WATER MANAGEMENT & HYDROLOGICAL SCIENCE

Self-Study Report for Academic Program Review

Spring 2020
Howdy! On behalf of the interdisciplinary faculty of Water Management and Hydrological Science (WMHS) Program, the students and the entire Texas A&M University community, we are pleased to welcome you to our campus and thank you for your service as external reviewers of our WMHS Program. This self-study report was prepared for your review and reflects an evaluation of our WMHS Graduate Program during the period of September 1, 2012 through August 31, 2019, since our last academic program review (APR) in 2012.

The review process provides us with an opportunity for self-reflection and critical assessment of our WMHS Graduate Program. We recognize that this review represents a considerable commitment of your time and effort and appreciate your willingness to invest in strengthening our program.

We can assure you that we value your review and will utilize it to facilitate our program’s continued progress forward.

Please do not hesitate to contact us before or during your meeting for any additional information that you may require.

We are looking forward to seeing you at the review April 26 – 29, 2020.

Ronald Kaiser, Chair

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Email: rkaiser@tamu.edu
The Academic Program Review (APR) process at Texas A&M provides the opportunity for academic units to plan strategically, assess the quality and efficacy of their programs and determine the best courses of action for ongoing improvement. APR is at the heart of our institutional commitment to excellence and we sincerely thank you for assisting us. This letter provides you with the charge to the committee and a brief overview of the program.

Please examine the interdisciplinary Water Management and Hydrological Science Graduate Degree Program and make recommendations that will help in planning improvements. Your resources are a self-study report prepared by the program, copies of materials from the program’s last review, information you gain through personal interactions while visiting Texas A&M University, copies of strategic plans, and goal-setting documents at the program, college, and/or university level, and any additional information requested by you that we can provide. Within the broad charge of recommending ways the program can continue to improve are some specific questions that we would like you to address:

- Based on the data/information provided in the self-study report or gathered by the review team, what are the program’s overall strengths and weaknesses?
- How well do the program’s strategic goals align with those of its college and with those of Texas A&M University?
- How would you compare this program with its peers? Specifically, is the curriculum directly related and appropriate to the mission and goals of the institution?
- What improvements (including student learning and faculty development) has the program made since the previous program review?
- With only current resources or a modest infusion of new ones, what specific recommendations could improve the program’s performance, marginally or significantly?

We look forward to meeting with you during your time on campus. If you have any questions or require additional information prior to your visit, please contact Ms. Bettyann Zito, APR Program Coordinator, at apr@tamu.edu.
This self-study report provides an overview of the interdisciplinary Water Management and Hydrological Science program at Texas A&M University, and its progress toward fulfilling its core academic mission. The report focuses on activities since the previous academic program review in 2012, with the aim of identifying strengths and opportunities for future enhancement.

The interdisciplinary Water Management and Hydrological Science (WMHS; waterprogram.tamu.edu) graduate degree program is one of 11 interdisciplinary degree programs at the University.

It was established in 2005 and is administratively located in the College of Geosciences, Department of Geography. Currently 56 faculty from the Colleges of Agriculture and Life Sciences, Engineering, Geosciences, the Bush School of Government and Public Service, School of Law, and School of Public Health participate in the program. The core faculty who participate do double duty. Not only do some supervise and fund students in their respective departments, but they also supervise and fund WMHS students.

Three degrees are offered:

- A 30-credit hour non-thesis Master of Water Management (MWM) degree designed to provide professional education emphasizing problem solving, technical and administrative skills for students who will manage water systems and water resources.

- A 32-credit hour research-based thesis Master of Science (MS) degree, designed to enhance student scientific, technical, or managerial expertise.

- A 64-credit hour dissertation-based research Ph.D. degree designed to provide students a comprehensive knowledge of water science and hydrology and provide expertise in research methods. It is designed to prepare students for academic or research careers.

Program by-laws provide for a faculty elected Executive Committee. A Program Chair is elected from the Executive Committee member to serve as the Program’s administrator. The Executive Committee and Program Chair are collectively responsible for program administration, reviewing and approving applicants for admission, performing periodic curricula assessments, approving curriculum course additions, awarding scholarships...
and ensuring a rigorous course of study. Additional responsibilities include assessment of the learning objectives, strengthening research, and other duties necessary for program administration.

Enrollment in the program has remained relatively constant over the last five years, averaging about 55 students. Since program's inception about 75 percent of the students have pursued the master's degree and about 25 percent the doctorate. The master’s students are predominately domestic while the doctoral students reflect nearly a balance between domestic and international students. Our currently enrolled international students are from 11 different countries.

An external Advisory Committee has been formed to provide advice regarding the curricular and educational needs for students, identify networking, internship, research and professional opportunities for students, provide guidance on evolving needs of the water industry and profession, assist in developing resources to support student needs, and serve as an advocate for the water program. Membership to the Committee is by invitation and there is no financial commitment either by Advisory Committee members or by TAMU.

Program funding of $139,300 for the 2019-2020 fiscal year is provided by the Provost through the Office of Graduate Studies, and $3,000 is provided by the Department of Geography. This funding supports the salary of the program coordinator, graduate assistantships, scholarships, student travel funding, and other administrative expenses.

### Degrees Awarded Annually

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<thead>
<tr>
<th>Degree</th>
<th>13-14</th>
<th>14-15</th>
<th>15-16</th>
<th>16-17</th>
<th>17-18</th>
<th>Total</th>
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<tr>
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<td>5</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>36</td>
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<tr>
<td>MS</td>
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<td>1</td>
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<tr>
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<td>15</td>
<td>20</td>
<td>23</td>
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<td>90</td>
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</tbody>
</table>
# Table of Contents

1 **Introduction to Degree Program**
   1.1 Overview of the System and University ........................................... 1
   1.2 Interdisciplinary Programs (IDPs) at Texas A&M .......................... 2
   1.3 WMHS Vision, Mission, and Strategic Plan .................................. 3
   1.4 Administrative Structure of the WMHS Program ........................ 4
      1.4.1 WMHS Executive Committee ........................................... 4
      1.4.2 Program Chair ......................................................... 5
      1.4.3 Program Coordinator ............................................... 5
      1.4.4 External Advisory Committee .................................... 5
   1.5 Degree Program Facilities ....................................................... 7
   1.6 Institutional Funding Formula for Interdisciplinary Programs ....... 7
   1.7 External Program Accreditation .............................................. 9
   1.8 Overview of Progress Since Previous Academic Program Review ... 9
   1.9 Analysis ............................................................................. 9

2 **Academic Program and Curricula** ............................................... 12
   2.1 Master of Water Management .................................................. 12
   2.2 Master of Science .............................................................. 12
   2.3 Doctoral Degree .................................................................. 13
   2.4 Admission Criteria ............................................................. 14
   2.5 Academic Enhancement /High Impact Opportunities for Students ... 15
   2.6 Assessment of Student Learning Outcomes: ............................ 16
   2.7 Analysis ............................................................................. 19

3 **Faculty Profile** ........................................................................ 20
   3.1 Core Faculty .......................................................................... 20
   3.3 Other Faculty ......................................................................... 23
   3.4 WMHS faculty teaching required or directed water courses ......... 24
   3.5 Core Faculty Publications ..................................................... 25
   3.6 Core Faculty External Grants .................................................. 25
3.7 Faculty Advising
3.8 Teaching Load
3.9 Faculty Diversity
3.10 Faculty Qualifications
3.11 Analysis

4 STUDENT PROFILE
4.1 Applications and Admissions
4.2 Annual Enrollment
4.3 Students by degree
4.4 student demographics
  4.3.1 Country of Origin of WMHS students
4.4 Time to Degree
4.5 Student financial support
4.6 Student publications
4.7 Graduation Rates and Employment Profile
4.8 Analysis

5 CONCLUDING OBSERVATIONS

APPENDIX A: FACULTY BIBLIOGRAPHY
APPENDIX B: WATER, RESEARCH METHODS, AND STATISTICS COURSES
APPENDIX C: WMHS ASSESSMENT REPORT FOR 2017-2018
APPENDIX D: WMHS FACULTY BYLAWS
APPENDIX E: INSTITUTIONAL PROFILE
INTRODUCTION TO DEGREE PROGRAM

1.1 OVERVIEW OF THE SYSTEM AND UNIVERSITY

Texas A&M University is part of the Texas A&M University System, one of the largest systems of higher education in the nation, with a statewide network of ten regional universities and seven state agencies. Collectively A&M System member universities enrollment is over 152,000 students annually. With more than 26,000 faculty and staff, the Texas A&M System has a physical presence in 250 of the state’s 254 counties and a programmatic presence in every one. More than one in five students in a public university in Texas is enrolled in a Texas A&M System institution. The A&M System, with a 2019 operating budget of $4.6 billion, is governed by a nine-member Board of Regents. The Regents appoint the chancellor who oversees the direction and operation of the system.

Texas A&M University, established as a land grant university in 1871 and originally named the Agricultural & Mechanical College of Texas, serves as the flagship of the System. In 1963, the Texas state legislature officially renamed the school to Texas A&M University.

Today, the university enrolls more than 69,000 students including 15,000 graduate and professional students. Nearly 4,000 faculty are located in the 19 academic colleges and schools at Texas A&M University. The university offers 133 undergraduate programs, 175 master programs, 92 doctoral degree programs and five professional degrees. The university ranks among the top U.S. universities in attracting international students with more than 4,500 students from 120 countries. It consistently ranks among the country’s top 20 universities in terms of enrollment of National Merit Scholars. Along with the University of Texas and Rice, Texas A&M is one of only three Tier 1 universities in the state. In 1971 and 1989, respectively, Texas A&M was designated as a sea-grant and a space-grant institution, making it among the first four universities to hold the triple distinction of land-grant, sea-grant, and space-grant designations.

Texas A&M ranks 9th among public research universities and 16th overall based upon research and development in the latest survey from NSF, with fiscal year 2019 expenditures of over $905 million. The University is one of only 62 members of the Association of American Universities and one of only 17 institutions in the nation to hold the triple designation as a land-grant, sea-grant, and space grant university.
1.2 Interdisciplinary Programs (IDPs) at Texas A&M

Texas A&M University is a department centric institution where department faculty are responsible for designing curriculum leading to graduate degrees. The process for an interdisciplinary faculty to establish and administer a graduate degree program involves meeting specific university-level requirements and approvals at various levels within the university, prior to its approval at the state-level by the Texas Higher Education Coordinating Board.

Interdisciplinary degree programs (IDP’s) are unique at Texas A&M University in that they are designed and administered by faculty representing multiple departments, and in some instances by faculty in multiple colleges, to oversee a graduate degree program not offered at any existing academic department. Of the graduate degrees offered by Texas A&M University, only 9 of the 175 master degree programs are awarded by IDP’s and only 8 of the 92 Ph.D. degree programs are awarded by IDP’s. The current IDP’s at Texas A&M University are:

Agribusiness (MAB)
Agribusiness and Managerial Economics (PhD)
Biotechnology (Master of Biotechnology) (MBIOT)
Ecology and Evolutionary Biology (PhD)
Energy (MS)
Genetics (MS & PhD)
Marine Biology (MS & PhD)
Molecular and Environmental Plant Sciences (MS & PhD)
Neuroscience (MS & PhD)
Toxicology (MS & PhD) and
Water Management and Hydrological Science (MS & PhD)

Oversight of IDPs falls under the responsibility of the Office of Graduate and Professional Studies and a Council of Participating Deans, consisting of the deans of the colleges having faculty participating in the IDP. In addition, IDP graduate degrees are also subject to the University external review process. Hence this review.
1.3 WMHS Vision, Mission, and Strategic Plan

Vision
To enhance water sustainability for present and future generations.

Mission
To prepare the next generation of water managers and scientists with expertise to improve the availability, security and reliability of human water supplies.

Values
The creation of knowledge, and the imparting of knowledge, skills, values, and ethics to our students that reflect a strong water science experience.

A collegial environment and the atmosphere and resources to facilitate and promote cutting-edge research by our students and faculty.

A diverse faculty and student body.

A responsibility to the citizens of Texas to provide research outcomes that will help lead the state in providing a sound economic, sustainable base for the future.

Goal
To be preeminent among interdisciplinary water education programs by developing impactful knowledge, leadership, critical thinking and research skills so students can pursue diverse career paths in academic, public and private sectors of the water industry.

Strategic Plan
Texas A&M University is currently engaged in the formulation of a new Strategic Plan. A draft is available at http://provost.tamu.edu/Provost/media/Assets/pdfs-strategicplan/Next150Comprehensive.pdf. Two strategies, listed at page 15 of the draft, are related to interdisciplinary graduate education.

- Improve interdisciplinary graduate education reducing barriers and fostering collaborations.
- Expand professional master’s program including integrative bachelor’s and master’s programs

The WMHS degree program is one of the University leaders in addressing these strategies.
1. Our core faculty drawn from multiple departments and curriculum demonstrate that we have removed barriers and achieved greater long-term collaboration and success than from University interdisciplinary research funding programs. This marks our 15th year of the WMHS program successfully having faculty from multiple departments and colleges collaborate on graduate education.

2. We are evaluating the potential of positioning the MWM professional degree into an option of offering 3+2 program for highly qualified undergraduate students. Potential exists for program development with Geology, Geography and School of Public Health students.

The College of Geosciences is also engaged in the formulation of a new Strategic Plan. The existing College of Geoscience Strategic Plan is available at https://geosciences.tamu.edu/about/strategic-plan/index.html

Considering that the university and college are engaged in formulating new strategic plans, the WMHS program will also be preparing a strategic plan that conforms with both the university and college plans.

1.4 Administrative Structure of the WMHS Program

In 2004 approval for the WMHS degree program was granted by the TAMUS Board of Regents and the Texas Higher Education Coordinating Board gave it final approval in March of 2005. The first students were admitted to the program in September of 2005. Since that time the WMHS program has been hosted by the Department of Geography in the College of Geoscience. The Department, with approval from the College, provides office space, administrative support, business and accounting functions pertinent to program administration.

1.4.1 WMHS Executive Committee

Governance is by an elected Executive Committee consisting of representatives from participating Colleges and Schools and one at large member of the WMHS faculty. The Chair of the Executive Committee is elected by the Committee and serves as the Program Chair.

The Executive Committee works with the Program Chair to determine and implement policy for the good of the Faculty of Water Management and Hydrological Science and represents the interests of the faculty generally to various University committees and other agencies.
**Current WMHS Executive Committee Membership**

Jacqui Peterson, College of Agriculture and Life Sciences  
Tony Cahill, College of Engineering  
John R. Giardino, College of Geoscience  
Gabriel Eckstein, School of Law  
Thomas McDonald, School of Public Health  
Ronald Kaiser, At Large and Program Chair

1.4.2 **Program Chair**

The WMHS Program Chair conducts academic reviews, administers program funds and approves spending, represents WMHS at appropriate College and Office of Graduate and Professional Studies (OGAPS) meetings, acts as the official advisor to graduate students, approves degree plans, and final exams. The Chair crafts graduate admission offer letters, nominates students for Scholarship through the Executive Committee, and officially grants admission to students into the program that have been selected by the Admissions Committee.

1.4.3 **Program Coordinator**

Currently, Dr. C. Prakash Khedun is the full-time Program Coordinator, whose duties span advising, program management, and accounting functions. General roles and responsibilities include; coordinating the planning, development and implementation of all WMHS activities, assisting with implementing programs to facilitate program goals, responding to inquiries regarding program offerings, coordinating program communications and marketing, compiling program statistics, records and databases, identifying and recommending program improvements, and performing other duties as assigned.

1.4.4 **External Advisory Committee**

An Advisory Committee has been formed for the Program. The function of the Committee is to provide advice regarding the curricular and educational needs for students, identify networking, internship, research and professional opportunities for students, provide guidance on evolving needs of the water industry and profession, assist in developing resources to support student needs, and serve as an advocate for the water program. Current membership is listed in Table 1.
**Table 1. External Advisory Committee Members**

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization and Contact Information</th>
</tr>
</thead>
</table>
| **Mike Howe**         | Executive Director  
|                       | Texas American Water Works Association  
|                       | P.O. Box 80150  
|                       | Austin, TX 78708  
|                       | (512) 238 9292  
|                       | mikehowe@tawwa.org                                                                                     |
| **Karen Guz**         | Water Conservation Director  
|                       | San Antonio Water System  
|                       | 2800 US Highway 281 N  
|                       | San Antonio, Texas 78212  
|                       | (210) 233 3671  
|                       | karen.guz@saws.org                                                                                     |
| **Alan Day**          | General Manager  
|                       | Brazos Valley Groundwater Conservation District  
|                       | 112 W 3rd St,  
|                       | Hearne, TX 77859  
|                       | (979) 279 9350  
|                       | aday@brazosvalleymgcd.org                                                                               |
| **Stacy Steinbach**   | Assistant General Manager  
|                       | Texas Water Conservation Association  
|                       | Barton Creek Plaza One  
|                       | 3755 S. Capital of Texas Highway, Suite 105  
|                       | Austin, Texas 78704  
|                       | (512) 472-7216  
|                       | ssteinbach@twca.org                                                                                     |
| **Billy Howe**        | Associate Director, Governmental Affairs  
|                       | Texas Farm Bureau  
|                       | P.O. Box 2689  
|                       | Waco, Texas 76702  
|                       | (254) 751 2208  
|                       | bhowe@texasfb.org                                                                                       |
| **Mike Reedy**        | Vice President  
|                       | Freese & Nichols Consulting  
|                       | 10497 Town and Country Way, Suite 500  
|                       | Houston, Texas 77024  
|                       | 713-600-6800  
|                       | mvr@freese.com                                                                                           |
| **James Beach**       | Supervising Hydrogeologist  
|                       | WSP  
|                       | 1101 S. Capital of Texas Highway, Suite B-220,  
|                       | Austin, Texas 78746  
|                       | (512) 501 5563  
<p>|                       | <a href="mailto:james.beach@wsp.com">james.beach@wsp.com</a>                                                                                      |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Organization and Contact Information</th>
</tr>
</thead>
</table>
| Ken Kramer    | Director Emeritus  
Sierra Club, Lone Star Chapter  
6406 N I-35, STE 1805  
Austin, TX 78752  
(512) 626 4204  
kenwkramer@aol.com |
| Walt Hufford  | Director of Government and Regulatory Affairs  
Repsol.  
whufford@repsol.com |

1.5 Degree Program Facilities

Office space for the Program Coordinator and two offices suites for graduate students are provided by the Geography Department based on their space allocation from the College of Geoscience. The WMHS student offices have space for 12 students. Ph.D. students are generally provided office space in the department of the chair of their graduate committee. An office for the Program Chair is not provided by the Department or the College.

1.6 Institutional Funding Formula for Interdisciplinary Programs

Beginning in FY 2011, a new institutional funding model was adopted whereby WMHS and other interdisciplinary programs received funding directly from the Office of Graduate and Professional Studies (OGAPS), as opposed to the previous system whereby funds were dispersed to participating colleges. This funding model is based on a formula that considers enrollment, graduation rates, and faculty engagement.

In the current fiscal year (FY 2020) the WMHS program received $139,300 for operating expenses from OGAPS. In addition, the Department of Geography has provided an annual allocation of $3,000 per year for the last 5 years. An overview of program income and expenditures during the past 5 years is provided in Table 2. Funds are used to support the Program Coordinator and graduate students. Graduate student support includes research assistantships, scholarships, tuition, fee and insurance payments and travel grants.

The Program has leveraged its funding by offering to pay one-half of an assistantship if a faculty member will pay the other one-half cost. In addition, a number of graduate students are support by faculty through their own research budgets and this support is not included in this table. Thus we have been able to increase the number of students funded through faculty support.
Most of our Master of Science (thesis required) and doctoral students receive some degree of funding through assistantships, scholarships, or tuition and fee payments.

**Table 2: Five Year Summary of WMHS Budgets**

<table>
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<th>FY 18</th>
<th>FY 19</th>
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<td>OGAPS</td>
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<td>3,000</td>
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<tr>
<td>College of GEOS</td>
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<tr>
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<td>165,200</td>
<td>152,300</td>
<td>143,300</td>
<td>142,300</td>
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</table>

| **Expenditures** |          |          |          |          |          |
| Salaries        | 144,900  | 128,500  | 111,700  | 115,900  | 117,500  |
| Scholarships    | 17,000   | 25,600   | 23,400   | 16,700   | 13,600   |
| Travel          | 1,500    | 4,000    | 4,000    | 4,000    | 4,000    |
| Water Daze      | 4,000    | 4,000    | 4,000    | 2,500    | 500      |
| Other Admin     | 2,700    | 3,100    | 9,200    | 4,200    | 6,700    |
| Total           | 170,100  | 165,200  | 152,300  | 143,300  | 142,300  |

* Graduate student support and Diversity and Lechner Fellowships.
** Lechner Fellowships provided by Geoscience. Starting in FY 2019 Lechner provided directly to WMHS from Provost

By matching WMHS funds with faculty research funds we were able to double the assistantships we could offer with WMHS funds (Table 1.3). We also allocated $1,000 for WMHS scholarships and provided the Lechner Scholarship and Val Silvy Scholarship to students.

The number of assistantships has declined for two primary reasons: (1) a slight reduction in funding from OGAPS and (2) salary increases for assistantships. We currently provide $17,000 for 9-month masters assistantship and $19,000 for 9-month PhD assistantships. Beginning this next fiscal year, the University is requiring that tuition and fees for PhD’s must be paid. This will increase costs by approximately $5,000 per assistantship.
1.7 **External Program Accreditation**

Texas A&M University is fully accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) and the WMHS Program is accredited per this process.

1.8 **Overview of Progress Since Previous Academic Program Review**

The WMHS Graduate Program last underwent an Academic Program Review in 2012. That was the inaugural review of the program.

1.9 **Analysis**

The 2012 APR identified a number of strengths of WMHS graduate program including:

- Dedicated faculty with a strong and diverse academic and research expertise.
- Breadth of course selection to accommodate students of diverse interests and backgrounds to find a “niche” for their research interests.
- Diverse and continuously improving student body.
- Diversity scholarships have allowed the Program to recruit students from under-represented groups that have shown strong commitment and leadership to the Program.
- Visionary leadership.
- Highly motivated students with a great sense of cohesion, camaraderie and mutual support.
- Former students are employed in diverse water sectors in positions of responsibility. The cohesion and camaraderie discussed in the point above continues after the students graduate and a network of mutual support has been created.

### Table 3: Number of Graduate Students Supported with Assistantships and Scholarships

<table>
<thead>
<tr>
<th></th>
<th>FY 16</th>
<th>FY 17</th>
<th>FY 18</th>
<th>FY 19</th>
<th>FY 20</th>
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<tbody>
<tr>
<td>Number of Graduate Assistantships</td>
<td>12</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Number of students receiving scholarships</td>
<td>17</td>
<td>21</td>
<td>21</td>
<td>14</td>
<td>11</td>
</tr>
</tbody>
</table>
The 2012 APR reviewers identified areas for improvement including:

1. **Learning Outcomes Master of Water Management (MWM) students.**

The communication learning objective should be made more rigorous to require Master of Water Management (MWM) students (non-thesis) to make a presentation in professional meetings.

**Our Progress:** For the last 5 years all our MWM (non-thesis) students have made a poster or oral presentation at meetings. In addition, we offer travel assistance to all WMHS students who make presentations at conferences.

2. **Program Physical Space**

Lack of adequate space for students is a serious limitation to the cohesion and mutual sharing of experiences among students. Additional space will increase program effectiveness. The cohesion and camaraderie fostered in shared space will significantly increase these great characteristics of the Program. The Review Team acknowledges that lack of space is common to most Universities and many other units at Texas A&M, however, we suggest that the creation of a Student Lounge may partially solve this issue.

**Our Progress:** Physical space allocated to the College of Geoscience and Department of Geography is extremely limited and while our student numbers have increased, we have not increased our physical space allocation.

3. **Degree Plan Preparation**

Inconsistency in advising on course selection and formulation of a degree plan leads to confusion and may unnecessarily increase the amount of coursework to be taken. It is strongly advised that the degree plan be formulated as soon as possible.

**Our Progress:** Our WMHS student handbook provided to each student at new student orientation outlines degree plan timelines. A copy of the current handbook is available on the program’s website (waterprogram.tamu.edu)

We also meet with each new student during their first semester and advise them on degree plan preparation. Additionally, the University blocks students from registering from classes if they fail to meet degree plan filing requirements.
The team strongly endorses the creation of an External Advisory Committee.

**Our Progress:** We have established an External Advisory Committee.

5 Linkage with Texas Water Resources Institute

*Increase collaboration with TWRI and re-engage other Universities in Texas to leverage resources and gain synergies in course deliveries and research opportunities.*

**Our Progress:** We have established highly successful collaborations with the Institute. Their three senior research scientist and two full time research associates are WMHS graduates. Currently seven WMHS students are funded through research assistantships at the Institute. In addition, we have leveraged funding with the Institute to support 2-3 graduate assistantship annually.
2 ACADEMIC PROGRAM AND CURRICULA

Three degrees are offered: a non-thesis Master of Water Management degree (MWM), a Master of Science thesis degree (MS) and a doctoral (Ph.D.) degree. Degree plans for individual students vary depending on the student's background and research focus. A listing of designated water, research methods and statistics courses available for students in the masters and doctoral programs are outline in Appendix B.

2.1 MASTER OF WATER MANAGEMENT

The Master of Water Management (MWM) is a 30-credit hour non-thesis degree intended to provide professional graduate education emphasizing problem solving, technical and administrative skills for students who will manage water systems and water resources. In 2018 the credit hours required for the degree were reduced from 36 hours to 30 hours. The curriculum is structured but flexible enabling students, with the guidance of an advisory committee, to design a course of study in accord with their career objectives.

**Required WMHS Courses (8 hours)**

WMHS 601 Applications and Problems in Hydrological Sciences
WMHS 602 Contemporary Issues in Water Resources
WMHS 681 Seminar – 2 credit hours.

**Common Body of Knowledge Water Courses (12 hours)**

RENR 662 Environmental Law and Policy
AGEC 606 Water Resource Economics
CVEN 664 Water Resources Engineering, Planning and Management
GEOL 410 Hydrogeology

**Designated Water Courses (minimum of 10 hours)**

Courses from the required list

The Program Chair serves as the chair of the students graduate advisory committee.

2.2 MASTER OF SCIENCE

A 32-credit hour research-based thesis Master of Science degree is designed to enhance student scientific, technical, or managerial expertise.
Required WMHS Courses (8 hours)
WMHS 601 Applications and Problems in Hydrological Science
WMHS 602 Contemporary Issues in Water Resources
WMHS 681 Seminar – 2 credit hours

Designated Statistics and Research Methods Courses (3 hours)
Courses from designated list

Designated Water Courses (15 hours)
Courses from the designated list

Electives (up to 3 hours)
Hours determined by student and student advisory committee.

Research Hours (1-4 hour minimum)
Students may opt to add an additional course in lieu of some research hours. Hours determined by student and student advisory committee.

Students applying for the master’s degree have until the start of the second semester to select a graduate chair and advisory committee. During the first semester all master’s students should consult with the Program Chair or Program Coordinator to identify a graduate chair and committee.

2.3 Doctoral Degree

The 64-credit hour Ph.D. is a dissertation-based research degree giving students a comprehensive knowledge of water science and hydrology and expertise in research methods. It is designed to prepare students for academic or research careers. Each student must have a faculty chair before acceptance into the program. Students will work with their chair and the advisory committee to develop a course of study satisfying the curriculum.

Required WHMS Courses (9 hours)
WMHS 601 Applications and Problems in Hydrological Science
WMHS 602 Contemporary Issues in Water Resources
WMHS 681 Seminar

Required Statistics and Research Methods Courses (9 hours)
Courses from designated list
Designated Water Courses (minimum of 18 hours)

Courses from the designated list

Free Electives (up to 9 or more hours)

Hours determined by student and student advisory committee. Any tools, planning or certificate courses are allowed. Students may opt to add an additional course in lieu of some research hours.

Research Hours (18 hours or more)

64 total hours required for degree, if student enters with a master’s degree

The Executive Committee and Program Chair considers exemptions of the required WMHS 601 and 602 courses, or statistics courses based on previous coursework.

2.4 Admission Criteria

Members of the Executive Committee serve as members of the admission committee and review every application. The applicants initially are evaluated based on their curriculum vitae including research experiences and accomplishments, GRE scores, academic record including GPA, letters of recommendation, and their personal statement. Final admission decisions are made by the Executive Committee and Program Chair.

For international graduate student applicants, the University requires those whose native language is not English to fulfill an English proficiency requirement. Verification of English proficiency can be achieved by a Test of English as a Foreign Language (TOEFL) score of at least 80, IELTS score of at least 6.0, or GRE Verbal score of 146. Those graduate applicants not so verified must take the English Language Proficiency Examination (ELPE) prior to registering for courses in their first semester. Those applicants with TOEFL scores below 80 and GRE verbal below 146 are required to take and pass the ELPE Oral exam as a condition of their acceptance into the graduate program.

GPA, GRE, and TOEFL Scores

These scores are important admissions criteria for our programs. We require a minimum GPA of 3.0 on a 4.0 scale and, to be competitive, GRE scores of at least 152 for the verbal and 152 for the quantitative section and 3.0 on the essay. For international graduate student applicants, the University requires those whose native language is not English to fulfill an English proficiency requirement. Verification of English proficiency can be achieved by a Test of
English as a Foreign Language (TOEFL) score of at least 80. For international students to be competitive for WMHS admission our benchmark is at least a 95 on TOEFL.

2.5 Academic Enhancement / High Impact Opportunities for Students

In addition to the WMHS programs highlighted below, Texas A&M University has professional development opportunities for graduate students through the Office of Graduate and Professional Studies and also the Center for Teaching Excellence. For incoming students, the Office of Graduate and Professional Studies has an Orientation day. Leadership opportunities are numerous, and our graduate students are active in the University Graduate Student Council and also their own College Graduate Student Associations. The Center for Teaching Excellence provides TA training and workshops throughout the year. Students can also participate in the Academy for Future Faculty. Graduate students are welcome to attend University and College sponsored grant writing workshops along with the TAMIN workshops. The Career Center assists with job placement and provides assistance with CV writing and interview skills.

**WMHS Field trips:** Starting in 2014 a field trip component was added to the WMHS 602 Contemporary Issues in Water Resources class. Our field trips have focused on the Water/Food/Energy Nexus between the United States and Mexico.

**Rio Grande 2014 Field Trip:** A grant from the University funded a two-week field trip taking students from the headwaters of the Rio Grande in Colorado to its mouth in the Gulf of Mexico. Forty students from the WMHS program, Civil Engineering and Geology were on this 1,800-mile bus trip that started in the San Luis Valley in southern Colorado and ended at the mouth of the Rio Grande. Along the route, students meet with federal, state and local governmental officials and other water stakeholders examining a myriad of water related issues and the socio-cultural, economic, and environmental problems. After the field trip a symposium was convened where students prepared and presented posters on different aspects of issues and solutions that they encountered.

**Mexico Field Trips:** Three field trips to Mexico focusing on the water food energy nexus have been held since 2015. These field trips have been conducted in conjunction with the University of Guanajuato and involve students from both universities working together on common problems. Up to twenty WMHS and 2-4 students from the TAMU School of Law were joined by an equal number from the University of Guanajuato students on each field trip. Students were housed together in facilities at the Hacienda Santa Clara
near San Miguel de Allende and at the University hotel in Guanajuato. As part of the class students prepared presentations and posters on common water/food/energy issues between the two countries. The College of Agriculture and Life Sciences provided $19,000 in scholarship support for TAMU students.

**Research Symposium:** The “Water Daze” annual research poster symposium provides a venue for graduate students to develop research communication skills. All WMHS students are required to present a poster during their graduate program. Each presenter receives constructive written critiques from faculty judges. The critiques serve a dual purpose as they provide the students with feedback on their presentation and are a metric related to assessing student learning outcomes. Monetary awards are given to the top three posters as determined by judges. The number of poster presentations numbers between 40 and 60 per year. WMHS graduate students are also encouraged to participate in the annual Texas A&M Student Research Week in March.

**Travel Grants:** Stipends up to $500 per student are available on a competitive basis to provide travel support for presentation of research at national or international conferences. We have allocated up to $4,000 per year in our annual budget to support student travel. This opportunity supports the professional development of students by encouraging the practice of communicating research findings and the significance/value of such research.

**Internships:** An internship is not required a part of the program however each summer from 3-5 Masters students opted for an internship. The WMHS program has arrangements with federal state and local and private agencies in identifying and placing students for internships.

### 2.6 Assessment of Student Learning Outcomes:

The WMHS Graduate Program recognized the importance of program assessment since its inception and utilizes direct and indirect methods to measure student learning outcomes. Our annual assessment plan sets forth the principal goals of each degree program and establishes the primary student learning outcomes with associated measures to determine what level of proficiency students have achieved. We adhere to the Texas A&M learning outcomes for master’s and doctoral students found on the university website.

The Program Chair in conjunction with the Program Coordinator reports the results of the annual assessment process via the University’s reporting
system used to document and archive all assessment plans. This system requires annual assessment plans and related results reported separately for the master's and doctoral degrees of the WMHS Graduate Program. See Appendix C for latest WMHS Assessment.

**Master’s Degree (MS and MWM) Assessment Plan**

The goals of the WMHS MS degree program are to develop critical knowledge among those who seek to advance water management and science and to provide optimal preparation for future academic and professional success.

Student learning outcomes are to:

1. Develop proficiency in and ability to integrate degree content as measured by:
   - Student performance in WMHS 601 and 602 course
   - Rubric administered at final examinations

2. Demonstrate effective oral and written communication skills as measured by:
   - Annual evaluation direct assessment
   - Rubric administered at final examinations
   - Annual Water Daze Research Symposium judging rubric
   - Conference presentations

3. Demonstrate ability to conduct research as measured by:
   - Rubric administered at final examinations
   - Publish in refereed journal

4. Apply critical inquiry and ethical reasoning as measured by:
   - Rubric administered at final examination
   - Published in referred journal

Although there is only one assessment plan for the master's degree, different measures of student learning are used for the master's non-thesis and master's thesis concentrations. This is because of the distinctive curriculum and focus of each. The only common milestones in the non-thesis curriculum are completion of a core curriculum and the final examination. Master's thesis students have a more robust curriculum and professional development opportunities that offer additional measures of student
Doctor of Philosophy (PhD) Assessment Plan

The goal of the PhD degree program is to provide an optimal learning experience for leadership in water discovery and research.

Student learning outcomes are to:

1. Demonstrate comprehensive knowledge in the water sciences as measured by:
   - Preliminary examination
   - Final evaluation of doctoral student learning in public and final dissertation defense with Graduate Advisory Committee

2. Demonstrate effective oral and written communication skills as measured by:
   - Preliminary examination
   - Final evaluation of doctoral student learning in public and final dissertation defense with Graduate Advisory Committee
   - Research publications

3. Display the acumen to conduct original research as measured by:
   - Preliminary examination
   - Final evaluation of doctoral student learning in public and final dissertation defense with Graduate Advisory Committee
   - Research publications

4. Apply critical inquiry and ethical reasoning to water research as measured by:
   - Preliminary examination
   - Final evaluation of doctoral student learning in public and final dissertation defense with Graduate Advisory Committee
   - Research publications
2.7 Analysis

Annual data collection has shown that nearly all of the master’s and doctoral students in the WMHS Graduate Program achieve competency or proficiency in the student learning outcomes (Appendix C). The annual assessment findings have shown the need for other initiatives as well. We have implemented mandatory annual academic advising meetings for all our students.
3 FACULTY PROFILE

Currently, 56 members from 12 departments are participate on WMHS faculty. These faculty have primary appointments in College of Agriculture & Life Sciences, Dwight Look College of Engineering, College of Geoscience, George Bush School of Government, School of Law, and School of Public Health. A complete list of WMHS faculty is contained in Table 5. Faculty numbers have remained fairly constant over the last 10 years as new faculty are added, faculty leave for other positions and faculty retire or become inactive in the program. As per the WMHS bylaws every three years the Program Chair, in conjunction with the WMHS Executive Committee, reviews the faculty list to determine continuing eligibility. Faculty that don’t meet continuing participation are dropped from the list.

Faculty roles and participation in the program vary. Some faculty are involved in chairing or serving on graduate student committees, while others teach a designated water course and chair a student committee. A faculty list and abbreviated CV is in Appendix A.

3.1 CORE FACULTY

Although a faculty member may be on the WMHS faculty the program differentiates between a faculty member and a core faculty member. Bylaws of the WMHS faculty are used to define core faculty. There are currently 37 core faculty in the program. The definition of core faculty are generally considered to be those faculty who, over the last three years, have done at least one of the following:

1. Chaired or co-chaired a WMHS graduate student advisory committee,
2. Provided funding for a WMHS student,
3. Taught a water courses in the curriculum, and/or
4. Served on the WMHS Executive Committee. Faculty who serve as a graduate advisory committee member but do not provide any other service to the program are not classified as core faculty.

A significant percentage of faculty have been involved in teaching in the water program. Ten faculty from the Colleges of Agriculture and Life Sciences, Engineering and Geosciences have been involved in teaching, or team teaching, the two required WMHS courses and the annual water seminars.
Over the last three years 23 core water faculty have taught a required or designated water course and an additional 12 faculty have either chaired or funded a graduate student or served on the WMHS Executive Committee during the time period.

**TABLE 4: LIST OF CORE WMHS FACULTY IN ALPHABETICAL ORDER FOR 2017-2019**

<table>
<thead>
<tr>
<th>Name</th>
<th>College</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacqueline Aitkenhead</td>
<td>COALS</td>
<td>SCSC</td>
</tr>
<tr>
<td>Srinivasulu Ale</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Robin Autenrieth</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Diane Boellstorff</td>
<td>COALS</td>
<td>SCSC</td>
</tr>
<tr>
<td>Kelly Brumbelow</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Anthony Cahill</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Kung-Hui Chu</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Gabriel Eckstein</td>
<td>LAW</td>
<td>LAW</td>
</tr>
<tr>
<td>Juan Enciso</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Huilin Gao</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Terry Gentry</td>
<td>COALS</td>
<td>SCSC</td>
</tr>
<tr>
<td>John Giardino</td>
<td>GEOS</td>
<td>GEPL</td>
</tr>
<tr>
<td>Inci Guneralp</td>
<td>GEOS</td>
<td>GEOG</td>
</tr>
<tr>
<td>Yong Huang</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Fouad Jaber</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Wendy Jepson</td>
<td>GEOS</td>
<td>GEOG</td>
</tr>
<tr>
<td>Ronald Kaiser</td>
<td>COALS</td>
<td>RPTS</td>
</tr>
<tr>
<td>Peter Knappett</td>
<td>GEOS</td>
<td>GEOL</td>
</tr>
<tr>
<td>Robert Knight</td>
<td>COALS</td>
<td>ESSM</td>
</tr>
<tr>
<td>Franco Marcantonio</td>
<td>GEOS</td>
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</tr>
<tr>
<td>Bruce McCarl</td>
<td>COALS</td>
<td>AGEC</td>
</tr>
<tr>
<td>Name</td>
<td>College</td>
<td>Department</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>------------</td>
</tr>
<tr>
<td>Thomas McDonald</td>
<td>HEALTH</td>
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</tr>
<tr>
<td>Gretchen Miller</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Binayak Mohanty</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Rabi Mohtar</td>
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<td>BAEN</td>
</tr>
<tr>
<td>Francisco Olivera</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Kent Portney</td>
<td>BUSH SCHOOL</td>
<td>BUSH</td>
</tr>
<tr>
<td>Rosario Sanchez</td>
<td>TWRI</td>
<td>TWRI</td>
</tr>
<tr>
<td>Paul Schwab</td>
<td>COALS</td>
<td>SCSC</td>
</tr>
<tr>
<td>Virender Sharma</td>
<td>PSSA</td>
<td>PSSA</td>
</tr>
<tr>
<td>Vijay Singh</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Patricia Smith</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Raghavan Srinivasan</td>
<td>COALS</td>
<td>ESSM</td>
</tr>
<tr>
<td>Benjamin Wherley</td>
<td>COALS</td>
<td>SCSC</td>
</tr>
<tr>
<td>Bradford Wilcox</td>
<td>COALS</td>
<td>ESSM</td>
</tr>
<tr>
<td>Ralph Wurbs</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Hongbin Zhan</td>
<td>GEOS</td>
<td>GEOL</td>
</tr>
</tbody>
</table>
3.3 Other Faculty

Faculty who serve a member on a graduate advisory committee but do not provide service to the program in any other capacity are classified as “other faculty”. The list includes those who have recently joined the WMHS group or in the past have served on a committee.

**Table 5: List of Other WMHS Faculty for 2017-2019**

<table>
<thead>
<tr>
<th>Name</th>
<th>College</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>George Allen</td>
<td>GEOS</td>
<td>GEOG</td>
</tr>
<tr>
<td>Michael Bishop</td>
<td>GEOS</td>
<td>GEOG</td>
</tr>
<tr>
<td>Guy Fipps</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Oliver Frauenfeld</td>
<td>GEOS</td>
<td>GEOG</td>
</tr>
<tr>
<td>John Nielsen-Gammon</td>
<td>GEOS</td>
<td>ATMO</td>
</tr>
<tr>
<td>James Heilman</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Ignacio Rodriguez-Iturbe</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>Fouad Jaber</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Gerard Kyle</td>
<td>COALS</td>
<td>SCSC</td>
</tr>
<tr>
<td>Kevin McInnes</td>
<td>COALS</td>
<td>RPTS</td>
</tr>
<tr>
<td>Garret McKay</td>
<td>ENGR</td>
<td>CVEN</td>
</tr>
<tr>
<td>James Mjelde</td>
<td>COALS</td>
<td>AGEC</td>
</tr>
<tr>
<td>Georgianne Moore</td>
<td>COALS</td>
<td>ESSM</td>
</tr>
<tr>
<td>Miguel Mora</td>
<td>COALS</td>
<td>WFSC</td>
</tr>
<tr>
<td>Kathleen O’Reilly</td>
<td>GEOS</td>
<td>GEOG</td>
</tr>
<tr>
<td>Vanessa Casado Perez</td>
<td>LAW</td>
<td>LAW</td>
</tr>
<tr>
<td>Suresh Pillai</td>
<td>COALS</td>
<td>POLS</td>
</tr>
<tr>
<td>Itza Mendoza-Sanchez</td>
<td>HEALTH</td>
<td>PHEA</td>
</tr>
<tr>
<td>John Tracy</td>
<td>TWRI</td>
<td>TWRI</td>
</tr>
</tbody>
</table>
### 3.4 WMHS Faculty Teaching Required or Directed Water Courses

Twenty-eight faculty from 10 different departments taught a required or directed water course in during the 2016-2019 time period.

**Table 6: WMHS Faculty Teaching a Required or Directed Water Courses For 2016-2019**

<table>
<thead>
<tr>
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<th>College</th>
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</tr>
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<tbody>
<tr>
<td>Jacqueline Aitkenhead</td>
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<td>ENGR</td>
<td>CVEN</td>
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<td>SCSC</td>
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<td>GEOL</td>
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<td>Inci Guneralp</td>
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<td>Yong Huang</td>
<td>COALS</td>
<td>BAEN</td>
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<td>Ronald Kaiser</td>
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<td>RPTS</td>
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<td>Peter Knappett</td>
<td>GOES</td>
<td>GEOL</td>
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<tr>
<td>Robert Knight</td>
<td>COALS</td>
<td>ESSM</td>
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<tr>
<td>Franco Marcantonio</td>
<td>GEOS</td>
<td>GEOL</td>
</tr>
<tr>
<td>Binayak Mohanty</td>
<td>COALS</td>
<td>BAEN</td>
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<td>ENGR</td>
<td>CVEN</td>
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<td>COALS</td>
<td>AGEC</td>
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<td>COALS</td>
<td>WFSC</td>
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<td>Francisco Olivera</td>
<td>ENGR</td>
<td>CVEN</td>
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<tr>
<td>Kent Portney</td>
<td>BUSH</td>
<td>BUSH</td>
</tr>
<tr>
<td>Paul Schwab</td>
<td>COALS</td>
<td>SCSC</td>
</tr>
<tr>
<td>Virender Sharma</td>
<td>PHEA</td>
<td>PHEA</td>
</tr>
<tr>
<td>Name</td>
<td>College</td>
<td>Department</td>
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<td>---------------------------</td>
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<td>------------</td>
</tr>
<tr>
<td>Vijay Singh</td>
<td>COALS</td>
<td>BAEN</td>
</tr>
<tr>
<td>Patricia Smith</td>
<td>COALS</td>
<td>BAEN</td>
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<td>Raghavan Srinivasan</td>
<td>COALS</td>
<td>ESSM</td>
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<td>Benjamin Wherley</td>
<td>COALS</td>
<td>SCSC</td>
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<td>Bradford Wilcox</td>
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<td>ESSM</td>
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<td>CVEN</td>
</tr>
<tr>
<td>Hongbin Zhan</td>
<td>GEOS</td>
<td>GEOL</td>
</tr>
</tbody>
</table>

3.5 **Core Faculty Publications**

Collectively, the WMHS faculty have a prolific water publication record. Over the past four years the 37 core water faculty produced an average of six (6) water related journal articles per year. There is variability in this record as some faculty published more than 100 journal articles during this time period while others produced six. For the last two years faculty have maintained this average. This is not a complete record of their career publications as faculty were requested, for purposes of this report, to limit their publication listing to the four years (See Appendix A for 2-page faculty CV’s).

3.6 **Core Faculty External Grants**

Faculty who participate in the water program have exceptional records not only in their publication records but also in receiving water-related external grants. Grants support students in their respective departments as well as students in the WMHS. Based on data collected from the University’s Office of Research, over the last 3 fiscal years core WMHS faculty members have generated approximately $22.6 million in external funding from competitive funding programs. The funds have supported robust research programs that helped steer the intellectual and scientific direction of the graduate program in addition to providing both financial support and research opportunities for students. The funding record reflects the commitment of Texas A&M University, as a Tier 1 Research Institution, to maintain highly productive research programs that help attract the world’s best faculty and graduate students.
### Table 7. Productivity Metrics for 36 Core Faculty in the WMHS Program over the Last Three Fiscal Years (2017-2019)

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total for Year</th>
<th>Number of Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>$4,931,500</td>
<td>45</td>
</tr>
<tr>
<td>2018</td>
<td>$8,532,000</td>
<td>63</td>
</tr>
<tr>
<td>2019</td>
<td>$9,155,800</td>
<td>55</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$22,619,300</strong></td>
<td><strong>163</strong></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>$7,539,766</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

### 3.7 Faculty Advising

University rules and those of the Water Program govern the formation of student advisory committees and degree plans. Students in the master's degree program must select a graduate chair, form an advisory committee, and file their degree plan by the end of the second semester. Prior to forming their committee, the program chair or program coordinator provide all advising.

Since 2010, the program chair serves as the advisory committee chair for all Master of Water Management students. Doctoral students must have identified a chair from the WMHS faculty who has agreed to serve in that capacity before they can be admitted to the program. However, students have until the end of their third semester to finalize their advisory committee and file their degree plan. At least 19 different members of the WMHS faculty are currently chairing student committees and nearly all members of the faculty have served on a student committee (Table 8). The list does not include master’s admitted in the spring or fall of 2019 because they are not required to select a chair until the end of their second semester. The list does not include PhD students admitted in 2019.

### Table 8. Current Chairs of Students with Degree Plans

<table>
<thead>
<tr>
<th>Student</th>
<th>Degree Sought</th>
<th>Chair/Co-Chair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azzah Al Kurdi</td>
<td>PhD</td>
<td>Peter Knappett</td>
</tr>
<tr>
<td>Ryan Bare</td>
<td>PhD</td>
<td>Terry Gentry</td>
</tr>
<tr>
<td>Patrick Carpenter</td>
<td>MS</td>
<td>Gretchen Miller</td>
</tr>
<tr>
<td>Student</td>
<td>Degree Sought</td>
<td>Chair/Co-Chair</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------</td>
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</tr>
<tr>
<td>Ramiro Chavez-Mota</td>
<td>PhD</td>
<td>Juan Enciso</td>
</tr>
<tr>
<td>Isabella Garrone</td>
<td>MWM</td>
<td>Ronald Kaiser</td>
</tr>
<tr>
<td>Anna Gitter</td>
<td>PhD</td>
<td>Terry Gentry</td>
</tr>
<tr>
<td>Reagan Heijl</td>
<td>PhD</td>
<td>Benjamin Wherley</td>
</tr>
<tr>
<td>Dikshya Khanal</td>
<td>MWM</td>
<td>Ronald Kaiser</td>
</tr>
<tr>
<td>Charis Kehrer</td>
<td>MS</td>
<td>Terry Gentry</td>
</tr>
<tr>
<td>Michael Kenny</td>
<td>MWM</td>
<td>Ronald Kaiser</td>
</tr>
<tr>
<td>Alan Lewis</td>
<td>PhD</td>
<td>Ronald Kaiser</td>
</tr>
<tr>
<td>Vanessa Limon</td>
<td>MS</td>
<td>Paul Schwab</td>
</tr>
<tr>
<td>Xiaohan Mei</td>
<td>PhD</td>
<td>Patricia Smith</td>
</tr>
<tr>
<td>Creighton Meyers</td>
<td>PhD</td>
<td>Srinivasan Raghavan</td>
</tr>
<tr>
<td>Jifar Nata</td>
<td>PhD</td>
<td>Bruce McCarl</td>
</tr>
<tr>
<td>Rebecca Owens</td>
<td>PhD</td>
<td>John Giardino</td>
</tr>
<tr>
<td>Aaron Perez Rodriguez</td>
<td>MS</td>
<td>Gretchen Miller</td>
</tr>
<tr>
<td>Destiny Russell</td>
<td>MS</td>
<td>Robert Knight</td>
</tr>
<tr>
<td>Osia Ruiz</td>
<td>PhD</td>
<td>Vijay Singh</td>
</tr>
<tr>
<td>Nick Russo</td>
<td>PhD</td>
<td>Ronald Kaiser</td>
</tr>
<tr>
<td>Lauren Salcido</td>
<td>MS</td>
<td>Vijay Singh</td>
</tr>
<tr>
<td>Vinit Sehgal</td>
<td>PhD</td>
<td>Binayak Mohanty</td>
</tr>
<tr>
<td>Yuri Shao</td>
<td>PhD</td>
<td>Kung-Hui (Bella) Chu</td>
</tr>
<tr>
<td>James Totten</td>
<td>MWM</td>
<td>Ronald Kaiser</td>
</tr>
<tr>
<td>Elimar Torres-Padilla</td>
<td>MS</td>
<td>Gretchen Miller</td>
</tr>
<tr>
<td>Uyen Truong</td>
<td>MS</td>
<td>Wendy Jepson</td>
</tr>
<tr>
<td>Michelle Ramirez</td>
<td>MS</td>
<td>Jacqueline Aitkenhead</td>
</tr>
<tr>
<td>Mingyue Yang</td>
<td>PhD</td>
<td>Francisco Olivera</td>
</tr>
</tbody>
</table>
### Table 9. Faculty Diversity in FY 2019

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>15</td>
</tr>
</tbody>
</table>

### 3.8 Teaching Load

WMHS does not determine faculty teaching loads. Each department in the university determines teaching loads and it varies considerably across the University.

### 3.9 Faculty Diversity

Since WMHS is an interdisciplinary program drawing on the strength of existing college and departmental faculty our diversity is based on college and department hiring decisions and on faculty willingness to be part of the program. Based on the most recent data the WMHS faculty composition, is listed in Table 9.

### 3.10 Faculty Qualifications

The WMHS Graduate Program has no designated authority related to faculty hiring decisions. Departments make faculty hiring decisions. With respect to teaching graduate classes the Texas A&M Office of the Dean of Faculties credentials graduate teaching faculty and all our WMHS core faculty meet their credential requirements.
3.11 Analysis

Faculty are clearly a strength of the WMHS Program. We have world-renowned senior faculty in their areas of expertise, as well as junior faculty that building national and international reputations. The faculty members contribute to the program in a number of ways: mentoring students, and teaching water science and management either in the core courses or through courses within their departments.

Our faculty have received many prestigious awards. Awards for each faculty member are listed in their short CV’s in Appendix A.
4 STUDENT PROFILE

4.1 APPLICATIONS AND ADMISSIONS

Since its inception in 2005 through academic year 2018, the program received a total of 360 applicants, of which 272 were offered a seat and 158 enrolled. The program has an overall acceptance rate of 75 percent and the percentage of applicant who ultimately choose to enroll is 44 percent. Enrollment reflects the water industry job market. Of the 158 enrolled students three quarters (120) have pursued the masters degree. For doctoral students these numbers reflect the reality that many of our applicants apply to more than one school and those who are accepted but don’t enroll usually do so for many reasons including a better financial aid package from another school.

For the masters program over the last five years (2014-2018) application, admission and enrollment rates remained fairly constant varying by about 2-3 students per year (Figure 1). There were 115 master’s degree applicants, 90 were admitted and 51 enrolled. Applications averaged 23 per year, admissions 18 per year and enrollments 10 per year. Over this period application to admission rates were 78 percent and admission to enrollment rates averaged 57 percent. However, over the last two years the number of admissions to enrollments are lower than the three previous years. This may result from fewer international student applications, students having offers from other universities, a declining base of university financial assistantship and scholarship support, and the need for a targeted recruiting effort. In the past the WMHS program has not engaged in a major recruiting program to encourage student applications. This may need to change.

For doctoral students (Figure 2) our application, admission, and enrollment numbers reflect the reality that many of our applicants apply to more than one school and those who are accepted but don’t enroll usually do so for many reasons including a better financial aid package from another school. Admission into or doctoral program also depends, inter alia, on the availability/willingness of a faculty member to advise the student, which in turn depends on availability of funds to support the student. We often receive application from very qualified students but are unfortunately unable to admit them because there was no faculty available to chair their committee in that particular year. Last year our application numbers were down. As with the master’s enrollments this may result from fewer international student applications, students having offers from other universities, a declining base of university financial assistantship and scholarship support, and the need for a targeted recruiting effort. In the past the WMHS program has not engaged in a major recruiting program to encourage student
applications. This may need to change and will be a topic for a strategic plan.

**Figure 1. A Yearly Comparison of Master’s Degree Applications, Admissions, and Enrollments**

**Figure 2. A Yearly Comparison of Doctoral Degree Applications, Admissions, and Enrollments**

### 4.2 Annual Enrollment

Over the last five years our enrollment has averaged about 55 students. The number of doctoral students has remained fairly constant while the master student has declined over the last two years. Overall student retention has not been an issue. All of the students admitted during the last five years are...
still in the program or graduated from the program.

**Figure 3. A Yearly Comparison of Total Enrollment**

### 4.3 Students by Degree

From 2014-2018 about 85 percent (77 students) of our graduates earned a master's degree and 15 percent (13 students) a PhD degree. This balance between master's and doctoral students reflects the reality of the job market in the water industry and academia.

**Table 10. Masters and Doctoral Degrees Awarded Annually**

<table>
<thead>
<tr>
<th>Degree</th>
<th>13-14</th>
<th>14-15</th>
<th>15-16</th>
<th>16-17</th>
<th>17-18</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWM</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>36</td>
</tr>
<tr>
<td>MS</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>11</td>
<td>10</td>
<td>41</td>
</tr>
<tr>
<td>PhD</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>15</td>
<td>20</td>
<td>23</td>
<td>18</td>
<td>90</td>
</tr>
</tbody>
</table>

### 4.4 Student Demographics

As a STEM program recruitment of women is a priority. From a gender perspective the WMHS program over its lifetime has excelled in this area as
the number of men (81) to women (77) that have enrolled in the program is nearly equal. Over the last five years more women (38) than men (31) have enrolled in the program. This ratio is fairly consistent in the master’s and doctoral degree programs. Figure 4 is the University compilation of WMHS student ethnic origins.

![Figure 4: Number of Current WMHS Students with Different Ethnic Origin]

### 4.3.1 Country of Origin of WMHS Students

Over the last 5 years about 65 percent of students were of domestic origin with over half from Texas. Our master’s students are predominately U.S. citizens while our doctoral program reflects nearly an equal balance between domestic and international students. Our international students are nearly equal in number between men and women at both the master’s and doctoral level. Our international students are truly diverse hailing from some 12 different countries including Latin American nations of Chile, Columbia, Mexico, Panama, Venezuela, from the Asian and South Asia nations of China, Nepal, Vietnam and India, and from Germany, Sudan, and Lebanon.

### 4.4 Time to Degree

The WMHS Graduate Program awards a MS (32-hour thesis option) a Master of Water Management (36-hour non-thesis option) and a PhD, all of which differ in particular ways from the other. The length of time to complete each of these degrees can vary for some students due to academic and personal reasons. This is particularly the case at the doctoral level (Table 11). Ideally, students in the master program should complete their degrees in 6-7 semesters or about 2.5 years. Our masters students graduation rate is
congruent with this ideal.

**Table 11. Time to Degree by Year and Number of Degrees Awarded**

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Degree Count</th>
<th>Year to Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Doctoral</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2014</td>
<td>1</td>
<td>6.00</td>
</tr>
<tr>
<td>2014-2015</td>
<td>3</td>
<td>6.83</td>
</tr>
<tr>
<td>2015-2016</td>
<td>5</td>
<td>8.30</td>
</tr>
<tr>
<td>2016-2017</td>
<td>2</td>
<td>7.00</td>
</tr>
<tr>
<td>2017-2018</td>
<td>1</td>
<td>8.00</td>
</tr>
<tr>
<td><strong>Masters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2014</td>
<td>13</td>
<td>2.62</td>
</tr>
<tr>
<td>2014-2015</td>
<td>11</td>
<td>2.68</td>
</tr>
<tr>
<td>2015-2016</td>
<td>15</td>
<td>2.97</td>
</tr>
<tr>
<td>2016-2017</td>
<td>21</td>
<td>2.31</td>
</tr>
<tr>
<td>2017-2018</td>
<td>17</td>
<td>2.74</td>
</tr>
</tbody>
</table>

4.5 **Student Financial Support**

Graduate student support includes research assistantships, scholarships, tuition, and fee payments. Increasing the number of research assistantship has been achieved by offering to pay one half of the assistant’s cost with a participating faculty who will pay the other one-half cost. In addition, a number of graduate students are supported by faculty through their research budgets, or through university fellowships.

All of our master students have received some degree of funding support either through scholarship, tuition and fee payment, or research assistantships. Our doctoral students are primarily supported from research funds provided by the chair of their advisory committee. All of our doctoral students receive support.

The number of students receiving financial support has been declining in part due to the declining budget provided by the OGAPS (Table 3) and
because we have increased our assistantship stipends to be competitive with other Universities.

4.6 STUDENT PUBLICATIONS

As part of the student learning objectives the following are expectations and achievements for the three degrees.

Master of Water Management (non-thesis). At least 50% of the graduates will have made a presentation or presented a poster at a professional or academic meeting. Over the last five years this objective has been achieved.

The Master of Science. At least 50% of the graduates will have prepared or submitted a research article by the time they graduate. Over the last five years this objective has also been achieved.

Ph.D. students. Are expected to publish at least three or more journal articles from their dissertation. By the time they defend, they should have at least two articles accepted and a third one completed. So far, our PhD students have published, one average, 1.5 articles by the time they defend. We are now stressing our requirement for at least three articles to all our new incoming doctoral students.

4.7 GRADUATION RATES AND EMPLOYMENT PROFILE

Our mission is to prepare the next generation of water scientists, hydrologists, and managers through teaching and research that improves the reliability and quality of water resources for human well-being and development. **We are clearly achieving our mission as 90 percent of our recent graduates are working in some sector or the water industry.** This includes 10 of 13 PhD and 71 of 77 masters graduates. The data presented is derived from graduate student exit interviews, Linkedin citations and personal knowledge.

Highlighting our master graduates, thirty two masters graduates (42 percent) are working for federal/state or local public water agencies. These include the federal EPA and state water agencies such as Arizona, Colorado and Texas and local government public water supply or regulatory agencies. By category most of our masters graduates are employed with water/environmental/engineering consulting companies.
TABLE 11. FIELD OF EMPLOYMENT FOR PhD AND MASTERS GRADUATES IN WMHS, 2013–2017

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PhD (13 graduates)</strong></td>
<td></td>
</tr>
<tr>
<td>University Water</td>
<td>7</td>
</tr>
<tr>
<td>University Other</td>
<td>2</td>
</tr>
<tr>
<td>Water Consulting Firm</td>
<td>3</td>
</tr>
<tr>
<td>State natural resource agency</td>
<td>1</td>
</tr>
<tr>
<td><strong>Masters (77 graduates)</strong></td>
<td></td>
</tr>
<tr>
<td>University water extension/outreach</td>
<td>5</td>
</tr>
<tr>
<td>Water/Environmental Consulting Firms</td>
<td>28</td>
</tr>
<tr>
<td>Federal water agency</td>
<td>5</td>
</tr>
<tr>
<td>State water agency</td>
<td>5</td>
</tr>
<tr>
<td>Local water agency</td>
<td>17</td>
</tr>
<tr>
<td>Pursuing water doctorate</td>
<td>11</td>
</tr>
<tr>
<td>Pursuing non-water doctorate</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>5</td>
</tr>
</tbody>
</table>

**4.8 Analysis**

The graduate program’s contribution to achieving the Land Grant mission of the University is pursued by developing students’ skills through classroom teaching, mentored research, and engagement in outreach and professional development programs.

**Achieving learning objectives:** The graduate program’s contribution to achieving the Land Grant mission of the University is pursued by developing students’ skills through classroom teaching, mentored research, and engagement in outreach and professional development programs. We use measures of Student Learning Outcomes (SLOs) to assess whether defined teaching and learning targets have been achieved. The results from assessments covering two cycles, 2015-2016 and 2016-2017, show our
student's abilities to effectively communicate with a diverse audience and share their subject matter in a way that all levels can understand. The learning outcomes assessments for MS and PhD degrees complies with College-level processes and uses input from the students’ advisory committees.

**Student retention:** This has not been a problem as all of our students over the last five years remain in the program or have graduated.

**Student enrollment:** Given the level of financial resources our student applications, admission and enrollment have been strong and matched our resources. However, over the last two years the number of admissions to enrollments are lower than the three previous years. This may result from fewer international student applications, students having offers from other universities, a declining base of university financial assistantship and scholarship support, and the need for a targeted recruiting effort. In the past the WMHS program has not engaged in a major recruiting program to encourage student applications. This may need to change and will be a topic for a strategic plan. Additionally, consideration of a MWM professional degree into an option of offering 3+2 program for highly qualified undergraduate students may stabilize student numbers consistent with financial resources.

**Time to degree:** Our 5-year history with doctoral students reveals they are taking longer than expected. This happens because students get a slow start on their research, some international students delay graduation as they make adjustments in their immigration status, or some students begin professional employment.

Several policies have been put in place to help reduce the time to degree. The Program Chair, with input from the Executive Committee, and the students advisory committee chair will annually conduct a review on student’s progress toward degree. We will monitor and require doctoral students to present a draft dissertation proposal as within 6 months of passing the written preliminary examination. This encourages the students to identify their dissertation research quicker in their PhD program.

**Reduction of credit requirements for Master of Water Management degree:** We have reduced the degree hour requirements for the Master of Water Management (non-thesis) degree from 36 to 30 credit hours. This will enable a student with a 9-semester hour course load to graduate in 4 semester, or two years.
Consideration of 3 plus 2 degree requirements: We will evaluate the potential of positioning the MWM professional degree into an option of offering 3+2 program for highly qualified undergraduate students. Potential exists for program development with Geology, Geography and School of Public Health students.
CONCLUDING OBSERVATIONS

The following is an assessment of the strengths, challenges and opportunities related to our graduate program.

**Strengths**

The success of the Water Management and Hydrological Science (WMHS) Graduate Degree Program at Texas A&M University is that it offers a curricular program and degree that transcends the traditional departmental options. The WMHS curriculum draws on the biophysical and social science faculty expertise and courses throughout the University. In addition to serving the students’ needs, the interdisciplinary faculty of WMHS and indeed the students themselves have served as a catalyst in encouraging research collaborations. Some highlights of the program include:

**Faculty Expertise:** There is a wide-ranging pool of expertise among members of the WMHS faculty exhibiting the highest quality in terms of scholarship, external research support, and dedication to excellence. The multidisciplinary core faculty who teach graduate courses and supervise graduate students are located in 12 different departments.

**Research Expertise:** WMHS faculty research programs have breadth and depth. Two or more faculty members can be found in most research areas. The scientists and scholars involved with WMHS program are highly productive in research funding and publication that advance the understanding of water science and management.

**Curriculum:** The WMHS program has a blend of water related biophysical science, engineering, management, planning, and socio-economic courses. In its current form, the curriculum offers students—regardless of their background—the opportunity to gain a broad perspective of some of the most fundamental concepts in hydrology. The designated elective courses provide students with good theoretical understanding of important disciplines and sub-disciplines within the broader field of hydrology and water management. Many of these courses also provide students with the valuable toolkit essential for their research endeavors.

**Student Placement:** WMHS graduates are highly employable and have great success in obtaining jobs in the water industry. Since 2005, when the program officially started, more than 150 students have graduated with a WMHS degree from Texas A&M University and about 90 percent are employed in some sector of the water industry.

**Student Learning Outcomes Mirror Marketable Skills:** Broadly, the WMHS program expects its graduates to demonstrate: (1) basic knowledge of the
science and management related to water science and hydrology; (2) critical analysis and creative problem-solving skills; and (3) effective communication. Each degree program has a slightly different set of learning outcomes and a set of achievement targets for each outcome. Students in the program have successful demonstrated these skills.

**Challenges**

Over the past 15 years the WMHS has made substantial strides in attracting and educating students to meet the needs water industry and indeed in fulfilling its mission to educate the next generation of water managers and scientist. The program faces some challenges to its continued success.

**Funding limitations for interdisciplinary education:** Given the existing University allocation and funding model for interdisciplinary education the WMHS program has reached a plateau in recruiting not only additional students but also high-quality students. The Office of Graduate and Professional Studies (OGAPS) funding model adopted in 2011 was a significant step forward in supporting interdisciplinary education however the total funding allocation to interdisciplinary programs has not changed. *Our OGAPS funding has decrease over the last 5 years. Perhaps the proposed University Strategic Plan that emphasizes interdisciplinary graduate education will allocate additional resources to this new mission.*

**Increasing competition for grants:** As financial resources are becoming limited many departments will only fund their own students. There are concerns that departments are restricting their faculty from offering research assistantships to WMHS students.

**Course scheduling conflicts:** Faculty and departments have a high degree of discretion for days and times when they offer water courses. Coordinating course sequencing from host departments on day and time of course scheduling for designated water courses is problematic.

**Classification of IDPs by the Registrar:** The University’s Registrar record systems creates confusion and difficulties for WMHS students. Even though the university is promoting IDPs, the Registrar’s system does not recognize IDPs as stand alone. They are lumped under the “administrative department” (which, for the water program, is the Department of Geography). This creates multiple issues for the Program and for students.

Students who are applying to the program are listed by the Registrar under Geography leading students to believe they are applying for a degree offered by the Department of Geography. We believe that this may even deter students from considering the water program if they wish to focus on the science or engineering aspects of hydrology and water resources
management. At the program level, it makes it harder for application screening.

Moreover, when WMHS students file their degree plan, the Registrar changes their affiliation from the College of Geosciences to the college where their Chair is located. This has led to erroneous fees being added to water program students account and also create confusions regarding the college with which they are expected to graduate.

Further, despite the fact that the water program is part of the College of Geosciences, the latter only considers water program students for college level scholarships if their main advisor is part of the college. For some students, this may not be an issue because, based on departmental policies, they are eligible for scholarships and awards made by their advisors’ departments. For others, unfortunately, this is not the case, which leads to two categories of water program students.

**Opportunities**

Considering the high potential for growth in the quantity and quality of WMHS student numbers and the reality of University funding limitations for interdisciplinary degree programs one option is to evaluate the challenges and opportunities for the program is to become a department.

**Evaluate the Options for converting the WMHS Program to Department status:** There are several questions and challenges to be discussed in creating a department but the current growth of the program, and its associated reach to students, suggests that it could operate more effectively if it were its own administrative unit. The Materials Science and Food Nutrition interdisciplinary degree programs recently transitioned to department status. The WMHS program would welcome the Academic Program Review team’s thoughts on this and other educational models.
APPENDIX A: FACULTY BIBLIOGRAPHY
JACQUELINE A. AITKENHEAD-PETERSON

Associate Professor
Soil and Crop Sciences
Email: jacqui_a-p@tamu.edu

Education

2000-2002 Post-Doc Natural Resources University of New Hampshire
2000 PhD Natural Resources University of New Hampshire, USA
1996 MSc Soil Science University of Aberdeen, Scotland
1995 BSc (Hons 2:1) Environmental Science University of Stirling, Scotland

Academic Experience

2013-Date Associate Professor: Urban Nutrient and Water Management
2007-2013 Assistant Professor: Urban Nutrient and Water Management
2014-2017 Adjunct Professor: Texas State University, Anthropology
2003 Visiting Scientist, BITOEK, University of Bayreuth, Germany
2002-2006 Research Assistant Professor, Natural Resources

Research Interests

Nutrient source, transportation and fate in urban and rural soils. Surface water chemistry. Effect of irrigation source water quality on nutrient transport

Awards

2016 Dept. Soil & Crop Science – Special Achievement Award for Teaching
2015 Deans Outstanding Achievement Award – Excellence in Diversity

Grants

- Wherley B, Aitkenhead-Peterson J.A. and Chang B Environmental Impacts and Runoff Dynamics Associated with Turfgrass Removal and Urban Landscape Conversions. Texas Lawn Institute 2019-2020 (Project: $30,000)
• Tracy J., Wherley B., Aitkenhead-Peterson JA. FY 2019 Annual Application under Section 104 of the Water Resources Research Act, USGS 2019-2020 (Project $92,335)
• Rajan N., Aitkenhead-Peterson JA., Jifon J., Bagavathian M., Schnell R., Okumoto S., Innovative sorghum-based production systems with biological nitrification inhibition property to enhance sustainability of agro-ecosystems. USDA- NIFA 2019-2022 (Project $500,000)

Publications


Aminiyan MM., Aitkenhead-Peterson JA., Aminiyan FM., (2018). Fifteen-year evaluation of water quality index (WQI), annual changes and hydrochemical characteristics of surface water for drinking and agricultural purposes: a case study of the Karoon River, Iran. Env. Geochemistry and Health DOI: 10.1007/s10653-018-0135-7


SRINIVASULU ALE

Associate Professor
Department of Biological & Agricultural Engineering

Education

2009  Ph.D.  Purdue University
1992  M.S.  G.B. Pant University of Ag. & Tech., India
1989  B.S.  Andhra Pradesh Ag. University, India

Academic Experience

2016 – Present  Associate Professor, Texas A&M Agrilife Research, Vernon, TX
2010 – 8/2016  Assistant Professor, Texas A&M Agrilife Research, Vernon, TX

Research Interests

Water resources management on crop, pasture and rangelands; land use change and grazing management impacts on hydrology, and soil and water quality; climate change impacts on hydrology and crop production; water quality assessment & management; Irrigation & drainage.

Honors and Awards

2017  Recognition of Excellence as an Associate Editor, ASABE journals

Grants

- Morgan, C.L.S., Woodward, R., McIntosh, W.A. and Ale, S. Actionable links between soil function, ecosystem services, and stakeholder perceptions to overcome barriers to improved soil management. USDA-NIFA Foundational Program, $496,000 (2018-2022).

Publications


ROBIN L. AUTENRIETH

Professor and Department Head
Civil Engineering
A.P. & Florence Wiley Professor and Herbert D. Kelleher Professor
Email: rautenrieth@civil.tamu.edu
URL: https://engineering.tamu.edu/civil/profiles/rautenrieth.html

Education

1986 PhD. Clarkston University

Academic Experience

2011-present Department Head and Professor, Department of Civil Engineering

Research Interests

Biological processes in water treatment, biodegradation and bioremediation of selected xenobiotic compounds, bioavailability of contaminants in aqueous and soil environments
DIANE BOELLSTORFF

Associate Professor and Extension Water Resource Specialist
Dept. of Soil and Crop Sciences

Education

1991 PhD Zoology University of California, Davis
1983 MS Ecology University of California, Davis
1980 BS Animal Ecology Iowa State University

Academic Experience

2009- present Associate Professor and Extension Specialist, Soil and Crop Sciences,
2001-2009 Program Specialist, Texas A&M AgriLife Extension Service,
1998-2001 Lecturer, Dept. of Biology, Texas A&M University

Research Interest

My primary areas of focus are developing educational outreach and applied research programs involving water resource management, including water conservation, water quality and aquatic ecosystems, watershed protection planning, and groundwater and private water well protection. Investigations concern identifying, evaluating and mitigating bacteria and nutrient loading to streams.

Awards

2015 Texas A&M AgriLife Extension Superior Service Award—Texas Well Owner Network
2015 American Society of Agronomy Extension Educational Materials Award for publications
2011 Texas A&M AgriLife Extension Superior Service Team Award for the Texas Watershed Stewards Program
2011 Southern Region Project of Excellence. Southern Region Down-Well Camera Team. Awarded by the USDA National Water Program

Grants

- As an extension specialist I have been involved with projects generating $30,219,719 of which $1,496,074 went to my outreach and applied research programs.

Publications


Kelly Brumbelow

Associate Professor, Civil Engineering
Director of Interdisciplinary Engineering Program Development
Email: kbrumbelow@tamu.edu
URL: https://engineering.tamu.edu/civil/profiles/kbrumbelow.html

Education

2001 Ph.D. Georgia Institute of Technology

Academic Experience

2016- present Associate Professor
2005-2016 Assistant Professor

Publications

TONY CAHILL

Associate Professor
Department of Civil Engineering
Email: tcahill@civil.tamu.edu
URL: https://engineering.tamu.edu/civil/profiles/acahill.html

Education

1998     Ph.D.     Johns Hopkins University
1993     M.E.S.     Yale University
1990     B.A.     Yale University

Academic Experience

Currently     Associate Professor, Director of Freshman Engineering Program

Research Interests

Hydrology and water resources engineering: environmental fluid mechanics, hydrometeorology, transport in porous media, watershed and statistical hydrology, land-atmosphere interaction, geostatistics and remote sensing.
KUNG-HUI (BELLA) CHU

Professor, Civil Engineering
Email: kchu@civil.tamu.edu
URL: https://chulab.engr.tamu.edu/

Education

1998 Ph.D. University of California at Berkeley

Academic Experience

Present Professor

Research Interests

Enhancing understanding of microbial-mediated processes in natural and engineered systems, and in application and development of biotechnology to address various environmental challenges in water, soils, and energy.

Publications

Wu, Y.W.; Yang, S.H.; Hwangbo, M.; Chu, K. H. Analysis of Zobellella denitrificans ZD1 draft genome: Genes and gene clusters responsible for high polyhydroxybutyrate (PHB) production from glycerol under saline conditions and its CRISPR-Cas system. PloS one 14 (9), e0222143.


Huang, P.-J.; Hwangbo, M.; Chen, Z.; Liu, Y.; Kameoka, J.; Chu, K. H., Reusable functionalized hydrogel sorbents for removing long- and short-chain perfluoroalkyl acids (PFAAs) and GenX from aqueous solution. ACS Omega 2018, 3, 12, 17447-17455.


Hwangbo, M.; Claycomb, E. C.; Liu, Y.; Alivio, T. E. G.; Banerjee, S.; Chu, K. H., Effectiveness of zinc-oxide-assisted photocatalysis for concerned constituents in reclaimed wastewater: 1,4-dioxane, trihalomethanes, antibiotics, antibiotic resistant bacteria (ARB), and antibiotic resistance


Gabriel E. Eckstein
Professor of Law
Texas A&M University School of Law, Fort Worth, TX
Email: gabrieleckstein@law.tamu.edu

Education

1997 Master of Laws (LLM) American University, Washington D.C.
1995 J.D. (Juris doctor) American University, Washington D.C.
1992 MS Florida State University
1989 B.S. Kent State University

Academic Employment

2013-Present Professor, School of Law, Texas A&M University
2010-2013 Professor, Texas Wesleyan School of Law
2005-2010 Professor, Texas Tech School of Law

Awards

2016 Vermont Law School Distinguished International Environmental Law Scholar
2008 Texas Tech University President’s Excellence in Teaching Award

Grants

2017-2018 WATERLEX Country and International Waters Profiles, Principle Investigator, 38,000, U.N. Food and Agriculture Organization
2016-2017 Toward a Texas-Mexico Transboundary Groundwater Management and Governance Pilot Project, Co-Principal Investigator, Texas A&M School of Law and Bush School of Government Grant, $50,000.
2016-2017 Assessment of State Groundwater Laws and Regulations Across the U.S., Principal Investigator, Texas A&M University Grant, $10,000

Publications


“Scientific, Legal, and Ethical Foundations for Texas Water Law,” in Texas Law of Water
Legal Mechanisms for Water Resources in the Third Millennium, Select Papers from the IWRA XIV and XV World Water Congresses (Routledge, 2018) (co-edited with Marcella Nanni, Stefano Burchi, and Ariella D’Andrea)

The International Law of Transboundary Groundwater Resources (Routledge, 2017), available at https://goo.gl/ouHqoz


Education

1992       Ph.D.  Agricultural and Biological Engineering, University of Nebraska-Lincoln.
1986       M.S.  Soil and Water Resources, ITESM. Monterrey, NL, Mexico.
1984       B.S.  Irrigation Engineering, U.A.A.A.N. Saltillo, Coahuila, Mexico.

Academic Experience

2006 to present Associate Professor Texas A&M AgriLife Research Center at Weslaco, Texas A&M University System
1998-2006 Assistant Professor, Texas A&M AgriLife Research Center at Weslaco, Texas A&M University System

Research Interests

Developing concepts and strategies for the optimization of water resources for irrigation

Grants


On-Farm Irrigation Strategies for Water Conservation in the LRGV. TWDB. $149,717.00. PI. My contribution of the project ($149,717.00). 11/15/2016 to 11/15/2019.

Publications


Corina Fuentes†, Juan Enciso, Shad D. Nelson, Juan Anciso, Mamoudou Setamou, and Sheren Elsayed-Farag. 2018. Yield Production and Water Use Efficiency under Furrow and Drip Irrigation Systems for Watermelon in South Texas. Subtropical Agriculture and Environments journal. 69:1-6


HU LIN GAO
Associate Professor Zachry Dept. of Civil Engineering
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Website: http://ceprofs.civil.tamu.edu/hgao

Education
2005 Ph.D. Princeton University,
2005 M.A. Princeton University,
2002 M.S. Atmospheric Sciences, Peking University,
2000 B.S. Atmospheric Sciences, Peking University

Academic Experience
2012-present Associate Professor, Civil Engineering, Texas A&M University
2012-2018 Assistant Professor, Civil Engineering, Texas A&M University
2008~2012 Research Professor Georgia Institute of Technology

Research Interests
Environmental biogeochemistry of conventional and emerging water contaminants, environmental remediation and ecosystem restoration, applications and implications of nanotechnology on water and agricultural safety, desalination and membrane technology.

Awards
2015: NSF CAREER Award
2015: Research Excellence Award, Civil Engineering Department, Texas A&M University

Publications


Zhao, G., H. Gao, and L. Cuo, Effects of urbanization and climate change on peak flows over the San Antonio River Basin, Texas, J. Hydrometeorology, 17, 2371-2389, 2016.


TERRY JOE GENTRY
Professor, Soil and Crop Sciences

Education

2003       Doctor of Philosophy (Microbiology & Immunology)   University of Arizona
1998       Master of Science (Agronomy)                      University of Arkansas
1993       Bachelor of Science (Agronomy)                    University of Arkansas

Academic Experience

2017 to present Professor, Department of Soil and Crop Sciences, Texas A&M University
2006-2017   Assistant/Associate Professor, Department of Soil and Crop Sciences, Texas A&M University
2003-2005   Postdoctoral Research Associate, Environmental Sciences Division, Oak Ridge National Laboratory

Research Interests

Microbial point and non-point source pollution issues in watersheds

Awards

University of Arizona Foundation Outstanding Teaching Associate Award, 2002
Special Achievement Award for Teaching, Soil and Crop Sciences Department, Texas A&M University, 2008

Grants

- Berthold, T., T. Gentry, and L. Gregory. Bacterial source tracking (BST) on tributaries of Trinity and Galveston Bays. Texas Commission on Environmental Quality. $240,000. 2017
- Jantrania, A., T. Gentry and J. Moore. Integrated high impact extension, research, and education program for undergraduate students in reuse water quality. USDA-NIFA. $475,591. 2018
Publications


Karthikeyan, T.J. Gentry, J. Rashid, I. Ahmed, and A.P. Schwab. 2019. Diesel degrading bacterial endophytes with plant growth promoting potential isolated from a petroleum storage facility. 3 Biotech 9:35. [0]


JOHN RICHARD GIARDINO

Professor
Department of Geology and Geophysics

Education

1979        PhD        University of Nebraska,
1971        MA        Arizona State University
1969        BS        Colorado State University, Pueblo, Colorado

Academic Experience

1991- present  Professor, Texas A&M University
2010-2015     Head, Geology and Geophysics, Texas A&M University
2000-2007     Dean Office of Graduate Studies, Texas A&M University
1989-1996     Head, Department of Geography, Texas A&M University

Research Interests

Fluvial geomorphology of rivers, streams, and glacially influence watersheds

Awards

2019           Minnie Piper Teaching Professor Award, State of Texas
2019           Presidential Professor, Texas A&M University
2018           Distinguished Alumni Award, University of Nebraska
2017           George and Barbara Bush Award for International Teaching

Grants

- National Aeronautics and Space Administration (NASA) Johnson Space Center STEM Pathway Activities - Consortium for Education (NSPACE) Grant M0023/TAMU-SP-1, $69,977
- National Aeronautics and Space Administration (NASA) Johnson Space Center STEM Pathway Activities - Consortium for Education (NSPACE) Grant, M0022/TAMU-HU-1 $273,276
- CONyCT (Convocatovia Institucional para Fortlecer La Excelancia Academica) Proyecto 004, CoPI John R. Giardino and P. Knappett, Yanmei Li, H. Hernandez; 12 month starting 2015; Total proposed $93,550.00; Portion funded $32,700.00
- Texas Water Development Board – Classifications of Texas Rivers Based on Rosgen Classification, 18-month proposal starting 10/01/2016, Total proposed $40,000.

Publications

Janke, Jason, Giardino, John R. and Vitek, John D., The 50th Binghamton Geomorphology Symposium, xx


Giardino, John R. and Rowley, Taylor, Evaluating Channel Migration of the Lower Guadalupe River: Seguin, TX to the San Antonio River Confluence, Published as Papers by the Texas Water Development Board, Austin, TX, 217p

INCI GUNERALP

Associate Professor
Department of Geography
Email: iguneralp@geos.tamu.edu
URL: https://geography.tamu.edu/people/profiles/faculty/guneralpinci.html

Education

Ph.D. Geography University of Illinois
M.S., Civil Engineering Istanbul Technical University, Civil Engineering
BS Civil Engineering, Istanbul Technical University

Research Interests

Planform-scale morphodynamics of meandering rivers, floodplain interactions and biomorphodynamics, impacts of global change on fluvial systems, remote sensing of fluvial landscapes

Awards

2012 G.K. Gilbert Award for Excellence in Geomorphological Research, Association of American Geographers (AAG), Geomorphology Specialty Group
2006 Reds Wolman Student Research Award, AAG, Geomorphology Specialty Group

Publications


Abad JD, Güneralp I, Zolezzi G, Hooke J (Editors) (2012), Meandering Channels, Geomorphology 163–164, 1–118. Link


YONGHENG HUANG

Professor
Biological and Agricultural Engineering
Email: yhuang@tamu.edu
URL: https://baen.tamu.edu/people/huang-yongheng/

Education

2002 Ph.D. University of Nebraska
1999 M.S. University of Nebraska
1994 B.S. Tongji University, China

Research Interest

Water/Wastewater Treatment Technologies, specialized in heavy metals and metalloids-impaired water treatment and nutrients removal; Environmental Remediation Technologies; Membrane-based Water Treatment Technologies; Mercury Emission Control Technology; Iron Chemistry for Environmental Applications; and Vadose-Zone Biogeochemistry

Positions

Currently Professor, Biological and Agricultural Engineering

Awards

2016 Excellence in Innovation Award, Texas A&M System Technology Commercialization
2016 Excellence in Environmental Engineering and Science AAEES
2013 Rudolf Industrial Waste Management Medal, Water Environment Federation (WEF)
WENDY ELIZABETH JEPSON
Department of Geography
Email: wjepson@tamu.edu

Education

2003  Ph.D., Geography  Department of Geography, University of California at Los Angeles
1997  M.A., Geography  Department of Geography, Syracuse University
1994  B.A., Geography and History (Honors)  University of Wisconsin-Madison

Research Interests

Environmental governance; water security; human-environment interaction; political ecology; environmental justice; regional geography (Brazil; Latin America)

Academic Appointments

2018-present  University Professor, Texas A&M University
2016-present  Professor, Department of Geography, Texas A&M University
Visiting Professor, Universidade Federal do Ceará, Fortaleza, Brazil
2014-2016  Director of Undergraduate Programs, Department of Geography, Texas A&M University
2010-2016  Associate Professor (with tenure), Department of Geography, Texas A&M University
2004-2010  Assistant Professor, Department of Geography, Texas A&M University

Awards

2018-2019  Leshner Fellow for Public Engagement (Water and Food Security), American Academy for the Advancement of Science, Washington DC.

Grants

- USAID, Feed the Future, Innovation Laboratory for Small-Scale Irrigation (ILSSI), Mali Water Security and Food Security Sub-project (AID-OAA-13-00054) Nicole Lafore (Jepson Co-PI, ~$50,000, Direct Cost), 10/2019-10/2020 (with option to renew for three more years)
- Research Collaboration Network “RCN: Building a Community of Practice for Household Water Insecurity (HWISE) Research,” National Science Foundation, Geography and Spatial Sciences, PI Jepson with Co-PIs Justin Stoler (University of Miami), Amber Wutich (Arizona State University), and Sera Young (Northwestern University) (2018-2023, $499,036)
- Social Science and Humanities Research Council (SSHRC, Canada) (PI, Leila Harris, University of British Columbia; Collaborator, Jepson) ($299,000; TAMU $15,000)


Publications

Schuster RC, Butler MS, Wutich A, Miller JD, Young SL, and HWISE-RCN. (accepted). “If there is no water, we cannot feed our children”: The far-reaching consequences of water insecurity on infant feeding practices and infant health across 16 low- and middle-income countries. American Journal of Human Biology. In Press. (Jepson HWISE Consortium Author)


RONALD KAISER
Professor
Department of Recreation, Park and Tourism Sciences
Program Chair, Water Management & Hydrological Science
2005-2017 Inaugural Program Chair
2019- present, Program Chair

Education

1988   LL.M.   School of Law, University of California at Berkeley
1977   J.D.   Thomas M. Cooley Law School, Western Michigan University
1971   M.S.   Michigan State University
1969   B.S.   Michigan State University

Academic Experience

1996- present   Professor, Texas A&M University
1987-1995   Associate Professor
1980-1987   Assistant Professor
2005-2016   Program Chair, Water Management & Hydrological Science
2018-present   Program Chair, Water Management & Hydrological Science

Research Interests

Water conservation techniques and practices, efficacy of educational interventions for urban water conservation, landscape irrigation water budgets, groundwater governance

Awards

2019   Texas Environmental Excellence Award from Texas Commission on Environmental Quality, State Water Conservation Award
2019   Blue Legacy Water Conservation Award from Texas Water Development Board
2017   Water Conservation Research Paper of Year Award, American Water Works Assn
2017   Innovative Educator of the Year, College of Geoscience.

Grants

- Rainfall and ET network and website for water conservation, City of College Station & Brazos Valley Groundwater Conservation District. 2016-present, $340,000
- Design of Rio Grande River High Impact Course, 2015-2016, Texas A&M University, $150,000.
Publications


PETER KNAPPETT
Associate Professor, Department of Geology & Geophysics
Email: knappett@tamu.edu

Education

2010       PhD, Hydrogeology       University of Tennessee at Knoxville
2006       Masters of Applied Science Water Resources Civil Engineering, University of Waterloo
2001       Bachelor of Science       University of Waterloo

Employment

2019-present Associate Professor Dept. of Geology & Geophysics, Texas A&M University
2013-2019  Assistant Professor Dept. of Geology & Geophysics, Texas A&M University
2013       Associate Research Scientist Lamont-Doherty Earth Observatory, Columbia University,

Research Interests

Field hydrology and groundwater quality and treatment

Awards

2018       Arts & Sciences Divisional Achievement Award in Natural Sciences, Univ. Tennessee
2014       Kohout Early Career Award, Hydrogeology Division, Geological Society of America
2010       C. H. Gordon Award for Exceptional Professional Promise, Earth & Planetary Sciences, UT
2008       Geological Society of America Travel Award, GSA Joint Annual Conference, Houston, TX

Grants

- The dynamic iron curtain surrounding fluctuating rivers and its impacts on arsenic fate and transport
- Quantifying and Modeling the Rising Concentrations of Toxic Fluoride and Arsenic in Aquifers
  Underlying Cities in the Independence Basin: A Bi-National Research-Education Approach,
  TAMU-CONACYT (Mexican Science Foundation) Amount: $74,183, Period: September 2017 –
  September 2019
- Research Experience for Undergraduates (REU) in Costa Rica, NSF, Amount: Approximately $600,000 of which ~ 5% goes to P. Knappett for travel and field research, January 2017 – December
  2020
Publications


ROBERT KNIGHT

Associate Professor
Ecosystem Science and Management
Email: bob-knight@tamu.edu
URL https://essm.tamu.edu/people/faculty/knight-robert/

Education

1980      Ph.D.    Texas A&M University
1977      M.S.     Oregon State University
1975      B.S.     University of Nevada at Reno

Experience

1990-present  Associate Department Head, Ecosystem Science and Management
1987-present  Associate Professor, Ecosystem Science and Management
1981-1987    Assistant Professor, Ecosystem Science and Management

He is currently an advisor and program leader for the Rangeland Ecology and Management degree, the Renewable Natural Resources degree and the Master of Natural Resources Development.

Research Interest

His research program is concerned with land management impacts on hydrologic processes. Dr. Knight's teaching responsibilities in undergraduate and graduate courses have included classes pertaining to Natural Resources and Ecosystem Management, Wildland Plants of North America, Wildland Watershed Management, Range and Forest Watershed Management and Wetland Delineation.
FRANCO MARCANTONIO

Professor, Geology and Geophysics
Email: marcantonio@tamu.edu
URL: https://geoweb.tamu.edu/people/profiles/faculty/marcantoniofranco.html

Education

1994 Ph.D. Columbia University
1992 MPhil. Columbia University
1988 M.S. McMaster University
1986 B.S. Carleton University

Academic Experience

2015- present Associate Department Head, Geology & Geophysics
2012- present Holder of the Robert R. Berg Professorship of Geology and Geophysics
2010- present Professor, Department of Geology & Geophysics
2006-2010 Associate Professor, Department of Geology and Geophysics
2002-2006 Associate Professor, Earth and Environmental Sciences, Tulane University
1996-2002 Assistant Professor, Department of Geology, Tulane University

Research Interests

How isotope and trace element tracers can be used to understand the relationship between past climate change and past oceanic biological productivity and patterns of continental aridity and hydrology based on past riverine discharge fluxes to the ocean. Understanding climate forcing and response mechanisms will help address a critical problem faced by climatologists.

Awards

2017- Holder of the Jane and Ken R. Williams Chair in Ocean Drilling Science
2015 Elected Fellow of the Geological Society of America
2012-2016 Holder of the Robert R. Berg Professorship

Grants

2015- 2018 Source: NSF: $1,121,909 Role: Co-PI Title: Acquisition of a Multicollector Inductively Coupled Plasma Mass Spectrometer and Laser Ablation System for Investigating the Evolution of the Earth’s Climate, Oceans, and Tectonics
2010-2015 Source: NSF: $235,121 Role: PI Title: Collaborative Research: Dust deposition, paleo-export production, and migration of the ITCZ through the last glacial cycle in the west-central Pacific (Line Islands)
Publications


BRUCE A. MCCARL

University Distinguished Professor
TAMU Presidential Impact Fellow
Department of Agricultural Economics
mccarl@tamu.edu

Education

1973 Ph.D. Pennsylvania State University
1970 B.S. University of Colorado

Experience

2017-present Presidential Impact Fellow, Texas A&M University
2008-present University Distinguished Professor, Texas A&M University
2002-present Regents Professor, Texas A&M University
1985-present Professor, Agricultural Economics, Texas A&M University

Research Interests

Research on resource and agricultural policy questions, effects of climate change, investigations of water use, policy and management, weather influences on water and agriculture, food, energy.

Awards

Presidential Impact Fellow, Texas A&M University, 2017 – date (inaugural class, 24 people, chosen by Provost)
TAMU Vice Chancellor for Agriculture Award in Excellence Individual on Campus Research, 2014 (1 given that year, chosen by College Committee)
Blue Legacy Award in Agriculture participant, 2012 given by the Water Conservation Advisory Council

Grants

2017 USDA.AFRI, Diversifying water Portfolio for Agriculture in Rio Grande Basin, Co-PI $5,000,000
2017 NSF, Decision Support for water Stressed FEW Nexus Decisions, PI, 2,400,000.

Publications


Fei, C.J., and B.A. McCarl, "Addressing uncertainty in adaptation planning for agriculture", US


THOMAS JOSEPH MCDONALD

Professor, School of Public Health
Department of Environmental and Occupational Health
t-mcdonald12332@tamu.edu

Education

1988 PhD. Texas A&M University, Department of Oceanography
1982 M.S. Texas A&M University, Department of Oceanography
1980 B.S. Texas A&M University at Galveston, Department of Marine Science

Academic Employment

2012 -present Professor, Health Science Center, School of Public Health,
2006-2012 Associate Professor, Health Science Center, School of Public Health
2005-2006 Assistant Professor, Health Science Center, School of Public Health
2014-2017 Assistant Dean for Academic Affairs, Health Science Center, School of Public Health,
2010- 2014 Department Head, Environmental and Occupational Health, Health Science Center,
School of Rural Public Health, Texas A&M System,

Awards

2018 Regents Professor, Texas A&M University 2018.
2018 Fellow, Institute for Sustainable Communities, Texas A&M University. 2018.
2015 The TAMU Association of Former Students, Distinguished Achievement Teaching Award

Research Interests

Organic geochemistry as it pertains to petroleum contamination of organisms, sediments/soils, and groundwater environments.

Grants

  $255,000/year
- NIEHS Superfund Research Program (P42), “Comprehensive tools and models for addressing exposure to mixtures during environmental emergency-related contamination events.” April 2017 –
  March 2022, $58,000/year.
- NIEHS Superfund Research Program, “Comprehensive tools and models for addressing exposure to mixtures during environmental emergency-related contamination events.” Supplemental funding -
  Hurricane Florence and Michael. December 2018 – March 2022, $206,810 (total)

Publications


GRETCHEN R. MILLER, PH.D., P.E.

Associate Professor
Zachry Department of Civil & Environmental Engineering
gmiller@tamu.edu

Education

2009   Ph.D.   University of California – Berkeley, Civil and Environmental Engineering,
2003   M.S.   University of Missouri – Rolla, Geological Engineering,
2002   B.S.   University of Missouri – Rolla, Geological Engineering,

Professional Experience

2016-present   Associate Professor
2009-2016   Assistant Professor

Research Interests

Ecohydrology, groundwater, vadose zone hydrology, Earth system modeling, reactive transport modeling, unsaturated zone modeling, aquifer storage and recovery, and sustainable engineering practices

Awards

2016   Research Impact Award, Civil Engineering, TAMU
2016   Dean of Engineering Excellence Award, TAMU
2015   Editors’ Citation for Excellence in Refereeing - Water Resources Res.
2015   Montague Scholar, Center for Teaching Excellence, TAMU

Grants

• Leveraging Environmental Monitoring UAS in Rainforests, NSF National Robotics Initiative October 2019 – August 2022, $1.2 M total, $225,000 to Miller.
• Collaborative Research: Magnitude and pathways of gaseous atmospheric mercury deposition in forests, PIs: D. Obrist (UMass Lowell) and R. Commane (Columbia University), Collaborators: G. Miller and W. Munger (Harvard), NSF Atmospheric Sciences Program, January 2020 – April 2021, $58,448 subcontract to Miller.
• State, Local, and Foundation Funding

xxxviii
• Phase II: Modeling, Monitoring, and Assessment of a Pilot Enhanced Infiltration Study in Harris County, TX, Binklely & Barfield Inc., PI: Gretchen Miller, Co-PI: Zhuping Sheng, $230K total, $191K to Miller.

• Water Supply Sustainability in Mexico: Quantifying Embedded Water in Agricultural Goods, Texas A&M Triads for Transformation, PIs: Gretchen Miller, Emily Sellars, and John Nielsen-Gammon, March 2018, $37,000 total, $13,000 to G. Miller.

Publications


BINAYAK P. MOHANTY

Regents Professor & COALS Chair in Hydrologic Engineering and Sciences  
Biological and Agricultural Engineering  
Email: bmohanty@tamu.edu  
URL: http://baen.tamu.edu/users/bmohanty

Education

1992  Ph.D.  Iowa State University
1987  M.Sc.  Asian Institute of Technology, Bangkok, Thailand
1985  B.Sc.  Orissa University of Agriculture & Technology, Bhubaneswar, India

Academic Experience

2004-Present  Professor, Depts. of Biological and Agricultural Engineering, and Ecosystem Science and Management, Texas A&M University, College Station
2001-2004  Associate Professor, Depts. of Biological and Agricultural Engineering, and Ecosystem Science and Management, Texas A&M University, College Station

Research Interests

Vadose or unsaturated zone hydrology from pore scale to continental scale under engineered, agricultural, range, forest, sub-urban, and urban land covers and various hydro-climatic conditions.

Awards

2018  Award for Research Excellence, Biological and Agricultural Engineering, Texas A&M University
2017  Fellow, American Association for the Advancement in Science (AAAS)
2016  Distinguished Alumni Award, Asian Institute of Technology (AIT), Bangkok, Thailand
2014  Don and Betty Kirkham Soil Physics Award, Soil Science Society of America (SSSA)
2014  Regents Professor, Texas A&M University System

Grants

2019-2020  NASA Jet Propulsion Laboratory-Strategic University Research Partnership (SURP): Total Amount - $60,000
2018-2020  Bill and Melinda Gates Foundation: Low Cost Paper Sensor for Surveillance of Cereal Crops, Total Amount - $100,000
2018-2023  Foundation for Food and Agricultural Research (FFAR): Water Scarcity Research – Irrigation Innovation Consortium, Total $675,000 Texas A&M Agrilife share
Publications


RABİ MOHTAR

Professor
Formerly of Biological & Agricultural Engineering Department
mohtar@tamu.edu

Education

1994  PhD  Michigan State University
1992  M.S.  Michigan State University
1985  M.S.  American University of Beirut
1983  B.S.  American University of Beirut

Academic Experience

2018-present  Dean, Agriculture and Food Sciences, American University of Beirut
2014-2018  Professor, Texas A&M University
2010-2014  Professor and Director, Qatar, Energy and Environment Institute

Research Interest

Water-food-energy nexus.

Grants


Publications

Water Capacity Comparing Standard Methods and a Pedostructure Method on a Weakly Structured Soil. Transactions of the ASABE 62(2)289-301. American Society of Agricultural and Biological Engineers. doi: 10.13031/trans.13073


FRANCISCO OLIVERA

Associate Professor, Civil Engineering
Email: folivera@civil.tamu.edu
URL: https://ceprofs.civil.tamu.edu/folivera/OliveraEducation.htm

Education

1996  Ph.D.  University of Texas at Austin
1988  M.S.  Delft University, Netherlands
1983  Diploma Delft University, Netherlands
1981  B.S.  Catholic University of Peru, Lima

Research Interest

Application of GIS to water resource engineering and management

Publications

Ferreira, CM., J. Irish and F. Olivera, Quantifying the potential impact of land cover change due to sea level rise on storm surge on lower Texas coast bays, 94 Coastal Engineering 102-111 (2014)
KENT E. PORTNEY

The Bush School of Government and Public Service
E-mail Address: kportney@tamu.edu

Education

1979 Ph.D. The Florida State University, Political Science
1975 M.A. The University of Connecticut, Political Science
1973 A.B. Rutgers: The State University of New Jersey

Employment

2018 to Present Professor, Bob Bullock Chair of Public Policy and Finance, Bush School of Government and Public Service, Texas A&M University
2014 to present Professor, Bush School of Government and Public Service, Texas A&M University
1994-2014 Professor of Political Science, Tufts University

Awards

2017 Texas A&M Presidential Impact Fellow.

Grants


Publications


ROSARIO SANCHEZ
Senior Research Scientist,
Texas Water Resources Institute,
Email: rosario@tamu.edu

Education

2009    Ph.D. Texas A&M University
2000    M.S. Matias Romero Institute, Mexico
1998    B.S. Monterrey Tech University, Mexico

Experience

2016- present Senior Research Scientist, Texas Water Resources Institute
2009-2016 WMHS Program Coordinator, Texas A&M University
2006-2009 Advisor on Water, Labor and Foreign Affairs Issues, Federal Congress of Mexico
2004-2006. Executive Director, Coahuila State Government, Secretary of State Office
2002-2006. Political Affairs Office and Technical Secretary Foreign and Border Affairs Advisor

Grants

2016-2021 Transboundary Aquifer Assessment Program, Principal Investigator, United States Department of Agriculture, $86,000/year for 5 years. USDS

Publications


PAUL SCHWAB
Professor
Department of Soil and Crop Sciences
Email: pschwab@tamu.edu
URL: http://soilcrop.tamu.edu/people/schwab-paul/

Education

1981 Ph.D. Colorado State University
1978, M.S. Colorado State University
1976, B.S. Colorado School Mines

Experience

2012-present Professor, Soil and Crop Sciences,
2008- 2012 Director, Natural Resources and Environmental Science Program, Purdue University,
2008-2012 Professor, Agronomy, Purdue University,
1998-2008 Adjunct Professor, Agronomy, Kansas State University

Awards

2012 Mentor of the Year, Purdue University Learning Communities
2001 Fellow, Soil Science Society of Agronomy
1998 Fellow, American Society of Agronomy

Research Interests

Environmental chemistry of organic and metallic contaminants in soils and water with special emphasis on remediation

Publications


VIRENDER K. SHARMA
School of Public Health

Education

1989  Ph.D.  University of Miami, Florida
1982  M.S.  University of Delhi, Delhi, India
1980  B.S.  University of Delhi, Delhi, India

Teaching Experience

2014-Present  Professor at Texas A&M University, College Station, Texas.
2014-2015  Interim Head, Department of Environmental and Occupational Health, School of Public Health, Texas A&M University, College Station, Texas.
2005-2013  Professor of Chemistry at Florida Institute of Technology, Melbourne, Florida.
1999-2005  Associate Professor of Chemistry at Florida Institute of Technology, Melbourne, Florida.
1997-1999  Associate Professor of Chemistry at Texas A&M University-Corpus Christi, Texas.
1992-1997  Assistant Professor of Chemistry at Texas A&M University- Corpus Christi, Texas.

Awards

2019  Bush Excellence Award for International Research – George H W Bush Presidential Library Foundation
2019  Sigma Xi Outstanding Distinguished Scientist Award – Texas A&M University Chapter of Sigma Xi
2019-2020  President Initiative International Fellowship – Chinese Academy of Science
2017  President Initiative International Fellowship – Chinese Academy of Science
2008  Faculty Excellence in Research Award – Florida Institute of Technology

Grants

- Environmental Protection Agency, E-beam Technology to Destruct Per-and Polyfluoroalkyl Substances (PFAS) in Landfills (09/01/2019 - 08/31/2022), $899,164.00
- Division of Research, Texas A&M University, Influence of Contaminant Antibiotics on Antibiotic Resistance in Soils, (May 1, 2017- April 30, 2018). $25,000
- School of Public Health, Texas A&M University, Bacterial Kinetics and Antibiotic Resistance in Soils due to Antibiotic Contamination (June 1, 2017-May 31, 2018). $25,000
Publications


VIJAY P. SINGH

Distinguished Professor, Regents Professor, and Caroline and William N. Lehrer
Distinguished Chair in Water Engineering
Department of Biological and Agricultural Engineering

Education

1974 Ph. D. Civil Engineering, Colorado State University
1970 M. S. Engineering, University of Guelph
1967 B. S. Engineering and Technology, U.P. Agricultural University, Pant College of Technology

Employment

2006 -present Professor of Biological and Agricultural Engineering and Civil Engineering Texas A&M University
1999-2006 Arthur K. Barton Endowed Professor and Coordinator of Environmental and Water Resources Systems Engineering Program, Department of Civil and Environmental Engineering, Louisiana State University

Research Interests

Surface-water Hydrology, Groundwater Hydrology, Hydraulics, Irrigation Engineering, Environmental Quality and Water Resources.

Awards

December 2006 Honorary Ph.D. in Environmental and Territorial Engineering, given by the University of Basilicata, Potenza, Italy
June 2010 Honorary Doctorate in Engineering, University of Waterloo, Waterloo, Canada
June 2014 Honorary Doctor of Science (D.Sc.), University of Guelph, Guelph, Canada,
2019 Distinguished Professor, China Three Gorges University, Yichang, China
2019 Honorary Professor, Beijing Normal University, Beijing, China
2019 Fulbright-Nehru Distinguished Chair Award, Fulbright Commission

Publications


PATRICIA SMITH
Professor and Associate Department Head
Biological and Agricultural Engineering
Email: patti-smith@tamu.edu
URL: https://baen.tamu.edu/people/smith-patricia/

Education

2000 Ph.D. North Carolina State University
1996 M.S. Oklahoma State University
1992 B.S. Oklahoma State University

Research Interest

Hydrologic modeling, particularly land use and land cover effects on hydrologic processes at different temporal and spatial scales. Development of TMDLs for bacterial impairment of streams.

Awards

2019 Margaret Annette Peters Award Advising Award from University Advisors and Counselors at TAMU
2015 United States Department of Agriculture Food and Agriculture Sciences Excellence in Teaching Regional Award

Publications


RAGHAVAN (SRINI) SRINIVASAN

Regents Professor
Ecosystem Science and Management
Email: r-srinivasan@tamu.edu
URL: https://ssl.tamu.edu/people/r-srinivasan/

Education

1992 Ph.D. Purdue University, Agricultural Engineering
1989 M.S. Asian Institute of Technology (Bangkok)
1984 B.E. Tamil Nadu Agricultural University, India

Academic Experience

2015-present Regents Fellow
2004-present Professor
2000-present Director of TAMU Spatial Science Lab
1999-2004 Associate Professor
1996-1999 Assistant Professor

Research Interest

Hydrology and as one of developers of Soil and Water Assessment Tool (SWAT) travels the world teaching SWAT workshops.

Awards

2015 College of Agriculture Distinguished Agriculture Alumni Award, Purdue University
2014 Texas A&M University Vice Chancellor's Award for International Involvement
2014 Texas A&M AgriLIFE Research Faculty Fellow Award
2012 Norman Hudson Memorial Award from the World Association of Soil and Water Conservation for the development and worldwide application of SWAT.

Publications


Nicholas A. Giles; Meghna Babbar-Sebens; Raghavan Srinivasan; Darren L. Ficklin; Bradley Barnhart. Optimization of linear stream temperature model parameters in the soil and water assessment tool for the continental United States. Ecological Engineering, ISSN: 0925-8574, 2019; 127,125-134, DOI:10.1016/j.ecoleng.2018.11.012

BENJAMIN WHERLEY
Associate Professor
Department of Soil and Crop Sciences

Education

2008 PhD North Carolina State University
2003 MS Ohio State University
1999 BS Ohio State University

Experience

2016- present Associate Professor, Texas A&M University
2011-2016 Assistant Professor, Texas A&M University
2009-2011 Assistant Research Scientist, Texas Agrilife Research

Research Interest

Sustainable cultural management strategies for improving turfgrass resource use efficiency (water, nutrients), environmental stress tolerance (drought, salinity, shade), and minimizing environmental impacts of managed turfgrass systems including golf courses, lawns, athletic fields, and sod production.

Grants


Publications


T. Culpepper, J. Young, and B. Wherley. 2019. Physiological response to water deficit stress with...


BRADFORD WILCOX
Department of Ecosystem Science and Management
bwilcox@tamu.edu

Education

1986 Ph.D. (Rangeland Hydrology) Department of Animal and Range Science, New Mexico State University
1982 M.S. (Rangeland Ecology) Department of Range and Wildlife, Texas Tech University
1978 B.S. (Rangeland Management) Department of Range and Wildlife, Texas Tech University

Academic Employment

2017– Sid Kyle Endowed Professor of Semiarid Ecohydrology, Department of Ecosystem Science and Management, Texas A&M University
2006–2017 Professor, Department of Ecosystem Science and Management, Texas A&M University
2004–2006 Professor, Rangeland Ecology and Management, Texas A&M University
2000–2004 Associate Professor, Rangeland Ecology and Management, Texas A&M University
1996–2000 Chief Scientific Officer, Inter-American Institute for Global Change Research, Sao Jose dos Campos, Brazil
1991–1996 Research Hydrologist, Los Alamos National Laboratory, Los Alamos, New Mexico
1985–1988 Visiting Assistant Professor, Watershed Science, Department of Earth Resources, Colorado State University, Fort Collins, Colorado

Honors and Awards

2018: Outstanding Achievement in Research, Society for Range Management
2017: Sid Kyle Endowed Professor of Semiarid Ecohydrology, Texas A&M University
2015: College of Agriculture and Life Sciences Dean’s Outstanding Achievement Award

Grants

- Wilcox, B.P. and A.E. Castellanos. Understanding the ecohydrological Implications of buffelgrass in dry subtropical forests. Division of Research, Texas A&M University, 2017, $25,000.
• Wilcox, B.P. Emerging Issues in Tropical Ecohydrology. National Science Foundation, 2016, $45,000

Publications


Ralph A. Wurbs
Senior Professor, Ph.D., P.E., Hon.D.WRE
Zachry Department of Civil Engineering
r-wurbs@tamu.edu

Education

1978    Ph.D.    Colorado State University
1974    M.S.    University of Texas at Arlington
1971    B.S.    Texas A&M University

Employment Experience

2017 to present  Senior Professor, Texas A&M University
1997-2017  Professor, Texas A&M University
1987-1997  Associate Professor, Texas A&M University
1980-1987  Assistant Professor, Texas A&M University

Awards

Fellow and Life Member, American Society of Civil Engineers (ASCE).
2012-2017  Arthur McFarland Endowed Professorship
Founding Diplomate, American Academy of Water Resources Engineers (AAWRE).

Grants

Principal investigator for research projects funded by the following sponsors:

Publications


lxiv
HONGBIN ZHAN

Professor, Dudley J. Hughes Chair in Geology in Geophysics,
Ray C. Fish Professor in Geology
Department of Geology and Geophysics
Email: zhan@geos.tamu.edu
Web: https://geoweb.tamu.edu/people/faculty/zhanhongbin.html

Education

1996    PhD Hydrology/Hydrogeology    University of Nevada, Reno
1993    MS Physics    University of Nevada, Reno
1989    BS Physics    University of Science & Technology of China

Academic Employment

2007-Present    Professor, Department of Geology and Geophysics, and Water Management and
Hydrological Science Graduate Program, Texas A&M University
2002-9/2007    Associate Professor, Department of Geology and Geophysics, and Water Management
and Hydrological Science Graduate Program, Texas A&M University.
1996-9/2002    Assistant Professor, Department of Geology and Geophysics, Texas A&M University

Awards

2019    Endowed Dudley J. Hughes Chair in Geology and Geophysics, Texas A&M University;
2016    Dean’s Distinguished Achievement Award in Faculty Research;
2013    Best Paper Award, Journal of Hydrologic Engineering, The American Society of Civil
Engineers (the single paper won this award in 2013);

Publications

Zhan, H.B., Wang, Q., and Wen, Z. (Editors), Advances in Groundwater Flow and Solute Transport;
Pushing the Hidden Boundary, MDPI Books, ISBN 978-3-03921-074-9 (Pbk); ISBN 978-3-03921-
075-6 (PDF), https://doi.org/10.3390/books978-3-03921-075-6 (registering DOI), 2019.


Zhang, T., Liu, S.Y., Zhan, H.B., and Ma, C., Durability of silty soil stabilized with recycled lignin for

Lian, B.Q., Peng, J.B., Zhan, H.B., and Cui, X.S., Effect of randomly distributed fibre on triaxial shear

Xian, Y., Jin, M.G., and Zhan, H.B., Buffer effect on identifying transient streambed hydraulic


George Allen, Associate Professor
Department of Geography
Research Interests
Remote sensing, models, geospatial analysis, and fieldwork. In particular, he is interested in the impacts of climate and land-use change on river systems at the global scale. Using remote sensing to improve real-time flood mitigation.
URL: https://geography.tamu.edu/people/profiles/faculty/allengeorge.html

Michael Bishop, Professor
Department of Geography
Research Interest
Remote sensing, geomorphometry, numerical modeling, cryosphere, mountain geomorphology
URL: https://geography.tamu.edu/people/profiles/faculty/bishopmichael.html

Guy Fipps, Professor and Extension Specialist
Department of Biological and Agricultural Engineering
Research Interest:
Irrigation technologies, irrigation scheme (district) management and rehabilitation, pumping plant efficiency and testing, salinity and water management. Weather stations and ET networks.
URL: https://baen.tamu.edu/people/fipps-guy/

Oliver Frauenfeld, Associate Professor
Department of Geography
Research Interests
High latitude climate, land cover and land use change and atmospheric teleconnections.
URL: https://geography.tamu.edu/people/profiles/faculty/frauenfeldoliver.html

John Nielsen-Gammon, Regents Professor
Department of Atmospheric Sciences
URL: https://atmo.tamu.edu/people/profiles/faculty/nielsen-gammonjohn.html
James Heilman, Professor
Department of Soil and Crop Sciences
Research Interest
Water use, greenhouse gas emission, and energy exchange in managed and unmanaged ecosystem, with an emphasis on plant-environment interactions, and plant-water relations focusing on wheat, cotton, sorghum, soybean, rice, vineyards, coastal marshes, grasslands, savannas, and forests.
URL: http://soilcrop.tamu.edu/people/heilman-james-l/

Ignacio Rodrigue-Iturbe, Distinguished University Professor
Department of Ocean Engineering
Research Interests
Ecohydrology, hydrogeomorphology, river basin functioning, stochastic modeling.
URL: https://engineering.tamu.edu/ocean/profiles/rodriguez-iturbe-ignacio.html

John Jacob, Professor and Extension Specialist
Director of coastal watershed program
Department of Recreation, Park and Tourism Sciences
Research Interest
Coastal community development consistent with environmental and water quality
URL: https://rpts.tamu.edu/people/jacob-dr-john/

Gerard Kyle, Professor
Department of Recreation, Park and Tourism Sciences
Research Interest
Human Dimensions of natural resources with an emphasis on conservation psychology
URL: https://rpts.tamu.edu/people/kyle-dr-gerard/

Kevin McInnes, Professor
Department of Soil and Crop Sciences
Research Interests
My research focuses on mass and energy transport in the soil-plant-atmosphere continuum.
URL: http://soilcrop.tamu.edu/people/mcinnes-kevin/
Garret McKay, Assistant Professor  
Department of Civil Engineering  
Research Interest  
Aquatic photochemistry, environmental redox reactions, wastewater treatment  
URL: https://engineering.tamu.edu/civil/profiles/mckay_garrett.html

James Mjelde, Professor  
Department of Agricultural Economics  
Research Interests  
Dynamic model of natural resource economic systems  
URL: http://agecon.tamu.edu/emd_person/james-mjelde/

Georgianne Moore, Professor and Associate Department Head  
Department of Ecosystem Science and Management  
Research Interest  
The role of vegetation in the water cycle and how vegetation management/change affects water resources  
 Ecological Restoration of Wetland and Riparian Systems.  
URL: https://essm.tamu.edu/people/faculty/moore-georgianne/

Miguel Mora, Professor and Associate Department Head  
Department of Wildlife and Fisheries Science  
Research Interest  
Avian ecology and toxicology, assessing the effects of soil and water contaminants or other stressors in wildlife populations.  
URL: https://wfsc.tamu.edu/people/mora-miguel/

Kathleen O’Reilly, Professor  
Department of Geography  
Research Interests  
Social and environmental impacts of development projects impacting drinking water, sanitation and poverty interventions in India.  
URL: https://geography.tamu.edu/people/profiles/faculty/oreillykathleen.html
Vanessa Casado Perez, Associate Professor
School of Law
Research Interests
The role of government in water markets
URL: http://law.tamu.edu/faculty-staff/find-people/faculty-profiles/vanessa-casado-perez

Suresh Pillai, Professor
Department of Poultry Science
Director of Electron Beam Technology
Research Interests
Molecular microbiology and environmental treatment technology
URL: https://ebeam-tamu.org/

Itza Mendoza-Sanchez, Assistant Professor
Department of Environmental and Occupational Health
Research Interests
Physical and biological factors that control bioremediation of contaminated plumes in groundwater. Water balance modeling to quantify ground water - surface water interactions. Emerging contaminants, specifically evaluating the persistence of heavy-metals in mining environments and predicting antibiotics transport in soils.
URL: https://public-health.tamu.edu/eoh/faculty/mendoza-sanchez.html

John Tracy
Director, Texas Water Resources Institute
Professor, Department of Civil Engineering
Research Interest
Developing an integrated understanding of the behavior of water resource systems under the influence of changing hydrologic, economic, and social conditions, as well as improving methods of engaging water managers and users in advancing their understand of water resource systems.
URL: https://twri.tamu.edu/our-team/leadership/john-tracy/
APPENDIX B: WATER, RESEARCH METHODS, AND STATISTICS COURSES
**WATER COURSES**

**SURFACE WATER HYDROLOGY**

BAEN 672 Small Watershed Hydrology. Credits 3. Hydrology of small agricultural watersheds; precipitation frequency analysis; infiltration; runoff; erosion theory.

BAEN 673 Modeling Small Watersheds. Credits 3. Transport of water and chemicals in small agricultural watersheds; simulation using hydrologic models.


ESSM 636 Range and Forest Watershed Management. Credits 3. Management of range and forest watersheds; influence of range and forest practices on runoff.

GEOG 626 Fluvial Geomorphology. Credits 3. Concepts and methods applicable to the fluvial systems; components affecting rivers and drainage basin and analysis geomorphology.

GEOL 631 Engineering Geomorphology. Credits 3. Active surface processes as they influence engineering construction.

**GROUNDWATER**

BAEN 674 Vadose Zone Hydrology. Credits 3. Fundamental concepts and advanced mathematical and experimental techniques for quantifying water, chemical, microorganism, and heat transport in the vadose zone (between soil surfaces and groundwater).

BAEN 675 Hydrology Across Scale. Credits 3. Advanced concepts of surface and subsurface hydrologic processes, measurements, and modeling techniques across different spatio-temporal scales.

GEOL 410 Hydrogeology. Credits 3. Geologic conditions determining the distribution and movement of ground water and their effect on the hydrologic properties of aquifers.

GEOL 610 Field Methods in Hydrogeology. Credits 3. Field methods in hydrogeology; including ground water drilling technology and law.


**WATER QUALITY**


CVEN 604 Environmental Analysis of Treatment Systems. Credits 3. Theory of processes used to treat water, wastewater and hazardous wastes.

CVEN 609 Environmental Control of Oil and Hazardous Materials. Credits 3. 2 Lecture Hours. 3 Lab Hours. properties and their behavior and impact to environmental systems.

CVEN 682 Environmental Remediation of Contaminated Sites. Credits 3. Aspects of characterization and design of plans for remediation of sites contaminated with hazardous wastes.

GEOL 621 Contaminant Hydrology. Credits 3. Physical concepts of mass transport; dispersion; diffusion; advection.

GEOL 640 Geochemistry of Natural Waters. Credits 3. Chemistry of aqueous solutions; weathering/redox reactions and controls on fresh waters.


SCSC 657 Environmental Soil and Water Science. Credits 3. Discussion of physical, chemical, and biological properties of soil and water and the impact on productivity and sustainability of various ecosystems.
SCSC 658 Watershed and Water Quality Management. Credits 3. Land use impact on surface and ground water chemistry; legislation impacting water quality.

**WATER MANAGEMENT**

AGEC 606 Water Resource Economics. Credits 3. Concepts of property rights and their valuation; factors affecting the value of these rights are related to general economic theory to explain real estate market process.

CVEN 455 Urban Storm water Management. Credits 3. Hydrologic, hydraulic, and general civil engineering design and implementation of storm water systems including drainage and detention storage facilities, floodplain regulation measures, and flood control structures.

CVEN 664 Water Resources Engineering Planning and Management. Credits 3. Managing water resources; the planning process, systems analysis methods.


PSAA 606 Environmental Policy and Management. Credits 3. Covers environmental policy areas, including air and water pollution, toxic waste disposal, public land use, sustainable development, and resource conservation.

RENR 662 Environmental Law and Management. Credits 3.

**WETLANDS**


ESSM 648 Wetland Plant Taxonomy. Credits 3. Interpretation of plant morphologies for keying and the identification of wetland plants from prime habitats.

WFSC 611 Estuarine Ecology. Credits 4. 3 Lecture Hours. 3 Lab Hours. Principles governing the relationships of estuarine organisms to their environment.

WFSC 628 Wetland Ecology. Credits 3. Wetlands as ecological systems that are prime habitats for wildlife and fish; geomorphology, hydrology, limnology.

**CLIMATE**

ATMO 629 Climate Change. Credits 3. Climate of geological and recent past; methods of assessing change.
GEOG 612 Applied Climatology. Credits 3. Climate data and methods to solve a wide range of environmental problems.

GEOG/GEOL 642 Past Climates. Credits 3. Terrestrial and marine proxy records of past climate variability, including tree rings, coral, and sediments.

**Research Methods Courses**


BUSH 631 Quantitative Methods in Public Management I. Credits 3. Introduction to the common methods for social and policy analysis with a focus on application of methods.

BUSH 632 Quantitative Methods in Public Management II. Credits 3. Numerous formal aspects and methods of decision-making useful in public management.

EPSY 636 Techniques of Research. Credits 3. Fundamental concepts and tools of research applied to psychological and educational problems.

GEOG 611 Geographical Research Design. Credits 3. Methods, techniques and conceptual models for the conception, design, planning and conduct of geographical research.

PLAN 613 Planning Methods and Techniques. Credits 3. Methods and techniques of research, data collection and analysis; coordination of planning process with public policy and plan implementation.


**Statistics Courses**


STAT 601 Statistical Analysis. Credits 4. 3 Lecture Hours. 2 Lab Hours. Introduction to probability, probability distributions and statistical inference.

STAT 626 Methods in Time Series Analysis. Credits 3. Introduction to statistical time series analysis; autocorrelation and spectral characteristics of univariate.
STAT 651 Statistics in Research I. Credit 3. For graduate students in other disciplines. Non-calculus exposition of the concepts, methods and usage of statistical data analysis.

STAT 652 Statistics in Research II. Credit 3. Continuation of STAT 651. Concepts of experimental design, individual treatment comparisons, randomized blocks and factorial experiments.

STAT 653 Statistics in Research III. Credit 3. Advanced topics in ANOVA; analysis of covariance; and Regression Analysis including analysis of messy data.
Mission / Purpose
The WMHS program provides graduate students with the intellectual and technical foundation in subjects relevant to water resources including a broad understanding of hydrology and associated ecosystems, and the interplay between the biophysical sciences and human systems to solve water problems. The program prepares the next generation of water scientists, hydrologists and managers for professional and academic careers at the state, national and international levels to improve the availability, security, and reliability of water supplies.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans
SLO 1: Demonstrate knowledge and expertise
Students exhibits a coherent understanding, knowledge and expertise regarding theories, principles, and practices of hydrology and water management.

Relevant Associations:
General Education/Core Curriculum Associations
1 Master the depth of knowledge required for a degree
Graduate Outcome Associations
1.1 Master degree program requirements, including theories, concepts, principles, and practice, and develop a coherent understanding of the subject matter through synthesis across courses and experiences.

Related Measures
M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded to all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommend that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/end-of-program subject matter exam

Connected Document
SLO Rubric
Target:
Above 80% proficiency (meeting and above expectations) according to the "Exhibits a coherent understanding of discipline knowledge" portion of the rubric.

Connected Document
SLO Rubric
Finding (2017-2018) - Target: Met
8 students out of 8 met this objective. 8 students graduated with an MS. Three students are currently pursuing a PhD, two in the WMHS program and one at a different university in the US.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Development water specific learning objective rubrics
Established in Cycle: 2013-2014
Goal: Develop water specific learning objective rubrics consistent with the general University learning objective rubrics. A...

SLO 2: Effectively communicate research findings
Students will be able to effectively communicate written and orally through papers and presentations research findings.

Relevant Associations:
General Education/Core Curriculum Associations
3 Communicate effectively
Graduate Outcome Associations
1.4 Communicate effectively.
Related Measures

M 1: Final Exam Rubric

Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded fo all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommend that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/end-of-program subject matter exam

Connected Document

SLO Rubric

Target:

Above 80% proficiency (meeting and above expectations) according to the "Communicate Effectively" portion of the rubric.

Connected Document

SLO Rubric

Finding (2017-2018) - Target: Met

8 out of 8 students who defended their thesis obtained 80% and above on this criteria. Three of the students are international students and are currently pursuing a PhD (2 in the WMHS program at Texas A&M University, and 1 at a different state university in the US).

Related Action Plans (by Established cycle, then alpha):

For full information, see the Details of Action Plans section of this report.

Water Daze Poster Competition

Established in Cycle: 2015-2016

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

WMHS 602 Study Abroad Program

Established in Cycle: 2015-2016

Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week ...

Improve Communication Skills

Established in Cycle: 2016-2017

Water Daze has been a very successful in the past years and we intend to maintain this event for the coming year. It gives the o...

SLO 3: Apply expertise to different contexts to solve problems

Students will be able to apply water management and hydrological science knowledge in a range of contexts to solve problems, make and justify decisions

Relevant Associations:

General Education/Core Curriculum Associations

2 Demonstrate critical thinking
3 Communicate effectively

Related Measures

M 1: Final Exam Rubric

Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded fo all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommend that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/end-of-program subject matter exam

Connected Document

SLO Rubric

Target:

Above 80% proficiency (meeting and above expectations) according to the "Applies discipline specific knowledge
in a range of contexts to solve problems..." portion of the rubric.

Connected Document
SLO Rubric
Finding (2017-2018) - Target: Met
8 out of 8 students who defended their thesis and graduated in this cycle received 80% and above. One student is working outside the US. She is also the President at World Youth Parliament for Water.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

WMHS 602 Study Abroad Program
Established in Cycle: 2015-2016
Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week ...

SLO 4: Analyze variety of sources and perspectives
Students will be able to use a variety of sources and evaluate multiple points of view to analyze and integrate information

Relevant Associations:
Graduate Outcome Associations
1.2 Apply subject matter knowledge in a range of contexts to solve problems and make decisions.
1.3 Use a variety of sources and evaluate multiple points of view to analyze and integrate information and to conduct critical, reasoned arguments.

Related Measures
M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded of all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations )) Above Expectations Meets Expectations Below Expectations Not Observable
1. Exhibits a coherent understanding of discipline-specific knowledge?
2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions?
3. Uses a variety of sources and evaluates multiple points of view to analyze and integrate information?
4. Communicates effectively?
5. Teaches or explains the subject matter in their discipline to a broad range of audiences?
6. Exhibits proficiency in technology appropriate to solve problems in their discipline?
7. Chooses ethical courses of action in research and practice?
This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommend that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO
Source of Evidence: Comprehensive/end-of-program subject matter exam

Connected Document
SLO Rubric
Target:
Above 80% proficiency (meeting and above expectations) according to the "Uses a variety of sources and evaluates multiple points of view..." portion of the rubric.

Connected Document
SLO Rubric
Finding (2017-2018) - Target: Met
8 out of 8 students met this target. Each score 80% and above.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

WMHS 602 Study Abroad Program
Established in Cycle: 2015-2016
Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week ...

SLO 5: Explain their discipline to a broad audience
Students will be able to teach or explain the subject matter in their discipline to a broad range of audiences.

Relevant Associations:
Graduate Outcome Associations
1.2 Apply subject matter knowledge in a range of contexts to solve problems and make decisions.
1.4 Communicate effectively.

Related Measures
M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded of all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations )) Above Expectations Meets Expectations Below Expectations Not Observable
1. Exhibits a coherent understanding of discipline-specific knowledge?
2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions?
3. Uses a variety of sources and evaluates multiple points of view to analyze and integrate information?
4. Communicates effectively?
5. Teaches or explains the subject matter in their discipline to a broad range of audiences?
6. Exhibits proficiency in technology
appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommented that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/end-of-program subject matter exam

Connected Document
SLO Rubric

Target:
Above 80% proficiency (meeting and above expectations) according to the "Teaches or explains the subject matter to a broad range of audiences" portion of the rubric.

Connected Document
SLO Rubric

Finding (2017-2018) - Target: Met
8 out of 8 students met this target. They all participated in the Water Daze Poster Presentation Competition. Two students also presented at national and international conferences.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Water Daze Poster Competition
Established in Cycle: 2015-2016
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

WMHS 602 Study Abroad Program
Established in Cycle: 2015-2016
Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week ...

Improve Communication Skills
Established in Cycle: 2016-2017
Water Daze has been a very successful in the past years and we intend to maintain this event for the coming year. It gives the o...

SLO 6: Proficiency in appropriate technology
Students will exhibit proficiency in technology appropriate to solve problems in the water field

Relevant Associations:
Graduate Outcome Associations
1.5 Use appropriate technologies to communicate, collaborate, conduct research, and solve problems.

Related Measures

M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations 1) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommend that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/end-of-program subject matter exam

Connected Document
SLO Rubric

Target:
Above 80% proficiency (meeting and above expectations) according to the "Exhibits proficiency in technology appropriate to solve problems" portion of the rubric.

Connected Document
SLO Rubric

Finding (2017-2018) - Target: Met
8 out of 8 students received 80% and above on this rubric. One student received 90%.

SLO 7: Chooses ethical course of action
Students will be able to choose ethical courses of action in research and practice.

Relevant Associations:
Graduate Outcome Associations
1.7 Choose ethical courses of action in research and practice.
\subsection*{Related Measures}

\textbf{M 1: Final Exam Rubric}

Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded fo all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommended that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/end-of-program subject matter exam

\textbf{Connected Document}

\textbf{SLO Rubric}

\textbf{Target:}

Above 80% proficiency (meeting and above expectations) according to the "Choose ethical courses of action is research and practice" portion of the rubric.

\textbf{Connected Document}

\textbf{SLO Rubric}

\textbf{Finding (2017-2018) - Target: Met}

8 out of 8 students received 80% and above. One student received 90%.

\textbf{SLO 8: Develops clear research plans}

Students will be able to develop clear, hypothesis-driven research plans

\textbf{Relevant Associations:}

Graduate Outcome Associations

1.6 Develop clear research plans and conduct valid, data-supported, theoretically consistent, and institutionally appropriate research.

\textbf{Related Measures}

\textbf{M 1: Final Exam Rubric}

Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded fo all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommended that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/end-of-program subject matter exam

\textbf{Connected Document}

\textbf{SLO Rubric}

\textbf{Target:}

Above 80% proficiency (meeting and above expectations) according to the "Develops clear hypotheses-driven research plans" portion of the rubric.

\textbf{Connected Document}

\textbf{SLO Rubric}

\textbf{Finding (2017-2018) - Target: Met}

8 out of 8 students received 80% and above on this rubric. Following the final defense, three students were recommended for PhD. Two students are currently registered in the WMHS program and one has been accepted at a different state university in the US.

\textbf{Related Action Plans (by Established cycle, then alpha):}

For full information, see the Details of Action Plans section of this report.

\textbf{Water Daze Poster Competition}

Established in Cycle: 2015-2016

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

\textbf{SLO 9: Conducts valid and theoretical research}

Students will be able to conduct valid, data-supported and theoretically consistent research

\textbf{Relevant Associations:}
Graduate Outcome Associations

1.6 Develop clear research plans and conduct valid, data-supported, theoretically consistent, and institutionally appropriate research.

Related Measures

M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or conveys the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? This additional section should be completed for MS (thesis option) and Doctoral students only. HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? 8. Develops clear, hypothesis-driven research plans? 9. Conducts valid, data-supported and theoretically consistent research? 10. Effectively disseminates research results in appropriate contexts? Additional comments (optional). 11. Would you recommend that this student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Comprehensive/endpoint of program subject matter exam

Connected Document

SLO Rubric

Target:
Above 80% proficiency (meeting and above expectations) according to the "Conducts valid, data supported, and theoretically consistent research" portion of the rubric.

Connected Document

SLO Rubric

Finding (2017-2018) - Target: Met
8 out of 8 students examined in this cycle received 80% and above on this criteria.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Water Daze Poster Competition
Established in Cycle: 2015-2016
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

WMHS 602 Study Abroad Program
Established in Cycle: 2015-2016
Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week ...

M 2: Effectively communicate and present research results
Department will promote graduate students presentations through annual events at the University level and by giving financial support to present their research at professional or academic meetings. This will train students to effectively communicate. This measure counts only graduating students in the corresponding cycle.

Source of Evidence: Presentation, either individual or group

Target:
60% of students will present at one or more professional meetings by the time they complete the program.

Finding (2017-2018) - Target: Met
8 out of 8 students gave at least one presentation during the program. One MS student has participated in several national and international conferences. One has presented at a national conference in his field.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Water Daze Poster Competition
Established in Cycle: 2015-2016
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

M 3: Publish refereed articles
Department will track graduate student publications in refereed journals. This measure counts only graduating students in the corresponding cycle.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:
50% of students will submit or publish refereed research article by the time they complete the program.

Finding (2017-2018) - Target: Met
MS Students are encouraged to publish the findings from their thesis. The work of one student who graduated in this assessment cycle has already been published. The work of another student is almost ready for submission. Others are at various stages in the preparation of their manuscript.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Water Daze Poster Competition
Established in Cycle: 2015-2016
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...
Department will track graduate student publications in refereed journals. This measure counts only graduating students in the corresponding cycle.

Source of Evidence: Written assignment(s), usually scored by a rubric

**Target:** 50% of students will submit or publish refereed research article by the time they complete the program.

**Finding (2017-2018) - Target: Met**
MS Students are encouraged to publish the findings from their thesis. The work of one student who graduated in this assessment cycle has already been published. The work of another student is almost ready for submission. Others are at various stages in the preparation of their manuscript.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Water Daze Poster Competition**
*Established in Cycle: 2015-2016*

To increase the publication output, we will develop a seminar to allow students to present previously completed work.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Details of Action Plans for This Cycle (by Established cycle, then alpha)**

**Masters student seminar**
We are not completely satisfied with the publishing rates among our MS students. To increase article output, we will develop a seminar for MS students to encourage them to prepare their thesis in journal article format and submit article after thesis defense.

*Established in Cycle: 2010-2011*

**Implementation Status:** In-Progress

**Priority:** High

**Projected Completion Date:** 06/2012

**Responsible Person/Group:** WMHS

**Water Poster Competition**
To improve the performance of the MS and MWM students in professional meetings and research papers, the WMHS Program will plan to develop a Water Poster Competition in which students will compete for monetary awards. The best three posters will be awarded by judges from the water faculty. Posters will be evaluated based on: creativity, innovation, quality and exposure to professional meetings. This project will help to improve Masters thesis and non thesis students to reach for national exposure at professional levels, enhance their research abilities and performance at graduate level.

*Established in Cycle: 2011-2012*

**Implementation Status:** Finished

**Priority:** High

**Projected Completion Date:** 09/2013

**Responsible Person/Group:** WMHS

**Budget Amount Requested:** $2,000.00 (recurring)

**Rio Grand Field Trip, Seminar and Conference Research Project**
In order to improve and achieve more aggressively our targets related to research publications and national and international exposure of students, we have developed an integrative research experience program for Spring and Fall 2014. The Rio Grand Basin will be the study case to investigate and address the fundamental water science concepts and issues as part of the WMHS 601 course, followed by a 17 day field trip from headwaters to the Gulf of Mexico during which students will be able to interact with water users and stakeholders, and be exposed to water challenges as part of the WMHS 602 "maymester" course. The field trip has the objective to offer students a variety of research possibilities as well as to experience the interdisciplinary nature of water issues along the Rio Grand. Students will develop a research project that will be presented at the Fall 2014 WMHS Seminar Series and at the Water Conference planned for Fall 2014. The overall result of this project will be a published TAMU book containing every student research paper on Water Issues along the Rio Grande Basin, as well as an integrative experience that will offer students scientific and field exposure and challenging research opportunities.

*Established in Cycle: 2012-2013*

**Implementation Status:** In-Progress

**Priority:** High

**Relationships (Measure | Outcome/Objective):**

<table>
<thead>
<tr>
<th>Measure</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Effectively communicate and present research results</td>
<td>Apply expertise to different contexts to solve problems</td>
</tr>
<tr>
<td>Demonstrate knowledge and expertise</td>
<td>Effectively communicate research findings</td>
</tr>
<tr>
<td>Publish refereed articles</td>
<td>Apply expertise to different contexts to solve problems</td>
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</table>

**Implementation Description:** WMHS 601 will offer the scientific background to prepare students for the field trip. WMHS 602 will be offered as a "Maymester" 17 days field (during May) during which we will travel from headwaters to the Gulf of Mexico, meeting water users, stakeholders and experts along the Basin. Students will identify their research and present their results at the 2014 Fall Seminar WMHS681 and Water Conference. Their papers will be part of a published book.

**Projected Completion Date:** 12/2014

**Responsible Person/Group:** Ronald Kaiser, Rosario Sanchez

**Development water specific learning objective rubrics**
Goal: Develop water specific learning objective rubrics consistent with the general University learning objective rubrics.

**Action Plan Item 1.** Develop water specific learning objective rubrics that will be applied at the time of final exam. 2. Assess the feasibility of applying these water specific learning objectives to a selected water courses.

*Established in Cycle: 2013-2014*

**Implementation Status:** In-Progress

**Priority:** High
WMHS 602 Study Abroad Program

Goal: Improve the opportunity for student presentations and publications. Action Plan item 1. Develop and conduct a water conference and poster competition as part of Rio Grande project funded by the University. Students that participated in project will present papers and posters at conference. 2. Work with Rio Grande project students to prepare their reports as book chapters for a Rio Grande book.

Established in Cycle: 2013-2014
Implementation Status: Finished
Priority: High
Implementation Description: Students are already working on their papers that should be submitted by the beginning of the Fall 2014. The edited book of the Rio Grande containing students chapters will be submitted for review on 2015. Papers and posters related to their research will also be presented during the Water Conference held in November 2014 (16-18) at the Annenberg Convention Center.
Responsible Person/Group: WMHS program
Budget Amount Requested: $0.00 (no request)

Water Conference-paper/poster presentation on the Rio Grande River

Goal: Improve the opportunity for student presentations and publications. Action Plan item 1. Develop and conduct a water conference and poster competition as part of Rio Grande project funded by the University. Students that participated in project will present papers and posters at conference. 2. Work with Rio Grande project students to prepare their reports as book chapters for a Rio Grande book.

Established in Cycle: 2013-2014
Implementation Status: Finished
Priority: High
Implementation Description: Students are already working on their papers that should be submitted by the beginning of the Fall 2014. The edited book of the Rio Grande containing students chapters will be submitted for review on 2015. Papers and posters related to their research will also be presented during the Water Conference held in November 2014 (16-18) at the Annenberg Convention Center.
Responsible Person/Group: WMHS program
Budget Amount Requested: $0.00 (no request)

WMHS 602 Study Abroad Program US-Mexico Water Energy Food Nexus

Our core course WMHS 602 Contemporary Issues in Water Resources has been planned to be implemented as a study abroad program every other year in Mexico. This plan of a two-week intensive class and field work will expose students to a broad spectrum of research possibilities as well as different cultures and audiences. The course will have presentations from other universities from the United States as well as from Mexico. The interdisciplinary nature of this class, as well as the multidisciplinary elements included will offer our students the capacity to address water challenges from different perspectives and well as to give integrative and global alternatives. Students will require to have a final exam as well as a presentation which will require members from different universities. This will improve their communication skills, as well as the research quality.

Implementation Status: Planned
Priority: High
Implementation Description: It will be implemented from August 16-22 at the Hacienda Santa Clara in Guanajuato and from August 22 to August 30 at the University of Guanajuato. Classes will be jointly thought with faculty from TAMU and University of Guanajuato. Field trips will accompany the course work. Final exam as well as a final presentation are planned.
Projected Completion Date: 12/2015
Responsible Person/Group: Ronald Kaiser
Budget Amount Requested: $20,000.00 (recurring)

Water Daze Poster Competition

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well as the research process (dissemination and development) including the use of appropriate technology according to our measures, our Water Poster Competition has developed into a permanent event for which students will be required to participate in order to get academic credit. Our spring required seminar class WMHS 681 will be used to get students register to participate in Poster Competition. Also, we are reducing the number of participants per poster to 2 instead of 3, to guarantee that every student participates equally in the amount of research work and at the same time in their oral presentation. We will develop a special session in which the top 5 posters will present to a broad audience (not just to judges) in order to work harder in their communication skills and research presentation. The purpose is to train students to develop clear hypothesis and research process, to help the prepare for their final examination and assure they obtained an "above expectation" evaluation.

Established in Cycle: 2015-2016
Implementation Status: Planed
Priority: High
Relationships (Measure | Outcome/Objective):
  Measure: Final Exam Rubric | Outcome/Objective: Conducts valid and theoretical research
  Measure: Final Exam Rubric | Outcome/Objective: Conducts valid and theoretical research
  Measure: Publish refereed articles | Outcome/Objective: Conducts valid and theoretical research
  Measure: Publish refereed articles | Outcome/Objective: Conducts valid and theoretical research

Implementation Description: This event has been and will continue to be implemented every year at a University level. Both graduate and undergrad students are able to present, but only the WMHS students are required as part of the seminar requirements.
Projected Completion Date: 04/2017
Responsible Person/Group: Ronald Kaiser
Additional Resources: 2000

WMHS 602 Study Abroad Program

Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week of field work in Guanajuato, Mexico (Hacienda Santa Clara) during Spring Break every year. This experience will have both the theoretical part of the class in Campus and the international exposure to real life water problems. We will adjust our traditional 2 week course to a 1 week intensive field course with the research component afterwards. Students and faculty from the University of Guanajuato will also keep participating in this program to guarantee the social interaction of students, their international exposure to cultural differences, and most of all, to improve their communication and research skills as they become aware of the value of integrated research. According to our findings from the last cycle, we need to make an extra effort in terms of improving even more communication skills and well as research analysis (dissemination, presentation to broad audiences, etc). We believe that a stronger
and permanent program will keep strengthen those elements on our graduates.

**Established in Cycle:** 2015-2016  
**Implementation Status:** Planned  
**Priority:** High

**Relationships (Measure | Outcome/Objective):**  
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<td>Improve Communication Skills</td>
<td>Apply expertise to different contexts to solve problems</td>
<td>Apply expertise to different contexts to solve problems</td>
</tr>
</tbody>
</table>

**Implementation Description:** We have already developed the program and syllabus for students since they already participated in this program this past spring break (2016). We have our partners from Hacienda Santa Clara and students and a team of faculty ready to develop this program next spring break 2017.

**Projected Completion Date:** 03/2017  
**Responsible Person/Group:** Ronald Kaiser

**Additional Resources:** 20000

**Improve Communication Skills**  
Water Daze has been a very successful in the past years and we intend to maintain this event for the coming year. It gives the opportunity to students in the water program to present their work to their peers and be judged, by a team of professors. The feedback they receive help them in their research. Water Daze also given them the opportunity for a mock presentation before they present at a national conference. Based on our observations and findings from past events and feedbacks from the judges, we have realized that not all student possess the necessary skills to do a good presentation. We therefore propose to include 6 hours of communication skills, that will include design of posters and PowerPoint presentation, elevator speech, etc. These 6 hours will be taught during before the Water Daze event in the second semester. Further, the Program Coordinator will assist, advise, and guide students as they work on their poster presentations.

**Established in Cycle:** 2016-2017  
**Implementation Status:** Planned  
**Priority:** Medium

**Relationships (Measure | Outcome/Objective):**  
| Measure: Final Exam Rubric | Outcome/Objective: Analyze variety of sources and perspectives |
| Measure: Final Exam Rubric | Outcome/Objective: Effectively disseminate research results |
| Measure: Effective communication and present research results | Outcome/Objective: Effectively communicate research findings |
| Measure: Final Exam Rubric | Outcome/Objective: Effectively communicate and present research results |

**Implementation Description:** We have already developed the program and syllabus for students since they already participated in this program this past spring break (2016). We have our partners from Hacienda Santa Clara and students and a team of faculty ready to develop this program next spring break 2017.

**Projected Completion Date:** 03/2017  
**Responsible Person/Group:** Ronald Kaiser

**Additional Resources:** 20000

**Analysis Questions and Analysis Answers**

Consider the Findings and the Action Plan(s) established this cycle. How did the program/unit identify these next steps for action? Why does the program/unit believe this Action Plan(s) should improve future assessment results?

The Water Management & Hydrological Science program is an interdisciplinary program. Students admitted into the program have a varied background and interests. They have the flexibility to choose courses and research topics based on their interest and career objective(s). While they are able to acquire the technical skills they need through the various courses they take at the university, they do not get the opportunity to develop their communication skills, which is extremely important for someone who will be operating in an interdisciplinary environment. PhD and MS student get the opportunity to present at national and, sometimes, international conferences. MWM students, on the other hand, since they are on a professional track, do not always get the opportunity to attend a conference while enrolled in the program. To ensure that they, along with MS and PhD student, get the opportunity to present and defend their ideas in front of an audience, students are strongly encouraged to participate in the annual Water Daze poster competition. Water Daze, has been an annual event since Spring 2013. It gives the opportunity to every student to present a poster at least twice while they are enrolled at the university. The event serves as a platform where students are able to present their work to their peers and professors, and be judged by a team of professors. The feedback they receive enable them to improve their presentation and communication skills. It also gives them the opportunity for a mock presentation before they attend a national or international conference. Based on the findings and feedback received, we note that both students and faculty welcome this event. The quality of presentations gets better every year (we had two first place winners in the last two Water Dazes). Nonetheless, some students skill lack the skills for a quality presentation, since there are no class that prepares them for that. To address this drawback, in spring 2018 prior to this year’s event, we taught a class on poster design and presentation. Following the class, we note a net improvement on the quality of posters presented. Feedback received from students were positive. We intend to continue teaching this class to every new group of student.

*CRITICAL* Provide an update for completed or ongoing action plans from the previous year(s). Discuss any successes, challenges, and/or obstacles the program/unit has experienced while implementing the Action Plan(s). Address whether or not the program/unit has seen any improvement in assessment results for the targeted Outcome(s) the Action Plan(s) were designed to address and why the action plan may/may not have resulted in improvements.

**Action Plan Completed:** Water Daze poster competition. Action Plan in Progress: Internship Program Water Daze poster competition was an overwhelming successful. We are keeping them as a recurring event such that new group of students in the program are able to benefit from them. We have include a “poster design and presentation class” which helped students prepare better posters and better defend their work. We hope that this experience will help them when they present at national and international conferences. Internship Program: We are continuing our effort to provide internship opportunities to our students. In the past year, one MWM and one MS student spent a summer interning at a consulting firm and with a congressional representative, respectively. We have noted that international students are required to be registered with the university while on internship. We are creating a special section for internships in our program.

**Detailed Assessment Report**  
2017-2018 Water Mgmt and Hydrological Sci, MWM  
As of: 8/02/2019 03:33 PM CENTRAL  
(Includes those Action Plans with Budget Amounts marked One-Time, Recurring, No Request)
Mission / Purpose

The WMHS program provides graduate students with the intellectual and technical foundation in subjects relevant to water resources including a broad understanding of hydrology and associated ecosystems, and the interplay between the biophysical sciences and human systems to solve water problems. The program prepares the next generation of water scientists, hydrologists and managers for professional and academic careers at the state, national and international levels to improve the availability, security, and reliability of water supplies.

The MWM is a non-thesis degree.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Demonstrate knowledge and expertise
Students exhibit a coherent understanding, knowledge and expertise regarding theories, principles, and practices of hydrology and water management.

Relevant Associations:

General Education/Core Curriculum Associations
1. Master the depth of knowledge required for a degree

Graduate Outcome Associations
1.1 Master degree program requirements, including theories, concepts, principles, and practice, and develop a coherent understanding of the subject matter through synthesis across courses and experiences.

Related Measures

M 1: Final Exam Rubric
Students’ graduate committees will assess their achievement of this outcome by evaluating their final examination. The committee members will use the “Master of Water Management Learning Outcomes Rating Scale” rubric to evaluate: mastery of scientific knowledge, effective communication and writing skills, presentations, required expertise for future careers. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? Additional comments (optional). 11. Would you recommend that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Writing exam to assure certain proficiency level

Connected Document
SLO MWM Rubric

Target:
Above 80% proficiency (meeting and above expectations) according to the "Exhibits a coherent understanding of discipline knowledge" portion of the rubric.

Connected Document
SLO MWM Rubric

Finding (2017-2018) - Target: Met
6 out of 6 students who presented and defended their ideas at their final exam for the MWM met this target. Every student scored 80% and above. One student scored 90% and above and one student averaged 85%.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Water Daze Poster Competition
Established in Cycle: 2015-2016
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understa...

WMHS 602 Study Abroad Program
Established in Cycle: 2015-2016
WMHS 602 was taught as a Study Abroad Program. Students spent a week (over spring break) in Guanajuato, Mexico (Hacienda Santa C...

M 2: Presentation of research results
Department will promote graduate students presentations through annual events at the University level and by giving financial support to present their research at professional or academic meetings. This will train students to effectively communicate.

Source of Evidence: Presentation, either individual or group

Target:
70% of MWM students will present at one professional or academic meeting by the time they complete the program.

Finding (2017-2018) - Target: Met
6 out of 6 students presented at a least one conference or academic meeting. Students are encouraged to present on a water related problem that they are interested in, through a poster presentation at the annual Water Daze event. The topics chosen pertain to some of the most pressing issue, both locally and nationally. Students receive feedback from a team of Texas A&M University professors plus the guest speaker at Water
Daze. Water Daze remains an annual activity within the program. 1 student participated and presented at a national workshop.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Water Daze Poster Competition**
*Established in Cycle: 2015-2016*
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understa...

**SLO 2: Effectively communicate research findings**
Students will be able to effectively communicate research findings.

**Relevant Associations:**

- **General Education/Core Curriculum Associations**
  1. Master the depth of knowledge required for a degree
  2. Communicate effectively

- **Graduate Outcome Associations**
  1. Communicate effectively.
  2. Use appropriate technologies to communicate, collaborate, conduct research, and solve problems.
  3. Choose ethical courses of action in research and practice.

**Related Measures**

**M 1: Final Exam Rubric**
Students' graduate committees will assess their achievement of this outcome by evaluating their final examination. The committee members will use the "Master of Water Management Learning Outcomes Rating Scale" rubric to evaluate: mastery of scientific knowledge, effective communication and writing skills, presentations, required expertise for future careers. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? Additional comments (optional). 11. Would you recommned that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Writing exam to assure certain proficiency level

**Connected Document**

**SLO MWM Rubric**

**Target:**
Above 80% proficiency (meeting and above expectations) according to the "Communicate Effectively" portion of the rubric.

**Connected Document**

**SLO MWM Rubric**

**Finding (2017-2018) - Target: Met**
6 out of 6 students met this target. Every student scored 80% and above. One student scored above 90% and one student scored 82%.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Water Daze Poster Competition**
*Established in Cycle: 2015-2016*

**WMHS 602 Study Abroad Program**
*Established in Cycle: 2015-2016*
WMHS 602 was taught as a Study Abroad Program. Students spent a week (over spring break) in Guanajuato, Mexico (Hacienda Santa C...

**M 2: Presentation of research results**
Department will promote graduate students presentations through annual events at the University level and by giving financial support to present their research at professional or academic meetings. This will train students to effectively communicate.

Source of Evidence: Presentation, either individual or group

**Target:**
70% of MWM students will present at one professional or academic meeting by the time they complete the program.

**Finding (2017-2018) - Target: Met**
6 out of 6 students presented at a least one conference or academic meeting. 1 student participated and presented at a national workshop.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Water Daze Poster Competition**
Established in Cycle: 2015-2016
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understa...

Improve Communication Skills
Established in Cycle: 2016-2017
Based on our findings, that some students lacks the necessary skills for presentation, we propose to include 6 hours of commun...

SLO 3: Apply expertise to different contexts to solve problems
Students will be able to apply water management and hydrological science knowledge in a range of contexts to solve problems, make and justify decisions

Relevant Associations:
General Education/Core Curriculum Associations
2 Demonstrate critical thinking
3 Communicate effectively

Related Measures
M 1: Final Exam Rubric
Students' graduate committees will assess their achievement of this outcome by evaluating their final examination. The committee members will use the "Master of Water Management Learning Outcomes Rating Scale" rubric to evaluate: mastery of scientific knowledge, effective communication and writing skills, presentations, required expertise for future careers. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? Additional comments (optional). 11. Would you recommened that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO
Source of Evidence: Writing exam to assure certain proficiency level

Connected Document
SLO MWM Rubric

Target:
Above 80% proficiency (meeting and above expectations) according to the "Applies discipline specific knowledge in a range of contexts to solve problems..." portion of the rubric.

Connected Document
SLO MWM Rubric
Finding (2017-2018) - Target: Met
6 out of 6 (100%) students examined obtained above 80% proficiency in this area. One student obtained 90% and above on this criteria.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

WMHS 602 Study Abroad Program
Established in Cycle: 2015-2016
WMHS 602 was taught as a Study Abroad Program. Students spent a week (over spring break) in Guanajuato, Mexico (Hacienda Santa C...

SLO 4: Analyze variety of sources and perspectives
Students will be able to use a variety of sources and evaluate multiple points of view to analyze and integrate information.

Relevant Associations:
Graduate Outcome Associations
1.2 Apply subject matter knowledge in a range of contexts to solve problems and make decisions.
1.3 Use a variety of sources and evaluate multiple points of view to analyze and integrate information and to conduct critical, reasoned arguments.

Related Measures
M 1: Final Exam Rubric
Students' graduate committees will assess their achievement of this outcome by evaluating their final examination. The committee members will use the "Master of Water Management Learning Outcomes Rating Scale" rubric to evaluate: mastery of scientific knowledge, effective communication and writing skills, presentations, required expertise for future careers. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? Additional comments (optional). 11. Would you recommened that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO
Source of Evidence: Writing exam to assure certain proficiency level
**SLO MWM Rubric**

**Target:**
Above 80% proficiency (meeting and above expectations) according to the "Uses a variety of sources and evaluates multiple points of view..." portion of the rubric.

**Finding (2017-2018) - Target: Met**
6 out of 6 (100%) students examined obtained above 80% proficiency in this area. Two students obtained 85% and an this rubric.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Water Daze Poster Competition**
*Established in Cycle: 2015-2016*
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understa...

**WMHS 602 Study Abroad Program**
*Established in Cycle: 2015-2016*
WMHS 602 was taught as a Study Abroad Program. Students spent a week (over spring break) in Guanajuato, Mexico (Hacienda Santa C...

**SLO 5: Explain their discipline to a broad audience**
Students will be able to teach or explain the subject matter in their discipline to a broad range of audiences.

**Relevant Associations:**

1.2 Apply subject matter knowledge in a range of contexts to solve problems and make decisions.
1.4 Communicate effectively.

**Related Measures**

**M 1: Final Exam Rubric**
Students' graduate committees will assess their achievement of this outcome by evaluating their final examination. The committee members will use the "Master of Water Management Learning Outcomes Rating Scale" rubric to evaluate: mastery of scientific knowledge, effective communication and writing skills, presentations, required expertise for future careers. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? Additional comments (optional). 11. Would you recommnd that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO

Source of Evidence: Writing exam to assure certain proficiency level

**Target:**
Above 80% proficiency (meeting and above expectations) according to the "Teaches or explains the subject matter to a broad range of audiences" portion of the rubric.

**Finding (2017-2018) - Target: Met**
5 out of 6 (100%) students examined obtained above 80% proficiency in this area. [One examiner recoded "not observable" for one student. Nonetheless, the average score (excluding the non-observable remark) for this student was 85%.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Internship Program**
*Established in Cycle: 2013-2014*
Objective: To improve applied experiences and knowledge for students and to improve their abilities to communicate to a broad...

**Water Daze Poster Competition**
*Established in Cycle: 2015-2016*
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understa...

**WMHS 602 Study Abroad Program**
*Established in Cycle: 2015-2016*
WMHS 602 was taught as a Study Abroad Program. Students spent a week (over spring break) in Guanajuato, Mexico (Hacienda Santa C...
M 2: Presentation of research results

Department will promote graduate students presentations through annual events at the University level and by giving financial support to present their research at professional or academic meetings. This will train students to effectively communicate.

Source of Evidence: Presentation, either individual or group

**Target:**
70% of MWM students will present at one professional or academic meeting by the time they complete the program.

**Finding (2017-2018) - Target: Met**
6 out of 6 students presented at a least one conference or academic meeting. 2 students are already working and have been presenting at professional meetings.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

Water Daze Poster Competition
*Established in Cycle: 2015-2016*
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understa...

Improve Communication Skills
*Established in Cycle: 2016-2017*
Based on our findings, that some students lacks the necessary skills for presentation, we propose to include 6 hours of commun...

SLO 6: Proficiency in appropriate technology

Students will exhibit proficiency in technology appropriate to solve problems in the water field

**Relevant Associations:**
Graduate Outcome Associations
1.5 Use appropriate technologies to communicate, collaborate, conduct research, and solve problems.

**Related Measures**

M 1: Final Exam Rubric
Students' graduate committees will assess their achievement of this outcome by evaluating their final examination. The committee members will use the "Master of Water Management Learning Outcomes Rating Scale" rubric to evaluate: mastery of scientific knowledge, effective communication and writing skills, presentations, required expertise for future careers. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to solve problems in their discipline? 7. Chooses ethical courses of action in research and practice? Additional comments (optional). 11. Would you recommended that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO
Source of Evidence: Writing exam to assure certain proficiency level

**Connected Document**
SLO MWM Rubric

**Target:**
Above 80% proficiency (meeting and above expectations) according to the "Exhibits proficiency in technology appropriate to solve problems" portion of the rubric.

**Connected Document**
SLO MWM Rubric

**Finding (2017-2018) - Target: Met**
6 out of 6 students scored 80% and above on this criteria.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

Internship Program
*Established in Cycle: 2013-2014*
Objective: To improve applied experiences and knowledge for students and to improve their abilities to communicate to a broad...

Water Daze Poster Competition
*Established in Cycle: 2015-2016*
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understa...

SLO 7: Chooses ethical course of action

Students will be able to choose ethical courses of action in research and practice.

**Relevant Associations:**
Graduate Outcome Associations
1.7 Choose ethical courses of action in research and practice.

**Related Measures**
M 1: Final Exam Rubric
Students' graduate committees will assess their achievement of this outcome by evaluating their final examination. The committee members will use the "Master of Water Management Learning Outcomes Rating Scale" rubric to evaluate: mastery of scientific knowledge, effective communication and writing skills, presentations, required expertise for future careers. Rubric Graduate Student Evaluation This section should be completed for ALL students HOW WELL DOES THE STUDENT MEET YOUR EXPECTATIONS IN THE FOLLOWING AREAS? (note: Expectations should represent a common level of proficiency demanded for all students in this program. Above Expectations represent exceeding 90% of proficiency and 80% represent Meeting Expectations ) Above Expectations Meets Expectations Below Expectations Not Observable 1. Exhibits a coherent understanding of discipline-specific knowledge? 2. Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions? 3. Uses a variety of sources and evaluates multiple points of view to analyse and integrate information? 4. Communicates effectively? 5. Teaches or explains the subject matter in their discipline to a broad range of audiences? 6. Exhibits proficiency in technology appropriate to ray problems in their discipline? 7. Chooses ethical courses of action in research and practice? Additional comments (optional). 11. Would you recommend that his student go on to a PhD program, or to pursue a post-doc position? circle one YES /NO
Source of Evidence: Writing exam to assure certain proficiency level

Details of Action Plans for This Cycle (by Established cycle, then alpha)

Water Poster Competition
Students will be encouraged to develop poster to compete for WMHS awards (monetary) every year. The Water Poster Competition will be open to all Geosciences students and besides the quality and topic they will be addressing, they will be evaluated based on the professional meetings they are actually presented or accepted to be presented.

Established in Cycle: 2011-2012
Implementation Status: Finished
Priority: High
Implementation Description: Water Poster Competition will be advertised at the beginning of the Spring Semester 2013. It will be open to all Geosciences students and will be offering awards to the best three posters. Judges will be selected faculty from the water program and will evaluate quality, creativity, innovation, topic and trascendence (this will include the presentation of the poster at professional meetings).
Projected Completion Date: 09/2013
Responsible Person/Group: WMHS
Budget Amount Requested: $2,000.00 (recurring)

Rio Grand Field Trip, Seminar and Conference Research Project
In order to improve and achieve more aggressively our targets related to national and international exposure of students as well as effective communication skills, we have developed an integrative research experience program for Spring and Fall 2014. The Rio Grand Basin will be the study case to investigate and address the fundamental water science concepts and issues as part of the WMHS 601 course, followed by a 17 day field trip from headwaters to the Gulf of Mexico during which students will be able to interact with water users and stakeholders, and be exposed to water challenges as part of the WMHS 602 "maymester" course. The field trip has the objective to offer students a variety of research possibilities as well as to experience the interdisciplinary nature of water issues along the Rio Grande. Students will develop a research project that will be presented at the Fall 2014 WMHS Seminar Series and at the Water Conference planned for Fall 2014. The overall result of this project will be a published TAMU book containing every student research paper on Water Issues along the Rio Grande Basin, as well as an integrative experience that will offer students scientific and field exposure and challenging research opportunities.

Established in Cycle: 2012-2013
Implementation Status: Finished
Priority: High
Implementation Description: WMHS 601 will offer the scientific background to prepare students for the field trip. WMHS 602 will be offered as a "Maymester" 17 days field (during May) during which we will travel from headwaters to the Gulf of Mexico, meeting water users, stakeholders and experts along the Basin. Students will identify their research and present their results at the 2014 Fall Seminar WMHS681 and Water Conference. Their papers will be part of a published book.
Projected Completion Date: 05/2014
Responsible Person/Group: Ronald Kaiser, Rosario Sanchez

Develop water specific learning objective rubric
Goal: Develop water specific learning objective rubrics consistent with the general University learning objective rubrics.
Water Daze Poster Competition

The purpose is to train students to develop clear hypothesis and research process, to help prepare for their final same time in their oral presentation. We will develop a special session in which the top 5 posters will present to a poster to 2 instead of 3, to guarantee that every student participates equally in the amount of research work and at the time they graduate. Developed into a permanent event for which students will be required to participate in order to get academic credit.

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understand clearly their discipline on water science, explain the water topic to a broad audience, including the use of appropriate technology according to our measures and target expectations, our Water Poster Competition has increased the Targets for Measure 2: "Presentation of research results" from 50% to 70% of students.

WMHS 602 Study Abroad Program: Water, Energy, Food Nexus

Our core course WMHS 602 Contemporary Issues in Water Resources has been planned to be implemented as a study abroad program every other year in Mexico. This plan of a two-week intensive class and field work will expose students to a broad spectrum of research possibilities as well as different cultures and audiences. The course will have presentations from other universities from the United States as well as from Mexico. The interdisciplinary nature of this class, as well as the multidiverse elements included will offer our students the capacity to address water challenges from different perspectives and well as to give integrative and global alternatives. Students will require to have a final exam as well as a presentation which will require members from different universities. This will improve their communication skills, as well as the research quality.

Internship Program

Objective: To improve applied experiences and knowledge for students and to improve their abilities to communicate to a broader audience. Action Plan item 1. Develop an on-going internship program for student with public and private water organizations. 2. Institute a target metric that 50% of all MWM students will have an internship experience by the time they graduate.

Water Conference-Rio Grande Papers and poster presentations

After the Rio Grande Field trip where a total of 31 students experienced the biophysical, economic, legal and political conditions as well as the challenges related to the management of the basin, students are required to submit a publishable paper by the beginning of the Fall 2014 that will be part of a Book for the Rio Grande river. At the same time, they will be required to present a paper or a poster during the Water Conference scheduled for November 2014.

Increase Targets of Measure 2

We have increased the Targets for Measure 2: "Presentation of research results" from 50% to 70% of students. We have also included 3 more targets to Measure 2 related to specific SLOs to separate our priorities on the elements we will like to concentrate: Target: Demonstrate knowledge and expertise (70%) Target: Effectively communicate research findings (70%) Target: Explain their discipline to a broad audience (70%)

Water Daze Poster Competition

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), understand clearly their discipline on water science, explain the water topic to a broad audience, including the use of appropriate technology according to our measures and target expectations, our Water Poster Competition has developed into a permanent event for which students will be required to participate in order to get academic credit. Our spring required seminar class WMHS 681 will be used to get students register to participate in Poster Competition. Based on our observation and feedbacks from previous events, we have reduced the number of participants per poster to 2 instead of 3, to guarantee that every student participates equally in the amount of research work and at the same time in their oral presentation. We will develop a special session in which the top 5 posters will present to a broad audience (not just to judges) in order to work harder in their communication skills and research presentation. The purpose is to train students to develop clear hypothesis and research process, to help the prepare for their final
### WMHS 602 Study Abroad Program

WMHS 602 was taught as a Study Abroad Program. Students spent a week (over spring break) in Guanajuato, Mexico (Hacienda Santa Clara). Students had theoretical lectures and were introduced to both traditional and state-of-the-art water management technologies. They also had the opportunity to interact with faculty and graduate students in Mexico (University of Guanajuato). Students and faculty will also keep participating in this program to guarantee the social interaction of students, their international exposure to cultural differences. This permanent program will enhance students' skills on problem solving in different contexts and explain the water field to a broader audiences, improve their knowledge and expertise, and will keep improving their communication and research skills as they become aware of the value of integrated and cooperative research. The international exposure and experience will be especially beneficial to students who are interested in international work.

**Established in Cycle:** 2015-2016  
**Implementation Status:** Finished  
**Priority:** High

<table>
<thead>
<tr>
<th>Relationships (Measure</th>
<th>Outcome/Objective):</th>
</tr>
</thead>
</table>
| Measure: Final Exam Rubric | Outcome/Objective: Analyze variety of sources and perspectives  
| Demonstrate knowledge and expertise | Effectively communicate research findings | Explain their discipline to a broad audience | Proficiency in appropriate technology |  
| Measure: Presentation of research results | Outcome/Objective: Demonstrate knowledge and expertise | Effectively communicate research findings | Explain their discipline to a broad audience |  

**Implementation Description:** The program has now been run twice (2016 and 2017). Our partners from Hacienda Santa Clara, students and a team of faculty from the University of Guanajuato welcome the opportunity to further collaborate on this initiative as student from both universities benefit tremendously from this interaction.

**Responsible Person/Group:** Ronald Kaiser

### Improve Communication Skills

Based on our findings, that some students lack the necessary skills for presentation, we propose to include 6 hours of communication skills, that will include design of posters, PowerPoint presentation, elevator speech, etc. These 6 hours will be taught before in the second semester before the Water Daze event. Further, the Program Coordinator will assist in advising/guiding students as they work on their poster presentations. Water Daze has been very successful in the past years and we intend to maintain this event for the coming year.

**Established in Cycle:** 2015-2016  
**Implementation Status:** Planned  
**Priority:** Medium

<table>
<thead>
<tr>
<th>Relationships (Measure</th>
<th>Outcome/Objective):</th>
</tr>
</thead>
</table>
| Measure: Final Exam Rubric | Outcome/Objective: Analyze variety of sources and perspectives  
| Apply expertise to different contexts to solve problems | Chooses ethical course of action | Demonstrate knowledge and expertise | Effectively communicate research findings | Explain their discipline to a broad audience |  

**Implementation Description:** This program has now been run twice (2016 and 2017). Our partners from Hacienda Santa Clara, students and a team of faculty from the University of Guanajuato welcome the opportunity to further collaborate on this initiative as student from both universities benefit tremendously from this interaction.

**Responsible Person/Group:** C Prakash Khedun (Program Coordinator) and R Karthikeyan (Chair)

### Consider the Findings and the Action Plan(s) established this cycle. How did the program/unit identify these next steps for action? Why does the program/unit believe this Action Plan(s) should improve future assessment results?

The Water Management & Hydrological Science program is an interdisciplinary program. Students admitted into the program have a varied background and interest. They have the flexibility to choose courses and research topics based on their interest and career objective(s). While they are able to acquire the technical skills they need through the various courses they take at the university, they do not get the opportunity to develop their communication skills, which is extremely important for someone who will be operating in an interdisciplinary environment. PhD and MS student get the opportunity to present at national and, sometimes, international conferences. MWM students, on the other hand, since they are on a professional track, do not always get the opportunity to attend a conference while enrolled in the program. To ensure that they, along with MS and PhD student, get the opportunity to present and defend their ideas in front of an audience, students are strongly encouraged to participate in the annual Water Daze poster competition. Water Daze has been an annual event since Spring 2013. It gives the opportunity to every student to present a poster at least twice while they are enrolled at the university. The event serves as a platform where students are able to present their work to their peers and professors, and be judged by a team of professors. The feedback they receive enable them to improve their presentation and communication skills. It also gives them the opportunity for a mock presentation before they attend a national or international conference. Based on the findings and feedback received, we note that both students and faculty welcome this event. The quality of presentations gets better every year (we had two first place winners in the last two Water Daze). Nonetheless, some students skill lack the skills for a quality presentation, since there are no class that prepares them for that. To address this drawback, in spring 2018 prior to this year’s event, we taught a class on poster design and presentation. Following the class, we note a net improvement on the quality of posters presented. Feedback received from students were positive. We intend to continue teaching this class to every new group of student.
*CRITICAL* Provide an update for completed or ongoing action plans from the previous year(s). Discuss any successes, challenges, and/or obstacles the program/unit has experienced while implementing the Action Plan(s). Address whether or not the program/unit has seen any improvement in assessment results for the targeted Outcome(s) the Action Plan(s) were designed to address and why the action plan may/may not have resulted in improvements.


Water Daze poster competition was an overwhelming successful. We are keeping them as a recurring event such that new group of students in the program are able to benefit from them. We have include a “poster design and presentation class” which helped students prepare better posters and better defend their work. We hope that this experience will help them when they present at national and international conferences. Internship Program: We are continuing our effort to provide internship opportunities to our students. In the past year, one MWM and one MS student spent a summer interning at a consulting firm and with a congressional representative, respectively. We have noted that international students are required to be registered with the university while on internship. We are creating a special section for internships in our program.

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**Detailed Assessment Report**

2017-2018 Water Mgmt and Hydrological Sci, PhD

(Includes those Action Plans with Budget Amounts marked One-Time, Recurring, No Request.)

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**Mission / Purpose**

The WMHS program provides graduate students with the intellectual and technical foundation in subjects relevant to water resources including a broad understanding of hydrology and associated ecosystems, and the interplay between the biophysical sciences and human systems to solve water problems. The program prepares the next generation of water scientists, hydrologists and managers for professional and academic careers at the state, national and international levels to improve the availability, security, and reliability of water supplies.

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**Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans**

**SLO 1: Demonstrate knowledge and expertise**

Students exhibits a coherent understanding, knowledge and expertise regarding theories, principles, and practices of hydrology and water management.

**Relevant Associations:**

General Education/Core Curriculum Associations

1. Master the depth of knowledge required for a degree

Graduate Outcome Associations

2.1 Master degree program requirements, including theories, concepts, principles, and practice; develop a coherent understanding of the subject matter through synthesis across courses and experiences; and apply subject matter knowledge to solve problems and make decisions.

**Related Measures**

M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric.

Source of Evidence: Comprehensive/end-of-program subject matter exam

**Connected Document**

SLO PHD Rubric

Target:
Above 80% proficiency (meeting and above expectations) according to the "Exhibits a coherent understanding of discipline knowledge" portion of the rubric.

**Connected Document**

SLO PHD Rubric

**Finding (2017-2018) - Target: Not Reported This Cycle**
No PhD student graduated in this assessment cycle.

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**SLO 2: Effectively communicate research findings**

Students will be able to effectively communicate written and orally through papers and presentations research findings.

**Relevant Associations:**

General Education/Core Curriculum Associations

3. Communicate effectively

Graduate Outcome Associations

2.3 Communicate effectively.

**Related Measures**

M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric.

Source of Evidence: Comprehensive/end-of-program subject matter exam

**Connected Document**

SLO PHD Rubric

Target:
Above 80% proficiency (meeting and above expectations) according to the "Communicate Effectively" portion of
the rubric.

**Connected Document**
[SLO PHD Rubric](#)

**Finding (2017-2018) - Target: Not Reported This Cycle**
No PhD student graduated in this assessment cycle.

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Improve Communication Skills**
*Established in Cycle: 2016-2017*
Water Daze has been a very successful in the past years and we intend to maintain this event for the coming year. It gives the o...

**SLO 3: Apply expertise to different contexts to solve problems**
Students will be able to apply water management and hydrological science knowledge in a range of contexts to solve problems, make and justify decisions.

**Relevant Associations:**
- General Education/Core Curriculum Associations
  - 2 Demonstrate critical thinking
  - 3 Communicate effectively

**Related Measures**

**M 1: Final Exam Rubric**
Each student graduate committee will collectively assess proficiency using University developed rubric.

*Source of Evidence: Comprehensive/end-of-program subject matter exam*

**Connected Document**
[SLO PHD Rubric](#)

**Target:**
Above 80% proficiency (meeting and above expectations) according to the "Applies discipline specific knowledge in a range of contexts to solve problems..." portion of the rubric.

**Connected Document**
[SLO PHD Rubric](#)

**Finding (2017-2018) - Target: Not Reported This Cycle**
No PhD student graduated in this assessment cycle.

**SLO 4: Analyze variety of sources and perspectives**
Students will be able to use a variety of sources and evaluate multiple points of view to analyze and integrate information.

**Relevant Associations:**
- Graduate Outcome Associations
  - 2.1 Master degree program requirements, including theories, concepts, principles, and practice; develop a coherent understanding of the subject matter through synthesis across courses and experiences; and apply subject matter knowledge to solve problems and make decisions.
  - 2.2 Apply a variety of strategies and tools, use a variety of sources, and evaluate multiple points of view to analyze and integrate information and to conduct critical, reasoned arguments.

**Related Measures**

**M 1: Final Exam Rubric**
Each student graduate committee will collectively assess proficiency using University developed rubric.

*Source of Evidence: Comprehensive/end-of-program subject matter exam*

**Connected Document**
[SLO PHD Rubric](#)

**Target:**
Above 80% proficiency (meeting and above expectations) according to the "Uses a variety of sources and evaluates multiple points of view..." portion of the rubric.

**Connected Document**
[SLO PHD Rubric](#)

**Finding (2017-2018) - Target: Not Reported This Cycle**
No PhD student graduated in this assessment cycle.

**SLO 5: Explain their discipline to a broad audience**
Students will be able to teach or explain the subject matter in their discipline to a broad range of audiences.

**Relevant Associations:**
- Graduate Outcome Associations
  - 2.1 Master degree program requirements, including theories, concepts, principles, and practice; develop a coherent understanding of the subject matter through synthesis across courses and experiences; and apply subject matter knowledge to solve problems and make decisions.
  - 2.3 Communicate effectively.

**Related Measures**

**M 1: Final Exam Rubric**
Each student graduate committee will collectively assess proficiency using University developed rubric.
SLO 6: Proficiency in appropriate technology
Students will exhibit proficiency in technology appropriate to solve problems in the water field.

**Relevant Associations:**

- Graduate Outcome Associations
  - 2.5 Use appropriate technologies to communicate, collaborate, conduct research, and solve problems.

**Related Measures**

**M 1: Final Exam Rubric**
Each student graduate committee will collectively assess proficiency using University developed rubric.

**Source of Evidence:** Comprehensive/end-of-program subject matter exam

**Finding (2017-2018) - Target: Not Reported This Cycle**
No PhD student graduated in this assessment cycle.

**SLO 7: Chooses ethical course of action**
Students will be able to choose ethical courses of action in research and practice.

**Relevant Associations:**

- Graduate Outcome Associations
  - 2.7 Choose ethical courses of action in research and practice.

**Related Measures**

**M 1: Final Exam Rubric**
Each student graduate committee will collectively assess proficiency using University developed rubric.

**Source of Evidence:** Comprehensive/end-of-program subject matter exam

**Finding (2017-2018) - Target: Not Reported This Cycle**
No PhD student graduated in this assessment cycle.

**SLO 8: Develops clear research plans**
Students will be able to develop clear, hypothesis-driven research plans.

**Relevant Associations:**

- Graduate Outcome Associations
  - 2.4 Develop clear research plans, conduct valid, data-supported, theoretically consistent, and institutionally appropriate research and effectively disseminate the results of the research in appropriate venues to a range of audiences.

**Related Measures**

**M 1: Final Exam Rubric**
Each student graduate committee will collectively assess proficiency using University developed rubric.
SLO 9: Conducts valid and theoretical research
Students will be able to conduct valid, data-supported and theoretically consistent research.

Relevant Associations:

Graduate Outcome Associations
2.4 Develop clear research plans, conduct valid, data-supported, theoretically consistent, and institutionally appropriate research and effectively disseminate the results of the research in appropriate venues to a range of audiences.

Related Measures

M 1: Final Exam Rubric
Each student graduate committee will collectively assess proficiency using University developed rubric.

Source of Evidence: Comprehensive/end-of-program subject matter exam

Target:
Above 80% proficiency (meeting and above expectations) according to the "Develops clear hypotheses-driven research plans" portion of the rubric.

Finding (2017-2018) - Target: Not Reported This Cycle
No PhD student graduated in this assessment cycle.

M 2: Effectively communicate and present research results
Department will promote graduate students presentations through annual events at the University level and by giving financial support to present their research at professional or academic meetings. This will train students to effectively communicate. This measure counts only graduating students in the corresponding cycle.

Source of Evidence: Presentation, either individual or group

Target:
80% of students will present at one or more professional meetings by the time they complete the program.

Finding (2017-2018) - Target: Not Reported This Cycle
No PhD student graduated in this assessment cycle. However, during the course of their studies PhD students are encouraged to present at national and international conferences. Some have participated in several conferences already.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Increase Targets for Measure 2: Effectively communicate...
Established in Cycle: 2015-2016
We have increased our Targets from 50% of PhD students to 80% in Measure 2: Effectively communicate and present research results...

Water Daze Poster Competition
Established in Cycle: 2015-2016
In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

WMHS 602 Study Abroad Program
Established in Cycle: 2015-2016
Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week of...

M 3: Publish refereed articles
Department will track graduate student publications in refereed journals. This measure counts only graduating students in the corresponding cycle.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:
75% of students will submit or publish refereed research article by the time they complete the program.

Finding (2017-2018) - Target: Not Reported This Cycle
No PhD student graduated in this assessment cycle. However, during the course of their studies PhD students are encouraged to publish their work. Several students already have one or more publications.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.
Increase Targets for Measure 2: Effectively communicate...  
*Established in Cycle: 2015-2016*

We have increased our Targets from 50% of PhD students to 80% in Measure 2: Effectively communicate and present research results...

**SLO 10: Effectively disseminates research results**  
Students will be able to disseminate research results in appropriate contexts.

**Relevant Associations:**

Graduate Outcome Associations

- 2.3 Communicate effectively.
- 2.4 Develop clear research plans, conduct valid, data-supported, theoretically consistent, and institutionally appropriate research and effectively disseminate the results of the research in appropriate venues to a range of audiences.

**Related Measures**

**M 1: Final Exam Rubric**  
Each student graduate committee will collectively assess proficiency using University developed rubric.

Source of Evidence: Comprehensive/end-of-program subject matter exam

**Connected Document**

[SLO PHD Rubric](#)

**Target:**

Above 80% proficiency (meeting and above expectations) according to the "Effectively disseminates research results in appropriate contexts" portion of the rubric.

**Connected Document**

[SLO PHD Rubric](#)

**Finding (2017-2018) - Target: Not Reported This Cycle**

No PhD student graduated in this assessment cycle.

**Related Action Plans (by Established cycle, then alpha):**

For full information, see the *Details of Action Plans* section of this report.

**WMHS Seminar**  
*Established in Cycle: 2013-2014*

All PhD students will be required to present a one hour seminar to the WMHS students (WMHS 681 Seminar), public and invited gues...

**Water Daze Poster Competition**  
*Established in Cycle: 2015-2016*

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

**WMHS 602 Study Abroad Program**  
*Established in Cycle: 2015-2016*

Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week of...

**Improve Communication Skills**  
*Established in Cycle: 2016-2017*

Water Daze has been a very successful in the past years and we intend to maintain this event for the coming year. It gives the o...

**M 2: Effectively communicate and present research results**  
Department will promote graduate students presentations through annual events at the University level and by giving financial support to present their research at professional or academic meetings. This will train students to effectively communicate. This measure counts only graduating students in the corresponding cycle.

Source of Evidence: Presentation, either individual or group

**Target:**

80% of students will present at one or more professional meetings by the time they complete the program.

**Finding (2017-2018) - Target: Not Reported This Cycle**

No PhD student graduated in this assessment cycle. However, during the course of their studies PhD students are encouraged to present at national and international conferences. Some have participated in several conferences already.

**Related Action Plans (by Established cycle, then alpha):**

For full information, see the *Details of Action Plans* section of this report.

**Increase Targets for Measure 2: Effectively communicate...**  
*Established in Cycle: 2015-2016*

We have increased our Targets from 50% of PhD students to 80% in Measure 2: Effectively communicate and present research results...

**Water Daze Poster Competition**  
*Established in Cycle: 2015-2016*

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well ...

**WMHS 602 Study Abroad Program**  
*Established in Cycle: 2015-2016*

Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week of...
**Improve Communication Skills**  
*Established in Cycle: 2016-2017*  
Water Daze has been a very successful in the past years and we intend to maintain this event for the coming year. It gives the o...

**M 3: Publish refereed articles**  
Department will track graduate student publications in refereed journals. This measure counts only graduating students in the corresponding cycle.  
Source of Evidence: Written assignment(s), usually scored by a rubric  
Target:  
75% of students will submit or publish refereed research article by the time they complete the program.  

Finding (2017-2018) - Target: Not Reported This Cycle  
No PhD student graduated in this assessment cycle. However, during the course of their studies PhD students are encouraged to publish their work. Several students already have one or more publications.  

Related Action Plans (by Established cycle, then alpha):  
For full information, see the Details of Action Plans section of this report.  

Increase Targets for Measure 2: Effectively communicate...  
*Established in Cycle: 2015-2016*  
We have increased our Targets from 50% of PhD students to 80% in Measure 2: Effectively communicate and present research results...

**Details of Action Plans for This Cycle (by Established cycle, then alpha)**

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**Water Poster Competition**  
To improve the performance of the MS and MWM students in professional meetings and research papers and to reinforce even more our Phd students curricula, the WMHS Program will plan to develop a Water Poster Competition in which students will compete for monetary awards. The best three posters will be awarded by judges from the water faculty. Posters will be evaluated based on: creativity, innovation, quality and exposure to professional meetings. This project will help to improve Masters thesis and non thesis students to reach for national exposure at professional levels, enhance their research abilities and performance at graduate level, and at the same time will support PhD students in their funding search.  

Established in Cycle: 2011-2012  
Implementation Status: Finished  
Priority: High  
Projected Completion Date: 09/2013  
Responsible Person/Group: WMHS  
Budget Amount Requested: $2,000.00 (recurring)

**Rio Grand Field Trip, Seminar and Conference Research Project**  
In order to improve and achieve more aggressively our targets related to research publications and national and international exposure of students, we have developed an integrative research experience program for Spring and Fall 2014. The Rio Grand Basin will be the study case to investigate and address the fundamental water science concepts and issues as part of the WMHS 601 course, followed by a 17 day field trip from headwaters to the Gulf of Mexico during which students will be able to interact with water users and stakeholders, and be exposed to water challenges as part of the WMHS 602 "maymester" course. The field trip has the objective to offer students a variety of research possibilities as well as to experience the interdisciplinary nature of water issues along the Rio Grand. Students will develop a research project that will be presented at the Fall 2014 WMHS Seminar Series and at the Water Conference planned for Fall 2014. The overall result of this project will be a published TAMU book containing every student research paper on Water Issues along the Rio Grande Basin, as well as an integrative experience that will offer students scientific and field exposure and challenging research opportunities.  

Established in Cycle: 2012-2013  
Implementation Status: In-Progress  
Priority: High  
Implementation Description: WMHS 601 will offer the scientific background to prepare students for the field trip. WMHS 602 will be offered as a "Maymester" 17 days field (during May) during which we will travel from headwaters to the Gulf of Mexico, meeting water users, stakeholders and experts along the Basin. Students will identify their research and present their results at the 2014 Fall Seminar WMHS681 and Water Conference. Their papers will be part of a published book.  
Projected Completion Date: 12/2014  
Responsible Person/Group: Ronald Kaiser, Rosario Sanchez

**Water Conference, Rio Grande Papers and Posters Presentation**  
Goal: Improve the opportunity for student presentations and publications. Action Plan item 1. Develop and conduct a water conference and poster competition as part of Rio Grande project funded by the University. Students that participated in project will present papers and posters at conference. 2. Work with Rio Grande project students to prepare their reports as book chapters for a Rio Grande book.  

Established in Cycle: 2013-2014  
Implementation Status: Finished  
Priority: High  
Implementation Description: Students are already working on their book chapters that will be published by 2015. The Water Conference will be held on November 16-18 at the Annenberg Conference Center.  
Projected Completion Date: 11/2014  
Responsible Person/Group: WMHS Program  
Budget Amount Requested: $0.00 (no request)

**WMHS Seminar**  
All PhD students will be required to present a one hour seminar to the WMHS students (WMHS 681 Seminar), public and invited guests, in which they will present their research and results. This requirement must be fulfilled after they have completed their prelims and before they graduate.  

Established in Cycle: 2013-2014
WMHS 602 Study Abroad Program: Water, Energy and Food Nexus

Our core course WMHS 602 Contemporary Issues in Water Resources has been planned to be implemented as a study abroad program every other year in Mexico. This plan of a two-week intensive class and field work will expose students to a broad spectrum of research possibilities as well as different cultures and audiences. The course will have presentations from other universities from the United States as well as from Mexico. The interdisciplinary nature of this class, as well as the multidiverse elements included will offer our students the capacity to address water challenges from different perspectives and well as to give integrative and global alternatives. Students will require to have a final exam as well as a presentation which will require members from different universities. This will improve their communication skills, as well as the research quality.

Implementation Status: Planned
Priority: High
Implementation Description: It will be implemented from August 16-22 at the Hacienda Santa Clara in Guanajuato and from August 22 to August 30 at the University of Guanajuato. Classes will be jointly taught with faculty from TAMU and University of Guanajuato. Field trips will accompany the course work. Final exam as well as a final presentation are planned.
Responsible Person/Group: Ronald Kaiser
Budget Amount Requested: $20,000.00 (recurring)

Increase Targets for Measure 2: Effectively communicate...

We have increased our Targets from 50% of PhD students to 80% in Measure 2: Effectively communicate and present research results. Target: 80% of PhD students conduct valid research Target: 80% of PhD students effectively disseminates research results.

Established in Cycle: 2015-2016
Implementation Status: In-Progress
Priority: High
Implementation Description: The Targets have already been adjusted for next cycle.
Responsible Person/Group: Ronald Kaiser

Water Daze Poster Competition

In order to assure that our students always exceed communication standards and skills (meaning above expectations 90%), as well as the research process (dissemination and developing valid hypothesis) our Water Poster Competition has developed into a permanent event for which students will be required to participate in order to get academic credit. Our spring required seminar class WMHS 681 will be used to get students register to participate in Poster Competition. Also, we are reducing the number of participants per poster to 2 instead of 3, to guarantee that every student participates equally in the amount of research work and at the same time in their oral presentation. We will develop a special session in which the top 5 posters will present to a broad audience (not just to judges) in order to work harder in their communication skills and research presentation. The purpose is to train students to develop clear hypothesis and research process, to help the prepare for their final examination and assure they obtained an "above expectation" evaluation.

Established in Cycle: 2015-2016
Implementation Status: Planned
Priority: High
Implementation Description: This event has been and will continue to be implemented every year at a University level. Both graduate and undergrad students are able to present, but only the WMHS students are required as part of the seminar requirements.
Projected Completion Date: 04/2017
Responsible Person/Group: Ronald Kaiser

WMHS 602 Study Abroad Program

Our core course WMHS 602 Study Abroad Program will be developed into a permanent program in which students will take a 1 week of field work in Guanajuato, Mexico (Hacienda Santa Clara) during Spring Break every year. This experience will have both the theoretical part of the class in Campus and the international exposure to real life water problems. We will adjust our traditional 2 week course to a 1 week intensive field course with the research component afterwards. Students and faculty from the University of Guanajuato and University of Texas will also keep working in this program to guarantee the social interaction of students, their international exposure to cultural differences, and most of all, to improve their communication and research skills as they become aware of the value of integrated research. According to our findings from the last cycle, we need to make an extra effort in terms of improving even more communication skills and well as research analysis (dissemination, presentation to broad audiences, etc). We believe that a stronger and permanent program will keep strengthen those elements on our graduates.

Established in Cycle: 2015-2016
Implementation Status: Planned
Priority: High
Implementation Description: Our spring required seminar class WMHS 681 will be used to get students register to participate in Poster Competition. Also, we are reducing the number of participants per poster to 2 instead of 3, to guarantee that every student participates equally in the amount of research work and at the same time in their oral presentation. We will develop a special session in which the top 5 posters will present to a broad audience (not just to judges) in order to work harder in their communication skills and research presentation. The purpose is to train students to develop clear hypothesis and research process, to help the prepare for their final examination and assure they obtained an "above expectation" evaluation.
Projected Completion Date: 04/2017
Responsible Person/Group: Ronald Kaiser
Analysis Questions and Analysis Answers

Consider the Findings and the Action Plan(s) established this cycle. How did the program/unit identify these next steps for action? Why does the program/unit believe this Action Plan(s) should improve future assessment results?

The Water Management & Hydrological Science program is an interdisciplinary program. Students admitted into the program have a varied background and interest. They have the flexibility to choose courses and research topics based on their interest and career objective(s). While they are able to acquire the technical skills they need through the various courses they take at the university, they do not get the opportunity to develop their communication skills, which is extremely important for someone who will be operating in an interdisciplinary environment. PhD and MS student get the opportunity to present at national and, sometimes, international conferences. MWM students, on the other hand, since they are on a professional track, do not always get the opportunity to attend a conference while enrolled in the program. To ensure that they, along with MS and PhD student, get the opportunity to present and defend their ideas in front of an audience, students are strongly encouraged to participate in the annual Water Daze poster competition. Water Daze, has been an annual event since Spring 2013. It gives the opportunity to every student to present a poster at least twice while they are enrolled at the university. The event serves as a platform where students are able to present their work to their peers and professors, and be judged by a team of professors. The feedback they receive enable them to improve their presentation and communication skills. It also gives them the opportunity for a mock presentation before they attend a national or international conference. Based on the findings and feedback received, we note that both students and faculty welcome this event. The quality of presentations gets better every year (we had two first place winners in the last two Water Daze). Nonetheless, some students skill lack the skills for a quality presentation, since there are no class that prepares them for that. To address this drawback, in spring 2018 prior to this year’s event, we taught a class on poster design and presentation. Following the class, we note a net improvement on the quality of posters presented. Feedback received from students were positive. We intend to continue teaching this class to every new group of student.

"CRITICAL" Provide an update for completed or ongoing action plans from the previous year(s). Discuss any successes, challenges, and/or obstacles the program/unit has experienced while implementing the Action Plan(s). Address whether or not the program/unit has seen any improvement in assessment results for the targeted Outcome(s) the Action Plan(s) were designed to address and why the action plan may/may not have resulted in improvements.

Action Plan Completed: Water Daze poster competition. Action Plan in Progress: Internship Program Water Daze poster competition was an overwhelming successful. We are keeping them as a recurring event such that new group of students in the program are able to benefit from them. We have include a “poster design and presentation class” which helped students prepare better posters and better defend their work. We hope that this experience will help them when they present at national and international conferences. Internship Program: We are continuing our effort to provide internship opportunities to our students. In the past year, one MWM and one MS student spent a summer interning at a consulting firm and with a congressional representative, respectively. We have noted that international students are required to be registered with the university while on internship. We are creating a special section for internships in our program. Our PhD students do not normally have internships, but occasionally some student spend the summer working at NASA or follow summer workshops at other locations.
APPENDIX D: WMHS FACULTY BYLAWS
By-Laws of the Faculty of Water Management and Hydrological Science

Article I. Description
The Faculty of Water Management and Hydrological Science (WMHS) is an interdisciplinary faculty composed of members of the graduate faculty from academic colleges and departments.

Article II. Purpose and Intent
The principal function of the Faculty of Water Management and Hydrological Science is administration of the graduate program leading to the Master of Water Management, Master of Science and Doctor of Philosophy degrees, in conformance with the rules of Texas A&M University. Its overall goal is to educate the next generation of water managers and scientists.

Article III. WMHS Faculty Membership
A. Status and Eligibility. Admission to the Water Management and Hydrological Science Faculty shall be determined by the WMHS Executive Committee after approval by the head of a faculty members administrative department and nomination of the Chair. Active scholarly involvement is a criterion for membership. Evidence of involvement includes teaching a graduate water course, chairing, co-chairing or serving on a student advisory committee, providing research funding for a student, or active student mentoring. The Executive Committee will review membership qualifications every three years for continuing Faculty eligibility. The Chair will notify Faculty that no longer meet the membership eligibility qualifications.

B. Membership. Members of the Graduate Faculty of Texas A&M University with significant teaching, research or scholarly activities in water are eligible to be members of the WMHS Faculty. Tenured and tenure-track faculty members may serve as chair, co-chair or member of WMHS student advisory committee. Academic professional track faculty (non-tenure track) of TAMUS agencies, or off campus faculty, may serve as co-chair or member of student advisory committees. Professional staff of the University who are members of the Graduate Faculty may serve as a member of student advisory committee.

C. Special Appointment. Qualified individuals may serve as a Special Appointment on a student’s advisory committee following University graduate faculty procedures. An individual serving as a Special Appointment does not count toward the minimum number of Graduate Committee Faculty to form the committee.

Article IV. WMHS Executive Committee
A. Membership. The Executive Committee shall include one elected faculty member from each participating college and one faculty member at large. At least three faculty members must be from a college before it is considered a participating college. All members of the Executive Committee are elected by the faculty. An at large member can be from any participating college. Only tenured or tenure track members of the Faculty may serve on the Executive Committee.

B. Term of Office. The term of the office for Executive Committee members shall be four years. Elections for members from the participating colleges shall be for staggered terms and will be held biennially, so that the terms of the Committee members overlap to maintain continuity. Committee members may serve consecutive terms as determined by election of the Faculty.

C. Program Chair. The Executive Committee shall by majority vote elect from its members a Chair. The Chair shall serve four years from the date of election. Upon expiration of the Chair’s terms a new Chair shall be elected following the annual election of New Executive Committee members. The Chair will be the chief administrative officer of the Faculty. The Chair may serve two or more
consecutive terms. The Chair, with approval of the Executive Committee, may appoint from its members a Vice-Chair.

D. **Vacancies.** The Executive Committee shall fill, by appointment, any vacancies that may occur among its members during the year. Appointees will serve the terms of departing members.

**Article V. Functions of the WMHS Executive Committee**

A. The principal functions of the Executive Committee shall include but not be limited to:
   1. Determine and implement policy and operating procedures for the good of the WMHS Faculty, curriculum and program.
   2. Ensure program uniformity.
   3. Approve addition of core water courses, curriculum, student admissions, student financial assistance, faculty membership, staff hiring, and budget allocation.
   4. Establish standing and *ad hoc* committees as needed.
   5. Conduct any and all additional business deemed necessary for the proper functioning of the program.

B. Meetings of the Executive Committee shall be held at least once each semester. Other meetings of the Executive Committee may be held as deemed necessary by the Executive Committee, or the Chair.

C. At Executive Committee meetings, Robert’s Rule of Order shall be followed in matters of parliamentary procedure.

**Article VI. Election to the WMHS Executive Committee**

A. **Nomination and Election Committee.** A committee composed of two persons from the Executive Committee, and one member from the faculty shall be appointed to accept nominations and conduct the election. Any tenured or tenure track member of the WMHS faculty from their representative college may self-nominate or agree to a nomination.

B. **Election.** The Nominations and Election Committee shall conduct the election and report the results to the membership. Elections shall be conducted by electronic ballot. Each member shall vote for no more candidates than the number of positions to be filled. Those persons receiving the most votes for that position shall be declared elected. Election results shall be emailed to the members promptly. Elected members shall assume their duties on September 1 of the calendar year.

**Article VII. Chair of the Executive Committee**

A. The Chair shall be the chief administrative office of the Executive Committee and Faculty with the responsibility for execution of the administrative functions delegated by the Executive Committee and Faculty. The Chair shall preside over all meetings of the Executive Committee and Faculty. The Chair shall
   1. Provide leadership for the program and represent the Faculty and Executive Committee in College, University and other functions as appropriate;
   2. Coordinate recruitment and admission, direct graduate student advising, approve degree programs and all necessary degree documents, supervise and evaluate staff; develop budgets and approve financial assistance expenditures as authorized by the Executive Committee.
   3. Coordinate program assessments consistent with institutional guidelines.
   4. Administer the program consistent with university requirements and Executive Committee procedures.
B. The Chair will serve as the liaison with the Deans, Department Heads, other administrative officers, and the Faculty Senate.

C. The Chair shall appoint a Vice-Chair from among the members of the Executive Committee to serve for a term of one or more years. A Vice-Chair may serve consecutive terms at the discretion of the Chair.

C. In the absence of the Chair, the Vice-Chair shall serve as Chair of the Executive Committee with power of signature.

Article VIII Meeting of the Faculty

A. A meeting of the Faculty of Water Management and Hydrological Science may be held annually. Items for the agenda must be submitted in writing to the Executive Committee at least two weeks prior to the annual meeting.

A. Special faculty meetings may be held at the call of the Chair or by written application to the Executive Committee by at least 10 or more members of the faculty.

B. The minutes of each Annual Meeting shall be distributed to all members of the Faculty within ten days after the meeting. Corrections, if needed, will appear in the minutes of the next meeting.

C. At Annual Faculty meetings, Robert’s Rule of Order shall be followed in matters of parliamentary procedure.

Article IX. Standing and Ad Hoc Committees

A. Nominations and Election Committee.

B. Any Committee deemed necessary by the Executive Committee.

Article X. Amendments

Proposed amendments to the By-Laws shall be submitted to members of the full faculty for approval or disapproval following either (1) approval of a motion by a majority vote of the Executive Committee, or (2) written petition to the Executive Committee by a minimum of 10 members of the faculty. Approval by two thirds or more of the voting faculty is required to adopt amendments. Voting shall be by electronic ballot.

Approved 2004

Revised 2007
APPENDIX E: INSTITUTIONAL PROFILE
November 18, 2019

TO: External Program Reviewers and Program Accreditors

FROM: Michael T. Stephenson
Vice Provost for Academic Affairs & Strategic Initiatives

RE: Information required for USDOE Accrediting Bodies

Texas A&M University is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award baccalaureate, master's, and doctoral degrees. Consistent with standard 14.4, the following provides the institution’s official position on its purpose, governance, programs, degrees, diplomas, certificates, personnel, finances, and constituencies and is published in official university documents as noted.

Purpose

Classified by the Carnegie Foundation as a Research Doctoral University (Highest Research Activity), Texas A&M embraces its mission of the advancement of knowledge and human achievement in all its dimensions. The research mission is a key to advancing economic development in both public and private sectors. Integration of research with teaching prepares students to compete in a knowledge-based society and to continue developing their own creativity, learning, and skills beyond graduation.

The institution’s official mission statement, published both on the institution’s web page as well as in its annual university catalog, is:

Texas A&M University (Texas A&M) is dedicated to the discovery, development, communication and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups, women and men alike, as it addresses the needs of an increasingly diverse population and a global economy. In the twenty-first century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

Governance

The governance of the institution was described in the 2012 certification of compliance submitted to SACSCOC.
Texas A&M University at College Station, the flagship institution of the Texas A&M University System, has
branch campuses located in Galveston, Texas and Doha, Qatar. A ten-member Board of Regents, appointed
by the Governor, directs the Texas A&M University System. The appointment of each Regent follows Texas
Education Code (TEC, Chapter 85, Section 21).

TEC outlines the duties and responsibilities of the Board of Regents. These responsibilities are also defined
in System Policy 02.01 Board of Regents and TEC 51.352. The Board elects two officers: Chair and Vice
Chair. There are four standing committees: Audit, Academic & Student Affairs, Finance, and Buildings &
Physical Plant. Special committees may be appointed by the Chair with Board approval.

At Texas A&M University the President is the chief executive officer; the President is not the presiding
officer of the Board of Regents. The President reports to the state-appointed Board of Regents through the
Chancellor of the Texas A&M University System. System Policy 2.05 Presidents of System Member
Universities defines the duties of the President. The appointment of the President follows conditions set forth
in System Policy 01.03 Appointing Power and Terms and Conditions of Employment, section 2.2.

**Personnel**

The institution is led by the President and members of his cabinet:

- Michael K. Young, President
- Carol A. Fierke, Provost and Executive Vice President, Chief Academic Officer
- Jerry R. Strawser, Executive Vice President and Chief Financial Officer
- Michael Benedik, Vice Provost and Chief International Officer
- Michael T. Stephenson, Vice Provost for Academic Affairs & Strategic Initiatives
- M. Dee Childs, Vice President for Information Technology and CIO
- Michael G. O’Quinn, Vice President for Government Relations & Strategic Initiatives
- Col. Michael E. Fossum, Chief Operating Officer, TAMU-Galveston
- Jeff Risinger, Vice President for HR & Organizational Effectiveness
- Robin Means Coleman, Vice President and Associate Provost for Diversity
- Mark Barteau, Vice President for Research
- Greg Hartman, Vice Chancellor for Strategic Initiatives, TAMU & Interim Senior Vice
  President, TAMU-HSC
- Daniel J. Pugh, Sr., Vice President for Student Affairs
- Joseph P. Pettibon, II, Vice President for Enrollment and Academic Services
- Gen Joe E. Ramirez, Jr. Commandant, Corps of Cadets
- Amy B. Smith, Senior Vice President and Chief Marketing and Communications Officer
- Ross Bjork, Athletics Director
- Jonathan Bowling, Sr. Associate Athletics Director, Athletics Compliance
- Shane Hinckley, Vice President for Brand Development
- Andrew P. Morris, VP of Entrepreneurship & Economic Development, Dean of the I-School
- C.J. Woods, Associate Vice President and Chief of Staff
- Kevin McGinnis, Chief Compliance Officer

**Programs, Degrees, Diplomas, and Certificates**

See the appended Degrees and Programs Offered tables.

**Finances**

See the 2019 SACSCOC Financial Profile and Indicators
Name of Institution  Texas A&M University

Name, Title, Phone number, and email address of Accreditation Liaison
Michael T. Stephenson
Vice Provost for Academic Affairs and Strategic Initiatives, and SACSCOC Accreditation Liaison
979.845.4016
mstephenson@tamu.edu

Name, Title, Phone number, and email address of Technical Support person for the Compliance Certification
Alicia M. Dorsey
Assistant Provost for Institutional Effectiveness
979.862.2918
amdorsey@tamu.edu

IMPORTANT:

Accreditation Activity (check one):
- Submitted at the time of Reaffirmation Orientation
☐ Submitted with Compliance Certification for Reaffirmation
☐ Submitted with Materials for an On-Site Reaffirmation Review
☐ Submitted with Compliance Certification for Fifth-Year Interim Report
☐ Submitted with Compliance Certification for Initial Candidacy/Accreditation Review
☐ Submitted with Merger/Consolidations/Acquisitions
☐ Submitted with Application for Level Change

Submission date of this completed document:  November 13, 2019
EDUCATIONAL PROGRAMS

1. Level of offerings (Check all that apply)

X Diploma or certificate program(s) requiring less than one year beyond Grade 12
X Diploma or certificate program(s) of at least two but fewer than four years of work beyond Grade 12
☐ Associate degree program(s) requiring a minimum of 60 semester hours or the equivalent designed for transfer to a baccalaureate institution
☐ Associate degree program(s) requiring a minimum of 60 semester hours or the equivalent not designed for transfer
X Four or five-year baccalaureate degree program(s) requiring a minimum of 120 semester hours or the equivalent
X Professional degree program(s)
X Master's degree program(s)
☐ Work beyond the master's level but not at the doctoral level (such as Specialist in Education)
X Doctoral degree program(s)
☐ Other (Specify)

2. Types of Undergraduate Programs (Check all that apply)

☐ Occupational certificate or diploma program(s)
☐ Occupational degree program(s)
☐ Two-year programs designed for transfer to a baccalaureate institution
X Liberal Arts and General
X Teacher Preparatory
X Professional
☐ Other (Specify)

GOVERNANCE CONTROL

Check the appropriate governance control for the institution:
☐ Private (check one)
  ☐ Independent, not-for-profit
  Name of corporation OR
  Name of religious affiliation and control:
  ☐ Independent, for-profit *
  If publicly traded, name of parent company:

X Public state * (check one)
  ☐ Not part of a state system, institution has own independent board
X Part of a state system, system board serves as governing board
  ☐ Part of a state system, system board is super governing board, local governing board has delegated authority
  ☐ Part of a state system, institution has own independent board

* If an institution is part of a state system or a corporate structure, a description of the system operation must be submitted as part of the Compliance Certification for the decennial review. See Commission policy “Reaffirmation of Accreditation and Subsequent Reports” for additional direction.
1. **History and Characteristics**

   Provide a brief history of the institution, a description of its current mission, an indication of its geographic service area, and a description of the composition of the student population. Include a description of any unusual or distinctive features of the institution and a description of the admissions policies (open, selective, etc.). If appropriate, indicate those institutions that are considered peers. Please limit this section to one-half page.

   **History.** Texas A&M University (TAMU) opened in 1876 as the state’s first public institution of higher education. TAMU is one of a select few institutions in the nation to hold land grant, sea grant (1971) and space grant (1989) designations. A mandatory military component was a part of the land grant designation until 1965; currently, it is one of only three institutions with a full-time Corps of Cadets, leading to commissions in all branches of service. TAMU has two branch campuses, one in Galveston, Texas, (established in 1962, officially merged with TAMU in 1991) and one in Doha, Qatar (established in 2003) and 16 approved off-campus instructional locations. In 2013, the Texas A&M University System Health Science Center merged with TAMU. This same year, TAMU acquired the School of Law from Texas Wesleyan University. Finally, TAMU is classified by the Carnegie Foundation as a Research University (very high research activity).

   **Mission.** Texas A&M University is dedicated to the discovery, development, communication, and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups as it addresses the needs of an increasingly diverse population and a global economy. In the 21st century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

   **Enrollment Profile.** Fall 2018 total enrollment was 69,367 students (across all campuses and locations), with 64,126 (92.4%) located on the main campus in College Station. Undergraduate enrollment made up 78.3% of the total student body, with Hispanic, Black, and American Indian students making up 24.9% of the total student body. TAMU Galveston enrolled 1,815 students as of Fall, 2018, with TAMU Qatar enrolling 549 students.

   **Admissions Process.** Automatic admission is available in two ways: (1) for Texas resident applicants in the top 10% of their high school graduating class; and, (2) for applicants who rank in the top 25% of their high school graduating class and achieve a combined SAT math and SAT critical reading score of at least 1300, with a test score of at least 600 in each component or 30 composite on the ACT with a 27 in the math and English components. The review of all other applicants is based on academic potential, distinguishing characteristics, exceptional circumstances, and personal achievements.

   **Peer Institutions.** Georgia Institution of Technology; The Ohio State University; Pennsylvania State University; Purdue University; University of California at Berkeley, Davis, Los Angeles, and San Diego; University of Florida; University of Illinois at Urbana-Champaign; University of Michigan; University of Minnesota; University of North Carolina at Chapel Hill; University of Texas at Austin; and University of Wisconsin – Madison.

2. **List of Degrees**

   List all degrees currently offered (A. S., B.A., B.S., M.A., Ph.D., for examples) and the majors or concentrations within those degrees, as well as all certificates and diplomas. For each credential offered, indicate the number of graduates in the academic year previous to submitting this report. Indicate term dates.

   Does the institution offer any credit, non-credit, or pathways English as a Second Language (ESL) programs? If yes, list the programs.
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<td>UNIVERSITY STUDIES - AGRICULTURE</td>
<td>BS</td>
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<p>| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - ARCHITECTURE | BS | 196 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - BUSINESS ADMIN | BS | 165 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - ENGINEERING | BS | 0 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - GALVESTON | BS | 9 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - GALVESTON | BA | 0 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - GENERAL AGRICULTURE | BS | 0 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - GEOSCIENCES | BS | 6 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - LEADERSHIP STUDIES | BS | 0 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - LIBERAL ARTS | BA | 24 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - LIBERAL ARTS | BS | 26 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - SCIENCE | BS | 10 |
| UNIVERSITY INTERDISCIPLINARY | UNIVERSITY STUDIES - VETERINARY MED | BS | 52 |
| UNIVERSITY INTERDISCIPLINARY | WATER MANAGEMENT AND HYDRO SCI | MS | 6 |
| UNIVERSITY INTERDISCIPLINARY | WATER MANAGEMENT AND HYDRO SCI | MWM | 9 |
| UNIVERSITY INTERDISCIPLINARY | WATER MANAGEMENT AND HYDRO SCI | PHD | 3 |
| VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES | BIOMEDICAL RESEARCH AND DEVELOPMENT | CERT - UG | 34 |
| VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES | BIOMEDICAL SCIENCES | BS | 466 |
| VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES | BIOMEDICAL SCIENCES | MS | 51 |
| VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES | BIOMEDICAL SCIENCES | PHD | 14 |</p>
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<tr>
<th>Program</th>
<th>Course Title</th>
<th>Degree</th>
<th>Credits</th>
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<td>VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES</td>
<td>CULTURAL COMPETENCY &amp; COMMUNICATION IN SPANISH*</td>
<td>CERT - UG</td>
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<td>VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES</td>
<td>SCIENCE &amp; TECHNOLOGY JOURNALISM</td>
<td>MS</td>
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<td>VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES</td>
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<td>VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES</td>
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<td>VETERINARY MEDICINE &amp; BIOMEDICAL SCIENCES</td>
<td>VETERINARY PUBLIC HEALTH - EPIDEMIOLOGY</td>
<td>MS</td>
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</table>

*Major dependent certificates*
### 3. Off-Campus Instructional Locations and Branch Campuses

List all approved off-campus instructional locations where 25% or more credit hours toward a degree, diploma, or certificate can be obtained primarily through traditional classroom instruction. Report those locations in accord with the Commission’s definitions and the directions as specified below.

**Table 1: Off-campus instructional sites**—a site located geographically apart from the main campus at which the institution offers **50% or more** of its credit hours for a diploma, certificate, or degree. This includes high schools where courses are offered as part of dual enrollment. For each site, provide the information below. The list should include only those sites reported to and approved by SACSCOC. Listing unapproved sites below does not constitute reporting them to SACSCOC. In such cases when an institution has initiated an off-campus instructional site as described above without prior approval by SACSCOC, a prospectus for approval should be submitted immediately to SACSCOC.

<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Physical Address (street, city, state, country) Do not include PO Boxes.</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 50% or more credits hours offered at each site</th>
<th>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
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<tbody>
<tr>
<td>Texas A&amp;M Health Science Center</td>
<td>8441 State Highway 47 Clinical Building 1, Suite 3100 Bryan, TX 77807</td>
<td>2000</td>
<td>2000</td>
<td>MEDICAL SCIENCES MS</td>
<td>Yes</td>
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<td></td>
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<td>MEDICAL SCIENCES PHD</td>
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<td></td>
<td></td>
<td></td>
<td>MEDICINE MD</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NURSING BSN</td>
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</tr>
<tr>
<td>Baylor University Medical Center</td>
<td>3500 Gaston Avenue Dallas, TX 75246</td>
<td>2012</td>
<td>2011</td>
<td>MEDICINE MD</td>
<td>Yes</td>
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<tr>
<td>College of Dentistry</td>
<td>3302 Gaston Ave. Dallas, TX 75246</td>
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<td>2000</td>
<td>ADVANCED EDUCATION IN GENERAL DENTISTRY CERT-G</td>
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<td>ORAL AND MAXilloFACIAL SURGERY CERT-G</td>
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<td>PROSTHODONTICS CERT-G</td>
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<td>Texas A&amp;M University School of Law</td>
<td>1515 Commerce St Fort Worth, TX 76102</td>
<td>2013</td>
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<td>HEALTH CARE LAW, INTELLECTUAL PROPERTY, LAW, LAWS</td>
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<td>City Centre</td>
<td>800 West Sam Houston Parkway North, Suite 200 Houston, TX 77024-3920</td>
<td>2012</td>
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<td>ANALYTICS, BUSINESS ADMINISTRATION - EXECUTIVE, MBA</td>
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<td>Houston Methodist Hospital</td>
<td>6670 Bertner Avenue, R2-216 Houston, TX 77030</td>
<td>2015</td>
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<td>MEDICINE, MEDICAL SCIENCES, ENGINEERING</td>
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<tr>
<td>Institute of Biosciences and Technology</td>
<td>2121 W. Holcombe Blvd. Houston, TX 77030</td>
<td>2000</td>
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<td>Rangel College of Pharmacy</td>
<td>1010 W. Avenue B. Kingsville, TX 78363</td>
<td>2011</td>
<td>2006</td>
<td>PHARMACY, PHMD</td>
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<td>Lawrence Livermore National Laboratory</td>
<td>7000 East Avenue Livermore, CA 94550</td>
<td>2018</td>
<td>2008</td>
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<td>Sandia National Laboratories, California</td>
<td>7011 East Avenue Livermore, CA 94550</td>
<td>2018</td>
<td>2008</td>
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<td>Sandia National Laboratories, New Mexico</td>
<td>1515 Eubank S.E. Albuquerque, NM 87123</td>
<td>2018</td>
<td>2008</td>
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<td>School of Public Health - McAllen Teaching Site</td>
<td>2101 South McColl Road McAllen, TX 78503</td>
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<td>HEALTH PROMOTION AND COMMUNITY HEALTH SCIENCES, MPH</td>
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<td>Texas A&amp;M Higher Education Center at McAllen</td>
<td>6200 Tres Lagos Blvd McAllen, TX 78504</td>
<td>2017</td>
<td>2018</td>
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<td>Clinical Learning Resource Center</td>
<td>Health Professions Building 3950 North A. W. Grimes Blvd. Round Rock, TX 78665</td>
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### Table 2: Off-campus instructional sites

At which the institution offers **25-49%** of its credit hours for a diploma, certificate, or degree—including high schools where courses are offered as dual enrollment. **Note: institutions are required to notify SACSCOC in advance of initiating coursework at the site.** For each site, provide the information below.

<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Physical Address</th>
<th>Date of SACSCOC letter accepting notification</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 25-49% credit hours offered at each site</th>
<th>Is the campus currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travis Park Plaza</td>
<td>711 Navarro Street, Suite 250 San Antonio, TX 78205</td>
<td>2017</td>
<td>2017</td>
<td>JURISPRUDENCE MJ</td>
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<tr>
<td>College of Medicine - Temple</td>
<td>2401 S. 31st Street Temple, TX 76508</td>
<td>2000</td>
<td>2000</td>
<td>MEDICINE MD</td>
<td>Yes</td>
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</table>

### Table 3: Branch campus

—An instructional site located geographically apart and independent of the main campus of the institution. A location is independent of the main campus if the location is (1) permanent in nature, (2) offers courses in educational programs leading to a degree, certificate, or other recognized educational credential, (3) has its own faculty and administrative or supervisory organization, and (4) has its own budgetary and hiring authority. **The list should include only those branch campuses reported to and approved by SACSCOC.** Listing unapproved branch campuses below does not constitute reporting them to SACSCOC. A prospectus for an unapproved branch campuses should be submitted immediately to SACSCOC.

<table>
<thead>
<tr>
<th>Name of Branch Campus</th>
<th>Physical Address</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs (specific degrees, certificates, diplomas) with 50% or more credits hours offered at the branch campus</th>
<th>Is the campus currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
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</thead>
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<tr>
<td>Texas A&amp;M University at Galveston</td>
<td>200 Seawolf Pkwy Galveston, TX 77553</td>
<td>1992</td>
<td>1991</td>
<td>INTERDISCIPLINARY ENGINEERING BS</td>
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<td>CONTINUING EDUCATION BS</td>
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<td>MEDICAL SCIENCES BS</td>
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<td>MARINE ENGINEERING TECHNOLOGY BS</td>
<td>MARINE TRANSPORTATION BS</td>
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<td>MARITIME ADMINISTRATION BS</td>
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<td>MARINE RESOURCES MANAGEMENT MMR</td>
<td>MARITIME ADMINISTRATION &amp; LOGISTICS MML</td>
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</tbody>
</table>
### 4. Distance and Correspondence Education

Provide an initial date of approval for your institution to offer distance education. Provide a list of credit-bearing educational programs (degrees, certificates, and diplomas) where 50% or more of the credit hours are delivered through distance education modes. For each educational program, indicate whether the program is delivered using synchronous or asynchronous technology, or both. For each educational program that uses distance education technology to deliver the program at a specific site (e.g., a synchronous program using interactive videoconferencing), indicate the program offered at each location where students receive the transmitted program. Please limit this description to one page, if possible.

<table>
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<tr>
<th>Credit Bearing Degree Programs</th>
<th>Synchronous, Asynchronous, or Both</th>
<th>Site</th>
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<tr>
<td>Advance International Affairs</td>
<td>CERT-G</td>
<td>Asynchronous</td>
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<td>Aerospace Engineering</td>
<td>MENG R</td>
<td>Asynchronous</td>
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<tr>
<td>Agricultural Development</td>
<td>MAGR</td>
<td>Asynchronous</td>
</tr>
<tr>
<td>Agricultural Education</td>
<td>EDD</td>
<td>Asynchronous</td>
</tr>
<tr>
<td>Agricultural Systems Management</td>
<td>MS</td>
<td>Asynchronous</td>
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*Major dependent certificates

5. Accreditation

(1) List all agencies that currently accredit the institution and any of its programs and indicate the date of the last review by each.

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<th>Accrediting Agency</th>
<th>Program</th>
<th>Last Reviewed</th>
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<tr>
<td>Accreditation Council for Pharmacy Education</td>
<td>Irma Lerma Rangel College of Pharmacy</td>
<td>April 2014</td>
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<tr>
<td>American Bar Association</td>
<td>Texas A&amp;M University School of Law</td>
<td>October 2016</td>
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<td>American Chemical Society</td>
<td>Chemistry</td>
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<td>American Council for Construction Education</td>
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<td>American Council for Construction Education</td>
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<tr>
<td>American Society of Agricultural and Biological Engineers</td>
<td>Agricultural Systems Management</td>
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<tr>
<td>American Veterinary Medical Association Council on Education</td>
<td>Veterinary Medicine</td>
<td>December 2015</td>
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<td>Association to Advance Collegiate Schools of Business</td>
<td>The business baccalaureate, master’s, and doctoral programs in Mays Business School</td>
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<td>Didactic Program in Dietetics</td>
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<td>Athletic Training</td>
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<td>• Endodontics</td>
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<td>• Oral Maxillofacial Pathology</td>
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<td>• Orthodontics &amp; Dentofacial Orthopedics</td>
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<td>• Nuclear Engineering</td>
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<td>• Ocean Engineering</td>
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<td>• Petroleum Engineering</td>
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<td>• Radiological Health Engineering</td>
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| Galveston Undergraduate Programs in:                     | • Marine Engineering Technology          | October 2013 |

| Forensic Science Education Programs Accreditation Commission (FEPAC) | Forensics & Investigative Sciences Program | September 2016 |

| Institute of Food Technologists                           | Food Science & Technology                 | December 2016 |

| Landscape Architectural Accreditation Board               | Bachelor – Landscape Architecture         | February 2015 |
|                                                         | Master – Landscape Architecture           | September 2017 |

| Liaison Committee on Medical Education                   | Medical Education Degree Program          | August 2012   |

| National Architectural Accrediting Board                  | Architecture                              | March 2017    |

| Network of Schools of Public Policy, Affairs, and Administration | The Master of Public Service and Administration degree in the Bush School of Government and Public Service | April 2014   |

| National Recreation and Park Association                  | Recreation, Park and Tourism Sciences     | January 2016  |

| Planning Accreditation Board                              | Urban and Regional Planning               | March 2013    |

| Society for Range Management                             | Rangeland Ecology and Management          | April 2017    |

| Society of American Foresters                             | Forestry                                 | March 2013    |

| Texas Education Agency                                     | Programs in professional education       | March 2011    |

(2) If SACS Commission on Colleges is not your primary accreditor for access to USDOE Title IV funding, identify which accrediting agency serves that purpose.

Not applicable.

(3) List any USDOE-recognized agency (national and programmatic) that has terminated the institution’s accreditation (include the date, reason, and copy of the letter of termination) or list any agency from which the institution has voluntarily withdrawn (include copy of letter to agency from institution).

1. COMMISSION ON ENGLISH LANGUAGE PROGRAM ACCREDITATION (CEA) – The English Language Institute at Texas A&M University voluntarily withdrew from CEA. The English Language Institute was accredited in good standing through August, 2018, at the time of the voluntary withdrawal (with no history of adverse action). The university made the decision to close the English Language Institute as an administrative unit on May 31, 2017. Please see attached correspondence.
(4) Describe any sanctions applied or negative actions taken by any USDOE-recognized accrediting agency (national, programmatic, SACSCOC) during the two years previous to the submission of this report. Include a copy of the letter from the USDOE-recognized agency to the institution.

None.

6. **Relationship to the U.S. Department of Education**

Indicate any limitations, suspensions, or termination by the U.S. Department of Education in regard to student financial aid or other financial aid programs during the previous three years. Report if on reimbursement or any other exceptional status in regard to federal or state financial aid.

None.
2019 SACSCOC Financial Profile and Indicators

Institution Name Address: Texas A&M University, College Station, TX

Thank you for completing the 2019 Financial Profile and Indicators:

The Profile was submitted by Michael T. Stephenson on 7/8/2019 and approved by Michael K. Young on 7/12/2019.

**FINAL SUBMISSION**

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