Agenda SNRE Retreat

9 am to 3 pm on Thursday 5 May 2016

Marriott University Park, Canyon Rooms A & B

9:00 to 9:30  Welcome, Objectives and State of the School address – accomplishments of the year - Stu

9:30 to 10:00  APR – Our opportunity – John Koprowski

10:00 to 11:00  SWOT analysis – Group discussion

11:00 to 12:00  Presentation of SWOT results – Group presentations

12:00 to 12:45  Lunch

12:45 to 1:30  Curriculum Committee Results and Discussion – Steve Smith

1:30 to 1:45  Current position plan and state of requests – Stu

1:45 – 3:00  Discussion – Do we need to adjust? Professors of Practice, Newly Identified Opportunities, etc.
Our Morning Agenda

• What is the APR? (15 min)
• Key components of the APR (15 min)
• Individual SWOT (15 min)
• Group SWOT (60 min – 4 x 15 min)
  – Strengths
  – Weaknesses
  – Opportunities
  – Threats
• Group presentation of results (45 min)

Our Charge

SERIAL VICE PROVOST FOR ACADEMIC AFFAIRS

ACADEMIC PROGRAM REVIEW

Arizona Board of Regents Policy 2-208: Academic Program Review

The purpose of academic program review is to examine, assess, and strengthen programs.

The areas in which program quality are evaluated include, but are not limited to:
  • quality of educational programs, including an assessment of student outcomes,
  • quality of research, creative activity, or scholarly work,
  • quality of outreach activities and service to the University, the profession, and the community,
  • contribution or importance of the program to other campus programs, and
  • potential and future expectations for the program.

The review is intended to enhance the quality of a program and to assist in determining a program’s ability to respond to future challenges and opportunities to evaluate strengths and weaknesses, and thus, determine future priorities; and to aid in shaping the program’s development plan.

Our Purpose

• The official purpose of academic program review is to examine, assess, and strengthen programs.

• To present a coherent message to the Dean and others in administration

• To have important external review to assist with that message

• To set the stage for external SNRE Director search – view this document as our initial communication

THE SELF-STUDY

As the basis for the entire review process, the self-study helps a program assess its past and present efforts and chart a realistic course for the future.

Self-Study Summary – We are scheduled for Spring 17

• History and goals
• Overview of academic quality
• Faculty (research/scholarship, teaching, and outreach)
• Administration
• Resources
• Undergraduate and graduate, including student learning outcomes assessment
• Academic outreach
• Collaborative efforts
• Planning for the Future
### OVERVIEW OF THE APR PROCESS

<table>
<thead>
<tr>
<th>Initial Planning</th>
<th>Self-Study</th>
<th>Joint Internal/External Review</th>
<th>Discussion of Findings</th>
<th>ABOR Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Affairs Reps available to help</td>
<td>Faculty in unit responsible for preparation</td>
<td>2 individuals for each position</td>
<td>Meeting with unit head, dean, Provost, &amp; Senior Vice Provost (and Sr. Vice President for Health Affairs, as appropriate)</td>
<td>Summary reviews sent to ABOR</td>
</tr>
<tr>
<td>BLOCK POSSIBLE DATES ON PROVOST and DEAN CALENDARS ASAP</td>
<td></td>
<td>Vice Provost approves committee membership and sends letters of invitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site visit itinerary</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Written report (sent to Senior Vice Provost)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INTERNAL/EXTERNAL REVIEW TEAM

**PURPOSE:** To review the self-study, assess quality, and make specific recommendations for improvement

- **COMMITTEE COMPOSITION:**
  - external members provide a national context (minimum 3)
  - internal members provide UA context (minimum 2)
  - community member provide local context (one)
  - alumnus (one)

- **TIME FRAME:**
  - discuss list of nominees with the dean
  - block time on calendars (Dean, Provost, and Sr. Vice Provost) after clearing dates with all potential (14) review committee members
  - site visit no later than April 15, with report submitted by the end of the semester
INTERNAL/EXTERNAL REVIEW TEAM

THE PROCESS

• Internal/External Review Team reviews self-study prior to visit
• Participate in the on-site interviews with faculty, staff, students, and administrators (department heads of other departments in college)
• Gathers additional data as needed
• Prepares evaluation, including specific recommendations
• Meets with Provost and Sr. Vice Provost (& Sr. Vice President for Health Sciences) at conclusion of visit
• Submits report to the Senior Vice Provost within three weeks of the visit

DISCUSSION OF FINDINGS

Final conference with Provost, Sr. Vice Provost, Dean, and Unit Head

• Unit head may submit a two page response concerning the APR Report to the Senior Vice Provost prior to the meeting
• Discuss review team recommendations and the unit’s plans for the implementation of recommendations
• Identify objectives designed to be achieved over the next several years
• Findings and agreed upon action plan will be summarized in in the report to ABOR
Department Quintile Analysis

The realities...

How professors spend their time:

- How they actually spend their time:
  - Teaching: 59%
  - Research: 18%
  - Service: 23%

- How departments expect them to spend their time:
  - Research: 25%

- How professors would like to spend their time:
  - “Service” 20%
Importance of leadership

External Perception

“Reality”

Our Perception

Strength       Weakness

Confirmed Strength       Hidden Strength

Blind Spot       Confirmed Weakness

Importance of leadership

External Perception

Our Perception

Strength       Weakness

Confirmed Strength       Opportunity

Opportunity       Opportunity
School of Natural Resources and the Environment
2016 Annual Review – Instruction-1

• 24% Increase in Faculty generated SCH since 2012
• UA-Online BS in Geographic Information Science Technology
• Developing 5 New Undergraduate Certificates
• Faculty Losses – Impacts
  • Ed DeSteiguer: resulting in loss of RNR 485/585
  • Bill Shaw: co-taught >600 SCH general education RNR 160D1
  • Bill Matter: WFSC 455/555R & Lab - Fisheries Management
  • Russ Monson: RNR 430 and RNR 448/548 Required Dave Moore to start co-teaching this course with R. Gallery
• Compelling New Faculty Needs
  • Human Dimensions of Natural Resource Management/Governance
  • Surface Water and Ecohydrology – Land Surface Modeling/Remote Sensing – Ecosystem/Wildlife Genomics
School of Natural Resources and the Environment
2016 Annual Review – Instruction-2

- 17 Research Experiences – 60 Internships – 7 Experiential
- MS Water, Society & Policy numbers increasing
- No longer directly involved in the Masters in Development Practice
- Difficult to maintain graduate numbers because of external funding challenges and shift to Post-Docs
- Need for significant increase in GTA support from CALS - now operating at an average yearly deficit of approximately $10K
- Need for greater GTS support from CALS due to increased tuition costs
- Nevertheless, still maintaining leadership in CALS graduate numbers
# School of Natural Resources and the Environment
## 2016 Annual Review – Research-1

<table>
<thead>
<tr>
<th>CALS Category</th>
<th>Metric</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>State Funded Research FTE</td>
<td>15.64</td>
<td>13.59</td>
<td>13.16</td>
<td>13.96</td>
<td>11.94</td>
</tr>
<tr>
<td>2a</td>
<td>Research FTE</td>
<td>No data</td>
<td>$3,196,693</td>
<td>$3,101,627</td>
<td>$3,485,364</td>
<td>$2,779,751</td>
</tr>
<tr>
<td></td>
<td>Salary+ Start-Up + Other Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2b</td>
<td>Unit Research Expenditures</td>
<td>$7,535,488</td>
<td>$7,110,765</td>
<td>$6,267,750</td>
<td>$5,895,025</td>
<td>$5,463,220</td>
</tr>
<tr>
<td>3a</td>
<td>Proposals submitted</td>
<td>163</td>
<td>149</td>
<td>129</td>
<td>120</td>
<td>110</td>
</tr>
<tr>
<td>3b</td>
<td>Proposals/Research Faculty FTE</td>
<td>10.42</td>
<td>10.96</td>
<td>9.80</td>
<td>8.61</td>
<td>9.21</td>
</tr>
<tr>
<td>4a</td>
<td># of peer-reviewed publications</td>
<td>54</td>
<td>87</td>
<td>86</td>
<td>102</td>
<td>74</td>
</tr>
<tr>
<td>4b</td>
<td># of peer-reviewed publications/Research Faculty FTE</td>
<td>3.45</td>
<td>6.40</td>
<td>6.54</td>
<td>7.31</td>
<td>6.20</td>
</tr>
<tr>
<td>CALS Category</td>
<td>Metric</td>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>State Funded Research FTE</td>
<td>11.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a</td>
<td>Total # of Citations for SNRE</td>
<td>2636</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b</td>
<td># of peer-reviewed citations/Research Faculty FTE</td>
<td>220.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
## School of Natural Resources and the Environment
### 2016 Annual Review – Research-3

<table>
<thead>
<tr>
<th>Metric</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALS Table Amount Total</td>
<td>$12,021,744</td>
</tr>
<tr>
<td>CALS Table Amount Direct</td>
<td>$2,913,819</td>
</tr>
<tr>
<td>SNRE Actual Total</td>
<td>$6,239,424</td>
</tr>
<tr>
<td>SNRE Actual Direct</td>
<td>$4,752,406</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CALS Support to Unit</th>
<th>Change 2012-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agric &amp; Biosystems Engr</td>
<td>101.8%</td>
</tr>
<tr>
<td>Agric &amp; Resource Econ</td>
<td>104.7%</td>
</tr>
<tr>
<td>Agricultural Education</td>
<td>66.0%</td>
</tr>
<tr>
<td>Animal &amp; Biomedical Sciences</td>
<td>94.7%</td>
</tr>
<tr>
<td>Entomology</td>
<td>117.4%</td>
</tr>
<tr>
<td>Nutritional Sciences</td>
<td>70.0%</td>
</tr>
<tr>
<td>Sch of Family &amp; Consumer Sciences</td>
<td>96.7%</td>
</tr>
<tr>
<td>Sch of Natural Resources</td>
<td><strong>87.0%</strong></td>
</tr>
<tr>
<td>School of Plant Sciences</td>
<td>112.3%</td>
</tr>
<tr>
<td>Soil Water and Enviro Sci</td>
<td>106.0%</td>
</tr>
</tbody>
</table>
The 13% Decline in CALS “state” support for SNRE, school demographics, and a 24% decline in research FTE since 2012 represent significant challenges for CALS and SNRE.

These realities along with the increased competition and scarcity of federal, state, and private research dollars have resulted in the decline in MTDC in recent years. However, our best and brightest faculty have risen to these challenges and shown remarkable resilience and productivity yielding $6.2M in new grants in 2015. It is also important to note that this is an increase of 23% ($1.4M) over last year while at the same time our research FTE declined by 17%.

Natural resource research and management is changing rapidly in the face of dramatic threats to our environment. The work SNRE has done and must continue to do is critical to our land grant mission and the economy of our state. The critical nature of these societal needs emphasizes the importance of innovative approaches and we believe SNRE must be given priority in the recruitment of new CALS faculty. We have clearly demonstrated that we can produce if given the resources we need.
The University of Arizona’s CE programs in SNRE seek to: 1) extend relevant science-based knowledge pertaining to Arizona’s natural resources in an understandable and usable form, 2) encourage the application of this knowledge to solve natural resource problems on both public and private lands, and 3) bring issues and concerns of Arizonans back to the university. Arizona’s SNRE CE programs provide value to people who directly participate in CE programs, but also benefit the general public who are not direct program participants. This is because all Arizonans reap the benefits of research-based land management practices that are applicable across millions of acres of public and private lands.

**Economic Impacts**

- **Northern Arizona Ranching Allotment Case Study**
  - $604,278 in local sales
  - $281,804 in state GDP
  - $148,859 in labor income
  - 5.1 jobs

- **Post Wallow Fire Ranching Recovery Case Study**
  - Total Rancher Benefits $477,000 to 2,061,000

- **Economic Impacts to Arizona Generated by SNRE Federal Research and Extension Grants** - $6,600,000 (118 jobs)
School of Natural Resources and the Environment
2016 Annual Review
Business Affairs

• CALS Audit Successfully Completed – Developed and Implemented Revised Procedures
• Retirement of Business Manager Senior – Search Committee Formed and Search is in Progress (Currently 21 applicants)
• Resignation of Senior Accountant for Promotion to Business Manager College of Engineering
School of Natural Resources and the Environment
2016 Annual Review
Critical Concerns

• The need for new faculty lines so that SNRE has a chance to be competitive for research dollars and attracting new students
• At least 2 impending critical faculty retention cases
• 2 impending critical faculty retirements
• Our horrific diversity profile and its impact on our students
• Our upcoming APR - faculty morale and their perceptions of the college and UA administration
• Successional Planning
## Performance with Instruction Investments & Returns

<table>
<thead>
<tr>
<th>Unit</th>
<th>SCH Undergraduate</th>
<th>SCH Graduate</th>
<th>SCH Total</th>
<th>Majors Undergraduate</th>
<th>Majors Graduate</th>
<th>Majors Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenue</td>
<td>$1,361,131</td>
<td>$123,941</td>
<td>$1,485,072</td>
<td>$60,148</td>
<td>$70,713</td>
<td>$130,861</td>
</tr>
<tr>
<td>Te of Agric &amp; Biosysm Engr</td>
<td>$456,050</td>
<td>$71,389</td>
<td>$527,439</td>
<td>$485,106</td>
<td>$170,889</td>
<td>$655,995</td>
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<tr>
<td>$882,717</td>
<td>$30,970</td>
<td>$913,686</td>
<td>$227,516</td>
<td>$54,999</td>
<td>$282,515</td>
<td></td>
</tr>
<tr>
<td>Animal &amp; Biomedical Sciences</td>
<td>$3,318,964</td>
<td>$102,181</td>
<td>$3,421,145</td>
<td>$2,035,877</td>
<td>$168,925</td>
<td>$2,204,802</td>
</tr>
<tr>
<td>$405,915</td>
<td>$66,573</td>
<td>$472,488</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Nutritional Sciences</td>
<td>$2,555,485</td>
<td>$64,066</td>
<td>$2,619,551</td>
<td>$1,567,769</td>
<td>$100,844</td>
<td>$1,668,614</td>
</tr>
<tr>
<td>Sch of Family &amp; Consum Sci</td>
<td>$3,982,697</td>
<td>$143,699</td>
<td>$4,126,396</td>
<td>$2,294,775</td>
<td>$229,816</td>
<td>$2,524,591</td>
</tr>
<tr>
<td>Scholar of Natural Resources</td>
<td>$1,313,869</td>
<td>$326,797</td>
<td>$1,640,666</td>
<td>$355,657</td>
<td>$647,218</td>
<td>$1,002,875</td>
</tr>
<tr>
<td>School of Plant Sciences</td>
<td>$2,261,035</td>
<td>$161,811</td>
<td>$2,422,846</td>
<td>$153,639</td>
<td>$219,995</td>
<td>$373,634</td>
</tr>
<tr>
<td>Soil Water and Enviro Sci</td>
<td>$1,144,438</td>
<td>$207,425</td>
<td>$1,351,863</td>
<td>$519,757</td>
<td>$405,687</td>
<td>$921,444</td>
</tr>
<tr>
<td>Total</td>
<td>$17,682,300</td>
<td>$1,298,851</td>
<td>$18,981,152</td>
<td>$7,700,245</td>
<td>$2,065,086</td>
<td>$9,765,331</td>
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<tr>
<td>Average</td>
<td>$1,768,230</td>
<td>$129,885</td>
<td>$1,898,115</td>
<td>$770,025</td>
<td>$206,509</td>
<td>$976,533</td>
</tr>
<tr>
<td>Median</td>
<td>$1,337,500</td>
<td>$113,061</td>
<td>$1,562,869</td>
<td>$420,382</td>
<td>$169,907</td>
<td>$788,720</td>
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</table>

## Performance on Research Investments and MTDC Returns

<table>
<thead>
<tr>
<th>Unit</th>
<th>Total Investments (and Costs)</th>
<th>MTDC Return Less Investments with AES Splits</th>
<th>% of MTDC Return</th>
<th>% of Total Investments</th>
<th>Proportional Research ROI Ratio (MTDC Form)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agric &amp; Biosystem Engr</td>
<td>$1,992,030</td>
<td>($1,071,017)</td>
<td>04.8%</td>
<td>07.1%</td>
<td>0.68</td>
</tr>
<tr>
<td>Agric &amp; Resource Econ</td>
<td>$1,304,096</td>
<td>($1,036,657)</td>
<td>01.4%</td>
<td>04.6%</td>
<td>0.30</td>
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<tr>
<td>Agricultural Education</td>
<td>$312,459</td>
<td>$362,770</td>
<td>03.5%</td>
<td>01.1%</td>
<td>3.19</td>
</tr>
<tr>
<td>Animal &amp; Biomedical Sciences</td>
<td>$4,642,824</td>
<td>($2,538,978)</td>
<td>11.0%</td>
<td>16.5%</td>
<td>0.67</td>
</tr>
<tr>
<td>Entomology</td>
<td>$2,715,878</td>
<td>($1,156,317)</td>
<td>08.2%</td>
<td>09.6%</td>
<td>0.85</td>
</tr>
<tr>
<td>Nutritional Sciences</td>
<td>$1,260,769</td>
<td>($305,837)</td>
<td>05.0%</td>
<td>04.5%</td>
<td>1.12</td>
</tr>
<tr>
<td>Sch of Family &amp; Consum Sci</td>
<td>$1,130,897</td>
<td>($155,340)</td>
<td>05.1%</td>
<td>04.0%</td>
<td>1.28</td>
</tr>
<tr>
<td>Sch of Natural Resources</td>
<td>$3,943,450</td>
<td>$33,526</td>
<td>20.8%</td>
<td>14.0%</td>
<td>1.49</td>
</tr>
<tr>
<td>School of Plant Sciences</td>
<td>$5,815,314</td>
<td>($2,014,058)</td>
<td>19.9%</td>
<td>20.6%</td>
<td>0.97</td>
</tr>
<tr>
<td>Soil Water &amp; Enviro Sci</td>
<td>$5,103,673</td>
<td>($1,246,767)</td>
<td>20.2%</td>
<td>18.1%</td>
<td>1.12</td>
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<tr>
<td>Total</td>
<td>$28,221,391</td>
<td>($9,128,674)</td>
<td>100.0%</td>
<td>100.0%</td>
<td>N/A</td>
</tr>
<tr>
<td>Average</td>
<td>$2,822,139</td>
<td>($912,867)</td>
<td>10.0%</td>
<td>10.0%</td>
<td>1.17</td>
</tr>
<tr>
<td>Median</td>
<td>$2,353,954</td>
<td>($1,053,837)</td>
<td>06.6%</td>
<td>08.3%</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Reference: FY 2015 Research ROI average was 1.41, and the median was 0.96.
Recommendations related to the core curriculum from the SNRE Curriculum Committee, Spring 2016

Process:

The Committee began evaluation of the core curriculum in its first meeting in the Fall Semester 2015. We initially gathered course outcomes and learning objectives from the core course instructors. Using this, we developed a survey that was administered to the faculty at the end of the semester. Fifteen faculty responded to the survey (Survey Monkey Results-Core Curriculum-Jan2016.xls). During the Spring Semester 2016 we met with each of the instructors and discussed their approach, objectives, and the challenges they confront in their course(s). We then collaborated to generate the materials presented here.

Summary of observations and recommendations:

1. The core curriculum meets most of the outcomes that faculty believe it should. Extensive re-organization of the core curriculum itself, or its courses, does not seem justified or practical.
2. We do not have a good understanding of the extent to which learning objectives in our core courses are being met. Various surveys may help us meet this need.
3. A lead instructor for RNR 384 will be needed after Spring 2017.
4. Additional coverage of remote sensing and spatial analysis should be included within the core curriculum. We suggest a faculty working group address this.
5. Additional coverage of the human dimensions of natural resource use and management should be included within the core curriculum. We suggest a faculty working group address this.
6. Many students do not take core courses in a “natural sequence.” We present a core course sequence with foundational, intermediate, and advanced courses and urge advisors to guide students along this sequence if possible.
7. Additional offerings of RNR 200 may yield many benefits to our students and recruit additional students to the major.
8. Offering RNR 316 online or in the spring or summer (or both) could improve articulation for majors and increase the number of students enrolling in the course.
9. Enrollment limits in RNR 321 may be slowing degree completion and complicating articulation among SNRE courses. We recommend dedicating the resources needed to increase the size of this course.
10. More active learning approaches are needed in our core courses.

Detailed observations and recommendations:

1. **The current core curriculum meets most of the outcomes that faculty believe it should.** Given our faculty composition and culture,
extensive mandated re-organization of the core curriculum itself, or its courses, does not seem justified or practical.

As expected, the quality and content of the core curriculum is a direct reflection of the faculty who are dedicated to teaching its courses. The instructors teaching these courses are very experienced. These faculty members have established strong personal and professional connections with these courses. The current instructors’ technical and pedagogical expertise is uncommon among our faculty and replacing them with other members of our current faculty would be generally difficult.

It is also important to recognize that there are limited incentives for faculty to increase course size, to engage in significant course revision, or new course development. This is especially true for more senior faculty who might be best prepared to teach core courses. It may be effective to directly reward faculty for growing or improving core courses. Funding to support instruction (GTA or grader positions) or support for research or other scholarship could incentivize these changes. Growth (increased SCH and perhaps majors) through audience extension would seem most likely to succeed in RNR 200 and RNR 316.

2. We do not have a good understanding of the extent to which learning objectives in our core courses are being met.

Pre- and post-course assessments for individual core courses could be used to measure learning and be useful in making course changes. Assessment should also be done across the curriculum. One option may be to modify our Core Curriculum Survey for incorporation within a graduating senior survey. We could also develop a comparable “entrance survey” for students as they begin in the Natural Resources major.

3. A lead instructor for RNR 384 will be needed after Spring 2017.

A replacement instructor should be identified for this course as soon as possible. Even though it is an upper-division course, and is intermediate in its content relationships with other core courses (see below), RNR 384 does unfortunately serve as one of five “gateway” courses for the major—RNR 150C1 (RNR 101), RNR 160D1, RNR 200, and RNR 230R are the others. Of these courses, RNR 384 is the only one of offered in-person during the spring semester. The new lead instructor should also be encouraged to begin redesign of this course perhaps using the foundation that exists in the current version of the course (and see Points 4 and 5 below). With this transition there exists a significant (and rare) opportunity to completely redesign this course. This could involve integration/overlap of content from RNR 384 with a senior capstone course (RNR 498, 1-3 units) and perhaps a new field experience course, which could be incorporated within the capstone experience. RNR 384 is the only one of the six core courses that involves significant co-teaching. Seven faculty members are involved in this course in 2016.
4. **Additional coverage of remote sensing and spatial analysis should be included within the core curriculum.**

Numerous faculty have expressed that the core curriculum does not adequately include this subject matter area. An entirely new 2- or 3-unit core course dealing with this topic is one option. Another, more practical option would be to incorporate core content as a component in RNR 384 or perhaps in RNR 321. A third, less favorable alternative, would be to include a course such as GEOG 330, RNR 403, RNR 483, or RNR 417 (3-unit courses) as part of the core curriculum. Following the first and third of these options may necessitate adjustment of major requirements to meet the 120-unit maximum. We suggest that a remote sensing and spatial analysis faculty working group (Guertin, Mannan, Steidl, van Leeuwen) be formed with the goal of establishing critical content for the core curriculum in this area. They would then work with the Curriculum Committee and Director to incorporate this into our student’s experience using whatever means the group determines. Ideally, the results of this group’s work could be complete early in the fall semester 2016.

5. **Additional coverage of the human dimensions of natural resource use and management should be included within the core curriculum.**

This subject area can involve many topics including governance, socioeconomic, social psychology, decision making, stakeholder engagement and negotiation, politics, human dimensions research techniques, environmental anthropology, communication, environmental ethics, collaborative planning, and conflict resolution. Currently there is some coverage of this content in RNR 150C1/101, RNR 200, and a module in RNR 480 that deals with collaboration in natural resources policy development. In RNR 384, there is coverage of ecosystem stewardship (four lectures by Dave Moore), and outdoor recreation (four lectures by Randy Gimblett). Scott Bonar also teaches WFSC 595A (Biopolitics: Communication and public relations skills, 2 units) every other spring semester. His book (*The conservation professional’s guide to working with people*) figures prominently in the course. This course contains many of the key human dimensions elements. Scott is in the process of redefining this course to make it a 400/500 offering. Hopefully this version of the course will be offered in Spring 2017. Scott also guest lectures on this topic in RAM 487/587 (Rangeland Management Plan).

Increasing human dimensions coverage could be achieved through a variety of means. The revised version of WFSC 595A (RNR 495A/595A) may accomplish this for many students as an elective course or as part of the core curriculum. Another option would be an entirely new 2- or 3-unit core course (e.g., “Social aspects of Natural Resource Management”), although this would require an instructor. Both of these approaches may require adjustment of major requirements to meet the 120-unit maximum. Another option would be to incorporate human dimensions elements into existing core courses. Among the most likely places for this content would be in RNR 480, 384, and 200. A final option would be to require students to take an existing course that includes some
element(s) of human dimensions and the environment. (Again, this would necessitate adjusting other major requirements.) Possibilities may include:

- AIS (RNR) 441A (Natural Resource Management in Native Communities)
- AREC 373 (Environmental Economics)
- GEOG 404 (Politics of Nature)
- PHIL 323 (Environmental Ethics)

We suggest that a human dimensions faculty working group (Archer, Bonar, Gimblett, López-Hoffman, Moore) be formed with the goal of establishing critical content for the core curriculum and then working with the Curriculum Committee and Director to incorporate this into our student’s experience using whatever means the group determines. Ideally, the results of this group’s work could be complete early in the fall semester 2016.

6. **Many students do not take core courses in a “natural sequence.”**

Based on content and input from instructors of core courses, an ideal order for taking the core courses may be as described in the table below:

<table>
<thead>
<tr>
<th>Foundational</th>
<th>Intermediate 1</th>
<th>Intermediate 2</th>
<th>Advanced 1</th>
<th>Advanced 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>316</td>
<td>384</td>
<td>321</td>
<td>480</td>
</tr>
<tr>
<td>230R/L</td>
<td>316</td>
<td>384</td>
<td>321</td>
<td>480</td>
</tr>
</tbody>
</table>

Colors:

- **Fall**
- **Spring**
- **R: Fall & Spring; L: Fall**

Advisors should be informed of this order and be urged to guide students through the curriculum with this in mind. Unfortunately, in the last three offerings of RNR 200 (2013-2015), which is probably the ideal foundational course for the major, 54-79% of the Natural Resources students in the course were Juniors or Seniors. Offering foundational courses such as RNR 200 in multiple semesters (including summer sessions) may help students to take courses in a more natural sequence (and perhaps generate additional income to the School). Achieving this should improve overall learning, especially in advanced courses. Offering courses online may permit multiple offering options. Once online course development is complete, the instructor’s workload may be reduced with an online course and this may permit increased course size without increased expenditure of faculty time.

7. **Additional offerings and revision of RNR 200 may yield many benefits to our students and recruit additional students to the Natural Resources major.**

In the last three offerings of the foundational course RNR 200 (2015, 2014, and 2013), the number of students enrolled (N=63, 68, and 60) has exceeded (or met) the room capacity (N=58, 57, and 60). In these offerings, 18-30% of students in
this course were also not Natural Resources majors. These facts suggest significant demand that we may not be satisfying and the potential for recruiting new majors. Increasing the size of this course in the fall semester is a simple solution. Increasing instructional support above the most recent 5 hours/week of student (grader) support is also justified. Additional offering times could also significantly improve contact with undeclared ("searching") lower-division students, improve articulation for majors, and increase SCH. The most efficient method of increasing offerings would be to offer the course on-line. Redesigning the course as a Tier 2 General Education Course could also increase contact with undeclared students.

8. Offering RNR 316 online or in the spring or summer (or both) could improve articulation for majors and increase the number of students enrolling in the course.

Over its last three offerings (2013–2015), more than 42% of the students in each offering of RNR 316 were not Natural Resources majors. This is the highest non-major proportion among the core courses over this period. Most of these students were upper-division Environmental Sciences or Environmental and Water Resource Economics majors. ECOL 302 (Ecology) is a comparable course that is also taught in the fall semester. Offering RNR 316 in the spring semester or in summer session—either in person or online—could draw some of these students. This may also help Natural Resources students as it provides a logical second course immediately after RNR 200 or RNR 230L, which are now taught only in the fall semester.

9. Enrollment limits in RNR 321 may be slowing degree completion and complicating articulation among SNRE courses.

We believe that course size should be increased to at least 60 students in RNR 321 (N=47 in 2016 and 43 in 2015). This will involve offering two lab sections and require increased support for grading and instructor assistance. We recommend dedicating whatever resources are needed to increase the size of this course.

10. More active learning approaches are needed in our core courses.

All core courses include active engagement pedagogies to some degree. The goal in such learning is to engage students in a variety of activities (reading, retrieval, discussion, writing, reflection, problem solving) to promote analysis, evaluation, and synthesis of course content. Problem-based learning and cooperative learning, and case studies would seem particularly well suited to many core courses. The redesign of RNR 480 (2016) includes many of these approaches. Faculty involved in other core courses should be encouraged to gain an understanding of these teaching methods and to incorporate these into their courses. “Teaching update” presentations during faculty meetings can be used to inform the faculty regarding methods being used by colleagues. Supporting the use of professional course designers may be a worthwhile use of School resources to improve pedagogy in core courses. Again, a key challenge is to incentivize course improvements of this sort, especially for senior faculty.
Results of Group SWOT Analysis

**Strengths**

- New Building
- Our UA Analytics ‘Flower’ – we are productive and match up well with peers
- Collegiality
- Interdisciplinary

- Research – global recognition, reputation, productivity
- Strong applied research & extension/outreach component (land grant mission)
- Relevance of SNRE mission to increasingly important issues – local, regional, global
- Critical specialties in climate change, arid lands, GIS
- Geographic position & strength – local, regional position
- Quality of students – especially in terms of engagement
- SNRE leadership and administrative support
- Quality of life/work environment (ENR2, Tucson)
- Collegiality, collaboration
- Strong partnerships w/land management agencies and other collaborators

- Collegial
- Real-life link betw/science and management (land grant mission)
- Productive, multidisciplinary group with momentum (backed by our UA Analytics flower diagram)

- Collegiality among faculty
- Opportunity for collaboration and connection to IE
- New building
- Quality of our students
- Importance of what we do
- Strong faculty in research/teaching/extension
Weaknesses

- Lack of faculty diversity – gender, race, age, international
- Diffuse identity – student perception that “SNRE = EEB or SWES light”
- Physical separation of wet labs (BSE vs. ENR2)
- On-line visibility to students (i.e. marketing SNRE)
- Lack of communication among SNRE programs
- Lack of social science, law, policy
- Weak integration and interdisciplinary work
- Emphasis on SE Arizona, limited international/global perspective

- Faculty diversity
- RA/TA Support
- Red tape – time wasted
- Applied statistics
- Structural barriers in the curriculum

- Physical space – no wet labs, office space limitations
- Diminishing resources – state/college support
- Limited TA support
- Insufficient investment in instruction
- No capstone or summer field course development
- Not realizing development potential
- Lack of diversity
- The world is changing and we are not – especially in higher education trends

Blind Spots – “Uncomfortable Realities”

- Maybe not as great a reputation in all areas as we tell ourselves
- Struggle to attract top tier students relative to other departments and universities
- Overspecialized in some areas, gaps in others
**Opportunities**

- Claim larger part of the “Environment” “Arid lands” and “Socially relevant ecological research”
- Wide variety of expertise….Large scale prospects, Cluster hires

  - Summer on-line courses/training
  - Multidisciplinary teams
  - Advisory board
  - Build on global reputation to meet growing management needs
  - Engagement of alumni
  - Global teaching, research and recruitment
  - Visibility in media about research applied to real-world problems
  - Using applied science to secure non-traditional funding

  - International programs – education, research, leadership & the arid lands brand
  - On-line & blended offerings
  - Broaden audience – Undergraduates, majors, SCH … need to understand market

  - On-line courses
  - International market (other arid land countries)
  - Development of additional tier 1 and 2 courses
  - Try to integrate with campus-wide initiatives to get good lab space (One Health, etc.)
  - Look for more collaborations with international groups
  - Pull cluster hire candidates into SNRE
  - Leveraging vet school recruitment
  - Highlight broader impacts of our grad students (e.g. outreach, teaching, STEM, mentoring)
  - Tie NPS to One Health program
  - Potential to integrate with NRULP

**Hidden Strengths**

- Grad student diversity
- Good reputation of university (even if not Ivy League)
- Adapting to changeable university priorities
- Entrepreneurial (GIS certificate on line)
- Diverse interests make us a natural place for new faculty
**Threats**

- Loss/decrease in extramural funding
- Less emphasis on mission/science vs. $
- Lower standing within CALS
- Collaborating outside rather than within
- RCM/ERE/indirect cost issues
- Societal changes not recognized by faculty
- Declining resources, increased competition
- State budget cuts
- Admin beyond SNRE
- Conservative views about the curriculum
- Limited coherence re: vision for future
- Low diversity vortex
- Economic impacts of climate change in Arizona
- Lack of support from CALS, UA, State of Arizona and the Public!
- Retention
- Morale
- Increased competition
- Multiple units want to own “Environment” – exacerbated by our ‘low profile’
- RCM over-recognizing undergraduates and undervaluing graduate students
- Vet School if resource allocation is imbalanced
- Insufficient investment in NPC and One Health in regard to SNRE
- State legislature, governor, etc.
SNRE Updated Hiring Plan – Retreat Results May 2016

2015-2016

1.0 FTE Assistant Professor Riparian Aquatic Systems Ecology* - Started 1/4/16

2016-2017

1.0 FTE Assistant Professor Environmental Remote Sensing and Ecosystem Modeling – Starts 8/15/16 (Cluster Hire)
1.0 FTE Assistant Professor of Molecular Ecology Soil Microbes and Genomics – Starts 1/2/17 (Cluster Hire)

1.0 FTE Assistant Professor Human Dimensions Natural Resources Decisions*  CALS REQUEST
1.0 FTE Assistant Professor Water in Arid Systems**  CALS REQUEST
1.0 FTE Assistant Professor Wildlife Conservation Genomics**  CALS REQUEST

1.0 FTE Assistant Professor Terrestrial Ecosystem Modeling**
1.0 FTE Assistant Professor Bio and Eco Statistics**
1.0 FTE Professor of Practice - TBD

2017-2018

1.0 FTE Professor of Practice - TBD
1.0 FTE Assistant Professor Wildlife Conservation and Human Health*
1.0 FTE Assistant Professor NPC Chemical Biologist-Cellular Biology***
1.0 FTE Assistant Professor Landscape Scale Restoration Ecology**
1.0 FTE Assistant Range Management Extension Specialist*

2018-2019

1.0 FTE Assistant Professor Environmental/Ecosystem Informatics – “Smart Data”***
1.0 FTE Assistant Professor Human Dimensions and Collaborative Processes*
1.0 FTE Assistant Professor NPC Bio-prospector and Genomics***
1.0 FTE Assistant Professor Watershed and Ecohydrology***

2019-2020

1.0 FTE Assistant Professor GIS and Watershed Modeling**
1.0 FTE Assistant Professor Conservation Biology*
1.0 FTE Assistant Professor Grazing Ecology and Management

2020-2021

1.0 FTE Assistant Professor Bio-Invasions Ecology*
1.0 FTE Assistant Professor NPC - Medicinal Chemist - Chemical Biology**
1.0 FTE Assistant Professor Microbial Ecology***
2021-2022

1.0 FTE Assistant Professor Ecosystems and Human Adaptation**
1.0 FTE Assistant Professor Environmental Remote Sensing*

2022-2023

1.0 FTE Assistant Professor Natural Resources Economics*
1.0 FTE Assistant Professor Geospatial Modeling**
1.0 FTE Assistant Professor Plant Physio-Ecology***
1.0 FTE Assistant Professor Fish and Wildlife Disease**

Estimated Start-Up:
*= $250,000
**= $500,000
***= $750,000