numerous water-related courses from departments on the St. Paul, Minneapolis, and Duluth campuses and is administered by the University of Minnesota Water Resources Center. The WRS graduate program is positioned within the College of Food, Agricultural and Natural Resource Sciences (CFANS). The WRS graduate program is overseen by co-Directors of Graduate Studies (co-DGSs), one located on the Twin Cities campus and one located on the Duluth campus. There are more than 100 faculty members associated with the Water Resources Sciences graduate program. The WRS faculty consists of traditional, tenure-track faculty who have appointments in numerous departments and colleges at both the University of Minnesota – Twin Cities and the University of Minnesota – Duluth. In addition, there are numerous WRS graduate faculty who hold adjunct positions.

2. Educational Goals and Outcomes

The WRS graduate has three educational goals: (1) To produce scientists with strong technical skills in disciplines relevant to water resources science; (2) to develop a holistic understanding of the hydrologic cycle and associated ecosystems, as well as the interconnectedness of the sciences needed to understand and manage aquatic resources; and (3) to generate an understanding of the interplay between the bio-physical sciences and the social sciences in developing and implementing public policies related to water. Students in the program develop the breadth of scientific knowledge appropriate to understand the complicated aquatic ecosystems and watersheds on which they will work, as well as social dimensions of the topic, including the public policy and legal frameworks in which water resources are protected and managed.

3. Development of the Learning Outcomes and Assessment Plan

The WRS graduate program relied partly on a semester-long effort in the spring of 2014 to develop a graduate studies assessment program under the purview of the Graduate School’s Graduate Review and Improvement Program (GRIP). As part of the GRIP effort, the DGS, the program level coordinator and an MS student in the WRS graduate program conducted an online survey of WRS students. This survey focused on the goals and outcomes of the graduate program, as well as the means by which to assess it. A final report and action plan were prepared to document the activities, collected information, data analysis, and recommendations of this effort. The results of the GRIP were presented to the WRS Executive Committee in May 2014. These results were discussed and several suggestions were implemented.

4. Graduate Learning Goals and Outcomes

One of the goals of the graduate program is to prepare students for a variety of roles in research and practice associated with Water Resources Science. Ergo, the following learning outcomes for the graduate program have been identified:
• Broad knowledge and scholarship in several areas of Water Resources Science. These areas include: aquatic biology, environmental/water chemistry, hydrology, limnology, water management technology, water policy and economics, water quality, and watershed science and management.
• Deep knowledge and scholarship in one specific area of Water Resources Science. These areas include: aquatic biology, environmental/water chemistry, hydrology, limnology, water management technology, water policy and economics, water quality, and watershed science and management.
• Research and methodology skills that are timely and pertinent in Water Resources Sciences (MS Plan A and PhD only).
• Communication skills (written and oral) commensurate with an advance degree holder.
• Education needed to provide service, exemplify citizenship, and convey professionalism in Water Resources Science.
• Knowledge of pedagogy and skills for teaching needed to be successful educators.
• Acquisition of skills needed for collaborative and interdisciplinary work.

The degree to which these learning outcomes are achieved should be proportional to the degree sought by the individual student (i.e. MS versus Ph.D).

5. Assessment of Learning Outcomes

There are numerous assessments that are used in the WRS graduate program to track the progress of graduate students. Some of the assessments are applicable to all graduate students, but others are appropriate for certain degrees only. The assessments and the corresponding degrees follow:

• Course completion and faculty evaluation of coursework (All)
• Participation in research seminars (All)
• Written preliminary examination (Ph.D.)
• Oral preliminary examination (Ph.D.)
• Final examination (All)
• Written project report (M.S. Plan B)
• M.S. thesis or Ph.D. dissertation (M.S. Plan A, Ph.D.)
• Publications (M.S. Plan A, Ph.D.)
• Conference presentations

Each student will be individually evaluated at the end of the spring semester each year for their levels of achievement in each of these learning outcomes. Students who are not evaluated will not be allowed to enroll in courses in the subsequent fall semester. The PLC will collect this data and it will be presented to the WRS Executive Committee. The WRS Executive Committee will make its recommendations to the co-DGS’s, who will be responsible for implementing improvements. In addition, programmatic issues (i.e., those not tied to an individual student) will be assessed every third year via a GRIP-like survey and assessment process.

6. Continued Development of the Graduate Program Learning Outcomes and Assessment
The graduate program learning outcomes and assessment for the WRS graduate program are expected to undergo continuing modification in response to active participation by the faculty and graduate students. Annual review of the plan will be conducted by the WRS Executive Committee to determine needed improvement and enhancement.